

**BRITISH COLUMBIA
MINISTRY OF FORESTS**

Boundary Timber Supply Area

**Rationale for
Allowable Annual Cut (AAC)
Determination**

effective March 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 the Boundary Timber Supply Area (TSA). The document will also identify where new or better information is required for incorporation in future determinations.

Description of the Timber Supply Area

The Boundary TSA lies in the southern interior of the province, at the western edge of the Nelson Forest Region. The TSA is administered from the Boundary Forest District Office in Grand Forks, and its boundaries coincide with those of the forest district, excluding Tree Farm Licence (TFL) 8. The TSA forms a rough triangle, stretching from a base along the U.S. border in the south to the bottom end of the Vernon Forest District in the north. To the west it is bounded by the Okanagan Highland Range of the Monashee Mountains and the Penticton Forest District. Its eastern boundary abuts the Christina Range and the Arrow Forest District.

In total, the TSA covers 580 110 hectares, over 73 percent, or 425 070 hectares, of which is Crown productive forest. Not all of the productive forest is suitable for timber management due to environmental sensitivity, limited accessibility, and non-merchantability; thus, the area currently available for timber management—the “timber harvesting land base”—is 311 321 hectares, approximately 54 percent of the total TSA area.

Ecological conditions are highly variable within the TSA. In the Northern Okanagan Highland areas, Interior Douglas-fir types occupy low elevation areas, with Montane Spruce, followed by Engelmann Spruce-Subalpine Fir occurring in higher elevation areas. In the Selkirk Foothills of the eastern portions of the TSA, the Interior Cedar-Hemlock zone occupies the lower elevations with Engelmann Spruce-Subalpine Fir at higher elevations, and, on a few high ridges, Alpine Tundra zones. The narrow strip of the Southern Okanagan Highlands is characterized by Bunchgrass, Ponderosa Pine, Interior Douglas-fir and Montane Spruce biogeoclimatic zones at higher elevations.

The forests in the Boundary TSA are diverse, particularly in the Selkirk Foothills. The dominant tree species by area in the timber harvesting land base are lodgepole pine (41 percent), western larch (22 percent), Douglas-fir (20 percent) and spruce/balsam (16 percent). Cedar, hemlock and ponderosa pine also occur in small amounts.

The age distribution of stands in the Boundary TSA reflects the fire history in the area. Just over half of the timber harvesting land base is covered with forests between 40 and 100 years of age, with nearly 30 percent of all forests in the 61- to 80-year age range and few old-growth forests over 250 years.

With just 10 850 residents, the Boundary Forest District is relatively sparsely populated. The largest municipality is Grand Forks, which currently has a population of just over 3 900. Other communities include the villages of Greenwood and Midway and several unincorporated communities.

There are no First Nations reserves or communities in the TSA. However, based on documentation and archaeological evidence, First Nations have lived and travelled in this area extensively in the past. A First Nations community in the Okanagan has identified traditional territory over a major portion of the TSA.

Historically, the economy of the Boundary area has been dependent on forestry, agriculture and mining. In the Grand Forks-Greenwood area, for instance, a 1992 study estimated that forestry accounted for 35 percent of basic income. The two major sawmills in the TSA are operated by one company at Grand Forks and Midway. There are several smaller mills within the TSA. Diversification of the local economy in recent years includes a growing service sector, increasing tourism activity, and retirement housing.

History of the AAC

In 1981 the AAC was determined at 700 000 cubic metres per year. This level remained in effect until 1993 when a temporary three-year uplift of 200 000 cubic metres per year was authorized for the harvesting of stands infested or threatened by mountain pine beetle attack. Harvesting of this additional timber was administered through temporary licences under the Small Business Forest Enterprise Program. At the end of 1993, surveys indicated the mountain pine beetle populations had dramatically declined, and all of the infested or threatened forests had been harvested. No further temporary licences were offered after 1993 and the uplift expired at the end of 1995.

The AAC is currently apportioned by the Minister of Forests as follows:

	cubic metres	% of AAC
Forest Licences (2)	502 493	71.8
Small Business Forest Enterprise Program	179 555	25.6
Woodlot Licences	10 900	1.6
Forest Service Reserve	7 052	1.0
Total = current AAC	700 000	100

New AAC determination

Effective March 1, 1996, the new AAC for the Boundary TSA will be 700 000 cubic metres. This will remain in effect until a new AAC is determined, which must take place within five years of this determination.

Information sources used in the AAC determination

Information considered in determining the AAC for the Boundary TSA includes the following:

- Boundary Forest District Development Plans: 1994-98 and 1995-99 for Forest Licence A18969, Forest Licence A18970 and the Small Business Forest Enterprise Program;
- Boundary Forest District letter to Pope and Talbot Ltd.: 1994-98 Forest Licence A18969 5- year Development Plan approval, December 1994;
- *Boundary TSA Socio-Economic Analysis*, British Columbia Forest Service (BCFS), Resource System Management International, December 1994;
- *Boundary TSA Summary of Public Input*, BCFS, March 1995;
- *Boundary TSA Timber Supply Analysis*, BCFS, November 1994;
- *Boundary TSA: Timber Supply Area Timber Supply Review Discussion Paper*, BCFS, January 1995;
- Critique of Boundary Timber Supply Area Socio-Economic Analysis, Interior Lumber Manufacturers' Association, January 1995;
- Development Plan Guidelines (Draft), Nelson Forest Region, October 1993;
- FS 5799 Development Plans, BCFS, May 1993;
- *Goatskin Local Resource Use Plan*, Goatskin LRUP Planning Team, Boundary Forest District, February 1994;
- *Harvesting Guidelines to Meet Visual Quality Objectives* (Standard Operating Procedures), Nelson Forest Region, Revised to May 1994;
- Integrated Silviculture Information System (ISIS), current Boundary Forest District records;
- *Italy-Sutherland Watershed Plan*, Italy-Sutherland Planning Team, Boundary Forest District, July 1993;
- *Interim Harvesting Guidelines/Assessment Criteria for Operation Plans for the Boundary Forest District*, British Columbia Ministry of Environment, Lands and Parks (MELP), March 1994;
- Letter from Pope and Talbot to Boundary District Manager regarding riparian zone management, June 1994;
- Letter from MELP to Boundary District Manager regarding riparian zone management, June 1994;
- Letter from the Minister of Forests, dated July 28, 1994, stating the Crown's economic and social objectives;

- *Logging Guidelines for Wildlife Habitat Classes*, MELP, Fish and Wildlife Branch, Kootenay Region, 1989;
- *Nelson Forest Region Armillaria Standard Operating Procedures*, Nelson Forest Region, 1993;
- *Review of Boundary TSA Timber Supply Area*, Sterling Wood Group Inc., March 1995, (the "licensees' review");
- *Southern Interior Watershed Assessment Procedure (Draft)*, BCFS, September 1993;
- *Standards for Forest Licence Guidelines*, BCFS, October 1993;
- Summary of 5-year Development Plan meeting held on January 18, 1995, BCFS;
- Technical review and evaluation of current operating conditions through comprehensive discussions with Forest Service staff, including a meeting in the Boundary Forest District on May 2 and 3, 1995, with a helicopter tour of part of the TSA;
- *Visual Landscape Management Objectives For Visually Sensitive Areas Within Provincial Forests (Draft)*, BCFS, December 1993;
- *Watershed Harvesting Guidelines (Proposed)*, Nelson Forest Region, March 1991;
- *West Kootenay-Boundary Land-Use Plan*, Government of British Columbia, March 1995;
- Forest inventory planning file updated to December 1989, BCFS;
- Terrain Resource Information Management (TRIM) data files, BCFS, 1992;
- Survey Intensity Level (SIL) 3 terrain surveys for parts of the Arrow TSA, BCFS, 1985-1992;
- Major Licensee Silviculture Information System (MLSIS) records, BCFS, 1993;
- Timber Harvesting Database - Billed Volumes, BCFS Timber Harvesting Branch, 1984-1993;
- Licensee cut control letters, BCFS, 1984-1993;
- Licensee mill capacity data, BCFS Arrow Forest District survey of mills, 1995.

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 the Boundary TSA. 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 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 when making forest management decisions 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 the Boundary TSA, I have considered the known limitations of the technical information provided and I am satisfied that this information provides a sound basis for my determination.

Statutory framework

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

Guiding principles for AAC determinations

Rapid changes in social values and in our understanding and management of complex forest ecosystems mean that there is always some uncertainty in the information used in AAC determinations. Two important ways of dealing with uncertainty are (i) minimizing risk, 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) this principle 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 the 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 which 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 of British Columbia Act*.

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 BCFS timber supply analyses were conducted. Accordingly, these 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 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. Preliminary studies in selected TSAs 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 the BCFS timber supply analyses that pre-date the Code as is the case in the Boundary TSA. 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.

Moreover, even where government has made land-use decisions—such as the March 1995 West Kootenay-Boundary Land-Use Plan (WKBLUP)—it may not always be possible to analyze their 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. Although the government has announced a land use plan for the Kootenay-Boundary area, the actual impact of these decisions is not yet evident. Nonetheless, for this determination, I have accepted certain commitments in the WKBLUP as statements of the Crown's social and economic objectives for the region and for the TSA.

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 timber supply analysis of the Boundary TSA 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 are 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 British Columbia Court of Appeal regarding aboriginal rights. The AAC I determine for a TSA 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 TSA and that it is 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 each TSA 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 (FSSIM), 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 which 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, which 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 recommendations. Rather, it is one possible forecast of timber supply, 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 projections 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 produced.

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 an 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 the Boundary TSA, the base case projected an initial harvest level of 700 000 cubic metres per year, equal to the current AAC. The base case projection maintained the harvest level of 700 000 cubic metres for eight decades, followed by a decline of 10 percent per decade for two decades until the long-term harvest level of 560 000 cubic metres is reached in the tenth decade.

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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 harvesting

- general comments

The total area of the Boundary TSA is 580 110 hectares. The area that is considered available for timber harvesting (the "timber harvesting land base") in the BCFS timber supply analysis is 311 321 hectares. Reductions were made to account for factors such as non-commercial cover, environmentally sensitive areas, inoperable areas, specific area exclusions, non-merchantable timber types and existing non-productive roads, trails and landings.

- economic and physical operability

In the BCFS analysis, approximately 45 000 hectares were deducted from the productive forest area due to inoperability. An industry submission cites a comparison conducted by Pope and Talbot Ltd. which claims that the BCFS analysis underestimated the timber harvesting land base by approximately 14 percent. The comparison results were derived from a limited review of BCFS operability lines on six mapsheets and estimates from Pope and Talbot's operability lines.

At the time of my determination of the AAC for this TSA, district staff had not formally evaluated the review conducted by Pope and Talbot Ltd., as it was submitted immediately prior to my meeting with the district. However, district staff had completed an earlier, more comprehensive operability study of the entire TSA performed by Pope and Talbot Ltd. which was, for the most part, consistent with the operability mapping used in the BCFS analysis.

In the BCFS analysis, only areas harvestable using conventional (ground-based) and cable harvesting systems were considered as part of the timber harvesting land base. Some areas currently not part of the timber harvesting land base may be suitable for helicopter logging, particularly where minimum site disturbance is necessary or in visually sensitive areas such as highway corridors.

A small amount of helicopter logging has been done in the TSA; however, until helicopter logging is more commonly demonstrated, it would be speculative to consider an increase in the availability of timber or the size of the timber harvesting land base at this time.

I acknowledge that the timber harvesting land base may in the future include areas that are currently inoperable due to of future changes in technology and in marketability. As a result, future timber supplies may be higher than projected in the BCFS analysis. I will consider these changes in future determinations if timber harvesting is consistently occurring on areas currently deemed as inoperable.

Total resource plans are being prepared in the district for areas where slope stability and erosion are a concern. These plans will assist in clarifying operability concerns for portions of the TSA. Based on the information presented to me, and on my helicopter overview of the Boundary TSA, I consider the operability assumptions used in the BCFS analysis to be appropriate for the purposes of this determination.

- roads, trails and landings

To account for existing losses to roads, trails and landings that have not been captured in the forest inventory data files, the BCFS analysis assumed a loss of 5 percent of the timber harvesting land base in areas occupied by forests younger than 60 years of age. To account for future losses of productive forest land to roads, trails and landings, the BCFS analysis assumed a loss of 4.5 percent of the timber harvesting land base in areas occupied by forests currently older than 60 years of age.

Subsequent to the completion of the BCFS analysis, a site disturbance survey of 19 cutblocks showed that approximately 6 percent of the productive forest land base within cutblocks has been lost to roads, trails and landings. Based on these findings, district staff are of the opinion that the amount of area deducted for roads, trails and landings has been underestimated, and, as a result, the timber harvesting land base is slightly smaller than indicated in the BCFS analysis.

Although the survey does indicate some underestimation in the BCFS analysis for areas lost to existing roads, trails and landings, there is insufficient sampling to substantiate an adjustment to the base case. In any case, a BCFS sensitivity analysis of changes to the timber harvesting land base indicates that even with a 20 percent decrease, there is no impact on the initial harvest level for 3 decades. Therefore, no significant short-term timber supply impacts are expected, and I have made no adjustment on this account in my determination.

- problem forest types, deciduous forest types and low productivity sites

In the BCFS analysis, approximately 21 000 hectares of problem forest types, deciduous forest types, and low productivity sites were deducted from the productive forest land base because timber from these areas is not currently considered to be merchantable. After reviewing the information I am satisfied that the deductions for these forest types in the BCFS analysis are appropriate for this determination.

- environmentally sensitive areas

In the BCFS analysis, approximately 43 000 hectares designated as environmentally sensitive areas (ESAs) were deducted from the productive forest land base. These areas are currently unavailable for harvesting mainly due to slope instability or difficulties with regeneration. Slope stability and terrain analysis studies are currently being initiated in the Boundary TSA, and a more accurate assessment of ESAs will be available once these studies are completed. For this determination, based on the inventory and planning information presented to me, I am satisfied that the reductions applied in the BCFS analysis are appropriate for use in this determination.

Existing forest inventory

- general comments

The most recent forest inventory for the Boundary TSA was conducted in 1988 and was updated to October 1993 for the BCFS analysis. The forest inventory update accounts for any changes that occurred between 1988 and 1993 due to logging, fire history, and forest growth. While this was the best information that was available when the analysis was conducted, it does not reflect the two years of harvesting that have occurred since 1993. Therefore, in considering the harvest forecasts in the BCFS analysis, I am mindful that harvesting in the TSA has already advanced into the first decade of the harvest forecast.

- age class structure

The age distribution of the forests in the Boundary TSA is uneven. For example, only approximately 2 percent of the timber harvesting land base is occupied by stands between the ages of 21 and 40 years, whereas approximately 42 percent of stands on the timber harvesting land base are between the ages of 61 and 100 years. Nevertheless, the BCFS analysis indicates that the current age class structure in the TSA does not limit timber availability. I am therefore satisfied that the age class structure is not a limiting factor in the determination of the AAC for this TSA. However, the mature and near-mature timber harvesting must be distributed with appropriate harvest levels over time until second-growth stands become available.

- *volume estimates for existing stands*

The BCFS analysis used the Variable Density Yield Prediction (VDYP) growth and yield model to predict volumes estimates for existing stands. VDYP is based on information gathered from a large number of sample plots, and is generally accepted in British Columbia for predicting volumes in existing stands. Therefore, as a general rule in making AAC determinations, in the absence of statistically valid contradictory evidence for a particular area, I rely on VDYP estimates for existing stand volumes.

The district staff and local forest industry submissions question the accuracy of the volumes estimates predicted for the Boundary TSA. This concern was identified as a critical factor in the *Boundary Timber Supply Area Timber Supply Review Discussion Paper*.

District staff submit that the existing stand volumes in this TSA may be *overestimated*. An informal study of cruised volumes from a limited sample of eight cutting permits in the TSA indicated that, in these cases, VDYP overestimated volumes by an average of approximately 10 percent. District staff acknowledge this is not a statistically valid sample. However, the BCFS timber supply forecast is highly sensitive to uncertainty about estimates of timber volumes in existing stands. A BCFS sensitivity analysis indicates that if existing stand volumes are 10 percent lower than estimated in the base case, the projected initial harvest level can be maintained for only one decade. Nonetheless, the very small sample size does not provide statistically reliable evidence that existing mature volumes are overestimated.

In contrast, the local forest industry submits that VDYP *underestimates* mature volumes in existing stands by 14 percent from scale records for seven cutting permits. A BCFS sensitivity analysis shows that if existing stand volumes are underestimated by 10 percent, then the projected initial harvest level can be maintained for 14 decades. The industry comparison is based on cutting permits where approximately 75 percent of the timber is lodgepole pine. Therefore, it is inappropriate to extrapolate this comparison to the entire TSA, where only 41 percent of the timber is lodgepole pine. Again, I am not convinced that existing stand volumes are underestimated given the lack of statistical rigour in this comparison.

Given the high sensitivity of the harvest forecast to decreases in volume estimates for existing stands, this issue warrants study for the next determination. A volume-ratio sampling study is scheduled to be initiated for the Boundary TSA in 1996 and results are expected to be available before the end of 1996. The study results may help to assess the validity of the volumes for existing stands which could lead to further work on forest inventory and volume estimates. Any conclusive evidence of changes to projected inventory volumes will be considered in a future determination.

For this determination, I have not seen adequate evidence to cause me to conclude that existing stand volume estimates have been over- or underestimated. At present, I believe the existing stand volumes as projected using VDYP in the BCFS analysis represent the best available information for the purposes of this determination.

Expected rate of growth

- site productivity estimates

Site indexes, determined from the ages and heights of trees are used to estimate the productivity (growth potential) of tree-growing sites. I am aware that questions are often raised as to whether or not site indexes determined from both young stands (less than 30 years), and old forests (over 150 years) accurately reflect potential site productivity in timber supply analyses.

Two local forest licensees commissioned Sterling Wood Group Inc. to complete a review of the BCFS analysis. The licensees' review maintains that site indexes have been underestimated in the Boundary TSA because the height growth of many stands has been suppressed due to excessive stocking density. Based on studies conducted in the United States, eastern Canada, and within British Columbia, the licensees' review estimates that the long-term harvest level could be increased by 20 percent or more over the harvest level projected in the BCFS base case. This view was supported by information provided in another forest industry submission.

I accept that it is possible that site indexes may be underestimated in the Boundary TSA, particularly for lodgepole pine and spruce forests. However, only limited studies of lodgepole pine forests have been completed to date; thus, I am not convinced that the specific results of these studies can be broadly applied to lodgepole pine forests in the Boundary TSA. Therefore, while I acknowledge that site indexes may be underestimated, currently available information is not adequate for an accurate adjustment to site indexes for the Boundary TSA.

A provincial paired-plot survey, which is examining this issue, is expected to provide the statistically sound information required to assess site indexes in particular areas, including the Boundary TSA.

The questions raised about this factor provide some optimism that the long-term timber supply level may be higher than shown in the BCFS analysis, as discussed under "Reasons for decision"; however, it cannot be viewed as a quantifiable upward pressure on short-term harvest levels. I am satisfied that the site indexes used in the BCFS analysis represent the best available information for use in this determination.

- volume estimates for regenerated stands

Estimates of volumes for regenerated stands were projected for the BCFS timber supply analysis using the Table Interpolation Program for Stand Yields (TIPSY), which was designed for use with managed stands. TIPSY is generally accepted in British Columbia as the appropriate model for these types of stands.

However, as discussed above (*- site productivity estimates*), if site indexes have been underestimated, then regenerated stand volumes could be higher than indicated in the BCFS analysis. A BCFS sensitivity analysis shows that if regenerated stand volumes are increased by 20 percent, then the projected initial harvest level can be maintained for eight decades as in the base case forecast with only a slight drop below the long-term level for three decades before rising to the estimated long-term harvest level, approximately 20 percent higher than the base case.

In summary, I have no compelling evidence to indicate that regenerated stand volumes were estimated inaccurately in the BCFS analysis, and I consider these estimates to be the most reliable for this determination.

- minimum harvestable ages

Minimum harvestable age is the estimated average time required for trees to reach specified harvestable sizes. In the BCFS analysis, minimum harvestable ages were assumed to be between 60 and 120 years based on the expected time required for trees to reach minimum volume and diameter requirements. The BCFS analysis indicates the timber supply is not highly sensitivity to an increase or decrease in minimum harvestable ages. District staff confirm that the minimum harvestable ages used are reasonable extrapolations of current practices in the TSA, and I accept them as appropriate for use in this determination.

- dense pine stands

Dense pine stands were defined in the BCFS analysis to include dense, small-diameter lodgepole pine stands between the ages of 41 and 80 years with an average height of less than 19.4 metres. All of the dense pine stands located on good and medium productivity sites, and half of the dense pine stands on poor productivity sites, were included in the timber harvesting land base. In total, approximately 61 000 hectares of dense pine stands were included in the timber harvesting land base in the BCFS analysis.

Some of the timber within these stands is smaller than the minimum utilization standards (scaled as grade 6 timber). Therefore, when this timber is harvested it is not included in the scaled volumes that are charged to the AAC. This is commonly practiced and is currently accepted through AAC administration.

However, an inconsistency arises because the dense pine stands are often harvested before they reach the minimum harvestable age assumed in the BCFS analysis. This is due to management objectives which are set for the harvesting of stands with mountain pine beetle infestations, commercial thinning or other conditions which prompt harvesting before the minimum harvestable ages used in the BCFS analysis are reached.

A BCFS sensitivity analysis provides some indication of the potential timber supply implications of the uncertainty regarding the volume contributions from dense pine stands. If the area of dense pine stands included in the timber harvesting land base is decreased by 50 percent, the projected initial harvest level can be maintained for 4 decades before declining to a slightly lower long-term harvest level. This sensitivity analysis suggests that even if half the dense pine stands never reach the minimum harvestable age, or remain below mandatory utilization standards, the short-term timber supply still remains relatively stable.

The actual impact of this issue has not been accurately assessed, since the area of dense pine stands that have been harvested below the minimum harvestable age or below mandatory utilization standards has not been quantified at this time. I have discussed the establishment of an AAC partition for volume contributions from dense pine stands with district staff. Based on this discussion, and considering the current uncertainty about this issue, I have determined that a partitioned AAC is not appropriate at this time. I expect further detailed study of the contributions and the site conditions of dense pine stands to be completed before the next determination to better clarify the areas to be included in the timber harvesting land base.

I note that, despite the above uncertainty, these areas do present an opportunity to increase future timber supplies since many of these dense pine stands are currently immature. District staff indicate that these immature stands could reach a harvestable size earlier than indicated in the BCFS analysis if a thinning program were implemented. In addition, if site productivity proves to have been underestimated, (see above - *site productivity estimates*), then the long-term timber supply benefit of thinning or reforestation and managing these stands may be potentially very high. However, until this opportunity has been evaluated further and planned changes put into effect, the outcome remains speculative and as such I cannot take it into consideration in this determination.

Thus, the development of a management strategy for treating dense pine stands should be a priority in this TSA, and I expect this matter to receive careful, thorough review prior to the next determination for this TSA. Any future review of these stands should evaluate merchantability, appropriate utilization standards, and appropriate minimum harvestable ages, leading to clarification of the areas which should be included in the timber harvesting land base. As well, policy requirements to ensure consistency between cut control administration and the AAC determination should be evaluated. Finally, there should be an assessment of

the potential to implement a thinning or rehabilitation program to increase the contribution of dense pine stands to the timber supply. Any revised information will then be considered in the next determination for this TSA.

Given the stability of the timber supply forecast and the lack of conclusive evaluation of the potential contribution from dense pine stands under current or future management, and in consideration of the sensitivity analysis, I accept the modelling of these stands in the base case as a reasonable reflection of current management and acceptable for use in this determination.

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

Regeneration delay

Regeneration delay is the period of time between harvesting and the date when the harvested area is occupied by a specified minimum number of acceptable well-spaced trees. The regeneration delays assumed in the BCFS analysis range from three to five years and were based on silvicultural records for areas harvested over the past eleven years.

District staff indicate there have been isolated regeneration problems caused by extreme environmental conditions on some high elevation sites and some dry, grassy sites, as well as by cattle damage, and by plantation pests such as black army cutworm and *Rhizina* root disease. Notwithstanding these isolated, and infrequent events, no ongoing or large scale impediments to prompt regeneration have been identified at this time.

Since the completion of the BCFS analysis, a greater proportion of the areas harvested in the TSA are being planted, resulting in regeneration delays of two to three years. Consequently, regeneration delays assumed in the BCFS analysis may be overestimated for some areas. However, this factor has little impact on short-term timber supplies as district staff indicate the area affected is relatively small. In future timber supply analyses, if the trend continues, shortened regeneration delays may have an upward influence on the timber supplies projected in the base case due to effects on green-up and minimum harvestable ages. I have considered the regeneration delays used in the BCFS analysis as satisfactory for this determination.

Not-satisfactorily-restocked areas

In the BCFS analysis, 17 171 hectares of the timber harvesting land base were considered as current and backlog not-satisfactorily-restocked (NSR) area in the Boundary TSA. BCFS staff indicate that 96 percent of the current NSR will be restocked within the regeneration delay period, as discussed above. The remaining 4 percent (approximately 500 hectares) of the current NSR areas are projected to take up to 20 years to restock. All the backlog NSR areas are scheduled to be restocked within the next 10 years. This was taken into account in the BCFS analysis and I am satisfied that NSR has been properly reflected in the base case forecast of the BCFS analysis.

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

Silvicultural systems

In the BCFS analysis, the uneven-aged management zone covers approximately 23 percent of the timber harvesting land base, and includes areas where single-tree selection and group-selection systems are used. This is consistent with the amount of area currently being harvested in the Boundary TSA using these systems. The BCFS analysis assumed a percentage of trees are left standing to provide forest cover at all times. Although this approach to modelling uneven-age management is appropriate for this determination, I encourage BCFS staff to evaluate alternative analytical approaches to assess the timber supply implications of uneven-age silvicultural systems and mixed species management.

The balance of the timber harvesting land is managed for even-aged stands using clearcut harvesting systems. Alternatives to clearcutting—such as seed tree and partial cutting systems—are used to promote reforestation of dry-belt Douglas-fir forests and to meet integrated resource management objectives.

Approximately 1 790 hectares of the timber harvesting land base are harvested per year using the seed-tree system, where it is estimated that approximately 7 cubic metres per hectare of mature timber remain on a cutblock after harvesting to provide a seed source for natural regeneration. District staff indicate that approximately two-thirds of these seed trees are removed once the area is regenerated. The remaining one-third (approximately 3 789 cubic metres per year) is retained to provide diversity in stand structure to meet integrated resource management objectives. In the BCFS analysis, it was assumed that 3 500 cubic metres per year would be retained. I am satisfied that the estimate used in the BCFS analysis adequately approximates current practice in the TSA and this factor does not have a significant impact on the projected initial harvest level in the BCFS analysis.

District staff indicate the use of alternative silvicultural systems will likely increase in the future. This could increase timber availability in areas where conventional

clearcut harvesting is limited due to forest cover requirements for integrated resource values such as visual quality. Conversely, this practice may decrease estimated timber supplies from specific sites compared to clearcut harvesting. Any increase in the use of alternative silvicultural systems will be incorporated into future analyses. For the purposes of this determination, I am satisfied that the BCFS analysis base case adequately reflects the timber supply implications of the current application of non-clearcut harvesting systems in this area. Accordingly, I have not made an adjustment for this factor in this determination.

Incremental silviculture

Incremental silviculture activities in the Boundary TSA include juvenile spacing, pruning, and fertilization. Most current research indicates that while spacing and pruning improve the quality of timber within a forest stand, they have little effect on the actual volume of timber produced, in most cases. A small amount of fertilization has been carried out in the TSA and could result in some increases in stand volumes, and reduced time until stands reach a greened-up condition. However, given the small scale of this activity and hence the minimal impact on timber supply, I have not considered any influence from fertilization on timber supplies in this determination.

Commercial thinning and intermediate harvesting practices

In the *Boundary Timber Supply Area Timber Supply Review Discussion Paper* commercial thinning was identified as a factor which could provide an opportunity to potentially offset future reductions in timber supply.

Currently, approximately 17 percent of the annual volume harvested through the Small Business Forest Enterprise Program in the Boundary TSA is harvested using commercial thinning and intermediate harvesting practices (strip cutting and small patch clearcutting). District staff indicate there is an opportunity to expand the use of these practices because road access and terrain are favourable, and many stands are of a suitable age for these practices to be effective and economically viable.

Documented research indicates that single-entry commercial thinning and intermediate harvesting practices will not significantly increase long-term timber supplies, though they may increase the value of the future final harvest. Therefore these harvesting practices are viewed as opportunities to influence timber supply constraints that arise from age-class gaps by moving the harvesting of some volume forward from the planned harvest forecast. In this way, these harvesting practices can make timber available at different points in time such that projected disruptions in timber supply can be minimized. As the BCFS analysis does not indicate limitations from the existing age-class structure, I do not consider this factor to have an impact on the projected initial harvest level in the BCFS analysis base case.

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

Utilization standards and compliance

In the BCFS analysis, utilization standards were assumed to be 17.5 centimetres diameter at breast height—except for pine, which must be harvested down to a 12.5-centimetre diameter—and a 30-centimetre stump height and 10-centimetre top diameter for all species.

Some licensees are currently making use of smaller dimension (see above - *dense pine stands*) and lower-quality timber than is required by mandatory utilization standards. District staff estimate that, on average, 63 000 cubic metres of this type of timber have been harvested annually over the past 5 years. Because much of this volume is not considered as part of mandatory utilization standards, it is currently not charged to the AAC. Also, as indicated above, it is not clear how much of the timber harvesting land base will provide opportunities for utilizing timber higher than the current utilization standards.

I note that in some cases the current level of utilization is higher than assumed in the BCFS analysis. This suggests an opportunity to increase the timber supply through changes in utilization standards, as discussed in "Reasons for decision". However, it is unclear how much of the timber harvesting land base has forests which provide opportunities for improved utilization. Also, the impacts on biodiversity, and the administration of this type of harvesting remain uncertain. Accordingly, at this time I have not considered utilization to any standard higher than assumed in the BCFS analysis.

Decay, waste and breakage

The standard provincial factors for decay, waste and breakage were used in the BCFS analysis. I am not aware of any evidence to suggest inaccuracies in these factors, so I accept them as suitable for use in this determination.

The licensees' review of the BCFS analysis indicates volume losses due to root rot were deducted twice in the BCFS analysis—first in the decay, waste and breakage factors and secondly through unsalvaged losses. This issue is discussed below in Unsalvaged losses.

- (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 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 the timber supply must be considered in AAC determinations.

- green-up and adjacency requirements

In order to protect forest resources such as wildlife, water quality and aesthetics, current harvesting practices limit the size and shape of cutblocks, and forest cover objectives prescribe the "green-up" (forest growth) conditions that must occur on a reforested site before timber on adjacent cutblocks can be harvested. This provides for a distribution of harvested areas and retained forest cover across the landscape. Cutblock adjacency guidelines are commonly expressed in terms of the number of harvesting entries, or "passes," required to harvest the entire area of the timber harvesting land base.

In the BCFS analysis, harvesting in the integrated resource management (IRM) zone, which includes approximately 52 percent of the timber harvesting land base, was modelled assuming a three-pass harvesting regime. Total chance plans for portions of the TSA indicate that harvesting in this zone currently takes place over four passes in many cases. A sensitivity analysis of the impact of harvesting with four passes shows the initial harvest level projected in the base case can still be maintained for six decades. This indicates to me that, even if harvesting in the IRM zone takes place over four passes, it will not affect short-term harvest levels. Nonetheless, before the next determination I expect clarification of whether a three- or four-pass harvesting regime is required in the IRM zone.

In the BCFS analysis, it was assumed that the green-up height was three metres in the IRM zone. District staff indicate that although the three-metre green-up in the IRM zone is reflective of current practice, this requirement may increase in the future, particularly in community watersheds. District staff are concerned that to meet water management objectives, regenerating stands may be required to be nine metres tall before adjacent areas can be harvested. The licensees' review of the BCFS analysis indicates that the five-metre green-up requirement applied in the community watershed zone is appropriate and suggests that a 9-metre green-up requirement is not necessary.

While I recognize the adjacency requirements may be somewhat more constraining than those used in the BCFS analysis, sensitivity analysis shows that increasing adjacency requirements will not affect short-term timber supply. In the long term, these increased constraints may decrease timber supply, and I have acknowledged this in "Reasons for decision".

- community watersheds

In the BCFS analysis, watershed management practices were accounted for in the community watershed zone. The forest cover requirements applied to this zone in the BCFS analysis were based on the requirements outlined in the *Italy-Sutherland Watershed Management Plan* within the TSA.

Since the BCFS analysis was completed, more constraining watershed requirements have been adopted in the TSA than were modelled in the BCFS analysis within the watershed zone. Therefore, the BCFS analysis base case does not fully reflect the impact of watershed management on the timber supply. The timber supply impact of this change in management has not been quantified at this time. However, district staff indicate that the new practice will exert a downward influence on the medium- and long-term timber supply and reduce the amount of time that the projected initial harvest level can be maintained.

District staff have identified an additional concern with respect to watershed management. Some watersheds in the TSA, such as Hellroarer Creek, have been extensively harvested in recent years to control mountain pine beetle infestations. A recent watershed assessment conducted for the Hellroarer Creek watershed indicated no further harvesting could take place until the previously harvested areas have been reforested and the new forests had grown to meet the green-up requirements for the area. Thus, even though there may be a large volume of harvestable timber in watersheds such as Hellroarer Creek, the timber may not currently be available for harvesting. This factor may limit timber availability somewhat in some areas, although I do not consider it to have an impact on short-term timber supply for the TSA as a whole given the relatively small size of the community watershed zone.

If more limiting guidelines are implemented in the TSA, they will be accounted for in future timber supply analyses. However, district staff indicate that the new practice will not affect timber availability in the short term. I am therefore satisfied that the BCFS analysis, which adequately accounts for watershed requirements, is suitable for use in this determination.

- visually sensitive areas

Forest resources managed by the BCFS include recreation resources. "Recreation resource" is defined in the *Forest Practices Code of British Columbia Act* to include "scenic or wilderness features or settings that have recreational significance

or value". In order to manage scenic features, visual landscape foresters in British Columbia, in collaboration with specialists in other parts of the world, have developed procedures for identifying and managing visually sensitive areas. These procedures incorporate both biophysical and social factors—including visual sensitivity ratings based on topography, slope and other biophysical factors, and social factors such as numbers of viewers and their perceptions—and provide recommended visual quality objectives (VQOs) for visually sensitive areas. These objectives limit the amount of visible disturbance that is acceptable in such areas.

In the Boundary TSA, a small portion of the timber harvesting land base (approximately 2.5 percent) is currently managed specifically to achieve VQOs. District staff indicate that the assumptions included in the BCFS analysis are reflective of current practices in these areas.

District staff advise me that new plans for visual quality objectives are being developed for the TSA which may limit timber harvesting to an extent greater than accounted for in the BCFS analysis. However, these plans are incomplete at this time, and, furthermore, it is unclear as to what extent any new requirements will overlap with constraints arising from other management objectives in the TSA. If new plans are developed and approved, they will be considered in a future AAC determination. For this determination I am satisfied that VQOs have been adequately accounted for in the BCFS analysis.

- riparian habitat

In the BCFS analysis, which was complete prior to the implementation of the Forest Practices Code, riparian habitat management requirements were not fully accounted for. Under the Code, to manage riparian habitat, reserves are required adjacent to some streams and lake shores and harvesting is limited to specified intensities with riparian management areas.

Since the BCFS analysis was completed, some estimates of the area affected by these practices have been completed. Based on a study of riparian habitat areas conducted on behalf of the West Kootenay-Boundary C.O.R.E. table, approximately 0.5 percent (1 500 hectares) of the timber harvesting land base in the Boundary TSA is affected by practices to protect riparian habitat. However, because mapping and classification have not been completed for the TSA, this estimate does not take into account fisheries habitat in the western half of the TSA. District staff indicate to me that overall, protection of riparian habitat will result in a reduction of 1 percent of the timber harvesting land base (3000 hectares).

The licensees' review of the BCFS analysis suggests that protection of riparian habitat would require a deduction of 500 to 600 hectares from the timber harvesting land base.

I have examined the information presented in the licensees' review, the information presented to me by district staff, and similar information for comparable TSAs, including preliminary impact assessments of the Forest Practices Code requirements. My evaluation of this information leads me to conclude that a riparian habitat reduction of at least 1 percent of the timber harvesting land base is necessary to reflect management of riparian habitat areas. My consideration of this factor in this AAC determination is outlined in "Reasons for decision" below.

- deer winter range

In the BCFS analysis, a nine-metre green-up requirement was applied in the wildlife corridor and winter range zone to reflect the need to maintain adequate thermal and hiding cover in these areas. District staff indicate this requirement is consistent with current practices.

However, the licensees' review submits this requirement does not reflect current guidelines for this zone. It maintains that managing for thermal cover is the primary goal, and this can be achieved without a nine-metre green-up requirement. However, an alternative approach was not fully described.

As the BCFS analysis represents current practice, I have not considered an adjustment to the BCFS base case forecast for this factor.

- grizzly bear habitat

Grizzly bear habitat has been identified by the Ministry of Environment, Lands and Parks (MELP) as a significant concern in the Boundary TSA. However, management practices for the protection of grizzly bear habitat have not been developed in the TSA to date. Some habitat needs will likely be met through forest ecosystem networks and other requirements for integrated resource management. The licensees' review of the BCFS analysis states that the grizzly bear issue is a problem of access management, not habitat preservation; thus, it should not have an impact on timber supply. At this time there is insufficient information for me to judge whether or not management for grizzlies will affect timber supply relative to that indicated in the BCFS base case forecast. Once guidelines are in place and are reflected in current practice in the TSA, their timber supply impacts will be taken into account in a future AAC determination.

- stand-level biodiversity

Provisions for stand-level biodiversity—as now required under the Forest Practices Code to provide structural diversity and habitat for wildlife through the retention of tree patches and leave trees—have become standard practice in the Boundary TSA. When the BCFS analysis was completed, prior to the implementation of the Forest Practices Code, it accounted for a wildlife tree retention of approximately 2 600 cubic metres per year (see below - Unsalvaged losses). However, district

staff estimate that new Code requirements for stand-level biodiversity will retain not just timber volume for wildlife trees but will also reduce the timber harvesting land base by approximately 1.7 percent for the retention of tree patches.

A sensitivity analysis shows that if the timber harvesting land base is reduced by 20 percent, the projected initial harvest level can be maintained for three decades before declining to a long-term harvest level that is 20 percent lower than that of the base case. However, in practice the reduction in land base will be much less than 20 percent, and from this I conclude that while provisions for stand-level biodiversity will reduce the timber availability slightly over the medium term, they will not impact the short-term timber supply.

As the Forest Practices Code is progressively implemented, the required provisions for stand-level biodiversity in the context of other management objectives will become clearer. I expect this matter will receive further consideration in the next AAC determination for the Boundary TSA. In the meantime, given the findings of the sensitivity analysis, I am satisfied that the magnitude of this issue and the manner in which it was modelled does not introduce unnecessary risk into this determination. Nonetheless, I have considered the future impacts of stand-level biodiversity in "Reasons for decision".

- landscape-level biodiversity

Landscape-level biodiversity—as now required under the Forest Practices Code—is provided through the retention of forested corridors (i.e. - forest ecosystem networks) and larger patches of older forests. Implementation of landscape-level biodiversity is of considerable concern to the forest industry and to the public.

- forest ecosystem networks

When the BCFS analysis was completed, prior to the implementation of the Forest Practices Code, a system of wildlife corridors (a predecessor of forest ecosystem networks in the Boundary TSA) had been developed for portions of the TSA. In the BCFS analysis, these corridors were defined as the wildlife corridor zone.

Since the completion of the BCFS analysis, forest ecosystem networks (FENs) have been mapped throughout the TSA. Approximately 59 000 hectares of the timber harvesting land base are affected by FENs, which are currently managed according to the *Interim Harvesting Guidelines/Assessment Criteria for Operation Plans for the Boundary Forest District* (Boundary Interim Harvesting Guidelines). District staff indicate that these guidelines will be revisited once the biodiversity planning provisions of the Forest Practices Code have assessed and plans implemented to ensure that management of FENs in the district is consistent with the intent of the Code.

It is difficult to estimate the impact of increasing the amount of FENs in the TSA because their final distribution and extent are not clear at this time, nor is it clear how FENs will be managed. Nevertheless, district staff have provided me with a sensitivity analysis, produced following the publication of the BCFS timber supply analysis, which estimates the impacts of the FEN management proposed in the TSA. This sensitivity analysis shows that under the proposed management for FENs, the amount of time that the projected initial harvest level can be maintained is reduced by one decade and the long-term harvest level is slightly reduced compared to the BCFS analysis base case.

The licensees' review questions the value of FENs for biodiversity management. While I acknowledge the significant uncertainty surrounding this issue, I am mindful that the Forest Practices Code and current management objectives in the Boundary TSA are both moving to more restrictive practices to meet biodiversity objectives, and this will affect timber supply in the TSA.

Based on the information presented to me, I conclude that FENs will likely have an impact on timber supply in the medium and long terms. However, I do not consider FENs, on their own, to have an impact on short-term timber supply in the TSA. This matter is considered further in "Reasons for decision" below.

- old-growth retention

The importance of old growth in the TSA was emphasized in comments submitted by several members of the public during the public input process for the Boundary TSA. In the BCFS analysis, an old-growth retention requirement was modelled for the community watershed zone, which represents approximately 3.5 percent of the timber harvesting land base; old-growth retention was not modelled for any of the other management zones. Current old-growth retention requirements are outlined in the Boundary Interim Harvesting Guidelines which specify that, at all times, at least 10 percent of the timber harvesting land base must be covered by well-distributed, old-growth (greater than 140 years old) forest patches at least 50 hectares in size. These guidelines are expected to be revised in the future as the Forest Practices Code is implemented.

Although the BCFS analysis base case did not include old-growth retention throughout the timber harvesting land base, a sensitivity analysis of the impact of applying a requirement that 10 percent of the timber harvesting land base be retained for old-growth in all the management zones in the TSA (except for the uneven-aged management zone), was completed. This sensitivity analysis indicates the initial harvest level can only be maintained

for four decades before declining to a long-term timber supply level that is 5 percent less than the base case long-term level.

The licensees' review of the BCFS analysis submits that old-growth retention can be met by forests that are not included in the timber harvesting land base due to factors such as inoperability and environmental sensitivity; thus, according to this submission, further old-growth retention requirements are pure speculation. However, district staff indicate to me that the guidelines for the area require 10 percent of the timber harvesting land base, not the productive forest land base, to have old-growth forests at all times. I expect that current plans will have to be reconciled against the industry view that there are merits to considering the biological benefits associated with old-growth stands outside of the timber harvesting land base and other areas with old-growth such as parks and protected areas.

The sensitivity analysis presented in the BCFS analysis provides an estimate of the impact of old-growth management in the TSA, and I expect this factor, on its own, to have no impact on short-term harvest levels; however, it could potentially reduce the amount of time that the projected initial harvest level can be maintained by up to four decades, from the eight decades projected in the base case forecast. This matter is discussed further in "Reasons for decision" below.

- mature forest cover retention

Mature forest cover provides habitat for a variety of wildlife species. Since the BCFS analysis was completed, the district has implemented a mature forest cover requirement, based on the Boundary Interim Harvesting Guidelines, which specifies that at least 15 to 20 percent of the land base must be covered by mature forest (greater than 20 metres tall) at all times.

The BCFS analysis did not incorporate a mature forest cover requirement because it was not currently applied in the TSA when the analysis was being conducted. District staff indicate that the mature forest cover requirement may be met in part by the requirements for old-growth retention, FENs, riparian habitat, ESAs, wildlife patches and other netdowns; thus, it is unlikely that this factor will have an additional effect on the timber supply over and above the other integrated resource management objectives.

However, the full timber supply impact of this mature forest cover requirement is not conclusively known at this time. It is evident to me that further analysis is required to determine the timber supply implications of this factor. Given the potential overlaps with other netdowns and the need for further analysis, I cannot make any specific adjustment with respect to this factor in this determination.

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

West Kootenay-Boundary Land-Use Plan

On March 13, 1995, the provincial government announced the West Kootenay-Boundary Land-Use Plan (WKBLUP) which identified new protected areas (see below, Protected areas) to be established, and the designation of Special Resource Management areas such as the Upper Goatskin and Upper Burrell in the Boundary TSA.

As noted under "Guiding principles for AAC determinations", government's land-use decisions generally must be followed by detailed implementation plans. This is the case with the WKBLUP. Although the land-use decision has been announced, all the details are not yet complete. Three land-use planning zones—Integrated Resource Management, Enhanced Resource Development and Special Resource Management zones—have been identified and a process is underway to develop targets and resource objectives for the WKBLUP. This process will also help to clarify the requirements for biodiversity under the Forest Practices Code in context of the WKBLUP.

Until the necessary decisions are made and implemented, it is impossible to fully assess the overall timber supply impacts of this land-use decision. For example, the impacts of some aspects of the land-use decision, such as protected areas and Special Resource Management Areas, may be offset by the designation of Enhanced Resource Development Areas. Therefore, although some areas have recently been designated as parks, until the entire plan is completed and approved by Cabinet I cannot speculate on the overall effects that the WKBLUP may have on timber supply.

However, as noted under "Guiding principles for AAC determinations", where recent land-use decisions are not able to be taken into account in the current round of timber supply analyses, the legislated requirement to revisit the AAC determinations will ensure that these decisions will be addressed within five years.

Moreover, if at any time during the implementation of the WKBLUP it becomes apparent that the new AAC for the Boundary TSA is no longer consistent with the plan, I am prepared to reassess the timber supply and redetermine the AAC before the five-year period required under the *Forest Act*.

Protected areas

On July 4, 1995, as part of the implementation of the WKBLUP, the Granby and Gladstone areas—which cover approximately 22 500 hectares (7.2 percent) of the timber harvesting land base—were designated in law as Class A provincial parks.

As these areas were not designated at the time when the BCFS analysis was completed, the areas were not incorporated in the analysis. However, the BCFS analysis provided a sensitivity analysis which showed that if the timber harvesting land base was reduced by 20 percent, the projected initial harvest level could be maintained for three decades before declining to a long-term harvest level that is 20 percent lower than that in the base case.

Although the protected areas component of the WKBLUP has been implemented, in view of the potentially significant changes in forest management in those areas yet to be identified as Enhanced Resource Development Areas, and until the entire plan is completed and approved by Cabinet, I am not prepared to speculate on the overall implications of the plan for timber supply, or incorporate any anticipated effects into an AAC determination at this time.

District staff indicate that the limited short-term availability of timber may create difficulty in meeting the harvest level during the initial period when the WKBLUP is being finalized and before the timber supply implications can be taken into account in an AAC determination under section 7 of the *Forest Act*. If the District Manager is concerned that harvest levels cannot be met given outstanding components of the WKBLUP, then I would recommend that steps be taken towards an application to Cabinet for the specification of designated areas for a temporary AAC reduction under Part 15 of the *Forest Act*.

Licensees' ability to find timber

In the opinion of district staff, licensees will be able to locate suitable and available timber to meet their planning requirements and harvesting allocations for the next few years. However, both district staff and licensees indicate that there could be difficulty in finding available timber in the medium term due to integrated resource management objectives. District staff believe that an opportunity to increase timber availability can be provided through total resource planning, whereby timber harvesting is planned over multiple passes considering all forest values and integrated resource management objectives. I am satisfied that in the short term this issue will not have any upward or downward influence on the projected initial harvest level in the BCFS analysis base case.

Harvest profile

In the BCFS timber supply analysis, it is assumed that harvesting will be distributed throughout the timber harvesting land base and over the range, or profile, of sites and forest conditions that exist. As the Boundary TSA is highly accessible with existing road networks, most forests throughout the timber harvesting land base can be accessed with low to moderate development costs. However, the timber supply may be affected if actual harvesting does not reflect these assumptions.

In the BCFS analysis, the current practice in the Boundary TSA of harvesting lodgepole pine stands infested with mountain pine beetle was modelled by attempting to obtain 50 percent of the projected harvest from lodgepole pine types where possible. Although only approximately 34 percent of the initial harvest is projected to be available for harvesting from lodgepole pine forests, the analysis indicates the current AAC can be maintained by harvesting other timber types. The harvest profile obtained in the BCFS analysis is not an exact representation of the current harvesting profile, but BCFS staff indicate that in this TSA, limiting the mix of timber types harvested does not affect the timber supply forecast. Furthermore, district staff expect harvesting in pine forests to decline significantly in the next one or two years due to a decline in mountain pine beetle populations. Therefore, I am satisfied that this factor does not impact the projected timber supply in this TSA.

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

Harvest flow alternatives

In keeping with the objectives of good forest stewardship, AACs in British Columbia 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 usually (but not always) lower long-term timber supply levels. Thus, timber supplies should remain sufficiently stable that there will be no inordinately adverse impacts on current or future generations, which is a consideration in this determination. To achieve this, the rate set must not be so high as to create unnecessary future community disruptions or to cause later disruptive shortfalls in supply, nor so low as to cause immediate social and economic impacts that are unnecessary to maintain forest productivity and future harvest stability.

The BCFS analysis for the Boundary TSA shows that, due to the availability of high-volume older forests, the current AAC of 700 000 cubic metres per year could be maintained for 80 years without causing an abrupt decline in future harvest levels. After 80 years, the timber supply is projected to decline by 10 percent per decade over the subsequent two decades, reaching the long-term timber supply level of 560 000 cubic metres per year in 100 years.

The BCFS analysis also examined a number of alternative harvest schedules. The analysis showed it is possible to increase the initial harvest level to 805 000 cubic metres per year for three decades before declining to the same long-term level as in the base case forecast. The BCFS analysis also showed that a harvest level of 595 000 cubic metres per year (15 percent below the initial harvest level in the base case) could be maintained for 26 decades before declining to the long-term level. In an alternative harvest flow, the initial harvest level was set at the long-

term timber supply level of 560 000 cubic metres per year and maintained at that level in perpetuity.

A socio-economic analysis (SEA) report for the Boundary TSA was prepared by Resource Systems Management International Inc. for the Economics and Trade Branch of the Ministry of Forests. This report details the importance of the forest industry to local economies, and describes the community impacts associated with various timber supply scenarios. The report indicates the forestry sector accounts for 35 percent of the basic income of the Boundary area. I have reviewed the economic development impacts described in the SEA report, which detail the community impacts associated with three different timber supply scenarios: the base case described above; a scenario in which the initial harvest level is 15 percent less than in the base case; and a scenario in which the initial harvest level is 15 percent above the base case.

I note that the higher stumpage rates set in April 1994 in conjunction with the implementation of the Forest Renewal Plan were not included in the revenue projections in the SEA report. It is safe to assume that those projections now underestimate the true revenue accruing to the province, but this does not affect the ability to make valid comparisons between the socio-economic implications of differing rates of harvesting under the three scenarios.

Many comments were provided by members of the public regarding alternative rates of harvesting in the TSA. These comments ranged from suggestions that the current harvest level be maintained, to requests that the harvest level be reduced in the near future to the long-term timber supply level. I note that the SEA shows that lowering the harvest level immediately to the long-term level would decrease employment by 20 percent immediately. In contrast, six submissions suggest the AAC determination should not be made until an audit of the recently expired uplift in the AAC to harvest beetle-infested timber is completed and a forest industry mitigation plan is in place. Much correspondence has occurred between concerned individuals or groups and government regarding these matters. No audit is planned at this time and I believe it would be inappropriate to defer this determination any longer.

In addition, I have received further information from BCFS staff addressing concerns about the SEA that were raised by the Interior Lumber Manufacturers' Association (ILMA). The ILMA contends the SEA underestimates the employment, income and government revenues related to timber harvested from the Boundary TSA while overestimating tourism and alternative employment options. I have reviewed the concerns, and I am satisfied that the SEA provides a useful and reliable indication of the socio-economic implications of alternative rates of harvest in the Boundary TSA, and that the assumptions, methodology and estimates in the SEA report are reasonable and suitable for consideration in this determination.

Community dependence on the forest industry

As noted above, the SEA report indicates the forest sector is the single largest component of the economy in the Boundary TSA, providing 35 percent of local income. Pensions, the other single most significant income source for the residents of the communities in the TSA, provide 20 percent of local income.

Modernization of both the Midway and Grand Forks mills, which increased the amount of timber processed at the Midway mill, combined with the ending of the temporary AAC increase, led to the layoff of one shift at the Grand Forks mill. As a result, the City of Grand Forks, representing much of the population of the TSA, emphasizes the importance of maintaining the annual harvest level at 700 000 cubic metres per year for this determination to sustain the local sawmill while strategies to deal with declining timber supplies could be prepared. This view is supported by three other submissions.

I am aware of the dependence of local communities on timber harvesting and processing in the Boundary TSA and of the recent impacts of adjustments in the level of timber harvesting. I have considered this, along with the social and economic objectives of the Crown (discussed below) in my determination.

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

Timber processing facilities

Approximately 72 percent of the timber harvested in the TSA is processed at sawmills located in Grand Forks and Midway which are owned by one company. There are also several smaller mills in the TSA that depend on timber from the TSA.

There is a widespread concern that if the timber supply is reduced in the Boundary TSA, the sawmill in Grand Forks will no longer be viable. Pope and Talbot Ltd. has indicated that if their current timber supply from the TSA (434 549 cubic metres) is reduced by more than 50 000 cubic metres per year, it is unlikely that the Grand Forks sawmill will continue to operate. I am mindful of this factor in this determination.

- (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;**

Minister's letter

The Minister has expressed the social and economic objectives of the Crown for the province (letter dated July 28, 1994, attached as Appendix 3), and I understand these to apply to the Boundary TSA. They are consistent with the objectives stated in the Forest Renewal Plan and include good 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 also 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 the consideration of partitioned AACs.

The employment and community impact issues are discussed in detail in the SEA, and I am familiar with the varying impacts of different harvest levels discussed in Harvest flow alternatives, above. The use of commercial thinning has been discussed in Commercial thinning and intermediate harvesting, above, where I noted that while there were opportunities to expand these practices in the TSA, and thus provide short-term employment opportunities, I do not expect them to have an impact on projected initial harvest levels.

Operability was discussed in - *economic and physical operability* above. There I concluded that it would be premature to consider an increase in the size of the timber harvesting land base until performance has been demonstrated with respect to increased operability, and therefore the assumptions used in the BCFS analysis appropriately reflect the operable land base in the TSA.

I also examined the possibility of establishing a partition for the purpose of harvesting in dense pine types, and concluded that, due to the significant uncertainty about this issue, a partitioned AAC for this purpose was not appropriate at this time.

- local objectives

The Minister's letter encourages me to consider important local social and economic objectives that may be derived from the public input in the timber supply review. Submissions were received from two local governments, four timber industry organizations, two interest groups, and twelve individuals. Comments were also received at two open houses conducted in the TSA and in presentations to nine organizations.

I have considered the input received and I am mindful of the many views which were brought forward. This information has been thoroughly considered in this determination, and, where possible, I have attempted in this rationale to respond briefly to many of the views expressed.

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

Unsalvaged losses

In the BCFS analysis, the annual unsalvaged losses are assumed to total 50 400 cubic metres and include timber losses to *Armillaria ostoyae* root rot disease, insects, fire, wind, wildlife trees and unrecovered seed trees. *Armillaria ostoyae* is the most prevalent disease affecting timber in the TSA and based on current estimates of annual losses, accounts for 30 000 cubic metres of the annual unsalvaged losses.

The licensees' review of the BCFS analysis submits that the losses to root rot are already accounted for in the analysis because volume estimates for regenerated stands have been reduced to account for decay, waste and breakage, and that half of this reduction is attributed to root rot and other diseases. BCFS Inventory staff indicate that while, in general, the current inventory accounts for losses to disease and therefore a separate reduction for unsalvaged losses due to disease is generally not required, in some cases such a reduction may be required, but is dependent upon factors which are unique and specific to any given area. The Nelson Forest Region pathologist believes the inventory projections for the Boundary TSA do not adequately account for projected unsalvaged losses due to root rot, and submits that annual losses due to *Armillaria* could be as high as 300 000 cubic metres in the future if root rot remains untreated. In estimating the unsalvaged losses attributable to root rot in the BCFS analysis, district staff combined information provided by the regional pathologist with local information and experience regarding the incidence of root rot in both existing and regenerated stands as well as the consideration of treatment options.

I have evaluated the information available to me, and it is evident that there is significant uncertainty about the timber losses attributable to *Armillaria* root rot. It would be inappropriate to change the assumed annual losses that were incorporated into the BCFS analysis until there is more certainty of annual losses. However, the impact of *Armillaria* is potentially very significant and is an issue throughout the province. I have made no adjustment on this account in this determination but I encourage the completion of ongoing studies to assess the impact of *Armillaria*, and I expect that any new information will be considered in the next determination.

I have also examined the reductions applied in the BCFS to account for annual unsalvaged losses due to insects, fire, and wind and I am satisfied that the reductions used are reasonable for use in this determination, with the exception of seed trees and wildlife trees, which I have discussed above in Silvicultural systems and in - *stand-level biodiversity*, respectively.

Reasons for decision

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

The BCFS base case forecast indicates that the timber supply is relatively stable and the current AAC can be maintained for eight decades before declining to the long-term harvest level. However, my considerations have identified several reasons why an earlier decline may be required.

Factors identified as limiting the timber supply relative to the base case forecast are as follows:

- District staff submit that a four-pass harvesting regime more accurately reflects current practice in parts of the IRM zone rather than the three-pass regime modelled in the BCFS analysis. A sensitivity analysis of a four-pass regime indicates the initial harvest level projected in the base case can be maintained for at least six decades.
- Riparian habitat areas were not adequately accounted for in the BCFS analysis. Based on the information presented to me by BCFS staff, a reduction of at least 1 percent (3 000 hectares) of the timber harvesting land base is appropriate to account for management practices in riparian habitat areas. A sensitivity analysis shows that if the timber harvesting land base is reduced by 20 percent, the projected initial harvest level can be maintained for three decades before declining to a long-term harvest level that is 20 percent lower than that of the base case. However, in practice the reduction in land base will be much less than 20 percent and therefore from this I conclude that while provisions for riparian habitat will reduce the timber availability slightly over the medium term, the provisions will not impact the short-term timber supply.
- The retention of wildlife trees for stand-level biodiversity was not adequately accounted for in the BCFS analysis. District staff estimate that approximately 1.7 percent of the timber harvesting land base will be retained for wildlife tree patches over time, and will not be available for timber harvesting. A sensitivity analysis indicates that reducing the timber harvesting land base by up to 20 percent (see above) will not impact the short-term timber supply.
- Sensitivity analysis shows that under proposed requirements for FENs, which were not incorporated in the BCFS base case analysis, the amount of time that the projected initial harvest level can be maintained is reduced by one decade, and the long-term harvest level is slightly reduced compared to the BCFS analysis base case.
- Sensitivity analysis indicates recent old-growth retention requirements in the Boundary TSA, which were not in place when the BCFS analysis was conducted, will reduce the number of decades the initial harvest level can be maintained by three decades compared to the base case analysis, and will result in a long-term timber supply level that is 5 percent lower than the base case long-term harvest level.

Factors that suggest the timber supply may be greater than projected in the base case:

- There are outstanding questions regarding the possible underestimation of site productivity in this TSA. However this issue is primarily expected to affect the long-term harvest level only and hence does not significantly affect this determination.
- Current harvesting practices indicate that there is a potential to increase mandatory utilization standards which would require the harvesting of smaller diameter and of lower grade timber to be charged to the AAC. However, while this may create an upward pressure on the timber supply, the potential opportunity is unquantified at this time, and the administrative policies are not in place to implement higher utilization standards than those assumed in the BCFS analysis.

When considered individually, none of the limiting or augmenting factors described above indicate a need to adjust the initial harvest level projected by the BCFS analysis base case. However, the combined implications of the limiting factors do put the projected initial harvest level at some risk of overestimation. In considering the degree of this risk, I am mindful that the timber supply implications of these factors are not entirely cumulative. There is some overlap—i.e. a riparian area may also partially fulfill an old-growth retention requirement and be part of a forest ecosystem network—and the degree of this overlap cannot be accurately assessed at this time. Nevertheless, these limiting factors, together with the unquantified downward pressure on timber supply resulting from the past two years of harvesting not accounted for in the BCFS analysis, lead me to conclude that the timber supply in the Boundary TSA is much less stable than indicated in the BCFS analysis base case.

From my review of the downward and upward influences on the projected timber supply, it is my judgement at this time that the initial harvest level projected in the BCFS analysis base can be maintained at least for the period of this determination, but that it is unlikely to be maintained for the eight decades projected in the forecast. Nevertheless, and particularly in view of the Crown's economic and social objectives for the province, as expressed in the Minister of Forest's letter (Appendix 3), I do not find sufficient reason to consider lowering the AAC at this time.

As discussed in West Kootenay-Boundary Land-Use Plan above, I have not attempted to predict or to take into account the overall timber supply implications of the WKBLUP. Although the plan and the land-use decision have been announced, relevant details are not complete at this time. Three planning zones have been identified and a process is currently underway to develop targets and resource objectives. Until outstanding decisions are made and implemented, I cannot speculate on the overall effect of the plan on timber supply.

However, I recognize that since the WKBLUP includes protected areas for which no reductions to timber supply have been taken into account in this determination, unless complementary action is taken, the determination could potentially lead to unacceptably

high harvest levels on the remaining timber harvesting land base in the TSA. If the District Manager is concerned that harvest levels cannot be met due to outstanding components of the WKBLUP, then I would recommend that steps be taken towards an application to Cabinet for the specification of designated areas for a temporary AAC reduction under Part 15 of the *Forest Act*. Action by Cabinet under Part 15 will allow me as Chief Forester to reduce the AAC expediently to a level that is achievable operationally without incurring potential conflict for district staff between the need to approve cutting permits and the need to manage for the full range of forest values.

In view of all the foregoing, it is my determination that a timber harvest level that accommodates objectives for all forest resources during the next five years, that provides for anticipated constraints during the initial implementation of the Forest Practices Code, that ensures longer-term IRM objectives can be met, that meets provincial objectives and avoids severe curtailment of locally established socio-economic activity based on timber harvesting, and that avoids disruptive shortfalls in future wood supply, can best be achieved in this TSA at this time by maintaining the current AAC of 700 000 cubic meters.

Determination

Effective March 1, 1996, the new AAC for the Boundary TSA will be 700 000 cubic metres.

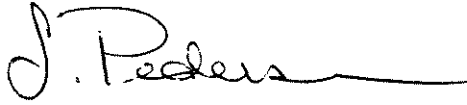
Implementation of decision

This determination comes into effect on March 1, 1996 and will remain in effect until a new AAC is determined, which must take place within five years of this determination.

In the period following this determination and leading up to the subsequent determination, I am directing BCFS staff to examine several issues:

1. complete a volume-ratio sampling study to assess the accuracy of the predicted volumes per hectare used in the timber supply analysis;
2. develop a management strategy for dense pine stands including an examination of:
 - merchantability, appropriate utilization standards, and appropriate minimum harvestable ages, leading to clarification of the areas which should be included in the timber harvesting land base;
 - policy requirements to ensure consistency between cut control administration and the AAC determination;
 - assess the potential to implement a thinning or rehabilitation to increase their contribution to the timber supply;
3. evaluate alternative analytical approaches to assessing the timber supply implications of uneven-aged silvicultural systems and mixed species management;
4. examine the cutblock adjacency requirements in the Boundary TSA;

5. clarify the timber supply implications from riparian habitat management, stand-level biodiversity, old-growth retention, forest ecosystem networks and mature forest cover retention;
6. identify candidate forests for commercial thinning and assess the impact of this practice on the projected short- and long-term timber supply;
7. review and either confirm or update the estimated timber losses due to *Armillaria ostoyae* in the TSA.

A handwritten signature in black ink, appearing to read "J. Pedersen", with a long horizontal flourish extending to the right.

Larry Pedersen
Chief Forester

January 30, 1996

Appendix 1: BC *Forest Act*, section 7

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.

Appendix 2: BC *Ministry of Forests Act*, section 4

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

Purposes and functions of ministry

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

Documents attached

Appendix 3: July 23, 1994, letter from Honourable Andrew Petter, Minister of Forests, to former Chief Forester John Cuthbert

Appendix 4: Summary of Public Input.



File: 10100-01

JUL 28 1994

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

Dear John Cuthbert:

Re: Economic and Social Objectives of the Crown

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

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

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

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

.../2

Province of
British Columbia

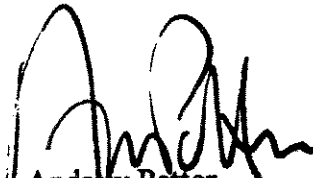
Minister of
Forests

Parliament Buildings
Victoria, British Columbia
V8V 1X4

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

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

Yours truly,



Andrew Petter
Minister