BRITISH COLUMBIA
MINISTRY OF FORESTS

Lillooet
Timber Supply Area

Rationale for
Allowable Annual Cut (AAC)
Determination

Effective January 1, 2002

Larry Pedersen
Chief Forester

Table of Contents

Objective of this document 3
Description of the TSA 3
History of the AAC 3
New AAC determination 4
Information sources used in the AAC determination 4
Role and limitations of the technical information used 5
Statutory framework 5
Guiding principles for AAC determinations 6
The role of the timber supply analysis 8
Timber supply analysis for the Lillooet TSA 9
Consideration of Factors as Required by Section 8 of the *Forest Act* 10
Land base contributing to timber harvesting 10
- general comments 10
- economic and physical operability 11
- environmentally sensitive areas 12
- sites with low timber growing potential 13
- unmerchantable forest types 14
- woodlot licences 15
- protected areas 15
Existing forest inventory 16
- existing stand volume estimates 16
Expected rate of growth 17
- site productivity estimates 17
- use of select seed 19
Expected time for forest to be re-established following harvest 19
Silvicultural treatments to be applied 20
Timber harvesting 20
Integrated resource management objectives 20
- visually sensitive areas 21
- recreation 22
- wildlife habitat 22
- riparian habitat 26
- lakeshore management zones 28
- community watersheds 28
- cultural heritage resources 29
- landscape-level biodiversity 30

Lillooet Land and Resource Management Plan 31
First Nations considerations 32
Alternative rates of harvest 33
Community implications 34
Difference between AAC and actual harvest 34
Timber processing facilities 35
Pulpwood Agreements 35
Minister's letter and memorandum 36
Local objectives 36
Unsalvaged losses 37
Reasons for Decision 37
Determination 40
Implementation 40
Appendix 1: Section 8 of the *Forest Act* 42
Appendix 2: Section 4 of the *Ministry of Forests Act* 44
Documents attached: 44
Appendix 3: Minister of Forests' letter of July 28, 1994 44
Appendix 4: Minister of Forests' memo of February 26, 1996 44
Appendix 5: Summary of Public Input 44

Objective of this document

This document is intended to provide an accounting of the factors I have considered and the rationale I have employed as chief forester of British Columbia in making my determination, under Section 8 of the *Forest Act*, of the allowable annual cut (AAC) for the Lillooet Timber Supply Area (TSA). This document also identifies where new or better information is needed for incorporation in future determinations.

Description of the TSA

The Lillooet TSA comprises approximately 1 125 200 hectares in southwestern British Columbia, and encompasses the entire British Columbia Forest Service (BCFS) Lillooet Forest District. The TSA lies between the Coast Mountains to the west and the Thompson-Okanagan Plateau to the east. The topography of the TSA is rugged, and the climate varies greatly due to the mountainous terrain. Wet coastal conditions predominate on the western side of the TSA, while the eastern portion lies in the interior drybelt and includes dry grassland and semi-desert areas. The primary tree species in the TSA are lodgepole pine, Douglas-fir and spruce; ponderosa pine, whitebark pine, subalpine fir (balsam), western redcedar and hemlock are also present.

There are several provincial parks within the TSA, including Stein Valley Nlaka'Pamux Heritage Park, Duffy Lake Park, Marble Canyon Park, Skihist Park and Goldpan Park.

The TSA has an estimated population of 6,538 persons according to the 1996 census data. There is a significant First Nations population in the Lillooet TSA. The major communities and First Nation reserves in the TSA include Lillooet, Seton Portage/Shalalth, Xaxli'p, Lytton, Pavilion, Spences Bridge, Bralorne, and Gold Bridge. Approximately one-third of the population in the TSA lives in the largest community of Lillooet, with the majority of the population living in rural areas or on reserve lands.

History of the AAC

In 1982, the AAC for the Lillooet TSA was temporarily increased from 650 000 cubic metres to 800 000 cubic metres to allow for the control of mountain pine beetle infestations, and the salvage of damaged timber. In 1988, the AAC was reduced to 650 000 cubic metres after the temporary increase expired. This AAC was in effect until 1996, when the chief forester determined the AAC to be 643 500 cubic metres.

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

Apportionment	Cubic metres/year	percentage
Forest licences – replaceable (3)	469 456	73
Forest licences – non-replaceable	15 000	2
Timber sale licence, < or = 10 000 m³, replaceable	7 278	1
SBFEP category 1	63 030	10
SBFEP bid proposal	75 336	12
Forest service reserve	6 500	1
Woodlot licences	6 900	1
Total	**643 500**	**100.0**

New AAC determination

Effective January 1, 2002 the new AAC for the Lillooet TSA will be 635 900 cubic metres.

This AAC excludes woodlot licences issued since the 1996 determination, and is otherwise unchanged from the previous AAC.

This determination 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 Lillooet TSA include the following:

- *Lillooet TSA Data Package and Information Report*, BCFS, 1999;
- *Lillooet TSA Analysis Report and Public Discussion Paper*, BCFS, January 2001;
- Lillooet TSA Summary of Public Input on Data Package and TSA Analysis Report, BCFS, December 2001;
- Letter from the Minister of Forests to the chief forester, dated July 28, 1994, stating the Crown's economic and social objectives for the province;
- Memorandum from the Minister of Forests to the chief forester, dated February 26, 1996, stating the Crown's economic and social objectives for the province regarding visual resources;
- Technical review and evaluation of current operating conditions through comprehensive discussions with staff of the BCFS, including the AAC determination meeting held in Lillooet, May 9 and 10, 2001;
- *Lillooet TSA Rationale for AAC determination*, BCFS, June 19, 1996;
- *Lillooet TSA Timber Supply Analysis*, BCFS, December 1993;
- *Lillooet TSA Timber Supply Analysis Addendum,* BCFS, July 1995;

- *Lillooet TSA Socio-Economic Analysis*, 1995;
- *Forest Practices Code of British Columbia Act*, consolidated to March 2001;
- *Forest Practices Code of British Columbia Act Regulations and Amendments*, current as of March 2001;
- Forest Practices Code of British Columbia Guidebooks, BCFS and MELP;
- Lillooet Land and Resource Management Plan – Phase 1, Government of B.C., April 2001;
- *Lillooet TSA Inventory Audit*, BCFS Inventory Branch, 1999;
- *Forest Practices Code Timber Supply Analysis*, 1996;
- *Identified Wildlife Management Strategy*, February 1999;
- *Landscape Unit Planning Guide*, BCFS and MELP, March 1999;
- *Higher Level Plans: Policy and Procedures*, BCFS and MELP, December 1996.

Role and limitations of the technical information used

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

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

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

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

Statutory framework

Section 8 of the *Forest Act* requires the chief forester to consider particular factors in determining AACs for TSAs and TFLs. Section 8 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. In making a large number of determinations for many forest management units over extended periods of time, administrative fairness requires consistency when addressing these changes and associated uncertainties. To make my approach in these matters explicit, I have set out the following body of guiding principles. If in some specific circumstance it is necessary to deviate from these principles, I will provide a detailed reasoning in the considerations that follow.

Two important ways of dealing with uncertainty are:

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

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

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

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

Although the Forest Practices Code has been fully implemented since the end of the transition period on June 15, 1997, the timber supply implications of some of its provisions, such as those for landscape-level biodiversity, still remain uncertain, particularly when considered in combination with other factors. In each AAC determination I take this uncertainty into account to the extent possible in context of the best available information.

The eventual timber supply impacts associated with strategic land-use decisions resulting from the various planning processes—including the Commission on Resources and Environment (CORE) process for regional plans, the Protected Areas Strategy, and Land and Resource Management Planning (LRMP) process—are often discussed in relation to

current AAC determinations. Since the outcomes of these planning processes are subject to significant uncertainty before formal approval by government, it has been and continues to be my position that in determining AACs it would be inappropriate to attempt to speculate on the timber supply impacts that will eventually result from land-use decisions not yet taken by government. Thus I do not account for 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 a formal land-use decision, it may not always be possible to fully analyze and account for the consequent timber supply impacts in a current AAC determination. In many cases, government's land-use decision must be followed by a number of detailed implementation decisions. For example, a land-use decision may require the establishment of resource management zones and resource management objectives and strategies for these zones. Until such implementation decisions are made it would be impossible to fully assess the overall impacts of the land-use decision. Nevertheless, the legislated requirement for five-year AAC reviews will ensure that future determinations address ongoing plan implementation decisions.

However, where specific protected areas have been designated by legislation or by order in council, these areas are deducted from the timber harvesting land base and are no longer considered to contribute to the timber supply in AAC determinations.

In April 2001, government announced its acceptance in principle of phase 1 of the *Lillooet Land and Resource Management Plan*. As well, Spruce Lake in the Southern Chilcotin Mountains was designated as a protected area, under the *Environmental Land Use Act*. In November 2001, government made a commitment to complete the plan by March 2002, based on all the LRMP work produced over the last five years. The completion of the plan, including final decisions on protected areas and other recommendations arising from the LRMP will provide further certainty regarding resource management in the area.

Forest Renewal British Columbia (FRBC) has funded a number of intensive silviculture activities that have the potential to affect timber supply, particularly in the long term. As with all components of my determinations, I require sound evidence before accounting for the effects of intensive silviculture on possible harvest levels. Nonetheless, I will consider information on the types and extent of planned and implemented practices as well as relevant scientific, empirical and analytical evidence on the likely magnitude and timing of any timber supply effects of intensive silviculture.

Some have suggested that, given the large uncertainties present with respect to much of the data in AAC determinations, any adjustments in AAC should wait until better data are available. I agree that some data are not complete, but this will always be true where information is constantly evolving and management issues are changing. Moreover, in the past, waiting for improved data created the extensive delays that resulted in the urgency to redetermine many outdated AACs between 1992 and 1996. In any case, the data and models available today are improved from those available in the past, and will undoubtedly provide for more reliable determinations.

Others have suggested that, in view of data uncertainties, I should immediately reduce some AACs in the interest 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 recent court decisions including those in the Supreme Court of Canada. The AAC that I determine should not in any way be construed as limiting those obligations under these decisions, and in this respect it should be noted that my determination does not prescribe a particular plan of harvesting activity within the Lillooet TSA. It is also independent of any decision by the Minister of Forests with respect to subsequent allocation of the wood supply.

With respect to 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. Any decisions on treaty negotiations with the First Nations that are undertaken by government will be reflected in future AAC determinations for the TSA.

Overall, in making AAC determinations, I am mindful 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* and the *Forest Act*.

The role of the timber supply analysis

In considering the factors required under Section 8 of the *Forest Act* to be addressed in AAC determinations, I am assisted by timber supply forecasts provided to me through the timber supply review process.

For each AAC determination for a TSA, a timber supply analysis is carried out using an information package including data and information from three categories—land base inventory, timber growth and yield, and management practices. Using this set of data and a computer model (Forest Stand Simulator, or FSSIM), a series of timber supply forecasts is produced, reflecting different starting harvest levels, rates of change over time, and potential 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, and forms the basis for comparison when assessing the effects of uncertainty on timber supply.

Because it represents only one in a number of theoretical forecasts, and because it incorporates information about which there may be some uncertainty, the base case forecast for a TSA is not an AAC recommendation. 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 predictions of timber supply must be adjusted, if necessary, to more properly reflect the current situation.

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

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

Timber supply analysis for the Lillooet TSA

The base case harvest forecast presented in the *January 2001 Lillooet Timber Supply Area Analysis Report* incorporated the most current available information on forest management, land base and timber yields for the TSA. It included specific assumptions about the TSA that are discussed in detail in the analysis report.

In this rationale, I will discuss many of those analysis assumptions in the context of my considerations for this AAC determination. However, where my review of an assumption has concluded that I am satisfied it was appropriately modelled in the base case of the timber supply analysis, I will not discuss my considerations in detail in this document, other than to note my agreement with the approach that is already documented in the timber supply analysis report. Some factors for which the assumptions were appropriately modelled in the analysis may warrant discussion, however, for other reasons, such as a high level of public input, lack of clarity in the analysis report, or concerns resulting from the previous determination for the Lillooet TSA. As a result, I may choose to provide my consideration of such factors in this rationale.

A base case forecast was generated that incorporated the factors appropriate to the TSA and was submitted for public review. The base case excluded 6900 cubic metres per year to account for new woodlot licences issued since the 1996 determination. The timber supply analysis illustrated that two initial harvest levels were possible; one with and one without the harvest level of 25 000 cubic metres per year associated with the portion of Pulpwood Agreement (PA) 16 within the TSA.

When PA 16 harvest level was not included, the analysis illustrated that a base case forecast of 636 600 cubic metres per year (the current AAC of 643 500 cubic metres less the issued woodlot volume) could be maintained for 30 years. After this, the harvest level forecast

declined by 10 percent per decade to the long-term harvest level of 368 000 cubic metres per year, reached in the tenth decade. When PA 16 harvest level was included, an initial harvest level of 661 000 cubic metres per year could be maintained for first 20 years (the estimated duration of the pulpwood agreement), after which the forecast declined in a similar manner as described above.

The base case harvest forecast for the Lillooet TSA did not specifically incorporate all the recommendations arising from the Lillooet Land and Resource Management Plan (LRMP), as the plan has not yet been formally approved by government. Although phase 1 of the plan has been approved in principle, final work is currently in progress and its completion will be followed by formal approval by government regarding the various resource values covered by the plan. In order to provide me with information about the possible implications to timber supply of the recommendations from phase 1 of the plan, I requested a series of harvest forecasts for the various factors affected by the LRMP recommendations, and will discuss my considerations of these under the appropriate factors in this rationale.

I have considered the criteria used to select the base case forecast, and I am satisfied that it provides a suitable basis from which to evaluate the assumptions regarding land base, management practices and timber yields for the Lillooet TSA. I have also considered all public input received on the data package and analysis report, and where appropriate I discuss these in my considerations under the various factors presented in this rationale.

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

Section 8 (8)

In determining an allowable annual cut under subsection (1) the chief forester, despite anything to the contrary in an agreement listed in section 12, must consider

(a) the rate of timber production that may be sustained on the area, taking into account

(i) the composition of the forest and its expected rate of growth on the area,

Land base contributing to timber harvesting

- general comments

As part of the process used to define the timber harvesting land base in the timber supply analysis, a series of deductions are made from the productive forest land base. These deductions account for the factors that effectively reduce the suitability or availability of the productive forest area for harvest, due to ecological, economic or social reasons.

In the Lillooet TSA, the deductions result in a timber harvesting land base of 295 802 hectares, or approximately 59 percent of the Crown productive forest land. In table 2 of the *January 2001 Lillooet Timber Supply Area Analysis Report* the values were incorrectly reported. The actual timber harvesting land base is 509 hectares smaller than reported in the analysis.

I have considered all of the deductions applied in the derivation of the timber harvesting land base for the Lillooet TSA. Based on my thorough review of these deductions, I have

not provided a detailed account where I have accepted the assumptions as applied in the analysis associated with deriving the timber harvesting land base. These factors include environmentally sensitive areas for recreation and avalanche, deciduous forest types, and existing as well as future roads, trails and landings. Where my consideration of the information has identified a factor which in my estimation requires discussion in this document, it is described below.

- economic and physical operability

Those portions of the TSA which are neither physically operable nor economically feasible to harvest are categorized as inoperable, and are excluded when deriving the timber harvesting land base. For the Lillooet TSA, BCFS staff in conjunction with licensee staff originally delineated operability lines in 1995, based primarily on physical access limitations. District and licensee staff have reviewed the information since then, and have made adjustments where necessary.

District staff recently reviewed the operability information again and believe that it provides a good approximation of areas that will be harvestable over the long term. However, staff expressed concern that some operable areas may not be harvestable in the short term. For the analysis, approximately 100 000 hectares were excluded as inoperable based on the operability mapping, an area which represents 19 percent of the Crown productive forest.

Public input expressed concern that a large amount of timber that is not economically viable was included in the timber harvesting land base.

The Lillooet TSA has one of the highest delivered wood costs in the interior of the province, and the economics of harvesting stands is very sensitive to changes in market. District staff note that since the operability information mainly focuses on access limitations, some timber that is currently uneconomic to harvest is likely included in the timber harvesting land base. District staff have identified a number of such areas, however they also note that areas can rapidly move from being considered inoperable to operable. Many areas in the past believed to be economically inoperable have proven to be harvestable.

District staff suspect that a timber opportunity study in which operability could be refined by zones based on economic criteria such as terrain, profile, proximity to mills would be beneficial for operability assessment. Such a study would refine the information necessary to determine the exclusion of areas that are unlikely to ever be economically harvestable.

District staff also note that the current operability information does not capture areas likely to be uneconomic for harvesting as a result of their small size and isolation. This includes areas becoming isolated and uneconomic as a result of access difficulties from planning deferrals and delays (as discussed under Other Information). Currently, the operability information does not capture areas unlikely to be operable for such reasons.

The magnitude of an overestimation of the operable area cannot be quantified until data from a timber opportunity or other type of study is collected. Results of a sensitivity analysis in which the size of the timber harvesting land base was reduced by 10 percent

indicate that the base case initial harvest level can still be maintained for 2 decades before beginning a series of 10 percent declines to a lower long-term harvest level.

I have reviewed the information regarding the assessment of operability in the Lillooet TSA. I note that assessing operability is difficult, particularly in units with rugged and mountainous terrain such as is found in the Lillooet TSA. I acknowledge that the criteria applied in the analysis has provided a good assessment of the stands likely to be inoperable for accessibility limitations. However, in consideration of the uncertainties associated with the assessment of economic limitations, I accept that there is a risk that some stands were assumed to contribute to timber supply that may in reality not be economically operable in the short term. The sensitivity analysis results show that short-term timber supply is not affected by this factor and indicates there is time to collect data to resolve any uncertainty prior to the next determination. Nonetheless, I am mindful that there is uncertainty and if data indicates that some areas should not contribute to timber supply, they should be excluded in the next timber supply analysis for the Lillooet TSA. I will discuss my consideration of operability and its implications to timber supply further under 'Reasons for decision'.

I request that district staff collect data that will facilitate an assessment of the economically operable land base for the next analysis for the Lillooet TSA.

- *environmentally sensitive areas*

Environmentally sensitive area (ESA) data identifies areas sensitive to disturbance and/or with significant value for fisheries, wildlife, water or recreation resources. ESA classifications of Es1 (highly sensitive) or Es2 (moderately sensitive) are used to exclude areas from the land base where more specific or detailed information is not available about a particular forest resource.

In my previous determination for the Lillooet TSA, I made note of the large amount of area excluded as environmentally sensitive for soils, and requested that district staff undertake soil and terrain studies and assess the impacts in terms of timber supply. Since then, additional terrain stability mapping has been completed and the available information now covers one third of the TSA. This information was used in the timber supply analysis to account for sensitive or unstable soils, in conjunction with ESA data.

For areas where terrain stability mapping was available, it was used in place of the ESA mapping, as terrain stability mapping is a more reliable method of classifying unstable terrain as compared to the ESA mapping developed through forest inventories. All class V terrain was 100 percent excluded, and class IV terrain was excluded within community watersheds. A total of 9716 hectares were excluded using the terrain class mapping, and an additional 40 673 hectares were excluded to account for Es1 areas.

District staff note that the terrain stability mapping indicated fewer areas for exclusion than had been indicated by the ESA data. On the one third of the TSA for which the terrain class mapping was available, staff indicate that 17 000 fewer hectares were excluded than had been excluded in the previous analysis using the ESA data. Staff expect that this trend (whereby less area is shown to be unstable than shown by the older ESA data) will continue for the remainder of the TSA west of the Fraser River. However, the terrain east of the

river is different and is expected to have more instability and therefore greater terrain class exclusions.

I am aware that no exclusions were applied in the analysis to account for Es2 areas. Often, areas considered moderately sensitive for soils are also subjected to a percentage exclusion in timber supply analysis. However, district staff indicate that the ESA data did not include many Es2 areas, and that given the trend exhibited by the terrain class data, it is unlikely that these areas are truly unavailable or inappropriate for timber harvesting.

Overall, district staff are satisfied that the terrain stability data provides better information for that portion of the TSA where the data is available, and believe the trend can be expected to continue for at least the areas west of the Fraser River as noted.

In a public submission, Ainsworth Lumber Co. Ltd. expressed the opinion that soil related-reductions were overestimated in the analysis, and recommended a review of the factors used.

I have considered the information about ESAs and terrain class data to account for soil stability. From review of the information, I consider it likely that the completion of the terrain stability mapping for the remainder of the TSA will result in fewer areas identified with unstable or sensitive soils. As a result of using the ESA data for the majority of the TSA, it is likely that the size of the timber harvesting land base has been underestimated in the analysis. Upon evaluating the size of the area west of the Fraser River with data yet to be compiled, I believe the underestimation of the timber harvesting land base due to the use of ESA data could be between 10 000 and 15 000 hectares, representing up to 5 percent of the timber harvesting land base.

I accept that for this determination the timber supply has been underestimated by up to 5 percent on this account, and I will consider this as discussed further under 'Reasons for decision'. For the next determination, I request that district staff work to complete terrain stability mapping for the remainder of the TSA prior to the next analysis so that this information can be incorporated.

- sites with low timber growing potential

Sites with low productivity as a result of inherent site factors such as nutrient availability, exposure, excessive moisture, or that are not fully occupied by commercial tree species are excluded from the timber harvesting land base.

In the timber supply analysis for the Lillooet TSA, low sites covered with Douglas-fir, spruce, subalpine fir (balsam), redcedar, and lodgepole pine leading stands were excluded from the timber harvesting land base based on achieving a minimum site index criteria. Based on a review of current harvesting practices, the criteria as applied in the previous timber supply analysis were still considered applicable for use. To account for low sites, a total of 38 588 hectares or 7.6 percent of the productive forest area was excluded in deriving the timber harvesting land base.

BCFS regional staff note that in the analysis, the stands in the PA 16 area were not subjected to low productivity exclusions. The site indices for about 40 percent of the

PA 16 stands were lower than the minimum site indices applied to the remaining stands in the analysis.

District staff reviewed inventory records to evaluate whether past harvesting has occurred in existing stands with low site indices. Where harvesting has occurred, the area now has a young-regenerating forest. As it is difficult to evaluate the site productivity of all these regenerating areas, the forest inventory typically records an assigned site index based on age and height measurements from the harvested stand. The review indicated that very little area classified as having low site productivity is currently occupied by stands less than 40 years. Staff note that this indicates very few stands classified as low site have been harvested.

Ainsworth Lumber Co. Ltd. submitted that the use of site index as a factor for exclusion in mature stands is very unreliable and tends to grossly overestimate exclusions. I agree that site indices obtained from old growth stands are not always an indication of the growing potential for future stands, as I discuss under *site productivity estimates*. However, the exclusions applied to account for low productivity sites are intended to address the merchantability of the current stands on these sites, not the potential merchantability of future stands. If these stands are not merchantable to harvest at the current time, then the potential for them to produce higher volume stands in the future cannot be realized.

Having reviewed the information about the analysis assumptions to account for sites with low timber growing potential, I am satisfied that the minimum site indices for excluding low sites were appropriate and reflective of current operational constraints in the TSA. However, I am mindful that the stands assumed to contribute to PA 16 were not subjected to low site exclusions. I will discuss my considerations of this further, under Pulpwood Agreement.

- unmerchantable forest types

Stands that are physically operable and exceed low site criteria yet are not currently utilized because of low timber quality or volume are referred to as problem forest types or unmerchantable forest types. This definition is based on economic criteria, for the purpose of defining the timber harvesting land base. It does not imply that these types of forests are not important in terms of their role and function in the ecosystem.

Typical stand characteristics may include the following: small trees, small diameter, few merchantable stems, or low merchantable volume. These stand types are either wholly or partially excluded from the timber harvesting land base in the analysis.

District staff reviewed information from forest development plans to develop criteria for unmerchantable type exclusions. Species, levels of stocking, age, height and crown closure criteria were used to exclude a total of 2515 hectares to account for unmerchantable forest types. As was the case with exclusions to account for low productivity sites, the stands contributing to PA 16 were not subject to unmerchantable forest type exclusions.

Having considered the information in the analysis about accounting for unmerchantable forest types, I am satisfied that the criteria were reasonable. However, as also noted under *sites with low timber growing potential*, I am concerned about the merchantability of stands

contributing to PA 16 in the timber supply analysis. I will discuss this further, under Pulpwood Agreement.

- woodlot licences

The *Forest Act* requires AACs determined for TSAs to be exclusive of the timber supply contribution from areas in woodlot licences. There are currently 16 woodlot licences in the Lillooet TSA. Seven of these have been issued since the 1996 determination. In the timber supply analysis, 7240 hectares of forested land base were excluded to account for the area in issued woodlots. In addition, the base case initial harvest level was reduced by 6900 cubic metres per year to account for the volume assigned to the new woodlot licences.

District staff indicate that the analysis assumptions did not account for all of the area and volume attributable to woodlots, because some licence top-ups have occurred since the analysis was completed. Staff indicate that an additional 800 hectares has been issued to woodlots, with a corresponding additional harvest level of 700 cubic metres per year.

I have considered the information for woodlot licences as reflected in the analysis, and I find it appropriate to exclude the additional area and account for a slight overestimation in timber supply of 700 cubic metres per year. I will discuss this further, under 'Reasons for decision'.

- protected areas

Areas not managed as part of the TSA, such as parks and legally established protected areas, are excluded from the timber harvesting land base. All protected areas established through order-in-council were excluded in the analysis for the Lillooet TSA, for a total of 111 035 hectares.

The proposed protected areas as recommended under the Lillooet Land and Resource Management Plan (LRMP) encompass an additional 7.23 percent or 21 673 hectares of timber harvesting land base in the Lillooet TSA. Since the completion of the analysis, one of these areas has been established through order-in-council. The Spruce Lake area in the Southern Chilcotin Mountains is now designated as protected under the *Environmental Land Use Act*. The area encompasses 71 487 hectares, 11 641 hectares of which overlaps with the timber harvesting land base.

The Spruce Lake protected area equates to nearly 4 percent of the timber harvesting land base of the Lillooet TSA. A sensitivity analysis was conducted in which an area of equivalent size of the designated area was excluded. Results indicated that the short-term harvest level could only be maintained for two decades before beginning a series of declines similar to those in the base case. A long-term harvest level approximately 4 percent less than that in the base case was reached in decade seven.

The remainder of the proposed protected areas is estimated to affect 3.4 percent of the timber harvesting land base of the TSA. In addition to the proposed protected areas, special management including specification of no-harvesting is proposed for two resource management zones (RMZs) under the LRMP. These areas total 1661 hectares of timber harvesting land base.

I have reviewed the LRMP information about proposed protected areas in the Lillooet TSA. Consistent with my guiding principles, I cannot account for the proposed protected areas at this time, as they have not yet been formally established by government. However, should these areas be established in the near future, then I am prepared to redetermine an AAC for the Lillooet TSA sooner than five years as required by legislation.

Given that Spruce Lake area has been designated through an order-in-council, I will take into account a deduction of 11 600 hectares of timber harvesting land base. Sensitivity analysis indicates that removing an area of this size affects the timber supply after two decades. I note that the site productivity of the Spruce Lake is likely higher than the average productivity of stands in the TSA, and its exclusion from the TSA may therefore represent a greater impact to timber supply than shown in the sensitivity analysis.

I will discuss my considerations of this factor further, under 'Reasons for decision'.

Existing forest inventory

The inventory data used for the timber supply analysis is based on a forest inventory completed in four separate re-inventory projects between 1988 and 1990. For the analysis, the inventory file was updated to December 1996 to account for changes in ownership, growth, and denudation through harvesting or fire.

I have considered the information about the forest inventory. Subject to considerations around volume estimates for existing stands, I am satisfied that the best available information was used in the analysis. My considerations about the volume estimates for existing stands are discussed in the next section of this rationale.

I note that this determination occurs 5 years into the first decade of the analysis horizon, which may indicate that short-term timber supply is more sensitive to those factors exerting either downward or upward influences on it, than suggested by the various sensitivity analyses. However, the analysis also assumes that the inventory is being depleted at a rate of harvesting equivalent to the level of the current AAC, and in reality (as discussed under *difference between AAC and actual harvest*) the TSA has a high level of undercut. The interaction of these two factors indicates that my determination is now occurring almost 4 years past the start of the analysis planning horizon. I will discuss my considerations of the implications of this to timber supply further under 'Reasons for decision'.

- existing stand volume estimates

Volumes for existing natural stands (in which species and stocking have not been managed) were estimated and projected using forest inventory attributes and the Variable Density Yield Prediction (VDYP) model which was developed by the former BCFS Resources Inventory Branch (now the Terrestrial Information Branch in the Ministry of Sustainable Resource Management).

At the time of my previous determination for the Lillooet TSA, preliminary findings from an inventory audit suggested that mature volumes could be underestimated, possibly by as much as 18 percent. As noted in the previous rationale, the underestimation appeared to be mainly associated with the appropriateness of the data used in VDYP to accurately reflect

the local conditions in this particular TSA. Many of the stands in the TSA are transitional between coastal and interior zones, which makes it difficult to estimate volumes. To attempt to address uncertainties around existing stand volumes, I requested that additional work be carried out prior to this determination.

Input received from Ainsworth regarding the data package supports the findings that existing stand volumes are underestimated in the TSA, based on the results of the audit.

Since the last determination, an intensive sampling program was developed and implemented in the TSA to address the uncertainties identified in the preliminary audit findings. However, an error was discovered in the manner in which the stocking of stands (stocking class) was reflected in the inventory. This error was corrected, and the audit results were again compared to the revised inventory values. Volume estimates were then found to be statistically acceptable overall.

Sensitivity analysis conducted to evaluate the timber supply implications of underestimating existing stand volumes by 10 percent showed that the short-term harvest level could be maintained for an additional two decades compared to the base case.

I have considered the information about existing stand volume estimates and discussed it with regional and district staff. Although both the preliminary inventory audit and the additional sampling originally indicated mature volumes could be underestimated, once errors found in the inventory were corrected, it showed that the volume estimates for stands on the timber harvesting land base were in fact acceptable. For the next determination, regional staff anticipate that additional inventory reviews or sampling could provide further clarification regarding any residual uncertainty about existing stand volumes. The sensitivity analysis results indicate that underestimating existing stand volumes could extend the short-term harvest level by two decades. However, because there has already been a fairly intensive audit program that concluded volume estimates are reasonable, I make no adjustments for this determination.

Expected rate of growth

I have considered the information regarding the projected volumes for managed stands, including the various operational adjustment factors applied to volume estimates to account for the influence of root diseases. I am satisfied that the analysis assumptions were appropriate in this regard and I will not discuss my considerations of these factors in detail in this rationale, with the exception of site productivity estimates, as discussed below.

- site productivity estimates

Inventory data includes estimates of site productivity for each forest stand. Site productivity is expressed in terms of a site index, which is based on the stand's height as a function of its age. The productivity of a site largely determines how quickly trees grow, which in turn affects the time seedlings will take to reach green-up conditions, the volume of timber that can be produced, and the age at which a stand will reach a merchantable size.

In general, in British Columbia, site indices determined from younger stands (i.e. less than 31 years old), and older stands (i.e. over 140 years old) may not accurately reflect potential

site productivity. In young stands, growth often depends as much on recent weather, stocking density and competition from other vegetation, as it does on site quality. In old stands, which have not been subject to management of stocking density, the trees used to measure site productivity may have grown under intense competition or may have been damaged, and therefore may not reflect the true growing potential of the site. This has been verified in several areas of the province where studies—such as the Old-Growth Site Index (OGSI) 'paired plot' project and the 'veteran' study—as well as results from using the Site Index Biogeoclimatic Ecosystem Classification System (SIBEC) suggest that actual site indices may be higher than those indicated by existing data from old-growth forests. Such studies indicate that site productivity has generally been underestimated by the inventory file data; managed stands tend to grow faster than projected by inventory-based site index estimates from old-growth stands.

No local site index studies have been conducted in the Lillooet TSA. Approximately 40 percent of the stands on the timber harvesting land base are currently greater than 140 years of age.

Sensitivity analysis was used to assess the impact to timber supply if site productivity is underestimated to the extent suggested by the OGSI studies. In the sensitivity analysis, the site indices of all stands older than 140 years of age were adjusted using the provincial OGSI data. The site indices for a total of 132 500 hectares of Douglas-fir, spruce, balsam, cedar, hemlock, and lodgepole pine stands were adjusted in the sensitivity analysis. Minimum harvestable ages and green-up ages were also adjusted to account for the increased site productivity. The sensitivity analysis results indicate that beginning in decade 5, mid-term and long-term timber supply would increase by up to 32 percent if these provincial OGSI adjustments were applicable to the stands in the Lillooet TSA.

District staff do not know the magnitude of the site productivity underestimation applicable to the stands in the Lillooet TSA. No local studies have been conducted to provide better estimates, and no funding is currently available for this purpose. Staff note that 20 percent of the provincial OGSI plots were collected within the Kamloops Forest Region, and therefore the data may be somewhat applicable to the stands in the Lillooet TSA.

While I acknowledge that there is uncertainty related to the ultimate performance of stands relative to their potential, data from provincial studies clearly demonstrates that stands in the province are growing at a much faster rate than would be expected based on measurements from the standing old growth inventory.

Given existing silvicultural requirements, it is reasonable to expect that full stocking will occur in the majority of managed stands in the Lillooet TSA, and that the stands will be managed to minimize losses to pests and competing vegetation. Therefore, while the exact magnitude of the productivity increase is not certain, I believe it is highly reasonable to expect that most second-growth stands will grow more quickly than productivity estimates from old-growth stands would suggest. In this determination, I have considered the implications of an underestimation for timber supply, and that the timber supply in the mid- to long-term is likely greater than projected in the base case. I will discuss my considerations of this further under 'Reasons for decision'.

I note that local data will provide much needed certainty around the magnitude of site productivity adjustments appropriate for the Lillooet TSA, and I strongly encourage the collection of data from stands within the TSA over the term of this determination.

- use of select seed

The Forest Practices Code requires the use of the best genetic quality (seed and vegetative material) source available for regeneration. Select seed produced from seed orchards is the product of B.C.'s forest gene resource management program, which uses traditional tree breeding techniques to select naturally-occurring, well-adapted, healthy and vigorous trees.

Select seed from seed orchards produces trees that grow faster than those from natural stands. As a result, a stand composed of such trees has a greater volume at the same age than a natural stand with the same species composition. Current expectations are that the volume differences will begin to decrease beyond a certain stand age.

The majority of class A seed planted in the Lillooet TSA is spruce. The Lillooet TSA has only partial availability for genetically improved seed for pine and spruce. Genetic gains of between 8 and 11 percent for pine, and 8 percent for spruce are expected under the current utilization levels of select seed.

The use of select seed was not reflected in the base case forecast. However, a sensitivity analysis was undertaken in which regenerated stand volumes were increased by 10 percent and showed a corresponding increase in the long-term timber supply. BCFS staff indicate that under the current levels of using class A seed (15 percent of planted seedlings), the value of genetic gains indicate a 1- to 1.5-percent increase in the long-term timber supply.

I have considered the information regarding the use of select seed in the Lillooet TSA. I am satisfied that it is appropriate to account for the timber supply implications of the current level of use, which indicates a 1.2 percent increase in timber supply. I will discuss this further under 'Reasons for decision'. As for the possible increases from projected future use, although I believe that these gains are likely to be realized over the next 10 years, I am satisfied any expected gains can be accounted for in a future determination, once that level of use is clearly demonstrated.

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

Expected time for forest to be re-established following harvest

I have reviewed the information regarding regeneration, regeneration delay, impediments to regeneration and not-satisfactorily-restocked areas, and I am satisfied that the assumptions in the analysis for these factors were appropriate. As a result, I will not discuss my considerations of these factors in this rationale.

(iii) silviculture treatments to be applied to the area,

Silvicultural treatments to be applied

I have reviewed the information regarding silvicultural systems, commercial thinning and incremental silviculture, and I am satisfied that the base case assumptions for these factors were appropriate.

(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,

Timber harvesting

I have reviewed the information regarding the utilization standards and the decay, waste and breakage factors assumed in the analysis for the Lillooet TSA, and I am satisfied that these factors were appropriately modelled in the analysis.

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

Integrated resource management objectives

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

To manage for resources such as water quality and aesthetics, current harvesting practices limit the size and shape of cutblocks and amount of disturbance (areas covered by stands of less than a specified height), and prescribe minimum green-up heights for regenerated stands on harvested areas before adjacent areas may be harvested. Green-up requirements provide for a distribution of harvested areas and retention of forest cover in a variety of age classes across the landscape.

In the timber supply analysis, as described in the January 2001 *Lillooet Timber Supply Area Analysis Report*, several management zones were created and different forest cover constraints were applied to the stands in each zone. These management zones—community watersheds, retention, partial retention and modification visuals (3 zones), ungulate winter range and standard management—were developed to reflect different operational considerations.

I have reviewed the information presented to me regarding the analysis assumptions for cutblock adjacency/green-up and I am satisfied that the base case forecast has appropriately reflected current practice within these areas. As a result, I will not discuss my considerations of this factor in this rationale. The factors discussed below are those for which I believe my consideration requires some documentation.

- visually sensitive areas

Careful management of scenic areas along travel corridors and near recreational sites is an important IRM objective. The Forest Practices Code enables the management of visual resources by providing for scenic areas to be identified and made known by the district manager or through a higher level plan, and by providing for the establishment of visual quality objectives (VQOs). A visual landscape inventory identifies, classifies and records visually sensitive areas within a landscape. Using such an inventory, recommended visual quality classes (RVQCs) of preservation, retention, partial retention or modification may be derived to guide operational practices. These recommended VQCs may become VQOs established by the district manager or through a higher level plan.

Management for visual quality applies to the Crown forested land within scenic areas. Scenic areas have been officially made known by the district manager in the Lillooet TSA.

To achieve objectives for visual quality, limits are placed on the amount of visible disturbance that is acceptable in visually sensitive areas. These limits act to constrain timber harvesting, road building and other forest practices. Guidelines to meet VQOs include setting a maximum percentage of a visual landscape allowed to be in a disturbed state at any one time, and setting visually effective green-up (VEG) targets that must be achieved before additional harvesting is permitted. VEG refers to the stage at which a stand of forested timber is perceived by the public to be satisfactorily greened-up from a visual standpoint.

Provincial guidelines provide a range of values for maximum disturbance in each visually sensitive area. The applicable disturbance value within the range is dependent on the visual absorption capacity (VAC) of the area, which is a measure of an area's physical capacity to absorb alterations while maintaining its visual integrity. An area with a low VAC can sustain relatively less disturbance than an area with a high VAC before the visual condition is compromised.

In the timber supply analysis for the Lillooet TSA, approximately 71 000 hectares or 24 percent of the timber harvesting land base was located within known scenic areas, which are considered to be visually sensitive. In the analysis, zones were created for the scenic areas using the recommended visual quality classes, and the constraints were applied as the maximum percentage of productive forest area within each landscape unit that could be occupied by stands that were less than the specified green-up height.

The restrictions for green-up were applied to the entire productive forest land base because disturbance restrictions in visual areas apply to the entire viewscape regardless of operability. Values for maximum percentage of disturbance which would reflect those applied in current practice were determined using provincial guidelines for factoring visual resources into timber supply analyses. Three visual quality zones were modelled in the timber supply analysis: retention, partial retention and modification.

District staff submit that the assumptions applied in the base case forecast reasonably reflect current management of scenic areas, and align with the visual management matrix contained in the Lillooet LRMP. However, they note that completion of the Lillooet LRMP may refine management objectives for visually sensitive areas.

In order to assess the likelihood of any risk to timber supply from increasing or decreasing constraints for visual management in the Lillooet TSA, I examined a number of sensitivity analyses. Overall, I found that the timber supply is not highly constrained by forest cover objectives for achieving visual quality, and the sensitivity analyses did not show any impact to the base case forecasts in the short term. Hence, I am satisfied that any refinements may be taken into account in a future determination as appropriate. In the meantime, for the purposes of this determination, I am satisfied that the base case forecast has adequately addressed visual quality constraints as currently practised.

- *recreation*

Recreation use in the Lillooet TSA includes a variety of pursuits such as hiking, mountain-biking, camping, boating, river rafting, horseback riding, heli-, back-country and cross-country skiing, snowmobiling, hunting and fishing. Local residents as well as tourists use the forests for recreation and the forests of the TSA are increasingly accessed by residents of the Lower Mainland.

District staff indicate that as over three-quarters of the TSA land base is not suitable for timber harvesting, for the most part recreation activities can be managed and maintained without conflict with harvesting operations. Some recreation features are located in productive forest land that have already been excluded from the timber harvesting land base for reasons such as environmentally sensitive areas – for recreation, riparian habitat, or other reserves. Visual landscape design and access management is used in some instances to manage for wilderness recreation opportunities.

When recreation features occur on the timber harvesting land base, good visual design principles are followed to minimize impacts of timber harvesting on the recreation resource. Management of wilderness recreation opportunities is also accomplished through visual design as well as access management. Hence, in the timber supply analysis there were no specific land base exclusions to account for recreation resource management.

Public input commented that recreation trails require special management, and that additional timber harvesting land base should be reserved to accommodate the needs of trails and other special features. District staff indicate that specific management requirements for recreation resources will be addressed through recommendations contained in the final Lillooet LRMP. Overall, district staff believe that recreation use in the TSA can be managed for without additional timber supply impacts.

Having reviewed the information about recreation in the Lillooet TSA, I am satisfied that the analysis assumptions regarding management for this resource were appropriate. I note that any further management requirements for recreation that arise from the Lillooet LRMP can be incorporated into a future timber supply analysis. For this determination, I make no further adjustments.

- *wildlife habitat*

Numerous wildlife species are found in the Lillooet TSA, including grizzly and black bear, mule deer, mountain goat, bighorn sheep, moose, cougar, numerous fur bearing species and fish species.

1) identified wildlife

'Identified wildlife' refers to species at risk (red- and blue-listed) and to regionally significant species which are potentially affected by forest management activities and which may not have been adequately accounted for with existing management strategies, such as those for biodiversity, riparian management, ungulate winter range or through the application of other forest cover constraints. Species at risk as defined under the Forest Practices Code also include those species that are not considered at risk provincially but which have regional populations that may be threatened. The intent is that by addressing the habitat needs of 'regionally important wildlife' early on, the possibility that they will become listed provincially as threatened or endangered at a later date may be avoided.

The Identified Wildlife Management Strategy (IWMS) was released in February 1999 and Volume 1 details several species which may occur and which require future consideration in the Lillooet TSA, including the following: bull trout, tailed frog, rubber boa, racer, gopher snake, American bittern, Northern goshawk, prairie falcon, long-billed curlew, Lewis's woodpecker, Brewer's sparrow, mountain beaver, fisher, grizzly bear, mountain goat and bighorn sheep.

Volume II, which has yet to be released, may identify additional species. The species identified in Volume I will be managed through the establishment of wildlife habitat areas (WHAs) and implementation of general wildlife measures (GWMs), or through other management practices specified in higher level plans. No WHAs have yet been established in the Lillooet TSA. The analysis did not explicitly model any requirements for identified wildlife.

Based on data accumulated on the habitat requirements for the identified species, the estimated impact of management was projected at one percent of the short-term harvest level for the province. Government has committed to limiting the impact of management for identified wildlife to this level in the short-term.

It is not possible in this determination to specify the exact location or precise amount of additional habitat area that will be required within the timber harvesting land base to implement the IWMS. However, given the province's commitment both to implement the IWMS, and to limit short-term timber supply impacts to one-percent province wide, as well as the expected occurrence of identified wildlife in this TSA, I find it appropriate to account for a one percent impact on timber supply, and I will discuss this further under 'Reasons for decision.'

I encourage the appropriate staff to work to establish WHAs and implement GWMs prior to the next determination for the Lillooet TSA. The establishment of these areas is a significant protective measure of the Forest Practices Code, and will assist with long-term planning and reduce operational conflicts between wildlife and harvesting.

2) ungulate habitat

The Lillooet TSA provides habitat for several species of ungulates, including deer, moose and goat. Approximately 172 000 hectares of mule deer winter range has been mapped in the TSA, of which about 88 000 hectares are within the timber harvesting land base. This

winter range has not yet been made known under the provisions of the *Operational Planning Regulation* or under a higher level plan. For the analysis, the *1992 Okanagan Timber Supply Area Integrated Resource Management Timber Harvesting Guidelines* were applied. These guidelines are now considered obsolete but have not been replaced by any specific management guidelines, as the LRMP is expected to provide direction for the management of ungulate winter range.

In the interim, the district manager provides guidance for the management of ungulate winter ranges. There is no formal policy in place to direct management and therefore in current practice, provisions are developed on a site-specific basis. In some areas, cutblock sizes have been restricted to 5 hectares, and in other areas, faller selection with wildlife tree retention has been used to address mule deer habitat needs.

In the analysis, constraints were applied within the ungulate winter range zone in which at least 20 percent of the stands on the forested land base must be older than 80 years of age at any time.

Currently, the Lillooet LRMP recommendations contemplate a 6000-hectare reduction to the timber harvesting land base of the TSA to accommodate ungulate winter range requirements. However, staff expect that the management requirements will most likely be implemented as a combination of forest cover constraints.

Staff of the former Ministry of Environment, Lands and Parks (now with Ministry of Water, Land and Air Protection) note that moose, goat and sheep habitat requirements were not mentioned in the analysis report. BCFS staff advise that the management requirements for these species are expected to be addressed through the LRMP. It is not expected, however, that any requirements for the management of habitat for these species will result in additional timber supply impacts beyond those for mule deer.

MELP staff also noted that the modelled constraints for mule deer winter range do not reflect current practice, and further that the impacts of current management on timber supply have not been evaluated.

BCFS staff indicate that the analysis assumptions applied in the ungulate winter range zone are not constraining to timber supply. However, they point out there is no confirmed policy direction approved by either the district manager under the *Operational Planning Regulation*, or through the LRMP process. It is not yet possible to assess whether any additional requirements will act to constrain timber supply more than the requirements reflected in the base case forecast.

I have reviewed the information about ungulate winter range and discussed it with district staff. I am aware that the constraints applied in the analysis to approximate management requirements for ungulate habitat does not entirely reflect current practice, and may not necessarily reflect requirements for ungulate habitat management upon completion of the Lillooet LRMP. Notwithstanding this, I note that for the ungulate winter range zone, forest cover constraints were applied to 30 percent of the timber harvesting land base, and from my review I believe that uncertainty about this factor does not represent a significant risk to the base case forecast in the short term.

Once the Lillooet LRMP is complete, it will be possible to assess what requirements will be approved for the management of ungulate habitat, and hence what timber supply impacts may result. I am satisfied that direction arising from the LRMP can be reflected in a future analysis, and I make no adjustments for this determination.

3) grizzly bear habitat

Grizzly bears occur throughout the Lillooet TSA. Although identified as a species under the IWMS, in some parts of the province the management requirements for grizzly bear predate the IWMS implementation.

BC Wildlife staff from the former MELP have grouped members of the species into three grizzly bear population units (GBPU), covering approximately 230 000 hectares of timber harvesting land base in the Lillooet TSA. Provincial biologists consider that the grizzly populations in all three units are threatened.

Grizzly bear habitat management in the TSA has been facilitated through site specific protection of critical habitats, primarily along avalanche tracks. Typically, a 50-metre forested buffer is maintained along either side of critical avalanche tracks. As quantified data about the amount of buffers was not available at the time of the analysis, no specific constraints were applied in the timber supply analysis to account for grizzly bear habitat.

Grizzly bear habitat requirements were examined as part of the Lillooet LRMP. Proposed management requirements include landscape-level forage supply of mid-seral forests, and protection (exclusion) of critical habitats. An impact analysis conducted on 7 test watersheds indicated that the critical habitat protection may result in timber harvesting land base impacts of between 3 and 14 percent. The LRMP proposal includes a planning allowance of 8000 hectares of timber harvesting land base to address critical habitat needs. Excluding the full area from the timber harvesting land base as indicated in the planning allowance would lead to an exclusion of 2.7 percent of the timber harvesting land base. However, at present it is not yet known whether this full exclusion will be required to meet grizzly bear habitat needs.

I have reviewed the information regarding grizzly bear habitat. I am mindful that future exclusions from the timber harvesting land base may result once the Lillooet LRMP has been completed. However, I am also aware that some of the habitat needs for grizzly bear may be addressed through the retention of old and mature forest for landscape-level biodiversity, and through the eventual establishment of connectivity corridors which will accompany the completion of landscape level planning. In the interim, grizzly bear habitat is managed appropriately at the operational level.

For this determination, given that the plan is not yet finalized or approved, the timber supply implications of grizzly bear management are not yet clear, and I am therefore not able to determine if adjustments are required to account for grizzly bear habitat, beyond the many netdowns already applied in the analysis. As information becomes available through the completion and implementation of the LRMP, it can be reflected in a future determination. I am satisfied that operationally, grizzly bear requirements are being considered and also that they can continue to be accommodated over the term of this AAC determination.

4) spotted owl habitat

The northern spotted owl is found exclusively within the temperate coniferous forests of western North America, with its entire Canadian distribution limited to southwestern BC. In 1986, the spotted owl was designated by the Committee on the Status of Endangered Wildlife in Canada as 'endangered', i.e. the owl is 'threatened with imminent extirpation throughout all or a significant portion of its Canadian range'.

Provincially, it's estimated that the majority of spotted owls occur in the Soo (Squamish) and Fraser (Chilliwack) TSAs. As a result, these TSAs were identified as priority areas for the management of spotted owl habitat. For these TSAs, an extensive planning process for the management of spotted owl habitat was conducted jointly by the BCFS and former MELP. In May 1997, the planning process culminated in the release of the cabinet-approved Northern Spotted Owl Management Plan (SOMP). The SOMP included permanent protection of potentially suitable owl habitat in existing and new protected areas, as well as Special Resource Management Zones (SRMZs), which were intended to allow for constrained levels of timber harvesting in order to meet owl habitat objectives. The SOMP also described 'matrix' areas outside the SRMZs and protected areas that have existing owls, which is planned to be phased out over the next 50 years.

Approximately 10 to 20 pairs of spotted owls are estimated to occur in the Lillooet TSA. District staff indicate that there has been no specific management to date for spotted owls in the TSA. Meeting habitat objectives for the confirmed spotted owl nest sites that are consistent with the objectives of the SOMP for the Fraser and Soo TSAs would require special management of approximately 1900 hectares of timber harvesting land base.

The Lillooet LRMP is expected to provide direction on management for spotted owls in the TSA. The LRMP currently recommends a 1000-hectare timber harvesting land base reserve to provide for spotted owl habitat.

I have considered the information about spotted owl in the Lillooet TSA. I am aware that there are spotted owls present in the TSA, and it is likely that future management for the owl may result in constraints on timber harvesting in those areas of the TSA where the owls occur. However, it is not yet clear whether any constraints will be in addition to other constraints already placed on the timber harvesting land base to manage for other resources. It is not yet possible to estimate any implications to timber supply that may result from the management for spotted owls.

I expect that the Lillooet LRMP once complete will provide clarity on this matter. As a result, for this determination I make no adjustments on this account.

- riparian habitat

Riparian habitats occur along streams and around lakes and wetlands. The Forest Practices Code requires the establishment of riparian reserve zones (RRZs) that exclude timber harvesting, and riparian management zones (RMZs) that restrict timber harvesting, in order to protect riparian and aquatic habitats. Stream classes (e.g. S1) described in the *Riparian Management Area Guidebook* are determined based on presence of fish, occurrence in a community watershed and average channel width criteria. The stream classes are used to estimate RRZs and RMZs.

In my previous AAC determination for the Lillooet TSA, I requested that district staff develop more precise estimates of areas retained within riparian reserves and riparian management areas. Since that time an inventory was initiated, but has not yet been completed for the streams in the Lillooet TSA.

For the analysis, in order to account for management in riparian areas, district staff conducted a buffering and overlay process in a Geographic Information System (GIS) to deduct geographically-specific areas from the productive forest land base. RRZs and RMZ widths were calculated for each class of stream. RRZs were entirely excluded, and for RMZs a percentage retention was calculated and an equivalent area reduction was applied. Management around lakes and wetlands was accounted for using the same criteria.

District staff note that no specific reductions were applied to account for management around S6 streams, as the reserve widths equated to a 1-metre buffer on each side of the stream. District staff also note that since the analysis was done, preliminary results of some new stream mapping have identified more stream reaches meeting the S6 criteria. Based on this, staff estimated that an additional 1000 hectares of timber harvesting land base could be within RMZs along these S6 streams.

Input received from Ainsworth Lumber Co. Ltd. commented that the reduction factors applied in the analysis to account for management practices in RRZs and RMZs were based on a theoretical projection of reserve widths according to guidebook values, and not retention criteria applied in actual practice. They recommended an audit of silviculture prescription data to determine the actual levels of retention in current practice. MELP staff also referenced silviculture prescriptions, expressing concern that silviculture prescription data indicates there are more S4 streams than are accounted for in the analysis. In response, district staff agree that the RRZ and RMZ width estimates were based on the recommended guidebook retentions, but indicate that the data used in the analysis reflected the best available information at the time.

The Lillooet LRMP recommends an additional 4000 hectares of timber harvesting land base be set aside to address enhanced management planned alongside S5 and S6 streams. The specific streams have not yet been identified to which this enhanced management may be applied.

I have considered the information about riparian areas and discussed the information with district staff. I accept that the best available information was used to account for management in riparian areas in the timber supply analysis, and that the information is a reasonable proxy for operational management. However, in consideration of the new information presented about S6 streams, I believe that it is appropriate to take into account the exclusion of an additional 1000 hectares of timber harvesting land base to account for management in RRZs. I will discuss my considerations of this further under ‘Reasons for decision’.

I encourage staff to complete the inventory prior to the next determination for the TSA, so that any additional information can be incorporated into the next analysis.

- lakeshore management zones

Lakes within the Lillooet TSA are expected to be classified as per the guidance in the Forest Practices Code and the *Lake Classification and Lakeshore Management Guidebook*, *Kamloops Forest Region*. The classification process involves identifying a 10-metre RRZ and a 200-metre lakeshore management zone. Management objectives for each LMZ are dependent upon the classification of the lake.

Data collection for lake classification was initiated during the summer of 2000 for the lakes in the Lillooet TSA. Preliminary lakeshore management zones have been delineated but the classification process has not been completed. District staff expect that the classification process will occur following completion of the LRMP.

As the classification has not been completed and the management practices not yet described, the timber supply analysis did not include any specific assumptions about management requirements in the LMZs.

District staff estimate that there are approximately 1700 hectares of timber harvesting land base located within the LMZs of the 181 most significant lakes in the Lillooet TSA. Just over half of this area (approximately 900 hectares) is within visually sensitive areas, and were modelled under visual quality constraints in the analysis as discussed under visually sensitive areas.

I have considered the information about lakeshore management zones, and I am satisfied that the analysis reflects the best available information. When the lakeshore classification is completed and management regimes in these areas is clarified, any timber supply implications can be reflected in a future analysis.

- community watersheds

There are 17 designated community watersheds within the Lillooet TSA, encompassing a total of 19 240 hectares or 6.5 percent of the timber harvesting land base.

An equivalent clearcut area (ECA) constraint was modelled in the timber supply analysis to reflect hydrological recovery rates, in accordance with the *Interior Watershed Assessment Procedure Guidebook* and the *Community Watershed Guidebook*.

Based on work completed for the previous timber supply review, the estimated tree height necessary for a stand to reach hydrological recovery in the snow pack portion is 9 metres. On the remaining 40 percent of the watershed a green-up criteria of 3 metres is required before adjacent areas could be harvested. For the purposes of the current timber supply analysis, a maximum of 20 percent equivalent clearcut area with a weighted average of 6.6 metres was used for determining green-up, which represents both adjacency and hydrological recovery on all community watersheds within the forested land base.

District staff indicate that the district manager has recently agreed to manage the Gun Lake watershed as a community watershed. The total area of the watershed is approximately 5000 hectares, about 2400 hectares of which is located in the timber harvesting land base.

Staff from the former MELP noted that the 20 percent ECA constraint is not supported by current legislation or policy. Input from Ainsworth Lumber Co. Ltd. noted that a

30 percent ECA is a more appropriate limitation on harvesting in community watershed areas. BCFS staff confirm that reaching a 20-percent ECA level in a watershed triggers a further watershed assessment but does not cause suspension of harvesting activity.

I am aware that approximately 2400 hectares more timber harvesting land base is now subject to community watershed management constraints than was reflected in the analysis. Community watersheds cover just over 6.5 percent of the timber harvesting land base, and hence are not highly constraining on the total timber supply projections for the Lillooet TSA. On this basis, I am prepared to accept the current assessment of the area (including the additional 2400 hectares) as well as the constraints modelled as the best available information and satisfactory for use in this determination. While the additional 2400 hectares will be managed in a more constrained manner than reflected in the analysis, I do not believe that the timber supply will be significantly impacted by this difference, and therefore I make no adjustments on this account. Any additional information that comes available, such as refinement in techniques to model community watershed constraints can be reflected in the next analysis for the Lillooet TSA.

- cultural heritage resources

Under the *Forest Act*, a cultural heritage resource means 'an object, a site or the location of a traditional societal practice that is of historical, cultural or archaeological significance to British Columbia, a community or an aboriginal community.' Archaeological sites contain physical evidence of past human activity, whereas traditional use sites may not necessarily contain historical physical evidence but may indicate current use by First Nations. Archaeological sites that predate 1846 are protected under the *Heritage Conservation Act*. The nature and extent of required protection of archaeological sites are detailed under this legislation.

An archaeological overview assessment (AOA) was completed in 1998 for the TSA. The overview assessment has proven to have limitations, and has not been a reliable predictor of sites. If sites of potential archaeological importance are discovered during operational planning, consideration is given to designing management practices that avoid disturbance of these sites. In practice, this may require that some areas be excluded from timber harvesting due to the presence of an archaeological resource. At present, because no tracking system has been developed to monitor these occurrences, it is difficult to assess the amount of area affected. Staff advise that a strategic approach is required to estimate the impacts and this should be undertaken for the next timber supply analysis. Broader concerns regarding spiritual areas or land claims are matters that are best addressed through treaty negotiations, as briefly discussed under First Nations.

Regional staff note that the Lillooet TSA is unique because of the high density of known and predicted archaeological sites. There are about 1170 recorded archaeological sites, of which most are located along waterways and hence are likely outside of the timber harvesting land base given the deductions applied in the analysis to reflect riparian buffers along waterways. Therefore, in the timber supply analysis there was no specific accounting for archaeological sites.

The Mount Currie Band expressed concern that cultural heritage resources were not addressed in the timber supply analysis. Staff agree that some newly discovered sites have been found within the timber harvesting land base and should be accounted for.

From the foregoing information it is evident there is some amount of area within the timber harvesting land base that is being affected by the high concentration of archaeological resources found within the TSA. Evidence suggests there is a preponderance of culturally modified trees and old village sites (including pit dwellings) in the area. Given the high probability of some amount of area required to account for these resources, I accept that there is an unquantified but small overestimation of the timber harvesting land base due to this factor. I have accounted for this overestimation as discussed further, under 'Reasons for decision.' For the next determination, I suggest that staff undertake the collection of information to address data gaps regarding cultural heritage resources.

I acknowledge that protection of archaeological areas is being managed by the district manager, unless an alteration permit is issued, and my accounting in this determination reflects the timber supply implications. As I have noted above in "Guiding Principles", no AAC that I determine should be construed as limiting in any way the Crown's obligations with respect to First Nations, and no BCFS timber supply analysis or associated AAC determination should be interpreted as prescribing any particular pattern of harvesting activity in a TSA.

- *landscape-level biodiversity*

Achieving landscape-level biodiversity objectives involves maintaining forests with a variety of patch sizes, seral stages, and forest stand attributes and structures, across a variety of ecosystems and landscapes. Managing for biodiversity is based in part on the principle that this—together with other provisions in the Forest Practices Code, such as riparian management, maintenance of wildlife trees, and other forest cover objectives as discussed throughout this document—will provide for the habitat needs of most forest and range organisms. A major consideration in managing for biodiversity at the landscape level is leaving sufficient and reasonably located patches of old-growth forests for species dependent on, or strongly associated with, old-growth forests.

The delineation and formal designation of 'landscape units' is a key component of a sub-regional biodiversity management strategy. For the Lillooet TSA, landscape unit boundaries and biodiversity emphasis options have not yet been designated. Draft boundaries were used and the provincial weighted averages of 45-45-10 were used in the timber supply analysis.

The Lillooet LRMP will be facilitating the completion of the landscape unit planning and is currently supporting that minimum areas of old-growth forests—old-growth management areas (OGMAs) — be assigned at a level that represents the biogeoclimatic variants of each landscape unit. This criteria was applied in the analysis with the exception that the forests outside the timber harvesting land base that do not contribute to timber supply were assumed to age over time so that, eventually, all non-contributing forests are over 250 years of age. In the analysis, this resulted in the assumption that, over time, an unrealistic

proportion of the old seral requirements (i.e. – OGMAs) could be met from the non-contributing land base.

Clearly, since non-contributing forests do experience stand-level disturbances, the contribution of these forests to meeting old-seral requirements may have been overestimated in the analysis. A review of the timber supply implications of assuming a more realistic ageing pattern for the non-contributing forest and hence appropriate distribution of OGMAs in the timber harvesting land base shows a small downward pressure on timber supply of about 2 percent over the long term. On this basis, as noted in "Reasons for decision", in my determination I have accepted a 2-percent overestimation in the long-term timber supply projection on this account. The introduced risk will be limited by the fact that the next AAC determination will benefit from inventory updates and will include an ageing pattern for the non-contributing forests.

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

Lillooet Land and Resource Management Plan

Portions of plans arising from strategic land use planning processes such as regional or subregional planning (land and resource management planning) may be declared as higher level plans under the Forest Practices Code. A higher level plan defined under the Forest Practices Code establishes government's social, economic and environmental objectives, thereby setting the resource management context for developing subsequent operational plans.

The Lillooet Land and Resource Management Plan (LRMP) covers the entire Lillooet TSA. The Lillooet LRMP process started in November 1995, involving a broad spectrum of land and resource management interests. Late in 2000, agreement was reached to pursue a phased approach to completing the LRMP. Phase 1 established the overall strategic direction for the planning area, including recommendations for new protected areas and the level of impact on resource development across the land base. In April 2001, government announced its acceptance in principle of phase 1 recommendations of the plan.

In November 2001, government reconfirmed that the LRMP would be complete by March of 2002. If necessary, government could refine the plan to ensure the most appropriate land and resource management plan for the Lillooet area.

I requested some additional analysis be completed in order to provide me with information about the potential impacts to timber supply should completion of the LRMP lead to confirmation of the management recommendations as provided in phase 1 of the plan. I have discussed the results of this analysis under the appropriate factors throughout this rationale. However at the time of this determination, the LRMP is not yet complete and the final recommendations arising from the plan are not yet certain. If, following the approval and implementation of the LRMP it becomes apparent that the harvest level does not appropriately reflect the LRMP decision and forest sustainability is at risk, then I am prepared to revisit this decision sooner than in the five years required by legislation.

First Nations considerations

The First Nations in the Lillooet TSA are represented by eight tribal associations who are responsible for strategic planning, economic development and co-ordination of information regarding the lands traditionally claimed by the St'at'imc, N'lakapamux, Secwepmc and T'silquotin First Nations.

Twelve First Nation communities are found within the TSA, mainly along the Fraser and Thompson rivers and Seton Lake, near to Lillooet and Lytton. The communities having reserve lands within the TSA are as follows: Lytton First Nation, Fountain Indian Band, Seton Lake Band, Pavilion Indian Band, Bridge River Indian Band, T'it'q'et (Lillooet) Indian Band, Cook's Ferry Indian Band, Siska Indian Band, Kanaka Bar Band, Cayoose Creek Indian Band, Nicomen Indian Band and Skuppah Indian Band.

In addition, First Nations with reserves outside the Lillooet TSA have significant land-based interests within the TSA include the following: Esketemc (Alkali), N'Quatqua, Ashcroft, Canoe Creek, High Bar, Mount Currie, Oregon Jack and Whispering Pines.

Public input was received from First Nations on the data package and information report, and on the timber supply analysis, socio-economic analysis and public discussion paper.

While the points of view and cultures of First Nations people in the Lillooet TSA are quite diverse, some common themes are apparent. Many First Nation communities within the Lillooet TSA have expressed a desire to have a greater role in the forest economy while still keeping with their beliefs as aboriginal peoples. For some First Nations people achieving balance between industry demands, and forestry practices that take into account good environmental stewardship is fundamental to their participation in forestry.

The Mount Currie Band submitted input indicating that the timber supply review process did not allow for meaningful public input from their members, given their lack of technical expertise and available band funding, and the very technical nature of the process. I asked BCFS staff to meet with members of the band and discuss their concerns.

Having considered the input and concerns carefully, understanding the reasons for and the nature of the concerns expressed, and relying on my authority to address matters within my jurisdiction as chief forester in making an AAC determination for the Lillooet TSA by considering the provisions of section 8 of the *Forest Act*, my responses are as follows.

With respect to the issue of meaningful input and the advocated large reductions in harvest level pending resolution of land title issues, as chief forester I am required by statute to determine an AAC for this and all TSAs in the province, every five years. Land claim processes are ongoing separately and concurrently, and, in accordance with my stated guiding principles for AAC determinations, as formal decisions are made that result in changes in land use or ownership, any significant timber supply implications for the TSA will be reflected in a new AAC as early as possible. In all determinations I must consider the social and economic objectives of the Crown as expressed by the Minister of Forests. As currently expressed, these objectives preclude the determination of a large, disruptive AAC reduction unless such a reduction is required to avoid compromising the long-term productivity of the forest (see below, Minister's letter and memorandum).

Regarding funding, while I appreciate the concern about understanding the technical data in the timber supply analysis, I am unable to either provide or direct funding for developing technical expertise. As noted above in the rationale, I have discussed concerns regarding data gaps and accounting for cultural heritage resources. I suggest that BCFS work with the First Nations to establish a good working relationship through which concerns can be addressed for future AAC determinations.

With respect to opportunities for including First Nations in the economic benefits of timber harvesting, either in joint ventures with existing licensees or in other forms of tenure, these are matters for consideration by the Minister of Forests with respect to the apportionment of the AAC I am now determining, rather than by me as chief forester in the determination of the AAC itself.

With respect to establishing harvest levels for traditional territories identified by individual First Nations, Section 8 of the *Forest Act* requires me to determine an AAC for the TSA *as a whole*. The Act does not provide me with authority to determine multiple harvest levels for specific areas *within* a TSA (e.g. a traditional territory associated with a particular First Nation) although harvest volumes may be specified as attributable to different types of terrain or timber.

In conclusion, I reiterate that it is inappropriate for me to speculate on impacts on land base, forest practices or timber supply that may ensue from treaty agreements until such decisions or agreements are formally complete and implemented. Nevertheless, no AAC that I determine should be construed as limiting in any way the Crown's obligations with respect to the conclusion of a treaty process, and as I have noted earlier in *cultural heritage resources*, in the interim no BCFS timber supply analysis or associated AAC determination should be interpreted as prescribing any particular pattern of harvesting activity in a TSA.

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

Alternative rates of harvest

The nature of the transition from harvesting old growth to harvesting second growth is a major consideration in determining AACs in many parts of the province. In the short term, the presence of large volumes of older forests often permits harvesting above long-term levels without jeopardizing the sustainability of future timber supply. In keeping with the objectives of good forest stewardship, AACs in British Columbia have been and continue to be determined to ensure that current and medium-term harvest levels will be compatible with a smooth transition toward the usually (but not always) lower long-term harvest level. Thus, timber supply should remain sufficiently stable so that there will be no inordinately adverse impacts on current or future generations. To achieve this, the AAC determined must not be so high as to cause later disruptive shortfalls in supply nor so low as to cause immediate social and economic impacts that are not required to maintain forest productivity and future harvest stability.

Several harvest forecasts would have been possible for the Lillooet TSA, given the current management regime and assumptions made in the analysis. The assumptions for these

options are discussed in detail in the *January 2001 Lillooet Timber Supply Area Analysis Report.*

As mentioned under Timber Supply Analysis for the Lillooet TSA, the base case harvest projection illustrated two possible initial harvest levels, one of which assumed a contribution of 25 000 cubic metres per year from the pulpwood agreement stands for the first twenty years.

One alternative in which a non-declining even flow harvest policy was tested, showed that a harvest level of 404 000 cubic metres per year could be maintained for the entire forecast period. The harvest level in this alternative represents a reduction of 40 percent from the current AAC in the Lillooet TSA.

A second alternative showed that the initial harvest level could be as high as 770 000 cubic metres per year, a level that could be maintained for one decade before declining by 10 percent per decade to similar mid- and long-term levels as shown in the base case.

I have reviewed the alternative harvest forecasts provided, and I am satisfied that the harvest flow selected for the base case provides the most suitable forecast of timber supply, and provides a suitable basis from which to evaluate the assumptions applied in the analysis.

Community implications

I have reviewed the information presented in the socio-economic analysis for the Lillooet TSA, and I am aware of the implications to communities of changes in the harvest levels for the TSA.

The Mount Currie Band in its input expressed concern that the socio-economic analysis did not adequately capture implications to First Nations communities of harvest in the TSA, and as well did not address economic considerations for other forest values other than the forest industry.

In response, I note that the socio-economic analysis is intended to provide a general view of the role of the forest industry in the area with respect to the level of economic diversity, primarily to assist in assessing the implications of changes in harvest levels.

First Nations also raised a number of issues related to employment, the value obtained from the harvested timber, and its ultimate destination, which again, I have no authority to address beyond determining the amount of timber that may be harvested in support of such activities and benefits, however they may be distributed.

Difference between AAC and actual harvest

The licensees in the Lillooet TSA have not harvested the full AAC since 1996. Since that time, the harvest level has averaged 72 percent of the total AAC for the TSA.

District staff indicate that the inability to harvest the AAC is the result of numerous and complex issues. The terrain in the TSA is difficult and road-building costs are high, and the market economics have been difficult over the past few years. Related to this issue, the

economics of harvesting some stands, as discussed under *economic and physical operability*, is uncertain. As part of the planning process under the Lillooet LRMP, several study areas have been subjected to deferral pending finalization of the plan. In addition to the actual areas themselves, access to adjacent areas is inhibited by the deferral of operations. This consideration is also prevalent in the deferrals and delays related to areas of First Nations concerns.

I am mindful of the difference between the AAC and the actual level of timber harvesting in this determination.

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

Timber processing facilities

I have reviewed the information regarding timber processing facilities, and I am aware of the reliance of timber processing facilities on the volume harvested in the Lillooet TSA.

Pulpwood Agreements

Pulpwood Agreement (PA) 16 covers parts of the Lillooet as well as the Williams Lake, 100 Mile House and Kamloops TSAs. The PA was issued in April 1990 to Ainsworth Lumber Co. Ltd. as a 25-year non-replaceable licence. The maximum annual harvest under the agreement is 330 000 cubic metres of pulp quality timber, of which 25 000 cubic metres per year can be harvested within the Lillooet TSA. Under the agreement, the licence has undertaken some harvesting in the other three TSAs, however no harvesting has occurred in the Lillooet TSA. As well, both the district and licensee staff indicate that no harvesting is planned due to the current poor economic market and the high costs of operating in the TSA.

In an alternative forecast, a harvest level contribution of 25 000 cubic metres per year was projected for the first 20 years of the analysis horizon. As discussed in other sections of this rationale, low productivity or otherwise unmerchantable coniferous and deciduous forests within the area delineated by the PA boundary contribute to the timber supply. These stands total about 42 284 hectares and contribute to about 14 percent of the timber harvesting land base in both the base case and the alternative forecast. Once harvested, the PA area then contributes to the conventional timber harvesting land base. A sensitivity analysis shows that if the PA area is deducted from the timber harvesting land base after 20 years, the base case forecast can only be maintained for 20 years, and not 30 years as shown in the base case. After 20 years, the harvest level declines (similar to the base case) but there is a severe shortfall in timber supply between the 8th and 12th decade, and the long-term harvest level is 6 percent lower than the base case.

I am mindful that the licence has not yet utilized the PA to harvest the poorer quality stands in the agreement area in the Lillooet TSA. Therefore, although I note that an alternative harvest level of 661 600 cubic metres per year is possible, I will not increase the harvest level at this time to reflect PA 16. If the licensee commits to operations in the future and begins harvesting in those stands under the agreement, then I will consider including the

harvest level in the next AAC determination. However, I am concerned with the amount of low-quality or low-productivity area that continues to contribute to the base case forecast beyond the amount of area and volume that are required to meet the obligations of PA 16. Accordingly, I am requesting that this matter be given careful consideration for the next timber supply analysis to ensure that the timber harvesting land base is not overestimated on this account.

In summary, I note the short-term timber supply is projected to decline sooner, and the long-term timber supply is 6 percent lower without the contribution of the PA area. I am concerned about the potential impact of the uncertainty regarding the contribution of the PA stands, and I have considered this as discussed below, under 'Reasons for decision.'

(d) the economic and social objectives of the government, as expressed by the minister, for the area, for the general region and for British Columbia,

Minister's letter and memorandum

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

The Minister stated in his letter of July 28, 1994, that "any decreases in allowable cut at this time should be no larger than are necessary to avoid compromising long-run sustainability." He placed particular emphasis on the importance of long-term community stability and the continued availability of good forest jobs. To this end he asked that the chief forester consider the potential impacts on timber supply of commercial thinning and harvesting in previously uneconomical areas. To encourage this the Minister suggested consideration of partitioned AACs.

I have considered the contents of the letter and memorandum in my determination of an AAC for the Lillooet TSA.

Local objectives

The Minister's letter of July 28, 1994, suggests that the chief forester should consider important social and economic objectives that may be derived from the public input in the timber supply review where these are consistent with government's broader objectives. Many public responses were received regarding the information report and data package, and the timber supply and socio-economic analyses. The summary of public input is reproduced in full as Appendix 5.

Public input was received on both the data package and information report, and on the analysis report and public discussion paper. Some of the input was related to considerations outside of my authority to consider under section 8 of the *Forest Act*.

However, local objectives have been an important consideration in my determination of an AAC for the Lillooet TSA. I have considered all public input received on the timber supply review, and where appropriate I have responded briefly to this input in this rationale.

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

Unsalvaged losses

I have reviewed the analysis assumptions about unsalvaged losses in the Lillooet TSA, and I am satisfied that losses were appropriately accounted for in the harvest projections. As a result, I will not discuss my considerations of this factor in detail in this rationale.

Reasons for Decision

In reaching my AAC determination for the Lillooet TSA, I have considered all of the factors presented to me, and I have reasoned as follows.

A base case prepared as part of the timber supply analysis projected that the initial harvest level of 636 600 cubic metres per year could be maintained for three decades before beginning a series of 10 percent declines to a long-term level of 368 000 cubic metres per year reached in decade ten.

Section 8 of the *Forest Act* requires me to consider a number of factors in the determination of an AAC for a timber supply area. In determining an AAC, my considerations identify factors which, when considered separately, indicate that the timber supply may actually be greater or less than that projected in the base case. Some factors can be quantified and their impacts assessed with some reliability. Others may influence timber supply by introducing an element of risk or uncertainty to the decision, but cannot be reliably quantified at the time of the determination.

I am satisfied that the assumptions applied in the base case of the analysis for the majority of the factors applicable to the Lillooet TSA were appropriate. Following is my consideration of those factors for which I consider it necessary in this determination to take into account implications to the timber supply projected in the base case.

I am aware of three factors that indicate that the timber supply as projected in the base case may be underestimated, as follows:

1) *environmentally sensitive areas* – as a result of overestimating the amount of unstable areas through the use of older ESA data, I accept that timber supply has been underestimated in the short- and long-term by up to 5 percent on this account.
2) *site productivity* - site productivity of second-growth forests is likely underestimated by site index measurements taken from existing old growth forests. If provincial trends are found to apply to the Lillooet TSA, the underestimation could result in harvest levels that are up to 32 percent higher than the base case in the mid to long term.
3) *use of select seed* – the current level of using select seed for reforestation in the Lillooet TSA indicates a 1.2-percent increase in timber supply over the long term.

I have also identified a number of factors that indicate that the base case harvest projection likely overestimates timber supply, which can be quantified. These factors are as follows:

1) *woodlots* – it is appropriate to take into account the 800 hectares and the associated volume of 700 cubic metres per year for new woodlots that have been issued since the last determination, which reduces the timber supply in the short to long term.
2) *protected areas* – I have taken into account the Spruce Lake area, which results in a reduction in the size of the timber harvesting land base of just less than 4 percent, acting across all time horizons.
3) *riparian management areas* – I find it is appropriate to account for an additional area of class 6 streams identified since the analysis was completed, resulting in an overestimation of the timber harvesting land base in the analysis of approximately 1000 hectares. This impacts the timber supply in the short to long term.
4) *landscape level biodiversity* – I accept that more OGMAs will likely be placed on the timber harvesting land base than were assumed in the analysis due to the continual ageing of the non-contributing land base. This overestimates timber supply by up to 2 percent in the longer term.
5) *pulpwood agreement* –The retention of poorer quality stands contributing to the pulpwood agreement in the timber harvesting land base after the expiry of the agreement leads to an overestimation in timber supply of approximately 6 percent in the mid to long term. In addition, I acknowledge a potential further timber supply deficit projected in decades 8 to 12, if these poorer quality stands remain undeveloped.

There are also a number of factors that indicate that timber supply has been overestimated, but to a degree that cannot be quantified, as follows:

1) *operability* – I accept that there is uncertainty about operability given the economic limitation of harvesting some stands in the Lillooet TSA, which acts across all time horizons.
2) *forest inventory* – I note that at the time of this determination, the initial harvest level projected in the base case forecast is likely to be somewhat more sensitive to those factors exerting downward pressure on timber supply, as a result of the fact that at this time we are already four years into the first decade of the harvest projection.
3) *cultural heritage resources* – I accept that timber supply has likely been overestimated in the analysis as a result of not accounting for the existence of cultural heritage resources on the timber harvesting land base.
4) *identified wildlife management strategy* – I accept that the implementation of the IWMS, including identification of wildlife habitat areas and implementation of general wildlife measures, will result in an impact to the timber harvesting land base of up to 1 percent over the entire analysis horizon.

In addition to the factors described above, there are two additional factors influencing timber supply in the Lillooet TSA. One is the Lillooet LRMP, which is scheduled to be complete by March 2002. If the final plan is similar to the recommendations as outlined in phase 1, then its implementation could result in up to an additional 3.4 percent impact on

the timber harvesting land base for the TSA. However, consistent with my guiding principles, I cannot take these implications into account in this decision, until the management direction becomes clearer following government's finalized plan.

Secondly, I acknowledge the deferrals and harvesting delays associated with First Nations cultural heritage resources and land base concerns. The operational uncertainty posed by these deferrals has in part affected the attainment of the AAC in the TSA. In combination with the land use considerations discussed through the LRMP process, this factor has contributed to a large undercut in the TSA over the past few years.

Having reviewed the information above, I conclude as follows. The impact of those factors that can be quantified indicating that timber supply has been overestimated in the base case of the analysis is about 5 percent in the short-term. The impact of the upward factors influencing timber supply is about 5 percent as well in the short-term. However, also acting as downward pressures in the short-term are factors such as this determination occurring all ready four years into the first decade of the analysis; the operational delays and deferrals associated with First Nations; and the uncertainty around the economic operability in the TSA. These items cannot be quantified at this time. Sensitivity analysis results indicate, however, that the short-term timber supply is relatively stable and is not overly affected by land base withdrawals of up to 10 percent for the next several decades.

When I examine the factors influencing the long-term timber supply, I note that they generally act to decrease timber supply in the order of magnitude of about 10 to 14 percent. Those factors acting to potentially increase the long-term timber supply, however, are in the range of between 1 and 38 percent. I recognize that there are uncertainties around land use decisions, and First Nations considerations, which cannot be taken into account in this determination but which nonetheless pose a risk to long-term timber supply. However, from my review of the information I am satisfied that those factors acting to increase timber supply in the TSA could mitigate some downward pressures in the mid to long term.

This brings me to my consideration of the PA, and whether it is appropriate in this determination to include an additional 25 000 cubic metres per year for the duration of the agreement term. I am aware that no operations have taken place in the Lillooet TSA in the stands contributing to the agreement, and none are currently planned. On this account, I do not think it appropriate to include this harvest level in my AAC determination at this time. If the licensee commits to operations in the future and begins harvesting in those stands under the agreement, then I will consider including the harvest level in a future AAC determination. I note that, regardless of whether I include this harvest level, the analysis has shown that in the short term, the stands and volume are indeed available operationally for harvest in the Lillooet TSA should the licensee chose to begin operations.

Furthermore, if it becomes apparent that the forest types that contribute to the PA in the Lillooet TSA are found to be uneconomic to harvest over the long term, then this should be explored further for the next determination. A sensitivity analysis shows that if the PA area is deducted after 20 years, the base case forecast can only be maintained for 20 years, and not 30 years as shown in the base case. After 20 years, the harvest level declines (similar to the base case) but there is a severe shortfall in timber supply between the 8th and 12th decade, and the long-term harvest level is 6 percent lower than the base case. Therefore, it

is important to review the PA area and assess its appropriate contribution to the short- and long-term timber supply.

I am concerned that there are a number of factors acting to decrease the mid- to long-term timber supply in the Lillooet TSA. I have not taken into account those factors whose implications to timber supply are still unclear at this time, such as the expected management arising from the Lillooet LRMP, land base deferrals for First Nations considerations and the long-term contribution of PA 16. Should any decisions be made by either the district manager or government over the term of this determination which clarifies timber supply implications, then I am prepared to redetermine an AAC for the TSA sooner than in the five years required by legislation.

In consideration of the foregoing information, I am confident that short-term timber supply in the Lillooet TSA can be maintained despite the factors acting to decrease it. In addition, I find it likely that the mid-term reductions could be somewhat less than indicated in the base case forecast, and that longer-term timber supply may be somewhat greater. However, if it is appropriate to reduce the PA 16 area contribution to the timber supply at the time of the next determination, then this could mitigate the mid- and long-term improvements. More clarity on the issues discussed above should provide a better assessment of mid- to long-term timber supply dynamics for the next determination. Finally, I have accounted for the additional volume issued to woodlots since the last determination. I am satisfied that an appropriate harvest level for the Lillooet TSA at this time is 635 900 cubic metres per year.

Determination

I have considered and reviewed all the factors as documented above, including the risks and uncertainties of the information provided. It is my determination that a timber harvest level that accommodates objectives for all forest resources during the next five years, that reflects current management practices as well as the socio-economic objectives of the Crown, can be best achieved in the Lillooet TSA by establishing an AAC of 635 900 cubic metres, effective January 1, 2002. This AAC excludes the area and volume issued to woodlot licences since the previous determination, and is otherwise unchanged from the current AAC.

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

Implementation

In the period following this decision and leading to the subsequent determination, I encourage BCFS staff to undertake the tasks and studies noted below that I have also mentioned in the appropriate sections of this rationale document. I recognize that the ability of staff to undertake these projects is dependent on available staff resource time and funding. These projects are, however, important to help reduce the risk and uncertainty associated with key factors that affect the timber supply in the Lillooet TSA. I recommend that district staff:

- conduct a timber opportunity or similar study to facilitate assessment of the economically operable land base in the TSA;
- collect data on site productivity from stands within the TSA;
- undertake the work to collect information to address data gaps around cultural heritage resources; and
- over the term of this determination, work with the First Nations to establish a good working relationship through which concerns can be addressed.

Larry Pedersen
Chief Forester

December 11, 2001

Appendix 1: Section 8 of the *Forest Act*

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

Allowable annual cut

8. (1) The chief forester must determine an allowable annual cut at least once every 5 years after the date of the last determination, for

(a) the Crown land in each timber supply area, excluding tree farm licence areas, community forest areas and woodlot licence areas, and

(b) each tree farm licence area.

(2) If the minister

(a) makes an order under section 7 (b) respecting a timber supply area, or

(b) amends or enters into a tree farm licence to accomplish the result set out under section 39 (1) (a) to (d),

the chief forester must make an allowable annual cut determination under subsection (1) for the timber supply area or tree farm licence area

(c) within 5 years after the order under paragraph (a) or the amendment or entering into under paragraph (b), and

(d) after the determination under paragraph (c), at least once every 5 years after the date of the last determination.

(3) If

(a) the allowable annual cut for the tree farm licence area is reduced under section 9 (3), and

(b) the chief forester subsequently determines, under subsection (1) of this section, the allowable annual cut for the tree farm licence area,

the chief forester must determine an allowable annual cut at least once every 5 years from the date the allowable annual cut under subsection (1) of this section is effective under section 9 (6).

(4) If the allowable annual cut for the tree farm licence area is reduced under section 9 (3), the chief forester is not required to make the determination under subsection (1) of this section at the times set out in subsection (1) or (2) (c) or (d), but must make that determination within one year after the chief forester determines that the holder is in compliance with section 9 (2).

(5) In determining an allowable annual cut under subsection (1) the chief forester may specify portions of the allowable annual cut attributable to

(a) different types of timber and terrain in different parts of Crown land within a timber supply area or tree farm licence area, and

(b) different types of timber and terrain in different parts of private land within a tree farm licence area.

(c) [Repealed 1999-10-1.]

(6) The regional manager or district manager must determine an allowable annual cut for each woodlot licence area, according to the licence.

(7) The regional manager or the regional manager's designate must determine a rate of timber harvesting for each community forest agreement area, in accordance with

(a) the community forest agreement, and

(b) any directions of the chief forester.

(8) In determining an allowable annual cut under subsection (1) the chief forester, despite anything to the contrary in an agreement listed in section 12, must consider

(a) the rate of timber production that may be sustained on the area, taking into account

(i) the composition of the forest and its expected rate of growth on the area,

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

(iii) 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 the chief forester's opinion, relates to the capability of the area to produce timber,

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

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

(d) the economic and social objectives of the government, as expressed by the minister, for the area, for the general region and for British Columbia, and

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

- - - - - -

Appendix 2: Section 4 of the *Ministry of Forests Act*

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

Purposes and functions of ministry

4. The purposes and functions of the ministry are, under the direction of the minister, to

(a) encourage maximum productivity of the forest and range resources in British Columbia;

(b) manage, protect and conserve the forest and range resources of the government, having regard to the immediate and long term economic and social benefits they may confer on British Columbia;

(c) plan the use of the forest and range resources of the government, so that the production of timber and forage, the harvesting of timber, the grazing of livestock and the realization of fisheries, wildlife, water, outdoor recreation and other natural resource values are coordinated and integrated, in consultation and cooperation with other ministries and agencies of the government and with the private sector;

(d) encourage a vigorous, efficient and world competitive timber processing industry in British Columbia; and

(e) assert the financial interest of the government in its forest and range resources in a systematic and equitable manner.

Documents attached:

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

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

Appendix 5: 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

Province of British Columbia
OFFICE OF THE MINISTER

Ministry of Forests

MEMORANDUM

File: 16290-01

February 26, 1996

To: Larry Pedersen
Chief Forester

From: The Honourable Andrew Petter
Minister of Forests

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

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

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

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

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

.../2

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

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

Andrew Petter
Minister of Forests

Lillooet Timber Supply Area
Timber Supply Review

Summary of Public Input

BC Ministry of Forests
Lillooet Forest District
650 Industrial Place
Bag 700
Lillooet, BC
V0K 1V0

December, 2001

This is a summary of the public input received on the Timber Supply Review in the Lillooet Timber Supply Area. This summary does not assess the feasibility or validity of the input or whether it relates to the clearly defined mandate of the chief forester in the allowable annual cut determination.

Lillooet Timber Supply Area

Background

As part of the review of timber supply in the Lillooet Timber Supply Area (TSA), two opportunities were provided for public input. The first followed release of the Lillooet Timber Supply Area *Data Package* and *Information Report* in June 1999. The *Information Report* was a non-technical summary of the draft data and management assumptions that were to be applied in reviewing the timber supply for the Lillooet TSA. A 30-day review period, ending July 19, 1999, was provided for the public to comment on these documents.

On January 25, 2001, the British Columbia Forest Service released the *2001 Lillooet Timber Supply Area Analysis Report* and *Public Discussion Paper*. The public was encouraged to review and comment on the accuracy of the information in these documents and to provide additional information during the 60-day review period that ended March 26, 2001.

This report summarizes the input received during both public review periods. This information was provided to the chief forester for his consideration when he reviewed the allowable annual cut (AAC) for the Lillooet TSA. The first section of this summary outlines the public review process implemented by the Forest Service, and describes the types of public input received. The second section summarizes the public input in sufficient detail to indicate the range of input received. The original submissions (with personal identifiers removed in accordance with the *Freedom of Information and Protection of Privacy Act*) can be reviewed at the Lillooet Forest District office.

Public Review Process and Response

Lillooet District staff actively solicited public input on the Timber Supply Review in the Lillooet TSA through the following actions:

- approximately 200 copies of the *Information Report*, *Data Package, Analysis Report* and *Public Discussion Paper* were mailed to stakeholders in the TSA, such as First Nations, licensees, local environmental groups and local governments. Meetings or presentations were offered.
- the *Data Package* and *Analysis Report* were available at the district office in Lillooet and the regional office in Kamloops; approximately 20 were picked up.
- newspaper advertisements were placed, advising of the availability of all documents for review by the public.
- copies of all the documents were made available to the local media and one radio interview was conducted.
- a meeting with the Lillooet Tribal Council was held in February 2001 regarding the *Analysis Report*.
- district staff had a display table at a community open house on February 17. Approximately 600 people attended this broad-based community event.
- staff attended forest development plan open houses in Lytton, Spence's Bridge, Goldbridge and Lillooet in March 2001 in order to answer questions about the Timber Supply Review and the *Analysis Report.*
- referrals were made to the Ministry of Forests website where documents were available to download.

The Lillooet Forest District received five written submissions on the *Data Package* and six submissions on the *Analysis Report* (see Appendix 1).

Public Input

In this section, public input on the information presented in the Timber Supply Review documents for the Lillooet TSA is summarized under the following headings:

- Data Package (and Information Report)
- Timber Supply Area Analysis Report (and Public Discussion Paper)
- Other comments

Data Package

Land Base Factors

Ainsworth Lumber Co. Ltd. (Ainsworth Lumber) says the 90 percent reduction applied to areas that are environmentally sensitive due to soil conditions is overly conservative, and this should be reviewed in concert with terrain stability mapping.

With regard to the definition of problem forest types, Ainsworth Lumber says a site index cut-off should only be used in immature stands. The company says the use of site index as a netdown factor in mature stands has proven to be very unreliable and to overestimate the appropriate level of reduction.

Ainsworth Lumber notes that a significant proportion of existing deciduous-leading stands naturally convert to coniferous-leading and, rather than excluding these stands from the timber harvesting land base, a deferral with an appropriate regeneration delay would be appropriate. The company also asks if all excluded types will contribute to forest cover requirements.

With regard to estimates of roads, trails and landings, Ainsworth Lumber says a large proportion of this area is occupied by temporary roads and landings and a significant portion supports healthy regeneration. The company says some recognition of regeneration ingress is needed.

Existing Inventory

Ainsworth Lumber says the results of current inventory work indicate that an increase of about 12 percent in the estimate of existing mature volumes should be incorporated into the analysis.

Expected Rate of Growth

Ainsworth Lumber says the yields from genetically improved planting stock should be included in the analysis, as recently directed by the chief forester.

Ainsworth Lumber questions the application of operational adjustment factors (OAFs), which represent a significant volume reduction in immature stands. The company says other TSAs are recommending the use of revised factors for OAF1, and asks what is the intention in the Lillooet TSA. As well, Ainsworth Lumber says the use of harvest criteria based on diameter limits rather than age will reduce OAF2 losses in higher productivity stands.

Ainsworth Lumber says the exclusive use of volume per hectare as the criterion to determine minimum harvestable age is inappropriate, and stands should be eligible for harvest when they meet either an age or volume criterion. The company says some low-volume stands (e.g., dry-belt Douglas-fir) may not ever meet the volume criterion.

Not-Satisfactorily Restocked Areas

Ainsworth Lumber says the level of current NSR land base should not be included as part of this analysis, as the regeneration delay component of yield curves covers that.

Utilization Standards

An individual submission questions why wet-belt and dry-belt Douglas-fir stands have different minimum diameter standards.

Visually Sensitive Areas

Ainsworth Lumber says the factors used to remove visually sensitive areas from the harvesting land base are not consistent with those used in the Kamloops Land and Resource Management Plan (LRMP), and asks for clarification.

Wildlife

The submission from the former Ministry of Environment, Lands and Parks (MELP) questioned the source of the 100-year rotation used for deer winter range, saying a 175-year rotation will more closely model deer winter requirements. MELP said the *Data Package* should mention that grizzly bear security requirements adjacent to avalanche chutes were addressed and have a negligible impact on the AAC.

MELP also noted that no mention is made of moose requirements, or goat and sheep winter range. While it's difficult to assess current practices, MELP said the *Data Package* should at least mention these species and note that their habitat needs will be addressed through the Lillooet LRMP guidelines.

Riparian Management

Ainsworth Lumber says the land base reductions for riparian areas are based on a theoretical projection, and recommend the Forest Service conduct an audit of recent silviculture prescriptions to determine the actual level of reductions.

MELP noted that not all S4 streams (streams <1.5 metres wide that are fish-bearing or in a community watershed) are accounted for. This submission says while the volume impact may be quite small, the *Data Package* should mention this uncertainty.

Community Watersheds

Two submissions note that community watersheds do not have a 20-percent equivalent clearcut area (ECA) limit, but that that level is a trigger for further watershed assessment. Ainsworth Lumber says a 30-percent ECA is a more appropriate limitation on the level of harvesting in community watersheds.

Stand Level Biodiversity

Ainsworth Lumber says it is inappropriate to apply a volume reduction for individual wildlife trees as in many cases stocking levels are not affected by the remaining single trees.

The company also says the use of silviculture prescription performance to assess wildlife tree patch (WTP) reductions is inappropriate. Ainsworth Lumber says as landscape level plans are developed, the level of WTP will be reduced to target levels. As well, the company says many WTPs will not persist, as they will be harvested in the second pass and subsequently replaced.

Pulpwood Agreement

Ainsworth Lumber expresses the opinion that the *Data Package* fails to recognize the contributing timber types and current harvest allocated to Pulpwood Agreement (PA) 16. The company says this is a fundamental flaw and the analysis units must recognize the original stand definitions used in the justification of PA 16.

Unsalvaged Losses

Ainsworth Lumber questions the reduction factors used to account for unsalvaged losses, saying both wind and epidemic insect losses are partially accounted for in inventory samples.

Timber Supply Area Analysis Report

Land Base Factors

One submission expresses the opinion that a large amount of timber that is not economically viable is included in the timber harvesting land base, inflating the AAC to an unattainable level and ensuring that little economical timber can be removed to protect other values.

The same submission says that although large areas needed for recreation and conservation are provided for through the Land and Resource Management Plan (LRMP), many trails in the TSA require some protection (e.g., Marriot Basin in upper Cayoosh and the Shulaps Range need some special management to protect trails). This individual suggests a 5,000-hectare budget be allocated for protection of recreation trails and special features.

Pulpwood Agreement

Ainsworth Lumber says they intend to see operations continue at the 100 Mile House oriented strand board facility, and believe it would be prudent to model the continuation of some form of pulpwood harvest beyond the time frame of the current pulpwood agreement.

Actual Harvest Levels

An individual submission notes that Ainsworth Lumber Co. has not cut their full AAC for years, has been laying off workers and cutting back operations, and is now trying to sell the Chasm mill and Savona timber rights. This individual says Ainsworth Lumber shouldn't be allowed to sell the timber rights, but they should remain in the Lillooet TSA to provide jobs in local communities.

A submission from Lytton Lumber Ltd. clarifies that the reason for the company's undercut from 1996-1999, referred to in the *Analysis Report*, was primarily due to efforts to balance previous overcuts. The company says this is entirely different than other licensees who were reducing activities, while Lytton Lumber was significantly expanding mill production levels.

Other Comments

All submissions commented on factors or issues other than those specifically covered by Timber Supply Review documents. These comments are summarized in this section.

Timber Supply Review Process

Ainsworth Lumber raises a number of questions regarding the analysis process (e.g., ownership codes on maps; the status of three studies directed to be completed by the chief forester in the previous timber supply review) and recommends three sensitivity analyses to be completed. The company also says that, in light of the cost implications of the Forest Practices Code, they are currently reviewing the long-term economic potential of various timber types and geographic regions within the Lillooet TSA. The company says the results of this review may have implications to the Timber Supply Review.

The submission from Tyax Mountain Lake Resort expresses the opinion that the forested land base is only being managed for timber harvesting and that the needs of wilderness operators and resorts should also be recognized and integrated. The resort says the attraction for their guests is a forest that is still standing, underlining the fact that a standing forest can be a long-term investment and moneymaker for the province.

The Outdoor Recreation Council expresses concern that the Lillooet LRMP will not be approved by the provincial government prior to the AAC determination. The Council says it will be difficult to accommodate recreation needs if the AAC remains high for the next five years, because the anticipated new protected areas that result from the LRMP process would remain in the land base for the timber supply analysis.

An individual submission (from a forestry professor at UBC) also expresses concern about the interaction between the TSR and the LRMP. The concerns include:

- most LRMP table members do not understand how LRMP decisions influence the AAC. The Forest Service should have put a lot more effort into educating the table about timber supply.

- there is no overall forest management plan for the Lillooet TSA. Public input via the LRMP and the TSR is not adequate, and will result in more conflict in this TSA.
- harvesting in this TSA is very spatially-constrained, and it's unfortunate resources were not available to create spatially-based scenarios to illustrate what the future forest or landscape will look like.
- the public must be directly and cooperatively involved in forest management planning, with visual tools and good understanding and with all parties at the table. The TSR process needs to be embedded in this.

Forest Tenures

An individual submission says the AAC should be better apportioned to licensees based on criteria such as the number of jobs created per 1000 cubic metres. This individual also says any undercut volumes should be reallocated to other licensees based on performance.

Harvest Levels

Two submissions say they favour a sharply lower, more realistic AAC. The following reasons are offered:

- the history of the undercut and the current estimate of the long-term harvest level indicate the AAC needs to come down dramatically.
- commodity prices appear to have a large impact on harvest levels in this TSA, particularly given the high costs of getting the wood out, making a high AAC unattainable.
- First Nations' interests and the outcome of the LRMP will have an impact on the AAC.

These two submissions note that the Conservation, Recreation, Tourism and Community LRMP proposal supports a harvest level higher than the current average cut.

Appendix 1

Submissions received by the Lillooet Forest District

Submissions received on the Data Package

Forest industry

Ainsworth Lumber Co. Ltd.

Interest groups

Outdoor Recreation Council of B.C.

Government agencies

(former) Ministry of Environment, Lands and Parks

General public

two individual submissions

Submissions received on the Timber Supply Analysis Report

Forest industry

Ainsworth Lumber Co. Ltd.
Lytton Lumber Ltd.

Interest groups

The Southern Chilcotin Mountains Wilderness Society
Tyax Mountain Lake Resort

General public

two individual submissions