BRITISH COLUMBIA
MINISTRY OF FORESTS

Williams Lake Timber Supply Area

Rationale for Allowable Annual Cut (AAC) Determination

Effective January 1, 2003

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Objective of this document

This document provides 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 Williams Lake timber supply area (TSA). The document identifies where new or better information is needed for incorporation in future determinations.

Documentation and process

Each AAC determination for a TSA is preceded by the release, for First Nations and public review and comment, of a data package and information report explaining the inputs and assumptions to be incorporated in a forthcoming timber supply analysis for the area. Comments are received and inputs or assumptions are amended as appropriate. Later the analysis report is released together with a public discussion paper, for review and comment. The report includes a comprehensive review of the volumes of timber projected to be available for harvest under specified assumptions and conditions, as well as a socio-economic analysis. A summary of the First Nations review and comments is documented in the First Nations section, and a summary of the public input received is published as an appendix to this rationale statement.

In this rationale for the Williams Lake TSA I attempt to avoid reiterating already published information. Where I conclude from my review that a particular aspect of current practice is adequately explained in earlier documents, and where its treatment in the analysis is consistent with this explanation, I simply present my finding that this consistency is confirmed for that factor. The rationale then focuses primarily on instances where I find differences between some aspect of current practice, the information previously made public about that particular aspect of practice, or the way it was dealt with in the analysis. I also address areas of particular uncertainty and specific assumptions or information that have drawn considerable public input or contention. In this way, the combined documents published in the process that culminates in this determination provide a full description and accounting of the factors considered in the AAC determination as required under section 8 of the *Forest Act*.

Description of the Timber Supply Area

The Williams Lake TSA covers approximately 4.9 million hectares in the Cariboo Forest Region in the central interior of the province. The TSA is bounded by the Quesnel TSA to the north, Wells Gray Park and Mitchell-Niagara Park to the east, the 100 Mile House and Lillooet TSAs to the south, and Tweedsmuir Provincial Park, Kingcome TSA and Sunshine Coast TSA to the west. The Williams Lake TSA is a complex management unit, spanning three forest districts and extending from a coastal influence in the west, across the broad Chilcotin plateau, including the drier interior Douglas-fir along the Fraser and Chilcotin River corridors, through to the rain shadow of the Cariboo Mountains in the east. The TSA is administered by the Chilcotin Forest District office in Alexis Creek, the Williams Lake Forest District office in Williams Lake, and the Horsefly Forest District office in Horsefly.

About 64 percent (approximately 3.15 million hectares) of the 4.9-million hectare Williams Lake TSA area is Crown forest land managed by the British Columbia Forest

Service. Currently about 67 percent of the Crown forest land (2.1 million hectares, or about 43 percent of the total TSA land base) is considered available for timber harvesting.

A detailed description of the TSA, including information on: landscape types; forest types; bio-geoclimatic zones; wildlife habitats and species; species at risk; demographics; First Nations populations and their involvement in the forestry sector; natural resources; and land-use planning status, is presented in the Ministry of Forests' *Williams Lake Timber Supply Area Analysis Report September 2001* (the analysis report). In my view this provides a description of the TSA that is both accurate and helpful to an understanding of this AAC rationale statement. The analysis report also includes socio-economic information including local dependency on harvesting activity in the TSA.

Current forest management practices in the TSA, including the protection of many non-timber resources and values, follow the legislation set out by the *Forest Practices Code*. In addition, the Cariboo-Chilcotin Land Use Plan provides management direction for public forest lands in the Williams Lake TSA, including direction for wildlife habitat.

History of the AAC

In 1981 an AAC of 2 500 000 cubic metres was determined for the TSA. This AAC included no contribution from the three western supply blocks. In 1985 an increase of 1 250 000 cubic metres was determined to allow for the harvesting of stands infested or threatened by the mountain pine beetle. The resulting AAC of 3 750 000 cubic metres was further increased in 1989 with the addition of a partition of 600 000 cubic metres for stands in the three western supply blocks. At that time the partition for timber damaged by beetles was reduced by 257 490 cubic metres, for a total AAC of 4 092 510 cubic metres. In 1992, this AAC was reduced by 117 510 cubic metres, in recognition of the declining beetle problem. At the same time, a further partition of 25 000 cubic metres was added, attributable to deciduous stands throughout the TSA, resulting in a total AAC in 1992 of 3 975 000 cubic metres.

In December 1995 the AAC was determined at 3.807 million cubic metres, effective January 1996, a decrease of 168 000 cubic metres from the 1992 level. Following a judicial review of this determination, the AAC was confirmed, as documented in the *Rationale for reconsideration of Allowable Annual Cut determination*, March 31, 1997. This AAC included four partitions: 2 500 000 cubic metres attributable to coniferous stands in the main TSA, of which a minimum of 100 000 cubic metres were required to be taken from stands classified as problem forest types; 350 000 cubic metres attributable to the three western supply blocks; and 107 000 cubic metres attributable to problem forest types in the area covered by Pulpwood Agreement (PA) 16. In addition, up to 850 000 cubic metres were allowed to be harvested throughout the TSA for the salvage of timber killed by beetles. The earlier partition for harvesting deciduous types was removed.

The total AAC of 3.807 million cubic metres is currently apportioned by the Minister of Forests as follows.

Tenure types	Partitions (m3/yr)				Totals	Percent of AAC
	Main TSA conventional	Mountain pine beetle	3 western. supply blocks	PFT* in PA 16		
Forest licences (replaceable)	2 055 793	0	0	0	2 055 793	54
Forest licences(non-replaceable)	21 454	700 000	290 000	0	1 011 454	26.6
Timber sale licences> 10 000 m^3 (replaceable)	10 760	0	0	0	10 760	.3
SBFEP †	344 720	150 000	50 000	0	544 720	14.3
Woodlot licences ‡	51 096	0	5 000	0	56 096	1.5
Pulpwood agreements	0	0	0	107 000	107 000	2.8
FS Reserve	16 177	0	5 000	0	21 177	.5
Totals	**2 500 000**	**850 000**	**350 000**	**107 000**	**3 807 000**	**100**

* Problem forest types, or forests of low productivity, in the area covered by Pulpwood Agreement 16.

† Small Business Forest Enterprise Program.

‡ AACs for woodlot licences are determined and administered separately from the AAC for the TSA, as required by the *Forest Act*. Therefore, the area and AAC volumes of woodlot licences are removed from consideration when determining the AAC for the TSA. The volume apportioned here for woodlot licences is 56 096 cubic metres, of which 23 620 cubic metres have been allocated in licences issued since the last AAC determination; this volume is excluded from the new AAC determined for the TSA.

New AAC determination

Effective January 1, 2003, the new AAC for the Williams Lake TSA will be 3 768 400 cubic metres.

Within this total AAC, the partition for the harvestable volume attributable to the main TSA is reduced from 2 500 000 cubic metres to 2 361 400 cubic metres, of which at least 70 000 cubic metres must be taken from low-volume stands containing from 65 to 100 cubic metres per hectare. The partition for the harvestable volume attributable to the three western supply blocks is increased from 350 000 cubic metres to 450 000 cubic metres, of which at least 100 000 cubic metres must be taken from low-volume stands. The harvestable volume of low-productivity stands attributable to the area of Pulpwood Agreement 16 remains unchanged at 107 000 cubic metres. The harvestable volume attributable to stands damaged by beetles throughout the TSA is maintained at 850 000 cubic metres.

This AAC excludes all volumes in issued woodlot and community forest licences. This new AAC will remain in effect until another new AAC is determined, which may take place within five years from the date of this determination.

The following observation forms an integral part of this determination. Staff of the BCFS will annually monitor and apprise the chief forester of the condition of the currently increasing new infestation of mountain pine beetles, and of the declining volumes of salvageable timber remaining from the previous infestation, on the understanding that, if and when required, this determination may be revisited at a date earlier than five years.

Information sources used in the AAC determination

- *Williams Lake Timber Supply Area: Rationale for AAC Determination*, British Columbia Ministry of Forests, Victoria, British Columbia, January 1, 1996;
- *Williams Lake Timber Supply Area: Rationale for reconsideration of AAC Determination*, British Columbia Ministry of Forests, Victoria, British Columbia, March 31, 1997;
- *Williams Lake Timber Supply Area Timber Supply Review Data Package and Information Report,* British Columbia Forest Service (BCFS), August 1999;
- *Williams Lake Timber Supply Area Analysis Report,* BCFS, September 2001;
- *Williams Lake Timber Supply Area Public Discussion Paper,* BCFS, September 2001;
- *Williams Lake TSA Summary of Public Input,* BCFS; November 2002;
- A*n Examination of Volume Adjustment Factors for the Williams Lake TSA,* BCFS, March 2000;
- *Cariboo-Chilcotin Land Use Plan*, October 1994;
- *Cariboo-Chilcotin Land Use Plan: 90-Day Implementation Plan, Final Report,* February 1995;
- *Cariboo-Chilcotin Land Use Plan Integration Report,* April 6, 1998;
- *Biodiversity Conservation Strategy for the CCLUP,* July 1996;
- *1996 Caribou Strategy,* 1996;
- *1998 Caribou Strategy Update,* September 1998;
- *Cariboo Region Landscape Unit Planning Strategy*, 1999;
- Forest Inventory Planning file, BCFS;
- *Williams Lake TSA Inventory Audit*, BCFS Resource Inventory Branch, 1999;
- *Inventory Audit- Extended Analysis Williams Lake TSA*, BCFS, July 15, 1999;
- *Regional Mule Deer Winter Range Management Strategy* for the CCLUP, June 1996;
- *Regional Mule Deer Winter Range Strategy Update*, November 14, 2000;
- *Mountain Caribou Strategy,* October 2000;
- *Annual SDM letters, 1998, 1999, 2000* SDM guide to licensees for submitting FDPs;
- *Establishment to Free Growing Guidebook,* April 1995;
- *Guidelines for Tree Species Selection and Stocking Standards for British Columbia*, BCFS, 1993;
- *Forest Practices Code of British Columbia Act* and Regulations;
- *Forest Practices Code Guidebooks*, Ministry of Environment, Lands and Parks (MELP) and BCFS;
- *Managing Identified Wildlife: Procedures and Measures, Volume 1*. BCFS and MELP, 1999;
- Five-year timber harvesting development plans;

- Integrated Silviculture Information System (ISIS) and Major Licence Silviculture Information System (MLSIS) history records, BCFS;
- *Anahim Round Table Resource Management Plan (Consensus document),* Jan 1994;
- *Anahim Round Table (ART) Sub Regional Plan document,* Nov 21, 2000;
- *South Chilcotin SRP* Document Feb 26, 1999;
- Draft *Horsefly SRP* Document Dec 21, 2001;
- *Consensus Report of the Chilko Lake Study Team,* Sept 16, 1993;
- Provincial correlated guidelines for management of uneven aged Dry-belt Douglas-fir stands in B.C., BCFS, 1992;
- Williams Lake TSA Association Annual PFT Reports;
- *Forest Practices Code Timber Supply Analysis*, BCFS and MELP, February 1996;
- 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 regarding visual resources;
- Letter from the Deputy Ministers of Forests and Environment, Lands and Parks, dated August 25, 1997, conveying government's objectives regarding the achievement of acceptable impacts on timber supply from biodiversity management;
- Technical review and evaluation of current operating conditions through comprehensive discussions with BCFS staff, notably at the AAC determination meeting with Williams Lake regional and district staff, November 28 and 29, 2001.

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 Williams Lake 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 timber supply areas and tree farm licences. 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 a reasonable degree of 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, in cases where projections of short-term timber supply are not stable, to ensure they incorporate current information and knowledge—a principle that has been recognized in the legislated requirement to redetermine these 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. The timber supply implications of some of the Act and its regulation, in some cases still remain uncertain, particularly when considered in combination with other

factors (for example landscape biodiversity provisions). In each AAC determination, I take these uncertainties into account to the extent possible in context of the best available information.

More recently, on November 21, 2002, government passed the new *Forest and Range Practices Act*, which will ultimately replace the *Forest Practices Code of British Columbia Act.* As the timber supply implications of this new Act and any pursuant regulations become clear and measurable, they will be accounted for in AAC determinations. Uncertainties will continue to be handled as they were under the previous legislative regime.

The eventual timber supply impacts associated with strategic land-use decisions resulting from the various planning processes—including the Cariboo Chilcotin Land-Use Plan, Protected Areas Strategy, Land and Resource Management Planning (LRMP) or other area-based planning processes—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 regular 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.

The Williams Lake TSA lies within the area covered by the Cariboo Chilcotin Land-Use Plan (CCLUP). Forest development in the TSA is required to be consistent with aspects of the plan that incorporate Higher Level Plan (HLP) direction as provided under the Forest Practices Code. The Cariboo Mid-Coast Interagency Management Committee (CMC-IAMC) and the Cariboo Chilcotin Regional Resource Board (CC-RRB) are mandated by government to monitor the implementation of the CCLUP. The CMC-IAMC and CC-RRB provide advice to the FPC statutory decision-makers regarding the best information available with respect to consistency with the CCLUP. The statutory decision-makers periodically inform licensees on how they will consider this advice or information in operational plan decisions. The timber supply analysis and my considerations in this AAC determination are consistent with the direction from the statutory decision-makers to licensees as representative of current management.

A number of intensive silviculture activities have been undertaken in the past 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 decisions in the British Columbia Court of Appeal and the Supreme Court of Canada. The AAC that I determine should not in any way be construed as limiting the Crown's obligations under these decisions. In this respect it should be noted that my determination does not prescribe a particular plan of harvesting activity within the Williams Lake TSA. It is also independent of any decision by the Minister of Forests with respect to subsequent allocation of the wood supply.

The British Columbia Court of Appeal decided in March 2002 that pending the final determination of the existence of aboriginal rights and title, the Crown has an obligation to consult with First Nations with respect to asserted rights and title in a manner proportional to the strength of the interests. I consider any information brought forward respecting First Nations' interests. In particular I consider information related to actions taken to protect interests, including operational plans that describe forest practices designed to seek to address such First Nations' interests. In this context, I re-iterate that my AAC determination does not prescribe a particular plan of harvesting activity, nor does it involve allocation of the wood supply to any particular party.

If, subsequent to this determination, I become aware of information respecting First Nations' interests that would substantially alter the estimate of timber supply underlying my determination, I am prepared to revisit my determination.

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 base case 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 work of the Timber Supply Review program for TSAs and TFLs.

For each AAC determination for a TSA a timber supply analysis is carried out by British Columbia Forest Service (BCFS) staff 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 (FSSIM—'Forest Service Simulator' (in this case for the Williams Lake TSA, 'version 3.1'), a series of timber supply forecasts is produced, reflecting different decline rates, starting harvest levels, and potential trade-offs between short- and long-term harvest levels.

From this range of forecasts, one is chosen which attempts to avoid both excessive changes from decade to decade (although exceptions may occur where harvest levels reflect large increases to deal with infestations, as is currently the case in the Williams Lake TSA) and significant timber shortages in the future, while ensuring the long-term productivity of forest lands. Often termed the 'base case', such a projection serves as a reference forecast, and forms a basis for comparison when assessing the implications of uncertainty for 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 reference 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 listed or discussed below follows an examination of the degree to which all the assumptions made in generating the base case reference forecast are realistic and current, and the degree to which the resulting projections of timber supply must be adjusted, if necessary, to more properly reflect the current situation.

These adjustments are made on the basis of informed judgement, using current, 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 Forest Practices Code, or during the implementation of new policies, procedures, guidelines or plans.

Thus it is important to remember, in reviewing the considerations which lead to the AAC determination, that while the timber supply analysis with which I am provided is integral to those considerations, the AAC determination itself is not a calculation but a synthesis of judgement and analysis in which numerous risks and uncertainties are weighed. Depending upon the outcome of these considerations, the AAC determined may or may not coincide with the base case or any other specified alternative 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, additional precision or validation may not be gained in all cases by attempting a computer analysis of the combined considerations to confirm the exact AAC determined.

Base case forecast for the Williams Lake TSA

The data package for the Williams Lake Timber Supply Area (TSA), on which the timber supply analysis was proposed to be based, and which included detailed descriptions of the management practices and the assumptions to be used to incorporate them into the analysis, was released in August 1999, together with a summary information report, for public review and comment. In September 2001, the *Williams Lake Timber Supply Area Analysis Report*, which included a socio-economic analysis, was released for public review and comment, together with the *Williams Lake Timber Supply Area Public Discussion Paper*. Appendix A of the September 2001 analysis report includes a detailed description of the data inputs and assumptions used in the timber supply analysis, including the available assessments of current forest management, the land available for timber harvesting, and timber yields.

Because forest management is inherently a long-term undertaking, uncertainty is present in much of the information used in analysing the timber supply. Any base case thus provides only a part of the timber supply picture for a TSA, and should not be viewed in isolation from accompanying sensitivity analysis. In my determination I have considered a number of relevant sensitivity analyses in assessing particular uncertainties, as well as alternative harvest forecasts, as documented in this rationale statement.

The base case forecast for the Williams Lake TSA showed a projected harvest level of 3.765 million cubic metres per year for the first five years. This reflected the current AAC of 3.807 million cubic metres reduced by an allowance for the required separate administration of all woodlot licences issued since the most recent AAC determination. (This is discussed further under 'Woodlot licences' below.)

The short- to mid-term level was projected to be maintained for roughly 170 years, then an increase was projected to a long-term level of 3.25 million cubic metres per year. This increase to the long-term level reflects the near-completion of the transition to harvesting in managed stands, which will be growing with higher productivity than the existing stands that originated under unmanaged conditions and that support much of the mid-term harvest.

In particular, the base case projection provided the following important information related to the four partitions within the current AAC. The partition of 107 000 cubic metres per year for the PA 16 area can be maintained for 30 years. The base case projected the salvage harvest of stands attacked in the 1980s by the mountain pine beetle to be about 595 000 cubic metres per year of live-tree volume (not including any dead trees that may still have commercial value and would contribute to the partition volume) while this partition is currently set at 850 000 cubic metres per year. The conventional harvest in the main TSA was projected to be slightly above the current partition of 2.5 million cubic metres per year at about 2.515 million cubic metres per year for the first five years, followed by a decline of 12 percent to about 2.22 million cubic metres. The harvest in the three western supply blocks was projected at about 548 000 cubic metres

per year over the first five years, rising to about 589 000 cubic metres per year for the medium-term.

The timber supply analysis report also provided other projections that were based on assumptions identical to those in the base case projection, but which incorporated different harvest flows over time. I have reviewed these projections in detail and have discussed my considerations below under 'Alternative harvest flows'. I have also considered a number of 'sensitivity analyses', which examine the implications for timber supply of making changes in particular assumptions, to review the effects of identified uncertainties, as discussed throughout this document. All of these analyses have been of assistance to me in making this AAC determination.

Consideration of factors as required by section 8 of the *Forest Act*

Section 8 (8)

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

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

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

Under this section of the *Forest Act*, I have reviewed, assessed for reliability, and considered with respect to consistency with current legislation, policy, approved land use plans, and forest practices as appropriate, information describing the nature and/or the extent, in the Williams Lake TSA, of the following factors as incorporated in the timber supply analysis.

Land base contributing to timber harvest:

- environmentally sensitive areas
- physical and economic operability
- sites with low timber growing potential (problem forest types)
- older cedar/hemlock stands
- roads, trails and landings
- woodlot licences
- community forest agreements
- Pulpwood Agreement (PA) 16

Forest inventory:

- current inventory and audit
- species and age profiles of the forest
- volume estimates for existing stands

Expected rate of growth:

- site productivity estimates
- minimum harvest criteria
- volume estimates for regenerating stands

From my review I have concluded that each of these factors is satisfactorily documented in the timber supply review process and is adequately accounted for in the projections in the timber supply analysis, with the following noted exceptions or additional information.

Land base contributing to the timber harvest

As part of the process used to define the timber harvesting land base for a TSA, (i.e. the area estimated to be physically, economically and biologically available for harvesting), a series of deductions are applied to the total area of the productive forest. These deductions account for factors that reflect the suitability or availability of the productive forest for economic, ecological or social reasons.

The total area of the Williams Lake TSA is 4 904 558 hectares. After deductions for areas not managed by the British Columbia Forest Service (BCFS)—including parks, ecological reserves, protected areas, woodlots, private lands—a total of 3 145 826 hectares are productive Crown forest managed by the BCFS for a range of objectives. From this productive forest, areas totalling 1 056 752* hectares were deducted to account for critical wildlife habitat, wildlife tree patches, riparian reserve areas, lake buffers, roads, trails and landings, environmental sensitivity or low productivity, or for stands that are not expected to reach the minimum merchantable volume or height by 160 years of age, or for other reasons, to derive the current timber harvesting land base of 2 089 064* hectares, as detailed in the timber supply analysis report and summarized in its Table 4. [*Please note a small change from the figures published in the analysis report, due to a correction for wildlife trees, discussed under 'stand-level biodiversity', below.]

I have considered all the individual deductions applied in deriving the timber harvesting land base. My considerations are presented in the following sections and are discussed further, if appropriate, in 'Reasons for decision'.

environmentally sensitive areas (ESAs)

Land base exclusions were applied for highly sensitive soils (92 803 hectares), areas with regeneration problems (21 857 hectares), high avalanche hazard and hydrological concerns. No specific land base exclusions were made for wildlife and this was noted as a concern in the public input. However, provisions for wildlife in the TSA were reflected in the analysis by the application of forest cover requirements consistent with plans for the management of mule deer winter range and caribou habitat, and by land base exclusions for riparian areas, wildlife trees and tree patches which can provide wetland habitat for moose and other species, as discussed under relevant sections below. No exclusion was made specifically for recreation, but I am satisfied that recreation objectives are appropriately addressed by the management of visual and lakeshore resources, the representation of which in the analysis is discussed under those sections below. No specific exclusion was made for moderately sensitive soils (ES2) in view of their substantial overlap with steep slopes, which are considered in the next factor, 'physical and economic operability'.

physical and economic operability

In the Williams Lake and Chilcotin forest districts, inoperable areas were identified by the use of Terrain Resource Information Management (TRIM) mapping and Geographic Information System (GIS) analysis. In these two districts, slopes over 40 percent are not harvested except for minor salvage operations. To reflect this in the timber supply analysis, for the two districts respectively, 12 754 hectares and 32 720 hectares were excluded in deriving the timber harvesting land base. Public input included concern that slopes over 40 percent ought to be included in the operable land base in view of demonstrated performance on such slopes. District staff note that those with a prior logging history were included, but they emphasize that operations for purposes other than salvage occurs only very rarely on these slopes.

In the Horsefly Forest District, harvesting is carried out with appropriate high-lead equipment on stable slopes up to 60 percent and greater where indicated as appropriate by terrain stability assessment. In this district, inoperable areas including unstable terrain on slopes over 60 percent have been identified by licensees and district staff on a map overlay, and a total of 25 962 hectares were excluded in deriving the timber harvesting land base (note a small correction from the published figure of 25 692 hectares in the analysis report). In public input, concern was expressed about the inclusion of some slopes over 60 percent in the timber harvesting land base for the Horsefly district. I am assured by district staff that the only slopes over 60 percent that were included were those identified on the mapped overlay as stable, either through terrain stability assessment or from having supported previous operations, and I consider this to be a satisfactory approach.

In conclusion I note the substantial area excluded as inoperable through deductions for highly sensitive soils in ESAs (92 803 hectares) and as unstable or potentially unstable terrain on steep slopes (a further 71 436 hectares). I am advised that overlaps between steep slopes and constraints for visual quality and for other resources such as fish and wildlife have been accounted for in the analysis, and I am satisfied that the analysis is based on a reasonable representation of terrain operability in the TSA.

sites with low growth potential and currently unharvested stands (problem forest types)

In the 1995 AAC determination, much uncertainty was identified in defining the extent and merchantability of ‘problem forest types’—stands of poor quality or low volume that traditionally have been uneconomical to harvest. These include deciduous stands, densely stocked stands of lodgepole pine, areas with low site productivity, and older hemlock, cedar and spruce stands. The AAC included a partition specifying that at least 100 000 cubic metres per year must be directed to these forest types. From 1996 to 2000, industry’s performance in these stands throughout the TSA substantially exceeded the required harvest level, averaging roughly 400 000 cubic metres per year. Definitions of the stands comprising ‘problem forest types’ were then refined for the 2001 analysis report. Six of the old definitions were retained and categorized as ‘currently unharvested stand types’ (CUST) and new minimum merchantability criteria were derived, based on stand height and volume (tables A11, A12 and A13 in the analysis report). From a retrospective review of 1993-96 cruise information, the ‘cut-off’ for the minimum merchantable volume of a stand was assessed at 65 cubic metres per hectare. All existing

stands of less than this volume, and all stands that were not expected to reach this volume or merchantable height were excluded from the timber harvesting land base.

The change in merchantability criteria resulted in the inclusion of about 400 000 hectares of previously excluded stands. This provided the major contribution to an overall increase in the timber harvesting land base of 25 percent over the previous timber supply review. The increase was distributed as a 20-percent increase in the timber harvesting land base in the main TSA and a larger, 43-percent increase in the timber harvesting land base in the three western supply blocks. These increases were the main factor influencing the projection of higher harvest levels in the current analysis than were projected in the analysis for the previous review. Specifically, under the applied harvest flow assumptions in the current base case, *for the first five years*, the three western supply blocks are now projected to support 548 172 cubic metres annually instead of the former 425 000 cubic metres, and the main TSA projection increased slightly from 2 607 000 cubic metres (including PA 16) annually to 2 622 000 cubic metres—though this is assumed to decline to the short-to-mid-term level of 2.33 million cubic metres after five years of salvage harvesting.

The effect on the projected timber supply of including low-productivity stands is substantial. A sensitivity analysis was performed to show the impact of including only stands capable of reaching 100 cubic metres per hectare by age 160, instead of 65 cubic metres per hectare. In the three western supply blocks, where most of the low-volume stands are located, the medium-term harvest level was thereby reduced from 589 205 cubic metres per year to 490 000 cubic metres per year. In the main TSA, the post-salvage, short-to-mid-term level dropped from 2.33 million cubic metres per year to 2.26 million cubic metres per year. Overall, the inclusion in the current analysis of low-volume stands capable of producing between 65 and 100 cubic metres per hectare by age 160 years contributes roughly 9 percent to the current timber harvesting land base and 6 percent to the timber supply forecasts.

I have carefully reviewed and discussed the validity of the minimum merchantability criteria with BCFS regional and district staff, and have reasoned as follows. A merchantability cut-off volume of 100 cubic metres per hectare is relatively low in comparison with most other areas of the province, and 65 cubic metres per hectare is unusually low. In my judgement, the fact that industry has demonstrated performance in stands down to 65 cubic metres per hectare is not so much an indication of the universal merchantability of these stands in the TSA as it is a confirmation that some of them are economically viable to harvest either (a) when they occur in physical proximity to, and are blended in cutting permits with, eligible stands of better quality, or (b) when they are harvested under beetle-salvage licences. Operational experience shows that only a small number of cutting permits are issued for volumes of 65 cubic metres per hectare, except for beetle-salvage. For these reasons, while I recognize that performance under the noted circumstances has been demonstrated in these stands, I believe it would be optimistic to assume that *all* of the very-low-volume stands down to 65 cubic metres per hectare will continue to contribute to the size of the land base used to produce the harvest level projections.

The potential for some or many of these stands to prove individually uneconomic to harvest clearly indicates the need for a partition(s) to be determined within the AAC, to

specify a minimum harvest volume attributable to the low-volume stands. Requiring partitioning for a suitable proportion of the harvest from low-volume stands will ensure (a) that the AAC is not based on an overestimation in the projected total timber supply, and (b) that achieving the AAC does not depend on over-harvesting the better quality stands. I have discussed partitioning in terms of the 3 western supply blocks and the main TSA below, in 'Reasons for decision'.

In public input, industry noted that requiring stands to reach a specified volume in a given time excludes all poorer stands from contributing to the harvest, and suggested that height, and not necessarily volume, is always the limiting factor on merchantability. But even if a stand were able to grow to a required height in a longer period, say 200 years, its inclusion in the harvest on this basis would not necessarily be consistent with principles of good stewardship. Industry also suggests that some of the low-volume stands may achieve higher volumes when site index adjustments are applied. I have discussed this below, under 'volume estimates for existing stands'.

older cedar/hemlock stands

As noted below in '*volume estimates for existing stands*' and in '*decay, waste and breakage*', volume reductions of 50 and 60 percent were applied to a total of 36 142 hectares of cedar and hemlock stands in age classes 8 and 9 (older than 140 years) respectively to account for underestimations of the decay, waste and breakage in the VDYP volume projections. However, BCFS staff advise that much of the timber in these cedar-hemlock stands is actually considered unmerchantable. After land base deductions for other management objectives, about 64 percent of the stands of these types that occur in the productive forest managed by the Forest Service were included in deriving the timber harvesting land base—of which they comprise about 2 percent by area.

Having reviewed these deductions for other management objectives, based on discussions with staff I note that there is still considerable uncertainty with respect to estimating the amount of area of these older stands that are likely to be viable to develop in the future. I consider it likely that the amount of area expected to contribute to the timber supply forecast is still over-estimated, and this could be by as much as 50 percent based on the historic operating experience and the marginal nature of many of these stands. If on average only about 50 percent of these stands are in fact merchantable, the full inclusion of all these stands represents an overestimation in the timber supply throughout the forecast period of less than one percent, as I have noted in 'Reasons for decision'.

roads, trails and landings

The volume-adjustment method documented in the analysis report differs from standard estimating procedures for accounting for losses due to existing roads, trails and landings, but BCFS staff consider this approach to be an improvement over the methodology for the previous timber supply review. I understand that a degree of uncertainty exists with respect to ingress on roads and landings, and that a related field survey, followed by analysis and received by the BCFS late in this timber supply review, indicates the possibility of a small underestimation of the timber supply. I also understand that BCFS staff and licensees have agreed to review the results and work cooperatively toward optimising related information for use in the next analysis. On this basis I have accepted

the current approach as representing the best available information for use in projecting the timber supply at this time; and note that this factor will hopefully benefit from the ongoing review for the next determination.

woodlot licences

To account for the removal of land associated with the woodlot licences issued from the TSA since the previous AAC determination, the harvest levels projected in the base case were reduced by about 23 600 cubic metres. I have accounted for the associated volume and land base reduction in this determination as noted in 'Reasons for decision'.

community forest agreements

The *Forest Act* requires AACs determined for TSAs to be exclusive of the areas and timber volumes allocated to community forest agreement areas. When a community forest licence has been issued from a TSA, in the next AAC determination for the TSA the land base of the TSA is reduced by the area of Crown land in the community forest area, and the issued volume does not contribute to the AAC for the TSA.

At the time of my considerations for this AAC determination, one community forest agreement has been issued since the last AAC determination. This is the Esketemc 5-year pilot community forest licence, which includes 15 100 hectares of the timber harvesting land base, supporting a projected harvest level of 15 000 cubic metres per year. I have accounted for the separate administration of this 15 000 cubic metres per year as noted in 'Reasons for decision'.

Pulpwood Agreement (PA) 16

Pulpwood Agreement, PA 16, originally issued in 1990, confers harvesting rights in four TSAs and is associated with 31 511 hectares, or 1.5 percent of the timber harvesting land base in the Williams Lake TSA. The PA 16 agreement allows the licensee to harvest in particular forest types—primarily deciduous species and low-productivity stands—that represent some of the least merchantable stands in the TSA. The current AAC includes a partition of 107 000 cubic metres specified as attributable to the harvesting of suitable forest types under this agreement. The timber supply analysis—in which the volumes harvested under PA 16 were assumed to contribute to the harvestable volume in the main TSA—indicated that such a harvest could be maintained for approximately 30 years from the date of the analysis.

Over the past five years, the licensee has not needed its full apportionment and the average annual volume billed under PA 16 in the Williams Lake TSA has been only 23 066 cubic metres. Meanwhile, many of the very low productivity stands in the TSA have now been included in the sawlog timber harvesting land base for the TSA. Some of these have already been logged, and a committee of staff from the licensee and from BCFS (PA 16 Review Committee) is currently reviewing the definition of forest types eligible under PA 16, with the intent of ensuring the ongoing availability of a suitable timber supply for PA16, since the eligible stands may not now necessarily be those stands of lowest merchantable productivity in the TSA.

From my discussions with BCFS staff and from my review of the public input, I have concluded the following.

Under the revised merchantability criteria for the TSA, at least some of the low-volume stands originally contemplated as harvestable under PA 16 have now been redefined and included in the timber harvesting land base as harvestable by other licensees. However, I am advised that the size of the area currently assumed to provide fibre for PA 16 (31 500 hectares) is comparable to that used in a 1994 PA 16 analysis (34 951 hectares). Further, PA 16 was modelled as a volume requirement in the base case, and the analysis showed the availability of 107 000 cubic metres per year for thirty years, in addition to the contribution from stands between 65 and 100 cubic metres per hectare to the harvest level in the main TSA. Thus the harvest level in the main TSA is projected to include an adequate volume from suitable stands to support PA 16 for at least another 30 years.

For the purposes of this AAC determination I have therefore assumed that a sufficient volume of timber will continue to be made available under the PA 16 agreement from types of stands that are equivalent to those included in the original agreement, even if the low-volume stands in question could now be described as sawlogs. If other licensees were to begin to consistently harvest in these lower volume stands at rates that could eventually jeopardize this availability, I am satisfied that the committee reviewing the availability of fibre for PA16 will identify appropriate stands for harvest under the agreement.

I note that the PA 16 licensee has expressed interest in harvesting more deciduous stands, which they have identified and which are not currently allocated. However, BCFS staff advise that these stands are likely to have high value for biodiversity and wildlife habitat, and more work is needed before their availability can be assessed. The PA 16 licensee recommended that the partition in the Williams Lake TSA for PA 16 be reduced to 45 000 cubic metres. I have not done this, since I am satisfied that there remains for harvest under the licence adequate timber equivalent to that agreed to in the original licence, in addition to that assumed to be available under other components of the AAC I have determined. A submission from the Williams Lake TSA Association questioned the applicability of the already noted 60-percent inventory adjustment to hemlock stands, suggesting it should not be applied to stands in PA 16. However, the reason for the adjustment—the underestimation of decay waste and breakage—is properly applied to all the identified stands irrespective of location or operator.

From all the foregoing, I am satisfied that for the purposes of the present determination, the fibre requirements for PA 16 have been adequately represented and accounted for in the base case projection.

Existing forest inventory

The current timber supply analysis for the Williams Lake TSA was based on an updated inventory file in which the key forest cover characteristics determining timber volumes were projected to 1999, and timber harvesting disturbances were updated to 1998.

An inventory audit sample was carried out for the TSA between 1995 and 1997. Results were reported in the BCFS document '*Williams Lake TSA Inventory Audit,'* June 29, 1998. The audit samples were then analysed in greater detail in combination with

samples collected under the Vegetation Resources Inventory (VRI) and the results were reported in the document '*An Examination of Volume Adjustment Factors for the Williams Lake TSA'*. The analysis units for the current timber supply analysis were determined in part from this report.

From my review of the inventory history of the TSA, the currency of the file used in the analysis, the inventory audit and sampling programs, and the comparative accuracy of the estimation methods discussed below in 'volume estimates for existing stands', I am satisfied that the current inventory file adjusted by the analysed inventory audit and VRI results provide the best available information at this time upon which to base timber supply projections for the Williams Lake TSA. However, I note that the date at which this determination is being made is five years later than the base year date for the timber supply projections; that is, the starting point for reviewing current harvest levels is five years later than shown on the time axis in the base case projection.

species and age profiles of the forest

I am advised that the inventory audit and VRI samples revealed significant overestimations in the age class estimates in the inventory for stands previously attacked by the mountain pine beetle. Implications for the natural regeneration of unsalvaged stands have been accounted for as discussed below, under 'old mountain pine beetle infestation'.

volume estimates for existing stands

The Variable Density Yield Prediction (VDYP) model version 6.4a, developed and supported by the Terrestrial Information Branch (TIB), MSRM (formerly the Ministry of Forests' Resources Inventory Branch), was used to estimate timber volumes for existing natural stands over 34 years of age in the main TSA and over 20 years of age in the three western supply blocks.

As explained in the analysis report, the short-to-mid-term level in the base case projection should have been revised upward by 80 000 cubic metres or 3 percent per year following a change in an inventory volume adjustment factor in the final version of the report '*An Examination of Volume Adjustment Factors for the Williams Lake TSA*'. I am accounting for this underestimation as discussed further in 'Reasons for decision'.

As noted below in the '*decay, waste and breakage*' section, a 'Net Volume Adjustment Factor' (NVAF) program, incorporating a 'net factoring' process to replace the 'loss factoring' and including destructive sampling, has also been carried out in the Williams Lake TSA to help to recalibrate the volume estimates for existing stands. As noted in that section, pending resolution of methodology and other problems, I must view the NVAF results as indeterminate at this time, and I am therefore placing no weight on the results of the NVAF process in this determination.

Also, as discussed below under *decay, waste and breakage*, I have accepted the volume reductions of 50 and 60 percent as applied to 36 142 hectares of cedar and hemlock stands to account for operationally determined underestimations of the decay waste and breakage in the VDYP volume projections.

Expected rate of growth

site productivity estimates

Inventory data includes estimates of site productivity for each forest stand, expressed in terms of a site index. The site index is based on the height of the stand as a function of its age, and is typically expressed in metres reached by the age of 50 years. The productivity of a site largely determines how quickly trees grow. This in turn affects the time seedlings will take to reach green-up conditions, the volume of timber that can be produced in regenerated stands, and the ages at which a stand will satisfy mature forest cover requirements and reach a merchantable size.

In general, in British Columbia, site indices determined from young and old stands may not accurately reflect potential site productivity. In young stands, growth often depends as much on recent weather, stocking density and competition from other vegetation, as it does on site quality. In old stands, which have not been subject to management of stocking density, the trees used to measure site productivity may have grown under intense competition or may have been damaged, and therefore may not reflect the true growing potential of the site. This has been verified in 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 mature forests. In recent years it has been concluded from such studies that site productivity has generally been underestimated by inventory file data; managed stands tend to grow faster than projected by inventory-based site index estimates from old-growth stands.

For TSAs where locally generated site productivity data exists to support particular adjustments in the order of those suggested by the OGSI studies, these data are incorporated into base case timber supply projections. However, in the Williams Lake TSA there are no statistically valid local data for adjusting site indices. The site indices assumed in the base case were therefore taken directly from the forest inventory files. A sensitivity analysis was then carried out to examine the implications for timber supply of applying the adjustments indicated by the general results of the paired plot and veteran OGSI studies to particular site indices in the TSA. In this analysis, adjustments were applied to the site indices of even-aged stands greater than 140 years old, which comprise about 20 percent of the total timber harvesting land base. The adjustments were equivalent to increasing the average site index for the entire timber harvesting land base by two metres. When associated changes to volume, green-up, and minimum harvestable ages were accounted for, increases of approximately 10 percent and 26 percent were projected for the short-to-mid-term and for the long-term timber supplies respectively. In timber supply projections that are relatively stable, such as the base case forecast for the Williams Lake TSA, site index adjustments may well increase harvest levels throughout the entire planning horizon.

Public input included criticism of the science on which the adjustments are based and advocacy of the use of the existing regional site index information. While the OGSI study results are by no means applicable to every stand in the province, it is important to note that the adjustments incorporated in this sensitivity analysis were derived using the

report's strict application guidelines. As the report also emphasizes, the adjustments correspond to *potential* productivity, since not all stands will achieve the potential indicated in the report—which assumes the elimination in large part of factors hindering tree growth, such as pests and competing vegetation—and I have taken this into account in my determination.

In other public input, the industry referred to ongoing work to calibrate the yield model Prognosis for the Interior Douglas-fir zone, as an alternative to the FSSIM model used in the BCFS analysis, which the industry considered to underestimate productivity. I understand that results so far are preliminary and that BCFS staff will work with the industry to develop improved growth and yield information for this zone. I have also noted above, in *sites with low-growth potential and currently unharvested stands (problem forest types)*, industry's suggestion that some of the low-volume stands may achieve higher volumes when OGSI adjustments are applied, and thus become part of the timber harvesting land base. I agree with the application of OGSI adjustments after a site has been logged, but OGSI adjustments should not be applied to current stands, and may not apply in a large way to pine stands in drier ecosystems. Stands that have attained only 60 cubic metres per hectare by 160 years of age are unlikely to benefit significantly from OGSI adjustments.

For this determination, I recognize the general validity of the need to adjust site indices to reflect the higher growth rates experienced in managed second-growth stands, but I am also mindful of the cautions expressed in the noted studies regarding the achievement of the full site potential on all areas which currently have old-growth site productivity estimates. I will therefore accept that the timber supply projected in the base case is underestimated by up to a maximum of 10 percent in the short-to-mid term and 26 percent in the long term. I have discussed this further in 'Reasons for decision'. In view of the associated potential for large increases in the projected timber supply, I encourage the collection of locally-based estimates of site productivity for consideration in the next determination.

minimum harvest criteria

Details of the minimum harvestable criteria and ages assumed in the timber supply analysis are provided in the analysis report. I note that thresholds of merchantability, measured by height or volume, are predicted to be achieved at relatively early ages for managed stands, and that in most cases the actual age at harvest greatly exceeds the assumed minimum age.

Public input included a recommendation to examine the effect on timber supply of harvesting at the (considerably higher) age of the culmination of the mean annual increment (CMAI). This would constrain the timber supply artificially, since many stands meet reasonable criteria for harvesting long before they reach their culmination age. A sensitivity analysis examining the effect of increasing all the minimum harvestable ages used in the base case by 40 years showed only a minor impact 12 decades from now. I am advised that this impact could be avoided by a reduction of about 76 000 cubic metres per year during the mid-term. The analysis report also included a sensitivity analysis which used CMAI as the minimum harvestable age. The results showed no appreciable difference in long term timber supply, while there was a

reduction in medium term timber supply. As was noted in the analysis report, if harvesting were to occur consistently at the minimum ages, the long-term level would decline to 2.6 million cubic metres per year.

I have discussed earlier my concern over the true contribution to the harvest from low-volume stands that are expected to reach 65 to 100 cubic metres per hectare only over relatively long periods. I have also noted my intention to address this concern by specifying in the AAC a minimum volume to be harvested from such stands. Having thereby addressed this concern, and noting the relative insensitivity of the projected timber supply to a significant increase in the assumed minimum harvestable ages, I am satisfied that these ages, although lower than in the previous timber supply review, are not being used to the detriment of the long-term timber supply.

(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

Under this subsection of the Act, I have reviewed, assessed for reliability, and considered with respect to consistency with current legislation, policy, approved land use plans, and forest practices as appropriate, information describing the nature and/or the extent in the Williams Lake TSA of the following factors as incorporated in the timber supply analysis:

- regeneration assumptions;
- not-satisfactorily-restocked (NSR) areas.

From my review I have concluded that each of these factors is satisfactorily documented in the timber supply review process and is adequately accounted for in the projections in the timber supply analysis, with the following noted exceptions or additional information.

regeneration assumptions

Some stands that were attacked by beetles but which are likely to remain unlogged will experience an extended regeneration delay and reduced productivity. I have considered the associated overestimation in the timber supply under section 8 (8) (e) 'abnormal infestations,' below, and in 'Reasons for decision'.

not-satisfactorily-restocked (NSR) areas

Not-satisfactorily-restocked (NSR) areas are those where timber has been removed, either by harvesting or by natural causes, and a stand of suitable forest species and stocking has yet to be re-established. Areas where the standard regeneration delay has not yet elapsed after harvesting are considered 'current' NSR. Where a suitable stand has not been regenerated and the site was harvested prior to 1987, the classification is 'backlog' NSR.

Differences exist between the areas recorded on the inventory (FIP) file and in the integrated silviculture information system/major licensee silviculture information system (ISIS/MLSIS) as 'current' and 'backlog' NSR. I am satisfied that these differences are largely attributable to delays both in posting updated information to the inventory file and

in waiting until year five after harvesting to survey the natural regeneration. However, any further discrepancy outside this range could pose some risk to the accuracy of the projected long-term timber supply, and I encourage BCFS staff to reconcile the area logged with the regeneration delay, the area reported as NSR on the inventory file, and the NSR areas reported through ISIS. I have noted this in 'Implementation' below.

(iii) silvicultural treatments to be applied to the area

Silvicultural treatments to be applied

Under this subsection of the Act, I have reviewed, assessed for reliability, and considered with respect to consistency with current legislation, policy, approved land use plans, and forest practices as appropriate, information describing the nature and/or the extent in the Williams Lake TSA of the following factors as incorporated in the timber supply analysis:

- silvicultural systems; and
- incremental silviculture and commercial thinning.

From my review I have concluded that each of these factors is satisfactorily documented in the timber supply review process and is adequately accounted for in the projections in the timber supply analysis, with the following noted exceptions or additional information.

silvicultural systems

A range of partial cutting regimes occurs on 21 percent of the timber harvesting land base in the TSA to meet management objectives for various values. In the analysis, a variety of growth rates in a large number of analysis units were modelled to represent and account for the related timber supply implications. In response to public input on the data package, 'year of harvest' information was included to refine intervals between harvest entries. In the current absence of specific modelling capabilities for partially harvested stands, I am satisfied that the applied methodology represents the best available means of approximating the timber supply under these management regimes.

incremental silviculture

Some of the spacing in the Williams lake TSA carried out in stand densities of less than 10 000 stems per hectare is considered to be incremental to basic silviculture. This activity was represented in the analysis as documented in the report's *Table A-30*. No commercial thinning or other incremental activity was modelled, as none is carried out in current practice. The Timber Investment Strategy Committee outlined some opportunities for commercial thinning, but these were based on data from the previous timber supply review that has now been supplanted by the current data, which includes a considerably larger timber harvesting land base. The continuance of incremental silviculture activities in this TSA depends on continued funding and is therefore uncertain to some extent; however, for the purpose of this AAC determination I am satisfied that current practice has been adequately considered in the analysis.

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

Timber harvesting

Under this subsection of the Act I have reviewed, assessed for reliability, and considered with respect to consistency with current legislation, policy, approved land use plans, and forest practices as appropriate, information describing the nature and/or the extent in the Williams Lake TSA of the following factors as incorporated in the timber supply analysis:

- utilization and compliance; and
- decay, waste and breakage.

From my review I have concluded that each of these factors is satisfactorily documented in the timber supply review process and is adequately accounted for in the projections in the timber supply analysis, with the following noted exceptions or additional information.

utilization and compliance

In public input it was suggested that because the minimum diameter at breast height (dbh) for the PA16 licence is 10 centimetres, not 12.5 centimetres as modelled, this increased utilization should be reflected in the timber supply projection. With respect to the discrepancies with the minimum diameters, I am advised that for this licence the 10 centimetres is measured at stump height; the current volume projection model (VDYP) does not report to a 10-centimetre dbh utilization level; and that differences of the magnitude described would have a negligible impact in terms of timber supply.

decay, waste and breakage

The VDYP model used to project volumes for natural stands incorporates estimates of the volume of wood lost to decay, waste and breakage. Decay losses are built into the volume estimates, while standard waste and breakage factors are applied to the analysis in the development of VDYP yield curves. These estimates of losses have been developed for different areas of the province based on field samples.

In the Williams Lake TSA, a program was carried out recently to recalibrate the volume estimates for existing stands by accounting as accurately as possible for decay, waste and breakage through destructive sampling of trees. This relatively new, statistically-based program, the 'Net Volume Adjustment Factor' (NVAF) process, which accounts as accurately as possible for merchantable tree volumes net of losses to decay and waste, was carried out on a sample of 50 trees. Preliminary findings indicated that overall decay and waste losses may be lower than previously estimated. The implied result is that the ministry's standard loss factor process may have contributed to a substantial *under*estimation in the true volumes in this TSA. However, application of the NVAF program to timber supply modelling has experienced difficulties in methodology, calculation and interpretation, all of which are currently under review by staff of BCFS in conjunction with staff of MSRM. Pending resolution of these outstanding questions, in view of the inconsistency of the recent findings with the earlier trend of *over*estimation observed in both the inventory audit and the VRI, I conclude that the NVAF results are

indeterminate at this time, and I consider it premature to place any weight on the NVAF findings in this determination.

For cedar and hemlock stands, much of the volume considered to be merchantable is in fact found operationally to be subject to high levels of hidden decay. Accordingly, as noted earlier in '*older cedar/hemlock stands*' and '*volume estimates for existing stands*', in the timber supply analysis, volume reductions of 50 and 60 percent were applied to a total of 36 142 hectares of cedar and hemlock stands respectively. From my discussions with BCFS staff, I accept the applied volume reductions for cedar and hemlock stands as appropriate. As noted in '*older cedar/hemlock stands*' and in 'Reasons for decision', in my determination I have also accounted for some additional unmerchantability in these stands.

(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.

Under this subsection of the Act, as discussed further in my 'Reasons for decision', I have reviewed, assessed for reliability, and considered with respect to consistency with current legislation, policy, approved land use plans, and forest practices, information describing the nature and/or the extent in the Williams Lake TSA of the following factors as incorporated in the timber supply analysis:

- forest cover, adjacency and green-up
- multiple use areas
- visually sensitive areas
- classified lakes
- riparian management areas
- mule deer winter range
- caribou
- identified wildlife
- stand-level biodiversity
- landscape-level biodiversity
- disturbance in stands outside timber harvesting land base
- cultural heritage resources

From my review I have concluded that each of these factors is satisfactorily documented in the timber supply review process and is adequately accounted for in the projections in the timber supply analysis, with the following noted exceptions or additional information.

forest cover, adjacency and green-up

To manage for resources such as water quality, wildlife and aesthetics, current harvesting practices limit the size and shape of cutblocks and the 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. Adjacency, green-up and forest cover objectives guide harvesting practices to 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 for the Williams Lake TSA, a number of management zones were created and different forest cover constraints were applied to the stands in each zone, to represent a wide range of management objectives in various areas. These zones and objectives reflect the Cariboo Chilcotin Land Use Plan (CCLUP) which specifies resource use zones, objectives, targets and strategies that are afforded legal status through a Higher Level Plan. Staff of the BCFS and the MSRM consider that the representation of factors in the timber supply analysis is consistent with the intent of the CCLUP. Having considered this consistency for the zones identified in the analysis, with reference as appropriate to the effect of harvesting stands attacked by mountain pine beetles, I am in general agreement, with the following specific observations.

multiple use areas

For multiple use areas on the timber harvesting land base throughout the TSA and for areas in the Chilcotin Forest District that are not attacked by the mountain pine beetle, (exclusive of areas managed for visual sensitivity or selection harvesting) a maximum of 30 percent of the area of each draft landscape unit is permitted to be below a green-up height of 3 metres as measured by the height of the tallest 100 trees. In public input it was suggested that the current field approach is to take an average height, which is closer to 2.1 metres, which should therefore have been used in the analysis. However, I am satisfied that the modelled requirements in the analysis were consistent with the intention of the regulations.

Five draft landscape units (Alexis, McLinchy, Pyper, Siwash and Sisters) are currently unable to support salvage operations for the mountain pine beetle within the specified green-up requirements for multiple use areas. For these landscape units, the priority in the analysis for salvage supersedes green-up requirements, however once the area is harvested it contributes to the unavailability of other adjacent unattacked stands for harvesting until greened-up.

Sensitivity analysis shows that the timber supply is not highly sensitive to changes in the green-up requirement, with only a small impact from reducing the maximum allowed disturbed area from 30 to 18 percent. Therefore, and since the implications of salvage harvesting on green-up requirements have been taken into account, I am satisfied that no further accounting is necessary.

visually sensitive areas

Details of the forest cover requirements modelled for visually sensitive areas in the three forest districts are provided in Table A-33 and the preceding paragraph of the *Williams Lake Timber Supply Area Analysis Report, September 2001*. In the Horsefly Forest

District a 5-metre green-up was required (compared to 3 metres in the other two districts) to account for the influence of generally steeper terrain than in the rest of the TSA.

BCFS staff advise that in their judgement the assumptions incorporated in the analysis adequately reflect the timber targets expressed in the CCLUP. I am aware that some concern has been identified among public groups and by the Forest Practices Board regarding consistency between policy guidance and commitments in the Higher Level Plan, some of which relates to objectives for visual quality. I am also aware that government is committed to early completion of sub-regional planning in the CCLUP area, which will aid in the clarification of objectives. The ongoing sub-regional planning processes have already refined the mapping and assignments for some visual areas since the data package was assembled for analysis, and BCFS staff advise that, to the present, the changes from completed plans are anticipated to have only minor or insignificant impacts on the timber supply. On this basis, while the approach taken to modelling visual quality objectives for this TSA differs from that for most TSAs, I am satisfied that the provisional consistency with the CCLUP targets confirms the adequacy of the representation in the analysis for purposes of the current AAC determination. If new information from planning refinements identifies significant impacts to the timber supply, the overall stability of the current timber supply projection is such that these can be appropriately accounted for in the next analysis and determination.

classified lakes

In the analysis report, 1726 hectares (2150 hectares before overlaps) of Class A lakeshore reserves were specifically excluded from the timber harvesting land base. In addition, forest cover requirements identical to those for 'partial retention' visual quality objectives were applied in the analysis to 9900 hectares, primarily in the Chilcotin Forest District, to account for specific areas being treated as Class B lake shore. Since the assembly of the data package, further 'no-harvest' areas in the Williams Lake Forest District and in the Anahim Round Table Sub-Regional Plan, totalling 3470 hectares associated with Class A lakes and 1970 hectares associated with Class B lakes, have been identified. Although not yet formally classified by the district manager, these areas have been made known to licensees, and the future establishment of landscape unit objectives may confer legal status on what is now considered to be guidance for current practice in these areas. At present, the relationship between this management regime and the targets of the CCLUP are not clear. However, the area in question is small relative to the overall size of the timber harvesting land base, and in my judgement, no separate accounting for the small potential impact on timber supply is required at this time.

riparian habitats

Those riparian habitats that remained unaccounted for in the timber supply analysis when all other land base deductions had been completed were modelled by applying percentage land base reductions to the productive forest. The percentages were defined for each forest district from a review of the areas required for riparian reserve zones and management zones as reported in 50 cutting permits approved from 1996 to 1998. In public input, concern was expressed that the percentage reductions did not account for riparian habitats for swamp and wetland areas. However, I am advised by BCFS staff

that the percentage figures did in fact account for riparian management areas for classified wetlands.

While the sample of 50 cutting permits is not large, it includes representation from each district and covers a total of 239 cutblocks with silviculture prescriptions which were all approved after the implementation of the Forest Practices Code. The data so obtained represents the best available information, and after discussions with BCFS and MSRM staff, I am satisfied the figures are reasonable and suitable for use in this determination.

mule deer winter range

The maintenance of mule deer winter range habitat has long been a recognized forest management objective in the Williams Lake TSA. Mule deer winter range (MDWR) is currently managed in accordance with the *CCLUP Regional Mule Deer Winter Range Strategy* as modified by the 1998 *Cariboo-Chilcotin Land Use Plan Integration Report*. The strategy defines the areas of land involved, specifies required degrees of crown closure, and establishes a risk ranking for each MDWR. The risk reflects the difference between the current forest condition of each MDWR and the forest condition described by the canopy closure objectives for that area. Forest managers have identified silvicultural regimes that permit the removal of specified timber volumes from mule deer winter range habitats in differing forest types and locations, consistent with meeting the objectives for habitat management.

The *Williams Lake TSA Analysis Report, September 2001*, describes in some detail the silvicultural regimes used and the techniques applied to represent these regimes in the analysis. I have reviewed the analysis techniques in greater detail with staff of the BCFS and MSRM. Their high complexity precludes a full description here beyond noting that:

- site productivity estimates were used to approximate the canopy closure potential of different parts of the MDWR;
- for specified areas in specified analysis units, silvicultural systems including partial cutting (for stands with more than 40 percent fir) and clear cutting were assumed to be applied;
- initial harvests were deferred consistent with the risk ratings (from low risk to very high risk) for periods sufficient to allow recovery of habitat condition to desired levels of crown closure;
- defined percentage volume removals and re-entry times were applied for each harvest, calculated from yield tables modified to take account of the reduced volumes remaining in partially harvested stands, and
- to ensure consistency with CCLUP, the MDWR management regime was assumed to contribute fixed proportions of the area of moderate and high canopy closure classes to old and mature-plus-old seral classes. This was taken into account as noted below under *landscape-level biodiversity*.

From my detailed discussions with BCFS and MSRM staff, I am satisfied that the requirements for winter range described in the CCLUP, including strategies respecting Douglas-fir stands, crown closure, and relative values of the range, were carefully used as

a basis for the timber supply analysis. The analysis included detailed harvest assumptions that were suited to particular stand types, that captured only modified forest growth where appropriate, that accounted for discrete harvesting patterns for areas with particular crown closure requirements and associated risks, and were consistent with required contributions to forest cover and habitat objectives. Biodiversity contributions were recognized, and the assumptions were adjusted for consistency with the CCLUP Integration Report. Noting the agreement of MSRM staff, I accept the methodology used in the analysis as a reasonable approach to modelling the complex requirements of the CCLUP for mule deer winter range, and I find no basis on which to adjust the parameters applied in the base case forecast.

caribou habitat

The CCLUP provided direction for the management of mountain caribou habitat for two distinct herds, the Eastern and the Itcha-Ilgachuz (or western) herds. For each herd, areas of 'no harvest' and of 'modified harvest' are identified. The 1998 *Caribou Strategy Update* revised these modified harvest and no harvest areas, and the resulting information was used in the base case timber supply analysis. In deriving the timber harvesting land base for the Williams Lake TSA, a total of 75 218 hectares were excluded for caribou no-harvest zones. The analysis also accounts for modified harvesting zones of 9522 hectares and 92 512 hectares in the eastern and western habitat areas respectively. Assumptions for these areas include: specified volume removal on first entry; the capture of modified growth rates (related to natural, rather than managed stand growth) in subsequent harvests; the designation of maximum permissible area harvests in landscape units and the rate of re-entry in caribou habitat within a landscape unit. In this way, sites for both terrestrial and arboreal lichens (primary food sources for caribou) are maintained. Details are provided in the *CCLUP Caribou Management Strategy Report*, the *CCLUP Integration Report*, and the *Williams Lake Timber Supply Area Analysis Report, September 2001*.

In October 2000, after the publication of the August 1999 data package, which was used in the timber supply analysis, the Caribou Strategy figures for 'no-harvest' and 'modified harvest' were revised. An additional 1000 hectares of 'no-harvest' and 6000 hectares of 'modified harvest' areas were identified for the productive forest of the Williams Lake TSA.

In public input it was noted that the Integration Report included an assumption that up to 10 percent of the no-harvest zone could be accessed to salvage damaged timber. The difficulty of estimating the implications from this for actual harvestable volumes prevented its inclusion in the modelling and I have discussed this below.

From my detailed discussions with BCFS and MSRM staff, and from my review of the current management of caribou habitat in the TSA, I note and conclude the following. The zones used in the analysis were consistent with the caribou management strategy, except for the noted update in 2000 and the 10-percent access in 'no-harvest' areas for damaged timber. The model accounted as well as possible for the effects of partial cutting silvicultural systems, for forest cover objectives, for deferrals on leave areas including the constraint of 20 years before entry after reaching a maximum permissible

harvest in a landscape unit. The constraints applied are provisions to maintain the arboreal and terrestrial lichen sites in the east and west.

In conclusion, it is not clear how much of the additional habitat area identified in October 2000 lies in the timber harvesting land base, and thereby constrains the harvest. Removing the entire 7000 hectares would represent an impact of approximately 0.5 percent. On the other hand, it is also not clear how much of the potential 10 percent of no-harvest zones will be accessed to salvage damaged timber, and thus add to the timber supply. The full 10 percent would represent about a 0.4-percent increase in timber supply. What is clear is that both figures are relatively small and offsetting, such that any net impact on the projected timber supply from these considerations would be negligible. I therefore accept that caribou habitat requirements have been adequately modelled and accounted for in the base case projection.

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 in some management units through existing management strategies such as those for biodiversity, riparian management, ungulate winter range or through the application of other forest cover constraints.

Volume I of the Identified Wildlife Management Strategy was released in February 1999. In the ecosections of the Chilcotin, Williams Lake and Horsefly forest districts, 18 wildlife species have been declared as Identified Wildlife. These are presented in Tables 1, 2 and 3 respectively of the *Williams Lake Timber Supply Area Analysis Report, September 2001*. To protect identified wildlife and other specified wildlife within the TSA, these are considered during operational planning as wildlife habitat features using existing processes and incorporating overlaps with objectives for other forest values. Three wildlife habitat areas (WHAs) for prairie falcons covering approximately 800 hectares have been established in the TSA. Of this area, about 22 hectares are within the timber harvesting land but were not specifically modelled in the analysis.

The species in the TSA that potentially require special consideration under the Identified Wildlife Management Strategy (IWMS) have been identified, as have some elements of the means for meeting objectives for those species. The ultimate extent of the forest cover provisions necessary for the management of habitat, and the degree to which these may be accomplished within anticipated components of sub-regional plans in support of the CCLUP cannot be fully determined until these plans are complete. My usual approach to uncertainty in this regard is to rely on the recognition by government that the implementation of the IWMS will have a maximum impact of one-percent on the provincial timber supply, and to make an equivalent allowance in my determination. However, the government-approved intention of the CCLUP is to manage for these species within the provisions of the plan, which include specified limits on impacts to the timber supply. In this case therefore, pending the completion of sub-regional strategies and subsequent analysis, and noting the small additional area identified for prairie falcons, which has negligible implications for the timber supply, I have assumed that the CCLUP contains adequate provisions for meeting objectives for identified wildlife species.

stand-level biodiversity

Biodiversity is defined as the full range of living organisms, in all their forms and levels of organization, and includes the diversity of genes, species and ecosystems and the evolutionary and functional processes that link them. Under the Forest Practices Code, biodiversity in a given management unit is assessed and managed at both the stand and landscape levels.

Stand-level biodiversity management includes retaining wildlife tree patches (WTPs), within or adjacent to cutblocks to provide structural diversity and wildlife habitat. Where landscape units have not yet been designated, as is the case in this TSA, requirements for WTPs are carried out operationally using Table 20(b) of the Biodiversity Guidebook (Table A3.2 of the Landscape Unit Planning Guide). The results are listed for each landscape unit in the *Williams Lake Timber Supply Area Analysis Report, September 2001*. These targets were reduced by 3 percent to reflect the reduced WTP requirements when old forest is retained within landscape units (as modelled) and by the contribution from riparian areas and other stands outside the timber harvesting land base. In the analysis, the area-weighted average percentage impacts on the timber harvesting land base from retaining wildlife tree patches greater than 2 hectares in size in the three forest districts were estimated to be: Chilcotin 4.7 percent; Williams Lake 4.3 percent; and Horsefly 1.9 percent. In the Horsefly Forest District, another 3 percent of the timber volume was estimated to be retained as individual wildlife trees and in WTPs smaller than 2 hectares, so that overall figures for the districts are similar. Patches greater than 2 hectares are assumed to contribute to meeting biodiversity objectives at the landscape level. The lower contribution indicated in the analysis for Horsefly in this respect has changed since the data package was prepared; under current practice only approximately 10 percent of the WTPs there are now less than 2 hectares in size, with a corresponding increase in the contribution to landscape level objectives.

The CCLUP Integration Report assumes that at some point over the first rotation period, 50 percent of WTPs will be available for harvest. However, given the need to meet stand-level requirements, these volumes are currently not available and were not included in the analysis in assessing the timber supply. Moreover, where the WTPs contribute to landscape-level objectives, future operational realities may entail consideration of reciprocal timber contributions from other constraints for non-timber values, in order to meet the timber targets. In view of the difficulty of anticipating and accounting for these complexities at this time, I accept that current practice with respect to WTPs has been adequately modelled for the purposes of this determination, noting that operationally, ongoing assessment and planning will be required to meet the CCLUP timber targets. However, I find the assumption in the analysis that forest stands excluded from the timber harvesting land base (including WTPs) will continue indefinitely to age and to contribute to biodiversity requirements to be unrealistic, and I have considered the implications of this below, under '*disturbance in stands outside the timber harvesting land base*' and in 'Reasons for decision'.

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 in 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.

For the Williams Lake TSA, the CCLUP *Biodiversity Conservation Strategy* provides guidance for the retention of old, and mature-plus-old forest cover requirements at the landscape unit level. To ensure that old and mature-plus-old seral targets were met throughout the Williams Lake TSA, the forest cover requirements listed in Table A-36 of the *Williams Lake Timber Supply Area Analysis Report, September 2001* were applied to amalgamated Biogeoclimatic Ecosystem Classification (BEC) variants within draft landscape units, using the assigned biodiversity emphasis option (BEO) found in Table A-18 of that report. The CCLUP Integration Report permits the amalgamation of small BEC variants (less than 5000 hectares) with larger ones, except in specified valley bottoms where rare site series or values exist. With these exceptions recognized, this amalgamation and management to cumulative seral targets are acceptable to the regional MSRM habitat specialist as a means of meeting biological objectives. In the analysis, only areas of 4000 hectares or smaller were amalgamated, although the Integration Report allowed amalgamation of units less than 5000 hectares.

Several issues were raised in public input.

First, it was suggested that current practice in the Quesnel Lake Special Resource Development Zone replaces the completely functioning old-growth Interior Cedar-Hemlock (ICH) ecosystem with pine, fir and spruce, with environmental impacts that should be addressed in the timber supply review. These are issues of silvicultural and ecological importance that are considered in habitat planning and in the definition and appropriateness of current management. On the other hand, the purpose of the timber supply review is to assess the timber supply once land use planning and current management have been formalized. In this TSA I am taking primary guidance in land use planning from the CCLUP, and I am unaware of conflict between the CCLUP and ongoing plans to harvest in the ICH ecosystem. I understand from local BCFS staff that both cedar and hemlock typically regenerate naturally in the new stands after harvest. That said, I believe this issue requires ongoing monitoring and I will review the objectives in close detail at the time of the next analysis and reflect any changes to species and regeneration strategies that may be in effect at that time. I make this point based on the knowledge that this issue is likely to be reviewed in the near future.

Second, industry has suggested several reasons why the required old growth retention may have been overestimated in the analysis. (i) It was noted that in the CCLUP biodiversity strategy an inventory adjustment was applied to ensure the old-growth retention process was reasonable and appropriate, and it was recommended that this adjustment be incorporated into the timber supply analysis. In response, I am advised that the inventory adjustment factor was a ‘one time application’ that was made in order to estimate the amount of available old-growth seral cover, and that the conclusion was not well supported by the results of the BCFS inventory audit. (ii) Concern was

expressed that overlaps may not have been accounted for. In fact, the recruitment process used in the timber supply analysis recognized overlapping objectives wherever this occurred —for instance for mule deer winter range—and also assumed contributions from forests outside the timber harvesting land base. (iii) It was noted that the CCLUP Integration Report directs that up to 10 percent of old growth management areas may be accessed for the salvage of damaged timber. As noted earlier, under *caribou habitat*, it is not clear how much of the potential 10 percent of no-harvest zones will be accessed to salvage damaged timber over the rotation, when interactions with other objectives are considered. If this harvest is needed in future to meet timber targets or occurs as a function of timber salvage, the harvest will be accounted for in future timber supply analyses. From all these considerations, I am satisfied the currently anticipated required retention of old seral forest has not been overestimated in the analysis; in fact there are indications of an underestimation, as discussed next.

Three sensitivity analyses examining variations in seral stage requirements are described in the analysis report. Two of these projections provide helpful information about the stability of the timber supply in relation to meeting seral requirements, but are based on assumptions that do not represent the CCLUP better than the base case. The third analysis examines the potential impact of reducing the degree to which stands that have been partially harvested are assumed to meet mature or old-seral characteristics. In this analysis, the assumed ages of forest stands following partial harvesting were reduced to 50 years for normal Douglas-fir selection, and to 80 years for all other forest types. The reason for this change is that when 50 percent (for instance) of a stand has been harvested, although the age on the inventory file continues to show a mature stand, what remains is in fact an uneven-aged stand, in which the number and spacing of mature trees will likely be inadequate to contribute to old-seral requirements. From my discussion of this issue with staff of BCFS and MSRM, I concur that the sensitivity analysis, which assumes lower regenerated ages for partially harvested stands, is a more reasonable projection of the timber supply based on the true ability of these stands to contribute to seral stage biodiversity requirements. Under the analysed conditions, the short-to-mid-term and long-term harvest levels were reduced by 1 percent and 2 percent respectively. In my determination I have therefore accounted for a one-percent overestimation in the short-to-mid-term timber supply, as discussed in ‘Reasons for decision’.

disturbance in stands outside timber harvesting land base

In the published analysis report, it was assumed by default that the forest outside the timber harvesting land base will continue to age indefinitely, contributing continuously to the old seral stage forest cover requirements for biodiversity. This assumption was applied also to stands projected to be retained on the timber harvesting land base to meet various objectives, as for example in visually sensitive areas.

In my view, these assumptions result in an overestimation in the timber supply since, in at least some cases, beetles, wildfire, or pathogens of some kind will disturb the stands at some point such that these forests will not continue to age and contribute uninterruptedly to biodiversity requirements, which will thus need to be met from elsewhere. This issue was partially explored by a sensitivity analysis in which stands outside the timber harvesting land base were assumed to be replaced at age 250 years by a new stand, if the

current stand is aged less than 200 years, or assumed to age indefinitely if the current stand is over 200 years. The results showed a three-percent reduction in timber supply in the short-to-mid term and the long term.

At my request, an additional sensitivity analysis was performed to examine the issue in more detail, including reviewing the effect of continuous aging of retained stands on the timber harvesting land base. In this analysis, with the agreement of MSRM's regional habitat specialist, the following assumptions were applied.

(a) Forests of natural disturbance types (NDT) 1 and 2 would age continually as before—since disturbances in these forest types are relatively light, and even if stands in Old Growth Management Areas (OGMAs) do lose some trees this is unlikely to produce a full stand replacement and necessitate the creation of a new OGMA. Moreover, OGMAs may tend to be located in stands that are longer-lived than pine stands.

(b) For forests of NDT 3 and 4, stands of pine and of spruce/balsam were assumed to 'fall over' at age 200 years and 300 years respectively, and then to regenerate to age zero.

(c) Douglas-fir stands in NDT4 forests, which are generally harvested by selection-cut, were assumed not to be subject to such dramatic change, being subject only to tree-replacing, rather than stand-replacing events.

This sensitivity analysis showed a short-to-mid-term level identical to that in the earlier sensitivity analysis, and a long-term level 50 000 cubic metres higher. The assumptions are obviously subject to uncertainty, but may be argued to provide a better account, over long periods, of the changing contribution of the forest cover in these stands to the biodiversity requirements in the TSA. For the purposes of this determination, therefore, I have assumed on this account a three-percent overestimation in the base case in the short-to-mid term.

cultural heritage resources

A cultural heritage resource as defined by the *Forest Act*, 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 and culturally modified trees 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.

Archaeological overview assessments (AOAs) identify areas of high potential for finding archaeological resources. Overview assessments were completed in March 1998 for the Williams Lake TSA. To date, few areas have been rejected from development plans due to conflict with cultural heritage (including archaeological) resources.

Most archaeological sites are found on gentle slopes and near water bodies, in areas historically abundant with fish and game. These areas often coincide with and can be protected by riparian reserve zones or wildlife tree patches, with little or no further impact on the timber supply. In general, due to the frequent overlap of cultural heritage sites with areas already removed from the timber harvesting land base or subjected to

restrictive cover constraints in respect of other forest values, it is often possible to avoid harvesting near these sites as required, without affecting the timber supply.

Other cultural heritage areas may be present in the TSA, and in the public input, concern was expressed that these may impact on the timber supply. However, until specific areas are identified, it is impossible to estimate an appropriate area to consider for exclusion from the timber harvesting land base. For this determination, I am therefore satisfied that known cultural and heritage resources can be managed under current practice within the existing exclusions from the harvestable land base for other resource values.

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

Harvest sequencing:

In the base case analysis it was assumed that stands eligible for harvest are taken in a 'relative-oldest-first' sequence, that is, in order of their age above their respective minimum harvestable age. However, district and regional staff consider that operationally the average harvest age is lower than would be indicated by the 'relative oldest first' rule. In their experience, at any one time in the TSA combinations of younger, middle aged and older stands are being harvested. This is due to the spatial distribution of stands combined with operational considerations including: the construction of new access in unroaded areas and the subsequent harvesting of any eligible mature stands once access is created—often with the most valuable but not necessarily the oldest stands taken first—and the inevitable harvest of younger stands while accessing and salvaging stands damaged by mountain pine beetles.

A summary of recent harvests in the Chilcotin Forest District showed that the harvest of 15 500 hectares had an area-weighted average harvest age of 135 years, compared to the projected base case average for the TSA of 195 years. To broaden the profile or range of harvest ages, a more randomized harvest rule was developed for a sensitivity analysis.

The sensitivity analysis based on a randomized harvest sequence projected a short-to-mid-term harvest level about 8 percent lower than the base case and a reduction of 8 percent in the long-term. The results also indicated a more balanced proportional distribution of harvests between districts than in the base case. The exact degree to which the harvest schedule should be randomized for accurate representation is uncertain. However, the experience of staff and the sensitivity of the projected timber supply to this factor indicate that some adjustment, greater than zero and no larger than 8 percent (with a rough but reasonable mid-point of 4 percent) must be made to the projected short- and mid-term supply. The impact in the long term would be smaller, as the cutblocks in the mosaic of managed forest will possess trees more similar in age at the time of harvest than is often found naturally today. In my determination I have accounted for an overestimation of the timber supply of approximately 4 percent, as discussed in 'Reasons for decision'.

Changes since the previous AAC determination

I note that since the last timber supply review was completed, significant changes have occurred in the Williams Lake TSA with respect to forest management legislation, policy and practices. These include further implementation of the *Forest Practices Code;* management direction from the Cariboo-Chilcotin Land Use Plan (CCLUP); updated visual classes and operability lines; and the delineation of draft landscape units and the assignment of biodiversity emphases. The timber harvesting land base has increased by approximately twenty-five percent—even after deducting new protected areas and woodlot licence areas—in good part due to the inclusion of lower-productivity sites. Minimum harvestable ages are significantly reduced. The net result of all the changes is a considerably more stable timber supply than was projected in the previous analysis and AAC determination, and I have referred to this stability in my 'Reasons for decision'.

Cariboo-Chilcotin Land Use Plan and Sub-Regional Planning

The Cariboo-Chilcotin Land Use Plan (CCLUP) was approved by government in October 1994 and subsequently declared a Higher Level Plan on January 31, 1996, under the *Forest Practices Code of British Columbia Act*. With the advice of the Regional Resource Board, the Interagency Management Committee developed additional information regarding implementation of the land use plan. The Higher Level Plan was varied on June 22, 1999, and the *Cariboo-Chilcotin Land Use Plan — Integration Report* was given official government policy status. Landscape unit objectives for the CCLUP area will be established following completion of sub-regional planning, which is underway. Detailed seral stage analysis is ongoing, and policy direction is provided periodically as required by the statutory decision-makers.

The Williams Lake TSA is included in the area covered by the CCLUP, and forest management and practices are required to be consistent with those aspects of the Plan with Higher-Level-Plan direction. In December 2000, the Forest Practices Board expressed concern regarding consistency between some aspects of the policy guidance expressed by government, and the commitments in the Higher Level Plan. The board also later expressed concern regarding the interpretation of timber targets. I understand that through meetings and correspondence, through an agreement to accelerate sub-regional planning and thereby provide more detailed objectives, and through clarification on timber targets, these differences are being addressed. I also understand that the Deputy Minister of the Ministry of Sustainable Resource Management (MSRM) has recently expressed to the board his confidence that the implementation direction that has been provided to date is sufficient to ensure that the plan is properly implemented in the short term, but acknowledges that clarification will be needed in the medium and long terms.

In the timber supply analysis prepared for my consideration in this AAC determination, BCFS staff have attempted to reflect as closely as possible those decisions and practices which are currently being implemented toward achieving the objectives of the CCLUP. Approval of the CCLUP included the implementation of 11 new 'Goal 1'parks and protected areas, the land base for which was entirely removed from the timber harvesting land base used in the analysis. (Goal 2 areas, still at the proposal stage, were not removed.) Complex requirements for mule deer winter range and caribou habitat,

including 'no-harvest' and partial-harvesting areas, were modelled as discussed in earlier sections. Draft biodiversity emphasis options, as well as mature, and mature-plus-old seral stage cover requirements were modelled for each landscape unit, and visually sensitive areas were accounted for. Public input included concern that the total amount of 'no-harvest' area will exceed that accounted for in the analysis. I am advised by staff of BCFS and MSRM that except for management prescriptions and zones for ungulates which are currently being reviewed and refined, all prescriptions have been modelled to the best of current ability.

I understand and accept that that some changes to current management are likely to occur as detailed planning and implementation of the CCLUP proceed—it would be surprising if this were not so. As I have noted in *visually sensitive areas*, ongoing sub-regional planning processes have already refined the mapping and assignments for some visual areas, but in this case the changes are expected to have only minor timber supply impacts. From my detailed discussions with staff of BCFS and MSRM, I am satisfied that all reasonable effort has been applied to reflect in the analysis the current management and direction under the CCLUP, as clarified by government. Given the ongoing efforts to reconcile any differences in the interpretation of objectives, I am confident that the currently discernible implications of the CCLUP have been incorporated in the analysis as faithfully as is currently practicable for my consideration in this determination.

Anahim Round Table Sub-Regional Plan

The Anahim Round Table Sub-Regional Plan covers 680 695 hectares in the western part of the Chilcotin Forest District, including 416 347 hectares of productive forest and 290 130 hectares of the timber harvesting land base in the three western supply blocks. The plan was approved by the Regional Resource Board on January 16, 2001, and endorsed by the Inter-Agency Management Committee in March 2001. Aspects of the plan with particular implications for productive forest and for the timber supply include Community Areas of Special Concern, such as the Dean Corridor, areas where biodiversity emphasis has been increased, and trail and riparian reserves. Some of the requirements under the plan exceed those of the Forest Practices Code, but are nevertheless expected to be consistent with meeting the overall timber targets of the CCLUP and the *Integration Report* within the plan area. In public input, it was requested that consideration be given to the implications of this plan in the current AAC determination, in view of the fact that the plan, a component of sub regional planning under the CCLUP, has been afforded community consensus, approval by the Regional Resource Board, and endorsement by the Inter-Agency Management Committee.

The total area of the timber harvesting land base affected by components of this plan but not accounted for in the timber supply analysis—which include the Community Areas of Special Concern, the Dean Corridor, enhanced biodiversity emphasis areas, trail reserves and additional riparian areas—is roughly 23 200 hectares. Staff of BCFS including the timber supply analyst and the district planner of the Chilcotin Forest District advise me that when overlaps with areas that are already accounted for in the analysis are taken into account, the timber harvesting land base in the Anahim supply block was overestimated by about 8 percent in the timber supply analysis, producing an overestimation of approximately 2 percent in the 3 western supply blocks. Since the Anahim Round Table

plan is a part of the ongoing sub-regional process to refine objectives for the government-approved CCLUP, and has the approval of local agencies with responsibility for implementing the CCLUP, I have accounted for this overestimation in my determination, as discussed in 'Reasons for decision'.

South Chilcotin Sub-Regional Plan

This plan covers 106 600 hectares in the Williams Lake Forest District. Except for Goal 2 areas, which will be protected once all sub-regional plans are complete, the plan has been adopted by the Cariboo-Chilcotin Regional Resource Board. The plan was endorsed by the Inter-Agency Management Committee on September 20, 1999 and is currently used by statutory decision-makers as the best available information for assessing the consistency of forest development plans with the CCLUP. It will be finalised through the establishment of landscape unit objectives when all sub-regional plans are complete.

Although the full plan was not considered current management when the data package was prepared for the timber supply analysis, some aspects of the plan were modelled. I have reviewed both those aspects that were represented and those that were not directly represented in the analysis. I note that 'no-harvest' areas that were not modelled result in a small overestimation in the projected supply, and that changes in visual management from 'partial retention' to 'modification' produce a small underestimation in the projection. These are potentially mutually offsetting influences, and only relatively small areas are involved. For these specific aspects of the plan, under the circumstances I am satisfied that no significant risk to the timber supply is introduced by considering the offsetting nature of these small influences, noting that there was also some explicit accounting for certain aspects of the plan in the base case. Any definitive changes upon completion may safely be taken into account in a future analysis and determination.

Taseko management zone

The Taseko management zone contains 9041 hectares of the timber harvesting land base in the Williams Lake TSA. Planning in the area derives from recommendations contained in the *Consensus Report of the Chilko Lake Study Team*, as endorsed by the *90-Day Implementation Process Final Report* of the CCLUP. Recommendations include smaller areas for timber harvesting and an area or volume to be harvested over a trial time period.

In public input it was suggested that this area should be excluded entirely from the timber harvesting land base, and be examined only through a sensitivity analysis. However, until formal endorsement of the plan is undertaken and it becomes current practice the area is still part of the land base of the TSA, contributes to the timber harvesting land base, and was modelled accordingly. I am therefore satisfied that this area has been accounted for appropriately in the timber supply analysis for the purposes of this AAC determination. I expect this situation will change in the future, and if this occurs it will be reassessed at the time of the next determination.

First Nations

Twenty-one First Nations assert traditional territories in the TSA. Ten of these First Nations have communities located within the Williams Lake TSA:

- four Secwepemc (Shuswap) communities —
  - Xats'ull (Soda Creek),
  - Xatl'tem/Stwecem'c (Dog Creek/Canoe Creek),
  - Esketemc(Alkali Lake) and
  - T'exelc (Williams Lake) bands;
- five Tsilhqot'in (Chilcotin) communities —
  - Tl'esqox (Toosey),
  - Tletinqox (Anaham),
  - Yunesit'in (Stone),
  - Xeni Gwet'in (Nemiah Valley) and
  - Tsi Del Del (Alexis Creek) bands; and
- one southern Carrier community —
  - Ulkatcho Band.

The eleven First Nations communities not located in the TSA that have asserted traditional territories in the TSA are:

- two Secwepemc (Shuswap) communities—High Bar and Whispering Pines/Clinton;
- one Tsilhqot'in (Chilcotin) community—Esdilagh (Alexandria);
- four southern Carrier communities—Lheidli T'enneh, Lhtako (Red Bluff), Nazko, and Kluskus;
- one Stl'atl'imx (Lillooet) community—(Ts'kw'aylaxw (Pavilion);
- two Coast Salish communities—Homalco and Nuxalk; and
- one Kwakiutl tribal group—Kwakiutl Laich-kwil-Tach.

In addition to asserting aboriginal title to parts of the area, representatives of all of these First Nations have expressed concerns over the sustainability of the timber harvest.

I am also aware that agreements-in-principle are being negotiated under the BC Treaty process with the Cariboo Tribal Council, the Esketemc First Nation, and the Nazko band. The BCFS and the Cariboo Tribal Council signed a two-year memorandum of understanding in September 2000, addressing consultation and information sharing. A similar agreement is under negotiation with the Esketemc First Nation.

Within the TSA, two community forest pilot projects are led by First Nations, and five bands hold woodlot licences. One band holds three non-replaceable forest licences in the TSA, and two First Nations in the TSA hold non-replaceable licences in the adjacent Quesnel TSA. Four bands are involved in joint timber ventures with other licensees.

Although several First Nations have demonstrated active interest in timber harvesting, First Nations have also raised concerns that some traditional interests may be incompatible with provincial objectives for timber harvesting in particular locations.

In a current provincial court action, the Xeni Gwet'in (Nemiah Valley Indian Band) has asserted aboriginal rights and title (on behalf of the Tsilhqot'in Nation) to areas totalling roughly 249 000 hectares in the Brittany Triangle and Nemiah Trapline areas. The Xeni Gwet'in is seeking further declarations that the issuance of forestry licences and tenures—including a forest development plan and any cutting permits that may be issued—unjustifiably infringes its rights and title. Since the questions regarding aboriginal rights and title are currently before the courts, I remain uncertain about the outcome of proceedings.

There are critical forest management and conservation issues in the Brittany Triangle and Nemiah Trapline areas related to forest health. In these areas, stands of lodgepole pine that were damaged by beetles in the 1970s and 1980s remain unsalvaged. These stands are deteriorating in health, becoming infected with mistletoe, and decreasing in stand density. Consequently, the timber in these stands is becoming increasingly unlikely to retain economic value. Unless the existing stands are renewed, either through harvest and managed reforestation, or through natural stand replacement associated with wildfire, they are unlikely to return to a healthy, economically viable state within the foreseeable future. Given existing fire suppression efforts, the latter route toward renewal is not likely. I believe it is responsible for me to consider these forest health and conservation issues along with uncertainties stemming from the legal proceedings.

A number of First Nations, including the Esketemc, have requested interim protection for the Blackdome Mountain area in the TSA because it is a sacred meeting- and gathering-place. While development approved over the past ten years is proceeding, First Nations are being consulted about all proposed development in the area and how this proposed development may impact aboriginal interests that may be practised in the area.

With the intent to provide First Nations with relevant information pertaining to the AAC determination process, and to provide an opportunity for them to raise concerns and aboriginal interests that they believe would be affected by the AAC determination, each of the twenty-one First Nations with stated interests in the TSA were sent copies of the data package, information report, analysis report and public discussion paper between August 1999 and September 2001. Responses were received from the Carrier-Chilcotin Tribal Council and the Ulkatcho First Nation, asserting title to parts of the TSA, and claiming that the Timber Supply Review interferes with their title.

In mid-July 2002, additional copies of the analysis report and public discussion paper were hand-delivered to the following groups:

- The Cariboo Tribal Council (Canim Lake, Canoe Creek, Soda Creek and Williams Lake Bands);
- the Tsilhqot'in National Government (Anaham, Alexandria, Stone, Alexis Creek and Nemiah Valley Bands);
- the Carrier-Chilcotin Tribal Council (Nazko, Ulkatcho, Lhtako, Kluskus, and Toosey Bands);

- the Ulkatcho Band;
- the Alkali Lake Indian Band, and
- the Nemiah Valley Indian Band.

This distribution ensured that all of the First Nations resident in the TSA, and those that had responded to earlier correspondence on the Timber Supply Review—the Carrier-Chilcotin Tribal Council and the Ulkatcho Band—were contacted. A letter requesting information on aboriginal interests related to the AAC determination was also sent to the Chief of the Xeni Gwet'in (Nemiah Valley Indian Band), whose band is currently in litigation with the Province over aboriginal rights, including title. In these communications, BCFS staff asked for the views of First Nations on how I might be able to consider aboriginal title assertions when making my allowable annual cut determination. The information received is summarised below.

The Tsilhqot'in and Xeni Gwet'in were reluctant to discuss matters in detail given the ongoing legal proceedings respecting the Brittany Triangle and Nemiah Trapline areas. However, some general assertions were made. The Tsilhqot'in Chiefs asserted that the trees in the Tsilhqot'in interest area, which overlaps much of the Chilcotin plateau, do not belong to the Province. They asserted that until the legal question is resolved, the AAC should be zero. In addition the chiefs indicated concerns about whether the AAC exceeded the productive capacity of the land, and about the lack of benefits received by the Tsilhqot'in from the harvest of trees in their territory.

The eventual outcome of the litigation, including its implications for timber supply and for future AAC determinations is uncertain since it may or may not lead to changes in the land base contributing to the timber supply. Because of this, in my AAC determination I assume that these areas will contribute to the timber supply within the TSA until a resolution of some kind is reached. I acknowledge that the area in question has been 'logged around' (avoided) in light of its contentious nature. However, given this matter is before the courts I cannot determine the extent to which aboriginal title may be established over any parts of timber harvesting land base.

No responses were received from Ulkatcho Band and the Esketemc First Nation after the Timber Supply Review information was delivered and BCFS staff made several follow-up phone calls. BCFS staff made a presentation to the Cariboo Tribal Council Memorandum of Understanding Implementation Committee. The primary concern identified by the Council was about the sustainability of the AAC.

In addition to comments received from First Nations related specifically to the Timber Supply Review, Forest Service staff reviewed evidence of aboriginal interests from other available information sources. These sources included a cultural heritage overview of the Cariboo Forest Region prepared in November 1997, and traditional use studies completed by the Tsilhqot'in Nation (2000), Esketemc First Nation (1998), Xatsu'll (1998), Williams Lake Band (1998), and Canoe Creek Band (1998).

Although the review identified some specific sites, most of the information related to activities whose precise location has not been identified due to a lack of detailed information from the First Nations. The distribution of sites noted in the traditional use studies showed use of main river valleys; lakeshores; areas close to the Indian Reserves

in which the main communities are located; along major road systems; and along secondary roads, where the road follows pre-existing aboriginal trails. Some areas have concentrated uses for gathering and hunting. Dispersed but widespread big game kill sites and plant gathering areas occupy the land between the road systems and concentrated use areas. A review of the cultural heritage overview identified sites associated with fishing, village sites, hunting, trapping, plant gathering, trading, transit camps, hunting base camps and culturally modified trees.

Some of these traditional uses are closely associated with riparian buffers and other types of areas that were excluded from the timber harvesting land base in the base case. There are also opportunities for design and timing of forest operations to minimize and hopefully eliminate negative impacts on First Nations uses without affecting timber supply at the TSA level. Some of the traditional uses, such as culturally modified trees, may affect the timber harvesting land base, but the location and exact size of such areas is unknown at this time. Objectives for protection of wildlife habitat and biodiversity that have been represented in the base case will assist in maintaining the basis for wildlife-related uses. At this time, I do not believe any adjustments or measures related to traditional uses are required beyond the land base exclusions and management objectives incorporated in the timber supply analysis. I encourage continued consultation with First Nations on operational activities, as is normal practice in the province, to enable design and timing of forest operations to minimize and hopefully eliminate negative impacts on First Nations' uses. If information becomes available that shows that protection of established or strong aboriginal interests requires further reduction to the timber harvesting land base beyond those applied in the timber supply analysis, I will consider it in a future determination.

First Nations have expressed major concerns about the sustainability of the timber harvest. I fully recognize and share this concern. Setting an AAC that allows for sustainable forest management and for sustainable timber supply is the purpose of the Timber Supply Review. Within the context of the considerations documented throughout this rationale and summarized in "Reasons for decision," I believe my determination is based on the best available information and provides for sustainability.

Respecting aboriginal title, from an analysis of the information regarding aboriginal interests available to me, it is unclear over how much of the land base and exactly where the assertions of aboriginal title may be shown to exist.

Based on all of this information and my related considerations, I conclude that the nature, scope, and geographical location of potential aboriginal rights and title within the Williams Lake TSA remain inconclusive. Consequently, I am uncertain as to whether those interests would logically extend to an impact on the AAC. Therefore, I will make no adjustments to the projected timber supply respecting First Nations' issues at this time. If further information becomes available indicating the existence and location of a sound title claim, I can re-examine my determination and consider this information that may lead to an area being excluded from contributing to timber supply. Similarly, if the court action by the Xeni Gwet'in reaches conclusion during the term of this determination, and the outcome warrants, I will evaluate my AAC determination prior to the five-year deadline for the next determination under the *Forest Act.*

As I have noted in my 'Guiding Principles,' the AAC that I determine should not in any way be construed as limiting the Crown's obligations as described in court decisions with respect to aboriginal rights and title. The AAC that I determine does not prescribe any particular plan of harvesting activity within the Williams Lake TSA by requiring any particular area to be harvested or not harvested. My AAC determination is also independent of any decision by the Minister of Forests with respect to subsequent allocation of the wood supply.

As I make my AAC determination, I am mindful of the responsibility of other statutory decision-makers to administer the determined AAC in a manner consistent with other legislation and with relevant decisions of the courts respecting the interests of First Nations.

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

Alternative harvest flows

In addition to the base case harvest forecast, the timber supply analysis report included two forecasts that were each based on the same data and the same assumptions about management as in the base case, but each of which incorporated a different assumption about the rates at which the harvestable timber volumes produced by the TSA's forests would be harvested over time. Each of these forecasts represents a biophysically supportable alternative 'harvest flow'.

In the first of these alternatives, the analyst attempted to maintain an even flow of timber from the TSA for all time after an all-at-once reduction from the starting harvest level (which includes the salvage uplift) in the base case. The highest level that could then be maintained indefinitely under current management assumptions was 3.05 million cubic metres per year, an increase of 130 000 cubic metres per year over the base case. This increase was essentially obtained by continually harvesting the forest at lower average ages than in the base case, and resulted in a reduction of about 200 000 cubic metres per year in the long-term harvest level. The durable increase in the projected short-to-mid-term harvest level clearly illustrates the underlying stability of the TSA's growing stock.

In the second alternative harvest flow, the analyst projected a more gradual downward transition from the starting harvest level in the base case, while maximising the long-term productivity of the land base. To achieve this, minimum harvestable ages were set to the age of maximum average growth. In this projection, while the short-to-mid-term level fell below the base case by 200 000 cubic metres for 70 years, the long-term level, at 3.3 million cubic metres per year, was 50 000 cubic metres higher than in the base case. This projection showed that harvest levels considerably higher than those forecast in the base case are possible for the first two decades while continuing to meet all environmental requirements and incur a 7-percent reduction to the timber supply for a 70-year period.

I note that the first alternative requires the consistent harvesting of large areas of smaller trees at lower ages, and the second alternative implies increasing the conventional sawlog harvest to provide a transition from the beetle salvage uplift, which while it has been in

place for many years, was projected to be temporary. Nonetheless, both of these projections attest to the long-term stability of the timber supply in the TSA, and to its ability to support harvest flows that could if necessary accommodate elevated short-term levels without serious future timber supply impacts. I have taken this information into account in my determination, as discussed in 'Reasons for decision'.

Social and economic implications

The elevated harvest levels in the TSA in recent years, associated with the salvage of beetle-damaged timber, have created temporarily increased levels of employment and economic activity in the area, as well as higher revenues to government. The socio-economic analysis section of the *Williams Lake Timber Supply Area Analysis Report, September, 2001*, notes that the TSA is 31-percent dependent on the forest industry for employment, with about 24 percent of residents' income derived from forest based employment. Based on 1998-2000 annual averages, the forestry sector supported about 2400 person-years of direct employment in the TSA, and an additional 1300 person years of indirect and induced employment. Provincially the total employment supported by the Williams Lake TSA is 7,100 person-years with a total employment income of $268 million. The report indicates that if the total TSA harvest level were to revert from the 3 765 000 cubic metres per year projected for the next five years under the current salvage-augmented AAC of 3 807 000 cubic metres per year, to the short-to-mid-term level of 2.92 million cubic metres projected in the base case, this would result provincially in losses of 1672 direct, indirect and induced person-years of employment, $63.23 million in employment income, and $24.34 million in provincial government revenues.

Public input to the AAC determination process included concern that the socio-economic analysis does not provide up-to-date employment and income data and that the predicted outcomes are therefore suspect. The input suggested that the population growth figures used in the analysis were inconsistent with those supplied by BC Statistics. However, I am advised that the areas for which this suggestion was made were not identical to those used in the analysis, and that when this is taken into account, the figures are not necessarily inconsistent.

The input also contrasted the unemployment rate used in the analysis with a rate provided by BC Statistics. However, the figure provided by BC Statistics was for the Cariboo Development Region, an area much larger then the Williams Lake TSA. When this is accounted for, for comparable years, the unemployment figures are not inconsistent.

The input also suggested that the economy of the Williams Lake TSA is more diversified than was stated in the analysis report. Information from the 2001 Census may indeed confirm this; however, there is no question that the forest sector is by far the dominant contributor to the local economy.

It was also suggested that the analysis does not recognize that environmental sustainability is of primary importance when allocating timber harvests, and that without this there can be no long-term socio-economic sustainability. In fact, the timber supply forecast is based on projecting and achieving a sustainable long-term timber supply which, in turn, is predicated on the environmental commitments of the CCLUP.

Environmental implications

The base case and alternative harvest flow projections that were examined in the timber supply analysis all account as fully as possible for the environmental commitments made in the CCLUP, as I have noted in various sections of this rationale, and are predicated on application of the Forest Practices Code. None of the harvest level projections assumes or necessitates compromise in meeting the objectives of the CCLUP or associated sub-regional planning processes. Even changes in green-up patterns necessitated by salvaging timber damaged by beetle infestation are taken into account in modelling the availability of timber for future harvests. I am therefore satisfied that the environmental implications of alternative rates of harvest are adequately accounted for in the analysis prepared for my consideration in this determination.

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

Timber processing facilities

Roughly 90 percent of the timber harvested in the Williams Lake TSA is processed within the TSA in primary plants that include nine lumber mills, one veneer/plywood mill, three log home builders and two chip mills, with an estimated combined total annual processing capacity of 1.7 to 3.95 million cubic metres, depending on shifts. In 2001, the actual harvest level in the TSA was about 3 million cubic metres, some of which was transported out of the TSA for processing, while other timber processed in the TSA came from nearby TSAs and private sources. In addition to the primary processing facilities, several secondary processors are located within the TSA, including finger-jointed producers, remanufacturers, planers, and an electrical energy generation plant.

I am satisfied that the production facilities in the TSA are capable of processing the volumes and species of timber from current and anticipated levels of harvest.

(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

I have reviewed and considered the Minister of Forests' expression of economic and social objectives of the government 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). This letter and memorandum together include references to forest investments, 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 objectives include specific reference to the importance attached by the government to the continued availability of good forest jobs and to the long-term stability of communities that rely on forests.

The principle of establishing harvest levels in consistency with a sustainable long-term timber supply as referred to by the minister is incorporated in the projection of the base

case for the Williams Lake TSA, and consideration of this principle is central in my determination of this AAC. The letter also refers to the Forest Practices Code, which is incorporated in the timber supply projections, and to partitioned harvests, to take advantage of geographic and forest-type profiles—these are also reflected in this determination. No opportunities for commercial thinning—a specific consideration suggested by the minister—have been identified in the TSA at this time. The minister's memorandum also refers to optimizing overlaps in assessing visually sensitive areas and other forest values, and in this analysis and determination I have relied on guidance from the CCLUP as providing specific objectives for the area in this regard. I am satisfied that this determination has been made to the best of my ability in consistency with protecting major elements of the health and productivity of the forest for the long term, and that the determination is thereby consistent with the objectives of the government as expressed most currently by the Minister of Forests.

Public input included criticism of the scope of the government's objectives with respect to AAC determination. The *Forest Act* requires the chief forester to consider the government's objectives, but assessment of the scope of those objectives is a matter for the consideration of the minister and government.

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.

A substantial amount of public input to this process was received. I have reviewed all the submitted information in summarised form, and some has been presented to me in detail. Wherever possible, I have attempted in the appropriate sections of this rationale to respond briefly to the views expressed, and consideration of this input has been an important component of this determination. Some specific considerations, not addressed in other sections, follow.

It has been questioned how the timber supply review process can predict timber supply 180 years into the future in the face of uncertain information. It is exactly due to this uncertainty that AACs are required by law to be redetermined frequently regularly, to reflect emerging changes in information.

The Forest Practices Board expressed concern that the CCLUP, which forms the basis for many of the assumptions incorporated in the timber supply analysis, was not being properly implemented as required by the Forest Practices Code. I have responded to this under the sections *visually sensitive areas* and 'Cariboo-Chilcotin Land Use Plan and Sub-Regional Planning'.

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

Unsalvaged losses

The unsalvaged losses of timber volume to fire, insects and wind—exclusive of the effects of the mountain pine beetle infestation in the TSA, which are discussed in the next

sections—were, as noted in the timber supply analysis report, 25 653 cubic metres, 16 297 cubic metres, and 11 550 cubic metres respectively, for a total of 53 500 cubic metres per year. These figures were derived from field studies; having reviewed the approach, and in the absence of contention, I accept them as the best available information and as satisfactory for incorporating in the timber supply projections for my consideration in this determination. However, I do have concerns about the ongoing mountain pine beetle epidemic, which I will discuss separately in the next sections.

Mountain pine beetle

The mountain pine beetle (MPB), *Dendroctonus ponderosae* Hopkins (Coleoptera: Scolytidae) is widely considered to be the most damaging of all the insects that attack lodgepole pine in western Canada. The insect is a small, cylindrical-shaped bark beetle that kills mature trees by boring through the bark, mining the phloem—the layer between the bark and the cambium or inner wood of a tree—and interrupting the flow of nutrients up the tree stem.

old mountain pine beetle infestation

Since 1985, the AAC for the Williams Lake TSA has included a component to allow for the harvesting of stands damaged by the mountain pine beetle. The size of this salvage-harvest partition has varied over time, as detailed above in the section 'History of the AAC'. The current partition allows for an annual harvest of 850 000 cubic metres throughout the TSA, but cut-control information from the tenures under this partition indicates that harvesting averaged 60 percent of the allowable level from 1996 to 2000, and is decreasing. The current partition has commitments of 700 000 cubic metres in non-replaceable forest licences and 150 000 cubic metres in the BC Timber Sales Program (formerly Small Business Forest Enterprise Program). Actual performance under this partition has been declining as the accessible supply of utilizable damaged timber from the old infestation becomes depleted. Currently about 375 000 cubic metres of beetle-attacked stands are harvested annually under forest licences.

The *Williams Lake Timber Supply Area Analysis Report, September 2001*, outlines the complex treatment applied in the analysis to various areas of forest classified under different levels of attack by beetles, with associated potential merchantable volumes, regeneration assumptions and modified yield tables. I have reviewed and considered this information in detail as comprehensively explained to me by BCFS district and regional staff. I note that: the age adjustments applied to regenerating stands to reflect the effects of the beetle attack were based on an analysis using the combined inventory audit and VRI information, taking into account their ages before attack and the attack intensity; that the modelling was sensitive to differences between the main TSA and the three western supply blocks; that the volumes in the inventory file were reduced to reflect the levels of beetle attack; and that the age adjustments were applied to all stands heavily attacked by beetles. I consider the representation in the analysis to be thorough and satisfactory in all regards, except as follows.

It is reported that in 1998, for stands with a greater than 30-percent level of attack, there remained in the TSA a total of 74 845 hectares of potentially harvestable stands containing volumes between 40 and 65 cubic metres per hectare. Since 1998, 1.2 million

cubic metres have been harvested from these stands. Region and district staff project that a further one million cubic metres of these stands will be harvested by 2006, by which time essentially no salvageable volume will remain. From this it is estimated that, of the 74 845 hectares, roughly 40 000 hectares will be harvested and will grow back as managed stands, leaving approximately 35 000 hectares unlogged, to grow back with an extended regeneration delay and greatly reduced productivity (reaching minimum harvestable volume again only after 130 years). In the analysis it was assumed that all of the 74 845 hectares would be logged and would grow back as managed stands. This causes two overestimations. First, the unlogged timber will not contribute to the timber supply in the short term. Secondly, the overestimated future productivity of the eventually regenerated stands means the timber supply is overestimated throughout the mid term.

I note that the total hectares of these salvageable stands, by volume class, are at best an estimate that is subject to uncertainty. Nonetheless, in the absence of further evidence I have accepted the estimated areas as outlined above, noting that my decision with respect to this partition is not overly sensitive to any further precision that might be gained by closer scrutiny or evaluation of these estimates. Based on this estimated area, I have considered the timber supply impacts as follows.

A sensitivity analysis showed that when no timber supply contribution at all was assumed from the area estimated to be salvageable at the time the analysis was undertaken, (and no regeneration was assumed from a further 90 424 hectares of stands with less than 40 cubic metres per hectare) the short-to-mid term level was reduced by 100 000 cubic metres or 3.4 percent. A rough appropriate fraction from this sensitivity analysis can be used to estimate the loss of productivity on the 35 000 hectares that will likely not be salvaged by assuming that the 90 424 hectares accounts for a 2-percent reduction, and the 74 845 hectares account for a 1.4-percent reduction. Therefore the 35 000 hectares then accounts for roughly half of the 1.4 percent, or about 0.7 percent. Since I am considering only a loss of productivity on this area during the next rotation, rather than a complete loss of its contribution to the timber supply (as was modelled in the sensitivity analysis) I have attributed to this factor an up to 0.5-percent overestimation in the projected short-to-mid term timber supply.

In summary, there is a declining amount of harvesting activity occurring in the old infestation, given the diminishing supply of economically accessible, eligible stands. I had considered reducing the harvest level attributable to the salvage of infested stands, however recent survey information indicates that the new infestation has grown substantially, as discussed next in *new mountain pine beetle*. Therefore, I have not eliminated this partition—which was suggested as an option in public input. This was proposed on the basis that there is no evidence that the removal of dead timber stops beetle infestations, and that harvesting at a rate higher than the long-term level must end. I agree that the salvage of timber in stands damaged by the historic infestation must come to an end at some point, but forest managers must assess the best time to halt this activity. For the moment, the damaged stands still hold some value; but if left on the landscape indefinitely, the deteriorating dead timber will eventually render these stands unmerchantable. The current harvesting in the older beetle-damaged stands is not intended to prevent or reduce infestation, but rather to salvage any economically

accessible value remaining in the already damaged stands. It is true that under alternative harvest flows I could choose to reduce the AAC to the mid-term level immediately, leaving more of the damaged stands unharvested than currently anticipated. However, this would mean both forgoing the remaining value of the timber, and worsening the extent of the regeneration problem noted earlier in this section. For these reasons, it is preferable to allow the harvest of damaged timber to continue as long as eligible stands are economically feasible to harvest.

new mountain pine beetle and Douglas-fir bark beetle infestations

A new mountain pine beetle outbreak in the Cariboo Forest Region is following a similar pathway to the outbreak that occurred in the late 1970s and early 1980s, and is affecting the entire Williams Lake TSA to varying degrees. In the TSA, the amount of red-attacked volume has increased by about 4 times from 2001 to 2002.

Winter mortality of the beetle has been decreasing since 1996, indicating significant beetle survival, and the ratios of progeny production to beetle attack are at very high levels and have increased every year since 1996, indicating dramatically increasing populations and intense beetle pressure on susceptible pine stands. The Douglas-fir beetle is also showing increasing populations from high beetle survival rates due to mild winters, however the spread is not as high as the mountain pine beetle. The current beetle epidemic will likely continue to spread unless there is a severe winter, with very low temperatures early in the winter or late in the spring for sustained periods.

Last year in response to the growing mountain pine beetle epidemic, the province developed a bark beetle strategy. This strategic plan includes the appointment of a beetle management coordinator; introduction of a bark beetle regulation; amendments to the stumpage system; provision for transferring cutting rights across TSA boundaries; administrative efficiencies; increased cut control flexibility; coordination of fire protection; improved transportation infrastructure; and pursuit of federal emergency funding. Portions of the three forest districts have been designated an 'emergency bark beetle management unit' under the *Bark Beetle Regulation*. Aggressive sanitation measures, including harvesting, must be undertaken in these units to control the infestation.

Based on preliminary results from aerial surveys taken last summer (2002), the currently infested volume, including both red and projected green attack in the Williams Lake TSA is estimated to be over 15 million cubic metres. However, not all this volume is within the timber harvesting land base.

During the completion of the timber supply analysis in 2001, aggressive management of the new infestation was keeping ahead of the new attack. Therefore, the analysis report and public discussion paper suggested that the partition level of 850 000 cubic metres per year could start to decline in the short term. However, after reviewing the new reports of the spread of the infestation over the past summer, staff now believe that the partition of 850 000 cubic metres per year, originally assigned to the old mountain pine beetle infestation, should be maintained. They propose to focus all available resources to manage this infestation. While it is not evident whether a higher level would be more appropriate, staff expressed concern about licensees' ability to extend their efforts, which

are constrained by lumber markets and prices, and existing mill requirements and capacity. Licensees' ability to expand is particularly difficult to evaluate given the higher volumes already being harvested in infested pine stands in the Quesnel and Prince George TSAs. The ability for the regional manager to redirect more of the licensees' existing harvest towards beetle infested stands under the authority provided under Part 6 of the forest licences, is also constrained by these limiting economic factors. However, staff submit that if full use of the existing partition can be demonstrated, and if the need for a higher partition level can be substantiated, then an evaluation will be undertaken to assess local capacity and market conditions against the need for a higher uplift. This evaluation may be necessary as soon as this spring (2003).

BCFS staff indicate that if the existing partition was maintained and new licences were issued for this volume, the amount of spread and volume losses due to the mountain pine beetle might be reduced. Staff state that priority would be placed on harvesting green-attack trees in the emergency bark beetle management unit. According to research conducted by the Canadian Forest Service (CFS), at least 80 percent of the beetle brood must be eliminated in order to suppress the beetle population during epidemic conditions. The provincial bark beetle strategy has therefore adopted a goal of eliminating 80 to 100 percent of the beetle brood in the aggressive management zones.

Although the timber supply analysis only examined the timber supply impact of the old mountain pine beetle infestation, staff have confirmed that the current base case level (3.76 million cubic metres per year) is possible in the short term without introducing significant impacts to the mid- to long-term harvest levels. On the other hand, if the current epidemic were left unchecked and attacked stands regenerated to an unmanaged state, the timber supply would likely be significantly affected.

I acknowledge that the large-scale salvage of insect damaged timber has a number of implications for environmental concerns and values. These include the potential for: reduced coarse woody debris, affecting species that depend on it and predators that rely on them; loss of habitat for woodpeckers and other cavity nesting birds; loss of mature forest habitat, which favours some species but is detrimental to others; increased peak stream flow and storm flow volumes in streams and rivers; and increased road development, which may lead to erosion, habitat fragmentation, altered predator-prey behaviour, and improved access to hunters and poachers.

In similar discussions with MWLAP staff regarding large-scale salvage, staff have made several recommendations to limit the negative impacts of extensive salvage and control measures on wildlife resources. These include: assigning a harvest priority to active infestations where containment may be effective; leaving non-susceptible and unattacked trees at the both the landscape and stand level; retain structural elements (e.g., wildlife tree patches) within stands wherever possible; aggressive deactivation of new access to previously unroaded areas; and development of a carefully planned program of harvesting that considers impacts to landscape and stand level environmental values. The majority of these environmental concerns, comments and recommendations relate to harvesting operations and should be considered by licensees and BCFS when developing and approving operational plans.

In consideration of the above matters I believe it is appropriate to maintain the existing partition at it's current level as part of the management strategy to control the mountain

pine beetle, and to the extent possible the Douglas-fir beetle, in the Williams Lake TSA. I have accounted for this partition as discussed in 'Reasons for decision'. The issues and need for the partition are very similar to those of the Quesnel, Lakes and Prince George TSAs, where I increased the level of harvest temporarily over the last year.

Reasons for decision

In this determination of an allowable annual cut for the Williams Lake TSA, from my review of the information presented to me, including public input, I have considered all the factors as noted, outlined or discussed in the foregoing sections of this document. In addition I have sought reference, where required, to information from the sources listed above in 'Information sources used in the AAC determination'. From all of this I have further considered and reasoned as follows.

In AAC determinations under section 8 of the *Forest Act* my considerations typically serve either to (i) verify the assumptions incorporated in the timber supply analysis and thus in the 'base-case' forecast, or (ii) to identify particular factors which, considered separately, indicate that the timber supply may actually be either greater, or less than, that projected in the base case. As I have reviewed the former type of considerations as documented in the preceding sections, I have accounted for the latter type further in terms of over- or underestimating timber supply, as discussed below.

While I am considering and determining one AAC for the entire Williams Lake TSA, because certain factors apply differently to the main TSA and the three western supply blocks, for clarity and efficiency in reporting the determination I have considered the timber supply in these areas sequentially.

Main TSA

For the main TSA, (including the PA 16 contribution) the base case projection indicated a steady short-to-mid-term harvest level of 2.3 million cubic metres per year upon termination of the current salvage harvest. I have identified the following factors as reasons why the projected timber supply may have been *under*estimated in the analysis:

- *volume estimates for existing stands*: I have accepted that existing volumes have been underestimated based on the final report '*An Examination of Volume Adjustment Factors for the Williams Lake TSA*. When these adjustment factors were applied to stands older than 60 years, the short-to-mid-term timber supply was increased by 3 percent, or 80 000 cubic metres per year.
- *site productivity*: I have accepted that site productivity estimates have likely been underestimated. For the total TSA, the timber supply impact of this underestimation is up to a maximum of approximately 10 percent in the short and mid terms, and up to 26 percent in the long term. Upon closer examination, for the main TSA (i.e.– excluding the three western supply blocks), these impacts are up to 6 percent in the short term and up to 27 percent in the long term. In the absence of local data the exact value is uncertain, and for the purposes of this determination I have assumed a mid-range underestimation of 3 percent in the short term.

I have identified the following factors as indicative of potential *over*estimations in the timber supply in the main TSA:

- *Older cedar-hemlock stands*: In respect of an overestimation in the amount of area with merchantable older cedar and hemlock stands that remains unaccounted for after applying the volume adjustments, I have accepted an overestimation in the timber supply throughout the forecast period of less than 1 percent.
- *Landscape-level biodiversity*: In the analysis it was assumed that after the first entry for selection harvesting in Douglas-fir stands the remaining forest cover will continue to provide adequate mature seral forest attributes to contribute to requirements for biodiversity. In practice, for biodiversity purposes these stands will be classified as younger stands after harvest (though the inventory may still label them 'mature') and the requirements for mature seral forest cover will need to be met elsewhere. Sensitivity analysis shows that this will reduce the projected timber supply by 1 percent in the short term and mid terms, and 2 percent in the long term, relative to the base case.
- *Aging of the forest outside the timber harvesting land base*: In the analysis it was assumed that the forest outside the timber harvesting land base will continue to age indefinitely, contributing continuously to old seral stage forest cover requirements for biodiversity. Accounting for a reasonable estimate of the impact reduces the base case harvest level by 3 percent in the short-to-mid-term.
- *Harvest sequencing*: Reflecting a more 'randomized' approach rather than a strict 'relative-oldest-first' to harvest sequencing results in a reduced short- and mid-term supply that is greater than zero but no larger than 8 percent. This represents a mid-point of 4 percent, with a smaller impact in the long term.
- *Overestimated yield of unlogged, beetle-attacked stands*: In the analysis it was assumed that approximately 74 845 hectares of potentially harvestable stands containing volumes between 40 and 65 cubic metres per hectare, that were attacked by beetles, and that were eligible for harvest under salvage licences, would all be logged and would grow back as managed stands. In fact, about 35 000 hectares of these stands are expected to remain unlogged, and to grow back eventually, after an extended regeneration delay, with a greatly reduced productivity. Considering the loss of productivity on this area during the next rotation only, I have attributed to this factor a 0.5-percent or smaller overestimation in the projected short-to-mid term timber supply.

Reviewing the above factors, the identified *over*estimations in the short to medium term total approximately 9.5 percent. The summary of the short- and mid-term *under*estimations comprises 3 percent from the volume estimates for existing stands and 3 percent from site productivity—for a total of about 6 percent. On balance and within a small margin, the difference is a net overestimation of about 100 000 cubic metres, or about 4 percent (rounded up from 3.5 percent), in the projected supply for the main TSA.

However, alternative harvest flow projections showed that the growing stock in the main TSA is sufficiently robust to support elevated harvest levels (up to 3.0 million in the short term then declining by 10 percent) for at least short periods in the near term without

serious future shortfalls. Therefore, apart from the *over*- and *under*-estimations discussed above and noting the likely magnitude of the range of uncertainty associated with them, it would be possible to maintain the current partition level of 2.5 million cubic metres per year. Nonetheless, while I accept that 2.5 million cubic metres per year is possible, I have accounted for the net overestimation of about 100 000 cubic metres, or about 4 percent. My consideration of this downward pressure on timber supply overlaps with my review of the timber supply projected in the three western supply blocks, which I have further discussed below, under *Synthesis.*

In addition, in recognition of woodlot licences involving 23 600 cubic metres and a community forest agreement of 15 000 cubic of timber issued since the previous AAC determination, I have reduced the AAC partition for the main TSA by this amount (38 600 cubic metres) since these volumes are directly associated with the main TSA. This reflects the separate administration of these licences as required by the *Forest Act*.

Next, I will speak to the consideration of the volume contribution of low-volume stands (between 65 to 100 cubic metres per hectare). As discussed earlier, the potential for some or many of these stands to prove individually uneconomic to harvest clearly indicates the need for a partition(s) to be determined within the AAC. As noted earlier, these low-volume stands comprise about 9 percent of the total TSA area, however I have reviewed the breakdown of their distribution—between the main TSA and the three western supply blocks. From this breakdown, I have concluded that of the resultant harvest level of 2.36 million cubic metres per year in the main TSA, at least 70 000 cubic metres is attributable to low-volume stands. This means that in the new AAC level for the main TSA, not only have I recognised that the harvest level must be reduced at this time, but I have also recognized that part of it must be located in low-volume stands.

Three western supply blocks

For the three western supply blocks, the base case projected a steady short-to-mid-term timber supply contribution of 590 000 cubic metres upon termination of the current salvage harvest. I have identified the following single factor as a reason why the projected timber supply may have been *under*estimated in the analysis:

Site productivity estimates: The distributed site productivity underestimations discussed above for the main TSA are expected to have a much larger potential impact in the short term in the three western supply blocks. For these blocks, the impact ranges from zero to 25 percent in the short term, and up to 22 percent in the long term. In the absence of local data the exact value is uncertain, however for the purposes of this determination I have placed some weight on this factor and have assumed a mid-range underestimation of between 10 to 12 percent in the short term.

For the three western supply blocks, I have identified the following two factors as reasons why the projected timber supply may have been *over*estimated in the analysis:

- *The Anahim Round Table Sub-Regional Plan*: The Anahim Round Table (ART) plan, part of the ongoing sub-regional process to refine objectives for the government-approved CCLUP, now has the approval of the Regional Resource Board, and endorsement by the Inter-Agency Management Committee, the local agencies with responsibility for implementing the CCLUP. The ART plan is expected to constrain

the timber supply by approximately 2 percent from that projected in the base case for the short to long terms.

- *Harvest sequencing*: The same issue of harvesting in a more randomized sequence, rather than a strict 'relative-oldest-first' sequence, as discussed above for the main TSA, is expected to constrain the timber supply in the three western supply blocks in the short to long terms by from zero to 8 percent, and may reasonably be taken at the mid-point of 4 percent, with a smaller impact in the long term.

In reviewing the three factors I have identified as influencing the reliability of the base case projection for the three western supply blocks, I note that the short-term overestimation of 4 percent from the change in harvest sequencing, in combination with the roughly 2-percent overestimation from the ART plan, amounts to a worst-case overestimation of less than half the potential (10 to 12 percent) underestimation from site index adjustments. While each of these three factors under consideration is subject to a range of uncertainty, the indicated orders of magnitude of the ranges are such that it is reasonable to conclude there are no significant risks to the timber supply in the three western supply blocks that have not already been adequately accounted for in the timber supply projection. If the site index adjustments prove to be validly applied at the upper end of the potential range, this would indicate a net underestimation in the projected timber supply. In the opposite event, if the site index adjustment is inadequate to compensate for the two overestimations, the timber supply analysis has indicated sufficient stability in the growing stock to manage a brief decline if necessary under an alternative harvest flow. Under these circumstances it is reasonable in either case to assume for the purposes of this determination that the base case projection is neither under- or overestimated with respect to these three factors in the three western supply blocks.

However, for several reasons touched on in earlier sections, I am concerned that in operational practice this projected level may not be realized in full. The timber harvesting land base has been increased by 43 percent from that analysed for the previous AAC determination, and roughly 19 percent of the timber harvesting land base in the three western supply blocks is comprised of low-volume stands ranging from 65 to 100 cubic metres per hectare. Questions have been raised about the true operational viability of some of these stands. I am not convinced that it is realistic to assume that all these low-volume stands will prove economic to access and to harvest, particularly where this must be done without the benefit of harvesting better quality adjacent stands. In my judgement, and in that of the regional and district managers, there are likely to be areas, particularly for instance in the Tatla and Chilcotin Supply Blocks, which may in fact prove uneconomic to access and harvest. Compounding this situation, the timber supply analysis projected a non-declining harvest of 269 000 cubic metres for one of the three supply blocks, the Anahim, which under approved planning is now expected to be curtailed somewhat, as noted in the list of factors, above. This curtailment increases the reliance of the overall harvest level for the three blocks on the assumption that all other areas in the timber harvesting land base will be harvested, whether access to individual, dispersed areas is economic or not.

For these reasons, I am reluctant to accept the full and durable operational viability of the steady harvest level of 590 000 cubic metres as projected for the three western supply

blocks. Certainly more harvestable timber is now available in the these blocks than the 350 000 cubic metres per year included under the current partition, and it is clear that licensees are performing better in the low-volume stands than was expected at the time of the previous AAC determination. I am therefore satisfied that it is appropriate to increase the allowable harvest from this area by 100 000 cubic metres per year.

Regarding the volume contribution of low-volume stands (between 65 to 100 cubic metres per hectare), as discussed earlier, I have reviewed the breakdown of their distribution between the main TSA and the three western supply blocks. From this, I have concluded that of the resultant harvest level of 450 000 cubic metres per year in the three western supply blocks, at least 100 000 cubic metres must come from these low-volume stands. In view of the evident uncertainty in the economics of accessing some areas within these three supply blocks, I have requested as noted in the 'Implementation' section below, that improved operability information be obtained for these areas, and incorporated in the next timber supply analysis.

Synthesis

My review of factors for the main TSA and three western supply blocks indicates that, through considering the sustainability of the projected timber supply of the Williams Lake TSA as a whole that appropriate harvest levels from the component partitions may be determined. If the (non-salvage) level in the western blocks were to be increased at this time while the (non-salvage) level in the main TSA remained the same, the net effect would be an increase in the overall AAC for the TSA. Current indications are, however, that such an increase must be temporary, and in any case the increase would be made at a time when the AAC for the TSA faces a reduction as the salvage harvest for the old beetle infestation is coming to an end. A preferable alternative is to maintain the current overall level of harvest in the TSA and provide some flexibility between the partitions by increasing the additional allowable harvest in the three western supply blocks by that amount decreased in the main TSA.

From my review of the base case, the factors discussed above, and the alternative harvest flows projections, I am satisfied that by decreasing the annual harvestable level in the main TSA by 100 000 cubic metres and increasing the level in the three western supply blocks by this amount would achieve several objectives:

- Such a change would maintain the overall conventional level of harvesting in the TSA, avoiding the social and economic disruption of an overall reduction while remaining within demonstrated harvest flows.
- It would provide for a reasonable increase in activity in the three western supply blocks without requiring dependence on harvesting in areas of questionable economic access.
- It would reduce the harvest level in the main TSA from 2.5 million cubic metres per year to 2.36 million cubic metres per year, as the first of a series of reductions, as indicated in this analysis, designed to achieve a projected mid-term harvest level of about 2.1 million cubic metres.
- And, in maintaining the overall level of activity in the TSA (aside from beetle salvage), it would incur a manageable amount of geographic transfer of operational activities for licensees.

Finally, I have considered the partitions for the PA 16 area, and for the mountain pine beetle infestation as follows:

PA 16 area

In the timber supply analysis, the volume assigned to the PA 16 area within the Williams Lake TSA was examined in the base case forecast. The analysis showed the availability of 107 000 cubic metres per year for thirty years from stands assigned to the PA licence. Thus the harvest level in the main TSA is projected to include an adequate volume from suitable low-volume stands (in addition to low-volume stands specified in the main TSA and three western supply blocks) to support PA 16 as well as the regular sawlog harvest, at least to the expiry of the licence in 20 years. A previous regional study performed in the mid-1990s showed that the area in the Williams Lake TSA attributable to the PA 16 agreement was 34 951 hectares, and the land base assumed in the current analysis is an approximately equal figure of 31 500 hectares. Therefore, although some of the low-volume stands in question may now be described as sawlogs or have been harvested as such, I am satisfied that areas supporting a sufficient volume of timber will continue to be made available under the PA 16 agreement from stands of types that are equivalent to those included in the original agreement. As I have noted, if other licensees were to begin harvesting in these lower volume stands at rates that could eventually jeopardize this availability given overall levels of growing stock reported in the analysis, I am satisfied that the BCFS will be able to identify appropriate areas for harvest under the agreement. I will therefore maintain the partition for PA 16 at the current level of 107 000 cubic metres per year in the appropriate forest types as defined by the PA 16 Review Committee.

Mountain pine beetle infestation

The current partition is for 850 000 cubic metres—originating from the old mountain pine beetle infestation—although actual performance under this partition has been declining as the accessible supply of utilizable damaged timber becomes depleted. Although last fall, staff had believed that the continuation of this partition was no longer required, new information has prompted a re-evaluation of this assumption.

The new information compels me not to reduce the partition at this time. Recent results of aerial surveys taken this fall show that over the past summer the spread of the mountain pine beetle infestation has continued to expand, affecting volumes (red attack) on average by 4 times. Without a marked effort to manage the infestation in the Williams Lake TSA, a significant amount of merchantable lodgepole pine will be lost. Staff have requested that the current partition of 850 000 cubic metres be maintained. This would allow prompt evaluation of existing and new harvesting tenures over the coming winter with the expectation that higher harvesting levels targeted at the new infestation could then occur by next summer. An annual harvest level of 850 000 cubic metres would permit a mountain pine beetle harvest of 4.25 million cubic metres—in addition to any infested wood harvested within the other partitions—over the next five years, the effective period of this AAC. Subject to markets, cut control, and other factors affecting operations, the harvest in these stands in any given year could be greater or less than 850 000 cubic metres.

Given the significance of this epidemic, my expectation is that as much harvesting as possible needs to be directed at the on-going green-attacked beetle stands.

As discussed earlier under the *First Nations* section, I am mindful of the First Nations concerns as communicated through meetings, submissions, research and conversations. With respect to First Nations' issues, given the Crown's legal obligations resulting from recent decisions in the British Columbia Court of Appeal and the Supreme Court of Canada, I have considered all the information brought forward respecting First Nations' interests and I have endeavoured to understand the issues carefully.

As stated in *Guiding Principles*, I re-iterate that my AAC determination does not prescribe where harvesting should occur or should not occur, nor does it prescribe who should harvest the timber supply. My AAC determination is based on many complex environmental, social and economic factors, however to be clear it establishes a target harvest level that reflects forest practices and a land base that is largely determined by government's policies and land-use decisions.

If, subsequent to this determination, I become aware of information respecting First Nations' interests that would substantially alter the forest practices or land base underlying my determination, I am prepared to revisit my determination.

In summary, the new AAC for the TSA will therefore be the former AAC of 3 807 000 cubic metres less the removed woodlot volume of 23 600 cubic metres, and less the removed community forest agreement volume of 15 000 cubic metres, for a total of 3 768 400 cubic metres, attributable to four partitions, as detailed in the next section.

Determination

Having 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, meets the requirements of the CCLUP, and reflects current management practices as well as the socio-economic objectives of the Crown, can best be achieved in the Williams Lake TSA at this time by establishing an AAC as follows.

Effective January 1, 2003, the new AAC for the Williams Lake TSA will be 3 768 400 cubic metres, partitioned to the following components:

- 2 361 400 cubic metres are attributable to coniferous stands in the main TSA, of which at least 70 000 cubic metres must be harvested from low-volume stands that are 65 to 100 cubic metres per hectare;
- 450 000 cubic metres are attributable to the three western supply blocks, of which at least 100 000 cubic metres must be harvested from low-volume stands that are 65 to 100 cubic metres per hectare;
- 107 000 cubic metres are attributable to the harvesting of eligible stands under the PA 16 agreement, as defined through ongoing work by the PA 16 Review Committee;
- 850 000 cubic metres are attributable to harvesting in stands damaged by the mountain pine beetle infestation throughout the TSA.

This new AAC volume excludes all volumes in issued woodlot licences and community forest agreements; and will remain in effect until another AAC is determined, which may take place within five years of the present determination.

The following observation forms an integral part of this determination. Staff of the BCFS will annually monitor and apprise the chief forester of the condition of the currently increasing new infestation of mountain pine beetles, and of the declining volumes of salvageable timber remaining from the previous infestation, on the understanding that, if and when required, this determination may be revisited at a date earlier than specified in the statute.

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 in helping to reduce the risk and uncertainty associated with key factors that affect the timber supply in the TSA.

- In view of the associated potential for large increases in the projected timber supply, I encourage the collection of locally-based estimates of site productivity for consideration in the next determination.
- I encourage BCFS staff to reconcile the area logged with the regeneration delay, the area reported as NSR on the inventory file, and the NSR areas reported through ISIS.
- I ask that staff review the regeneration assumptions in the ICH zone and monitor to ensure that any changes to species and regeneration strategies are reflected in the next analysis.
- The economic operability of particular areas in the three western supply bocks should be studied to ensure that areas that are uneconomic to access are not included in the timber harvesting land base for the next timber supply analysis.
- Annually monitor the amount of area harvested of stands that are less than 100 cubic metres per hectare under all licenses to confirm the utilization of low-volume stands.
- Promptly report any new information with respect to First Nations' rights and title that might affect the timber supply for the Williams Lake TSA.

Larry Pedersen
Chief Forester

November 27, 2002

Appendix 1: Section 8 of the *Forest Act*

Section 8 of the *Forest Act*, Revised Statutes of British Columbia 2002, 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).

(3.1) If, in respect of the allowable annual cut for a timber supply area or tree farm licence area, the chief forester considers that the allowable annual cut that was determined under subsection (1) is not likely to be changed significantly with a new determination, then, despite subsections (1) to (3), the chief forester

(a) by written order may postpone the next determination under subsection (1) to a date that is up to 10 years after the date of the relevant last determination, and

(b) must give written reasons for the postponement.

(3.2) If the chief forester, having made an order under subsection (3.1), considers that because of changed circumstances the allowable annual cut that was determined under subsection (1) for a timber supply area or tree farm licence area is likely to be changed significantly with a new determination, he or she

(a) by written order may rescind the order made under subsection (3.1) and set an earlier date for the next determination under subsection (1), and

(b) must give written reasons for setting the earlier date.

(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) silviculture 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.

1998-29-2; 1999-10-1; 2000-6-2; 2002-25-21.

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

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

Purposes and functions of ministry

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

(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.

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Documents attached:

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

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

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.

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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

Williams Lake Timber Supply Area
Timber Supply Review

Summary of Public Input

BC Ministry of Forests
Cariboo Forest Region
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Williams Lake, BC V2G 4T1

Williams Lake Forest District
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Williams Lake, BC V2G 4P7

Chilcotin Forest District
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Alexis Creek, BC V0L 1A0

Horsefly Forest District
Box 69
Horsefly, BC V0L 1L0

November, 2002

This is a summary of the public input received on the Timber Supply Review in the Williams Lake 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.

Williams Lake Timber Supply Area

Background

As part of the review of timber supply in the Williams Lake Timber Supply Area (TSA), two opportunities were provided for public input. The first followed release of the Williams Lake TSA *Data Package* and *Information Report* in August 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 Williams Lake TSA. A 30-day review period, ending September 7, 1999, was provided for the public to comment on these documents.

On September 6, 2001, the British Columbia Forest Service released the *2001 Williams Lake 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 45-day review period that ended October 23, 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 AAC for the Williams Lake 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 Cariboo Forest Region office in Williams Lake.

Public Review Process and Response

Staff from the three forest districts in the TSA, as well as Cariboo regional staff, actively solicited public input on the Timber Supply Review in the Williams Lake TSA through the following actions:

- copies of the *Data Package, Information Report, Analysis Report* and *Public Discussion Paper* were mailed to stakeholders in the TSA, including First Nations, licensees, local governments and environmental groups. Meetings or presentations were offered.
- newspaper advertisements were placed, advising of the availability of all documents for review by the public.
- the *Data Package* and *Analysis Report* were available at the three district offices and the Cariboo regional office in Williams Lake. About 20 copies of the *Data Package* and 30 copies of the *Analysis Report* were picked up.
- copies of all the documents were made available to the local media. One interview was conducted with the local radio station and two interviews with the local newspaper.

Two formal meetings were held regarding the Timber Supply Review Process. One meeting was with the Cariboo Chilcotin Conservation Society and the other with the Williams Lake TSA Association. As well, informal discussions were held with the TSA Association throughout the development of the *Data Package* and at various points during the data review phase.

The forest district and regional offices received eight 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 Williams Lake TSA is summarized under the following headings:

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

Data Package

Land Base Factors

The submission from the Williams Lake TSA Licensee Association (the Licensee Association) recommends the Taseko Management Zone be excluded from the timber harvesting land base (THLB) but be subject to a sensitivity analysis.

The Licensee Association says the widths estimated for existing road and skid-trail netdowns are inappropriate and that ingress of trees into road rights-of-way should be recognized.

Definition of the Operable Land Base

The Licensee Association says they have submitted performance data regarding harvesting on slopes over 40 per cent in the Williams Lake and Chilcotin forest districts. They ask why this data was not considered.

The Cariboo Chilcotin Conservation Society (the Conservation Society) questions why most slopes greater than 60 per cent in the Horsefly Forest District are included in the operable land base, while being excluded in the rest of the TSA.

The Horsefly District Homeowners & Ratepayers Association (the Horsefly Association) says that current practice in the Horsefly Forest District appears to be that steep slopes (over 60 per cent) are harvested without formal slope assessments and that areas to be removed from the THLB ("identified areas") are based on this questionable practice. In addition, the association says, not all areas of steep and/or unstable slopes are "identified" and they recommend that an overlay be prepared to do so and the THLB be reduced accordingly. The association says it appears necessary to also make a reduction for slopes over 40 per cent that do double duty (e.g., because they're visually sensitive or important for wildlife protection). If no further deductions are made now, there will be extreme pressure later to make up the timber supply shortfall from other areas that address non-timber values, according to this submission.

Low Sites and Unharvested Types

The Licensee Association says that data on performance in Problem Forest Types (PFTs) should be included in the *Data Package*, not just presented to the chief forester, as it represents valid current performance information. The Conservation Society questions how it happened that 100,000 cubic metres of PFTs were allocated but 400,000 cubic metres were harvested.

The Licensee Association says the term Marginal Forest Type (MFT) is new and the definition is vague or uncertain. The association says licensees are confused about how criteria for merchantability and MFTs relate to each other. They express the opinion that age of stands should not be a constraint and the rotation age should be extended until minimum harvestable volumes are achieved. The Licensee Association also expresses concern about how MFTs contribute to old growth requirements.

The Licensee Association poses several questions about the criteria used to define currently unharvested stand types and to exclude them from the THLB.

Pulpwood Agreement 16 Stand Types

The Licensee Association notes that PA16 exists for a finite period and modeling of these stand types for the entire planning horizon may be unnecessary. They say that after the first harvest, PA16 stands should transfer to normal analysis units because they will not continue to be marginal or problem forest types. The Licensee Association also notes that the full partitioned volume for PA16 may not have been harvested to date and asks how this will be modeled through the planning horizon.

Mountain Pine Beetle-Attacked Stands

The Licensee Association comments on various harvesting and silvicultural assumptions for stands attacked by mountain pine beetles (MPB):

- for stands with less than 50 per cent attack, they suggest adjusting for age by averaging the pre-attack age and the age recommended in Table 15.
- will modeling be sensitive to the split of the main TSA and the three western supply blocks?
- are volumes in the inventory file reduced for MPB attack?
- what does the last paragraph mean in referring to further adjustments to young stand ages based on the audit results for beetle-attacked stands?

Forest Inventory

The Conservation Society questions the existing inventory and its accuracy. The society urges consideration of inventory audit results that show a 12 per cent overestimation of mature volumes.

Expected Rate of Growth

The Conservation Society says using provincial site index adjustments is a "what if" not a "what is." They express the opinion that the results of the Old Growth Site Index (OGSI) study are based on bad science, and say it is better to stay with existing regional information. The Horsefly Association says both the growth rate adjustments (inventory audit results) and old-growth overestimates (OGSI adjustments) should be treated the same way (either both in the base case, or both in sensitivity analyses).

The Licensee Association says they are under the impression there is regionally-derived data to support the OGSI adjustments being applied to the Cariboo Region. They note that these adjustments affect many assumptions and must be considered carefully. The Licensee Association recommends that in the OGSI sensitivity analysis, the adjustment be applied to the entire land base (before netdowns) to ensure all constraints, criteria and class drivers are similarly affected.

The Licensee Association says Table 19 (Regeneration Assumptions) should clarify the assumptions used to estimate the expected growth rate for dry belt Douglas-fir. They recommend sensitivity analyses to change the mean annual increment from one cubic metre per year, to 1.5, 2.0 and 2.5 cubic metres per year.

The Licensee Association says they understand that all spruce planted east of the Fraser River is from improved seed, and this should be modeled in the analysis. The association also recommends a sensitivity analysis to examine harvesting at culmination age.

Regeneration and Silvicultural Factors

The Licensee Association questions why the dry belt Douglas-fir analysis unit has a different regeneration delay than the rest of the natural regeneration units. They also note that the cedar-hemlock components of this unit are naturally regenerated, not planted.

The Licensee Association says the assumption for normal selection harvesting that fir-leading forest types with logging disturbance records have just been logged and are currently between entries is inaccurate, and may add years to the normal return intervals. They recommend instead using history information in the forest inventory file, which provides a year of harvest.

With regard to return intervals for mule deer winter range selection harvesting (Table 16), the Licensee Association says the definition is confusing. For Douglas-fir, the association says there should be a 20 per cent

removal on a 30-year return interval. They also question the description of what volume is left in these selection stands.

The Licensee Association recommends some sensitivity analysis regarding commercial thinning.

Utilization Factors

The Licensee Association notes that the utilization levels in Table 11 of the *Data Package* are different from those in the *Information Report*. They also say the harvest of PA16 types takes place at the utilization levels stated within the tenure document, and the information in Table 11 should be adjusted to show increased utilization.

Green-up Requirements

The Licensee Association notes that the current field approach to assessing green-up is to average the height of the tallest 100 trees, with the result that the average height is closer to 2.1 metres (vs. three metres used in the *Data Package*). The association recommends consideration of this approach. They also express uncertainty about how converted MPB-attacked stands and the maximum disturbance constraints will interact.

With regard to visual quality objectives, the Licensee Association says the 25 per cent maximum disturbance for modified VQO areas should be 30 per cent (the same as for multiple use areas). They ask why a five-metre green-up height is required in the Horsefly Forest District, and recommend similar sensitivity analyses for the maximum allowable disturbance be done for the Horsefly District as for the other two districts.

Riparian Management

The Horsefly Association says swamp and wetland areas shown on maps provided by the Ministry of Forests are not accounted for by the riparian management requirements, and reductions for these areas must be made.

The Licensee Association expresses concern that the right shapes are used for stream/river buffers, particularly in the area covered by the ART consensus document for the Anahim supply block. They also ask that the direction regarding lakes contained in the Cariboo-Chilcotin Land Use Plan (CCLUP) be compared with lake classification assumptions in the Timber Supply Review, and this comparison be recorded for future reference.

Wildlife Management

The Horsefly Association questions how the maximum harvest rates for the caribou modified harvest area, the caribou partial cutting assumptions, and the caribou habitat forest cover requirements (all with different rotation ages) can be reconciled.

The Licensee Association states their belief that the 1998 Caribou Strategy Update is being used for sub-regional planning processes and could therefore be considered current management, and asks if it will be modeled in the analysis. The association asks how the timber supply implications of the CCLUP assumption of access to 10 per cent of the caribou no-harvest zone to salvage damaged timber will be estimated. The Licensee Association also questions how the maximum rates of harvest for the caribou modified harvest area will be applied and on what land base.

With regard to mule deer winter range management, the Licensee Association says the harvest deferrals presented in Table 17 are new information and they question various aspects of them. They recommend a sensitivity analysis that removes these deferrals. The association notes that the CCLUP and its Integration Report (CCLUPIR) provide that mule deer winter range harvest is available if needed to meet 20-year short-term timber availability requirements. The Licensee Association asks for clarification of their understanding that the

mule deer winter range prescription creates credits toward meeting old growth requirements.

The Horsefly Association notes the absence of any reductions to the THLB for environmentally sensitive wildlife areas. The association says provisions for caribou habitat and riparian management are insufficient to protect caribou, grizzly bears, and other fish and wildlife species covered by the Identified Wildlife Management Strategy, the Forest Practices Code and the CCLUP. Consideration of the effects of legislated requirements for wildlife is being deferred for five years when sufficient information exists now to make a reasonable impact assessment, according to this submission. The association urges this assessment be made now.

Wildlife Tree Patches

The Licensee Association asks how the ages of wildlife tree patches (WTPs) will be determined so they can contribute to mature and old growth retention requirements. The association says the CCLUPIR assumes that 50 per cent of the volume in WTPs is available for harvest over the first rotation and asks how this will be modeled.

Landscape Level Biodiversity

The Horsefly Association's submission says that current practice in the Quesnel Lake Special Resource Development Zone is resulting in elimination of a complete functioning ecosystem by liquidating old growth cedar-hemlock and replacing it with pine, fir and spruce. The association says this can have environmental impacts that should be addressed in the timber supply analysis.

The Licensee Association makes several comments about the requirements for landscape-level biodiversity, including the following:

- recommend the inventory adjustment used in the CCLUP biodiversity strategy be incorporated in the analysis.
- the CCLUPIR developed an 'overlap' model to account for various land uses on common areas; can the timber supply analysis model do this?
- the CCLUPIR approach was to meet old growth requirements outside the THLB first; the Timber Supply Review approach of oldest first will overestimate this constraint.
- the CCLUPIR directs that up to 10 per cent of the old-growth management areas may be accessed for timber target achievement or forest health reasons; this direction is missing from the *Data Package*.

Cariboo-Chilcotin Land-Use Plan

The Horsefly Association says the *Data Package* assumptions do not produce an adequate reduction factor to account for CCLUP requirements. The association says the failure to institute on schedule the landscape unit planning requirements of the CCLUP has caused wildlife habitat protection mandated by the land-use plan not to be applied in riparian management prescriptions or through the use of forest ecosystem networks. In particular, the association says the percentage reductions for caribou no-harvest areas are well known and must be accounted for, even if exact locations of these areas are not yet established.

The Conservation Society is of the opinion that the CCLUP seems to be an upward pressure on harvest levels and the CCLUPIR is insufficient to protect non-timber values. The society says the professional review of the Integration Report should be included in the Timber Supply Review.

First Nations

The Carrier Chilcotin Tribal Council (the Tribal Council) asserts aboriginal title to portions of the Williams Lake TSA for the Dene and for the territory of the Lhtako, Tlesq'ox and Ulkatcho communities. The Tribal Council says

the referral through the Timber Supply Review will cause or lead to interference with their aboriginal title and they do not consent to such interference. The Tribal Council advises they require financial assistance to properly consider the impacts of the review on their lands and people, and are prepared to submit a budget.

The Tribal Council also refers to the Delgamuukw decision:

- the Court required that aboriginal title be given priority. How has this been done?
- how will the issue of compensation for infringement of title be addressed?
- the Court outlined conditions for meaningful consultation; as well, the above questions must be answered prior to any detailed consultation with the Tribal Council.

The Conservation Society expresses pleasure that Cultural Heritage Resources are finally being considered, but says it is probably naive and risky to assume this issue can be managed operationally with minimum impacts on timber supply. The society says traditional uses tend to occur on the same good growing sites identified for forest management, and are impacted by timber removal. As well, the society says there are area impacts; for example, protecting a fishing spot is meaningless without ensuring the entire watershed is healthy.

Mill Requirements

Jackpine Forest Products points out that the value-added sector also requires timber to provide logs for lumber trade agreements with the primary wood processors. As well, the company says they are investigating a new fibreboard facility in Williams Lake and asks that the opportunity to access timber from currently unharvested stand types or marginal forest types be provided.

Ainsworth Lumber Co. says they are increasingly dependent on PA16 to supply their 100 Mile House OSB facility. The company suggests modeling the entire harvest commitment of 107,000 cubic metres in perpetuity, in order to illustrate the implications of increasing harvest levels and to provide insight into timber supply after the current tenure arrangement expires.

Mountain Pine Beetle Management

The Conservation Society says there is no evidence that removal of dead timber stops the beetle infestations; only very cold winters do that. Continuing the liquidation policy of harvesting above the long-term harvest level will deepen the falldown trough and increase the economic impact to the TSA, according to this submission.

Socio-Economic Factors

The Williams Lake & District Chamber of Commerce submission requests further information on how socio-economic goals and objectives for the Cariboo will be established, and asks who will prepare the socio-economic analysis.

Jackpine Forest Products notes that the *Data Package* makes only cursory mention of the value-added sector while indicating the socio-economic analysis will examine the implications of timber supply for the area's primary processing facilities. The company says that having a viable value-added industry must be identified as an economic and social objective of the Timber Supply Review.

The Conservation Society asks why only the socio-economic objectives expressed by the Minister of Forests are to be considered, and expresses the opinion that "social" is entirely dominated by "economic." The society proposes a revised set of socio-economic objectives:

- enhanced biodiversity, to ensure the presence of diverse climax forests that meet a wide range of objectives.

- respect for traditional aboriginal economics and cultures.
- economic parity between aboriginal and non-aboriginal residents.
- regional economic diversification.

Timber Supply Area Analysis Report

Land Base Factors

The submission from the Williams Lake TSA Licensee Association (the Licensee Association) says the assumptions used in the analysis for netdowns for roads, trails and landings (RTLs) are based on obligatory standards rather than empirical data. They say a field survey was conducted in 2001 to assess actual right-of-way widths and tree ingress on existing RTLs and the results showed a potential 1.3 per cent increase in harvest level by using netdown factors based on the survey. The Licensee Association recommends the new factors be incorporated in the analysis.

Ainsworth Lumber Co. Ltd. says they are focusing efforts on shifting their fibre dependency from private sources to Crown sources, and have identified a significant deciduous volume that is not currently allocated or included in the timber supply analysis. The company provides details on this available deciduous volume and requests it be included in the analysis, as their intent is to apply for tenure over any deciduous volume included in the AAC.

The Licensee Association says it does not make sense to remove marginal pine and fir stands with low site indices from the THLB once they have been harvested only because they have not achieved a particular height within a given time frame. These stands should remain in the THLB, according to the Licensee Association, providing an upward pressure on the long-term harvest level.

Site Productivity

The Licensee Association says they are involved in ongoing work to calibrate the Prognosis yield model in dry-belt Douglas-fir areas. They say using a different mean annual growth in the Prognosis model resulted in a 2.9 per cent increase in timber supply. The association says this issue should have been identified as a critical one, since the information in the *Analysis Report* is a known underestimate.

Forest Cover Requirements

The Licensee Association says that a two-metre green-up height was tested in the Chilcotin Forest District. This change created the opportunity to increase the harvest level by 0.5 per cent, according to this submission.

Identified Wildlife

The Horsefly District Homeowners & Ratepayers Association (the Horsefly Association) asks why the *Analysis Report* fails to name the red-listed western and eastern mountain caribou sub-populations. They say the needs of this endangered species need to be fully accounted for in the analysis.

Mountain Pine Beetle-Attacked Stands

West Chilcotin Forest Products says (2001) that redirecting their focus to harvesting areas recently affected by the mountain pine beetle (MPB) has resulted in an increase in hauling costs and in development costs due to forgoing other developed cutting permits. The company says they have increased their harvesting of new MPB-infected wood from 30,000 cubic metres last season to 70,000-90,000 cubic metres this season, and are able to utilize all MPB volumes, based on current populations. However, the company says further increases of that magnitude could place them in the position of exceeding cut control as their current licence provides for 140,000 cubic metres annually.

Cariboo-Chilcotin Land-Use Plan

The Horsefly Association says the *Analysis Report* appears to create problems for implementation of the CCLUP by failing to consider the legal requirements of this higher level plan, as well as its spirit and intent, thus putting other forest values at risk. For example, the association says the Forest Practices Board found that the practices of the industry over the past five years have not properly implemented all of the legally mandatory provisions of the plan. Yet the analysis is based on "current forest management" regardless of how deficient those practices are under the Code or the CCLUP. The association also says the reductions for non-timber forest values, as determined by the land-use plan, will massively exceed what is assumed in the timber supply analysis.

Socio-Economic Factors

The Tatlayoko Think Tank (the Think Tank) says the socio-economic analysis (SEA) does not use up-to-date employment and income data, so its conclusions are suspect. For example:

- the SEA indicates a population increase of four per cent 1991-1996. Stats BC indicates a 0.8 per cent increase in 1999-2000.
- the SEA reports an unemployment rate of 11.4 per cent in 1996. Stats BC reports 13.4 per cent in 1999.

This submission notes the SEA lacks any discussion of dependencies, and says economic diversity in the TSA has decreased by four per cent in the last eight years. The Think Tank also says the SEA does not recognize that environmental sustainability is of primary importance when allocating timber harvests. Without it, there can be no long-term socio-economic sustainability, according to this submission.

Other Comments

Most submissions comment 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

The Horsefly Association says there are fundamental shortcomings in the assumptions used in the analysis (e.g., they're based on inadequate and outdated inventory and on a three-pass harvest when four-pass is current practice; practices that are detrimental or poor, or are subject to imminent change, are modeled). The association says the precautionary principle must be applied, because if legislated objectives are to be achieved, allowance must be made now to account for the known deficiencies of the data base.

The Licensee Association says the Timber Supply Review process and documents are significantly improved over the previous review. They detail numerous questions and concerns with regard to assumptions and definitions in the *Data Package*. With regard to the *Analysis Report*, the Licensee Association says they are encouraged by the basic message that the existing harvest level is sustainable but express the opinion that the sensitivity analyses focussed on assessing downward pressures on timber supply while disregarding key upward pressures. The Licensee Association says the process should incorporate analysis to indicate the potential to offset any perceived harvest decline.

The Conservation Society says the *Data Package* is confused about "what is" vs. "what if." They say the former is not just current practice but includes what is planned over the next five years at least (e.g., landscape unit planning is current, even if the results are not yet known). The society expresses the opinion that the Ministry of Forests has bent over backward to maintain an overall upward pressure on the AAC and this is unacceptable.

The Tatlayoko Think Tank questions how the ministry can predict a sustainable rate of cut with such certainty 180 years into the future, given the variables around growing and cutting trees, uncertainties in computer models and anticipated effects of climate change.

Harvest Levels

The Licensee Association says that modeling the cumulative effect of new assumptions for RTLs, site productivity, marginal stands and green-up resulted in a five per cent timber supply increase, and they believe this increase is achievable using assumptions very close to the current management regime.

The Licensee Association says the opportunity to substantially increase the harvest level in the western supply blocks is apparent throughout the *Analysis Report*, but they recommend maintaining the current level pending the outcome of MPB infestation dynamics and the ongoing salvage program's impact on long-term harvest levels.

The Licensee Association recommends the current partition of 850,000 cubic metres for MPB-attacked stands be maintained to ensure continued access to candidate stands under the ongoing salvage program. They say the *Analysis Report* is unclear if the proposed reduction is based on the assumption that only standing living trees will be harvested, but the association is of the opinion that the dead tree component will continue to contribute merchantable volume, at least until the next Timber Supply Review.

Apportionment

Ainsworth Lumber Company says they are participating in a working group with the regional managers of the Cariboo and Kamloops forest regions to clarify management issues for Pulpwood Agreement #16 (PA16). The company says the issue of harvest apportionment for PA16 should be considered in the Timber Supply Review for four TSAs, including Williams Lake.

With regard to regional apportionment, Ainsworth recommends a 45/55 split between the Kamloops Region and the Cariboo Region, respectively, based mainly on timber availability shortfalls in the Lillooet TSA.

With regard to apportionment among TSAs, Ainsworth notes that the region and districts in the Cariboo region have not provided "exclusivity" to Ainsworth within PA16 and allow other licensees to harvest the forest types that Ainsworth is restricted to. The company recommends the Williams Lake apportionment for PA16 decrease from the current 107,000 cubic metres to 45,000 cubic metres, while the ministry recommends 30,000 cubic metres.

Jackpine Forest Products says they currently hold a forest licence for 60,000 cubic metres in the Chilcotin Forest District to facilitate salvage of MPB-damaged timber. The company says maintaining this type of licence, and the timber allocation for it, is critical, and will strengthen the entire forest industry.

Appendix 1

Submissions received by the Cariboo Forest Region

Submissions received on the Data Package

Forest industry

Williams Lake TSA Association
Ainsworth Lumber Co. Ltd.
Jackpine Forest Products Ltd.

First Nations

Carrier Chilcotin Tribal Council

Interest groups

Williams Lake & District Chamber of Commerce
Horsefly District Homeowners & Ratepayers Association (two submissions: Sept. 4 and Sept. 6, 1999)
Cariboo Chilcotin Conservation Society

Submissions received on the Timber Supply Analysis Report

Forest industry

Williams Lake TSA Licensee Association
Ainsworth Lumber Co. (two submissions: Oct. 3 and Oct. 22, 2001)
West Chilcotin Forest Products

Interest groups

Horsefly District Homeowners & Ratepayers Association
Tatlayoko Think Tank