

**BRITISH COLUMBIA  
MINISTRY OF FORESTS**

# **Tree Farm Licence 42**

Issued to Tanizul Timber Ltd.

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

**effective July 1, 1996**

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Chief Forester**

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## Objective of this Document

This document is intended to provide an accounting of the factors considered and the rationale employed in making my determination, under Section 7 of the *Forest Act*, of the allowable annual cut (AAC) for Tree Farm Licence (TFL) 42. The document will also identify where new or better information is required for incorporation into future determinations.

## Description of the TFL

TFL 42, held by Tanizul Timber Ltd., is situated in the center of British Columbia approximately 50 kilometers northwest of Ft. St. James and about 170 kilometers northwest of Prince George. The Tl'azt'en Nation owns and controls Tanizul Timber Ltd. and administers the company's activities through an elected Board of Directors. The Directors seek the authority of the Tl'azt'ene on all economic, operational, cultural and social issues that are foreseeable, or that result from management of the TFL 42.

The TFL is bordered by Stuart Lake, Trembleur Lake and the Tachie River in the Ft. St. James Forest District and is surrounded by the Prince George TSA. The TFL is administered from the Ft. St. James Forest District Office in Ft. St. James. The licence area topography is rolling to broken and does not contain any mountainous or alpine terrain. Moving south from Trembleur Lake at an elevation of 750 metres, the landscape gently rises to the headwaters of Tarnezell Creek peaking at 1450 metres above sea level. Continuing south, the TFL descends more steeply to 750 metres falling upon the shores of Stuart Lake. The area is dotted with several small water bodies including Tarnezell and McKelvey lakes.

The total land base for TFL 42 is 49 394 hectares, with a productive forest land base of 45 207 hectares or 92 percent of the total area. Forests in the area are predominantly mixtures of lodgepole pine, white spruce, Douglas-fir and sub-alpine fir. Two biogeoclimatic zones—the Engelmann Spruce Subalpine-Fir and the Sub-Boreal Spruce—extend across the licence area. Cold winters and generally warm summers are the norm with an approximate annual rainfall of 50 centimetres.

## History of Present AAC

Tree Farm Licence 42 was awarded in 1983 to Tanizul Timber Ltd. with an original AAC set at 120 000 cubic metres. In 1988, with the approval of Management Plan 2, the AAC was temporarily raised to 132 300 cubic metres, an increase of about 9.7 percent, to facilitate the short-term management of an identified mountain pine beetle epidemic on the TFL. The temporary increase was granted with the provision that unless there were compelling reasons to maintain the AAC at this elevated level, Management Plan 3 would recommend the AAC return to a lower level. The AAC history for TFL 42 is shown below:

Management Plan	Period	Licensee AAC (m <sup>3</sup> )	SBFEP AAC (m <sup>3</sup> )	Comments
1	1983-1987	120 000		Original area of 49 576 ha
2	1988	132 300		Temporary increase of 12 300 m <sup>3</sup> for pest management
	1988	129 356	2 944	2.5 % of AAC to SBFEP
	1989	126 412	5 888	2.5 % of AAC to SBFEP
	1993-1996	126 412	5 888	MP No. 2 extended

### New AAC Determination

Effective July 1, 1996, the new AAC for TFL 42 will be 120 000 cubic metres, a reduction of 12 300 cubic metres or about 9 percent from the current AAC. This AAC will remain in effect until a new AAC is determined, which must take place within five years of this determination.

### Information Sources Used in the AAC Determination

Information considered in determining the AAC for TFL 42 includes the following:

- *TFL 42: Statement of Management Objectives, Options and Procedures*, Tanizul Timber Ltd., March 26, 1992;
- *TFL 42: Existing Stand Yields*, TFL 42 - Tanizul Timber Ltd., October 6, 1994;
- *TFL 42: Managed Stand Yields*, TFL 42 - Tanizul Timber Ltd., February 14, 1994;
- *TFL 42: Timber Supply Review Information Package*, TFL 42 - Tanizul Timber Ltd., June 13, 1995;
- *TFL 42: Timber Supply Analysis Report*, TFL 42 - Tanizul Timber Ltd., 1995;
- *TFL 42: Draft Management Plan 3*, TFL 42 - Tanizul Timber Ltd., September 21, 1995;
- *TFL 42: Twenty-Year Plan*, TFL 42 - Tanizul Timber Ltd., November 17, 1995;
- Technical review and evaluation of current operating conditions through comprehensive discussions with British Columbia Forest Service staff, November 30, 1995.
- *Forest Practices Code of British Columbia Act*, July 1995; and
- *Forest Practices Code of British Columbia Regulations*, April 1995.

### Role and Limitations of the Technical Information Used

The *Forest Act* requires me as Chief Forester to consider biophysical, economic and social information in AAC determinations. A timber supply analysis and the inventory and growth and yield data used as inputs to the analysis formed the major body of technical information used in my AAC determination for TFL 42. The timber supply analysis is concerned primarily with biophysical factors—such as the rate of timber growth and definition of the land base considered available for timber harvesting—and with management practices. The analysis also indirectly

incorporates some economic information such as an operability classification that defines the types of terrain and timber that can be physically and economically accessed given current technology and markets.

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

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

In making the AAC determination for TFL 42, I have considered known limitations of the technical information provided and am satisfied that, with the cautions identified above and at various places in this document, this information provides a sound basis for my determination.

## **Statutory Framework**

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

## **Guiding Principles**

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

In considering the various factors that Section 7 of the *Forest Act* requires me to take into account in determining AACs, I attempt to reflect as closely as possible operability and forest management factors that are a reasonable extrapolation from current practices. It is not appropriate to base my decision on unsupported speculation with respect either to factors that could work to increase the timber supply—such as optimistic assumptions about harvesting in

unconventional areas or using unconventional technology that are not substantiated by demonstrated performance—or to factors that could work to reduce the timber supply—such as integrated resource management objectives beyond those articulated in current planning guidelines or the Forest Practices Code.

The impact of the Forest Practices Code on timber supply is a matter of considerable public concern. In determinations made before the Code was brought into force, no final standards or regulations were available at the time the timber supply analyses were conducted. Accordingly, the analyses were unable to assess the impacts of any new constraints on timber production which might be imposed under the Code. In those determinations I did not consider any more stringent restrictions or additional impacts upon timber supply beyond those anticipated to occur due to the application of guidelines current at the time of determination. However, I assumed that the Code would at least entrench the standards exemplified by those guidelines as statutory requirements.

The *Forest Practices Code of British Columbia Regulations* were approved by the Lieutenant Governor in Council on April 12, 1995, and released to the public at that time. The *Forest Practices Code of British Columbia Act* was brought into force on June 15, 1995. Studies in selected TSAs (*Forest Practices Code Timber Supply Analysis*, BCFS, February 1996) indicate that under the Code there will be some impacts on timber supply additional to those expected under previous guidelines. In AAC determinations made since the coming into force of the Code, I have viewed with some caution the timber supply projections in timber supply analyses that pre-date the Code, as is the case in TFL 42. At the same time, I am mindful that the full force of the Code may not be felt during the transition phase of its implementation, and that the impacts of specific factors on timber supply may not yet have been assessed on a local basis.

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

Moreover, even where government has made land-use decisions, it may not always be possible to analyze or to incorporate their eventual timber supply impact in an AAC determination. In most cases, government's land-use decision must be followed by detailed implementation decisions. For example, a land-use decision may require the establishment of resource management zones and resource management objectives and strategies for these zones. Until such implementation decisions are made, it is impossible to properly assess the impact of the land-use decision. However, the legislated requirement for five-year AAC reviews will ensure such decisions are addressed in future timber supply analyses.

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

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

Others have suggested that, in view of data uncertainties, I should immediately reduce some AACs in the interests of caution. However, any AAC determination I make must be the result of applying my judgement to the available information, taking any uncertainties into account. Given the large impacts that AAC determinations can have on communities, no responsible AAC determination can be made solely on the basis of a response to uncertainty. Nevertheless, in making my determination, I may need to make allowances for risks that arise because of uncertainty.

With respect to First Nations issues, I am aware of the Crown's legal obligations resulting from the June 1993 Delgamuukw decision of the B.C. Court of Appeal regarding "unextinguished non-exclusive aboriginal rights." I am aware that the Tl'azt'en Nation considers the lands covered by TFL 42 to be contained within their traditional territory. The AAC I determine should not in any way be construed as limiting the Crown's obligation under the Delgamuukw decision, and in this respect it should be noted that my determination does not prescribe a particular plan of harvesting activity within the TFL. It is also independent of any decision by the Minister of Forests with respect to subsequent allocation of the wood supply. Aboriginal rights will be taken into account as far as possible under Section 7(3)(a)(v) of the *Forest Act* and will be respected in the administration of the AAC determined.

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

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

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

The role of the "base case"



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

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

Because it represents only one in a number of theoretical forecasts, and because it incorporates information about which there may be some uncertainty, the base case forecast is not an AAC recommendation. Rather, it is one possible timber supply forecast, whose validity—as with all the other forecasts provided—depends on the validity of the data and assumptions incorporated into the computer simulation used to generate it.

Therefore, much of what follows in the considerations outlined below is an examination of the degree to which all the assumptions made in generating the base case forecast are realistic and current, and the degree to which its predictions of timber supply must be adjusted, if necessary, to more properly reflect the current situation.

These adjustments are made on the basis of informed judgement, using current information available about forest management, which—particularly during the period leading up to, and now during, the implementation of the Forest Practices Code—may well have changed since the original data package was assembled.

Thus it is important to remember, in reviewing the considerations which lead to the AAC determination, that while the timber supply analysis with which I am provided is integral to those considerations, the AAC determination itself is not a calculation but a synthesis of judgement and analysis in which numerous risks and uncertainties are weighed. Depending upon the outcome of these considerations, the AAC determined may or may not coincide with the base case forecast. But once an AAC has been determined that reflects appropriate assessment of all the factors required to be considered, no additional precision or validation may be gained by attempting a computer analysis of the combined considerations to confirm the exact AAC determined—it would be impossible for any such analysis to fully incorporate the subtleties of the judgement involved.

On behalf of Tanizul Timber Ltd., a timber supply analysis for TFL 42 was completed by Timberline Forest Inventory Consultants in June, 1995. The licensee analysis base case indicated an initial harvest level of 132 280 cubic metres per year—20 cubic metres below the current

AAC—for the first decade followed by a 13 percent drop in decade 2 and eventually reaching the long term harvest level of 73 731 cubic metres per year in decade 9.

In their Management Plan 3 submission, the licensee proposed an AAC of 127 777 cubic metres per year. This would bring about a 3 percent drop from the base case in the first decade in anticipation of a 10 percent decrease in the second decade. The licensee hoped that by initiating a decrease in the harvest level now, the anticipated timber harvest decrease in decade 2 would be less than if the base case were followed.

### Section 7 (3)

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

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

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

#### Land base description

##### *general comments*

The total area of TFL 42 is 49 394 hectares. The land base considered available for timber harvesting (the "timber harvesting land base") is limited by inoperability, environmental sensitivity, non-merchantable forest types, steep slopes and unstable soils, non-commercial forest cover types and the use of areas for purposes other than timber production. Reasonable assumptions, and if necessary, projections, must be made about these factors and appropriate areas must be deducted from the productive forest area to determine the timber harvesting land base. In the licensee analysis, about 92 percent of the total area is classified as productive forest. While the proportion of the total area considered productive forest is higher than the surrounding Prince George TSA, I do not find this unreasonable given the moderate topography of the TFL. Unlike the Prince George TSA, TFL 42 contains no mountainous terrain, greatly reducing the occurrence of non-productive areas such as alpine tundra, steep, rocky hillsides, and unstable soils. Approximately 76 percent of the total productive area, or about 70 percent of the TFL area, is considered currently available for timber harvesting.

##### *operability*

There were no reductions to the timber harvesting land base to account for inoperable areas. For the purposes of the licensee analysis, reductions to the timber harvesting land base such as environmentally sensitive areas (ESAs) were deemed to adequately account for any inoperable sites on this unit. District staff have supported this assumption as the TFL topography is favorable for timber harvesting and largely operable. Given the approval of district staff and recognizing the correlation between the application of other guidelines and operability, and having had no evidence presented to suggest otherwise, I

consider operability to be appropriately accounted for in the licensee analysis for the purposes of this determination.

I do, however, take note of the licensee's commitment to define inoperable areas in terms of physical inoperability, problem forest types and slope/volume considerations for the TFL during the term of Management Plan 3. I expect this information to be available for the next determination and will consider it at that time.

*environmentally sensitive areas*

Forest areas identified in the forest inventory file as ESAs included a fisheries management zone along the Tachie River, other sensitive wildlife zones and areas with unstable soils. Altogether, the timber harvesting land base was reduced by 925 hectares or about 2 percent of the total area to account for ESAs. Similar to my observations above in *operability*, although this reduction is relatively small when compared with the surrounding Prince George TSA, it is not unexpected as the more moderate topography characteristic of this TFL has proportionately fewer unstable steep slopes requiring protection than the TSA. This mapping was completed to current standards and I am satisfied that the ESA information used in the licensee analysis provides a sound basis for this determination. Therefore, I have made no further adjustments to account for ESAs.

*low productivity sites*

In determining the timber harvesting land base, sites with low timber growing potential (those with a low site index) were not considered to contribute to the timber harvesting land base. Areas were deducted if the coniferous volume at age 150 years was projected to be less than 140 cubic metres per hectare. A total of 418 hectares, or about one percent of the total area, were deducted from the timber harvesting land base to account for low sites. This is a relatively small reduction compared with other areas but is indicative of this TFL's highly productive land base. I am satisfied that low productivity sites are appropriately represented in the licensee analysis and as such have determined not to make any further adjustments to account for them.

*deciduous forest types*

Sites supporting deciduous (broadleafed species in this area) leading stands were removed from the productive land base considered available for harvesting if the coniferous volume of the stand at 150 years of age was projected to be less than 140 cubic metres per hectare. A total area of 5834 hectares, or approximately 13 percent of the total productive area was deducted—by far the single largest deduction to the productive land base. Deciduous volume was assumed to be non-merchantable for the entire area. As there currently is no utilization of deciduous timber from this unit, I accept that this is an appropriate representation of current practices on TFL 42.

The licensee is commencing development of a hardwood management strategy that will examine, among other things, the viability of harvesting high quality birch. However, while it is recognized that there are possible opportunities for deciduous utilization, the contributions to riparian areas, biodiversity, Integrated Resource Management (IRM) and wildlife habitat by deciduous stands remain unquantified at this time. Upon completion of the ongoing LRMP and the development of landscape-level biodiversity objectives for this area, I will be better positioned to evaluate the potential contributions of deciduous stands to the timber harvesting land base. In light of current uncertainties and expected resolution of some management and land use questions, I have determined that deciduous volumes are not part of the timber harvesting land base in this determination and as such have made no further adjustments to account for deciduous stands.

*estimates for roads, trails and landings*

In the licensee analysis, approximately 536 hectares, or about one percent of the total productive forest land base, were deducted to account for the fact that timber production is not expected on roads, trails and landings constructed in the past. To account for productive land losses from the future construction of roads, trails and landings, approximately 1930 hectares, about 6 percent of the current timber harvesting land base, was deducted.

In assessing reductions for existing roads, trails and landings, a reduction factor was applied equally to immature and mature stands. I recognize that at present, it is unlikely that all of the mature stands do indeed have existing roads, trails and landings, and therefore consider that there is a very minor upward pressure on available short-term volumes. Conversely, applying this reduction method slightly underestimates the roaded area in immature stands resulting in a minor overestimation of available mid-term volumes. Overall, there is no difference in the long-term available volumes from this reduction method. Beyond this however, some double counting of deductions occurred on existing plantations as the reduction factor for future losses was applied to areas already subject to a deduction for existing roads, trails and landings. I am aware of these analytical inaccuracies and consider them to be a very minor upward pressure on the base case harvest forecast as I discuss below under "Reasons for Decision".

*traditional use objectives and archeological areas*

As expressed in the TFL 42 Management Plan 3, the traditional use objective for the Tl'azt'en Nation is to ensure that opportunities for continued traditional activities including berry picking, medicinal herb gathering, firewood cutting, trapping, fishing, and hunting are maintained. As such, the Tl'azt'en Nation is currently conducting an inventory of traditional use areas as well as sites having archeological and/or spiritual significance on the TFL. However, the Tl'azt'en Nation wishes to keep the location of areas having archeological and/or spiritual significance confidential in an effort to limit intrusion and preserve their integrity. In addition, the Tl'azt'en Nation has expressed an interest in entering into a framework agreement with the British Columbia Ministry of

Environment, Lands and Parks (MELP) with the intention of developing a "Traditional Wildlife Use Strategy" for the area.

Some traditional use or archeological areas have been accounted for in reductions made for visually sensitive areas and as such have been considered in this determination. However, as I note below under *recreation*, no specific deletions to the timber harvesting land base to account for recreation areas were made in the licensee analysis. At this time it remains unclear what implications the new inventory and strategy concerning traditional use and archeological areas might have on timber supplies in TFL 42. In light of this it would be inappropriate for me to consider any further adjustments to quantitatively account for such factors at this time. I do however recognize there is some uncertainty of unknown magnitude regarding timber supplies as a result of the expected future identification of traditional use areas and sites having archeological and/or spiritual significance on the TFL.

### Composition of the forest

#### *forest cover updates / reinventories*

The inventory information used in the licensee analysis for TFL 42 was derived from surveys over the period of 1989 to 1991. The information was updated to the end of 1991 reflecting any harvesting and silviculture activities since the inventory data was collected. I am mindful then that this determination is being made 5 years into the timber supply projection. This is significant given that the base case scenario indicates a 13 percent drop between decades one and two—five years from now. This reduced time span introduces a downward risk to the base case harvest projection as there is less short term capacity to offset future risks to timber supply than the licensee analysis indicates as I discuss below under "Reasons for Decision".

An inventory audit was carried out by the BCFS during the summer of 1995. Preliminary results of the audit suggest that the inventory is satisfactory. I will return to the forthcoming audit results below under *volume estimates for existing stands*. District staff have not noted any particular problems or shortcomings with the inventory. Given that the inventory used in the analysis was surveyed according to accepted standards and procedures and that I have no evidence before me to suggest this information is not reliable, I accept the information as suitable for this determination bearing in mind the cautions noted above.

#### *age class structure/species profile*

Mature forests are prevalent on TFL 42 with the majority of stands 100 years of age or older. About 9 percent of the current timber harvesting land base is between the ages of 20 and 90 years indicating very little disturbance from the turn of this century until around 1970.

Stands dominated by spruce and pine are largely mature and cover three-quarters of the timber harvesting land base while Douglas-fir and balsam dominated stands make up the remaining 25 percent.

*volume estimates for existing stands*

The licensee analysis used the Variable Density Yield Projection (VDYP) growth and yield model to estimate volumes for all existing stands older than 10 years of age. VDYP is generally accepted as an appropriate model for these types of stands since it is based upon information from sample plots throughout the province. The BCFS Resources Inventory Branch accepted the yield tables as appropriate for this analysis.

The licensee analysis indicated that timber supply is highly sensitive to changes in or uncertainty regarding existing stand volumes for the first 11 decades. Increasing or decreasing these volume estimates dramatically alters the harvest projection from the base case.

If existing stand volumes are 10 percent higher than estimated, the initial harvest level of 132 280 cubic metres per year could be maintained for an additional decade before dropping 13 percent to 115 200 cubic metres per year. Whereas the base case harvest projection continues to drop through decades 3 and 4, a 10 percent increase in existing volumes would allow the maintenance of a constant harvest level at 115 200 cubic metres per year over these periods. From this point on, the harvest projection mirrors that of the base case except that the decreases are delayed by two decades.

If on the other hand, existing stand volumes are 10 percent lower than estimated in the base case timber supply projection, the initial harvest level would have to decrease immediately by 13 percent to 115 200 cubic metres per year to avoid future disruptions. Continuing under this scenario, decade 2 would see a further 10 percent drop in projected timber supply to 103 200 cubic metres per year, followed by a 14 percent decrease in decade 3, some 25 970 cubic metres per year below the base case harvest projection.

As discussed above under *forest cover updates / reinventories*, preliminary results of an inventory audit indicate existing volume estimates are satisfactory. I have no information that would cause me to consider these estimates as unreliable and as such I accept them as representing the best available information suitable for use in this determination. However, recognizing the high sensitivity of the base case harvest projection to existing volume estimates, and the preliminary reporting on the findings of the inventory audit, if any new information is produced, I am prepared to review this AAC decision. Regardless, any further conclusions from the audit will be fully considered in the next determination.

*Aggregation procedures*

The TFL 42 land base is divided into polygons for inventory purposes, and each polygon is classified according to tree species composition, height and age, and the site on which it grows. Polygons with similar characteristics are aggregated for timber supply analysis purposes.

For this determination, analysis units were created by aggregating on the basis of inventory type group and site index range. All Douglas-fir and pine leading types were assumed to be regenerated to pure pine while all balsam and spruce types were assumed to be regenerated to pure spruce. For the purposes of this determination I accept that this represents current practice. However, I take note of the licensee's commitment in their Management Plan 3 to explore options for the regeneration of Douglas-fir following harvest. Once more information regarding this is available, it will be considered in future AAC determinations.

### Expected rate of growth of the forest

#### *site productivity*

Inventory data includes estimates of site productivity which is the ability of a particular site to grow trees and is usually expressed in terms of site index. Site index is based on the height of a stand as a function of the stand age. The productivity of a site largely determines how quickly trees will grow, and therefore affects expectations of the time seedlings will take to reach green-up conditions, the volumes of timber that will grow in regenerated stands, and the age at which those stands will reach merchantable size or minimum harvest age. Accurately estimating site productivity in both young and old stands is difficult. 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 the 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.

In the licensee analysis, site indexes for existing stands were assigned using BCFS site productivity curves, and estimates of stand height and stand age. Site indexes for current managed stands and areas not-satisfactorily restocked were assigned based upon the existing species and the respective site class distribution for that species. This assignment method was accepted by the BCFS Research Branch as appropriate for the entire timber harvesting land base.

The licensee intends to pursue a paired-plot analysis in conjunction with the BCFS examining managed stand site indexes on the TFL that are believed to be underestimated. If the site productivity of these stands is underestimated, future timber growth of these stands and hence the sustainable long-term harvest level may be higher than that projected in the base case harvest projection. Although increased site indexes could mean a potential increase in the long-term timber supply, a sensitivity analysis showed that even increasing yield estimates from regenerated stands by 10 percent would have no

effect on the short-term harvest projection because all of the timber harvested in the short term is from existing stands. Underestimated site indexes may also result in the overestimation of minimum harvest ages and the time required to reach green-up in these areas and I will discuss this potential impact on the base case harvest projection further under *volume estimates for regenerated stands*, and *green-up*.

Based upon studies to date and my experience with northern forests, it is my understanding that the site index of some stands is likely underestimated. However, the magnitudes and corresponding impacts on volumes, green-up ages and minimum harvest ages are uncertain. It is likely that the long-term projected harvest level is higher than indicated in the licensee analysis as I discuss below under "Reasons for Decision". However, it seems reasonable to me to wait for further evidence before concluding that any short term timber supply effects exist.

#### *volume estimates for regenerated stands*

The Stand Projection System (SPS) was used to estimate managed stand yields as accepted by the BCFS Research Branch.

Operational adjustment factors (OAFs) developed by BCFS staff were applied to a proportion of the initial volume estimates of pine and spruce stands regenerating on good, medium and poor sites to account in part for lower stocking levels resulting from expected brush competition. The OAFs were developed based upon field observations by BCFS staff. OAF impacts ranged from a 45 percent reduction of medium site pine yields to a 23 percent reduction to good site pine yields. This approach recognizes, as included in the base case harvest projection, that some stands will regenerate to a mixed coniferous/deciduous state resulting from deciduous competition. While I accept that, for the purposes of analysis, these OAFs represent current practice, I have concerns regarding the appropriateness of such practice which I will discuss further in Impediments to prompt regeneration.

As was mentioned above in *site productivity*, the licensee intends to pursue a paired-plot analysis examining site indexes for managed stands on the TFL that are suspected of being underestimated. If in fact site indexes are underestimated, then it stands to reason that managed stand yields could be higher. However, a sensitivity analysis indicated that timber supply is insensitive to 10 percent changes in managed stand yields for the first 9 decades of this projection. Given this short- to mid-term insensitivity as well as the lack of conclusive evidence to suggest that managed stand yields are underestimated, the I am comfortable with the estimates used in the licensee analysis for the purposes of this determination. Should new evidence become available that suggests otherwise it will be considered in the next determination.

#### *minimum harvestable age*



In the licensee analysis, minimum harvestable ages were defined as the age at which the mean annual increment of a stand culminates—the culmination age—when average growth reaches its maximum. Minimum harvestable ages for existing stands were generally between 80 and 160 years, with the most common being 100 years. Regenerated stand minimum harvestable ages depended upon site productivity and species ranging from 80 to 100 years for spruce stands and from 60 to 80 years for pine stands. Stands that were simulated to suffer brush competition during regeneration had slightly higher minimum harvestable ages to account for reduced growth.

The BCFS Research Branch has advised caution regarding minimum harvestable ages defined using SPS, as they are short when compared with those defined using TIPSYS. I recognize this difference but a sensitivity analysis indicates that increasing minimum harvestable ages by as much as 20 years does not have an impact in the first 2 decades of the base case projection. I expect that this matter will be further clarified in future determinations as improved and more comprehensive information is developed on this factor. I am satisfied that the licensee analysis is an appropriate representation of current practice on TFL 42 and as such have made no adjustments to account for minimum harvestable ages.

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

Regeneration delay

Regeneration delay is the period between harvesting and the time at which an area is occupied by a specified minimum number of acceptable, well-spaced trees. In the licensee analysis, the Prince George regional standard of 3 years was used for all regenerating stands except for those that were modelled to experience brush competition. In order to represent competition specifically, medium sites regenerated to spruce and good sites regenerated to pine stands were given a 10-year regeneration delay and good sites regenerated to spruce were assigned a delay of 20 years. District staff agree that using this increased delay for the purposes of the analysis is somewhat reflective of observed longer-term regenerated stand performance. I recognize that the use of regeneration delay in this analysis is, in part, a method of reflecting anticipated impediments to forest growth due to brush competition in this analysis rather than operational planting practices. However, while I accept that this analysis somewhat mimics current practice, I do not endorse regeneration delays of 10 and 20 years as suitable practice.

Nonetheless, district staff confirm that, notwithstanding the various analysis assumptions referenced above, the licensee is actually meeting the 3 year regeneration delay. Beyond this, a sensitivity analysis indicated that short-term timber supply is not directly influenced when regeneration delay periods are reduced to 3 years for all sites except good site spruce which was reduced from 20 years to 10 years. In light of the licensee's current performance and the short-term insensitivity of timber supplies to reductions in regeneration delay, I have determined that further adjustments to account for regeneration

delay are not required for the purposes of this determination and reiterate my concerns about the acceptability of planning or modelling longer delays as discussed above.

#### Impediments to prompt regeneration

The establishment of many aggressive brush species on harvested areas has been identified as a significant impediment to the prompt regeneration of coniferous stands following harvest on TFL 42. The licensee recognizes this hazard in the Management Plan 3 for TFL 42 and has outlined a strategy for brush control that emphasizes early identification of possible competition and the timely application of treatment. The licensee intends to use treatments such as manual brushing and girdling, mechanical clearing and sheep grazing to achieve the basic silviculture requirements for stand establishment rather than the application of herbicide treatments. The use of chemical treatments for brush control is deemed by the licensee to be inconsistent with local community objectives.

Based upon available silviculture audit information and field observations, BCFS staff indicate that brush competition is significantly impacting regenerated stand performance on TFL 42. In order to mimic the effects of this brush on stand performance in the licensee analysis, BCFS staff developed a series of volume curve OAFs to be applied to spruce and pine leading stands on good, medium and poor sites in the base case analysis in conjunction with the above noted extended regeneration delays as was discussed above under *volume estimates for regenerated stands* and *regeneration delay*. The net effect of all simulated brush competition in the base case analysis is that 30 percent of the timber harvesting land base is or will be experiencing sub-potential growth, resulting in extended harvest ages and reduced harvestable volumes. As a result, the long term harvest level projected in the licensee analysis is about 14 percent lower than it would have been if the brush competition effects had not been included in the analysis and basic silviculture requirements were assumed to be achieved.

As discussed above, for the purposes of this determination I accept that the OAFs applied to the volume curves reflect current practice on TFL 42. However, having examined the evidence before me I have concerns regarding such practices. Failure to achieve the basic silviculture requirements would not be consistent with responsible forest land stewardship.

The licensee has committed in Management Plan 3 to achieve basic silviculture and current silviculture prescriptions include brushing treatments as necessary in order to achieve the free-growing status required by basic silviculture under the Forest Practices Code. However, while the average area receiving brush treatment over the past 5 years is approximately equal to the average area harvested, district staff have indicated that many regenerating areas will require more than one brushing treatment to achieve the free-growing status. It would follow then, that if more than one treatment is required in some areas and all areas harvested require at least one treatment, the area undergoing brush reduction treatment will need to increase from the current level.

However, because harvesting operations on TFL 42 only commenced 13 years ago, insufficient time has passed to provide conclusive evidence that any of the plantations will not reach free-growing status within the required time frame. Thus, it remains unclear whether adequate brushing treatments are in fact being conducted.

Nonetheless, as noted above under *volume estimates for regenerated stands*, timber supply is not sensitive to managed stand yields for the first 9 decades of this projection. Furthermore, I acknowledge that the extraordinarily high OAFs and regeneration delays as modelled in the licensee's analysis reflect the risks associated with this factor. While I accept that the licensee analysis adequately accounts for the concerns expressed above, and recognize that the timber supply forecast is not sensitive to changes in these assumptions, I expect that there is a potential to improve the management of these sites as noted in Management Plan 3. I will return to this point below under "Reasons for Decision".

#### Not-satisfactorily-restocked areas

An area is classified as not-satisfactorily-restocked (NSR) if it is not covered by a sufficient number of tree stems of desirable species as specified in BCFS stocking standards. In the licensee analysis, if such a condition exists and the area was harvested in 1987 or later, the land is defined as current NSR. If the area was harvested prior to 1987, then the land is classified as backlog NSR. On the timber harvesting land base there are approximately 3200 hectares of NSR, of which about 38 percent is current, and the remaining 62 percent is backlog. The licensee analysis represented regeneration of current NSR areas in the first decade of the harvest projection.

Of the approximately 1989 hectares of backlog NSR on TFL 42, approximately 34 percent, or about 672 hectares, is scheduled for treatment as described under Incremental silviculture below. The remaining 66 percent of the backlog NSR, approximately 1317 hectares, is considered by the licensee to be unlikely to respond to treatment. These areas were harvested 30 to 40 years ago prior to issuance of TFL 42 and have regenerated mainly to aspen stands with minor components of spruce. These stands are largely concentrated along the shores of Stuart and Trembleur Lakes and the Tachie River. Although the licensee's Management Plan 3 commits to regenerating all outstanding backlog NSR areas, district staff have indicated that riparian and visual quality objective requirements under the Forest Practices Code may inhibit full restoration of some of these areas to coniferous stands. Thus far, there has been no restoration treatment to any of the backlog NSR areas.

I find the 1210 hectares of current NSR to be consistent with the harvest level and basic silviculture requirements in the TFL. With respect to the representation of backlog NSR areas in the licensee analysis, I note that the licensee's Management Plan 3 commits to regenerating all outstanding backlog areas but the sensitivity analysis regarding incremental silviculture only considers the treatment of 34 percent. I expect the licensee

to meet its Management Plan 3 commitments and to this end expect a detailed plan outlining the management objectives for the entire 1989 hectares, incorporating any integrated resource management requirements, to be included in their next Management Plan and available for consideration in the next determination. I encourage district staff to closely monitor the licensee's performance in this regard such that any timber supply impacts of these treatments will be more clear in future determinations. I will return to these points below under "Implementation of Decision". Since any backlog NSR treatment impacts on timber supply will be long-term in nature, I am satisfied that, for the purposes of this determination, no further adjustments are required.

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

Pierre Forest rehabilitation area

The Pierre Forest rehabilitation area is the product of old logging that was carried out prior to the issuance of TFL 42. Following the logging, the areas were generally poorly stocked and experiencing severe brush competition. Utilizing funds available under the Forest Resource Development Agreement, the BCFS performed initial brushing treatments to, and planted, approximately 1125 hectares, or about 86 percent, of this area. The licensee is currently conducting further brushing treatments to the area as per commitments in their current and previous management plans.

Some of the areas are responding well to these rehabilitation treatments. Treatment continues on areas experiencing severe brush competition and all the area is expected to achieve free-growing status. I accept that the Pierre Forest rehabilitation area is appropriately represented in the licensee analysis but expect continued monitoring and reporting on the development of this area by the licensee. I will return to this point below under "Implementation of Decision".

Juvenile spacing and rehabilitation programs

An area known locally as the Tanizul Burn covers approximately 796 hectares and is fully regenerated with coniferous trees aged 21 to 40 years old. Natural regeneration on the site has resulted in stocking levels higher than 2500 stems per hectare. Opportunities exist to improve individual tree growth on the burn by spacing the stand to a lower density. By reducing crop-tree competition, the remaining trees grow faster and yield larger diameters than they would if the stand was left at its current density. Silvicultural treatments such as this are incremental to the basic silviculture obligations required on areas harvested by the licensee.

In addition, as was noted above, 672 hectares of backlog NSR area currently dominated by competitive brush species are scheduled for brush control during plantation establishment. This treatment, which is incremental to the base case harvest projection, is expected to facilitate the establishment of free-growing coniferous stands.

A sensitivity analysis examining the combined impact of the above two silviculture regimes indicated that their successful completion would increase timber supplies by about one percent beyond the achievement of basic silviculture, approximately 60 years from now and continuing into the long-term.

However, while I recognize the potential for a minor increase in future timber supplies beyond the licensee analysis base case harvest projection by undertaking these incremental activities, there are uncertainties surrounding their implementation which I expect will be addressed through the plan requested above in Not-satisfactorily-restocked areas. In addition, spacing of the Tanizul Burn is stated by the licensee to be subject to the acquisition of funding from agencies other than the licensee. Given these uncertainties, it would be inappropriate for me to speculate about the potential outcomes of activities which may or may not come to fruition. Therefore, for the purposes of this determination, I recognize that opportunities exist for incremental silviculture activities to increase long-term timber supplies, but I will not make adjustments for them at this time.

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

#### Utilization standards and compliance

The standard of timber utilization defines the species, dimensions (stump height and minimum diameter), and quality of trees that must be harvested, and is used to estimate merchantable volume.

A minimum diameter at breast height of 12.5 centimetres for pine species and a minimum diameter at breast height of 17.5 centimetres for all other coniferous species was used in the licensee analysis. As well, utilization of timber down to a 10 centimetres diameter top and a maximum stump height of 30 centimetres were assumed in the analysis. These utilization parameters are the standard limits for interior harvesting operations. BCFS staff indicate that the licensee is meeting these utilization requirements in their operations.

I consider utilization standards and compliance to be appropriately represented in the licensee analysis as it is consistent with current standards and practice.

#### Decay, waste and breakage

For existing stands, the Stuart Lake PSYU decay, waste and breakage factors, based on samples for the general area, were approved by the BCFS Resources Inventory Branch and used in the generation of VDYP volume tables for the base case harvest projection. Net regeneration yields from the Stand Projection System were compared with TIPSY estimates using an OAF2 of 5 percent to account for estimated decay, waste and breakage in regenerated stands, and were approved for use by the BCFS Research Branch. These estimates constitute the best available information and I consider them to be reasonable for use in this determination.



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

Integrated Resource Management (IRM) objectives

As provided in the *Ministry of Forests Act*, the purpose and function of the Ministry of Forests is to manage, protect and conserve the forest and range resources of the Crown and to plan the use of these resources to ensure production and harvesting of timber and the realization of fisheries, wildlife, water, outdoor recreation and other natural resource values are coordinated and integrated. Accordingly, the extent to which IRM objectives constrain the timber supply must be considered in AAC determinations.

In the licensee analysis, 5 resource emphasis zones within the timber harvesting land base were identified: Mule deer winter range, visual quality objective (VQO) modification, VQO partial retention, VQO retention and general forestry. Each of these zones will be discussed under the appropriate considerations below.

*cutblock adjacency*

In order to protect resources such as wildlife, water quality and aesthetics, current harvesting practices limit the size and shape of cutblocks, and prescribe minimum green-up times (the period required following harvesting for a stand of trees to reach a desired condition such as height). This provides for a distribution of harvested areas and retained forest cover across the landscape, and as such takes into account the impact of several forest management requirements. Cutblock adjacency guidelines are commonly expressed in terms of the number of harvesting entries, or 'passes', required for harvesting operations to cover an area while meeting IRM objectives. At the request of the BCFS Prince George Forest Region, a 4-pass harvesting system was modelled in the general forestry zone for the base case analysis to reflect current practice.

A 4-pass system may be somewhat restrictive given the anticipated beetle management activities in the general forestry zone, as I will discuss below under Non-recoverable losses. A sensitivity analysis indicated that a shift to a less restrictive 3-pass system would increase available timber supplies relative to the base case by about 4 percent in the first decade, about 6 percent in the second, about 2 percent in the third and approximately 4 percent in the fourth decade. From the fifth decade onward there is no impact on the base case analysis. While short-term timber supplies do not appear to be highly sensitive to adjacency considerations, I recognize that there is some capacity here to somewhat offset other downward uncertainties in the mid-term should a 3-pass system be necessary to control insect outbreaks. While I in no way wish to minimize the objectives that are achieved by adjacency requirements, it would not be logical to place restrictions on harvesting that would subsequently fail to meet the desired objectives due to the impacts of an insect infestation. In addition, I note that harvesting to date has not been evenly distributed across the TFL as was assumed in the licensee analysis. This will likely provide increased operational flexibility beyond what was represented in the

licensee analysis which would also somewhat offset some other downward uncertainties. I will return to this point below under "Reasons for Decision".

*green-up*

As discussed above, the green-up ages assumed in the base case harvest forecast are the estimated number of years for the trees growing in a previously harvested area to reach a required height. The following table outlines the green-up requirements used in the licensee analysis:

Resource Emphasis Zone	Maximum Allowable Non-Green-up (% area)	Minimum Green-up Height (m)
mule deer winter range	15.4	4.1
VQO modification	21.5	5.0
VQO partial retention	12.0	5.0
VQO retention	3.2	5.0
general forestry	25.0	2.5

In the licensee analysis, analysis unit specific ages at the required minimum height for green-up were derived from SPS data. In general, these ages are greater than those projected by the Ministry of Forests' Freddie (a site index computer program incorporating BCFS site index curves). Therefore, I consider the green-up ages used in the base case analysis to be more conservative than those approved for use by the BCFS Research Branch.

The general forestry zone accounts for approximately 79 percent of the timber harvesting land base. Operations in this zone have a timber production emphasis with due consideration of other IRM objectives as required under the Forest Practices Code.

A sensitivity analysis examining the impact of changing minimum green-up heights required in the general forestry zone indicates that short and mid-term timber supplies are sensitive to this requirement. Increasing the minimum height required in the general forestry zone from 2.5 metres to 3 metres, as is standard within the Forest Practices Code, would reduce timber supplies in the first 4 decades of the base case harvest projection. However, as I noted above, the SPS age estimates in the licensee analysis are conservative. Further examination by the BCFS Research Branch indicated that the period predicted by SPS to reach a green-up height of 2.5 metres is more or less equivalent to the period predicted by the BCFS model for trees to reach 3 metres. Thus, if the BCFS model had been used in the base case harvest projection with a minimum green-up height of 3 metres in the general forestry zone, the resulting harvest forecast would be the same as the base case.

To conclude, historic requirements in the Ft. St. James Forest District for minimum green-up heights have been 2.5 metres. The Forest Practices Code now requires that these heights be at least 3 metres, and on its own this new requirement would tend to reduce the timber supply projection relative to the base case harvest forecast. However, I



consider the conservative estimates from SPS used in the licensee analysis to offset these impacts. In addition, there are other offsetting factors, including the possible use of a 3-pass system as discussed above under *cutblock adjacency* and the potential for overestimating green-up ages if site indexes are underestimated as discussed above under *site productivity*, and I reflect this below under "Reasons for Decision".

*visually sensitive areas*

One of the resources required by the *Ministry of Forests Act* to be managed by the Ministry of Forests is outdoor recreation, which is defined under the *Forest Act* to include scenic features. Visual landscape foresters in B.C., in collaboration with specialists from around the world, have developed procedures for identifying and managing visually sensitive areas. Recommended procedures incorporate both biophysical and social factors—including visual sensitivity ratings, numbers of viewers and their perceptions, and others—and provide recommended visual quality objectives for visually sensitive areas.

To meet these objectives, constraints must be placed on timber harvesting, road building and other forest practices in the sensitive areas. These constraints are based on research and experience, and on public preferences and acceptance of degrees of alteration of visual landscape. The constraints are expressed in terms of "forest cover" requirements that relate to the maximum allowable percentage of a landscape unit that can have visual disturbance at any one time, and to "visually effective green-up", i.e., the stage at which regeneration is perceived by the public to represent a newly established forest.

The licensee analysis accounted for visual quality management by incorporating specific visual quality objectives by resource emphasis zones as identified above in *green-up*. All three VQO zones are located adjacent to or near Stuart and Trembleur lakes.

The modification zone, partial retention zone and the retention zone account for approximately eight, five and one percent of the timber harvesting land base respectively. Requirements for the modification zone are that a maximum of 21.5 percent of the zone can have stands less than 5 metres in height at any one time. In the partial retention zone, which includes areas with moderate visual sensitivity, no more than 12 percent of this zone is allowed to have stands less than 5 metres in height at any time. Finally, the retention zone, located in high visual sensitivity areas near Stuart and Trembleur lakes, is the most restrictive to harvesting and requires that no more than 3.2 percent of this zone has stands less than 5 metres in height at any time.

Standard BCFS procedures were followed in the identification of these zones and the definition of their associated forest cover requirements. Also, Regional BCFS staff have reviewed the visual management areas around Stuart and Trembleur Lakes and confirm that the appropriate visual quality management objectives for those areas were incorporated in the licensee analysis.

A sensitivity analysis indicated that timber supplies are not sensitive to changes in visual quality requirements in the short-term. Nonetheless, I recognize that there are other important lake features which may have viewsheds associated with them and were not included in the licensee analysis, such as McKelvey Lake. It is possible that future inclusion of such areas in VQO zones could cause downward pressures on future timber supplies. In order to help address this uncertainty, I expect the licensee to fully document the management objectives for these areas such that they are available for consideration in the next AAC determination for TFL 42. I will return to this under "Implementation of Decision".

I recognize that the management objectives for visually sensitive areas not identified in this analysis are expected to be defined for the next determination. However, the specific objectives and any possible impacts are unknown at this time. Nonetheless, since short term timber supplies are not highly sensitive to visual quality requirements, I am not making any adjustments with respect to VQOs for this determination.

*riparian areas*

As mentioned above under *environmentally sensitive areas*, the fisheries management zone is located along the Tachie River. In the licensee analysis, the total area of this zone was 822 hectares and the area removed from the productive forest to account for wildlife sensitivity, particularly regarding fish, within this zone was 378 hectares, or approximately one percent of the timber harvesting land base.

In view of the new Forest Practices Code riparian management requirements, BCFS staff have completed a study for a similar area in the Prince George TSA, that suggests a 4.4 percent reduction to the timber harvesting land base is required to adequately account for riparian reserves and an additional 1.5 percent reduction for riparian management areas, or a total reduction of about 6 percent.

Therefore, since the licensee analysis accounts for a reduction of approximately one percent, I accept that additional reductions of up to 5 percent may be required to adequately account for riparian areas on this unit. However, given that the BCFS study examined only two map sheets in the Prince George TSA, the actual reduction is unclear at this time as an explicit analysis of this area has not yet been undertaken. Nonetheless, it is worth noting that deductions for riparian areas in the licensee analysis were very small and therefore additional deductions are required to account for riparian management requirements as per the Forest Practices Code. I have accounted for the risk associated with this in my determination as noted below under "Reasons for Decision".

*biodiversity, old growth and forest ecosystem networks*

The Forest Practices Code requires the establishment of both stand and landscape level objectives for biodiversity management. To date these have not been established for this unit. Although the magnitude is as yet unknown, I expect there will be some overlaps of

biodiversity requirements with visual quality objectives, riparian areas and deciduous forest types as discussed above in the respective considerations, and with wildlife requirements as noted below in *wildlife*.

In addition to this, 625 cubic metres per year were assumed to be a non-recoverable loss as a means of capturing the impact on timber supplies of retaining wildlife trees and snags in the licensee analysis. This equates to approximately 2 trees per hectare harvested per year which is less than 1 percent of the available volume. Based upon previous studies conducted in the adjacent Prince George TSA, BCFS Regional staff estimate that a 2 to 3 percent reduction in available volume may be necessary to fully reflect the impacts of requirements for wildlife tree retention on timber supply.

Based upon my understanding of biodiversity requirements gained from experience elsewhere in the province, together with the relatively small land base deductions in the licensee analysis, I find it reasonable to expect that there will be further reductions to timber supply to account for biodiversity, old growth and forest ecosystem networks.

For the purposes of this determination, I consider this to be a downward pressure on timber supply in the short term and I have accounted for the risk associated with this in my determination as noted below under "Reasons for Decision".

#### *wildlife*

Staff from the BCFS and MELP agree that the licensee analysis adequately accounts for moose habitat in the area through the incorporation of current integrated resource management objectives.

A mule deer winter range zone was identified in the licensee analysis that includes diverse landscapes such as steep south and south-west facing slopes, stands of mature Douglas-fir, rock outcrops and deciduous stands at elevations ranging from 680 to 1100 metres above sea level. The mule deer zone, which covers an area identified as having high value mule deer winter habitat, accounts for roughly 7 percent of the timber harvesting land base.

Concerns have been expressed by MELP staff as to whether Douglas-fir stands will continue to be sufficiently maintained in this zone. Historically, pine stands have been regenerated on areas where Douglas-fir stands were harvested. MELP has indicated that pine stands are not suitable for winter forage and considers the mule deer zone in this TFL to be one of two critical mule deer habitat areas in the Prince George Forest Region. In recognition of these concerns, the licensee's Management Plan 3 commits to researching a viable means of successfully re-establishing Douglas-fir stands and opportunities for more detailed mule deer habitat mapping. In addition, as mentioned above in *biodiversity, old growth and forest ecosystem networks*, wildlife tree patch strategies also contribute to the maintenance of wildlife habitat.

The licensee intends to harvest 25 percent of the mature Douglas-fir in the mule deer winter range area every 60 years. In addition, since the licensee's 20-year plan for TFL 42 schedules the full 25 percent of the mature Douglas-fir in the mule deer winter range for harvest in that period, no harvesting would be expected in the zone for the last 40 years of the 60 year period. I encourage district staff to closely monitor harvesting plans for Douglas-fir stands with a particular emphasis on ensuring that these activities support forest health objectives and will return to this point below under "Implementation of Decision".

I view the regime represented in the licensee analysis to be a reasonable representation of the requirements that MELP staff have identified. However, BCFS district staff consider these requirements to be overly restrictive in view of the increasing infestations of the Douglas-fir bark beetle. If harvesting of infested stands is not permitted, the maintenance of many of the existing Douglas-fir stands would be unlikely as mortality would be expected to increase as a result of continuing insect attacks. I recognize the opportunity for continued dialogue around the management objectives for these stands in view of the increasing age and declining health of some of the Douglas-fir stands in this zone. Any refinement of objectives for this area will be considered in the next determination. At this time I see no need to make any further adjustments to account for mule deer habitat.

For the purposes of this determination I consider the deductions for wildlife habitat and forest cover requirements represented in the licensee analysis to be an appropriate reflection of current plans and knowledge of impacts. As new information becomes available, it will be considered in future determinations.

*recreation*

A recreation inventory was completed for TFL 42 in 1992 but was not incorporated into the licensee analysis. A comprehensive recreation analysis is ongoing, which will include recreation inventory information, but it is not yet complete and therefore was not considered in the analysis. However, BCFS staff indicate that, for the purposes of this determination, existing visual quality objectives accounted for in the licensee analysis do adequately provide for recreation requirements at this time, even though there were no other direct land base reductions for recreation. Based on my understanding of the close linkage between VQOs, ESAs and recreational values from personal experience and consultation with BCFS staff, I find this to be reasonable. The completion of a full recreation analysis combined with the ongoing LRMP for the Ft. St. James district is expected to provide further clarification in this area. Any guidance related to management objectives from these processes will be considered in future AAC determinations.

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

Harvest profile

Species profiling—scheduling harvesting according to specified species composition criteria—was used in the first two decades of the licensee analysis. In these decades it was assumed that a minimum of 36 percent and a maximum of 42.5 percent of the total harvest would take place in spruce stands. In addition, minimums of 35, 12.5 and 0 percent, and maximums of 40, 15.5 and 10.5 percent were assumed for pine, balsam and Douglas-fir respectively. Given the need to salvage timber attacked by the pine beetle, as I discuss below in Non-recoverable losses, harvesting a larger proportion of pine stands may be desirable not only for salvage purposes but to help control further insect outbreaks as they occur.

A sensitivity analysis indicates that there would be no short term impact to timber supplies if the harvest profile was shifted to harvesting predominantly older pine stands that are susceptible to pine beetle attack. However, in the event that these susceptible stands are not harvested soon and become non-recoverable losses as a result of insect attack in currently unaccessed areas, there could be a moderate downward influence on timber supplies in the mid-term. I expect that a detailed forest health plan for TFL 42, as I discuss below under Non-recoverable losses will bring more certainty to this factor in the next determination. At that time I will be better positioned to assess the impacts of an altered harvest profile. Because short-term timber supplies are not highly sensitive to a change in the harvest profile to represent the harvest of more mature pine stands, I am satisfied that no adjustments are required at this time.

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

Harvest flow

The nature of the transition from harvesting old growth to harvesting second growth is a major consideration in determining AACs in management units that have a large mature forest component, such as TFL 42. In the short term, the presence of large volumes of older wood permits harvesting above the long-term harvest level without compromising future timber supplies. In keeping with the objectives of good forest stewardship on areas where a falldown in timber supply is expected, AACs have been and will continue to be determined so as to ensure a smooth and orderly transition toward the lower long-term harvest level. Thus, timber supplies should remain sufficiently stable to avoid unnecessary adverse impacts on current or future generations. To achieve this, the rate set must not be so high as to cause later disruptive shortfalls in supply, nor so low as to cause undue social and economic impacts now.

I have taken this into account in my determination as discussed below under Minister's letter and again under "Reasons for Decision".

20-year plan

The licensee's proposed 20-year plan was accepted by the BCFS in November, 1995, and supports the feasibility of the base case projection. However, the green-up and access assumptions in the plan are more optimistic than those used in the licensee analysis. I recognize this variance and note that the licensee is obliged to meet BCFS standards regarding stocking, regeneration delay and free-growing commitments which may somewhat constrain full development of the areas identified in the 20-year plan. Nonetheless, as I noted above under *green-up*, I consider the green-up ages used in the licensee analysis to be more conservative than those used by the BCFS. Overall, I consider the conservative green-up estimates in the licensee analysis to offset any downward risk to timber supplies that might be brought about by the above mentioned optimistic assumptions in the licensee's 20-year plan. Therefore, I am satisfied that no adjustments to the base case to account for the findings of the licensee's 20-year plan are required for this determination.

Difference between AAC and actual harvest

In recent years the full attainment of the AAC has not been achieved but district staff advise that this has been largely due to licensee and BCFS administrative delays rather than timber supply constraints. I accept the district's assessment of these recent difficulties and regard this as a licence management issue rather than a reflection of the area's capacity to support a given harvest level. Accordingly, it is not a significant factor for this determination.

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

Timber processing facilities and community dependence on the forest industry

The Tl'azt'en Nation owns and operates the Teeslee Forest Products sawmill, located in Tachie, with an estimated milling capacity of about 65 000 cubic metres per year. The mill employs 32 people, and saws large diameter logs producing, among other dimensional lumber products, timbers destined for offshore markets. At present, the licensee estimates that approximately one-half of the timber harvested on TFL 42 is suitable for processing at the Teeslee sawmill.

In addition to mill employment, the TFL directly supports the employment of 16 people in forest management with Tanizul Timber Ltd., approximately 18 person-years in timber harvesting, about 19 person-years in silvicultural activities including tree planting and an additional 2 person-years in forestry consulting.

I am aware of the significance of the TFL harvest to the Tl'azt'en Nation's manufacturing facility in Tachie, and of that facility's importance to the local economy and have considered this in my determination.

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

Minister's letter and memo

The Minister expressed the economic and social objectives of the Crown for the province in two documents to the Chief Forester: a letter dated July 28, 1994 (attached as Appendix 3), and a memorandum dated February 26, 1996 (attached as Appendix 4). I understand both documents to apply to TFL 42. They are consistent with the objectives stated in the Forest Renewal Plan and include forest stewardship, a stable timber supply, and allowance of time for communities to adjust to harvest level changes in a managed transition from old growth to second-growth forests, so as to provide for continuity of employment.

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

To date, the use of alternative harvesting systems and commercial thinning have not been significant in this TFL. However, in areas that are subject to visual quality objectives, the use of these systems may be appropriate. The Minister's memorandum addressed the effects of visual resource management on timber supply. It asked that pre-Code constraints applied to timber supply in order to meet VQOs be re-examined when

determining AACs in order to ensure they do not unreasonably restrict timber supply. As noted earlier, under *visually sensitive areas*, BCFS Regional staff have reviewed the existing visual quality management objectives for this area and confirm that they were appropriately represented in the licensee analysis. However, I do expect further examination of the management objectives for areas which may have viewsheds associated with them and were not included in the licensee analysis.

I have thoroughly considered the social and economic objectives of the Crown as stated by the Minister of Forests and have accounted for them in my determination wherever appropriate.

#### Local objectives

The people of the Tl'azt'en Nation have lived in the area of TFL 42 for many generations and they have taken care to help preserve the integrity of special cultural and historical sites. As was discussed above under *traditional use objectives and archeological areas*, the Tl'azt'en Nation also wishes to ensure that opportunities for continued traditional activities in the area are maintained.

The Tl'azt'en Nation is involved in all aspects of managing TFL 42 and is encouraging their people to learn more about forest management. To this end, the Tachie Education Centre is offering a course in forest science, and Tanizul Timber Ltd. provides contracting opportunities to Tl'azt'en silviculture contractors and summer employment for those pursuing post secondary education. Ultimately, Tanizul Timber Ltd. hopes to employ a Registered Professional Forester from the Tl'azt'en Nation.

In my considerations and findings as part of this determination, I have attempted to account for Tl'azt'en Nation objectives for this TFL.

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

#### Non-recoverable losses

Based upon data collected by the licensee, the base case analysis included a deduction of 4755 cubic metres per year to account for non-recoverable losses due to fire (875 cubic metres), wind damage (1500 cubic metres), insects (1755 cubic metres) and as discussed above under *biodiversity, old growth and forest ecosystem networks*, wildlife tree retention (625 cubic metres). The licensee has indicated that during the term of Management Plan 3, non-recoverable losses are expected to be reduced by one-half to about 2385 cubic metres, or about 2 percent of the current AAC, through an aggressive salvage program.

BCFS staff reviewed the losses they expect due to beetle attack and found a significant variance to those assumed in the analysis. BCFS staff estimate that approximately 20 000 cubic metres per year is a more realistic non-recoverable loss estimate. This is largely



because many attacked areas are not readily accessible from the existing road infrastructure and the licensee's 20-year plan does not indicate plans to build roads in a timely manner to many of the currently isolated areas of infestation.

I have carefully reviewed this information and find significant uncertainty regarding estimates of non-recoverable losses. The licensee has indicated its intention to limit losses to about 2 percent of current AAC. However, I find this to be an optimistic assumption in the absence of a plan detailing how this will be accomplished and given that the licensee has not demonstrated that this is feasible through past performance. In addition, 2 percent is quite low when compared with many other areas in the province. Finally, a local BCFS forest health expert estimates that non-recoverable losses will likely be about 15 percent of the current AAC if the current dispersion and intensity of infestations continues unabated.

Overall, I observe a range of uncertainty from 2380 cubic metres per year to 20 000 cubic metres per year. I expect the licensee to conduct a thorough analysis of insect infestations on TFL 42 and further to develop a comprehensive forest health plan detailing management objectives for these areas, as noted below under "Implementation of Decision". Until this plan is completed showing a firm commitment on the part of the licensee to address this uncertainty, I view non-recoverable losses as a downward risk to the base case harvest projection. I have accounted for the risk associated with this in my determination as noted below under "Reasons for Decision".

## **Reasons For Decision**

In reaching my decision on an AAC for TFL 42, I have considered all of the factors presented above and have reasoned as follows.

The licensee analysis base case indicated an initial harvest level of 132 280 cubic metres per year—20 cubic metres per year below the current AAC—for the first decade followed by a 13 percent drop in decade 2 and eventually reaching the long term harvest level of 73 731 cubic metres per year in decade 9.

My considerations have identified 3 categories of information which work to influence the available timber supply either in an upward or downward direction from the licensee's base case harvest projection.

Factors that place some unquantified downward risk on the base case timber supply projection are:

- well-founded concerns regarding the licensee's difficulty in controlling brush competition; and
- significant uncertainty regarding non-recoverable losses due to insect infestations.

Silviculture audit information indicates that high levels of brush competition exist on regenerating areas, especially on the most productive sites. The licensee's information on regeneration indicates that if this level of competition is allowed to continue as is represented in the licensee analysis, then roughly 30 percent of the TFL area will undergo sub-potential growth. While I accept that current practice may have been appropriately represented in the analysis, I do not accept this as appropriate practice. Uncertainty regarding the licensees' yet-to-be proven performance in these areas imposes an unquantified downward risk on the base case harvest level in the mid- to long-term.

There is tremendous uncertainty around the issue of what NRLs will be as a result of insect damage on the area. NRLs were assumed to be 4755 cubic metres per year in the base case analysis as derived from current licensee estimates. Subsequently, the licensee has committed in its Management Plan 3 to limiting NRLs to 2385 cubic metres per year (about 50 percent of current estimates), but has yet to present an adequate plan detailing how this will be accomplished. The BCFS has indicated that given the lack of road access to much of the TFL, in addition to many of the attacked areas not being identified for removal in the licensee's 20-year plan, losses could be as high as 20 000 cubic metres per year. There is however, some uncertainty in my mind as to whether the analysis supporting this higher estimate fully considered that NRLs are projected evenly for every single year over the entire long-term planning horizon, rather than reflecting worst case periodic outcomes. This wide range of estimates combined with little evidence on the part of the licensee to demonstrate how they intend to curtail these losses introduces significant downward pressures on the base case harvest forecast.

Factors that place downward pressures on the base case timber supply projection are:

- the vintage of information used in the timber supply analysis, which means this determination is being made 5 years into the base case projection; and
- the requirements of the Forest Practices Code, which were not represented in the licensee analysis.

The base case timber supply projection indicated that a level of harvest 20 cubic metres per year less than the current AAC could be maintained for a period of 10 years which would be followed by a 13 percent drop in the second decade. Because the inventory information used in the analysis was current to 1991, we are now half way through that first decade at the time of this determination. It is obvious then that there is even less capacity than the licensee analysis indicates, to offset other downward pressures on timber supply in the remainder of the first decade.

Based upon my understanding of biodiversity requirements gained from experience elsewhere in the province, together with the relatively small land base deductions in the licensee analysis that may to some extent account for biodiversity and riparian management requirements, I find it reasonable to expect that there will be further reductions to timber supply to account for these factors. With the exception of the Tachie River riparian zone there are insufficient reductions across the area to possibly account for riparian and biodiversity requirements. Given the

numerous lakes and drainage features on the land base it is reasonable to expect much larger impacts as a direct consequence of Code requirements on this TFL than were accounted for in the licensee analysis.

I find up to a 5 percent decrease in the timber harvesting land base to fully account for riparian reserves and management areas to be a reasonable approximation of the impacts of implementing the riparian management requirements of the Forest Practices Code. This recognition is in line with previous studies in similar areas.

In addition to the land base effects, the management of biodiversity and wildlife tree requirements will likely further decrease the timber yields from the area. It is difficult to determine an order of magnitude reduction accounting for these factors as it should be a function of a detailed plan which has yet to be prepared for this unit and the land base surrounding it. Nonetheless, based upon my understanding of biodiversity requirements gained from experience elsewhere in the province, together with the relatively small land base deductions in the licensee analysis that may to some extent account for biodiversity, I find it reasonable to expect that there will be further reductions to timber supply to account for biodiversity, old growth and forest ecosystem networks. For the purposes of this determination, I accept that a downward pressure of up to 3 percent in available volume exists to account for wildlife tree requirements which contribute to biodiversity. This is particularly important given the high sensitivity of the base case to existing stand volume estimates.

Factors that place upward pressures on the base case timber supply projection are:

- the future inclusion of backlog NSR areas,
- the likelihood that site productivity is higher than assumed in the licensee analysis, and
- minor adjustments to account for analytical inaccuracies in the licensee's analysis regarding roads, trails and landings.

The licensee has committed to conduct intensive treatments on backlog NSR areas not included in the base case harvest projection and I consider this to represent an upward pressure on available timber supply in the long-term.

As I discussed above in *site productivity*, the likelihood that managed stands will provide more volume than was estimated in the licensee analysis places additional upward pressures on the base case harvest forecast. Empirical studies such as the paired plot analysis may not bring full certainty to this question but I expect that they will provide better evidence than is currently available. There is a reasonably high probability that site productivity is higher than estimated for the licensee analysis, but the magnitude of the difference is unknown and unproven. For now, I consider site productivity to represent an upward pressure which primarily affects long-term harvest projections.

Analytical inaccuracies exist in the licensee analysis regarding the representation of roads, trails and landings. However, these inaccuracies represent only a slight variance in estimating current

practice which results in a very minor upward pressure primarily affecting the long-term harvest projection.

I expect the licensee to meet its basic silviculture requirements according to the terms of its licence. In light of the somewhat pessimistic assumptions in the licensee analysis regarding impediments to prompt regeneration, I expect the manner in which basic silviculture requirements will be achieved to be clarified prior to the next determination through the submission of more detailed plans regarding silviculture objectives. However, as noted above, given past licensee performance in this regard, I do recognize that there is still a risk to timber supplies which will be re-assessed in future determinations based upon future licensee performance.

While I recognize that the base case harvest forecast is bound in decades 3 through 5 by adjacency constraints resulting in reduced flexibility to increase the harvest forecast during those decades, I note that a 4-pass system for the forest management zone, as assumed in the licensee analysis, is somewhat unlikely given the need to address beetle damaged stands in this zone. I consider it more likely that a 3-pass system will need to be implemented in this zone to address forest health concerns which adds flexibility in the achievement of projected mid-term harvest levels. In addition, there may be more flexibility on mid-term timber supplies than indicated in the licensee analysis if site indexes are underestimated, which would result in a slight overestimation of green-up ages. Overall, I consider the reduced and increased flexibility influences to offset one another.

In determining an AAC for TFL 42, I note that there is some flexibility in the short- to mid-term to manage the rate of inter-decadal decline in harvest levels. I take guidance here from the social and economic objectives of the Crown as expressed by the Minister of Forests which suggest that the AAC should not be decreased more than is necessary to avoid compromising long-run sustainability. However, given the risks associated with the factors discussed above, particularly regarding the impacts of implementing the Forest Practices Code, and significant uncertainty regarding the control of insect epidemics and the salvage of damaged timber, I do not find justification for maintaining the current AAC without introducing an unacceptable risk to future timber supplies.

From the foregoing reasoning, it is my determination that a timber harvest level that accommodates objectives for all forest resources during the next five years, that provides for requirements implemented as part of the Forest Practices Code, that ensures longer-term integrated resource management objectives can be met, that meets provincial objectives and that avoids disruptive shortfalls in future timber supply, can best be achieved in this TFL at this time by establishing an overall AAC at 120 000 cubic metres per year.

## **Determination**

The new AAC for TFL 42 will be 120 000 cubic metres per year. This AAC comes into effect on July 1, 1996, and will remain in effect until a new AAC is determined, which must take place within five years of this determination.

### **Implementation of Decision**

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

1. district staff to closely monitor the licensee's performance regarding the scheduled treatment of the 672 hectares of backlog NSR for treatment.
2. the licensee to complete a detailed plan outlining the management objectives for the entire 1989 hectares of backlog NSR, incorporating any integrated resource management requirements, which will be included in their next Management Plan and available for consideration in the next determination. I also encourage district staff to closely monitor the licensee's performance in this regard such that any timber supply impacts of these treatments will be more clear in future determinations.
3. continued monitoring and reporting by the licensee to district staff on the development of the Pierre Forest rehabilitation area.
4. the licensee to fully document the management objectives for other important lake features which may have viewsheds associated with them such as McKelvey Lake so that they are available for consideration in the next AAC determination.

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

Larry Pedersen  
Chief Forester

June 28, 1996

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

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

### Allowable annual cut

7. (1) The chief forester must determine an allowable annual cut before December 31, 1996, and after that determination at least once every 5 years after the date of the last determination, for

- (a) the Crown land in each timber supply area, excluding tree farm licence areas and woodlot licence areas, and
- (b) each tree farm licence area.

(1.1) If, after the coming into force of this subsection, the minister

- (a) makes an order under section 6 (b) respecting a timber supply area, or
- (b) amends or enters into a tree farm licence to accomplish the result set out under section 33.1 (1) (a) to (d),

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

- (c) within 5 years after the order under paragraph (a) or the amendment or entering into under paragraph (b), and
- (d) after the determination under paragraph (c), at least once every 5 years after the date of the last determination.

(1.11) If

- (a) the allowable annual cut for the tree farm licence is reduced under section 7.1 (3), and
- (b) the chief forester subsequently determines, under subsection (1) of this section, the allowable annual cut for the tree farm licence area,

the chief forester must determine an allowable annual cut at least once every 5 years from the date the allowable annual cut under subsection (1) of this section is effective under section 7.1 (6).

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

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

(1.3) In determining an allowable annual cut under this section the chief forester may specify portions of the allowable annual cut attributable to

- (a) different types of timber and terrain in different parts of Crown land within a timber supply area or tree farm licence area,
- (b) different types of timber and terrain in different parts of private land within a tree farm licence area, and
- (c) gains in timber production on Crown land that are attributable to silviculture treatments funded by the Province, the federal government, or both.

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

(3) In determining an allowable annual cut under this section the chief forester, despite anything to the contrary in an agreement listed in section 10, shall consider

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

- (i) the composition of the forest and its expected rate of growth on the area;
  - (ii) the expected time that it will take the forest to become re-established on the area following denudation;
  - (iii) silvicultural treatments to be applied to the area;
  - (iv) the standard of timber utilization and the allowance for decay, waste and breakage expected to be applied with respect to timber harvesting on the area;
  - (v) the constraints on the amount of timber produced from the area that reasonably can be expected by use of the area for purposes other than timber production; and
  - (vi) any other information that, in his opinion, relates to the capability of the area to produce timber;
- (b) the short and long term implications to the Province of alternative rates of timber harvesting from the area;
  - (c) the nature, production capabilities and timber requirements of established and proposed timber processing facilities;
  - (d) the economic and social objectives of the Crown, as expressed by the minister, for the area, for the general region and for the Province; and
  - (e) abnormal infestations in and devastations of, and major salvage programs planned for, timber on the area.

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

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

### **Purposes and functions of ministry**

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

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