

**BRITISH COLUMBIA
MINISTRY OF FORESTS**

Tree Farm Licence 6

**Rationale for
Allowable annual cut (AAC) determination**

effective December 1, 1995

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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 6 (TFL 6). The document will also identify where new or better information is required for incorporation into future determinations.

Introduction

TFL 6, also known as the Quatsino TFL, consists of five supply blocks on land surrounding Quatsino Sound in the northern portion of Vancouver Island. The TFL is held by Western Forest Products Limited and is administered from the Port McNeill Forest District Office in Port McNeill, as part of the Vancouver Forest Region.

The total land base for TFL 6 is 170 213 hectares (ha), with a productive forest land base of 141 732 ha and a timber harvesting land base of 121 918 ha (86 percent of the productive forest land or 72 percent of the total TFL area).

The great majority of the operable forest lies within the Coastal Western Hemlock biogeoclimatic zone. Western hemlock-leading stands are the most common (covering 73 percent of the timber harvesting land base) with western redcedar (12 percent) and sitka spruce (3 percent) also present.

Most of the wood harvested on the TFL is transported to processing facilities on Vancouver Island and the Lower Mainland of British Columbia.

History of AAC

TFL 6, originally known as Forest Management Licence No. 6, was awarded in 1950 to British Columbia Pulp & Paper Company Ltd. as a 21-year licence. At that time the licence comprised 172 042 ha and the company was authorized to harvest 509 703 cubic metres per year under Management Plan No. 1. During the next 30 years there were six name changes (Alaska Pine & Cellulose Ltd., Rayonier Canada Ltd., Rayonier B.C. Ltd., Rayonier Canada (BC) Ltd., ITT Industries of Canada Ltd. and finally to Western Forest Products Ltd. on October 31, 1980). The name Western Forest Products Ltd. is still in effect even though Doman Forest Products Ltd. acquired control of the company on October 18, 1989. On March 1, 1995, a 25-year TFL agreement was issued to Western Forest Products Ltd. After five years, this agreement is renewable for a further 25-year period if the licensee so desires and has complied with the terms and conditions of the agreement.

Since its inception the total licence area has remained essentially the same, however changes in management practices, technology and log prices have caused the timber harvesting land base to fluctuate from 110 847 ha to a high of 143 340 ha to its present level of 121 918 ha. Mainly as a result of the conversion to close utilization standards from the intermediate utilization standards, the AAC increased from 730 574 cubic metres in 1965 to 1 200 634 cubic metres in 1966. The AAC in effect today set under Management Plan No. 7 effective 1987 is 1 300 000 cubic metres. The Small Business Forest Enterprise Program component of that AAC is 100 620 cubic metres. During the past 40 years the licensee has consistently harvested its allocation of the AAC.

Information Sources Used in the AAC Determination

Information considered in determining the AAC for TFL 6 includes the following:

- TFL 6 Draft Management Plan 8, (MP No. 8) dated January 17, 1995;
- Statement of Management Objectives, Options and Procedures for Management Plan No. 7, dated August 14, 1992;
- Western Forest Products' Timber Supply Analysis Report for TFL 6, Management Plan No. 8, dated February 1992 (revised November, 1994);
- Letter from the Minister, dated July 28, 1994, stating the Crown's economic and social objectives;
- *Forest Practices Code of British Columbia Act* and Regulations;
- Technical review and evaluation of current operating conditions through comprehensive discussions with British Columbia Forest Service (BCFS) staff, particularly at the AAC determination meeting in Victoria on May 19, 1995.

Role and limitations of the technical information used

The *Forest Act* requires me to consider biophysical as well as social and economic information in AAC determinations. A timber supply analysis and the inventory and growth and yield data used as inputs to the analysis formed the major body of technical information used in my AAC determination for TFL 6. The timber supply analysis is concerned primarily with biophysical factors—such as the rate of timber growth and definition of the land base considered available for timber harvesting—and with management practices.

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

Furthermore, technical analytical methods such as computer models cannot incorporate all of the social, cultural, and economic factors that are relevant when making forest management decisions. Therefore, technical information and analysis do not necessarily provide the complete answer or solution when making forest management decisions such as AAC determinations. The information does, however, provide valuable insight into potential impacts of different resource-

use assumptions and actions, and thus forms an important component of the information I must consider in AAC determinations.

The preparation and review of MP No. 8 occurred over a period of four years. As a result, some of the information considered in this determination is dated and does not fully reflect current practice. I have accounted for this in my determination.

In particular, I have taken the following into account.

- The inventory information for the TFL is based upon a 1970 forest cover inventory updated for management activity to 1990. This inventory information, and therefore the harvest forecasts of the timber supply analysis, do not reflect the five years of harvesting activity that has occurred since the inventory information was prepared or the growth of the remaining forests during that same five-year period. This is discussed under 7(3)(a)(i) below.
- The method used in the timber supply analysis to account for the management of visually sensitive areas, as discussed under 7(3)(a)(v) below, did not include a TFL landscape inventory.
- Inventories and mapping of a number of forest resources and attributes such as environmentally sensitive areas and operability are incomplete or out of date. This is discussed further under 7(3)(a)(i) and 7(3)(a)(v) below.

In making the AAC determination for TFL 6, I have considered known limitations of the technical information provided, and I am satisfied that the information provides an adequate basis for my considerations in this 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 for AAC determinations

Rapid changes in social values and in our understanding and management of complex forest ecosystems mean that there is always some uncertainty in the information used in AAC determinations. Two important ways of dealing with uncertainty in AAC decisions are (i) avoiding unnecessary risk, and (ii) redetermining AACs frequently to ensure they incorporate up-to-date information and knowledge. When making AAC determinations I assess the risks and uncertainties associated with the information before me. The second principle has been recognized in the legislated requirement to redetermine AACs every five years. The adoption of this principle is central to many of the guiding principles that follow.

In considering the various factors that Section 7 of the *Forest Act* requires me to take into account in determining AACs, I attempt to reflect as closely as possible operability and forest management proposals that are a reasonable extrapolation of 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 (IRM) 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 proclaimed, no final standards or regulations were available at the time the licensees' timber supply analyses were conducted. Accordingly, the analyses were unable to address 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 Regulations were approved by the Lieutenant Governor in Council on April 12, 1995, and released to the public at that time. The *Forest Practices Code of British Columbia Act* was brought into force on June 15, 1995. Preliminary studies in selected Timber Supply Areas (TSAs) indicate that under the Code there will be some impacts on timber supply additional to those expected under previous guidelines. In AAC determinations made since the coming into force of the Code, I have viewed with some caution the timber supply projections in the timber supply analyses for TFLs such as TFL 6, which pre-date the Code. At the same time, I am mindful that the full force of the Code may not be felt during the transition phase of its implementation, and the impacts of specific factors on timber supply may not yet have been assessed on a local basis.

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

Moreover, even where government has made land-use decisions—such as the June 1994 Vancouver Island Land-Use Decision—it may not always be possible to analyze their timber supply impact in an AAC determination. In most cases, government's land-use decision must be followed by detailed implementation decisions. For example, a land-use decision may require the establishment of resource management zones, and resource management objectives and strategies for these zones. Although the government has issued an implementation plan for Vancouver Island, the actual impact of these decisions is not yet evident. Nonetheless, for this determination, I have accepted certain commitments in the Vancouver Island Land-Use Plan and the implementation plan as statements of the Crown's social and economic objectives for the region and for the TFL.

The Forest Renewal Plan will fund a number of intensive silviculture activities that have the potential to affect timber supply, particularly in the long term. In general, it is too early for me to assess the consequences of these activities, but wherever feasible I will take their effects into account. The next timber supply review of TFL 6 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 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". The AAC I determine for a TFL 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 it is expected that these 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, and 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 for TFLs, I am assisted by timber supply forecasts provided by the licensee and reviewed by BCFS staff. For each AAC 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 forest estate computer model, a range of timber supply forecasts is produced. Each forecast is guided by the objectives of achieving a maximum long-term harvest level, maintaining the current harvest level for as long as possible, and having an orderly transition between the short- and long-term harvest levels.

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

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

The forest estate model used by Western Forest Products Ltd. for its harvest projections was TRIM (Timber Resource Inventory Model), a simulation model developed at the United States Forest Service Pacific Northwest Research Station by P.L. Tedder, J.C. Gourley and R.N. LaMont in 1986. In addition to a base case, Western Forest Products examined six different

management regimes on the TFL, changing both the definition of the timber harvesting land base and management practices. Lower ecosite stands were included in the timber harvesting land base to test their contribution to wood supply, rate of cut constraints were imposed on certain special management areas, and some previously inoperable areas were included in the timber harvesting land base as part of the unconventional harvest system option. Also, the effect on wood supply projections of increasing or decreasing the base case timber harvesting land base by ten percent was tested.

Under the base case, a timber harvesting land base of 121 918 ha could support an initial harvest of 1 258 750 cubic metres per year for the first decade. The harvest is then projected to decline by approximately six percent per decade for five decades until the long term harvest level of 967 780 cubic metres per year is reached. The analysis illustrates that the existing old-growth forest will support the harvest operations for the first 50 years after which the second-growth forest will become the major component of the harvest.

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

Composition of the forest

Forest land base contributing to timber harvest

- The Vancouver Island Land-Use Plan

The government's Vancouver Island land-Use Plan implementation report was released in January 1995 and revised in April 1995. Under this plan, various land uses are designated, some of which will result in decreased availability of timber for harvesting, and some of which will work to increase timber availability. In particular, since the date of the completion of the licensee's analysis, two new parks, approved by Order In Council, have been designated within TFL 6. Because it is not yet possible to predict with certainty the overall implications for timber supply that will result from implementing this plan, it is premature to consider any one element, such as protected areas, in isolation. Further information is required before these implications may be incorporated into an AAC determination. Information and experience generated during the implementation of the plan will provide guidance in future AAC determinations.

- Reductions for roads, trails and landings

The area occupied by existing roads, trails and landings is approximately four percent of the immature forest. This area was classified as non-forest land and deducted from the timber harvesting land base. The area to be occupied by future roads, trails and landings

was estimated at five percent of the currently un-harvested timber harvesting land base. This estimate is reasonable given the terrain and harvesting systems used in TFL 6 and is acceptable for use in this determination.

- Reductions for environmentally sensitive areas

An inventory of environmentally sensitive areas (ESAs) conforming to provincial standards was not available for TFL 6 at the time the timber supply analysis was done. In order to account for the presence of ESAs, Western Forest Products Ltd. reduced the timber harvesting land base by 4693 ha based on information obtained during field study and which was used in the analysis. A concern was raised by BCFS regional staff that this reduction may be insufficient, however, the staff members were unable to present data to refute the licensee's estimate of ESAs. However, it is likely that the total area affected by the estimate for ESAs is in fact larger than the 4693 ha, given overlap with other netdowns on the TFL which were deducted prior to assessing the ESAs. I conclude that there is no need to make any further adjustment to the base case projection of timber supply to account for ESAs.

I note that as part of MP No. 8, the licensee is committed to completing an ESA inventory by the end of 1995. As such, I expect that there will be less uncertainty concerning the area classified as ESA in the next analysis. I have discussed my concerns about the completion of non-timber inventories under 7(3)(a)(v) below.

- Operability

The operability mapping completed by Western Forest Products was accepted by the Port McNeill Forest District staff in August, 1993. While it is reasonable to expect that some areas classified as inoperable by conventional means are actually operable and vice versa, I am satisfied that this information is adequate for the purposes of this AAC determination. However, I do hold the licensee to its commitment in MP No. 8 to reassess operability before preparation of MP No. 9.

- Non-conventional harvesting areas

The operability mapping shows approximately 1 277 ha of forest land that are not included in the conventional timber harvesting land base but are suitable for helicopter logging. The analysis shows that it is possible for this area to sustain a harvest of approximately 10 200 cubic metres per year. Western Forest Products is asking for a partitioned harvest of 10 200 cubic metres per year from this area. They now have four years of experience in helicopter logging in other locations in the province and the five-year forest development plans for TFL 6 will include cutblocks located in the non-conventional harvesting areas. Operating in these areas will result in a small upward influence on the timber harvesting land base and therefore on timber supply throughout the forecast horizon. I have accounted for this factor in **Reasons for Decision**.

- Reductions for low productivity sites

According to the Western Forest Products ecosite classification system, two thirds of the forest area on moderate, low and very low ecosites has been excluded from the timber harvesting land base in the base case. These areas are covered mainly by height class 3 stands, that on average are not expected to attain a diameter at breast height of 35 centimetres. If these stands were included in the timber harvesting land base they would contribute 53 000 cubic metres per year for the next 50 years. The licensee is willing to harvest these areas in the future if the price of lumber remains high. They are asking for a partitioned harvest in these lower ecosite areas of 26 000 cubic metres per year (one half the potential contribution). Harvesting of these timber types will result in an upward influence on timber supply in the short-term which is accounted for in **Reasons for Decision**.

- Reductions for mixed coniferous/deciduous stands

Areas covered by pure deciduous and a mixture of coniferous and deciduous stands (2 521 ha) were included in the timber harvesting land base. Only the coniferous component of these stands was included in the volume tables for these areas. The timber supply analysis assumes that 2 258 ha of these stands will be harvested and replaced with pure coniferous species. However, there is no firm commitment in MP No. 8 by the licensee to harvest these stands. The forest management records indicate that only 100 ha of alder have been harvested to date. If this performance improves and continues, then the analysis assumptions are reasonable. If it does not, then future timber supply will be lower than projected and this will be taken into account in future AAC decisions. I am satisfied that the base case timber supply forecast has the capacity to absorb any uncertainty associated with this factor. I can therefore wait until the next AAC review to assess the validity of the inclusion of these areas in the timber harvesting land base.

Existing inventory information

- General comments

The last timber inventory was completed in 1970. This inventory was based on aerial photographs taken in 1967. For the purposes of the timber supply analysis, the inventory information was updated to reflect harvesting, natural depletions and growth up to January 1, 1990. This is an important factor because the harvest operations that have occurred since 1990 are not reflected in the inventory information or the timber supply analysis. In **Reasons for Decision** I have accounted for the fact that the harvest forecast begins in 1990, and five years have passed with harvests at the current AAC.

Although I am aware that inventory standards have changed since this inventory was compiled, I take some comfort in an audit conducted by the BCFS Inventory Branch in 1980 which found the inventory acceptable. I also note that another inventory audit of

TFL 6 by the Inventory Branch is scheduled for 1997. The existing inventory is adequate and constitutes the best information currently available for use in this determination.

- Age structure

Mature forest greater than 120 years old covers over 40 percent of the timber harvesting land base of the TFL. There is also a fairly even distribution of forest between ages 0 and 90 years. This age structure allows the volume of timber harvested on the TFL to gradually decline over the next 50 years by which time the presently 90-year old forest will be ready for harvesting. As discussed under 7(3)(a)(iii) below, it is not necessary to undertake activities such as commercial thinning to augment gaps in the age structure.

- Volume estimates for existing stands

The volume of wood in existing old growth stands was determined for each analysis unit by averaging the volumes of the inventory plots located in these stands. These volume estimates were accepted by BCFS Inventory Branch in 1992 and I accept them for use in my determination.

For existing second growth stands, Western Forest Products used the TIPS Y (Table Interpolation Program for Stand Yield) growth and yield model to project the development of Douglas-fir stands, the VDYP (Variable Density Yield Projection) model for amabilis fir and mixed deciduous stands, and their own local tables for western hemlock, sitka spruce, cedar and cypress stands. These growth and yield projections were accepted by the Inventory Branch in 1991. This set of sample information and both standard and localized growth and yield methods for estimating the volume of existing stands represents the best information available currently, and I am satisfied that it is adequate for use in my determination.

Expected rate of growth

- Ecosite classification

Site indices in TFL 6 are assigned according to a Western Forest Products ecosite classification system completed in 1985. The results show that approximately 70 percent of the timber harvesting land base can be classified as good ecosites which corresponds to an average site index for western hemlock of approximately 28 metres at age 50. In 1992, the ecosite classification was reviewed by BCFS Research Branch and considered acceptable for the term of MP No. 8. However, before completion of MP No. 8, Research Branch reviewed the ecosite classification system again and accepted it but expressed concerns about its statistical validity and additional studies were recommended before the preparation of MP No. 9.

Given the large amount of research and development of ecosystem and biogeoclimatic classification systems over the last decade, it is reasonable to expect a continued

evolution and refinement of the ecosite classification system used for TFL 6. Taking this and the recommendations made by Research Branch into consideration, I believe the site indices used in the timber supply analyses are satisfactory for this determination. However, I wish to emphasize the importance of site productivity information in timber supply analysis and I have specified certain conditions in my approval of MP No. 8.

- Volume projections for regenerated stands

As with the existing second growth stands, Western Forest Products projected the development for future stands on TFL 6 using the TIPSYP model for Douglas-fir stands, the VDYP model for amabilis fir and mixed deciduous stands, and their own local tables for western hemlock, sitka spruce, cedar and cypress stands. These projections were reviewed and accepted by BCFS Research Branch in July 1991 and then reaffirmed in December, 1994. The volume estimates from these tables are comparable to volume projections for similar stands using the TIPSYP model. It was brought to my attention by BCFS Silviculture Branch that the actual initial stand densities on TFL 6 average approximately 5 000 stems per ha whereas the projections modeled assume an initial stand density of approximately 1 500 stems per ha. The implication is that unless more spacing intervention is planned, the regenerated stands will not attain the minimum harvestable diameter as early as projected in the yield curves. However, I also note that the possible difference in initial stocking will not significantly affect total volume production. I have instructed that during the term of MP No. 8 the company prepare yield curves which more accurately reflect the conditions of the stands being modeled. For now I am satisfied that the possibility of optimistic diameter growth for regenerated stands will not affect the volume of timber harvestable in the short term.

- Minimum harvestable ages

Minimum harvestable ages on TFL 6 were established at the age that trees reach the size which Western Forest Products considers suitable for the products they wish to produce. The size was set at a minimum diameter at breast height of 45 centimetres on the best sites, 40 centimetres on the moderate sites, and 35 centimetres on the poorer sites. Trees that never reach 35 centimetres diameter at breast height are projected to be harvested between ages 190 and 205 years. This results in minimum harvestable ages that range from 55 to 205 years depending on species, site productivity and stand management practices.

In most unspaced stands the required minimum harvestable diameter is reached after the culmination of mean annual increment. The practice of harvesting these trees when they reach a certain size rather than at the time when their average rate of growth is at the maximum results in the volume of wood available in the long term being reduced by approximately one percent. Given the link between existing management objectives and minimum harvestable ages, as well as the insensitivity of long-term timber supply to the harvest ages, the ages used in the analysis are acceptable for use in this determination.

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

Regeneration delay

The Western Forest Products timber supply analysis reflected the commitments of MP No. 8 which assumed a regeneration delay of 2 to 3 years on excellent and good ecosites, and 5 years on moderate, low and very low ecosites. While these delays are comparable with delays in other adjacent management units, I caution the licensee that any further delays may cause them not to meet their cutblock adjacency requirements under 7(3)(a)(v) below.

Impediments to prompt regeneration

I note a certain challenge associated with managing cedar regeneration on salal sites. However, I do not have any specific concern that would affect this determination due to this factor, since I am also aware that the management of these sites is improving.

Not-satisfactorily-restocked areas

The amount of area considered not-satisfactorily-restocked (NSR) is approximately equivalent to the amount of area harvested on the TFL during a three-year period. MP No. 8 commits to restocking all the NSR areas more than 5 years old by the end of 1996. Staff in the Port McNeill Forest District office will be monitoring compliance with this commitment since any lapse may make it difficult to achieve cutblock adjacency requirements as discussed under 7(3)(a)(v) below. I am satisfied that current practices were appropriately modelled for use in this determination.

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

Juvenile spacing

Over the last 4 years, approximately 380 ha per year of the TFL area occupied by immature stands have been spaced (a total of 1 524 ha). MP No. 8 includes the commitment to increase juvenile spacing activities to 700 ha per year subject to the availability of provincial and federal government funding. In the intensive silviculture simulation run, where spacing activity was doubled to 1 400 ha per year, there was no effect on either the short- or long-term harvest level. Although it is uncertain what level of spacing will actually be practised over time, I am satisfied the juvenile spacing program represented in the base case (700 ha per year) is acceptable since the modelling did not show any volume benefit attributable to a higher level of spacing on this TFL.

Commercial thinning

The licensee has no current plans to conduct commercial thinning operations. MP No. 8 includes a commitment to conduct a feasibility study of commercial thinning opportunities during the period of the plan. Even though it seems that commercial thinning may not be vital to avoid timber supply disruptions on this TFL because of the age structure, I do encourage the licensee to explore the possibilities since there may be opportunities to reduce the rate of decline to the long-term harvest level.

Fertilization

Western Forest Products fertilized 1 275 ha of nutrient-deficient sitka spruce stands in 1989 and 1990. These trees needed fertilization because they were planted on lower productivity sites better suited to growing western redcedar rather than the more nutrient-demanding sitka spruce. The licensee, quite properly, did not model any gain from fertilization of these stands since none was expected beyond what is normally obtained from sitka spruce growing on more suitable sites.

MP No. 8 includes a commitment to pursue funding to fertilize up to 700 ha per year of stands which were previously spaced. If this activity is undertaken, the implications can be considered in a future AAC review.

Genetically improved stock

Western Forest Products use genetically improved seeds from their seed orchards for their planting program. Even though the research literature suggests that one can expect volume gains of up to ten percent from such first generation stock, the company did not model any gains in their analysis. In my determination, I have considered the likelihood that long-term future yields will be higher than modeled for those areas planted with seedlings originating from their seed orchards. I have accounted for this factor in

Reasons for Decision.

Conversion and rehabilitation programs

As discussed under 7(3)(a)(i) above, the base case timber supply analysis is predicated on the conversion of 2 258 ha of deciduous and mixed deciduous/coniferous stands to pure conifers. Since there is no history of hardwood harvesting and no firm commitment in MP No. 8 to harvest these areas, BCFS staff are instructed to monitor the licensee's activities in these stands to determine whether these areas should be included in the timber harvesting land base in the next analysis. I have concluded that the impact of possible non-performance would be a slight downward influence on the long-term timber supply.

(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

MP No. 8 commits the licensee to comply with the utilization standards specified in the cutting permits. The timber supply analysis modeled Ministry of Forest's coastal utilization standards for existing and regenerated stands. Standards for existing mature stands require that all trees of at least 17.5 centimetres diameter at breast height be harvested and removed from the site; that no stumps be taller than 30 centimetres and that the top diameter of the stems taken be no larger than 15 centimetres. Standards for regenerated stands require the same maximum stump height but the top diameter is reduced to 10 centimetres, and trees as small as 12.5 centimetres diameter at breast height are required to be harvested and removed from the site. Current practices reflect the management plan commitments, and the standards modeled are reasonable and acceptable for use in this determination.

Decay, waste and breakage

The Western Forest Products yield tables used to project stand growth and yield incorporate factors for decay, waste and breakage which are comparable with the yield tables and estimates of decay, waste and breakage used and accepted by the BCFS. I am satisfied, therefore, that the timber yield estimates used in the analysis adequately account for factors of decay waste and breakage.

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

Integrated Resource Management (IRM) objectives

The Ministry of Forests is required by the *Ministry of Forests Act* to "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." The extent to which integrated management objectives for various forest resources and values affect the timber supply must be considered in AAC determinations.

- Resource inventories and assessments

A number of forest resource and attribute inventories and plans such as those for soil stability, hydrological assessment, wildlife habitat, stream classification, archaeological site, biodiversity, and total resource plans are either incomplete, or outdated. The inventory of environmentally sensitive areas is of particular concern as discussed under 7 (3)(a)(i) above. I hold the licensee to their MP No. 8 commitments to complete and update this information for use in the preparation of MP No. 9 and I emphasize the importance of this information to the next AAC determined for this TFL. For these

reasons I have specified certain conditions in my approval letter. Furthermore, I am prepared to re-determine the AAC of this TFL before the next scheduled determination date should the information from these inventories indicate that such action is warranted. In the meantime, I am satisfied that the risk associated with any uncertainty around these factors is accounted for in my determination.

- Cutblock adjacency

In MP No. 8, Western Forest Products is committed to waiting at least ten years before harvesting stands adjacent to a previous cutblock. The Forest Service expects that to achieve a desired spatial and temporal distribution of cutblocks within TFL 6, harvesting will need to conform to a four-pass system. This requires that at any time a maximum of 25 percent of the area may be covered by stands shorter than three metres (10 years of age for most of the stands on this TFL). Timber Resource Inventory Model (TRIM), the computer simulation model used to conduct the Western Forest Products analysis, is not capable of accounting explicitly for forest cover constraints. Forest Service staff therefore examined the outputs of the licensee's analysis for each decade and verified that the four-pass forest cover constraints can be met at the harvest levels indicated in the base case harvest forecast.

I am satisfied that objectives for cutblock adjacency can be achieved adequately and will therefore have no effect on the base case timber supply projections for this TFL.

- Visually sensitive areas

At the time the Western Forest Products timber supply analysis was conducted the inventory of visually sensitive areas was not complete. Visual Quality Objectives (VQOs) were therefore not directly addressed in the traditional manner in the licensee's timber supply analysis. However, in recognition of local sensitivity there were three "special management areas" identified where the licensee negotiated a "60-year rate of harvest" constraint with the local communities. In two of these three areas (Rumble Beach and West Coast) the harvest constraint is an attempt to address visual quality concerns. This constraint is equivalent to the partial retention forest cover objectives for a VQO zone. In addition, the licensee contends, and Port McNeill Forest District staff agree, that most of the more restrictive VQO areas are along the waterbodies where the forest is immature. Hence, constraints on these areas would not affect short-term timber supplies.

I am mindful that this analysis was done in 1992 before the BCFS staff had developed the procedures they now have in place for modelling visual quality concerns. However, it is my responsibility to account for VQOs, and in this AAC determination I conclude that proper accounting for VQOs on this TFL, which has significant areas of coastline, will put some downward pressure on timber supply in both the short- and long-term, in addition to what was explicitly modelled as discussed above. I have accounted for this factor in **Reasons for Decision**.

- *Biodiversity*

Neither MP No. 8 nor the Western Forest Products analysis were required to make, specific allowances for landscape- and stand-level management objectives for biological diversity such as forest ecosystem networks and wildlife trees. However, the Forest Practices Code require objectives and plans for the management of biodiversity. MP No. 8 anticipated Code requirements by including a commitment to prepare a biological diversity plan that incorporates the intent of the *Guidelines to Maintain Biological Diversity in Coastal Forests, December 1992* during the term of MP No. 8. I am satisfied that the preparation of a biodiversity plan as part of MP No. 9 will provide adequate information for consideration in the next AAC determined for this TFL. I also recognize that the management of biodiversity is likely to continue to be refined through plans, and hence management objectives are still uncertain. On this TFL I am concerned about the pressure, through the request for the logging partitions mentioned earlier, to use forest that would otherwise be able to contribute to biodiversity. The timber supply analysis incorporated no allowance for biodiversity, and I believe it is reasonable to expect that biodiversity management will reduce timber supply to some degree. Therefore, in **Reasons for Decision**, I conclude there is some downward pressure on timber supply both in the short- and long-term in order to account for biodiversity.

- *Riparian areas*

In comparison to many coastal areas, TFL 6 contains a greater-than-average number of fish-bearing streams and waterways. The licensee did not take into account the impact on wood supply of the Coastal Fish/Forestry Guidelines which were in place at the time this analysis was done. I hold the licensee to its commitment contained in MP No. 8 to complete by 1996 a classification of all streams in the TFL to standards set out in the *Forest Practices Code of BC Act*. Given that the Forest Practices Code is now being implemented, and that preliminary studies indicate that the constraints on timber supply from riparian management under the Code are expected to be greater than under the Coastal Fish/Forestry Guidelines, I expect that there will be very significant downward impacts on timber supply in both the short- and long-term. I have accounted for this factor in **Reasons for Decision**.

- *Community water resources*

The licensee has identified 32 "water sources" and one watershed which supports community use (Quatse Lake) within the TFL. The Quatse Lake watershed is the third of the three "special management areas" mentioned under *Visually sensitive areas* above where it was negotiated with the community that Western Forest Products will harvest the area over a 60-year period. In draft MP No. 8, the licensee undertakes "to ensure that all known drinking water sources are protected during harvesting and silviculture activities". Since it seems that community concerns can be addressed at the site specific level

through careful planning, I do not expect that the protection of drinking water sources will have any significant short- or long-term impact on wood supply for this TFL.

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

Timber supply profile

The timber supply analysis conducted by Western Forest Products assumes that harvesting will conform to the species mix of the forest. My main concerns regarding this factor are with the licensee's harvesting performance in moderate, low and very low ecosites, and with the conversion of deciduous stands. While I note that these concerns mainly affect the long-term harvest level, it should be understood that lack of performance in these areas may require review of whether these areas should continue to contribute to the timber harvesting land base.

Partitioned component of the harvest

As discussed under 7(3)(a)(i) earlier, the licensee has identified an opportunity to increase the harvest of wood by 10 200 cubic metres per year by operating in areas suitable for helicopter logging. Also under 7(3)(a)(i), Western Forest Products identified an opportunity to harvest an additional 26 000 cubic metres of wood per year in lower ecosite areas not included in the base case timber harvesting land base. I consider these requests, along with all the other factors affecting the base case harvest flow projections, under **Reasons for Decision**.

(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 TFLs that have a large old-growth component, such as TFL 6. In the short term, the presence of large volumes of older wood permits harvest levels above long-term levels without compromising the stability of future timber supply. In keeping with the objectives of good forest stewardship, AACs in British Columbia have been and continue to be determined to ensure that current and mid-term harvest rates will be compatible with a smooth and orderly transition toward the usually (but not always) lower long-term harvest rates. Thus, timber supplies should remain sufficiently stable that there will be no inordinately 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 immediate social and economic impacts.

Western Forest Products' base case, option 1D, shows that beginning at 1 258 750 cubic metres per year and with an average decline in harvest levels of six percent per decade, the existing old growth will last for approximately five decades. After this time the

projected harvest volume remains steady and is comprised mainly of second growth timber. This smooth and gradual decline in harvest levels satisfies my objectives described above.

Community dependence on the forest industry

Residents of Port Alice, Holberg, Port Hardy and Port McNeill depend to varying degrees on the economic activity generated by TFL 6. Public review of MP No. 8 revealed many concerns regarding the economy and jobs in the northern part of Vancouver Island. In addition to the licensee's sawmills on the island and lower mainland, the Port Alice pulpmill depends greatly on wood from TFL 6. In making my determination, I am aware of the dependence of these communities on timber harvesting and processing activities on TFL 6.

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

Timber processing facilities

Most of the wood harvested from TFL 6 is transported to Western Forest Products' mills located on Vancouver Island and the lower mainland. These mills have a combined demand of about three million cubic metres per year, two thirds of which is met from TFL 6 and other licences held by Western Forest Products. The balance of the wood required for the mills is purchased on the open market. The licensee portion of the TFL 6 AAC represents approximately 35 percent of Western Forest Products mill requirements.

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

Minister's letter

The Minister has expressed the economic and social objectives of the Crown for the province (letter to former Chief Forester John Cuthbert, dated July 28, 1994, attached as Appendix 2), and I understand these to apply to TFL 6. 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 also stated in his letter that "any decreases in allowable cut at this time should be no larger than are necessary to avoid compromising long-run sustainability". He placed particular emphasis on the importance of long-term community stability and the continued availability of good forest jobs. To this end he asked that the Chief Forester consider the potential impacts on timber supply of commercial thinning and harvesting in previously uneconomical areas. The latter would likely require the use of

alternative harvesting systems, and to encourage this the Minister suggested consideration of a partitioned AAC.

I have considered the potential impacts on timber supply of commercial thinning as discussed under 7(3)(a)(iii) above where I encouraged the licensee to explore the opportunities for commercial thinning. I will also consider the licensee's requests for partitioned harvesting in previously uneconomical areas and forest types. Finally, the licensee made a tentative commitment to harvest alder and other deciduous species and plant coniferous species on those sites.

Local objectives

Public review of MP No. 8 resulted in a number of concerns about management objectives and harvesting practices in the TFL. I have considered the input received and I am mindful of the many views which were brought forward. This information was thoroughly reviewed at the AAC determination meeting and, where possible is addressed in this determination. I also encourage the licensee to review these concerns and address them in the implementation of MP No. 8 and in the preparation of MP No. 9.

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

Normal unsalvaged losses

MP No. 8 includes the commitment to, when practical or as directed by the Regional Manager, conduct salvage operations to recover timber damaged by fire, wind, insects or disease. Nevertheless, it is unlikely that salvage operations would reclaim all the damaged timber on the TFL. The Western Forest Products analysis and MP No. 8 do not include any estimates of unsalvaged losses expected to occur as a result of fire, wind, insects or disease. I consider it unreasonable to project no losses of this kind, and as part of this determination, in order to account for losses that can reasonably be expected to occur, I have examined estimates of similar losses for the nearby Kingcome TSA.

Unsalvaged losses from fire, wind, insects and disease in the Kingcome TSA were estimated to be about 0.6 percent of the current AAC. By applying the same proportionate estimate of unsalvaged losses to projected timber supply in TFL 6, unsalvaged losses in the TFL should be between 7 000 and 8 000 cubic metres per year. These losses represent a very small downward pressure on timber supply throughout the projection period and is accounted for in **Reasons for Decision**. In my letter approving MP No. 8, I have requested that the licensee ensure that unsalvaged losses are quantified and an estimate included in MP No. 9.

Reasons for Decision

In reaching my decision on the determination of an AAC for TFL 6, I have considered all of the factors presented above and have reasoned as follows.

The base case timber supply projection (option 1D) conducted for TFL 6 indicates that a timber harvesting land base of 121 918 ha could support a harvest of 1 258 750 cubic metres per year for the first decade. Timber supply then declines by approximately six percent per decade for five decades until the long-term harvest level of 967 780 cubic metres per year is reached.

As discussed earlier, certain data gaps and uncertainties, management practices and timber supply analysis procedures have caused me to adjust the estimate of timber supply indicated in the base case. Downward pressures on both short- and long-term timber supply are created by proper consideration for riparian areas, biodiversity, visually sensitive areas, and normal unsalvaged losses. Short-term downward pressure on timber supply is also caused by the company harvesting for five years at the current AAC. In addition, a small amount of risk to long-term timber supply stems from uncertainty that harvesting in deciduous forest and replanting those areas with coniferous species will actually occur.

Upward pressure on timber supply in the short-term results from the licensee's willingness to use helicopters to harvest in previously inoperable areas, and to harvest (by conventional means) in the lower ecosite areas. Long-term upward pressure on timber supply also results from harvesting in previously inoperable areas and from use of genetically improved seed in the licensee's planting program.

There are many different ways to evaluate downward or upward pressures on the timber supply. The harvest flow projection in the base case is one which reflects a projection based on a certain set of assumptions. My response is guided by statements made throughout this document and particularly under *Guiding principles for AAC determinations*, *Harvest flow* and *Minister's letter*. In the case of this TFL, considerable flexibility in harvest flow is afforded by the fact that more than 40 percent of the timber harvesting land base is still occupied by mature forest and that there is good representation of second-growth forest in the 40- to 90-year age-classes. In my evaluation, I have concluded that there is a small net downward pressure on timber supply. However, I am satisfied from the information presented that the additional effect on the timber supply of the downward pressures I list above which were not reflected in the base case, can be accommodated by a steeper, yet acceptable decline in harvest levels over time to a slightly lower long-term level.

In part, this decline has been anticipated by setting the initial harvest level in the base case below the current AAC and through consideration of partitioned harvests. In view of the considerable community dependence on harvesting activities in this TFL, and the flexibility in harvest flows mentioned above, I see no compelling reason for moving from the initial harvest level established in the base case.

The request to harvest by helicopter 10 200 cubic metres per year from previously inoperable areas is reasonable and is included as a partition in my determination. Aside from the reservations mentioned under *Biodiversity*, I am willing to consider the request for a partitioned

harvest in the lower ecosite areas but I am concerned about a potential administrative problem. One third of the moderate, low and very low ecosite areas is already in the conventional timber harvesting land base. The contribution of this third is approximately 26 000 cubic metres per year. Forest service staff will be unable to determine whether lower ecosite wood should be attributed to the partition or to the regular cut. I am therefore deducting 26 000 cubic metres from the regular cut and granting a partition of 52 000 cubic metres from these moderate, low and very low ecosite areas. Also deducted from the regular cut is an allowance of 7 000 cubic metres per year for unsalvaged losses.

It is my determination that a timber harvest level that accommodates objectives for all forest resources during the next five years, that provides for anticipated constraints during the implementation of the Forest Practices Code, that ensures longer-term IRM objectives can be met, that reflects current management practices, that avoids severe curtailment of locally established patterns of socio-economic activity based on timber harvesting, and that avoids disruptive shortfalls in future wood supply, can best be achieved in this TFL at this time by establishment of an AAC of 1 288 000 cubic metres of wood from coniferous species.

New AAC Determination

Effective December 1, 1995, the AAC for TFL 6, including Schedule A private lands and Schedule B land in the Small Business Forest Enterprise Program, will be 1 288 000 cubic metres. This AAC is partitioned as follows:

10 200 cubic metres from previously inoperable areas (helicopter logging);

52 000 cubic metres from moderate, low and very low ecosite areas;

and 1 225 800 cubic metres from the remainder of the timber harvesting land base. This AAC will remain in effect until a new AAC is determined, which must take place within five years of this determination.

Implementation of Decision

Although this AAC is expected to satisfactorily accommodate forest management and socio-economic objectives during the period in which it will be in effect, further study and information is required before the completion of the next management plan.

- The completion of resource inventories and assessments of environmentally sensitive areas, wildlife habitat, stream classification, archaeological sites, biodiversity and total resource plans is required before the next timber supply analysis as part of MP No. 8.
- As well, the completion of studies regarding the ecosite classification system, as recommended by Research Branch, is necessary before the next timber supply analysis is conducted in order to reduce uncertainty with respect to the productivity of the land base.
- Quantification of non-recoverable losses is also required so that they may be reflected with more certainty in salvage programs and management plan commitments.

- Forest Service staff will monitor the licensee's activities in deciduous and mixed deciduous/coniferous stands to determine whether the coniferous volume is removed and the area is planted with coniferous species in accordance with the commitments in MP No. 8. I also encourage the licensee to examine the feasibility of commercial thinning activities and expanded juvenile spacing, including the implications for minimum harvestable ages. Information about these activities will allow consideration in the next AAC determined for this TFL of opportunities to alleviate the rate of future timber supply declines.

This determination comes into effect on December 1, 1995 and will remain in effect until a new AAC is determined, which must take place within five years of this determination.

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

Larry Pedersen
Chief Forester

November 30, 1995

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.

Appendix 2: Minister's Letter to Chief Forester