

**BRITISH COLUMBIA  
MINISTRY OF FORESTS**

# **Tree Farm Licence 47**

Held by TimberWest Forest Limited

## **Rationale for allowable annual cut (AAC) determination**

**effective December 1, 1996**

**Larry Pedersen**  
Chief Forester

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## Objective of this document

This document is intended to provide an accounting of the factors I have considered and the rationale I have employed as Chief Forester of British Columbia in making my determination, under Section 7 of the *Forest Act*, of the allowable annual cut (AAC) for Tree Farm Licence (TFL) 47. The document also identifies where new or better information is required for incorporation into future determinations.

## Description of the TFL

TFL 47, currently held by TimberWest Forest Limited, consists of 18 geographically dispersed supply blocks which the licensee groups into five management units on Vancouver Island, the mainland coast, and the Queen Charlotte Islands. The TFL covers a total area of 221 151 hectares in four B.C. Forest Service (BCFS) forest districts, and prior to this determination supported an AAC of 711 000 cubic metres.

Of the total TFL area, 91 percent or 202 099 hectares are considered productive forest. Approximately 15 percent of the productive forest land base is considered by the licensee to be unavailable for timber harvesting due to poor quality or low volume timber, unmerchantable species, physically inoperable terrain, or requirements for protection of riparian habitat or environmentally sensitive areas. The licensee considers 170 738 hectares of the productive forest land base to be available for timber harvesting, representing approximately 77 percent of the total TFL area. (Note: Land base figures in this discussion are from the most up-to-date versions of the information package and analysis report referred to in "Information sources" below.)

The majority of the TFL is within the Coastal Western Hemlock biogeoclimatic zone and the most predominant tree species in the TFL is western hemlock. Slightly less than 80 percent of the TFL's timber harvesting land base is covered by stands younger than 70 years of age. More than 12 percent of the timber harvesting land base is covered by stands over 250 years of age. The timber harvesting land base contains almost no stands aged between 90 and 250 years old.

The five management units in the TFL are: Nanaimo Lakes; Courtenay; Johnstone Strait; Bonanza Lake; and Moresby Island. The Nanaimo Lakes management unit is located on eastern Vancouver Island and marks the southern extent of the TFL. The southern part of the Nanaimo Lakes unit runs in a north-westerly direction from Chemainus and is bounded in the north by Haslam Creek. The northerly part of the management unit runs west to east between Fourth Lake and the western side of Mount Benson. Its southern border includes the Nanaimo Lakes and River and it stretches to the north to approximately the same latitude as the City of Nanaimo. This unit surrounds or is in the vicinity of the communities of Nanaimo, Ladysmith, Chemainus and Duncan. The unit contains both mountainous and low-lying topography, including portions of both the East Coast Lowland and the Vancouver Island Range. This unit is primarily within the Coastal Douglas-fir, Coastal Western Hemlock, and Mountain Hemlock biogeoclimatic zones. Ninety-three percent of the Nanaimo Lakes unit is considered productive forest land, and 85 percent of the total area is considered available for harvest. The timber harvesting land base associated with this unit is 22 948 hectares in size, and represents slightly more than 13 percent

of total TFL timber harvesting land base. Harvesting in this area began between 50 and 60 years ago with railway logging operations.

The Courtenay management unit is located north of the Nanaimo Lakes unit on the northeastern side of Vancouver Island. It stretches from southwest of Comox Lake to the community of Courtenay in the northeast. The topography is also mountainous, but not especially rugged or steep. This unit surrounds or is in the vicinity of the communities of the Comox Valley—Courtenay, Cumberland and Comox. The Courtenay management unit falls entirely into the Coastal Western Hemlock biogeoclimatic zone. Ninety-two percent of the unit is considered productive forest and approximately 83 percent is considered part of the timber harvesting land base. The timber harvesting land base for this block is 22 728 hectares and represents more than 13 percent of the TFL timber harvesting land base. Harvesting in the Courtenay management unit began more than a half century ago with the use of railway logging operations. Forests in this area were also altered significantly by a fire in 1938.

The Johnstone Strait management unit is located north of the Courtenay management unit, on the islands and peninsulas that protrude into Johnstone Strait, which separates northern Vancouver Island and the British Columbia mainland. The unit extends along the strait to include the islands and portions of the mainland coast from the northwestern parts of Quadra Island in the south, to include Hanson Island in the north. This unit surrounds or is in the vicinity of Campbell River and Sayward. A significant component of harvesting operations in this management unit is camp-based. The management unit is characterized by coastline with mountainous, but not especially rugged or steep terrain. The majority lies within the Coastal Western Hemlock biogeoclimatic zone with small portions in the Mountain Hemlock zone. Ninety-two percent of the Johnstone Strait unit is considered productive forest and 81 percent, or 82 002 hectares, is considered part of the timber harvesting land base. This area represents almost half of the timber harvesting land base for the TFL as whole. Timber harvesting in this management unit began in the early 1900s along the coastline and moved inland as technological innovations allowed.

The Bonanza Lake management unit is located on Vancouver Island north of the Johnstone Strait management unit in the area surrounding Bonanza Lake. It lies immediately south of Telegraph Cove and is bounded by the heights of land that surround the lake. The communities of Port McNeill, and to a lesser extent, Alert Bay, Sointula, Beaver Cove and Telegraph Cove are associated with this management unit. The unit is contained within a valley formed by glacial processes and is classified within the Coastal Western Hemlock biogeoclimatic zone. Productive forest land makes up 84 percent of the Bonanza Lake unit, while 62 percent, or 23 358 hectares, is considered available for timber harvesting, representing almost 14 percent of the TFL timber harvesting land base. Harvesting operations started in this area in the 1940s.

The Moresby Island management unit is located on the southernmost of the two main islands of the Queen Charlotte group, and is northwest of Vancouver Island across Hecate Strait from Prince Rupert. The management unit lies on the northern end of Moresby Island and consists of three main drainages: Government Creek, Deena Creek and the Copper River. The community of Sandspit is immediately adjacent to the management unit and relies on economic activity associated with forestry in the area. Most of this unit lies within the rolling uplands of the

Skidegate Plateau ecosection which is known for high forest productivity. The majority of the Moresby Island unit is within the Coastal Western Hemlock biogeoclimatic zone. A small portion falls within the Mountain Hemlock zone, and even less lies within the Alpine Tundra zone. Over 95 percent of the Moresby Island unit is considered productive forest. About 73 percent, or 19 702 hectares, is considered part of the timber harvesting land base, constituting more than an eighth of the total TFL timber harvesting land base. The majority of the harvesting in this management unit has occurred within the last 50 years. Harvesting operations were initially shoreline-based in the Skidegate Inlet area, and then continued inland with the use of road-based harvesting operations.

## **History of the AAC**

TFL 47, the result of the amalgamation of TFLs 2 and 12 in 1985, was originally composed of the Duncan Bay Forest Management Licence (FML No.2) and the Hardwicke Forest Management Licence (FML No.12). FML No.2 was originally awarded in 1949 to Canadian Western Timber Company Limited and FML No.12 was originally awarded in 1952 to Bendickson Logging Company Limited. At the time that TFLs 2 and 12 were amalgamated to form TFL 47 both TFLs were held by Crown Forest Industries Limited. Under Management Plan (MP) No. 1, TFL 47 comprised 226 869 hectares and the licensee was authorized to harvest 1 090 000 cubic metres per year.

The harvest level was reduced at the beginning of 1991 to its current level based on improvements in timber supply analysis techniques that resulted in more reliable timber supply projections and significant new objectives for the management of visually sensitive areas and biodiversity and the implementation of the Coast Planning Guidelines, which addressed a number of integrated resource management objectives. In addition, the licensee was experiencing economic difficulty in the transition from harvesting old-growth to second-growth stands mostly due to the need to re-tool mills to the changing timber characteristics. Difficulty in demonstrating timber availability in development plans and 20-year plans supported the need for a harvest level reduction.

In December 1992, the TFL was reduced in size to cover a total of 221 151 hectares to coincide with the surrender by the licensee of approximately 5500 hectares to the Small Business Forest Enterprise Program which is administered through the Strathcona Timber Supply Area. Almost a third of the TFL is comprised of land owned privately by the licensee and areas specified under timber licences held by the licensee.

The current AAC of 711 000 cubic metres does not include a Small Business Forest Enterprise Program (SBFEP) component because land was withdrawn from the TFL to support separate administration of the program.

## **New AAC determination**

Effective December 1, 1996, the new AAC for TFL 47—including Schedule A and B land—will be 865 000 cubic metres. The 865 000 cubic metres will be partitioned as follows:

- 40 000 cubic metres is attributed to stands in the Nanaimo Lakes management unit;
- 100 000 cubic metres is attributed to stands in the Courtenay management unit;
- 425 000 cubic metres is attributed to stands in the Johnstone Straits management unit;
- 200 000 cubic metres is attributed to stands in the Bonanza Lake management unit; and •
- 100 000 cubic metres is attributed to stands in the Moresby Island management unit.

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 47 includes the following:

- TimberWest Forest Limited Tree Farm Licence 47 Draft Management Plan No. 2, originally submitted February 2, 1996 with revisions June 7, 1996;
- TimberWest Forest Limited TFL 47 Draft Management Plan No. 2, Timber Supply Analysis Report, submitted February 2, 1996, with revisions September 18, 1996;
- TFL 47 Twenty-Year Plan for Bonanza Lake Management Unit, prepared by TimberWest Forest Limited, submitted March 21, 1995;
- TFL 47 Twenty-Year Plan for Courtenay and Johnstone Strait Management Units, prepared by TimberWest Forest Limited, and both submitted July 11, 1995;
- TFL 47 Twenty-Year Plan for Moresby Island Management Unit, prepared by TimberWest Forest Limited, submitted August 25, 1995;
- TFL 47 Twenty-Year Plan for Nanaimo Lakes Management Unit, prepared by TimberWest Forest Limited, submitted January 3, 1996;
- TimberWest Forest Limited TFL 47 Information Package, submitted July 13, 1995 with revisions November 10, 1995, and September 18, 1996;
- TimberWest Forest Limited TFL 47 Yields for Existing Stands, February 8, 1996 and Yields for Managed Stands, January 31, 1996;
- TimberWest Forest Limited Tree Farm Licence 47 Statement of Objectives, Options and Procedures, July 31, 1989;
- TimberWest Information Report No.1 — TFL 47 Management Plan No.2: The role of rotation length assumptions in timber supply. June 12, 1996;
- TimberWest Information Report No.2 — TFL 47 Management Plan No.2: Density management: assumptions in timber supply analyses and relationships to future product opportunities. June 12, 1996;
- TimberWest Information Report No.3 — TFL 47 Management Plan No.2: Relationships between yield analysis assumptions, harvest strategies and stand management practices. June 12, 1996
- Summary of the public input solicited by the licensee regarding the contents of TFL 47 Management Plan No. 2;
- Letter from the Minister of Forests to the Chief Forester, dated July 28, 1994, stating the Crown's economic and social objectives;

- Memorandum from the Minister of Forests to the Chief Forester, dated February 26, 1996, stating the Crown's economic and social objectives regarding visual resources;
- Technical review and evaluation of current operating conditions through comprehensive discussions with Forest Service (BCFS) and British Columbia Environment staff, July 17 and 18, 1996;
- *Forest Practices Code of British Columbia Act*, July 1995;
- *Forest Practices Code of British Columbia Regulations*, April 1995; and
- *Forest Practices Code Timber Supply Analysis*, Ministries of Forests and Environment, Lands and Parks. February, 1996.

### **Role and limitations of the technical information used**

The *Forest Act* requires me as Chief Forester to consider biophysical as well as social and economic information in AAC determinations. A timber supply analysis and the inventory and growth and yield data used as inputs to the analysis formed the major body of technical information used in my AAC determination for TFL 47. The timber supply analysis is concerned primarily with biophysical factors—such as the rate of timber growth and definition of the land base considered available for timber harvesting—and with management practices.

However, the analytical techniques used to assess timber supply are simplifications of the real world. There is uncertainty about many of the factors used as inputs to timber supply analysis due in part to variation in physical, biological and social conditions—although ongoing science-based improvements in the understanding of ecological dynamics will 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 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 47, I have considered known limitations of the technical information provided, and am satisfied that, accounting for the concerns listed in the above paragraph, the information provides a suitable basis for my determination. In particular I have taken the following into account:

- reductions in starting harvest levels were used to represent the impacts of managing for some non-timber values. The starting levels were therefore not the maximum levels achievable given the available inventory, growth and yield, and management information. The reductions were an attempt to estimate the outcomes of analysis, and to compensate for not incorporating management for some non-timber values into the timber supply analysis through land base or stand yield reductions or forest cover requirements. However,



- alternative harvest forecasts submitted by the licensee provided useful information on timber supply flexibility in the short term, which I discuss below under Harvest flow.
- initial analysis-related submissions by the licensee were not clear on whether or not forest ecosystem network (FEN) linkages were deducted from the timber harvesting land base. Revised submission clarified that, while areas were proposed for FEN linkages, area had not been deducted in derivation of the harvesting land base. This information is incorporated into this decision.
  - several of the timber supply projections submitted as part of the analysis show moderate disruptions in the long term harvest level. These disruptions indicate that the long-term harvest levels are slightly lower than shown in the harvest projections. Submitted results still provide sound information on timber supply, particularly over the short and medium terms.

## 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 are:

- (i) minimizing risk, in respect of which, in making AAC determinations, I consider the uncertainty associated with the information before me, and attempt to assess the various potential current and future social, economic and environmental risks associated with a range of possible AACs; and
- (ii) redetermining AACs frequently, to ensure they incorporate up-to-date information and knowledge—a principle that has been recognized in the legislated requirement to redetermine AACs every five years. The adoption of this principle is central to many of the guiding principles that follow.

In considering the various factors that Section 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 and BC Environment, 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 47. 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 Vancouver Island Land-Use Plan, it may not always be possible to analyze the 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 overall impact of the land-use decision. However, where specific protected areas have been designated by legislation or order in council, these areas are no longer considered to contribute to timber supply. The legislated requirement for five-year AAC reviews will ensure that ongoing plan implementation decisions are addressed.

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 aboriginal rights. 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) 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*.

## **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 licensees.

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 computer simulation model, timber supply forecasts are produced. These include sensitivity analyses of changes in various assumptions around a baseline option, normally referred to as the "base case" forecast, which forms the basis for comparison when assessing the effects of uncertainty on timber supply.

The base case forecast represents only one in a number of theoretical forecasts, and may incorporate information about which there is some uncertainty. Its 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.

### **Timber supply analysis**

The timber supply analysis for TFL 47 that I have considered in making this determination was undertaken by the licensee and reviewed by BCFS staff. TimberWest Forest Limited used a timber supply simulation model, which they have been developing since 1992. The December 1995 operational version was used, to generate the harvest forecasts contained in the timber supply analysis. While the specific workings of their model differ from those of the BCFS simulation model, the TimberWest model incorporates the same general processes of forest growth and harvest under specified management regimes. I find these projections of timber supply reasonable for consideration as part of this determination.

In addition to a base case option intended to represent the management regime currently practiced on the TFL by TimberWest Forest Limited, the analysis also examined the effect on

timber supply of varying many of the assumptions and estimates used. These sensitivity analyses have been of assistance in my determination, as discussed in my considerations below.

The timber supply analysis base case for the entire TFL projects that under current management assumptions, harvesting could increase over the next two decades by approximately 42 percent from an initial harvest level of 866 570 cubic metres per year (22 percent above the current AAC) to a long-term harvest level of 1 233 310 cubic metres per year.

The base case harvest forecast for the entire TFL is, in fact, the sum of separate base cases generated for each of the five management units that comprise the TFL. Most of my considerations focus on the base cases for the separate management units.

The base case harvest forecasts for Nanaimo Lakes, Courtenay and Johnstone Strait management units have similar characteristics. The initial rates of harvest projected for these units represent significant increases from current rates. The harvest forecasts for all of these units also project that timber supply will continue to increase to higher long-term levels. As discussed under "Description of the TFL" above, harvesting in parts of these units has been underway for some time and, will soon shift to regenerated stands. Available timber yield information suggests these stands will yield high volumes per unit area.

The initial harvest rate projected for the Nanaimo Lakes management unit is approximately 26 percent of the long-term harvest level for the unit. For the Courtenay and Johnstone Strait units the initial levels are 58 percent and 73 percent respectively of the projected long-term levels for these units. In all three forecasts the transition to higher long-term harvest levels is projected to occur over the next two decades. Together these three management units contribute approximately 65 percent of the short-term timber supply for the TFL and almost three-quarters of the TFL's timber harvesting land base. The harvest forecast for the Johnstone Strait unit shows temporary shortfalls below the long-term harvest level in decades 12 and 18, suggesting that the actual sustainable long-term level is slightly lower than projected.

The base case harvest forecast for the Moresby Island management unit shares some common characteristics with the forecasts described above. The base case indicates that timber supply will increase over the next 20 years. The initial harvest level forecast for the unit is approximately 64 percent of the projected long-term level. The harvest forecast projects temporary shortfalls below the long-term harvest level during decades 7 and 18, suggesting that the actual sustainable long-term level is slightly lower than projected. However, the Moresby Island timber supply differs from those of the Nanaimo Lakes, Courtenay and Johnstone Strait units in that the initial harvest level projected for the Moresby Island unit is 24 percent below the current harvest level. The Moresby Island management unit provides slightly less than 12 percent of the projected initial harvest for the TFL, which closely mirrors the contribution of unit to the TFL timber harvesting land base.

Bonanza Lake is the only unit for which a decline from short-term harvests to the long-term level is projected. Also, the initial harvest level projected for the management unit is approximately one percent less than the current level. The base case projects a decrease of approximately

14 percent over the next two decades from the initial harvest level to the long-term level. The Bonanza Lake unit is projected to contribute almost a quarter of the initial harvest level for the TFL. As the high volume old-growth timber that is available for harvest in this unit is utilized, the projected harvest declines to a long-term level that is about 14 percent of the TFL long-term level, proportionate to the unit's contribution to the overall timber harvesting land base.

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## **Consideration of factors as required by section 7 of the *Forest Act***

### ***Forest Act, Section 7 (3)***

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

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

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

#### Land base contributing to timber harvest

The land base that is considered available for timber harvesting is limited by a number of factors related to economics, terrain and management for non-timber values. 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. The total area of TFL 47 is 221 151 hectares. The current timber harvesting land base, as defined for the base case, is 170 738 hectares, or approximately 77 percent of the total TFL area. I note that concerns have also been raised by BCFS staff regarding the protection of riparian areas, which are discussed below, and concerns have been raised by BCFS and Ministry of Environment, Lands and Parks staff regarding the protection of areas for purposes other than timber production, which are discussed under Integrated resource management objectives below.

#### *- economic operability*

Stands in TFL 47 were evaluated by the licensee to determine if they would support economically viable harvest operations. The licensee timber supply analysis assumes that stands are economically operable if they contain a timber volume greater than 250 cubic metres per hectare or are adjacent to a higher-volume stand. In addition, the majority of the trees in the stand must be of sufficient size and timber value to allow milling of relatively knot- and twist-free lumber. Some stands which did not meet these criteria were also considered economically operable by the licensee on the basis of an individual evaluation of the amount of area the stand covers, its timber volume, species composition, timber value and associated logging costs. Stands that were considered economically operable on the basis of this evaluation were included in the timber

harvesting land base. In addition to economic criteria based on timber characteristics, some areas were deemed inoperable due to inaccessibility based on aerial reconnaissance. In total, 15 565 hectares, or about seven percent of the TFL area, were deducted because of inoperability (inaccessibility or low timber quality). These criteria and their application to TFL 47 were reviewed and accepted by forest district staff.

I acknowledge that the economic operability criteria assumed as part of the timber supply analysis indicate a departure from previous assumptions for this TFL, and result in an expansion of the area that is considered operable. However, I am prepared to accept them as part of the licensee's proposed management regime based on evaluation of their analysis and strategies for harvest of second-growth. To ensure that operations coincide with analytical assumptions, I have specified certain conditions in my approval of MP No.2 to provide for monitoring of harvest operations. This will allow a thorough evaluation of the merits of these criteria and further consideration as part of the next management plan and AAC determination for this TFL.

I am satisfied that the economic operability assumptions included in the timber supply analysis provide an adequate representation of economic and operational concerns for consideration in this determination.

*- deciduous stands*

Stands dominated by broadleaf deciduous species, (deciduous-leading stands), comprise a relatively small part of the TFL 47 timber harvesting land base. The largest concentrations of deciduous-leading stands occur in the Johnstone Strait and Courtenay management units, where they represent less than five percent of the timber harvesting land base in those units. The licensee has demonstrated that harvest of deciduous-leading stands is economically feasible in the Johnstone Strait unit, but elsewhere in the TFL, deciduous components of stands have usually been felled but not harvested.

MP No.2 commits to harvesting alder-leading stands, in response to a requirement by the regional manager of the Vancouver Forest Region that alder-leading stands be harvested in proportion to their contribution to the timber supply projected in the licensee's analysis.

Although viable harvest operations in deciduous-leading stands have not been demonstrated throughout the TFL, alternative harvest forecasts in which the initial harvest rates in each management unit were elevated above the base case levels, indicate that the short-term harvest levels projected in the base case forecasts do not depend on the harvest of deciduous-leading stands. Given these results, and management plan commitments, in combination with conditions I have specified in my approval of MP No.2, I am comfortable that the inclusion of deciduous-leading stands in the timber harvesting land base does not introduce unreasonable risk to future timber supplies.

Harvesting in these stands should be balanced over the term of MP No.2 and special attention should be paid to the contribution of these stands to biological diversity in TFL

47. Harvesting performance in these stands will be evaluated critically as part of the next analysis and determination for this licence. The need for a more formal arrangement, such as a partitioned harvest, for these stands may be considered as part of that evaluation.

For the purposes of this determination, I consider the assumptions for deciduous stands used in the timber supply analysis to be reasonable. Inclusion of deciduous stands in the timber harvesting land base should lead to their increased utilization in this TFL.

*- environmentally sensitive areas (ESAs)*

In the timber supply analysis, after deductions for non-productive forest and inoperability, 9193 hectares, about four percent of the total TFL area, were considered unavailable for timber harvesting due to environmental sensitivity. Environmental sensitivity classifications included soil, recreation, potential regeneration difficulties, fish buffers, wildlife habitat and avalanche risk. Areas were also classified as to the degree of sensitivity to harvesting or importance to protecting a particular value. All or parts of ESAs were deducted from the timber harvesting land base depending on the classification and sensitivity. I have reviewed the ESA designations for each management unit as well as the percentage deductions applied to each category, and find them generally acceptable for use in this determination. Further discussion of some of the environmental sensitivity deductions is included below under Impediments to prompt regeneration, *riparian areas*, *wildlife habitat*, and *recreation resources*.

*- roads, trails and landings*

The construction of roads, trails and landings necessary for timber harvesting usually results in some loss of productive forest land. The estimates used in the timber supply analysis for area lost to roads, trails and landings were derived using licensee road summaries from their annual reports, and were applied to stands less than 40 years of age (less than 60 years in Nanaimo Lakes). The estimates ranged from 2.7 percent to 5.2 percent depending on the management unit. It was assumed that the same reduction factors will account for roads, trails and landings constructed in the future.

Based on a review of recent silviculture prescriptions and records, forest district staff administering the Bonanza Lake, Johnstone Strait and Moresby Island management units expect losses to be larger than projected in the timber supply analysis. This review provides a better indication of the full extent of disturbance on individual sites because the silviculture information includes impacts from blading, landings and skid trails, as well as estimates of associated road bed width and toe-of-fill to top-of-cut measurements. The licensee's road summaries focus primarily on length of road constructed and do not account fully for the impacts associated with harvesting, which are addressed in the silviculture information.



An underestimate of losses associated with existing roads, trails and landings would lead to an overestimate of the size of the future timber harvesting land base and consequently, an overestimate of medium- and long-term timber supply. In my view, this possible underestimation presents little risk to the short-term timber supplies projected for TFL 47.

The projection of losses resulting from roads, trails and landings is also a matter of uncertainty in other areas of the province. I have directed BCFS staff and other licensees to examine procedures used to estimate the area lost to roads, trails and landings to help reduce uncertainty associated with these estimates, and provide a consistent approach to the estimation of losses. This direction is also appropriate in the case of TFL 47.

For the purposes of this decision, I consider the licensee's estimates to underestimate actual losses to roads, trails and landings, which will affect long-term timber supply. I have discussed the implications of underestimated losses below under "Reasons for decision".

#### Existing forest inventory

##### *- general comments*

The last complete inventories conducted for TFL 47 management units occurred between 1966 and 1970. Since then, a number of smaller inventory projects have been conducted. In 1983 slightly more than 10 000 hectares of old-growth stands in the Johnstone Strait management unit were inventoried. In addition, a re-inventory of approximately 7000 hectares of deciduous stands in the Johnstone Strait management unit was conducted in 1994. These inventory updates were available for use in the timber supply analysis for TFL 47. Inventory work was done for approximately 23 000 hectares of mature and immature forests in the Courtenay, Bonanza Lake and Moresby Island management units in 1990. These results are part of a larger re-inventory process. The data was not ready to be transferred into the licensee's geographic information system for use in this determination.

MP No.2 indicates that biogeoclimatic mapping of zones, subzones, variants and site series, is underway and will be completed in 1997.

An audit of inventory information for the Johnstone Strait management unit was conducted in the summer of 1995, the results of which are discussed under *volume estimates for existing stands* below.

The inventory information used to generate the forecasts in the timber supply analysis were updated to reflect forest growth and depletion resulting from harvesting and natural causes up to the end of 1993. This means that some of the timber supply shown in the base case forecasts has been depleted. However, some growth that has occurred during that time has not been reflected. Overall, I believe the vintage of the file updates does not

have significant implications for this determination, and I consider the current inventory to represent the best available information for consideration in this determination.

*- age class structure*

Approximately 80 percent of the timber harvesting land base of TFL 47 is covered by stands that are currently younger than 70 years old, and more than 12 percent is covered by stands currently older than 250 years old. There are few stands in the timber harvesting land base that are currently between 90 and 250 years old.

The stand age-class structures of the timber harvesting land base in the Nanaimo Lakes and Courtenay management units are very similar. Over 90 percent of the timber harvesting land base in both of the units is covered by stands younger than 60 years old. There are few stands in the Nanaimo Lakes and Courtenay units older than 250 years of age. As discussed below, because of the limited number of old-growth stands in these units, careful planning is required to ensure options are retained for maintaining biological diversity.

The Bonanza Lake management unit contains the largest proportion of old stands in the TFL. More than a third of the timber harvesting land base in this management unit is covered by stands older than 250 years of age. The remainder is covered almost entirely by stands younger than 60 years old. There are very few stands aged between 60 and 250 years in the Bonanza Lake unit.

The stand age-class structure of the Moresby Island timber harvesting land base is similar to that of the Bonanza Lake unit, but contains a smaller proportion of old stands. A quarter of the timber harvesting land base of the Moresby Island unit is covered by stands older than 250 years. The remainder of the Moresby Island timber harvesting land base is younger than 50 years of age. Less than two percent of the timber harvesting land base of the Moresby Island unit is covered by stands currently aged between 50 and 250 years.

Almost three-quarters of the Johnstone Strait timber harvesting land base is covered by stands younger than 70 years old. Approximately 15 percent of the timber harvesting land base of this unit has stands between 70 and 250 years old, and the remainder of the land base, approximately a tenth, is currently covered by stands over 250 years old.

The limited presence of old-growth stands in parts of the TFL creates some concerns related to the maintenance of biodiversity. These concerns, and related sensitivity analysis are discussed under *wildlife trees* and *forest ecosystem network*, below.

*- species profile*

Western hemlock-leading stands predominate in the TFL 47, covering almost half of the timber harvesting land base. Douglas-fir-leading stands are the second most common; covering almost a third of the timber harvesting land base. Western redcedar, deciduous

and spruce dominated stands cover approximately 5 percent, 4 percent and 3.5 percent of the TFL timber harvesting land base, respectively.

The tree species distribution in each management unit varies from the overall TFL distribution reflecting the different biogeoclimatic characteristics of each unit. Western hemlock predominates in all but the two southern-most management units (Courtenay and Nanaimo Lakes). Douglas-fir stands cover almost two-thirds of the timber harvesting land base in the Nanaimo Lakes unit and even a greater proportion in the Courtenay unit. Spruce stands cover almost a third of the Moresby Island management unit's timber harvesting land base. The relevance of this is discussed under *minimum harvestable age* and *harvest profile* below.

- *volume estimates for existing stands*

Volume estimates for existing stands in TFL 47 were projected by two methods depending on the age of the existing stand. Volumes for existing stands over 200 years of age were estimated using average volume lines. Volumes for existing stands between 40 and 200 years old were estimated using the Variable Density Yield Prediction (VDYP) model. Volume estimates for stands younger than 40 years old are discussed under *volume estimates for regenerated stands* below.

Average volume lines for existing stands over 200 years old were generated from inventory plot measurements in each of the management units and were accepted for use in the timber supply analysis by the BCFS Resources Inventory Branch.

TimberWest Forest Limited indicates that average volume lines used in the Bonanza Lake management unit may overestimate actual existing volumes by approximately eight percent. This observation is based on preliminary investigation into inventory work that began in 1989, and on comparisons with volumes determined through log measurements made during scaling. Also, licensee estimates of volume loss to decay, waste and breakage, based on field observations (timber cruises), are higher than the standard factors employed by the BCFS. These observations are not based on a rigorous statistical study, and constitute a fairly small sample. Consequently they do not provide conclusive evidence that timber yields are lower than estimated for the base case. However, given the stand age composition of the Bonanza Lake unit, the possibility that existing stand volumes may be lower than estimated creates some risk to short- and medium-term timber supply, which I have reflected in "Reasons for decision." The re-inventory process for the Bonanza Lake management unit should be completed in 1997. It is anticipated that a BCFS inventory audit of this unit will be performed in 1998. The audit should provide a more sound basis for examining existing stand volumes in the future.

Sensitivity analysis shows that if volumes in Bonanza Lake stands were eight percent lower, medium term timber supply would be reduced by five percent from base case levels. The sensitivity analysis indicates some flexibility in the medium term to absorb

any downward influences of possible volume overestimation without affecting short-term timber supply, which suggests there are few risks associated with awaiting the inventory and audit results.

Volume estimates for existing stands between 40 and 200 years old in TFL 47 were developed using VDYP. VDYP is based on information gathered from a large number of sample plots, and is generally accepted in British Columbia as an adequate model for projecting volumes in existing stands. Therefore, in general, in the absence of statistically valid contradictory evidence for a particular area, I rely on VDYP estimates for existing stand volumes.

In the case of TFL 47, however, there is concern that the method in which the licensee used VDYP may have resulted in underestimates of stand volumes relative to estimates that would result with standard methods.

The licensee derived yield information for individual forest cover polygons by combining pure species yields tables according to the proportional species composition of the polygon. Resources Inventory Branch indicated that this is not the way VDYP was designed to be used, and that projected yields would likely be underestimated as a result. In general, a multiple-species stand is expected to have a different volume than several single-species stands of the same age and same combined area. The results of the recently completed inventory audit conducted for the Johnstone Strait management unit confirm this expectation. The results indicate that, on average, the volume estimates generated using the licensee's method underestimate actual stand volumes by approximately 19 percent. Moreover, subsequent tests conducted by Resources Inventory Branch indicate no statistical difference between the yields generated using licensee inventory information together with the conventional VDYP method, and actual stand volumes derived from the audit. Therefore, it appears that the method in which VDYP was employed was responsible for the bulk of the volume underestimation.

The timber supply implications of volume underestimates for stands currently aged between 40 and 200 years have not been investigated fully for the entire TFL. However, it is reasonable to consider that underestimated volumes exert an upward pressure on timber supply as projected in the base case for the Johnstone Strait management unit. It is unknown whether a similar situation as indicated for the Johnstone Strait management unit exists in the Nanaimo Lakes or Courtenay management units where similar species dominate and a similar volume estimation method was used. Given the age composition of these units, higher volumes in stands in the 40 to 200-year range could add flexibility to both short- and medium-term timber supply. However, I cannot determine whether results for Johnstone Strait apply in other units, and have therefore made no adjustments to my assessment of timber supply based on the possibility of volume underestimates for these units.

For the purposes of this determination, I consider the underestimation of volumes for stands between 40 and 200 years old as an upward pressure on timber supply projected in

the base case in the Johnstone Strait management unit. I discuss this under "Reasons for decision" below. I have concerns regarding existing volumes in other management units and age ranges, however, evidence is not sufficient for me to justify timber supply adjustments. New inventory information and audit results should assist assessment of existing stand volumes in future determinations.

### Expected rate of growth

#### *- site productivity estimates*

Site productivity influences the ability of a site to grow trees and is usually expressed in terms of "site index". Site index is based on the height, as a function of the age, of a particular stand of trees. The productivity of a site largely determines how quickly trees will grow, and therefore affects the time seedlings will take to reach green-up conditions, the volumes of timber that will grow, and the age at which stands will satisfy mature forest cover requirements and reach a merchantable size or minimum harvestable age.

In the absence of actual height information with which to derive polygon-specific site index, the licensee, in consultation with the BCFS Research Branch assigned polygon site index using height class information available in the inventory file, and derived site indexes using current BCFS site index curves.

Past growth of both very young and old stands may not reflect accurately the productivity of a site. In very young stands, growth often depends as much on recent weather, stocking density and competition from other vegetation, as it does on site quality. Old stands may have experienced repression or suppression (where trees compete for sunlight and nutrients because of stand density or competition from overstory vegetation), or may have been damaged, and therefore may not reflect the true growing potential of the site.

TimberWest Forest Limited is confident that site indexes for very old and young stands in TFL 47 are underestimated. TimberWest Forest Limited began a four-year, comprehensive review of site index estimates in 1994. The licensee expects to complete an assessment of site index for immature stands in the Bonanza Lake and Moresby Island management unit in the near future. Any information generated through these studies may be incorporated as part of the next timber supply analysis conducted for this TFL, and will be considered in future determinations.

Site productivity studies from elsewhere on the coast suggest that site index is underestimated from inventory information on old-growth stands. It is reasonable to expect that similar results will be found for current old-growth sites in TFL 47. However, given the limited number of coastal studies and lack of information specific to TFL 47, the degree of underestimation is unknown, as is the magnitude of potential effects on timber supply. Any timber supply implications will be more important in units with substantial amounts of old-growth and very young stands—notably Bonanza Lake and Moresby Island. Most effects would occur in the medium to long term when regenerated

stands become merchantable. Higher site productivity could result in shorter green-up ages; however, given the uncertainty surrounding the degree to which site index may be underestimated, I am unwilling to speculate on potential timber supply effects in this determination. Site productivity could also affect the time needed for stands to reach a merchantable condition. The licensee has developed a strategy for minimum harvestable ages, which I discuss in the related section below.

Since information on the previous old-growth stand was used to assign site index to recently planted stands and not yet free-growing stands, site productivity may be underestimated for very young stands as well. As is the case for old-growth, I cannot be certain of the degree of underestimation or the effects. If ongoing studies provide information on the relationship between site index and immature stand inventory information, it will be incorporated into future timber supply analysis and AAC determinations.

The BCFS inventory audit for the Johnstone Strait management unit evaluated site index, derived from height and age data, for immature stands between free-growing and 60 years of age. Since the concern about the functional relationship between inherent site productivity and site index measured using inventory information does not apply to older immature stands as it does to old-growth, examination of stand heights and ages, serves as an evaluation of the accuracy of site index. Results showed no significant difference between average site indexes derived from the inventory and those measured in the audit, and therefore suggest that site indexes derived using the inventory for older immature stands are reasonably assigned.

In conclusion, I acknowledge that site indexes used in the timber supply analysis likely underestimate actual site productivity for some stands in the TFL. However, I do not believe the evidence is sufficient to support adjustment of short-term timber supply relative to levels indicated in the base case. As I acknowledge under "Reasons for decision" below, medium to long-term timber supply will likely be higher, and timber supply more stable than indicated in the base case.

*- volume estimates for regenerated stands*

Volume estimates for regenerated stands were developed using the Table Interpolation Program for Stand Yields (TIPSY) growth and yield model, which is used to project the growth and yield of managed stands. Stands that have been subject to controlled stocking density, spacing and other silviculture treatments are defined as managed. For the timber supply analysis, generally, stands aged 40 years and younger, and all stands regenerated in the future are considered to be managed. Average yields for these stands were estimated to be between 20 and 30 percent greater than for unmanaged stands of the same age.

There is some uncertainty regarding whether all stands currently between 30 and 40 years of age will achieve the yields estimated by the TIPSY model. The concern arose because the total area in stands younger than 40 years old is larger than the area indicated in

silvicultural activity records provided by the licensee. However, given the length of forest management history in this TFL, it is reasonable to expect that most stands less than 40 years old meet the criteria for managed stands. Moreover, since these stands will not be extensively harvested in the short term, uncertainty about the volumes present in these stands does not affect short-term timber supply. The worst outcome, if some stands assigned managed stands yields in the analysis are not in fact managed, would be a more gradual increase in timber supply over the next few decades in most units, and a larger, but still gradual decline in the Bonanza unit.

Uncertainty associated with regenerated stand volumes should be reduced as more of these stands approach merchantable condition, when operational cruising and harvest monitoring can provide feedback regarding the accuracy of estimated volumes. Updates in volume information will be reflected in future timber supply analyses conducted for this TFL.

I acknowledge the uncertainty about whether volume yield estimates for managed stands were appropriately assigned to all stands aged between 30 and 40 years. Given that any timber supply impacts would not be in the short term, I will accept the volume estimates for purposes of this determination. However, stands in this age range should be examined over the term of MP No.2 to ascertain their condition, and verify how many should be defined as managed stands.

*- minimum harvestable ages*

Minimum harvestable age is the estimated average time required for forest stands to reach a harvestable condition. Information reports that supplement MP No.2 include a detailed discussion of the licensee's strategy regarding minimum harvestable ages. The licensee indicates that recent market conditions and technological improvements have created opportunities to profitably harvest stands at younger ages. Moreover, the licensee views the harvest of suitable younger stands as a mechanism to provide additional flexibility in the transition of harvesting from old-growth to second-growth stands.

The minimum ages assumed in the timber supply analysis for TFL 47 were established according to two criteria: (1) stand volume should be at least 300 cubic metres per hectare; and (2) the average diameter of trees at breast height should be at least 30 centimetres. The licensee used these criteria to define the age at which the first entry would be made in areas with relatively high timber productivity. Where the two criteria above are met at ages older than culmination age (the age at which the stand reaches its maximum average annual volume growth), the licensee established the minimum harvestable age as culmination age. I accept the method used to derive minimum harvestable ages. The stand volume and tree size criteria are reasonable to approximate economic thresholds for coastal operations (related to potential wood products and markets), while comparisons with culmination ages account for concerns about long-term productivity.

The licensee indicates that past harvesting in TFL 47 has created large, relatively contiguous areas of young stands. The assertion is that waiting for culmination age would both limit short-term timber supply in some units, and lower long-term productivity because large openings are no longer accepted under today's forest management regime, and parts of the area would be held until well past the age of maximum productivity. I accept this reasoning as further basis for the proposed minimum ages.

Sensitivity analysis using culmination age as the minimum harvestable age rather than the first entry ages proposed by the licensee indicates that the long-term harvest level is not reduced. This result is not surprising, since the proposed first entry ages are not substantially different from culmination ages for most species and sites, and not all projected harvesting occurs at the minimum ages.

Analysis also indicates that first entry ages provide a significant amount of short-term timber supply in the Courtenay unit, and medium term supply in the Moresby Island unit relative to culmination ages. Analysis indicates that harvests in the base case for the Courtenay management unit between six and fifteen years from now require harvesting of stands younger than culmination age. In the Moresby unit, medium-term projected harvests depend on harvesting at ages younger than culmination. Results also show that harvesting will shift to younger stands in the Nanaimo Lakes and Johnstone Strait units over the next twenty-five years, suggesting that projected harvest levels depend on achievement of harvest ages proposed by the licensee.



Forest district staff indicate that recent harvest operations have occurred in stands at ages close to, and younger than the first entry ages in the Courtenay and Nanaimo Lakes management units. In the Moresby Island management unit, the viability of harvesting at proposed first entry ages is a concern; however, the recent approval of a cutting permit for young spruce and hemlock in this unit increases my confidence that harvesting of young stands will be viable. As discussed below under Harvest profile, continued monitoring of harvests will assist in establishing the viability of harvesting young stands.

Sensitivity analysis indicates that in addition to supplying timber in the short term, the harvest of younger stands at or near the minimum harvestable ages will allow retention of old-growth stands, which are important to biodiversity objectives. Sensitivity analysis indicates this is most critical in the Courtenay unit and also important for the Johnstone Strait and Nanaimo Lakes management units. Analysis suggests that placing highest priority for harvesting on young stands that have just reached minimum harvestable age decreases long-term timber supply by a small amount, but does not create large timber supply disruptions or compromise long-term productivity. I would not expect all harvesting to occur at minimum harvestable ages, therefore, the sensitivity analysis shows maximum likely impacts on timber supply. The results provide some comfort that employing the harvest ages proposed by the licensee may assist in maintaining options for managing non-timber values, without creating risks to medium- or long-term timber supply.

MP No.2 indicates that to further improve operational flexibility, the licensee may harvest a maximum of 20 percent of the annual harvest from stands at ages younger than the minimum harvestable ages defined above. Implementation of this management regime will require careful site specific forest management considerations during operational planning to ensure that such decisions are both biologically and economically appropriate.

As discussed under *site productivity estimates* above, if site productivity is actually higher than defined for the analysis, trees may reach a harvestable condition sooner. This may provide additional flexibility in the harvest transition from old-growth to second-growth stands. However, given the age class composition of units in the TFL, most of the flexibility would occur in the medium term, so is not of great concern for this determination. The next timber supply analysis conducted for this licence should be able to incorporate results from the current examination of site productivity in the TFL.

Given commitments provided by the licensee in MP No.2, and the reasonable criteria used in deriving minimum harvestable ages, I am satisfied that the ages used in the timber supply analysis are suitable for consideration in this determination. Harvests should be monitored to ensure commitments are achieved in practice. Monitoring is particularly important in the Courtenay unit, but also relevant in the other management units.

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

Regeneration delay

Silvicultural standards require establishment of fully-stocked stands by the end of a specified regeneration delay period. The timber supply analysis assumes a regeneration delay of two years for all species. BCFS district staff accept this assumption subject to continued monitoring and compliance. A regeneration delay of two years, in my experience, represents prompt regeneration relative to other TFLs and TSAs in the province. Regeneration delay estimates for areas adjacent to TFL 47 range from two to five years. Nevertheless, with prompt planting, a two-year delay is reasonable.

I am satisfied that the regeneration delay estimate assumed in the timber supply analysis is reasonable for consideration as part of this determination, while acknowledging that monitoring of regeneration performance should continue.

#### Impediments to prompt regeneration

Difficulties encountered in regenerating forests in TFL 47 have largely been a result of competition from brush and salal, and the effects of deer browsing. Also, the balsam woolly aphid (*Adelges piceae*) has affected establishment of amabilis and grand fir.

More than 12 000 hectares of the TFL are considered environmentally sensitive because of difficulties associated with regenerating forests. Some of these areas are also classified as inaccessible or environmentally sensitive for other reasons such as sensitive soils or wildlife habitat, or have low timber-growing potential, and were deducted from the timber harvesting land base for those reasons. The timber supply analysis accounts for difficult to regenerate areas that were not deducted for other reasons through reductions to the timber harvesting land base. Ninety percent of areas considered to have severe regeneration problems were considered unavailable for timber harvesting. Half of areas with less severe regeneration problems were considered available for timber harvesting. As a result, approximately 1484 hectares were removed from the timber harvesting land base to account specifically for regeneration problems.

I am satisfied that the reductions to the timber harvesting land base discussed above provide adequate representation of the most serious impediments to regeneration in TFL 47. I am satisfied that any other difficulties associated with regeneration are being managed within the regeneration delays assumed in the timber supply analysis. Therefore, for the purposes of this determination, I am satisfied that the timber supply analysis addresses regeneration difficulties in TFL 47 adequately.

#### Not-satisfactorily-restocked areas

The licensee's timber supply analysis reports that 4607 hectares of the TFL are considered current, not-satisfactorily-restocked (NSR) area. Most of this area has been harvested recently and is not yet covered by a sufficient number of tree stems of desirable species, but is expected to be reforested within the acceptable regeneration delay period. BCFS district staff indicate that some of the NSR areas listed for the Bonanza Lake and

Moresby Island management units have likely been restocked but silviculture records have not been updated to reflect this.

NSR areas are planned to be restocked within the next two years and represent a small portion (about 2.7 percent) of the timber harvesting land base. Records indicate that compliance with stocking standards has been good and I am satisfied that the timber supply analysis provides satisfactory representation of NSR areas for this determination.

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

Alternative silvicultural systems

The 20-year plan prepared by TimberWest Forest Limited indicates that selection harvesting is employed in parts of the TFL, but that clearcutting will be the predominant harvesting system. Approximately 20 percent of the harvest identified in the 20-year plan for the Courtenay management unit and approximately 10 percent of the harvest identified for the first five years in the Nanaimo Lakes management unit is expected to be harvested using selection harvesting systems.

As discussed under *visually sensitive areas* below, the use of alternative silvicultural systems, such as partial cutting and commercial thinning, may provide additional harvesting flexibility in visually sensitive areas or may be used to protect other values.

BCFS district staff indicate that selection harvesting systems are currently being used in the Courtenay management unit near residential areas where the visual effect of harvesting is of particular concern. A similar approach is being practiced in the visually sensitive areas of Quadra Island in the Johnstone Strait management unit.

Public input on MP No.2 included a request that harvesting on Quadra Island around Morte Lake and Long Lake be conducted using selection harvesting systems. TimberWest Forest Limited, in response to this request, indicates that proposed harvesting in these areas makes use of selection techniques and small clearcuts. Careful planning and the continued use of alternative silviculture systems will likely become increasingly necessary near urban areas and in visually sensitive areas.

While the 20-year plan and current operations include some partial cutting, this was not reflected in the timber supply analysis. Use of alternative approaches could have implications for timber yields, but no empirical information about possible effects is available at this time. The converse of potential timber yield reductions relative to clearcutting is that alternative systems will likely allow some harvesting in areas where clearcutting would not be appropriate. I recognize that direct representation of alternative harvesting systems in the analysis may have resulted in different timber supply projections. However, neither the magnitude nor direction of any effects is certain at this time. It will be important to determine timber growth and yield under the alternative systems, particularly if their use becomes more extensive. As new growth and yield

information becomes available, it will be incorporated in future determinations. At this time, I will make no adjustments to account for the use of alternative silvicultural systems in this TFL.

*- juvenile spacing*

MP No.2 lists the criteria the licensee uses to determine the suitability of juvenile stands for spacing and discusses how the licensee establishes priorities for spacing among suitable stands. The criteria include the density of stems, the productivity of the growing site, the height of trees, the health of tree crowns, the presence of pests and disease, and the risk of fire.

MP No.2 does not specify an annual spacing commitment nor does the timber supply analysis account for any spacing beyond that inherent in the growth and yield estimates used in the timber supply analysis, which assume stands will be free growing. Given that establishment of free-growing stands is mandatory, and that any spacing required to achieve that status must be done, I have made no adjustments in my assessment of timber supply to account for juvenile spacing in this determination.

*- commercial thinning*

As reflected in the 20-year plan, the licensee commits to commercial thinning during the term of MP No.2 in most of the TFL management units. It is planned that commercial thinning will be evaluated as a method for providing timber supply while meeting requirements for forest cover and wildlife forage, and for facilitating the transition of harvesting from old-growth to second-growth stands.

Commercial thinning may provide operational flexibility. However MP No.2 does not commit to a specific quantity of thinning and none was assumed in the timber supply analysis. It is not proven whether the development of a commercial thinning strategy and an examination of its timber yield implications would result in a change in projected timber supply.

For the purposes of this determination, I have not assumed any changes will occur in timber supply due to commercial thinnings. However, as noted under Alternative silvicultural systems above, I recognize the operational flexibility that commercial thinning activities may afford in visually sensitive areas and near urban areas.

*- fertilization*

The majority of stand fertilization in TFL 47 has been conducted in the Courtenay management unit. MP No.2 indicates that fertilization and associated funding arrangements with the provincial government will be considered for stands in the Courtenay and Nanaimo Lakes management units that contain trees which are on average between 25 and 35 metres tall at 50 years of age. This criterion describes stands

considered to fall within upper-medium to lower-good site productivity classes. The management plan does not commit to fertilization of a specific amount of area and the timber supply analysis does not examine the implications of this silvicultural treatment. As discussed under *genetic improvement* below, I recognize the combined influence that silvicultural treatments may have on timber supplies. However, as no analysis was submitted there is no specific estimate of the implications of this treatment on timber supply. Also, there are no firm commitments to such a program. Therefore, I have assumed no timber supply contribution from fertilization for the purposes of this determination.

- *genetic improvement*

Genetically improved seedlings are used regularly to plant harvested areas in TFL 47. TimberWest Forest Limited has its own coastal seed orchards engaged in the production of Douglas-fir, western hemlock, western redcedar, amabilis fir and yellow cedar seed. The extent to which genetically improved stock has been and is being planted in TFL 47 was not quantified as part of MP No.2. Similarly the volume and growth gains typically associated with genetically improved stock were not estimated or incorporated as part of the timber supply analysis. Gains of this kind have been demonstrated in other TFLs and TSAs in the province. These gains likely apply to TFL 47 and therefore provide a reason to expect higher future timber yields in the TFL. The extent of the use of genetically improved stock, its interaction with silvicultural treatments such as fertilization, and its associated yield implications should be quantified as part of the preparation of the next management plan for this TFL.

For the purposes of this determination, however, insufficient information is available to quantify the implications for timber supply of the use of genetically improved stock. Nevertheless it is reasonable, in my opinion, to consider the licensee's use of genetically improved stock as an unquantified upward pressure on future timber supplies, as reflected in "Reasons for decision."

**(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 and compliance

Utilization standards define the species, dimensions (stump height and minimum diameter), and quality of trees that must be harvested and removed from an area during harvesting operations. The utilization standards are incorporated in the analysis to estimate minimum merchantable stand volume.

The timber supply analysis for TFL 47 assumes that in stands currently over 200 years old, all trees with diameter at breast height of at least 17.5 centimetres are harvested and removed from the site. It also assumes that all the logs from these stands to a top diameter of 15 centimetres are harvested. Assumptions for stands younger than 200 years old are that all trees of 12.5 centimetres or more in diameter at breast height are harvested

and removed from the site, and that all the logs from these stands to a top diameter of 10.0 centimetres are removed from the site. The analysis also assumes that for all harvested stands, regardless of age, no stumps may be taller than 30 centimetres. Any merchantable wood that remains on the site is measured in residue and waste surveys for the purposes of cut control, and therefore counts against the licence AAC. Forest district staff report that, in general, these standards are achieved. I consider these assumptions to be a reasonable representation of current practices and suitable for consideration in this determination.

#### Decay, waste and breakage

Timber yield estimates used in the timber supply analysis incorporate estimates of volume losses to decay, waste and breakage for specific species and forest inventory zones. For existing stand yields, loss estimates were provided by the BCFS Resources Inventory Branch. I consider the estimates to be the most reliable indicator of decay, waste and breakage in TFL 47 available for consideration in this determination.

In estimating yields from regenerated stands using TIPSy, decay, waste and breakage losses are normally accounted for through operational adjustment factors. For this analysis, the operational adjustment factors used for specific species and site combinations indirectly account for losses through the assumption that managed, regenerated stands will yield only a limited amount more volume than untreated, naturally regenerated stands. I have reviewed the methods used, and accept the loss estimates that form a part of the volume yield projections for regenerated stands as the best available information, and as suitable for 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

The Ministry of Forests is required by the *Ministry of Forests Act* to manage, protect and conserve the forest and range resources of the Crown and 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.

#### *- green-up and forest cover requirements*

To protect such resources as wildlife habitat, water quality and forest aesthetics, the Forest Practices Code specifies limitations on cutblock size and the required forest growth or green-up conditions that must occur on a reforested site before timber on adjacent cutblocks can be harvested. These requirements provide for a distribution of harvested areas and retained forest cover across the landscape. This is commonly

expressed in terms of the number of harvesting entries or “passes” required to harvest the mature timber from portions of the timber harvesting land base.

The objectives for, and the management of specific forest resources, such as visually sensitive areas, on parts of the TFL 47 timber harvesting land base are discussed under relevant sections below. The remaining about two-thirds of the timber harvesting land base, is subject to forest cover requirements for general integrated resource management. The base case harvest forecast assumes that no more than 25 percent of this area may be under cover of stands that are shorter than three metres at any time. The forest cover objectives assumed in the analysis describe a four-pass system.

Sensitivity analysis was conducted to examine the implications of reducing the area in the TFL allowed to be under cover of stands that have not reached green-up conditions, to simulate a five-pass system. The sensitivity analysis indicates that Moresby Island is the only management unit that is sensitive, in the short term, to this change. The sensitivity to changes in green-up requirements in the Moresby Island unit is caused by the large proportion of stands currently slightly younger than green-up age. The analysis suggests that any difficulty in accessing currently harvestable timber, for example, due to a deferral, may increase restrictions due to adjacency requirements on the remaining land base, and thereby reduce short-term timber supply to below the base case initial harvest level for at least five years. The sensitivity of short-term timber supply in the Moresby Island unit to uncertainty in adjacency requirements is relevant to the discussion on Deferral of harvest operations, below.

I note the possible implications for green-up requirements if site productivity has been underestimated. As discussed under *site productivity estimates* above, any increase in estimates of site productivity would likely result in the attainment of green-up conditions at younger ages. As discussed in that earlier section, I will await verification of earlier green-up before incorporating such effects into AAC determinations.

Based on the lack of sensitivity of timber supply in most management units to uncertainty in adjacency requirements, I am satisfied that the timber supply analysis provides adequate representation of forest cover requirements in TFL 47 for consideration in this determination. The exception is the potential risk to short-term timber supply in the Moresby Island unit that adjacency requirements may pose, which I discuss below under Deferral of harvest operations.

*- riparian areas*

Two methods were used to account for riparian management objectives in the timber supply analysis: land base deductions and reductions in initial harvest level.

In the Bonanza Lake, Moresby Island, Nanaimo Lakes and Courtenay management units, land was deducted from the timber harvesting land base, either as environmentally sensitive areas, or (in the Bonanza Lake and Moresby units only) specifically as stream buffers. The buffers were classified according to the Coastal Fisheries/Forestry Guidelines which were in effect at the time the analysis was conducted. Deductions in Nanaimo Lakes and Courtenay (for environment sensitivity only) were small (about one-tenth of a percent of the harvesting land base). In the Bonanza Lake unit, 0.74 percent of the timber harvesting land base was deducted for riparian protection, and in the Moresby Island unit, 1.3 percent was deducted. MP No.2 indicates that during its term, streams in TFL 47, currently classified according to the Coastal Fisheries/Forestry Guidelines, will be reclassified according to requirements of the Forest Practices Code.

In the Johnstone Strait management unit, the effects of riparian and shoreline buffers were accounted for through a reduction in the initial harvest level in the base case. A 50-metre marine shoreline buffer is planned, as well as riparian reserves and management zones under the Forest Practices Code. The initial harvest level in the base case was reduced by 80 000 cubic metres per year to approximate the effects of riparian and marine management objectives. This reduction was based on estimates of harvest level impacts from the licensee based on 20-year plans. Since requirements for riparian management were not incorporated in derivation of the timber harvesting land base, and the initial harvest level is an input to the harvest projection, not an output of analysis, it is difficult to determine the effects that riparian management will have on timber supply over all time frames in the Johnstone Strait unit. As discussed below under Harvest flow, an alternative harvest forecast suggests that higher short-term harvests are possible in the Johnstone Strait unit than shown in the base case. I also acknowledge that an attempt was made to reflect the impacts of riparian management in this unit, albeit only in the short term, by using the findings of operational planning.

New riparian management requirements under the Code include wider buffers for high-value streams than assumed in the timber supply analysis, as well as riparian management zones where harvesting is constrained. In the Strathcona Timber Supply Area, another coastal management unit, riparian requirements under the Code were estimated to decrease the timber harvesting land base by about five percent, and timber yields—to reflect forest cover requirements in riparian management zones—by about four percent. These reductions apply after all other deductions normally made in deriving the timber harvesting land base. I am reluctant to directly transfer these estimates to TFL 47, because of differing terrain and forest conditions. However, given the size of land base deductions applied to TFL 47 management unit, riparian management under the Code will undoubtedly place downward pressure on timber supply relative to the base cases.



Queen Charlotte Forest District staff, based on review of maps, and measurement of stream lengths, estimate that the deduction applied in the timber supply analysis for the Moresby Island management unit is likely to meet a substantial portion of the Code requirements. Based on assessments in other areas, however, I believe that additional forest area will be required to meet Code requirements in that unit. For the other parts of the TFL reductions to the timber harvesting land base necessary to account for Code requirements are expected to be larger than in the Moresby unit.

Based on my review of the constraints applied in the timber supply analysis, my experience reviewing the influence of this factor in other TFLs and TSAs, and the further evaluation by BCFS staff of the Forest Practices Code riparian requirements, I consider the protection of riparian habitat to be more restrictive on timber supply than shown in the analysis. I have accounted for this in "Reasons for decision" below.

*- biodiversity*

Biological diversity, or biodiversity, is the full range of living organisms, in all their forms and levels of organization, and includes the diversity of genes, species and ecosystems, and the evolutionary and functional processes that link them. The Forest Practices Code acknowledges the importance of conserving biodiversity, and a supporting guidebook has been released that addresses stand- and landscape-level biodiversity management in a variety of ecological units found within the province. A major consideration in managing for biodiversity at the stand level is retention of wildlife tree patches. At the landscape level, leaving sufficient and appropriately located mature and old-growth forests—including forest ecosystem networks—for species dependent on, or strongly associated with, old-growth forests are the major biodiversity concerns.

*- wildlife trees*

The maintenance of biological diversity within individual stands in TFL 47 is ensured through the retention of wildlife trees on harvested cutblocks. Wildlife trees provide many kinds of important habitat for birds, mammals and amphibians including nesting cavities and platforms, nurseries, dens, roosts, hunting perches, foraging sites and display stations. Objectives for the retention of wildlife trees, according to the Forest Practices Code, are now required to be incorporated in plans.

No land base or timber yield adjustments were made to account for wildlife trees in the timber supply analysis for TFL 47. Instead, the licensee estimated the impact of retaining wildlife trees on the achievable harvest in three management units, and adjusted the initial harvest level in the corresponding base cases. The reductions in initial harvest level were 3000 cubic metres per year in both Courtenay and Nanaimo Lakes and 15 000 cubic metres per year in the Johnstone Strait management unit. Higher harvest levels are achievable for each of these management units as shown in alternative forecasts in which initial harvest levels are elevated significantly for most blocks (see Harvest flow). No

estimates of effects on initial harvest level were provided for Bonanza Lake and Moresby Island.

For three management units, I am faced with an accounting of a factor based on its estimated impact on harvest level rather than its impact on available land base or inventory—similar to the situation discussed under *riparian areas*. The other two units (Moresby Island and Bonanza) clearly require additional accounting for this factor. Studies done in other coastal areas for the *Forest Practices Code Timber Supply Analysis*, suggest that protection of wildlife trees will reduce the timber inventory available for harvest by about three percent. This reduction would apply over all time frames, not only the short term. For three of the units, the impact on short-term timber supply is somewhat uncertain given the use of an estimated harvest-level impact. However, the effect of wildlife trees on available timber inventory can be viewed in context with alternative harvest forecasts that maximize short term projected harvests (as discussed in Harvest flow).

For the purposes of this determination, I consider the retention of wildlife trees to represent a downward pressure on timber inventory available for harvest, which I have discussed further under "Reasons for decision" below.

- forest ecosystem network

Measures to ensure the maintenance of biodiversity at the landscape-level in the TFL, although explicitly identified, were not incorporated into the base case projections of timber supply. Forest ecosystem network (FEN) linkages for TFL 47 were identified by a professional biologist in the Integrated Resource Analysis Section of TimberWest Forest Limited using guidelines from a March 1994 Draft Coastal Biodiversity Guideline. These linkages are designed to connect other reserve areas and wildlife habitat.

The proposed FEN linkages were identified in the 20-year plans for Moresby Island, Bonanza Lake and Johnstone Strait management units and the land base reductions necessary to account for the FEN linkages were identified in the timber harvesting land base for all five of the management units. However, these areas were not deducted when deriving the timber harvesting land base for the timber supply analysis.

The base case forecast incorporates an assumption that the land base in FEN linkages is available for timber harvesting without any specific requirements beyond the forest cover objectives assumed for general integrated resource management. Sensitivity analysis was conducted, however, to examine the implications of deducting 75 percent of the area within FEN linkages from the timber harvesting land base. The area removed represents between 6 and 11 percent of the timber harvesting land base, depending on the management unit, and is currently covered by both young and old stands on sites that tend to be of average and better productivity.

The sensitivity analysis assumes no specific forest cover requirements beyond general integrated resource management requirements for the 25 percent of the FEN linkages that remains available for harvesting. Results indicate that the harvest levels projected in the first two decades of the base case forecasts could be attained with these additional objectives for landscape-level biodiversity. However, timber supply projected over the medium and long terms would be approximately eight percent lower than in the base case. These results indicate that there is minimal risk to the attainment of projected short-term timber supply in the event that this more constraining view is a better representation of how these areas will be managed. At the same time, the sensitivity analysis highlights the importance of preparing a landscape biodiversity plan, due to the potential medium and long term timber supply implications.

At present, the FEN linkages have not been approved or considered as part of a comprehensive landscape-level biodiversity plan. Nevertheless, TimberWest Forest Limited indicates that difficulty is being experienced in gaining approval for harvest operations in areas identified in the 20-year plan as part of the proposed FEN linkages. Access of potential FEN linkage areas represents an operational concern that I trust can be addressed in the short term. I am satisfied from the results of the sensitivity analysis examining the implications of the FEN linkages that their implementation as proposed is not likely to limit short-term timber supply.

While I support the progressive efforts of the licensee in identifying FEN linkages, I consider it prudent to examine the proposed FEN linkages in the context of a comprehensive plan for the maintenance of biodiversity at the landscape level. The protection of riparian and wildlife habitat, as discussed in related sections of this rationale, also contribute to the maintenance of biodiversity, as do other reductions to the timber harvesting land base. This protection needs to be addressed as part of a landscape-level plan whereby objectives are set, and appropriate management regimes developed. Any outcomes of landscape-level biodiversity planning will be reflected in the next analysis and determination conducted for this TFL.

In the meantime, based on the stability of short-term harvest under these management regimes, I am satisfied that the uncertainty does not introduce an unacceptable degree of risk for timber supplies for this determination. However, given the potential medium- and long-term timber supply implications of biodiversity management, it is important to prepare and implement a landscape-level biodiversity plan, including objectives for different types and ages of forest, for consideration in the next determination. Plan implementation will be important to evaluate assumptions and verify the efficacy of planned management regimes to assist in preparing the next management plan and timber supply analysis.

*- wildlife habitat*

The timber supply analysis for TFL 47 accounts for the protection of wildlife habitat through deductions of areas classified as environmentally sensitive from the timber

harvesting land base. Due to classification overlaps, a large proportion of the areas considered sensitive wildlife habitat are unavailable for timber harvesting because of other reasons (e.g. inaccessibility, sensitive soils). However, an additional reduction of 1090 hectares was made to the timber harvesting land base to account specifically for sensitive habitat.

The habitat for some species in TFL 47 is protected by the licensee through management practices; for example, the licensee commits in MP No.2 to retain live veteran trees used for nesting by bald eagles, particularly in foreshore and riparian areas.

As discussed under *forest ecosystem network* above, FEN linkages which also help achieve objectives for the protection of wildlife habitat, were identified for TFL 47 by the licensee. The role of FEN linkages in achieving objectives for general biodiversity, as well as for specific wildlife species, should be decided as part of a comprehensive biodiversity plan, which can be incorporated into future management plans and AAC determinations.

For the purposes of this determination, I am satisfied that the timber supply analysis provides adequate representation of the protection of sensitive wildlife habitat in TFL 47.

*- visually sensitive areas*

The *Forest Practices Code of British Columbia Act* specifies that one of the forest resources to be managed in British Columbia is the recreation resource, which includes a "scenic or wilderness feature or setting that has recreational significance or value." In order to manage such scenic features, visual landscape foresters in B.C., in collaboration with specialists in other parts of the world, have developed procedures for identifying and managing visually sensitive areas. These procedures incorporate both biophysical and social factors—including visual sensitivity ratings based on topography, slope and other biophysical factors, and social factors such as numbers of viewers and their perceptions—and provide recommended management objectives (VQOs) for these visually sensitive areas. These objectives limit the amount of visible disturbance that is acceptable in these 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 expressed in terms of forest cover requirements which relate to "visually effective green-up" (i.e., the stage at which regeneration is perceived by viewers as newly established forest), and to the maximum allowable percentage of a landscape unit that can be in a non-greened-up state at any one time.

In TFL 47, recreation and landscape inventories of viewscales for each management unit were completed and accepted by the BCFS between 1993 and 1995. MP No.2 commits to updating these inventories further during its term.

The forest cover objectives for visual quality incorporated in the analysis, which were prepared in accordance with provincial standards, apply to about one third of the TFL timber harvesting land base. The Johnstone Strait management unit contains proportionately the largest amount of visually sensitive area in the TFL. Slightly less than half of the timber harvesting land base in the Johnstone Strait management unit is managed specifically for visual quality. Objectives for areas of this kind require that, at any time, a limited amount of the visually sensitive area may be under cover of stands that have not reached a green-up height of five metres.

The Minister of Forests has expressed the provincial socio-economic objective of ensuring an appropriate balance between protecting visual resources and minimizing the impact of such protection measures on timber supplies, recognizing the environmental protection measures now required under the Forest Practices Code (see below, Minister's letter and memorandum and Appendix 4).

Viewscape information for the Bonanza Lake management unit was reviewed by an engineer from TimberWest Forest Limited, a BCFS recreation officer and a recreation resource consultant. As a result of the review, the maximum disturbance allowed was increased for over half of the viewsapes examined. These adjustments were included in the timber supply analysis.

MP No.2 describes the licensee's ability to design cutblocks using digital terrain models and three-dimensional perspective images. The licensee intends to use these techniques to minimize visual impacts of harvest operations and provide additional flexibility in scheduling harvests in visually sensitive areas.

In addition, the use of alternative silvicultural systems such as partial cutting techniques and commercial thinning may provide additional harvesting flexibility in visually sensitive areas. As discussed under Alternative silviculture systems above, the 20-year plan includes the use of alternative silviculture systems to protect environmental values and to ameliorate visual disturbance.

In my view, the review of VQOs that has been undertaken, inventory work which will proceed during the term of MP No.2, the use of sophisticated cutblock design and the use of alternative silviculture systems will assist in ensuring an appropriate balance between the protection of visual resources and minimizing the impact of such protection measures on timber supplies. I understand that these planning and management measures were incorporated into the VQOs used in the timber supply analysis, and therefore no adjustments are needed to account for the Minister's stated objectives.

There is a need, however, to demonstrate the viability of plans to harvest in all types of visually sensitive areas, especially in areas that are more difficult to access. Of particular concern are areas in the Moresby Island management unit that can be harvested only through the use of helicopters. I expect harvesting operations to be conducted in these

areas in the near future if they are to continue to contribute to the timber harvesting land base.

I hold the licensee to their commitments regarding harvesting operations in visually sensitive areas and I am satisfied that the timber supply analysis provides adequate representation of the management of visually sensitive areas in TFL 47 for consideration in this determination.

*- recreation resources*

The protection of areas in TFL 47 having high and exceptionally high value for recreation was accounted for in the timber supply analysis. Limitations on harvesting were accounted for in the timber supply analysis through a reduction to the timber harvesting land base.

MP No.2 indicates that recreation inventories for TFL 47 used in deriving land base reductions were completed between 1991 and 1994. The management plan also commits to updating these inventories as new information becomes available.

Input was also received from the public expressing the desire for the use of alternatives to clearcut harvesting in recreation areas. The licensee indicates that selection or small clearcut silviculture systems are planned for any proposed harvesting in TFL 47 adjacent to important areas of public recreational use.

I am satisfied that for the purposes of this determination the recreation resources in TFL 47 are represented adequately by the timber supply analysis. I hold the licensee to their commitments to maintain and update recreation inventories and to be sensitive to public concerns in the planning of harvest operations associated with recreation areas.

*- watershed resources and terrain stability*

TFL 47 contains several community watersheds where protection of water quality and quantity is a concern. In addition, terrain stability considerations are important in some parts of the TFL because of potential effects both on sediment inputs to waterways, as well as loss of growing sites to erosion and damage to regenerating trees. The Forest Practices Code requires the assessment of watersheds for susceptibility to adverse effects on water values due to forest practices. These assessments, known as Coastal Watershed Assessment Procedures (CWAPs), involve a set of environmental and harvesting-related indicators.

In the Courtenay unit, watershed management is a concern in the Oyster River, Dove Creek and Puntledge River watersheds. The Oyster and Puntledge drainages are designated under the Code as community watersheds. The regional district of Comox/Strathcona holds a water licence in the Puntledge. A watershed assessment has been performed for the Oyster River watershed. Further studies of fish habitat within the Oyster River watershed are expected to be completed in the near future. Public input

regarding a draft of MP No.2 suggested watershed plans are needed in Oyster River and Dove Creek. The licensee claims that attempts were made in the 20-year plan to reflect the requirements of the Code; however, no specific watershed management practices were incorporated into the timber supply analysis. Because management objectives have not been developed, I do not have sufficient information at this time to quantify the possible impacts of watershed management in the Courtenay management unit. However, I recognize that protection of watershed values may affect timber supply in this unit, and I discuss the potential risks to timber supply further in "Reasons for decision."

In the Moresby Island unit, watershed assessments are ongoing for several watersheds, most notably for the Deena watershed. BCFS staff in the Queen Charlotte Islands Forest District anticipate the watershed assessment may lead to reduced harvesting opportunities in the Deena watershed compared to what was proposed in the 20-year plan and reflected in the timber supply analysis. This is of concern because the 20-year plan indicates that between a quarter and a third of the short-term harvest is expected to come from this area. District staff note that terrain stability concerns apply to a significant amount of the remaining old-growth timber that is available for harvest in this watershed. Given the ongoing watershed assessment and concerns expressed by BCFS staff, I believe that watershed management will most likely reduce timber supply in the Moresby Island unit relative to the base case. Since specific management objectives have not been developed, the pressures cannot be quantified at this time. Operations should be monitored to evaluate the extent to which planned activities achieve watershed management requirements under the Code, and to further evaluate their timber supply impacts. Implications on timber supply of watershed management in the Moresby Island unit are reflected in "Reasons for decision."

In the Nanaimo Lakes management unit, the Holland Creek community watershed is designated under the Code and is a water supply to Ladysmith and Saltaire. The Holland Creek community watershed encompasses over 2000 hectares. A condition of forest district acceptance of the 20-year plan for this unit was that the blocks scheduled for harvest in the watershed would be subject to the integrated watershed management plan being prepared for the area. The management practices prescribed by the plan are likely to limit timber supply from the watershed, but the 20-year plan suggests that proposed harvest levels can be achieved from the unit in the short-term. Nevertheless, while watershed management does not place a firm downward pressure on timber supply in the Nanaimo Lakes unit, it does represent an uncertainty that suggests short-term timber supply in the unit should be viewed with some caution, which is reflected in "Reasons for decision."

In the Bonanza Lake management unit, the watershed for the community of Telegraph Cove was accounted for in the timber supply analysis through an environmentally sensitive area reduction to the timber harvesting land base. Twenty percent of the sensitive area (19 hectares) was deducted. Regional BCFS staff indicate that a different water source outside the TFL is being evaluated for the community. Since a small area deduction was made, and it appears likely that community watershed management will

not likely be a concern in this unit, I will make no adjustments to account for this factor in the Bonanza Lake unit.

*- archaeological and heritage resources*

Culturally significant areas are located throughout TFL 47, particularly in the Moresby Island and Johnstone Strait management units. The majority of these areas are associated with culturally modified trees. These trees, primarily western redcedar, have been altered by aboriginal peoples as part of their traditional use of the forest. Uses include bark collection, plank splitting and canoe construction. These trees are protected by the *Conservation Heritage Act* and harvesting is deferred in areas where they are located. There is may be some overlap between the protection of these trees and the protection of other resources such as biodiversity reserves and riparian areas.

MP No.2 indicates that the presence of culturally modified trees in the Moresby Island management unit may affect operations in some manner on about a quarter of the productive forest land base in this management unit. The timber supply analysis does not account for limitations on harvesting to protect culturally modified trees. However, MP No.2 includes the commitment to, upon locating heritage sites, seek guidance on appropriate management practices from local First Nations, BCFS district staff and staff from the Archaeology Branch of the Ministry of Small Business, Tourism and Culture.

In this TFL and other management units in the Queen Charlotte Islands, continued consultation with the Haida Nation toward the completion of a strategy for the protection of the culturally modified trees is necessary to identify the location of these sites and quantify the implications of their protection. Protecting archaeological resources—in this case primarily culturally modified trees—places a downward pressure on the timber harvesting land base and hence, a downward pressure on timber supply.

The preparation of the next management plan for this TFL should include an analysis of the extent and implications of archaeological and heritage resources in TFL 47. For the purposes of this determination, I consider the protection of archaeological and heritage resources as an unquantified downward pressure on timber supply in the Moresby Island and Johnstone Strait management units, as discussed in "Reasons for decision."

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

Deferral of harvest operations

In the Moresby Island management unit, harvesting has been deferred from the Government Creek due to a request by the Council of the Haida Nation for a moratorium on resource extraction, as well as local environmental concerns. In the Johnstone Strait management unit, no harvesting has occurred on Hanson Island because of concerns expressed by the Orca Killer Whale research facility and discussions regarding overlapping traditional claims of the Namgis and Tlowitsis Mumtagila First Nations.



TimberWest Forest Limited estimates that avoidance of harvesting in Government Creek in the Moresby Island management unit involves the deferral of an annual harvest of approximately 10 339 cubic metres. The avoidance of harvesting from Hanson Island in the Johnstone Strait management unit is estimated by Forest Service staff to represent the annual deferral of approximately 7519 cubic metres. Impacts on harvests were assumed to be proportionate to the mature timber inventory contained in the affected areas relative to the whole management unit. However, the areas where harvesting is being deferred are considered part of the timber harvesting land base, and currently activities are being directed to other parts of the timber harvesting land base to maintain harvests. As discussed below, shifting harvests away from deferred areas while still assuming those areas contribute to timber supply is a temporary measure that can eventually lead to conflicts between timber harvests and integrated forest management objectives.

The purpose of the informal interim strategies of avoiding harvesting has been to maintain the undisturbed nature of these areas while management options are being reviewed. In the Moresby Island unit, a local planning process is underway, with the objective to develop management objectives for Government Creek, including direction for harvesting activities, and submit management recommendations to the Queen Charlottes Islands Forest district manager. It is anticipated that these recommendations may resolve many of the concerns regarding Government Creek before the next AAC determination for this TFL.

In the Johnstone Strait management unit, the Port McNeill Forest District staff are evaluating management options for Hanson Island in consultation with the Namgis and Tlowitsis Mumtagila First Nations, and the Orca Killer Whale research facility. District staff indicate that discussions should provide greater certainty regarding forest management on Hanson Island before the next AAC determination for this TFL.

Under "Guiding Principles," I discussed the inappropriateness of speculating on the outcomes of government land-use decisions. While the concerns in the areas discussed here are not strictly land-use issues, but rather decisions on management objectives, I still do not wish to predetermine the outcomes of ongoing processes. Therefore, areas around Government Creek, and the contentious area associated with Hanson Island must be considered as part of the timber harvesting land base, even though the timber in these areas may not be harvested in the short term.

I am aware that the resolution of processes examining management in these areas is expected in the near future. Nevertheless, for harvesting to proceed in the Moresby Island and Johnstone Strait management units at current levels, or those indicated in the base cases, continued avoidance of harvesting in contentious areas means that harvesting will be concentrated in the remaining areas of the timber harvesting land base. If the deferrals continue, at some point conflicts may develop between achievement of integrated resource management objectives and allowable rates of harvesting in the remaining areas. This difficulty is illustrated in the 20-year plan for the Moresby Island management unit,

and further in sensitivity analysis showing a large reduction in short-term timber supply in that unit due to changes in forest cover requirements (see *green-up and forest cover requirements*).

If the district managers in either the Queen Charlotte Islands or Port McNeill Forest Districts become concerned that the allowable harvest level cannot be met on the remaining available land base while continuing to meet integrated resource management objectives, they may wish to take steps towards an application to Cabinet for the specification of designated areas, which would allow a temporary AAC reduction under Part 15 of the *Forest Act*.

If recommendations from planning and management reviews result in important changes or variations from current management or land use that form the basis of this determination, I am prepared to revisit this decision sooner than the maximum five-year period outlined in the *Forest Act*.

I have discussed these matters under "Reasons for decision", below.

#### Vancouver Island Land-Use Plan

The provincial government Vancouver Island Land-Use Plan implementation report was released in January 1995 and revised in April 1995. The plan designated various land uses for different parts of TFL 47 including protected area status, various intensities of management for specific values including timber, or integrated management of several forest values. In the area covered by TFL 47, three new parks were designated, and part of Quadra Island in the Johnstone Strait unit was designated as a low intensity area. Management objectives and strategies associated with land-use designations are being developed at this time. In some cases the objectives may restrict timber supplies, while in others they may augment timber supplies relative to previous management objectives such as were represented in the timber supply analysis for TFL 47.

The Main Lakes chain, the Octopus Island Marine Park extension and part of Surge Narrows in the Johnstone Strait management unit were designated as Class A Provincial Parks through Order-in-Council. Since the analysis was conducted prior to the designations, the affected areas were included in the timber harvesting land base in the analysis. Therefore, the new parks must be accounted for by acknowledging they no longer contribute to the timber harvesting land base, and by applying a corresponding downward adjustment to timber supply. Considering the estimate that approximately 2100 hectares of the parks contributed to the timber supply analysis, their full removal reduces the total TFL timber harvesting land base by approximately one percent, and that of the Johnstone Strait unit by 2.6 percent. It is possible that management regimes in some management zones in other parts of the TFL may offset the new parks designations to some extent. Alternatively, changes to management regimes related to the plan could reduce timber supply further. However, management regimes for the zones have not been

defined, and therefore I cannot determine whether or to what extent future management in certain parts of the TFL will change timber supply.

Future AAC determinations will be better positioned to incorporate timber supply implications of the entire Vancouver Island Land Use Plan as implementation is completed and objectives and strategies are assigned to the various management zones.

I have accounted for the removal of the parks, and discussed the land-use plan in general under "Reasons for decision."

#### Difference between proposed and actual harvests

The last AAC determination for TFL 47 indicated target harvest levels for each management unit (a single target was provided for the Courtenay and Nanaimo Lakes units). During the period since the last determination, actual harvests in the Bonanza Lake and Moresby Island units have approximated the targets for these management units. Harvests over this same period for the Courtenay and Nanaimo Lakes management units have been lower than the target, although over the last two years, harvests from these units have been closer to the 30 000 cubic metre per year target. Harvests from the Johnstone Strait unit have been significantly higher than the target for that unit.

MP No.2 proposes an AAC of 872 000 cubic metres per year, an increase of almost 23 percent from the current level. Again, the proposed AAC is the sum of the proposed harvest levels of the five management units. Proposed harvest levels for Johnstone Strait, Courtenay and Nanaimo Lakes management units are considerably higher than the current targets. The Nanaimo Lakes and Courtenay management units were previously managed as a single unit with a combined target harvest of 30 000 cubic metres per year. The proposed harvest levels for the Nanaimo Lakes and Courtenay units together represent an increase of over 4.5 times from previous levels. The proposed harvest level for the Johnstone Strait management unit, 425 000 cubic metres annually, represents a 24 percent increase from the current harvest target of 340 000 cubic metres per year.

I recognize that the proposed increases in the Nanaimo Lakes, Courtenay and Johnstone Strait units are substantial. The timber supply analysis suggests the proposed levels can be achieved, and in fact exceeded (see Harvest flow, below) given the base case management assumptions. Recent harvests in the Johnstone Strait unit indicate that higher harvests can be implemented operationally in that unit. Further, the licensee has renovated its mill to facilitate processing of smaller timber from younger forests, which should resolve the economic difficulties experienced some years ago.

Proposed harvest levels for the Bonanza Lake and Moresby Island management units represent decreases from current harvest levels. For the Bonanza Lake unit recent harvest levels have approximated the previous 209 000 cubic metre per year target, and the licensee's proposed new harvest level for this unit, 207 000 cubic metres per year, represents a decrease of approximately one percent. The Bonanza Lake unit contains

more old-growth timber than other units in the TFL, and therefore is at an earlier stage of the transition of harvests from old-growth to second-growth forests. It is expected that timber supply will decline somewhat during this transition, and the proposed harvest reduction for this unit allows for a controlled and gradual reduction to a harvest level that is sustainable over the long term.

For the Moresby Island unit, the proposed harvest of 100 000 cubic metres per year represents a 24 percent decrease from the current target level of 132 000 cubic metres per year. While this level has been achieved in the recent past, analysis indicates insufficient timber supply to maintain past harvest levels over the next several years. The reduction in timber supply is partly due to recent increases in emphasis on non-timber values in the area. Also, the Moresby unit is further into the old growth to second growth transition than Bonanza Lake, with less mature timber available to harvest over the next two decades while younger forest grow to a merchantable condition. The lower harvest levels proposed for the Moresby unit are consistent with the timber inventory and forest management objectives for the area.

Subject to the other considerations discussed in this rationale, I accept the nature of the harvest level changes proposed for TFL 47. Given the size of the changes in some units, the geographical dispersion of the units and different community dependencies, I will partition the harvest by management unit to ensure allowable harvest levels are achieved. I discuss this further in the following section.

### Harvest profile

The mixture of different stand types that make up the harvest is known as the harvest profile. In TFL 47, one of the most significant considerations related to the harvest profile is the distribution of harvesting activities among all five of the TFL management units. This distribution is central to the management of the TFL because of its size and geographically distinct units, the different management approaches needed for its diverse forests and different community dependencies. The timber supply analysis prepared as part of MP No.2 indicates a shift in the contribution of each management unit from historical levels. As discussed below, I have specified certain conditions to address the distribution of harvests throughout the TFL in my approval of MP No.2.

Another significant aspect of the TFL 47 harvest profile is the age and associated characteristics of stands that are harvested. I am requiring that the characteristics of stands and the age at which they are harvested be monitored to validate assumptions in the timber supply analysis and proposed in MP No.2. As discussed under *minimum harvestable ages* above, in order to maintain options for maintaining biodiversity in parts of the TFL, harvesting must occur in stands at the minimum harvestable ages assumed in the timber supply analysis.

Also as discussed under *minimum harvestable age* above, achieving the base case timber supply projection for some areas, particularly the Courtenay and Moresby Island

management units, requires demonstrated harvesting performance in young stands at or near the minimum harvestable age.

It should be understood that the harvest levels indicated in the base case harvest forecasts and the AAC I have determined assume that actual harvests are reasonably balanced in accordance with the assumptions on which the timber supply analysis is predicated. Because of this, I have directed the licensee, in conjunction with the Vancouver Forest Region, to initiate procedures for reporting the harvest profile according to management unit and stand characteristics which are necessary for continued viable harvest operations. Monitoring of these factors should ensure that the harvest profile is consistent with the timber supply analysis and my review of it, which support this determination. The assessment of harvesting performance in this regard will likely be a significant consideration in the next timber supply analysis and AAC determined for this licence. I have discussed this further under "Reasons for decision" below and have specified corresponding conditions in my approval of MP No.2.

- (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 many parts of the province. In the short term, the presence of large volumes of older wood permits harvest levels to be above long-term levels without jeopardizing the future timber supply. In TFL 47, this remains the case for the Bonanza Lake management unit which still contains a significant old-growth component. In keeping with the objectives of forest stewardship, AACs in other parts of the province with similar characteristics 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 so 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 to cause immediate social and economic impacts that are unnecessary to maintain forest productivity and future harvest stability.

In other management units in the TFL, most of the accessible old-growth stands considered available for timber use have been harvested. Harvests from these units have declined in the past, as discussed in "History of the AAC" above. Timber supply for the TFL is expected to increase over the next few decades as second-growth managed stands continue to reach merchantable conditions, with expected timber volumes being greater than for untreated, naturally regenerated stands.

The timber supply analysis shows that, for the TFL as a whole, over the next two decades harvesting could increase by approximately 42 percent from an initial harvest level of

866 570 cubic metres per year (22 percent above the current AAC) to a long-term harvest level of 1 233 310 cubic metres per year.

The harvest forecasts for each management unit that form the base case harvest forecast for the TFL were established to avoid a decline to below the long-term level. It was not possible to avoid a decline below the long term level for the Bonanza Lake management unit while maintaining short term harvests at a level close to the current target. For this unit, the decline was minimized. Such a mid-term decline does not indicate a timber supply disruption since increased yields expected from second growth due to current management treatments will not be realized until these stands reach merchantable conditions further into the future.

Based on the same information on forest management practices assumed for the base case harvest forecast, alternative harvest projections were generated for each management unit with a total initial harvest level of 1 085 618 cubic metres per year, 25 percent greater than in the base case forecast. From this initial harvest level, the alternative harvest forecast for the entire TFL increases to the same long-term harvest level as the base case. Similar to the base case forecast, this alternative forecast is the sum of individual alternative forecasts for each management unit.

The alternative forecasts show initial harvest levels for the Johnstone Strait and Courtenay units approximately 30 percent higher than in the base case forecasts. The initial harvest level of the alternative forecast for the Nanaimo Lakes unit is twice that of the base case forecast. The Bonanza Lake unit alternative forecast has an initial harvest level five percent higher than that of the base case forecast, and the Moresby Island unit alternative forecast indicates that the initial harvest level could be increased approximately 17 percent from that of the base case.

These harvest forecasts would involve the harvest of existing stands at a greater rate than implied by the base case forecasts. Increases in short-term harvests above the base case level could decrease future flexibility and consequently increase risks of future timber supply disruptions given the uncertainties regarding achievement of minimum harvestable ages and definition of biodiversity management objectives. However, the higher timber supplies projected in the alternative forecasts indicate some flexibility in the short term which could be employed to buffer downward pressures on timber supply.

For the purpose of this determination, I will use the base case forecasts submitted by the licensee as the base from which to discuss the uncertainties about, and changes in the various inventory, land base and management considerations that affect timber supply. For most management units in the TFL, the alternative harvest forecasts suggest some flexibility exists in short-term timber supply to absorb downward influences, which I discuss under "Reasons for decision".

#### Community dependence on forest industry

I am aware of the dependence of communities around TFL 47—including Campbell River, Sayward, Courtenay, Cumberland, Comox, Nanaimo, Duncan, Chemainus, Ladysmith, Port McNeill, Sandspit and others—on forest-based employment and income, and of the potential implications of changes in harvest level.

Public comments received as part of the management plan review suggested that increased employment in the forest sector should be an objective for the TFL. Forest-related employment is important throughout B.C., and is an important consideration in all AAC determinations.

In TFL 47, a significant consideration is the distribution of harvesting activities among all five of the TFL management units. This distribution is central to the management of the TFL because of its size and geographically distinct management units, the different management approaches needed for its diverse forests, and different community dependencies. Accordingly, I have attributed harvest levels to each unit in the TFL, as discussed under "Reasons for decision."

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

Timber processing facilities and mill fibre requirements

Timber from TFL 47 is used primarily in the Elk Falls mill complex which consists of a sawmill operated by Timber West and a pulp and paper mill owned by Fletcher Challenge Canada, which owns 51 percent of TimberWest.

The Elk Falls sawmill includes a small log sawmill and integrated whole log chipping facility, a planer mill and dry kilns. It has been re-tooled to handle smaller diameter timber from second-growth stands. These renovations have helped to resolve the economic difficulties experienced in harvesting and utilizing timber from younger stands. The new milling capacity provides for the successful utilization of second-growth timber forecast for harvest in TFL 47. TimberWest also operates the Cowichan sawmill in Youbou.

Fletcher Challenge Canada owns and operates two pulp and paper mills on the coast in Duncan Bay (Elk Falls complex) and Crofton. The Elk Falls pulp and paper mill has an annual fibre requirement of 2 736 750 cubic metres and produces 819 000 metric tons of pulp and 593 000 metric tons of paper. The Crofton Pulp and Paper Mill, which depends more on TFL 46 as a fibre source, has an annual fibre requirement of 3 323 700 cubic metres and produces 686 000 metric tons of pulp and 437 000 metric tons of paper.

The estimated annual fibre requirements of all the facilities is approximately 6.9 million cubic metres. TimberWest obtains its fibre supply from a number sources including a number of forest licences in the Vancouver Forest Region and two tree farm licences (TFL 46 and TFL 47). Fibre for the two pulp and paper mills is obtained from various chip agreements.





- (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 memorandum

The Minister has expressed the economic and social objectives of the Crown for the province in two documents to the Chief Forester: a letter dated July 28, 1994, (attached as Appendix 3), and a memorandum dated February 26, 1996, (attached as Appendix 4). I understand both documents to apply to TFL 47. 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 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.

As discussed under Alternative silvicultural systems and *commercial thinning* above, the use of alternative silviculture systems and commercial thinning operations will likely provide operational flexibility in visually sensitive areas and near urban areas. MP No.2 does not commit to a specific quantity of thinning and none was assumed in the timber supply analysis. It is likely that use of commercial thinning would increase operational flexibility to attain harvest levels, but the timber supply implications have not been explicitly examined, and there is no commercial thinning strategy in place at this time. For the purposes of this determination, I have not assumed any changes to timber supply due to contributions from commercial thinnings.

The AAC I have determined includes the volume contribution of the deciduous timber component of stands throughout the TFL. The harvesting and use of deciduous stands is projected to increase from historic levels.

The Minister's memorandum addressed the effects of visual resource management on timber supply. It asked that constraints applied to timber supply in order to meet VQOs prior to the implementation of the Code be examined when determining AACs in order to ensure they do not unreasonably restrict timber supply. As noted earlier under *visually sensitive areas*, a review of objectives has been undertaken, inventory work will proceed during the term of MP No.2, and the use of cutblock design and alternative silviculture systems will assist in ensuring an appropriate balance between the protection of visual resources and minimizing the impact of such protection measures on timber supplies. Recent work on visual quality objectives was incorporated in the timber supply analysis

considered in this determination. Any changes resulting from ongoing efforts will be incorporated into future determinations.

### Local objectives

The Minister's letter suggests that the Chief Forester should consider important local social and economic objectives that may be derived from the public input received where these are consistent with government's broader objectives. The licensee held five open houses during the spring of 1996 to provide an opportunity for public review and comment on the development of MP No.2. The open houses were held in Ladysmith, Port McNeill, Campbell River, Courtenay and Sandspit. Public concerns were raised regarding silvicultural practices on Quadra Island, the presence of clearcuts in recreation areas, the desire for a diverse and mature forest, the preparation of watershed plans for Dove Creek and Oyster River and the importance of employment associated with the TFL. I have attempted in this rationale to respond briefly to these concerns. Consideration of this input has been an important component of this determination.

### *- First Nations*

Since government must be cognizant of and not infringe upon aboriginal rights, it is critical that the BCFS and the licensee continue to seek input from First Nations when planning forest operations. In TFL 47, this is of particular importance in relation to archaeological and cultural heritage resources and Hanson Island. I have considered issues related to aboriginal rights and other First Nations concerns under *archaeological and cultural heritage resources*, and Deferral of harvest operations, above.

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

### Non-recoverable losses

Non-recoverable losses are timber volumes destroyed or damaged by natural causes such as fire, disease, insects and wind that are not recovered through salvage operations. The timber supply analysis for TFL 47 assumes annual losses from all of these factors except fire because of the historic absence of fire-related losses in TFL 47.

For all management units except the Moresby Island unit, annual losses of one percent of the projected timber supply for the entire forecast were assumed in the analysis. For the Moresby Island unit, at the request of Queen Charlotte Islands Forest District staff, the analysis assumes annual timber supply losses of three percent. In the Moresby Island unit, district staff believe losses could be reduced through more prompt salvage. Because these losses fluctuate with the projected harvest level, the total quantity of losses is projected to increase over time, in all management units except Bonanza Lake.

MP No.2 reports minor infestations of spruce aphid, spruce budworm and hemlock sawfly in the Moresby Island management unit. The plan also reports the incidence of

root rots (*Phellinus weirii*, *Armillaria ostoyae* and *Verticicladiella wagereri*) in the Johnstone Strait, Courtenay and Nanaimo Lakes management units.

The representation of expected non-recoverable losses in the near future appears reasonable, given current forest management and the relative absence of infestations in the TFL. Losses included in the timber supply analysis are comparable with estimates used in adjacent areas.

Procedures used to estimate non-recoverable losses vary throughout the province and introduce considerable uncertainty to timber supply projections. I have directed BCFS staff and other licensees to examine procedures used to estimate non-recoverable losses so that associated uncertainty may be reduced, and to develop a consistent approach to the estimation of losses. This direction is also appropriate in the case of TFL 47.

For the purposes of this determination I accept the licensee's estimate of non recoverable losses. However, I expect salvage operations and non-recoverable losses to be monitored and examined over the term of MP No.2.

## Reasons for decision

In reaching my decision on an AAC for TFL 47, I have considered all of the factors presented above and have reasoned as follows.

The timber supply analysis base case for the entire TFL projects that under current management assumptions, harvesting could increase over the next two decades by approximately 42 percent from an initial harvest level of 866 570 cubic metres per year, which is 22 percent above the current AAC, to a long-term harvest level of 1 233 310 cubic metres per year. As discussed under "Timber supply analysis" above, this harvest forecast is the sum of individual forecasts for each of the management units.

My considerations have identified forest management requirements and changes in practice or information since the completion of the timber supply analysis that either increase or decrease the timber supply relative to that projected in the base case harvest forecasts. A number of factors apply to all of the management units within the TFL, which I discuss immediately below. Following this discussion, I examine the specific factors which influence each management unit individually.

Factors identified as limiting short-term timber supply in all of the management units relative to their base case forecasts include:

- new Forest Practices Code requirements that specify the retention of wildlife trees to assist in maintaining biodiversity within stands that were not adequately accounted for in the timber supply analysis; and
- new Forest Practices Code requirements for riparian areas which will involve reservation from harvesting of more area than was accounted for in the timber supply analysis.

None of my considerations indicated that short-term timber supply may be greater than projected in the base case forecasts in all management units.

In addition to influences on short-term timber supply throughout the TFL, reductions necessary to account for roads, trails and landings in the Johnstone Strait, Courtenay, and Moresby Island management units represent a downward pressure to medium- and long-term timber supply. This downward pressure is more than offset by upward pressures on medium- and long-term timber supply resulting from increased future timber volumes expected from genetically improved planting stock and the likelihood that site productivity is higher than estimated in the timber supply analysis.

My assessment of the upward and downward influences on the timber supply common to all management units within the TFL, leads me to conclude that, on balance, there is a small downward pressure on short-term timber supply compared to that projected in the base case. Conversely, the factors affecting all management units increase medium- and long-term timber supply above that projected in the base case.

In addition to these factors, which are common to all management units in the TFL, my considerations have identified factors that apply only to particular management units. I have discussed factors specific to particular management units below.

#### Nanaimo Lakes

In addition to the downward pressures common to all units, watershed protection measures present additional unquantified risks to short-term timber supply in the Nanaimo Lakes unit. However, management regimes for watersheds have not been decided, and impacts on timber supply are consequently unknown.

In combination, the Code-related downward pressures discussed above, and the risks presented by watershed management represent a downward pressure on short-term timber supply. However, the alternative harvest forecast for this unit indicates that an initial harvest level twice that shown in the base case is possible. I am satisfied from this forecast that the initial harvest level shown in the base case can be achieved after accounting for the downward influences on short-term timber supply.

The alternative harvest forecast indicates that sufficient flexibility exists to allow an increase in the initial harvest level relative to that shown in the base case. However, it is prudent, in my opinion, to consider this flexibility as a buffer to absorb the uncertainties and potential changes in management practices that may impose a downward pressure on future timber supply. In particular, the limited amount of old-growth forest remaining in this unit signals a risk to objectives for maintaining biological diversity. To maintain options for managing biodiversity in this unit, I hold the licensee to their minimum harvestable age commitments. This will allow old-growth stands to be maintained while landscape level biodiversity planning is being conducted. Furthermore, timber supply in the Nanaimo Lakes unit depends largely on the use of second-growth timber. It would be best to be cautious when contemplating harvest level increases to allow time for both experience in harvesting and processing second growth, and for market adaptation to the corresponding products. While recognizing all of the above reasoning, I also note that the base case initial level for this unit (39 600 cubic metres) is one percent (400 cubic metres) less than the harvest level proposed by the licensee. I believe that the alternative harvest flow indicates sufficient flexibility to support an increase of that magnitude relative to the base case.

Given all of the considerations discussed above, an annual harvest of 40 000 cubic metres is suitable for the Nanaimo Lakes management unit for the term of MP No.2.

#### Courtenay

Considerations relevant to the Courtenay management unit are similar to those for the Nanaimo Lakes unit. The only factors that affect short-term timber supply significantly relative to the base case are those that apply to all units. Coastal watershed assessments suggest that harvesting may be more restricted than assumed in the base case, which creates some risk to short-term timber supply.

While management-related considerations indicate downward pressures on short-term timber supply, the alternative harvest forecast for the Courtenay unit suggests there is flexibility to increase short-term harvests to as much as 30 percent above the base case initial level. Therefore, sufficient flexibility exists to buffer the downward influences of Code-related factors that apply to all units, as well as the potential effects of watershed protection measures.

While the alternative harvest forecast for Courtenay indicates that an increase in the initial harvest level relative to that shown in the base case could be achieved, two considerations indicate that an increase would not be appropriate at this time. Firstly, the limited amount of old-growth forest remaining in the Courtenay unit limits options for achieving biodiversity objectives. Sensitivity analysis indicated that maintaining sufficient old-growth stands in this unit while landscape-level biodiversity planning is being conducted depends on some harvesting at the proposed minimum harvestable ages. Therefore, I hold the licensee to their minimum harvestable age commitments. The discussion for the Nanaimo Lakes unit on the need for caution while gaining experience in the use and marketing of second-growth timber also applies in the Courtenay unit. Secondly, there are uncertainties associated with timber harvesting in areas close to population centers. The licensee has proposed to use alternative silvicultural systems to provide flexibility in these areas. This management approach should be monitored to ensure it addresses forest management issues associated with the urban interface and to examine any timber supply implications. It is best, in my opinion, to use the flexibility suggested in the alternative harvest forecast as a buffer to absorb these uncertainties and limitations that may impose downward pressures on timber supply.

While recognizing all of the above reasoning, I also note that the base case initial level for this unit (99 000 cubic metres) is one percent (1000 cubic metres) less than the harvest level proposed by the licensee. I believe that the alternative harvest flow indicates sufficient flexibility to support an increase of that magnitude relative to the base case.

Even if all downward pressures considered in the above paragraphs came to apply in this unit (other than the need for harvesting at proposed minimum harvestable ages), timber supply would remain stable in the short term, but would not rise as quickly or to as high a level over the medium term.

Given all of the considerations discussed above, an annual harvest of 100 000 cubic metres is suitable for the Courtenay management unit for the term of MP No.2. I re-iterate the need for some harvesting at the proposed minimum harvestable ages.

### Johnstone Strait

In addition to the downward pressures common to all units there are downward pressures on short-term timber supply specific to Johnstone Strait management unit. These are:

- the presence of culturally modified trees (CMTs). Reservation of CMTs from harvest will reduce the timber harvesting land base and the timber inventory available for harvest. The impact is unquantified at this time. I have required that as part of the next round of management planning for TFL 47, the area likely to be influenced by the presence of CMTs be estimated, and that suitable management practices be defined. New information will be incorporated into future timber supply analysis and AAC determinations.
- designation of the Main Lakes chain, Octopus Island extension and parts of Surge Narrows in the Johnstone Strait management unit as Class A Provincial Parks, through Order-in-Council as part of the Vancouver Island Land-Use Plan (VILUP). Full removal of these areas reduces the Johnstone Strait unit timber harvesting land base by 2.6 percent. This land base reduction places downward pressure on timber supply over all time frames. It is possible that management practices in some zones designated under the VILUP may increase timber supply and offset to some extent the designation of protected areas. However, management regimes for zones have not been defined, and therefore I cannot determine whether or to what extent elements of the plan may offset designation of protected areas.

In addition to these downward pressures, some risk to short-term timber supply is suggested by difficulty in planning and implementing forest practices near population centers due to visual quality considerations, and in gaining approval for operations in areas proposed for FEN linkages. As discussed above under *forest ecosystem network*, I acknowledge the operational difficulties being experienced, but also recognize the uncertainty around biodiversity emphases and corresponding management practices. I believe, a landscape-level plan is imperative and have directed the licensee to undertake biodiversity planning during the term of MP No.2. My concern regarding biodiversity management is partly lessened by analysis results that indicate short-term timber supply does not rely on the harvest of old growth, therefore providing time for planning.

I discussed the risks to timber supply associated with forest management next to population centers in the above section on the Courtenay unit. As is the case for that unit, I believe that experience with alternative silvicultural systems should be monitored to evaluate how well such systems assist in achieving management objectives, and the potential timber yield implications of using these systems. I cannot quantify the timber supply implications at this time.

Short-term timber supply is higher than indicated in the base case due to:

- indications from an inventory audit that timber volumes in stands currently between 40 and 200 years of age have been underestimated by as much as 19 percent. Given the substantial amount of timber in this age range, and its predicted availability in the near future, the audit results suggest that short- and medium-term timber supply is higher than in the base case.

When all pressures on timber supply in this unit are viewed together, the substantial volume underestimation offsets the downward pressures related to the riparian and stand-level biodiversity management requirements under the Code, the protected areas designations, and culturally modified trees. The upward pressure also provides time to examine the risks associated with landscape-level biodiversity and management near population centers.

In addition to the upward pressure exerted by the inventory audit, an alternative harvest forecast for the Johnstone Strait unit indicates that an initial harvest of up to 19 percent greater than in the base case could be achieved. As for the Nanaimo Lake and Courtenay units, a harvest level increase appears possible. However, for the same reasons that apply in those two units, as well as the additional downward pressures that exist in the Johnstone Strait unit, a harvest above that suggested in the base case does not seem appropriate at this time. Furthermore, the substantial fluctuations in the long-term level shown in the harvest forecasts submitted for the Johnstone Strait unit suggest that the long-term level is not as high as shown. Given that the initial and long-term levels are not far apart, I would be additionally hesitant to increase the harvest level in the short-term only to decrease it in a later determination. While recognizing all of the above reasoning, I also note that the base case initial level for this unit (420 750 cubic metres) is one percent (4250 cubic metres) less than the harvest level proposed by the licensee. I believe that the alternative harvest flow indicates there is sufficient flexibility to support an increase of that magnitude relative to the base case.

I acknowledge that harvesting is being deferred on Hanson Island, and that continued deferral could affect short-term timber supply. I also recognize that discussions are ongoing regarding appropriate management regimes for the area. As discussed under Deferral of harvest operations above, if the district manager of the Port McNeill Forest District believes that the deferral is resulting in conflicts between timber harvesting and integrated resource management objectives, he should consider applying for designation of the area under Part 15 of the *Forest Act* which would allow a temporary AAC reduction. I will not speculate on the outcome of the ongoing discussions.

In conclusion, timber supply in the Johnstone Strait unit is less stable than in the Courtenay and Nanaimo Lakes units. I recognize that challenges are already being faced in managing near population centers, and in operating in proposed FEN linkages. These challenges highlight the necessity for careful harvest planning, development of a biodiversity plan, and monitoring of the timber yield impacts and management benefits of alternative silviculture systems. In balance, given all of the considerations discussed above, an annual harvest of 425 000 cubic metres is suitable for the Johnstone strait management unit for the term of MP No.2, again recognizing the need for careful planning and monitoring.

#### Bonanza Lake

There are no firm upward or downward influences on timber supply in the Bonanza Lake unit other than those that apply to all units. However, the licensee has suggested that mature stand volumes may be lower than estimated for the timber supply analysis by as much as eight percent. Lower existing stand volume would reduce short-term timber supply. The observations are not based on rigorous statistical sampling, but given the dependence of short-term harvests on old-



growth stands, the uncertainty does present concerns, and suggests I should view short- and medium timber supply with some caution.

The alternative harvest forecast for the Bonanza Lake unit shows that the initial harvest level could be increased by five percent above the base case. Therefore, there is less flexibility in short-term timber supply in this unit than in the others. Conversely, I recognize that there is a small degree of flexibility to adjust timber supply in the medium term if necessary to address risks and uncertainties, while still maintaining reasonable rates of decline to the long-term timber supply level.

The downward pressures on short-term timber supply resulting from the riparian and stand-level biodiversity requirements of the Code, together with the possibility of smaller old-growth volumes and limited flexibility in short-term supply suggest that a harvest level somewhat lower than indicated in the base case would be more appropriate for this unit.

The base case initial harvest level is almost 207 000 cubic metres per year. Given all of the considerations discussed above, an annual harvest of 200 000 cubic metres is suitable for the Bonanza Lake management unit for the term of MP No.2. Achieving this harvest level in the short-term will not depend on harvesting at the minimum harvestable ages assumed for the analysis. However, the direction to monitor harvesting to verify the ages in other units will greatly assist in assuring that projected medium-term timber supply for this unit is accurate, and will allow for a gradual and orderly transition to the long-term harvest level.

### Moresby Island

In addition to the downward pressures common to all units, two considerations in the Moresby Island unit exert downward pressure on timber supply relative to the base:

- protection of CMTs will reduce the timber harvesting land base and the timber inventory available for harvest. The impact is unquantified at this time, but local experience suggests the impact could be large. I have required that as part of the next round of management planning for TFL 47, the area likely to be influenced by the presence of CMTs be estimated, and that suitable management practices be defined. New information will be incorporated into future timber supply analysis and AAC determinations.
- it is highly probable that watershed protection measures will decrease timber supply in the Deena watershed. Watershed assessments indicate that harvesting will be more restricted than is assumed in the timber supply analysis. While the potential impacts are uncertain at this time, watershed concerns are currently affecting operations.

Riparian management requirements under the Code exert downward pressure on timber supply in all units of the TFL. In the Moresby Island unit, downward pressures due to riparian management are expected to be smaller than in other units.

There are no upward pressures on short-term timber supply specific to the Moresby Island unit.

Other considerations related to the timber supply outlook for this unit are the age-class distribution and minimum harvestable ages. The Moresby unit still contains some old growth, which provides a limited amount of flexibility to maintain harvests while developing plans for landscape-level biodiversity. However, it is certain that some old growth will be reserved from harvest to meet biodiversity objectives. To maximize the probability that biodiversity objectives can be met it will be necessary to harvest second-growth stands. At the same time, analytical results and operational experience indicate that achieving the base case harvest forecast will require contributions from second-growth stands in the short term. Therefore achieving both timber supply and biodiversity objectives requires demonstration of the validity of proposed first-entry ages in this unit.

I acknowledge that harvesting is being deferred in the Government Creek area, and that continued deferral could affect short-term timber supply. The potential for short-term impacts is illustrated both by challenges in locating operations during 20-year planning, and by the sensitivity of short-term timber supply to changes in adjacency requirements (see *green-up and forest cover requirements*). A local planning process is underway to develop management strategies for the area. As discussed under Deferral of harvest operations above, if the deferral continues and the district manager of the Queen Charlotte Islands Forest District believes it is resulting in conflicts between timber harvesting and integrated resource management objectives, she should consider applying for designation of the area under Part 15 of the *Forest Act*. Such a designation would allow a temporary AAC reduction. I will not speculate on the outcome of the ongoing planning.

The base case for the Moresby Island unit shows an initial harvest level 24 percent below the current AAC. The alternative harvest flow for the Moresby unit suggests it would be possible to increase the initial harvest level to 17 percent above the base case level. I believe the alternative harvest flow suggests there is sufficient timber supply in the short-term to offset the downward pressures on timber supply associated with the Code (related to management of riparian values and stand-level biodiversity), CMTs and watershed management. In consideration of these downward pressures, as well as uncertainties surrounding harvest deferrals and current operational planning difficulties, however, I do not believe, that there is sufficient flexibility to maintain harvests above the levels indicated in the base case without jeopardizing future timber supply and the viability of future operations.

In fact, the number of forest management uncertainties in this unit, create a reasonable expectation of further timber supply reductions at the next determination. However, I must consider the direction given by the Minister of Forests to minimize AAC reductions unless they are necessary to avoid compromising sustainable forest management. In addition there may be opportunities to enhance timber supply through use of alternative silvicultural systems and suitable second-growth timber.

The initial harvest level shown in the base case for the Moresby Island unit is 99 910 cubic meters per year. Given all of the considerations discussed above, an annual harvest of 100 000 cubic metres, a reasonable approximation of the base case level, is suitable for the Moresby Island management unit for the term of MP No.2. Given the uncertainties and pressures

that exist in this unit, careful planning and monitoring of operations will be important to ensure an orderly and economically viable transition of harvesting from old-growth to second-growth stands.

## **Determination**

As reflected throughout this rationale, TFL 47 is made up of five management units with different forest conditions, community dependencies and management regimes. Consequently, it will be important to achieve the harvest levels attributed to each unit as outlined in the above reasoning, and I have partitioned the AAC accordingly.

It is my determination that a timber harvest level that accommodates objectives for all forest resources during the next five years, that ensures longer-term IRM objectives can be met, that reflects current management practices, and that minimizes the risk of disruptive shortfalls in future wood supply, can best be achieved in this TFL at this time by an AAC for TFL 47—including Schedule A and B land—of 865 000 cubic metres. This AAC is partitioned by management unit as follows:

- 40 000 cubic metres is attributed to stands in the Nanaimo Lakes management unit;
- 100 000 cubic metres is attributed to stands in the Courtenay management unit;
- 425 000 cubic metres is attributed to stands in the Johnstone Straits management unit;
- 200 000 cubic metres is attributed to stands in the Bonanza Lake management unit; and
- 100 000 cubic metres is attributed to stands in the Moresby Island management unit.

## Implementation

This determination comes into effect on December 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 term of this current Management Plan, the following must be provided or undertaken by the licensee:

1. prepare and implement landscape-level biodiversity plans for all units, including objectives for different types and ages of forest, for consideration in the next determination.
2. document the extent of use of genetically improved stock, and quantify timber yield implications of planting such stock, including those due to interactions with silvicultural treatments such as fertilization.
3. estimate the area likely to be influenced by the presence of culturally modified trees, and develop suitable management practices for those areas.
4. monitor results of planned inventory audits to verify or improve volume estimates for existing stands.
5. monitor harvests to assist in verifying volume projections for second-growth stands.
6. quantify the timber yield implications of employing alternative silvicultural systems.

Other requirements have been noted in my Management Plan approval letter.

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

Larry Pedersen  
Chief Forester

November 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.

## **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.

### **Documents attached:**

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

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