BRITISH COLUMBIA
MINISTRY OF FORESTS

Kingcome
Timber Supply Area

Rationale for allowable annual cut (AAC) determination

effective November 1, 1996

Larry Pedersen
Chief Forester

Table of Contents

Objective of this document 3
Description of the TSA 3
History of the AAC 4
New AAC determination 5
Information sources used in the AAC determination 5
Role and limitations of the technical information used 6
Statutory framework 7
Guiding principles for AAC determinations 7
Consideration of factors as required by Section 7 of the Forest Act 10
The role of the "base case" 10
Land base contributing to timber harvesting 12
- general comments 12
- operability 12
- reductions for environmentally sensitive areas 14
- unmerchantable forest types 15
- deciduous (broadleaf) species 15
- low productivity sites 16
- roads, trails and landings 17
- Timber Licence reversion 18
Existing forest inventory 19
-general comments 19
- volume estimates for existing stands 19
Expected rate of growth 20
- site productivity estimates 20
- volume estimates for regenerated stands 21
- minimum harvestable ages 22
Regeneration delay 23
- impediments to prompt regeneration 24
Not-satisfactorily-restocked area 24
Silvicultural systems 25
- incremental silviculture 25
Deciduous competition 26
Commercial thinning 26
Utilization and compliance 27
Decay, waste and breakage 27
Integrated Resource Management (IRM) objectives 28
- green-up period 28
- cutblock adjacency 29
- visually sensitive areas 30
- riparian habitat 31
- wildlife habitat 32
- community watersheds 32
- recreation 33
- areas of cultural or archaeological significance, and traditional uses 33
- biodiversity 34
- gully management 35
Vancouver Island Land Use Plan and the Protected Areas Strategy 35
Areas where harvesting is currently deferred 36
Small Business Forest Enterprise Program undercut 37
Harvest flow 38
Community dependence on the forest industry 40

Mill requirements 41
Economic and social objectives of the Crown 42
- Minister's letter and memorandum 42
- local objectives 43
Non-recoverable losses 44
Reasons for decision 44
Determination 49
Implementation of Decision 49
Appendix 1: Section 7 of the Forest Act 50
Appendix 2: Section 4 of the Ministry of Forests Act 51
Documents attached: 51

Documents attached:

Appendix 3: Minister of Forests' Letter of July 28, 1994, to Chief Forester, re social and economic objectives of the Crown.

Appendix 4: Minister of Forests' memo of February 26, 1996, to Chief Forester, re social and economic objectives of the Crown—visual resources.

Appendix 5: Summary of Public Input

Objective of this document

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

Description of the TSA

The Kingcome Timber Supply Area (TSA) lies within the Port McNeill Forest District in the Vancouver Forest Region, and is located on northern Vancouver Island, the adjacent mainland, and on small islands between the mainland and Vancouver Island. Most of the TSA is on the mainland opposite Port McNeill. Small areas of the TSA lie on the very northern end of Vancouver Island, along the northeast coast of the Island, and on the northwest coast adjacent to Brooks Bay. On the mainland, the TSA abuts the Mid Coast TSA to the north, the Williams Lake TSA and TFL 45 to the east, and Sunshine Coast and Strathcona TSAs to the south. On Vancouver Island, the TSA is adjacent to Tree Farm Licences (TFLs) 6, 25, 39, and 47 and the Strathcona TSA. Within the TSA's boundaries lie small blocks of TFLs 39 and 43.

The total area of the TSA is 1 126 126 hectares, of which 519 694 hectares are productive Crown forest. A significant portion of this productive Crown forest is presently unavailable for timber harvesting for various reasons, including inoperability, environmental sensitivity, inaccessibility, low site productivity, and the unmerchantability of certain forest types. Only 185 253 hectares (approximately 16 percent of the total land base) were considered in the timber supply analysis (July 1995) to be available for timber harvesting in the Kingcome TSA. It should be noted that several changes in land base and management have taken place since publication of the British Columbia Forest Service (BCFS) analysis report; for example, new protected areas have been designated in the TSA. These changes have been examined in the following sections and have been taken into account in this determination.

The Kingcome TSA has varied topography, which ranges from the rolling terrain with flat valley bottoms found on northern Vancouver Island, to the rugged mountains and numerous inlets characterizing the mainland coast portion of the TSA. Approximately half of the land base available for timber harvesting (the "timber harvesting land base") is occupied by mature forests. The timber harvesting land base is dominated by hemlock and balsam stands (covering approximately 54 percent of the timber harvesting land base) and cedar forests (43 percent), with small amounts of Douglas-fir and Sitka spruce (3 percent).

The Port McNeill Forest District has about 15,000 residents, located primarily on Vancouver Island. The principal communities and their approximate populations are: Port Hardy (5400); Port McNeill (2800); Port Alice (1500); Alert Bay (700); and Sointula (700). There are 11 First Nations bands in the Port McNeill Forest District, with approximately 4000 members. About half of these members live within the forest district,

with most of the remainder residing elsewhere on Vancouver Island and in the Lower Mainland.

The economies of the communities within the Port McNeill Forest District are highly dependent on resource-based industries, including forestry, mining, fishing and tourism. The forestry sector provides approximately 36 percent of the employment in the Port McNeill Forest District. However, harvesting from the TSA represents only approximately 28 percent of the total timber harvest in the Port McNeill Forest District, with TFLs being the single largest source (45 percent). The remainder of wood harvested in the forest district comes from Timber Licences (24 percent) and private forest land (3 percent).

Approximately 90 percent of the timber harvested in the Kingcome TSA is processed in facilities located outside the Port McNeill Forest District, mainly in facilities in southern Vancouver Island and the Lower Mainland regions of the province. Shushartie Log Sales Ltd.'s mill, located in Port Hardy, processes approximately 60 000 cubic metres annually of timber harvested from the TSA, and a pulp mill located in Port Alice relies on approximately 45 000 cubic metres of timber harvested annually from the TSA to provide about 5 percent of its fibre requirement.

History of the AAC

The first timber supply analysis for the Kingcome TSA was completed in 1980. Based on this analysis, which estimated a timber harvesting land base of 343 406 ha, the AAC was determined at 1 700 000 cubic metres. The AAC was reduced to 1 632 500 cubic metres in 1987, to reflect the decrease in the size of the land base with the transfer of the Loughborough Supply Block (approximately 101 550 hectares of the total land base) to the Strathcona TSA. In 1989, the AAC was increased to 1 769 500 cubic metres with the award of three non-replaceable licences: 112 000 cubic metres for the harvesting of low site productivity conifer stands, awarded to Shushartie Log Sales Ltd.; 20 000 cubic metres for harvesting in broadleaf stands, awarded to Discovery Hardwoods Ltd.; and 5 000 cubic metres per year for harvesting in broadleaf stands, awarded to Scott Paper Ltd. A timber supply analysis conducted in 1990 indicated a timber harvesting land base of 203 056 hectares. In 1993, the AAC was increased with the transfer of 3718 hectares of operable area from TFL 45 to the Small Business Forest Enterprise Program in the Kingcome TSA, resulting in an AAC of 1 798 270 cubic metres.

This volume is apportioned by the Minister of Forests as follows:

	Cubic Metres	% of AAC
Forest Licences, replaceable (5)	1 290 363	71.8
Timber sale licences replaceable (2)	10 009	0.5
Small Business Forest Enterprise Program	339 572	18.9
Forest Service Reserve	18 370	1.0
Subtotal [≅ 1995 base case 1 658 770]	**1 658 314**	**92.2**
Forest Licences, non-replaceable (low site productivity coniferous)	112 000	6.2
Forest Licences, non-replaceable (deciduous)	25 000	1.4
Woodlot licence volume*	2 956	0.2
Total	**1 798 270**	**100.0**

* N.B.: Allocated woodlot licence volumes are not included in AACs determined by the Chief Forester under Section 7 of the *Forest Act*. The woodlot licence volume in the table has been allocated recently and is no longer included in the AAC for the TSA. At the date of this rationale, the total allocated woodlot licence volume in the TSA was 10 728 cubic metres.

New AAC determination

Effective November 1, 1996, the new AAC for the Kingcome TSA will be 1 399 000 cubic metres, exclusive of allocated woodlot licence volumes. Of this AAC, the conventional timber supply will provide 1 244 000 cubic metres. A partition of 25 000 cubic metres has been established for harvesting in deciduous (broadleaf) forest stands. A partition of 130 000 cubic metres for harvesting in low-productivity stands has also been included in this AAC. This AAC will remain in effect until a new AAC is determined, which must take place within five years of this determination.

Information sources used in the AAC determination

Information considered in determining the AAC for the Kingcome TSA includes the following:

- *Kingcome TSA Timber Supply Analysis Report*, British Columbia Forest Service (BCFS), July 1995;
- *Kingcome Timber Supply Area Socio-Economic Analysis*, Alan Fitzgibbon and Associates, North Vancouver; July 1995;
- *Kingcome Timber Supply Area: Timber Supply Review Discussion Paper*, BCFS, July 1995;
- *Kingcome TSA Summary of Public Input*, BCFS (appended to this document);
- Five-year timber harvesting development plans;
- Silviculture history records, BCFS;
- Forest inventory planning file, BCFS;

- *Completing the Protected Area System on Vancouver Island*, Protected Areas Boundary Advisory Team, October 1994;
- *Low Intensity Areas for the Vancouver Forest Region: Exploring a New Resource Management Vision*, Low Intensity Area Review Committee, January 1995;
- Integrated Silviculture Information System (ISIS), current Port McNeill Forest District records;
- Major Licensee Silviculture Information System (MLSIS) records, BCFS
- Letter to G. Kennah, Acting District Manager, Port McNeill Forest District from International Forest Products Limited, with attached *Kingcome TSA Timber Supply Review Audit (Preliminary Report)* prepared by Timberline Forest Inventory Consultants, October 1995 (final report submitted February 1996);
- Letter to Chief Forester from Coast Forest & Lumber Association, with attached *Kingcome Timber Supply Area Timber Supply Review Choices for AAC: 1995-2000*;
- *Upper Klinaklini River Operability Review*, International Forest Products Limited, February 1996;
- *Brief Overview of the Logging Access Opportunities Within the Upper Klinaklini River Valley*, D.E. Gyton & Associates Ltd., January 1996;
- *Klinaklini Timber Recce (1986)*, International Forest Products Limited, submitted February 1996;
- Letter from the Minister of Forests, dated July 28, 1994, to the Chief Forester stating the Crown's economic and social objectives;
- Memo from the Minister of Forests, dated February 26, 1996, to the Chief Forester stating the Crown's economic and social objectives regarding visual resources;
- Technical review and evaluation of current operating conditions through comprehensive discussions with BCFS staff, notably at the AAC determination meeting in Port McNeill on March 13 and 14, 1996;
- *Forest Practices Code of British Columbia Act*, June 1995;
- *Forest Practices Code of British Columbia Regulations*, April 1995;
- *Forest Practices Code Timber Supply Analysis*, BCFS and BC Environment, February, 1996.
- *Forest Practices Code of British Columbia Biodiversity Guidebook*, BCFS and BC Environment, September 1995;

Role and limitations of the technical information used

The *Forest Act* requires me as chief forester to consider biophysical, social and economic information in determining AACs. 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 the Kingcome TSA. 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 to 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 the Kingcome TSA, I have considered known limitations of the technical information provided, and I am satisfied that the information provides a suitable basis for my considerations in this determination.

Statutory framework

Section 7 of the *Forest Act* requires the chief forester to consider various factors in determining AACs for TSAs. 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 AACs from a range of possible harvest levels; 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, either with respect 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 with respect 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 BCFS timber supply analyses were conducted. Accordingly, the analyses were unable to assess the impacts of any new constraints on timber production which might be imposed under the Code. In those determinations I did not consider any more stringent restrictions or additional impacts upon timber supply beyond those anticipated to occur due to the application of guidelines current at the time of determination. However, I assumed that the Code would at least entrench the standards exemplified by those guidelines as statutory requirements.

The *Forest Practices Code of British Columbia Regulations* were approved by the Lieutenant Governor in Council on April 12, 1995, and released to the public at that time. The *Forest Practices Code of British Columbia Act* was brought into force on June 15, 1995. Studies in selected TSAs (*Forest Practices Code Timber Supply Analysis*, BCFS, February, 1996) indicate that under the Code there will be some impacts on timber supply additional to those expected under previous guidelines. In AAC determinations made since the coming into force of the Code, I have viewed with some caution the timber supply projections in BCFS timber supply analyses that pre-date the Code, as is the case in the Kingcome TSA. 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 its June 22, 1994 Vancouver Island Land-Use Plan—it may not always be possible to analyze their timber supply impact in an AAC determination. In most cases, government's land-use decision must be followed by detailed implementation decisions. For example, a land-use decision may require the establishment of resource management zones and resource management objectives and strategies for these zones. Until such implementation decisions are made, it is impossible to properly assess the impact of the land-use decision. However, the legislated requirement for AAC reviews at least every five years will ensure such 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 timber supply analysis of the Kingcome TSA will be better positioned to determine how the Forest Renewal Plan may affect timber supply.

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

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

With respect to First Nations issues, I am aware of the Crown's legal obligations resulting from the June 1993 Delgamuukw decision of the B.C. Court of Appeal regarding aboriginal rights. The AAC I determine for a TSA 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 TSA. It is also independent of any decision by the Minister of Forests with respect to subsequent allocation of the wood supply. Aboriginal rights will be taken into account as far as possible under Section 7(3)(a)(v) of the *Forest Act*, and will be respected in the administration of the AAC determined.

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

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

Consideration of factors as required by Section 7 of the *Forest Act*

The role of the "base case"

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

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

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

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

These adjustments are made on the basis of informed judgement, using current 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. Once an AAC has been determined that reflects appropriate assessment of all the factors required to be considered, no additional validation or precision 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.

In the analysis conducted by the British Columbia Forest Service (the "BCFS analysis"), the land base allocated to woodlots, deciduous stands, and stands with low site productivity were deducted to reflect their separate AAC administration. In order to maintain a correlation between the initial harvest level shown in the analysis and the timber harvesting land base, the volume associated with allocated woodlots, deciduous stands, and stands with low site productivity—139 500 cubic metres—was deducted from the current harvest level of 1 798 270 cubic metres. As a result, it was assumed in the BCFS analysis that the current AAC is 1 658 770 cubic metres. Throughout this document, the term "current AAC" will refer to this figure.

The base case projection in the BCFS *Kingcome TSA Timber Supply Analysis Report* shows an initial harvest rate of 1 068 600 cubic metres (approximately 35 percent below the current AAC used for this analysis). In order to avoid abrupt future declines in harvest levels, the harvest level would have to decrease after one decade at a rate of 10 percent per decade for 3 decades, to reach a level of 779 000 cubic metres per year (approximately 14 percent below the long-term harvest level). This level could not be exceeded until decade 15, when the rate of harvest could increase over 2 decades to a long-term harvest level of 902 600 cubic metres per year.

Subsequent to the completion of the BCFS analysis, an error was detected in the estimate of the timber harvesting land base used in the BCFS analysis (see below, Land base contributing to timber harvesting). Approximately 7400 hectares of cedar forest types on sites with poor site productivity were incorrectly assumed to be inoperable, and were therefore excluded from the timber harvesting land base. As a result, the timber harvesting land base was underestimated by a net 7244 hectares in the BCFS analysis. BCFS staff provided a harvest forecast in which this error was corrected. This forecast showed that an initial harvest level of 1 117 600 cubic metres (approximately 33 percent below the current harvest level) could be maintained for one decade before decreasing at a rate of 10 percent per decade for 3 decades, to reach a level of 811 600 cubic metres per year. This level would could not be exceeded until decade 16, when the rate of harvest could increase over 2 decades to the long term harvest level of 936 600 cubic metres per year. Throughout this document, "corrected base case" will refer to this harvest forecast. BCFS staff also provided updated sensitivity analyses based on this corrected base case for those uncertainties which would have an impact on short-term timber supply in this TSA. These updated sensitivity analyses will be identified and described where they have been considered in the determination.

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The *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 harvesting

- general comments

The total area of the Kingcome TSA is 1 126 126 hectares. The land base that is considered available for timber harvesting (the "timber harvesting land base") is limited by inoperability, environmental sensitivity, inaccessibility, low site productivity, and unmerchantable forest types. 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 timber harvesting land base was determined for the purposes of the BCFS analysis to be 178 009 hectares. However, as discussed above, under "The role of the base case", an error was detected in the estimate of the timber harvesting land base used in the BCFS analysis. Approximately 7400 hectares of cedar forest types on sites with poor site productivity were incorrectly assumed to be excluded from the timber harvesting land base; as a result, the timber harvesting land base was underestimated by a net 7244 hectares in the BCFS analysis. The corrected timber harvesting land base for consideration as the base case in this determination is 185 253 hectares. (Since the analysis was completed, the timber harvesting land base has been slightly reduced due to the designation of Class A provincial parks. This is discussed below, under Vancouver Island Land Use Plan and the Protected Areas Strategy.)

- operability

Operability was identified in the *Kingcome TSA Timber Supply Review Discussion Paper* as a critical factor which could potentially be used to partially offset reductions in short-term timber supply.

The operability mapping was completed by district staff in 1993. In mapping the operability for the Kingcome TSA, district staff examined development plans and 5-year management plans, as well as information from the Musgamagw-Tsawataineuk Traditional Territory Timber Supply Study prepared for International Forest Products Limited, (Interfor) and the Tribal Council, with input from other licensees. The areas mapped as inoperable were reviewed and generally agreed to by licensees. In total, 193 826 hectares of inoperable area were excluded from the timber harvesting land base in the BCFS analysis.

The Klinaklini Supply Block covering approximately 36 000 hectares of the productive Crown forest in the Kingcome TSA and located in the northeast corner

of the TSA on the mainland, was considered unavailable for timber harvesting in the BCFS analysis because accessing the area would be difficult and extremely expensive, and because timber values in the area are relatively low. Comments received as part of the public input process recommended the Klinaklini Supply Block be included in the timber harvesting land base, and that it be considered to contribute to the timber supply of the TSA. District staff have examined the Klinaklini, and do not believe harvesting operations would currently be feasible in this area of the TSA since the cost of providing primary road access would be extremely high relative to the value of the timber volumes available. An independent professional assessment conducted on behalf of the District of Port Hardy confirmed these findings by BCFS staff. In addition, this area contains many environmentally sensitive areas, and wildlife and ecological values that would strictly limit any harvesting activities in this area. I am satisfied that the exclusion of this area from the timber harvesting land base in the BCFS analysis is appropriate.

A local First Nations group has submitted a proposal to harvest in areas in the TSA that are currently considered inoperable. District staff examined the cutblocks proposed and determined that while the cutblocks had adequate timber volume and quality, harvesting could have negative environmental, wildlife and hydrological impacts, and there was uncertainty about the economic feasibility of harvesting these cutblocks.

Using the methodology from this proposal, district staff examined the operability in six major drainages covering a significant portion of the TSA. They identified a maximum of approximately 3550 hectares currently considered inoperable, which could potentially be harvested based on the volume and quality of timber on the areas. However, district staff note that some of these areas proposed for harvesting are located on steep and broken terrain characterized by sensitive and unstable soils. In addition, environmentally sensitive areas had not been adequately identified in these areas. Similarly, staff of the Ministry of Environment, Lands and Parks have examined these areas and have also expressed a concern that many of these areas have highly sensitive wildlife values. Based on these concerns, district staff estimate that only 1000 hectares of the area examined could reasonably be harvested in the near future.

Interfor had submitted that, while the operability mapping used in the BCFS analysis is a realistic representation of current operability, the operable land base will increase by at least 10 percent over time as timber values and technology change. Subsequently, Interfor submitted to the Port McNeill Forest District 12 mapsheets which identified approximately 6000 hectares of potential extensions to operability, and suggested that a 10-percent increase in the timber harvesting land base was possible immediately. District staff examined these mapsheets and found that, since Interfor had relied on old operability information, in many cases Interfor had identified areas which had already been classified as operable in the BCFS analysis. Having carefully reviewed this information, and after examining

many of the sites in the field, I share the view of district staff that only two of the mapsheets submitted—those covering a portion of Gilford Island—demonstrate reasonable extensions to operability. Approximately 2000 hectares of potential extensions to operability were identified by Interfor on these two mapsheets. However, district staff noted that some of these were located on steep terrain, or sensitive soils, or were covered by stands of low timber quality. District staff also noted that some existing logging and development plans included cutblocks in areas considered inoperable in the BCFS analysis, and that some areas had already been developed by adjacent roads. From the above, district staff estimate that a maximum of 600 hectares of the areas identified by Interfor could realistically be harvested in the near future.

Considering the significant decrease in timber supply projected in the BCFS analysis corrected base case, I am compelled to consider any realistic timber supply contribution from harvesting in these areas that have been identified as inoperable. It is reasonable to assume that the operable land base of the area examined in the mapping exercises based on the First Nations operability proposal may have been underestimated in the BCFS analysis by 1000 hectares. Furthermore, based on the maps presented by Interfor, it is reasonable to assume that the size of the operable land base on Gilford Island has been underestimated by 600 hectares in the BCFS analysis. I am mindful that these mapping exercises do not cover the entire TSA. Based on my discussions with district staff, and my review of the information available, I believe it is reasonable to assume that the operable land base of the Kingcome TSA has been underestimated by a total of 2000 hectares. Accordingly, I have accounted for the timber supply contribution of an additional 2000 hectares of operable land in this determination, as discussed below under "Reasons for decision".

- reductions for environmentally sensitive areas

A total of 70 825 hectares of environmentally sensitive areas were excluded from the timber harvesting land base in the BCFS analysis. Concerns were expressed through the public input process that this exclusion was too high. In the *Kingcome TSA Timber Supply Review Discussion Paper* it was suggested that the use of alternative harvesting systems could make harvesting feasible for some sensitive areas where harvesting using existing techniques is not environmentally feasible. However, it was also noted in the *Kingcome TSA Timber Supply Review Discussion Paper* that mapping of environmentally sensitive areas—particularly wildlife habitat and soils—needs to be refined, and that if additional environmentally sensitive areas are identified through improved mapping, this may result in further exclusions from the timber harvesting land base or in additional constraints on harvesting which could reduce the short-term timber supply.

District staff have expressed a concern that the total area of sensitive soils is underestimated in the BCFS analysis. They indicate that the inventory likely does not fully identify areas characterized by soils with very high sensitivity (ES1 areas)

and does not account for any areas with highly sensitive soils (ES2 areas) since none of these ES2 areas have been mapped for the Kingcome TSA. District staff extrapolated the results of terrain stability assessment reports for 27 cutblocks to the timber harvesting land base of the TSA. They assumed that 90 percent of the ES1 areas and 50 percent of the ES2 areas would be unavailable for harvesting. Based on this exercise, district staff estimate that a full accounting of sensitive soils could result in a 5.8 percent decrease in the size of the timber harvesting land base. However, they note that this estimate is based on a relatively small sample of cutblocks, and that while the review does provide a strong indication that the total area of sensitive soils has been underestimated, the extrapolation to the whole TSA may not be statistically valid.

Considering the significant uncertainty about the estimate provided by district staff, this matter should be clarified for the next determination. In the meantime, I am satisfied that the area of sensitive soils in the Kingcome TSA may have been underestimated in the inventory, and that accounting for these sensitive soils could potentially reduce the timber harvesting land base by up to 5.8 percent.

If harvesting does occur in the future consistent with other forest management objectives in the areas that were excluded from the timber harvesting land base due to their highly sensitive soils, the contribution of these areas to the supply of timber in the Kingcome TSA will be considered and accounted for in future determinations.

- *unmerchantable forest types*

Approximately 11 450 hectares of pine and broadleaf forest types were excluded from the timber harvesting land base in the BCFS analysis. It was stated in the *Kingcome TSA Timber Supply Review Discussion Paper* that some stands currently considered unmerchantable could become economical to harvest in the future if timber values increase.

Stands dominated by pine of low timber quality occupy approximately 1440 hectares of the TSA. However, district staff indicate that no harvesting is currently taking place in these stands, and I have made no adjustment to the projected timber supply with respect to unmerchantable forest types.

- *deciduous (broadleaf) species*

Stands consisting mainly of deciduous (broadleaf) species occupy approximately 10 000 hectares of the TSA. Currently in the Kingcome TSA, 25 000 cubic metres of the allowable annual cut are attributable to harvesting in broadleaf stands. Of this volume, only 5000 cubic metres of cottonwood have been allocated to a licence, although I understand that the remainder of the volume (primarily alder stands) has recently been committed.

Approximately 800 hectares of operable cottonwood stands are identified on the inventory. The management plan completed for the cottonwood licence indicates that approximately 300 hectares of these cottonwood stands are located within the licensee's operating area, and that there is enough volume in these stands (approximately 109 500 cubic metres) to support the current harvest level of 5000 cubic metres annually for 22 years. District staff have confirmed that the supply of cottonwood is adequate to support the current harvest level in the short-term.

Vancouver Forest Region staff have completed a preliminary study of the alder volume in the Kingcome TSA. This analysis identified approximately 2200 hectares of alder-leading stands that could reasonably be expected to be harvested in the near future, taking into account timber value, operability, and deductions for environmentally sensitive areas and low site productivity. Based on an average stand volume of 300 cubic metres per hectare, district staff indicate that there is sufficient alder volume to support an annual harvest level of 20 000 cubic metres for the next 5 years. However, the new licensee has submitted that an annual harvest level of 44 000 cubic metres could be supported by alder stands in the TSA, based on an available alder land base of approximately 3060 hectares and an estimated average stand volume of 472 cubic metres per hectare. There is evidently some uncertainty about the volume that can be harvested from alder stands in this TSA. The discrepancies between the studies performed by the BCFS and the licensee in examining the supply of alder should be reconciled prior to the next determination. In the meantime, while I acknowledge that it may be possible that both the area of alder stands and the volume within those stands are greater than assumed by the BCFS, the availability of alder may be limited by other forest management considerations, such as biodiversity and visual quality. Accordingly, I am not prepared to increase the harvest level from alder stands at this time.

From the above, I am satisfied that the current allowable deciduous harvest level of 25 000 cubic metres is reasonable and appropriate.

- *low productivity sites*

Approximately 25 500 hectares of sites with low timber productivity were excluded from the timber harvesting land base in the BCFS analysis. In the *Kingcome TSA Timber Supply Review Discussion Paper* it is suggested that these sites could provide an opportunity to partially offset reductions in short-term timber supply.

Currently in the Kingcome TSA, there is a non-replaceable licence of 112 000 cubic metres for harvesting on sites with low timber productivity. District staff have conducted an evaluation of the potential for harvesting on low-productivity sites in the TSA. They estimate that approximately 21 000 hectares of sites with poor timber productivity can be harvested within the Kingcome TSA. Assuming that the area would be managed under a four-pass harvesting system,

and assuming an average volume of 350 cubic metres per hectare—both of which I consider to be reasonable assumptions—district staff estimate that approximately 1 837 500 cubic metres of harvestable volume are available in poor-timber-productivity sites in the near future. The projected number of passes is consistent with the IRM zone of the Kingcome TSA, as discussed under *cutblock adjacency*. District staff submitted that an accelerated harvest rate of 180 000 cubic metres annually could be maintained over the next 10 years.

I acknowledge that an increase in the harvest level from low-productivity stands is possible. However, I am not convinced that it is appropriate to increase the harvest level from these stands to 180 000 cubic metres per year, since this harvest level would not allow for a reasonable rate of decline in the future. The inclusion of these stands in the timber supply for the TSA represents an increase in the size of the timber harvesting land base of approximately 11 percent. Sensitivity analysis shows that if the size of the timber harvesting land base is increased by 10 percent across all forest types, the initial harvest level could be increased by approximately 150 000 cubic metres. Since these low productivity sites have lower timber volumes than an average site in the TSA, it is expected that the addition of these stands to the timber harvesting land base will not have the full impact shown in the sensitivity analysis. BCFS staff estimate that the addition of the low-productivity stands to the timber harvesting land base could increase the initial harvest level to 130 000 cubic metres. I am satisfied that this estimate is a reasonable approximation of the harvesting potential on low-productivity sites, and I have accounted for the contribution of these sites to the timber supply of the Kingcome TSA in my determination as discussed below, under "Reasons for decision".

- roads, trails and landings

In the BCFS analysis, to account for existing roads, trails and landings, a reduction of 7 percent was applied to those areas on the timber harvesting land base harvested over the past 50 years. District staff have examined site degradation numbers from Major Licensee Silviculture Information System (MLSIS) records, which show an average 6.3 percent loss of site productivity within cutblocks from 1987 to 1995. These records do not account for roads that are established between cutblocks; therefore, the total loss of productivity due to roads will be higher than these results indicate. I am satisfied that the estimate used in the BCFS analysis is reasonable and is the best available at this time.

A further reduction of 7 percent was projected in the BCFS analysis to account for future roads, trails and landings in the remainder of the timber harvesting land base. This estimate is based on projecting current road building practices, taking into account the increasingly difficult terrain expected to be encountered in future operations, and is consistent with allowable site degradation limits in the Forest Practices Code. I consider the estimate used in the BCFS analysis for losses due to future roads, trails and landings to be reasonable for use in this determination.

However, I note that due to the nature of deductions in the model for future roads, trails and landings—these areas are assumed to contribute currently to the timber supply and are to be taken out of the timber harvesting land base only after they are harvested—even if the reduction has been underestimated or overestimated in the BCFS analysis, the projected harvest level would not be affected in the short term.

In summary, I believe the deductions for existing and future roads, trails and landings that were used in the BCFS analysis are adequate and do not represent a cause for concern in this determination. However, I do note that there is significant uncertainty about road deductions in general in the province, and I have instructed Forest Service staff to clarify provincial procedures for estimating losses of this kind and to assess their implications for timber supply throughout the province, so that improvements in estimating these losses may be utilized in future AAC determinations.

- *Timber Licence reversion*

Timber Licences are old tenure arrangements that give a licensee exclusive rights to harvest merchantable timber within the licence area. Once these areas have been harvested, all future harvesting rights revert to the Crown and future harvests from the area are expected to contribute to the harvest for the TSA. Accordingly, in the BCFS analysis, timber licences in the Kingcome TSA are assumed to be included in the operable land base only after harvesting of the existing stand takes place.

In the BCFS analysis, it was assumed that 16 332 hectares of timber licences would be harvested and then revert to the timber harvesting land base of the Kingcome TSA over the next 40 years. It was assumed that these stands would regenerate more like unmanaged stands than managed stands. However, since the completion of the BCFS analysis, it has become apparent that these timber licence areas will regenerate more like managed stands. The timber supply implications of this are discussed below, under *volume estimates for regenerated stands*.

Concern was expressed in the licensee's analysis that the assumptions used in the BCFS analysis regarding the reversion of timber licences unduly limit the availability of timber. In the BCFS analysis, it was assumed that these areas contribute to the total area that is not greened-up immediately after harvesting. It is stated in the licensee's analysis that these areas should not contribute to the area of the TSA that is non-greened-up, as these areas will not legally revert to the TSA until silviculture commitments have been met (estimated to be on average about 15 years following harvest). However, district staff indicate that once these stands are harvested, they are considered as non-greened-up area operationally, and stands adjacent to these areas cannot be harvested until they have greened-up. Thus, these stands affect adjacency immediately following harvesting. Therefore, I do not agree with the assertion made in the licensee's analysis, and I am satisfied that

the assumptions regarding the reversion of timber licences in the BCFS analysis are reasonable.

Existing forest inventory

-general comments

Inventory information for the Kingcome TSA was collected between 1966 and 1974. An inventory of environmentally sensitive areas in the TSA was conducted in 1978, and this information was incorporated into the inventory for the TSA. The inventory was updated to 1993 to account for any growth that had occurred in the forests to that date. The TSA inventory information has also been updated to November 1993 to account for changes to the forest, including depletions resulting from harvesting and fires that have occurred since the last inventory was conducted. However, the inventory does not reflect any harvesting or depletions that have occurred since this update. The inventory information used in projecting the base case harvest forecast therefore slightly overestimates the amount of mature timber currently available for harvest. This represents a small decrease in the short-term timber supply, which I have considered in this determination, as noted under "Reasons for decision", below.

An issue was raised concerning the overall quality of the inventory. As noted in the BCFS analysis, there are approximately 60 000 000 cubic metres of timber older than 140 years of age on the timber harvesting land base. However, district staff noted that in licensees' and Small Business Forest Enterprise Program (SBFEP) records, the amount of mature timber on the timber harvesting land base was shown as significantly less than 60 000 000 cubic metres. Since this concern was raised, district staff have examined and confirmed the original estimate from the BCFS analysis. However, I note that there is still uncertainty about other aspects of the inventory (as discussed below under *site productivity, reductions for environmentally sensitive areas, operability, and volumes estimates for existing stands*) which are important to resolve prior to the next AAC determination.

- volume estimates for existing stands

In the BCFS analysis, existing volumes were estimated and projected using the Variable Density Yield Prediction (VDYP) model. This is a generally accepted yield model based on many sample plots throughout BC. The potential for an overestimation in volume estimates for existing stands is identified in the *Kingcome Timber Supply Area: Timber Supply Review Discussion Paper* as a critical factor which may represent a downward influence on the short-term timber supply projected in the base case. District staff have expressed a concern, based on field observations, that there may be some inaccuracies in the inventory, particularly with respect to height and species composition, which result in a discrepancy between the volumes projected in the BCFS analysis and the cruised volumes for the TSA. However, the comparison of projected volumes and cruised volumes does not provide statistically valid results that would constitute conclusive

evidence, and I am not aware of any other conclusive evidence to support this claim.

I do note, however, that a recently completed statistical inventory audit for the Kingcome TSA found that, for the TSA taken as a whole, the mean value of the mature timber volumes as projected by VDYP from inventory information and used in the BCFS analysis were on average approximately 11 percent higher than the mean of the volumes obtained from the plots sampled in the audit. This result indicates a strong probability that the mature volumes derived through VDYP from the inventory figures and used in the analysis are overestimated to some extent. The magnitude of the implications for timber supply of this probable overestimation are uncertain, since the audit is intended to provide generalized results which are statistically reliable for the entire TSA, but which do not identify the accuracy of the volume estimates in the inventory data for a particular part or parts of, or for particular groups, species or site classes within, the TSA. This study did not measure enough samples to provide valid information about the accuracy of volume estimates for existing stands on the *timber harvesting land base*.

BCFS sensitivity analysis shows that if existing stand volumes on the timber harvesting land base have been overestimated by 10 percent, then the initial harvest level projected in the base case would have to decrease by 10 percent in order to avoid abrupt future declines in harvest levels. I am not convinced that existing stand volumes on the timber harvesting land base have been overestimated to the extent shown in the inventory audit for the whole TSA. Nevertheless, the inventory audit does indicate that there is a risk that existing stand volumes have been overestimated in the timber harvesting land base, and I have accounted for this risk in my determination, as discussed below, under "Reasons for decision".

Expected rate of growth

- *site productivity estimates*

Site indexes, determined from the ages and heights of trees, are used to estimate the productivity (growth potential) of tree-growing sites. In the BCFS analysis, site indexes based on the existing mature stand characteristics were applied to the regenerating stands following harvest. As discussed in the *Kingcome Timber Supply Area: Timber Supply Review Discussion Paper*, site indexes determined from inventory information for very old stands may not accurately reflect the potential site productivity for regenerating stands.

While there is no direct evidence showing that site indexes in the Kingcome TSA have been underestimated, I am aware that there is some evidence indicating that site indexes in other areas of the province have been underestimated. For example, a study conducted on TFL 6, adjacent to the Kingcome TSA, shows that site indexes in the TFL may be underestimated, on average, by 4 metres. While the results from this study cannot be directly extrapolated to the Kingcome TSA—the

sites within the TFL are, on average, characterized by a higher site productivity—the study does provide an indication that site indexes in other areas of the Port McNeill Forest District have been underestimated. A provincial paired-plot survey is expected to provide information from which to assess site indexes in the Kingcome TSA. The results will be incorporated into future timber supply analysis.

In the meantime, I note that if site indexes have been underestimated in old-growth stands, projections about the time required to reach green-up, the volumes in regenerated stands, and minimum harvestable ages could be affected; however, there would be no effect on the volume estimates for existing natural stands. The licensee's analysis provided a harvest forecast which illustrated the timber supply impact of increasing the site indexes of regenerating stands which replace old-growth stands by 6.5 metres and 8 metres for cedar and hemlock stands, respectively. This harvest forecast shows that increasing the site indexes in this manner could allow an increase of 64 100 cubic metres (approximately 5 percent) over the initial harvest level projected in the base case from the licensee's analysis. However, I note that the site index adjustments used in the licensee's analysis were not based on any field measurements.

If all site indexes are increased by an average of 4 metres, estimates of minimum harvestable ages decrease by 20 years and regenerated stand volume estimates increase by 30 percent. Sensitivity analysis shows that if site productivity has been underestimated to this extent, there is a significant increase in the long-term harvest level, but there is no direct impact on the initial harvest level projected in the BCFS analysis base case. However, as discussed below, under *green-up period*, if site productivity has been underestimated by 4 metres, green-up periods could be about 3 years shorter, which sensitivity analysis shows would result in the initial harvest level increasing by 18 percent over the initial harvest level projected in the corrected base case.

I have no statistically reliable information upon which to base any adjustment to site indexes in this TSA. However, based on my experience with this issue in various parts of the province, and on the results of the study in the adjacent TFL 6, I consider it likely that site productivity has been underestimated for regenerating stands in the TSA. The risk associated with such an underestimation in terms of foregone short-term timber supply is significant, particularly in view of the projected severe declines in timber supply in this TSA. I have recognized and accounted for this risk, as discussed below, under *green-up period* and in "Reasons for decision".

- volume estimates for regenerated stands

Estimates of volumes for most regenerated stands were projected in the BCFS timber supply analysis using the Table Interpolation Program for Stand Yields (TIPSY), which was designed for use with managed stands. Operational

Adjustment Factors (OAFs) were applied to the volume estimates and yield predictions in BCFS timber supply analysis in order to account for the loss of timber productivity due to operational conditions, such as openings in stands, damage by pests, decay and waste and breakage.

I believe that it is likely that the site productivity is underestimated for old-growth stands, and thus there are uncertainties with the volume estimates for regenerated stands. However, while sensitivity analysis shows that increases in regenerated volume estimates result in increases in the long-term timber supply, there is no impact on short-term timber supply. Apart from the implications of underestimated site productivity, I am otherwise satisfied that the volume estimates for regenerated stands in the Kingcome TSA analysis projected using TIPSY are appropriate for this determination.

There is, however, one outstanding consideration regarding regenerated stand volume estimates. As noted above in *Timber Licence reversion* in the BCFS analysis, it was assumed that 16 332 hectares of timber licences would revert to the timber harvesting land base of the Kingcome TSA over the next 40 years. At the time the data package was completed it was assumed that these stands would regenerate more like unmanaged stands than managed stands, and thus the volumes for these stands were projected using the VDYP model, which is designed primarily for use in unmanaged stands. Since the completion of the BCFS analysis, it has become apparent that these timber licence areas will regenerate more like managed stands. Accordingly, the volumes for these stands should have been projected using TIPSY. This would have an impact on the estimates, used in the BCFS analysis, for regenerated stand volumes for the stands currently managed under timber licences. As a result, the mid- and long-term harvest level for the Kingcome TSA should be slightly higher than projected in the BCFS analysis. I consider this to have a small impact on medium- and long-term timber supply in the TSA, but this is not expected to affect the short-term timber supply and I have made no adjustment on this account in this determination.

- *minimum harvestable ages*

Minimum harvestable age is the average time required for trees to reach a merchantable condition or a minimum harvestable size. In the BCFS analysis, the minimum harvestable ages were based on the ages at which the mean annual increment (MAI, i.e. the average annual volume growth of a stand) for each tree species and growing site is within 5 percent of the maximum average annual volume growth, with the exception of stands currently older than 120 years, for which the minimum harvestable age was assumed to be 140 years. Currently, the BCFS analysis projects that most stands will be harvested at ages well beyond the minimum harvestable ages.

At present, district staff confirm that these minimum harvestable ages are a reasonable extrapolation from current practice in the TSA. However, as discussed

under *site productivity* above, minimum harvestable conditions may be met sooner than estimated in the timber supply analysis. Sensitivity analysis indicates that if minimum harvestable ages were reduced by 20 years, short-term timber supply would remain unchanged; therefore, I have made no adjustment to the projected initial harvest level on this account in my determination. However, I am mindful that a reduction in minimum harvestable ages would provide some additional flexibility in the medium term, which could partially offset the drop below the long term harvest level from decades 5 to 16.

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

Regeneration delay

Regeneration delay is the elapsed time after harvesting before an area becomes occupied by a specified minimum number of acceptable, well-spaced trees. For the purposes of the BCFS analysis, regeneration delays in the Kingcome TSA were assumed to range from 3 to 6 years, depending on the regeneration methods used for given sites.

Regeneration delay was identified in the *Kingcome TSA Timber Supply Review Discussion Paper* as a critical factor which, if reduced, could result in an increase in timber supply in the TSA. Approximately 40 percent of the areas harvested in the TSA are currently regenerated naturally. Interfor and the Truck Loggers' Association suggest that regeneration delay could be reduced to 3 years throughout the TSA by planting all sites harvested in the TSA. If there is an increase in the proportion of area planted over the next few years, and regeneration delays are reduced, this will be considered and accounted for in future determinations. For this determination, district staff indicate that the regeneration delays used in the BCFS analysis are a reflection of current practice, with the following exception.

In general, records from the Major Licensee Silviculture Information System (MLSIS) confirm the regeneration delays used in the BCFS analysis. The exception is that the records show that where a 6-year regeneration delay was assumed in the analysis, regeneration is actually taking place in 5 years.

Subsequent to the completion of the BCFS analysis, BCFS staff produced a sensitivity analysis which showed the timber supply impacts of adjusting the regeneration delay in those analysis units that had a regeneration delay of 6 years to 5 years. As a result of this change, the initial harvest level could be increased by 1.2 percent over the initial harvest level projected in the corrected base case. I am satisfied that this sensitivity analysis appropriately reflects the impact of the change in regeneration delays reflected in the MLSIS records, and I have accounted for the timber supply impacts of this change in my determination, as discussed below, under "Reasons for decision".

- impediments to prompt regeneration

Some regeneration difficulties in the Kingcome TSA are caused by deer browse. Successful regeneration of areas susceptible to deer browse is ensured through the use of tree tubing and metal cages. In general, the effects of deer browse in the TSA were incorporated in the BCFS analysis through the assumptions about regeneration delays. However, there are several hundred hectares of low and poor timber-productivity sites on Malcolm Island which, as a result of past deer browse, have been overtaken by salal and are currently not sufficiently restocked. This has been accounted for in the BCFS analysis through deductions for not-satisfactorily restocked areas, discussed below.

The Sitka-spruce-leader weevil is the most significant impediment to prompt regeneration in the Kingcome TSA. This pest has affected the growth of Sitka spruce stands primarily in the mainland inlets of the TSA; however, the spruce weevil is now affecting stands found on the west coast of Vancouver Island as well. District staff estimate that Sitka-spruce-leader weevil is a significant impediment to the regeneration of Sitka spruce on approximately 2200 hectares in the TSA. However, half of this area is occupied by stands with a Sitka spruce component of less than 50 percent. Therefore, on 1100 hectares of the timber harvesting land base, the weevil is not expected to have a significant timber supply impact, as other species will naturally fill for the damaged spruce seedlings. The volume losses expected from the 1100 hectares of stands composed mainly of Sitka spruce are estimated by district staff to be 2200 cubic metres per year. This loss was not accounted for in the BCFS analysis base case, and represents a very small reduction—approximately 0.2 percent—in the initial harvest level projected in the BCFS analysis corrected base case.

I believe that the estimate of growth loss due to Sitka-spruce-leader weevil provided by district staff is reasonable. However, the information used to derive this estimate cannot be directly applied to Sitka spruce stands throughout the Kingcome TSA. While I therefore do not consider the impact of this pest to be fully quantified, from the information before me I do not believe that the losses due to the Sitka-spruce-leader weevil are of sufficient magnitude to be of significance in this determination, and I have made no specific adjustment on this account.

Not-satisfactorily-restocked area

At the time the BCFS analysis was conducted, 6844 hectares of the TSA were identified as not-satisfactorily-restocked (NSR) area on the inventory file. This estimate was used in the BCFS analysis. The current NSR area consists mainly of recently harvested areas that are not covered by a sufficient number of tree stems of desirable species, but that are expected to be reforested within 3 to 5 years, the acceptable regeneration delay period. I am satisfied that the assumptions used in the BCFS analysis for current NSR area are reasonable for use in this determination.

Of the 6844 hectares of NSR approximately 443 hectares are considered backlog not-satisfactorily-restocked areas in the Kingcome TSA. Most of these areas are inaccessible (or in some cases, extremely small and difficult to treat); others occur along riparian areas. District staff indicate that some of these backlog NSR areas will be reclassified as sufficiently-restocked deciduous stands; other areas will be restocked but at a lower number of trees per hectare than average, which will result in lower than expected timber volumes. It was assumed in the BCFS analysis that all of this backlog NSR would be included in the timber harvesting land base within 3 to 5 years at normal stocking levels. While a lower volume per hectare will be realized from these stands, the impact to the timber supply will be minimal due to the small area affected. In addition, any impacts will occur in the mid to long term. Therefore, while I am mindful that a reduction in volumes from these stands would result in small decreases in the mid- and long-term harvest levels, in my determination I have made no adjustment to the projected initial harvest level on this account.

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

Silvicultural systems

In the *Kingcome TSA Timber Supply Review Discussion Paper*, it was suggested that partial cutting systems could be used to partially offset projected reductions in short-term timber supply. However, most of the timber harvesting land base in the Kingcome TSA is currently managed under a clearcut harvesting system, and district staff indicate that the use of alternative silvicultural systems is limited in much of the TSA by the steep terrain and the high potential for wind damage to residual trees. Nevertheless, there is some potential to use alternative silvicultural systems in visually sensitive areas to increase the availability of timber for harvesting. This is discussed below, under *visually sensitive areas.*

Some harvesting in the TSA is currently conducted using clearcuts with reserves. The use of this alternative system was not assumed in the timber supply analysis. District staff indicate that the patches of timber reserved in cutblocks generally correspond with riparian management areas and unstable gullies, and will partially fulfill requirements for stand-level biodiversity . The timber supply impacts of managing these riparian areas and gullies are discussed below, under *riparian habitat*, *gully management*, and *biodiversity*. Therefore, for the purposes of this determination, I am satisfied the base case assumptions regarding silvicultural treatments are appropriate.

- incremental silviculture

It is suggested in the *Kingcome TSA Timber Supply Review Discussion Paper* that in some circumstances, spacing and fertilization could be used to partially offset projected reductions in short-term timber supply.

Since 1980, approximately 5000 hectares have been spaced in the TSA. However, spacing generally improves the quality, rather than increasing the quantity, of timber produced. Thus, in the BCFS analysis, no adjustments to the volume estimates were made on this account. I accept this and in my determination I have made no adjustment to the projected initial harvest level to account for spacing.

There has been very little fertilization in the TSA. District staff note that hemlock stands have a variable response to fertilization. Douglas-fir can have a positive response; however, there are few Douglas-fir stands in the TSA, which consequently do not provide a significant opportunity to increase timber supply. There may be some opportunity to increase timber production by fertilizing in some cedar stands on the north end of Vancouver Island and on the islands in Queen Charlotte Strait. However, there has been no assessment of the opportunity to date, and district staff suggest that difficulties with access and the cost of fertilization will limit the extent of any fertilization program in these stands. Thus the assumption of no contribution to timber supply from fertilization as used in the BCFS analysis appropriately represents current practice, and I have assumed no additional timber supply contribution from fertilization.

Deciduous competition

In the Kingcome TSA, many previously harvested areas have regenerated to alder-dominated stands with hemlock and cedar regenerating under the alder canopy. In order to promote the growth of coniferous species a program is in place to remove the alder in some of these stands, to enable the coniferous species to grow without competition from the alder. Over the past 5 years, approximately 6000 hectares have been treated in this manner and much of this has been captured in the inventory file. An additional 600 hectares are scheduled to be treated in the future. This program does not affect short-term timber supply, and district staff indicate that the majority of the long-term benefits of this conversion program have been accounted for in the BCFS timber supply analysis. Accordingly, I have made no adjustment on this account in my determination.

Commercial thinning

Documented research indicates that single-entry commercial thinning does not generally increase long-term timber supply significantly, though it may increase the value of the future final harvest. Commercial thinning is therefore viewed as a mechanism to alleviate timber supply shortfalls arising from age-class gaps by moving the harvesting of some volume forward from the planned harvest age.

In the *Kingcome TSA Timber Supply Review Discussion Paper* it was noted that approximately 17 percent of the timber harvesting land base is occupied by stands between the ages of 30 and 80 years, some of which could be commercially thinned. Steep terrain and lack of access limit the availability of many of these stands for commercial thinning. Furthermore, no commercial thinning has been conducted in the TSA to date, and there has been no analysis of commercial

thinning opportunities beyond the identification of approximately 10 400 hectares of hemlock stands between the ages of 40 to 60 years, which district staff believe could potentially provide an opportunity for commercial thinning. However, considering the significant decrease in short-term timber supply projected in the BCFS analysis, it is important that opportunities for commercial thinning are examined carefully. I expect district staff to analyze the potential for commercial thinning in the Kingcome TSA, and if it is feasible, to implement a commercial thinning strategy. In the meantime, in this determination I have assumed no additional timber supply contribution from commercial thinning.

(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

The standard and level of timber utilization define the species, dimensions and quality of trees that must be cut and removed from the site during harvesting operations. Standards in place for the Kingcome TSA for existing mature stands require that all trees greater than 17.5 centimetres diameter at breast height (dbh) be harvested and removed from the site. Standards also require that no stumps be taller than 30 centimetres and that all wood down to a top diameter of 15 centimetres be removed from the site. Standards for regenerating stands and existing immature stands are the same except that the top diameter limit is 10 centimetres. With one exception noted below these standards are reflected in the BCFS analysis.

The Variable Density Yield Prediction model, used for predicting volumes in the existing mature stands, projects volumes based on a 10-centimetre top diameter limit. Staff of the BCFS Resources Inventory Branch estimate that as a result, the volumes projected to be harvested from existing mature stands in the BCFS analysis have been overestimated by less than 1 percent, and I do not consider this to be a significant factor in the determination. In general, I am satisfied that the assumptions used in the BCFS analysis adequately represent the utilization standards predominantly practiced in the TSA.

Decay, waste and breakage

The Variable Density Yield Prediction model used in estimating volumes for existing, unmanaged stands incorporates estimates of the volume of wood within a stand lost to decay, waste and breakage. The BCFS analysis for the Kingcome TSA used standard provincial factors to estimate timber volume losses due to waste and breakage. Some concerns were raised by district staff about the decay, waste and breakage levels for yellow cedar and western red cedar stands. The BCFS Resources Inventory Branch conducted a study to address these concerns, and confirmed that the standards used for these species are satisfactory.

The Table Interpolation Program for Stand Yields (TIPSY) was used to estimate volumes for most regenerated stands in the BCFS timber supply analysis. Operational Adjustment Factors (OAFs) are applied to the regenerated stand volume estimates in the BCFS timber supply analysis in order to account for the loss of timber productivity due to decay, waste and breakage. I am satisfied that the decay, waste and breakage factors used in the BCFS analysis are appropriate for use in this determination.

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

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

Integrated Resource Management (IRM) objectives

- *green-up period*

Stands of timber adjacent to harvested cutblocks are not available for harvest until the harvested cutblocks have regenerated, and the regenerated stands have attained an acceptable "green-up" height. The number of years required for a regenerated stand to reach the green-up height is referred to as the "green-up age". In the *Kingcome TSA Timber Supply Review Discussion Paper*, green-up age was noted as a critical factor which could affect short-term timber supply.

Comments were received through the public input process regarding the green-up heights assumed to provide the conditions required to meet management objectives in the Kingcome TSA. The length of the green-up period, and therefore the availability of timber, can be affected by the definition of acceptable green-up height. Based on current management, I believe that what was modeled in the BCFS analysis provides the best available approximation of the green-up height requirements and I have no information at this time to suggest that the BCFS analysis assumptions about the definitions of acceptable green-up height are inappropriate.

Nevertheless, there is some uncertainty regarding the assumptions about the time required to reach these green-up heights. In the BCFS analysis, based on current site index equations, it was assumed that it would take 14 years on average for stands to reach the green-up height of 3 metres required in the integrated resource management zone. It was also assumed that it would take 19 years on average for stands to reach the green-up height of 5 metres required in the three visual quality objective zones.

However, as discussed above, under *site productivity estimates*, it is likely that site productivity is underestimated for regenerated stands. As also noted in *site productivity estimates*, while there is no direct evidence showing that site indexes in the Kingcome TSA have been underestimated, there is some evidence indicating that site indexes in other areas in the Port McNeill Forest District have been underestimated by about 4 metres. If all site indexes in the Kingcome TSA have been underestimated on average by 4 metres, the time required to reach green-up conditions will have been overestimated by about 3 years. A sensitivity analysis on the corrected base case shows that, if the time required to meet green-up is decreased by 3 years, then the initial harvest level could be 18 percent higher than projected in the corrected base case.

To the extent that site productivity has been underestimated, it is equally likely that green-up ages have been overestimated. However, since no site productivity information specific to the Kingcome TSA is available, in this determination I have considered this likelihood as an indication of a significant risk that the short-term timber supply was underestimated on this account in the BCFS corrected base case. As discussed in "Reasons for Decision", I have considered the acknowledged uncertainty in this factor in context of the uncertainties in other factors in this determination, and in context of the social and economic objectives of the Crown as expressed by the Minister of Forests in his letter of July 28, 1994.

- cutblock adjacency

In order to protect non-timber resources such as wildlife, water quality and aesthetics, current harvesting practices limit the size and shape of cutblocks and prescribe a minimum green-up height for adjacent cutblocks. This provides for a distribution of harvested areas and retained forest cover across the landscape, which helps to meet several forest management objectives. Cutblock adjacency guidelines are commonly expressed in terms of the number of harvesting entries, or "passes," required to harvest the entire area of the timber harvesting land base.

In the BCFS analysis, it was assumed that a 4-pass harvesting regime would be required in the integrated resource management (IRM) zone, which constitutes approximately 59 percent of the timber harvesting land base. Suggestions were received as part of the public input process that a 3-pass harvesting regime would more closely approximate harvesting patterns in the IRM zone for the Kingcome TSA. Sensitivity analysis shows that if this zone were managed under a 3-pass system, the initial harvest level could be increased by 8.7 percent over the initial harvest level projected in the base case. However, I note that the 4-pass harvesting system modeled in the BCFS analysis is based on an average cutblock size and the need for the leave strip size to support an economical cutblock. In addition there is a district harvesting guideline that specifies that a minimum 400-metre buffer be maintained between cutblocks. Research shows that permitting only a maximum of 25 percent of the timber harvesting land base in the IRM zone to be below green-up age at any time (i.e. a 4-pass harvesting regime) is a

reasonable representation of these harvesting requirements. I am satisfied that what was modeled is a reasonable approximation of current requirements for cutblock adjacency in the TSA, and I have made no adjustment on this account in my determination.

- *visually sensitive areas*

Forest resources managed by the BCFS include recreation resources. "Recreation resource" is defined in the *Forest Practices Code of British Columbia Act* to include "scenic or wilderness features or settings that have 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 visual quality objectives (VQOs) for visually sensitive areas. These objectives limit the amount of visible disturbance that is acceptable in such areas.

A significant amount of public input was received regarding the level of harvesting restrictions in visually sensitive areas and the harvesting techniques and systems used in these areas. In the BCFS analysis, 41 percent of the timber harvesting land base of the Kingcome TSA is assumed to be managed for visual quality objectives. Visual quality objectives were identified in the *Kingcome TSA Timber Supply Review Discussion Paper* as a critical factor which could increase or decrease short-term timber supply. In the discussion paper, it is suggested that the timber supply projected in the BCFS analysis could be affected by changes to the visual sensitivity of a particular area or to the forest cover requirements applied to areas to maintain scenic values.

The areas identified in the BCFS analysis as visually sensitive were derived from the district's Recreational Feature Inventory. Visual landscape inventory information has been collected for the TSA and is currently being evaluated. When completed, this inventory will provide a more detailed assessment of visual sensitivity in the TSA, and will be subject to public review, potentially for the mainland portion through the recently announced Land and Resource Management Planning (LRMP) process for the Central Coast. The VQO information derived from the inventory will be incorporated into future timber supply analysis.

The forest cover requirements applied to visually sensitive areas in the TSA are based on recommended visual quality objectives for the TSA. These recommended VQOs provide a range of disturbance levels that are acceptable within a visual quality objective zone, expressed as the range of allowable area in the zone that is allowed to be covered by stands that have not met green-up conditions. In the BCFS analysis, the *midpoint* of the range was used as a starting point. This level of allowed disturbance was then adjusted to account for the

contribution made to the maintenance of visual quality from the forested areas excluded from the timber harvesting land base, and for the dispersion of the timber harvesting land base within the total forested land base. District staff believe that until the visual landscape inventory information is evaluated and the VQOs subjected to public review, it is more appropriate to assume that the *maximum* allowable disturbance for each VQO area can be utilized as the starting point for the adjustments noted above. District staff feel that improved cutblock design, alternative harvesting systems, and potentially shorter green-up periods will allow this opportunity to maximize the harvest from each VQO class in the short term, without compromising VQO guidelines in the long term. Maximizing harvesting within the acceptable VQO disturbance ranges in the short-term is also consistent with the recent direction provided by the Minister of Forests, discussed under Economic and social objectives of the Crown, below.

District staff also note that in the BCFS analysis, 193 hectares classified as "preservation" VQO should have been included in the IRM zone. They also suggest that an additional 3274 hectares of preservation VQO area could be classified as "retention" VQO area, in which some harvesting could be conducted.

Sensitivity analysis provided subsequent to the completion of the BCFS analysis shows the timber supply impacts of modeling the maximum allowable disturbance for VQO zones, changing the amount of area classified as preservation VQO and making the small addition to the IRM zone. If all three of these changes are made then the initial harvest level could be increased by 13 percent over the initial harvest level projected in the corrected base case.

I also note that there is some potential to increase the availability of timber for harvesting by using alternative silvicultural systems in visually sensitive areas. A local company has requested a forest licence for harvesting timber from visually sensitive areas using alternative harvesting systems. In addition, improved cutblock design in visually sensitive areas could increase the availability of timber in the short term.

Taking all the above into consideration, and based on my field review of many of these sites, I believe it is reasonable to expect that timber availability may be increased in visually sensitive areas beyond that assumed in the BCFS analysis; similarly, I believe it is likely that some harvesting can be conducted in some of the preservation VQO areas while still meeting the visual management objectives for the area. I have taken this into account in my determination, as discussed below, under "Reasons for decision".

- riparian habitat

The protection of riparian habitat was accounted for in the BCFS analysis through a 4071 hectare (approximately 2.2 percent) reduction to the timber harvesting land base. This reduction was based on requirements outlined in the Coastal Fisheries/Forestry Guidelines, which were in place at the time the analysis was

initiated. These guidelines specified that a 25-metre no-harvest buffer be maintained on each side of all Class A streams and lakes. Since the completion of the timber supply analysis, Forest Practices Code requirements for the protection of riparian habitat have introduced different requirements for riparian areas. As a result, lakeshore reserve areas have been slightly *overestimated*, and streamside reserves have been substantially *underestimated*, in the BCFS analysis. Analysis work performed in the Vancouver Forest Region indicates that, on average, riparian reserve requirements under the Forest Practices Code in TSAs with terrain similar to the Kingcome represent a total reduction of approximately 5 percent to the size of the timber harvesting land base. In view of the 2.2% reduction incorporated in the BCFS analysis, I consider Forest Practices Code requirements for the protection of riparian habitat to represent a further 2.8 percent reduction to the size of the timber harvesting land base in the BCFS analysis. The timber supply implications of increased riparian habitat requirement under the Forest Practices Code are discussed below, under *biodiversity* and in "Reasons for Decision".

- wildlife habitat

Approximately 2300 hectares are classified as environmentally sensitive areas for wildlife and were excluded from the forested area in the BCFS analysis. No forest cover constraints were applied specifically to account for wildlife habitat requirements. However, the relatively stringent forest cover requirements for VQOs applied to much of the timber harvesting land base, as well as requirements for riparian habitat and stand-level biodiversity, will likely provide some of the habitat needed for many of the wildlife species found in the Kingcome TSA. In the meantime, I am satisfied that current knowledge on wildlife habitat has been adequately modeled in the BCFS analysis.

Staff of the Ministry of Environment, Lands and Parks have expressed concern that current management practices may not accommodate the needs of several species, including grizzly bears, mountain goats, and marbled murrelet. I believe that management for these species may represent a downward influence on the size of the timber harvesting land base. However, in most cases, explicit management approaches have not been resolved, and in all cases, it is not yet possible to predict the timber supply impacts of managing for these species. Therefore, I have made no adjustment to the projected initial harvest level on this account in my determination. However, any additional wildlife habitat information will be incorporated into future timber supply analysis and I am mindful that accounting for further wildlife habitat management could decrease future harvest levels.

- community watersheds

There are two licenced community watersheds in the Kingcome TSA: the Tsulquate River (approximately 4500 hectares), and the Quaee and North Quaee Creeks (approximately 410 hectares). In the BCFS analysis, no forest cover requirements specific to water quality were applied to these areas. Under the

Forest Practices Code, coastal watershed assessments will be required in community watersheds prior to the submission of harvesting plans for these areas. It is possible that the forest cover and green-up requirements arising from the assessment process may be more stringent than those modeled in the BCFS analysis. However, I note that these areas cover only approximately 1000 hectares of the mature stands in the timber harvesting land base. Therefore, even if forest cover and green-up requirements for these watershed areas are made significantly more stringent than modeled, this will not have a significant impact on timber availability in the short term. For the purposes of this determination, I do not consider this to have a measurable impact on timber supply. Watershed assessments will be conducted in these areas, and the information from these assessments will be taken into consideration in future determinations.

- recreation

Approximately 2830 hectares of forested area located in designated Recreation Reserves were considered in the BCFS analysis to be unavailable for harvesting. In addition, 587 hectares of forested area identified as having moderate to high recreation values were excluded from the timber harvesting land base in the BCFS analysis. District staff indicate that under the Vancouver Island Land Use Plan, some of these recreational areas have been incorporated into protected areas. The timber supply impacts of the Vancouver Island Land Use Plan are discussed below, under Vancouver Island Land Use Plan and the Protected Areas Strategy. I am satisfied that the BCFS analysis captures recreation management appropriately and that no adjustment to the projected initial harvest level is required to account for any changes to recreation areas.

- areas of cultural or archaeological significance, and traditional uses

Sites of archaeological or traditional use are located throughout the Kingcome TSA, predominantly along foreshore or riparian areas. Requirements for these areas were not specifically modeled in the BCFS analysis; however, many of these sites are already protected by other guidelines or have been removed from the land base for other forest values, such as riparian habitat. Currently in the TSA, when these areas are encountered, archaeological impact assessments are conducted, and the results of these assessments are taken into consideration in operational plans in consultation with First Nations.

District staff note that historically there has been extensive use by First Nations' of many areas of the Kingcome TSA; as a result, archaeological features are abundant throughout the TSA. In particular, many culturally modified trees (CMT) have been identified. These trees have been altered by aboriginal peoples as part of their traditional use of the forest resource. Management of culturally modified trees is carried out in accordance with the *Conservation Heritage Act*. Operations in the vicinity are deferred until the CMT has been evaluated and impact management measures are provided to the licensee by the Archaeology Branch. These impact management measures may include recording, dating and removal of the CMT or

preservation with buffer zones. In most cases, the existence of CMTs in the Kingcome TSA has not precluded timber harvesting; however, associated delays in planning or development have occurred. Provincial policy is currently being developed to further clarify the process for management of culturally modified trees.

An archaeological overview assessment has recently been completed for the Port McNeill Forest District. This preliminary assessment is currently being used by district staff to guide further consultations with First Nations. In addition, a traditional use study has been initiated for the district, and is expected to take 3 or more years to complete. In the meantime, as noted in "Guiding Principles...", I fully expect that areas of cultural or archaeological significance, and traditional uses, will be considered by the district manager in his administration of the AAC determined.

For the period of this determination I consider it reasonable to expect that identified areas of archaeological, cultural and traditional significance can continue to be managed through the administration of the AAC and that this will not require any specific adjustment to the projected short-term timber supply at this time.

- *biodiversity*

At the time of the BCFS analysis, no specific biodiversity provisions were applied operationally in the TSA; it was assumed that forest cover requirements for the extensive visually sensitive areas (approximately 41 percent of the timber harvesting land base) would contribute to requirements for old-growth and biodiversity.

According to the *Forest Practices Code of British Columbia Biodiversity Guidebook*, approximately 8 percent of cutblock area should be retained as wildlife tree patches to meet requirements for stand-level biodiversity. However, riparian management zones, gully management, and other suitable areas outside the timber harvesting land base will meet approximately 75 percent of the required 8 percent retention. The guidebook also notes that this requirement is expected to decrease over time as landscape-level biodiversity management is applied in the TSA.

BCFS staff provided a sensitivity analysis showing the combined timber supply impacts of biodiversity and riparian requirements (discussed above, under *riparian habitat*). This sensitivity analysis showed that these requirements could result in a decrease of 5.7 percent in the initial harvest level compared to that projected in the corrected base case. I believe that this sensitivity analysis provides the best approximation of the timber supply impacts of biodiversity *combined with the impacts of riparian habitat requirements* in the Kingcome TSA at this time, and I have taken these results into account in my determination, as discussed below, under "Reasons for decision".

District staff indicate that landscape-level biodiversity has not been implemented in the TSA at this time, although some licensees have included forest ecosystem networks in development plans. Provisions for landscape-level biodiversity are likely to exert a downward pressure on timber supply, particularly in the long term. However, until these provisions are in place, the timber supply impacts cannot be assessed with any certainty. Landscape-level planning is expected to occur over the next several years, and the results will be incorporated into future timber supply analysis.

- gully management

Recent changes in forest management that are reinforced by the Forest Practices Code have resulted in the special management of gullies. This was not accounted for in the BCFS analysis because the practice was not current when the data package was assembled.

In order to assess current gully management practices, district staff reviewed 70 silviculture prescriptions submitted by major licensees in the TSA. Based on their analysis, district staff estimated that gully management could affect as much as 3.2 percent of total cutblock area. BCFS staff indicate that this would result in a decrease of approximately 3 percent in the initial harvest level projected in the corrected base case. They also note that there is very little overlap between the area estimated to be affected by gully management and the estimates of riparian areas and areas with sensitive soils. However, the review performed by district staff included only currently planned cutblocks, and it is possible that fewer gullies will be encountered in the future as harvesting operations are once again conducted on lower slopes. It is also possible that some of the gullies may coincide with areas which were excluded from the timber harvesting land base in the BCFS analysis. Therefore, I consider the 3 percent estimate provided by district staff to be the maximum probable timber supply impact attributed to gully management.

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

Vancouver Island Land Use Plan and the Protected Areas Strategy

On June 22, 1994, the provincial government announced the Vancouver Island Land-Use Plan (VILUP) which identified 23 new protected areas and 22 Low Intensity Areas to be established.

As noted under "Guiding principles for AAC determinations", government's land-use decisions generally must be followed by detailed implementation plans. This is the case with the Vancouver Island Land-Use Plan. Although the land-use decision has been announced, all the details are not complete at this time. A process is currently underway to identify High Intensity Areas (HIAs) and General Forestry Areas, and to develop resource targets for all zones in the VILUP. This

process will also help to clarify the landscape-level biodiversity requirements under the Forest Practices Code in context of the VILUP. It is not possible at present to predict the impacts on timber supply which may result from changes in management associated with this process. When implementation is complete these factors will be analyzed and may be taken into account in the next determination.

The Class A parks totalling 7265 hectares designated within the Kingcome TSA as part of the VILUP will no longer contribute to the timber supply in the TSA. The designation of these parks took place after the BCFS analysis, but I do not expect this to affect the projected timber supply significantly, as the park area which falls within the timber harvesting land base, 902 hectares, is relatively small—less than 0.5 percent of the timber harvesting land base. Goal 2 protected areas arising from the VILUP have recently been finalized, and do not impact the size of the timber harvesting land base of the TSA.

Thus the timber supply impact of the protected areas may be expected to be small. However, in view of other elements of the VILUP, it must be noted that the overall impact of the plan remains uncertain. The locations of the HIAs have not yet been finalized and the management regimes for the Low Intensity Areas (LIAs) have not be determined. Until the HIAs are identified and the LIAs management defined, and other aspects of the land-use plan are finalized and implemented, it is impossible to assess the overall timber supply impacts of all the interacting components of the plan. Therefore, while I will not speculate on the overall effects that the VILUP may have on timber supply, I am satisfied that the effects of the removal of the new protected areas from the timber harvesting land base are not sufficient to warrant any adjustment at this time to the initial harvest level projected in the corrected BCFS base case. However, if at any time during the implementation of the land-use plan it becomes apparent that the new AAC is no longer consistent with the plan, I am prepared to reassess the timber supply and redetermine the AAC before the five-year period required under the *Forest Act*.

Areas where harvesting is currently deferred

Currently in the Kingcome TSA, the Anuhuati River, Blunden Harbour and Upper Klinaklini areas are designated as study areas under the Protected Areas Strategy. The Klinaklini area is assumed to be unavailable for timber harvesting in the BCFS analysis (as discussed above, under *operability*), and district staff indicate that the Blunden Harbour area is characterized by relatively low timber values. The Anuhuati River study area is the only area in which the formal deferral of harvesting impacts timber supply in the TSA. However, I note that this study area covers only approximately 950 hectares of the timber harvesting land base. Therefore, I do not consider these study areas to represent a significant risk to the Kingcome TSA timber supply in the short term. The LRMP process is appropriate for addressing these issues, and the recently announced LRMP for the Central Coast should clarify the status of many of these areas for incorporation into future determinations.

In addition to these formal study areas, there are almost 10 000 hectares of the timber harvesting land base in the TSA in which harvesting is informally deferred for various reasons. These areas—Malcolm Island, Tsulquate River, Ahta River, and the Upper Seymour/Waump Creek—were assumed to be available for harvesting in the BCFS analysis.

The deferral of harvesting operations in these areas of the TSA is causing increasing harvesting pressure on the remainder of the timber harvesting land base. I am concerned that under these circumstances, for harvesting to continue in the TSA at the level indicated by the AAC, the continued avoidance of harvesting in these areas means that the remaining areas must be harvested at higher rates. If the deferrals continue, at some point, the achievement of integrated resource management objectives may prevent higher rates of harvesting in the remaining areas. In fact, district staff indicated that some of these deferrals limit the ability to meet operational plans, particularly since under new guidelines numerous drainages cannot be harvested until adjacency and green-up requirements have been met, and I believe that it is therefore imperative that these deferrals be resolved immediately. As noted above, the recently announced LRMP for the Central Coast area should clarify the status of many of these areas for incorporation into future determinations. In the meantime, if the district manager becomes concerned that the allowable harvest level cannot be met on the remaining available land base while continuing to meet integrated resource management objectives, he 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*. I have noted this matter under "Reasons for decision", below.

Small Business Forest Enterprise Program undercut

Over the last 8 years, the total volume of timber apportioned to the Small Business Forest Enterprise Program (SBFEP) has not been harvested. This 'small business undercut' is estimated to be between 335 000 and 575 000 cubic metres, and under a regional action plan, may be harvested over the next 5 years. This potential additional harvest was not accounted for in the BCFS analysis. If the short term harvest level is temporarily increased to capture this small business undercut, the inventory of mature timber will be depleted faster than indicated in the BCFS analysis, and the decline to the long-term harvest level will be more rapid than projected in the corrected base case. I am mindful that this could significantly affect timber supply; however, I cannot speculate on the administration of the small business undercut because it unknown at this time how much of the small business undercut will actually be harvested over the next few years. However, if harvesting of the small business undercut proceeds, it will be reflected in the inventory depletions for the next analysis, and the resulting decrease in timber supply will be accounted for in future determinations.

(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 TSAs that have an old-growth component, such as the Kingcome TSA. In the short term, the presence of older forests permits harvest levels that are above the long-term harvest level without jeopardizing the future timber supply. In keeping with the objectives of good forest stewardship, AACs in British Columbia have been and continue to be determined so as 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 to ensure that there will be no inordinately adverse impacts on current or future generations. To achieve this, the AAC determined must not be so high as to cause later disruptive shortfalls in supply, nor so low as to cause undue immediate social and economic impacts.

The BCFS timber supply analysis for the Kingcome TSA shows that the original abundance of mature forests which historically allowed harvest levels well above the long-term harvest level has been significantly reduced. In this situation, harvest levels must decline towards the long-term harvest level to avoid serious disruptions in timber supply in the future. The corrected base case harvest forecast shows that harvest levels would have to decline by 33 percent immediately from the current AAC, followed by declines at about 10 percent per decade for the next 3 decades, to about 811 600 cubic metres per year, which is about 13 percent below the steady long-term harvest level.

The BCFS sensitivity analysis also examined alternative harvest projections in which the initial harvest level, its duration, and the subsequent rate of decline were adjusted. Two of these projections showed the timber supply implications of two different rates of inter-decadal decline: 15 and 20 percent. Using these rates of decline permitted initial harvest levels 26 percent and 28 percent below the current AAC, respectively. I have made use of the information provided by this analysis in my determination, as discussed in "Reasons for Decision".

Another BCFS sensitivity analysis examined the consequences of attempting to maintain the current AAC for one decade. This harvest forecast shows that the maximum initial harvest level that can be achieved for one decade under the base case assumptions is 10 percent below the current AAC. However, I must be mindful of problems associated with meeting all the forest cover requirements in both the corrected base case and in this alternative harvest flow. After a decade at this harvest level (1 496 300 cubic metres per year), the harvest level drops severely to 610 486 cubic metres per year (64 percent). Additional significant shortages in timber supply are indicated at several other periods in the harvest forecast.

An additional sensitivity analysis was provided which examined the harvest forecast resulting from rising to the long-term harvest level as early as possible. This forecast is the same as the BCFS analysis base case for the first 4 decades; however, the harvest level declines an additional 10 percent after 4 decades, to a level which is 22 percent lower than the long-term harvest level. Under these circumstances, the long-term harvest level is reached in decade 14.

In the licensee's analysis, the assumptions applied in the BCFS analysis were used to produce a harvest forecast which closely matches the BCFS analysis corrected base case. However, the licensee also submitted a proposed initial harvest level based on an analysis that made the following modifications to the assumptions used in the BCFS analysis: all forested areas with "preservation" VQOs were assumed to be available for harvesting, subject to the same forest cover requirements as applied to the "retention" VQO management zone; forest cover requirements were made less stringent for all VQO zones; regeneration delay was assumed to be limited to 3 years for all areas of the TSA; timber licence areas were assumed to regenerate as managed stands; the Klinaklini area was included in the timber harvesting land base; the size of the operable land base was increased by 10 percent; and old-growth site indexes were adjusted by 6.5 metres for cedar and 8.0 metres for hemlock stands.

I am not prepared to accept that all of the "preservation" VQO areas are harvestable as many of these area are in fact inoperable; however, I do accept that a portion of the 'preservation VQO areas could be available for harvesting, as discussed above under *visually sensitive areas.* Furthermore, considering the Minister's direction regarding VQOs, the use of alternative silvicultural systems and better cutblock design (as noted under *visually sensitive areas*), I am prepared to consider some flexibility in the application of visual quality objectives. As discussed above under Regeneration delay, I am not prepared to accept that regeneration delays are 3 years for all areas of the TSA. However, as indicated above under *Timber licence reversion*, I believe that timber licence areas will regenerate more like managed stands. I have examined the potential for harvesting in the Klinaklini areas (see above, *operability*), and I am satisfied that the exclusion of this area from the timber harvesting land base in the BCFS analysis is appropriate. As discussed further under *operability*, I do not believe that the size of the operable land base can be increased by as much as 10 percent at this time. Finally, as noted under *Site productivity estimates*, while I believe that site indexes have likely been underestimated for old-growth stands, I do not have any information that proves that site indexes have been underestimated to the extent the licensees have assumed. Accordingly, I do not accept the licensee's proposal as a more accurate representation of timber supply in the Kingcome TSA than the corrected base case in the BCFS analysis. However, I do acknowledge the uncertainty about many of these assumptions, and this is reflected in my decision, as discussed below under "Reasons for decision".

Significant public input was received regarding alternative rates of harvesting in the Kingcome TSA. Some of the comments favoured maintenance of current harvest levels while transition strategies and options for the long-term are examined. Others criticized the rates of inter-decadal decline, stating that it was more acceptable to defer large reductions in harvest level to the future. One submission suggested that a decline in harvest levels was needed; however, the decline projected in the BCFS analysis was felt to be too extreme to enable an orderly transition to the long-term harvest level. Several submissions supported the size of reduction in harvest level projected in the BCFS analysis base case, and one comment received asserted that the projected decrease should be a minimum. I have reviewed this input, and I am aware of the many views expressed, which are summarized in the *Summary of Public Input* attached to this rationale as Appendix 5.

Community dependence on the forest industry

A socio-economic analysis (SEA) report for the Kingcome TSA was prepared by Alan Fitzgibbon and Associates for the BCFS, and I have considered this report in making my determination. The SEA describes the economic importance of the TSA's forest industry to both local communities and the province as a whole, and discusses the possible community implications associated with different timber harvest levels. The SEA shows that resource-based industries—fishing, mining, and particularly forestry—dominate the economy and employment base of the Kingcome TSA. Forestry-related employment accounted for 36 percent of all employment in the Port McNeill Forest District in 1990, and provided most of the jobs in Port McNeill (55 percent) and Port Alice (76 percent). Tourism and the public sector also provide employment in the TSA.

Timber harvesting in the TSA accounts for approximately 28 percent of the total timber harvest in the Port McNeill Forest District. Most of the remainder of the harvest comes from Tree Farm Licences (45 percent) and Timber Licences (24 percent). The TSA's average annual timber harvest from 1992 to 1994 was estimated to provide about 1900 person-years of direct employment across the province. About 13 percent of this employment, predominantly related to timber harvesting, is located in northern Vancouver Island, and approximately 19 percent, in harvesting and timber processing, is in the Campbell River area. The majority of employment (68 percent) generated by harvesting in the TSA is located in southern Vancouver Island and the Lower Mainland region, primarily in the sawmilling and pulp/paper sectors. This distribution of employment relates to the fact that approximately 90 percent of the timber harvested in the TSA is processed elsewhere.

I have reviewed the economic development impacts and the community implications described in the SEA report, associated with three different timber supply scenarios including: the BCFS analysis base case, with an initial harvest level of 1 069 000 cubic metres per year; a scenario in which forest cover

requirements were relaxed by 5 percentage points, which results in an initial harvest level of 1 184 000 cubic metres per year (a reduction of 29 percent from the current AAC); and a scenario in which forest cover requirements were restricted by a further 5 percentage points, resulting in an initial harvest level of 713 000 cubic metres per year (a reduction of 57 percent from the current AAC). I am aware of the dependence of local communities on timber harvesting, and I am aware that other communities, and in particular, Campbell River, would be significantly impacted by the decrease in harvest levels projected in the BCFS analysis. I have considered this, along with the social and economic objectives of the Crown (discussed below) in my determination.

A number of submissions were received from the public regarding the SEA report. The SEA was criticized for *underestimating* employment impacts in some cases, and one submission argued that impacts had been *overestimated*. Other submissions emphasized the impacts projected in the SEA. The Coast Forest and Lumber Association submitted a critique of the SEA. Following a review of both the SEA and the submissions, I am satisfied that the SEA was conducted appropriately and provides socio-economic analysis pertinent to this determination.

However, I note that some of the impacts projected in the SEA are based on the BCFS analysis base case, and do not take into account the land base correction. The smaller decrease in harvest levels projected in the corrected base case would result in smaller socio-economic impacts than the decrease projected in the BCFS analysis base case. This small overestimation in the SEA is somewhat offset by the fact that some of the socio-economic impacts were calculated with reference to the average of the actual harvest levels in the TSA from 1992 to 1994, rather than the current AAC. Including subsequently available 1995 harvest information would increase the average by about 9 percent, increasing the initial impacts above those presented in the SEA. On balance, the impacts would still fall within the range presented in the SEA.

The BCFS analysis indicates to me that an appropriate balance between minimizing both short-term socio-economic disruption and future supply shortfalls would be achieved by some initial reduction in harvest level followed by a decline to a stable level. The BCFS analysis corrected base case and similar forecasts provide useful information for achieving this purpose, and I have discussed this further below under "Reasons for Decision".

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

Mill requirements

Approximately 90 percent of the timber harvested in the Kingcome TSA is processed in facilities located outside the Port McNeill Forest District, mainly in facilities in southern Vancouver Island and the Lower Mainland regions of the province. Timber from the TSA (excluding timber obtained from operators in the

Small Business Forest Enterprise Program) provides approximately 25 percent of the annual timber requirements for Mill and Timber Products Ltd. in Surrey. Similarly, Richmond Plywood Corporation Limited obtains approximately 20 percent of the timber required by its processing facility from the TSA. Interfor, the licensee with the largest forest licence in the TSA, relies on its apportionment of timber in the Kingcome TSA for about 20 percent of its total timber supply.

Shushartie Log Sales Ltd., located in Port Hardy, is the largest local mill dependent on timber harvested from the TSA. The mill obtains all of its supply from the TSA, processing approximately 60 000 cubic metres annually. There is also a pulp mill located in Port Alice, which relies on timber harvested from the TSA to provide approximately 45 000 cubic metres of timber annually, about 5 percent of the mill's fibre requirement.

From the above, it is evident to me that timber harvested from the TSA provides a significant timber supply for processing facilities predominantly in the Lower Mainland and southern Vancouver Island, and is an important source of employment both locally and provincially. A reduction in the AAC will have significant implications for employment and for the viability of 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**

Economic and social objectives of the Crown

- Minister's letter and memorandum

The Minister has expressed the social and economic objectives of the Crown for the province (letter to chief forester, dated July 28, 1994, attached as Appendix 3 and memo to chief forester dated February 26, 1996, attached as Appendix 4) and I understand these to apply to the Kingcome TSA. 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.

Issues related to employment and community are discussed in detail in the SEA report, and I am familiar with the varying potential impacts of different harvest levels. The use of commercial thinning is discussed above under Commercial

thinning, where I noted that although there are some stands in the TSA of an appropriate age for commercial thinning, access to these stands is limited and no commercial thinning strategy is in place. Furthermore, although in some cases commercial thinning provides some flexibility in harvest scheduling it does not usually result in any additional harvestable volume. The possibility of expanding the timber harvesting land base was explored above under *operability*, and I have accounted for the timber supply contribution of an additional 2000 hectares of operable land in "Reasons for decision". I have also examined the contribution of low-productivity stands to the timber harvesting land base under *low productivity sites*, above, and I have established a partitioned AAC to account for the timber supply contribution of these stands, as described in "Reasons for decision".

Finally, in his memo of February 26, 1996, the Minister has asked that pre-Code constraints applied to timber supplies in order to meet visual quality objectives be re-examined when setting AACs in order to ensure that they do not unreasonably restrict timber supplies when considered in conjunction with other requirements under the Code. As discussed above, under *visually sensitive areas* I have considered several adjustments to the assumptions made in the BCFS analysis with respect to visually sensitive areas, and these considerations have formed an important part of my "Reasons for decision" as documented below.

- *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 in the timber supply review where these are consistent with government's broader objectives. Submissions were received from the general public, licensees and forest industry groups, local governments and other municipalities outside the Kingcome TSA, one First Nations group, one environmental organization, and one community resource board. In addition, many individuals attended information sessions and open houses conducted in communities in the Port McNeill Forest District and in Campbell River.

In the public input received, the most commonly expressed concern was that constraints to timber supply be reduced to ensure an economically acceptable transition to the long-term harvest level. The submissions received also expressed the importance of the forest industry to the welfare and stability of local communities, and indicated that local objectives include social, economic and environmental stability.

Throughout the Timber Supply Review process, BCFS staff actively sought First Nations input. There are 11 First Nations groups located within the boundary of the Port McNeill Forest District, and approximately 2000 First Nations individuals reside locally. The one submission received from a First Nations group emphasized the importance of reducing the AAC, even at the expense of employment, to protect limited resources.

The comments received are summarized in the attached Summary of Public Input. I have considered the input received and I am mindful of the many views which were brought forward in the public input received. Where possible I have attempted in this rationale to respond briefly to many of those views, and this information has been thoroughly considered in this determination.

(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 and disease that are not recovered through salvage operations. In the Kingcome TSA, annual non-recoverable losses were estimated to be 16 365 cubic metres and result from fire and windthrow damage. From my review of the data supporting the deduction, I am satisfied that it is a reasonable estimate of what is currently experienced in the TSA and is suitable for use in this determination.

Reasons for decision

In reaching my decision on an AAC for the Kingcome TSA, I have considered all the factors presented above and have reasoned as follows:

I have divided the AAC for the Kingcome TSA into three components and will address each separately.

Conventional coniferous component

The BCFS analysis corrected base case shows that an initial harvest level of 1 117 600 cubic metres (approximately 33 percent below the current harvest level) could be maintained for one decade before decreasing at a rate of 10 percent per decade for 3 decades, to reach a level of 811 600 cubic metres per year. This level could not be exceeded until decade 16, when the rate of harvest could increase over 2 decades to the long-term harvest level of 936 600 cubic metres per year. This forecast conforms, as much as possible, to the principles discussed in 7(3)(b) above, regarding the transition from old- to second-growth harvesting, and from my review of implications to the province of alternative harvest rates, lies within an acceptable range of harvest forecasts for the Kingcome TSA at this time.

My considerations have identified a number of factors that work either to increase or decrease the timber supply projected in the corrected base case and that were not accounted for in the initial harvest level in the corrected base case forecast, due to changes in practice or information since completion of the BCFS analysis in July 1995. The magnitudes of the effects of some of these factors may be quantified with some reliability; others are subject to more uncertainty. As discussed above in Vancouver Island Land Use Plan and the Protected Areas Strategy, in my determination I have excluded the minor

timber supply contribution from Class A parks recently designated within the TSA, which was included in the BCFS base case, but this exclusion is not of sufficient magnitude to require any specific adjustment in the determination.

Factors which are identified as decreasing the conventional timber supply relative to the corrected base case projection and which may be quantified with a good degree of reliability, are as follows:

- Forest Practices Code requirements for the protection of riparian habitat and stand-level biodiversity represent a 5.7 percent decrease in the initial harvest level compared to that of the corrected base case; and

- gully management represents a decrease of approximately 3 percent in the initial harvest level projected in the corrected base case.

Factors identified as decreasing the conventional timber supply relative to the corrected base case projection, but which are not currently subject to reliable quantification, are as follows:

- The amount of sensitive soils in the Kingcome TSA may have been underestimated in the inventory. Accounting for these sensitive soils could potentially have a downward influence on the timber harvesting land base of up to 5.8 percent;

- the inventory does not reflect any harvesting or depletions that have occurred since the most recent update in November 1993. The inventory information used in projecting the base case harvest forecast therefore slightly overestimates the amount of mature timber available for harvest in the short-term; and

- existing stand volumes, shown by the inventory audit to have been overestimated by 11 percent for the Kingcome TSA as a whole, are likely also to have been overestimated to some degree in the timber harvesting land base. Due to the uncertainty in the degree of overestimation, the impact on timber supply has not been fully quantified at this time.

I have considered the acknowledged uncertainty in these factors in context of the social and economic objectives of the Crown, as expressed by the Minister in his letter of July 28, 1994.

Factors suggesting the timber supply may be greater than projected in the corrected base case, and which may be quantified with a good degree of reliability, are as follows:

- The size of the operable land base has been underestimated by approximately 2000 hectares in the BCFS analysis. This could increase timber supply by approximately 1% in the short term;

- in areas where a 6-year regeneration delay was assumed in the BCFS analysis, regeneration is actually taking place in 5 years. As a result of this change, the

initial harvest level could be increased by 1.2 percent over the initial harvest level projected in the corrected base case;

- if the forest cover requirements in the VQO zones are relaxed so that the maximum allowable disturbance for each VQO area is modeled, and the amount suggested by district staff of "preservation" VQO area is reclassified as "retention" VQO, (and the 193 hectares classified in the analysis as "preservation" VQO are more properly included in the IRM zone) then the initial harvest level could be increased by 13 percent over the initial harvest level projected in the corrected base case.

Factors identified as increasing the conventional timber supply relative to the corrected base case projection, but which are not currently subject to reliable quantification, are as follows:

- To the extent that site productivity has been underestimated, it is also likely that the minimum harvest ages have been overestimated, the estimated regenerated stand volumes have been underestimated and the green-up periods have been overestimated. As noted above, reducing the minimum harvest ages does not impact the short-term timber supply and increasing the regenerated stand volume estimates impacts the long-term timber supply but no change is seen in the initial harvest level. However, sensitivity analysis shows that a 4-metre increase in all site index estimates reduces the green-up age and results in a potential 18-percent increase in the initial harvest level over the corrected base case. Since no site productivity information specific to the Kingcome TSA is currently available, in view of the projected serious declines in timber supply for the TSA, I have considered the uncertainty in this factor with careful respect to the social and economic objectives of the Crown as expressed by the Minister in his letter of July 28, 1994. Thus, while not explicitly accepting that site productivity and green up periods have indeed been overestimated, I have accepted that the likelihood of an addition to supply on this account is equal to the likelihood that there will be a reduction to supply resulting from other uncertain factors, as discussed below.

In considering the above-noted augmenting and restricting influences on timber supply, I note the following. As stated, some of the identified changes in practice or information have been quantified. Of these quantified changes, the augmenting or 'upward' influences on timber supply attributed to changes in operability and regeneration delay are approximately offset by the restricting or 'downward' influence attributed to gully management.

The changes in riparian management and biodiversity under the Forest Practices Code, and the changes in visual quality objectives have similarly been quantified. Mathematically the combined impact of these changes in management, would be an upward timber supply impact of 7 or 8 percent. However, there are complex timber supply interactions between these considerations, and the combined impact of these changes in management is not necessarily the sum of the independent impacts. Accordingly, I instructed BCFS staff to

provide me with a harvest forecast incorporating these changes in management. This forecast indicates that these combined changes enable a timber supply increase of approximately 4 percent over the initial harvest level projected in the corrected base case, if the same harvest flow requirements are applied as in the base case.

In addition to the above quantified considerations, there are also several factors which influence timber supply, but which have not been fully quantified. Uncertainty about sensitive soils and existing stand volume estimates could represent a *downward* influence of up to 17 percent. Conversely, underestimation of site productivity in some stands in the TSA, as discussed above, could represent, through reduced green-up periods, about an 18 percent *upward* influence on timber supply. As noted, I have considered both of these upward and downward factors to be associated with the same degree of uncertainty; being of approximately equal magnitude, it is therefore reasonable to conclude that these factors are approximately balanced with no required net resultant adjustment to the projected initial harvest level.

In aggregate, therefore, all the quantified and unquantified considerations represent an approximately 4 percent upward influence on the initial harvest level projected in the corrected base case. This would represent an overall timber supply decrease of approximately 29 percent from the current partition for conventional coniferous harvest in the AAC for the TSA.

However, I also note that if alternative rates of inter-decadal decline are used (discussed above, under Harvest flow), a slightly higher initial harvest level can be supported by the timber supply in the short term. For example, if the corrected base case harvest forecast is allowed to decline at 15 percent per decade, an initial harvest level 26 percent below the current AAC can be maintained for one decade. Considering the importance of the forest sector to the stability of local communities and other areas of the province that rely on timber harvested from the TSA (discussed above, under Community dependence on the forest industry), being mindful of the socio-economic objectives of the Crown as expressed in the Minister's letter, and taking into account the fact that this AAC will be revisited within 5 years and could be further decreased at that time if necessary, I believe that it is reasonable to limit the timber supply reduction in the conventional coniferous component of the AAC for the Kingcome TSA to 25 percent at this time.

There are two outstanding issues that impact the conventional coniferous component of the AAC for the Kingcome TSA:

- In addition to the formal study areas and proposed study areas, there are numerous informal deferrals in the TSA, which affect almost 10 000 hectares of the timber harvesting land base. The deferral of harvesting operations in these areas of the TSA is causing increasing harvesting pressure on the remainder of the timber harvesting land base. If the deferrals continue, at some point, the achievement of integrated resource management objectives may prevent higher rates of harvesting in the remaining areas. As noted above, the recently announced LRMP for the Central Coast area should clarify the status of many of these areas for incorporation in future

determinations. In the meantime, if the district manager becomes concerned that the allowable harvest level cannot be met on the remaining available land base while continuing to meet integrated resource management objectives, he 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*.

- Over the past 8 years, the total volume of timber apportioned to the Small Business Forest Enterprise Program (SBFEP) has not been harvested. This 'small business undercut' is estimated to be between 335 000 and 575 000 cubic metres, and under a regional action plan, may be harvested over the next 5 years. The harvest of this additional volume was not accounted for in the BCFS analysis. If this small business undercut volume is harvested, the inventory of mature timber will be depleted faster than indicated in the BCFS analysis, and the decline to the long-term harvest level will be more rapid than projected in the corrected base case.

low-productivity sites component

Approximately 25 500 hectares of sites with low timber productivity were excluded from the timber-harvesting land base in the BCFS analysis. District staff have conducted an evaluation of the potential for harvesting on low-productivity sites in the TSA. They estimate that approximately 21 000 hectares of sites with poor timber productivity can be harvested within the Kingcome TSA. BCFS staff estimate that the addition of these low-productivity stands to the timber harvesting land base would allow an initial harvest level of 130 000 cubic metres for this component of the AAC. I am satisfied that this estimate is a reasonable approximation of the harvesting potential on low-productivity sites, and I am setting a partition for harvesting of low-productivity sites at 130 000 cubic metres per year.

deciduous (broadleaf) species component

Stands consisting mainly of deciduous (broadleaf) species occupy approximately 10 000 hectares of the TSA. Currently in the Kingcome TSA, 25 000 cubic metres of the allowable annual cut are attributable to harvesting in broadleaf stands. Of this volume, 5000 cubic metres are allocated for cottonwood harvesting, and the remaining 20 000 cubic metres are allocated for harvesting alder stands.

I find that the cottonwood portion of 5000 cubic metres per year is supportable. I also acknowledge that it is possible that both the area of alder stands and the volume within those stands are greater than assumed by the BCFS. However, I note that the availability of alder may be limited by other forest management considerations, such as biodiversity and visual quality. Accordingly, I am not prepared to increase the harvest level from alder stands at this time. Thus for this determination I am satisfied that the current allowable deciduous (broadleaf) harvest level of 25 000 cubic metres is reasonable and appropriate.

Determination

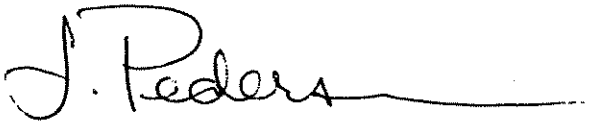
From a careful evaluation of the assumptions incorporated in the BCFS timber supply analysis, from my review of public input, and from all the foregoing considerations and reasoning, it is my determination that a suitable harvest level for the Kingcome TSA at this time can be achieved by establishing an AAC at 1 399 000 cubic metres (exclusive of allocated woodlot licence volumes). A partition of 130 000 cubic metres has been established for harvesting of low productivity sites. An additional partition of 25 000 cubic metres is provided for harvesting of deciduous (broadleaf) species.

This determination comes into effect on November 1, 1996 and will remain in effect until a new AAC is determined, which must take place within five years of this determination.

Implementation of Decision

In preparation for the next AAC determination:

- I expect district staff to analyze the potential for commercial thinning in the Kingcome TSA, and if it is feasible, to implement a commercial thinning strategy.
- In consideration of the significant uncertainty in the estimated area of sensitive soils work should be undertaken to clarify this matter for the next determination; and
- The discrepancies between the studies performed by the BCFS and the licensee in examining the timber supply of alder should be investigated prior to the next determination.
- Numerous questions have been raised about uncertainties in the inventory information for this TSA, and I expect these matters to be given attention prior to the next determination.



Larry Pedersen
Chief Forester

July 22, 1996

Appendix 1: Section 7 of the *Forest Act*

The B.C *Forest Act* Section 7 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.

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Documents attached:

Appendix 3: Minister of Forests' letter of July 28, 1994 to Chief Forester, re social and economic objectives of the Crown.

Appendix 4: Minister of Forests' memo of February 26, 1996, to Chief Forester, re social and economic objectives of the Crown—visual resources.

Appendix 5: Summary of Public Input.

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File: 10100-01

JUL 28 1994

John Cuthbert
Chief Forester
Ministry of Forests
595 Pandora Avenue
Victoria, British Columbia
V8W 3E7

Dear John Cuthbert:

Re: Economic and Social Objectives of the Crown

The *Forest Act* gives you the clear responsibility for determining Allowable Annual Cuts, decisions with far-reaching implications for the province's economy. The *Forest Act* provides that you consider the social and economic objectives of the Crown, as expressed by me, in making these determinations. The purpose of this letter is to provide this information to you.

The social and economic objectives expressed below should be considered in conjunction with environmental considerations as reflected in the Forest Practices Code, which requires recognition and better protection of non-timber values such as biodiversity, wildlife and water quality.

The government's general social and economic objectives for the forest sector are made clear in the goals of the Forest Renewal Program. In relation to the Allowable Annual Cut determinations you must make, I would emphasize the particular importance the government attaches to the continued availability of good forest jobs and to the long-term stability of communities that rely on forests.

Through the Forest Renewal Plan, the government is taking the steps necessary to facilitate the transition to more value-based management in the forest and the forest sector. We feel that adjustment costs should be minimized wherever possible, and to this end, any decreases in allowable cut at this time should be no larger than are necessary to avoid compromising long-run sustainability.

.../2

Province of
British Columbia

Minister of
Forests

Parliament Buildings
Victoria, British Columbia
V8V 1X4

In addition to the provincial perspective, you should also consider important local social and economic objectives that may be derived from the public input on the Timber Supply Review discussion papers where these are consistent with the government's broader objectives.

Finally, I would note that improving economic conditions may make it possible to harvest timber which has typically not been used in the past. For example, use of wood from commercial thinnings and previously uneconomic areas may assist in maintaining harvests without violating forest practices constraints. I urge you to consider all available vehicles, such as partitioned cuts, which could provide the forest industry with the opportunity and incentive to demonstrate their ability to utilize such timber resources.

Yours truly,

Andrew Petter
Minister

Province of British Columbia

Ministry of Forests

OFFICE OF THE MINISTER

MEMORANDUM

File: 16290-01

February 26, 1996

To: Larry Pedersen
Chief Forester

From: The Honourable Andrew Petter
Minister of Forests

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

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

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

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

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

.../2

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

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

Andrew Petter
Minister of Forests