

**BRITISH COLUMBIA
MINISTRY OF FORESTS, LANDS AND
NATURAL RESOURCE OPERATIONS**

**Rationale for
Allowable Annual Cut (AAC)
Determinations for
Tree Farm Licence 58,
Tree Farm Licence 60, and
Timber Supply Area 25**

Effective September 20, 2012

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Acknowledgement

For preparation of the information I have considered in this determination, I am indebted to the members of the Haida-British Columbia Timber Supply Review Joint Technical Working Group. I am also grateful to the Haida Gwaii Management Council for its detailed and clear allowable annual cut rationale for the Haida Gwaii Management Area, which provided a clear basis for my considerations for determining the individual unit allowable annual cuts. Finally, I would like to thank all of those who have supported the various aspects of the Timber Supply Review process on Haida Gwaii through providing advice and information to the Joint Technical Working Group and providing feedback on related documents.

Objective of this document

This document provides an accounting of the factors I have considered, and the rationale I have employed in making my determinations, under Section 8 of the *Forest Act*, of the allowable annual cuts (AAC) for Tree Farm Licence (TFL) 58, TFL 60, and Timber Supply Area (TSA) 25 on Haida Gwaii. This document also identifies where new or better information is needed for incorporation in future determinations. A distinguishing component of the determinations and rationale discussed in this document is that they follow from a previous AAC determined by the Haida Gwaii Management Council (HGMC) for the Haida Gwaii Management Area. Therefore, a significant objective of this document is to describe the linkages between my determinations and that of the HGMC, including the considerations made by the council in reaching its determination.

Statutory framework

Section 8 of the *Forest Act* requires the chief forester to consider a number of specified factors in determining AACs for timber supply areas (TSAs) and Tree Farm Licences (TFLs). Section 8 of the *Act* is reproduced in full as Appendix 1 of this document. The deputy chief forester was delegated the responsibility for determining the AACs for the TSA and TFLs on Haida Gwaii.

In respect of Haida Gwaii, section 8(11) of the *Forest Act* specifies that the aggregate of the AACs determined for woodlot licences, community forest agreements, First Nations Woodland Licences, TFLs, and TSAs that overlap with the Haida Gwaii Management Area (HGMA), which is defined in section 1 (1) of the *Haida Gwaii Reconciliation Act*, must not exceed the AAC determined by the HGMC for the HGMA.

Description of the TSA and TFLs

The biophysical, social and economic conditions on Haida Gwaii formed an important context for my considerations in making the AAC determinations. Since those conditions were described in some detail in the October 2011 Haida Gwaii *Public Discussion Paper*, I have not discussed them again in this rationale. The *Public Discussion Paper* is available electronically at

http://www.haidagwaiimanagementcouncil.ca/Documents/HaidaGwaiiAACPDPOctober31_final.pdf

Since release of the Public Discussion Paper, one change has recently occurred with respect to TFL 60. When the Public Discussion Paper was released, Western Forest Products Ltd held TFL 60. In June 2012, TFL 60 was purchased by Taan Forest Inc.

TFL 58 is still held by Teal Cedar Products Ltd.

History of the AAC

Appendix 4 shows the AACs for each of TSA 25, TFL 58, and TFL 60 from 2000 to 2011.

New AAC determinations

Effective September 20, 2012:

- The new AAC for TSA 25 is 512 000 cubic metres, of which the contribution of red and yellow cedar should not exceed on average, about 195 000 cubic metres.
- The new AAC for TFL 58 is 79 000 cubic metres, of which the contribution of red and yellow cedar should not exceed on average, about 32 000 cubic metres
- The new AAC for TFL 60 is 340 000 cubic metres, of which the contribution of red and yellow cedar should not exceed on average, about 133 000 cubic metres.

These AACs will remain in effect until new AACs are determined, which must take place within 10 years of these determinations.

Section 8(11) of the *Forest Act* requires that the aggregate of AACs for the TSA, TFLs, woodlot licences, community forest agreements, and First Nations woodland tenures that apply to the HGMA not exceed the AAC determined by the HGMC for the HGMA. In the interests of measuring consistency with this requirement, I note that while the AAC determined by the HGMC did not include the contribution of municipal areas, as required by the *Haida Gwaii Reconciliation Act*, my determinations assume contributions from portions of municipal areas within the timber harvesting land base. The new AAC for TFL 60 includes a projected average contribution from municipal areas of 2000 cubic metres per year, and the new AAC for TSA 25 includes a projected average contribution from municipal areas of 7500 cubic metres per year. These amounts do not constitute an attribution under section 8(5) of the *Forest Act*, but rather are noted for the purposes of monitoring consistency with section 8(11) of the *Forest Act*. The aggregate of the AACs for the TSA, TFL 58, and TFL 60 that applies to the Haida Gwaii Management Area as defined in the *Haida Gwaii Reconciliation Act* is 921 500 cubic metres.

Information sources considered in the AAC determination

The information sources considered in determining these AACs for TFL 58, TFL 60, and TSA 25 include:

- *Rationale for Allowable Annual Cut (AAC) Determination for Haida Gwaii*, dated April 4, 2012, by the Haida Gwaii Management Council
- *Haida Gwaii Timber Supply Review Data Package 2011*, updated to April 4, 2012 (including data source references in the report's Appendix 3, page 92-94), submitted by the Joint Technical Working Group to: Haida Gwaii Management Council and Jim Sutherland, Deputy Chief Forester;
- *Haida Gwaii Timber Supply Review Timber Supply Analysis Report*, January 25th, 2012;
- *Haida Gwaii Public Discussion Paper*, October, 2011;
- *Haida Gwaii Timber Supply Review Decision Binder*, submitted by the Joint Haida-BC Technical Working Group to the Deputy Chief Forester, April 18, 2012;
- *Haida Gwaii Land Use Objectives Order*, December 16, 2010;
- British Columbia. Ministries of Forests and Environment. 1999. *Forest Practices Code of British Columbia. Mapping and assessing terrain stability guidebook*. Second edition. (<http://www.for.gov.bc.ca/TASB/LEGSREGS/FPC/FPCGUIDE/terrain/zipped/terrain.pdf>)
- Review and evaluation of current forest management objectives and operating conditions on Haida Gwaii and associated timber supply implications through discussions between the Deputy Chief Forester, and members of the Joint Technical Working Group, at AAC determination meetings held on April 18, 19, and 24, 2012;

- Responses from the general public to the October, 2011 timber supply review public discussion paper and to the draft data package;
- Letter from the Minister of Forests and Range (now the Ministry of Forests, Lands and Natural Resource Operations) to the chief forester stating the economic and social objectives of the Crown, July 4, 2006;
- *Forest and Range Practices Act – Regulations and amendments*, current to February 8, 2012;
- *Forest Act*, current to February 8, 2012;
- *Ministry of Forests and Range Act*, current to February 8, 2012;
- *Forest Practices Code of British Columbia Act* and amendments and guidebooks, January 31, 2004;

Role and limitations of the technical information used

Section 8 of the *Forest Act* requires the chief forester, in determining AACs, to consider biophysical, social and economic information. Most of the technical information used in determinations is in the form of a timber supply analysis and its inputs of inventory and growth and yield data. These are concerned primarily with biophysical factors – such as the rate of timber growth and the definition of the land base considered available for timber harvesting – and with management practices.

The analytical techniques used to assess timber supply necessarily are simplifications of the real world. Many of the factors used as inputs to timber supply analysis are uncertain, due in part to variation in physical, biological and social conditions. Ongoing scientific studies of ecological dynamics will help reduce some of this uncertainty.

Furthermore, computer models cannot incorporate all of the social, cultural and economic factors that are relevant when making forest management decisions. Technical information and analysis, therefore, do not necessarily provide the complete answers or solutions to forest management decisions such as AAC determinations. Such information does 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 determining these AACs for TFL 58, TFL 60, and TSA 25, I have considered known limitations of the technical information provided. I am satisfied that the information provides a suitable basis for my determinations.

Guiding principles for AAC determinations

Rapid changes in social values and in the understanding and management of complex forest ecosystems mean there is always uncertainty in the information used in AAC determinations. In making the large number of periodic determinations required for British Columbia's many forest management units, administrative fairness requires a reasonable degree of consistency of approach in incorporating these changes and uncertainties. To make my approach in these matters explicit, I have set out the following body of guiding principles. In any specific circumstance where I may consider it necessary to deviate from these principles, I will explain my reasoning in detail.

Two important ways of dealing with uncertainty are:

- (i) minimizing risk, in respect of which in making AAC determinations I consider particular uncertainties associated with the information before me and attempt to assess and address the

various potential current and future, social, economic and environmental risks associated with a range of possible AACs; and

- (ii) redetermining AACs frequently, in cases where projections of short-term timber supply are not stable, to ensure they incorporate current information and knowledge.

In considering the various factors that Section 8 of the *Forest Act* requires the chief forester to take into account in determining AACs, I intend to reflect, as closely as possible, those forest management factors that are a reasonable extrapolation from current practices. It is not appropriate to base my decisions on proposed or potential practices that could affect the timber supply but that are not substantiated by demonstrated performance or are beyond current legal requirements.

In many areas, the timber supply implications of some legislative provisions remain uncertain, particularly when considered in combination with other factors. In each AAC determination I take this uncertainty into account to the extent possible in context of the best available information.

It is my practice not to speculate on timber supply impacts that may eventually result from land-use decisions not yet finalized by government. However, where specific protected areas, conservancies, or similar areas have been designated by legislation or by order in council, these areas are deducted from the timber harvesting land base and are not considered to contribute any harvestable volume to the timber supply in AAC determinations, although they may contribute indirectly by providing forest cover to help in meeting resource management objectives such as for biodiversity.

In some cases, even when government has made a formal land-use decision, it is not necessarily possible to fully analyse and account for the consequent timber supply impacts in a current AAC determination. Many government land-use decisions must be followed by detailed implementation decisions requiring, for instance, further detailed planning or legal designations such as those provided for under the *Land Act* and the *Forest and Range Practices Act* (FRPA). In cases where there is a clear intent by government to implement these decisions that have not yet been finalized, I will consider information that is relevant to the decision in a manner that is appropriate to the circumstance. The requirement for regular AAC reviews will ensure that future determinations address ongoing plan-implementation decisions.

Where appropriate I will consider information on the types and extent of planned and implemented silviculture practices as well as relevant scientific, empirical and analytical evidence on the likely magnitude and timing of their timber supply effects.

Some persons 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 incomplete, but this will always be true where information is constantly evolving and management issues are changing. The requirement for regular AAC reviews will ensure that future determinations incorporate improved information.

Others have suggested that, in view of data uncertainties, I should immediately reduce some AACs in the interest of caution. However, any AAC determination I make must be the result of applying my judgment 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 obligation resulting from recent court decisions to consult with First Nations regarding asserted rights and title (aboriginal

interests) in a manner proportional to the strength of their aboriginal interests and the degree to which the decision may impact these interests. In this regard, I will consider the information provided to First Nations to explain the timber supply review (TSR) process and any information brought forward respecting First Nations' aboriginal interests including how these interests may be impacted, and any operational plans and actions that describe forest practices to address First Nations' interests, before I make my decision. As I am able within the scope of my authority under Section 8 of the *Forest Act*, where appropriate I will seek to address aboriginal interests that will be impacted by my decision. When aboriginal interests are raised that are outside my jurisdiction, I will endeavour to forward these interests for consideration by appropriate decision makers. In general I address specific concerns identified by First Nations in relation to their aboriginal interests within management units in various sections of rationales. In the case of management units on Haida Gwaii, the Haida Nation was engaged in the land use planning processes that have defined the land use and management regime on the islands; and was involved in the joint AAC determination process for the Haida Gwaii Management Area, and in preparing information for my consideration in the determinations documented here. Further, throughout this rationale I discuss land use and management objectives and practices agreed to by the Haida Nation and the Province in the Strategic Land Use Agreement (SLUA) and Land Use Objectives Order (LUOO).

The AACs that I determine should not be construed as limiting the Crown's obligations under court decisions in any way, and in this respect it should be noted that my determinations do not prescribe a particular plan of harvesting activity within TFL 58, TFL 60, and TSA 25. They are also independent of any decisions by the Minister of Forests, Lands and Natural Resource Operations with respect to subsequent allocation of wood supply.

Circumstances on Haida Gwaii are somewhat different from many areas in British Columbia, since the Haida are the only First Nation with interests on Haida Gwaii, and the Haida and the Province have signed a reconciliation protocol that outlines commitments for shared and joint management and decision making for lands and natural resources. The entire timber supply review process has involved intensive joint work on data gathering and analysis, and a joint consensus AAC has been determined for the Haida Gwaii Management Area by the Haida Gwaii Management Council. After seeking guidance from a Haida-appointed member of the HGMC as to the desired form of consultation with the Haida Nation, I have undertaken consultation on these AAC determinations through the members of the Haida Gwaii Management Council appointed by the Haida Nation. I describe my consultation with the Haida Nation later in this document.

Overall, in making AAC determinations, I am mindful of my obligation as a steward of the forested land of British Columbia, of the mandate of the Ministry of Forests, Lands and Natural Resource Operations (formerly the Ministry of Forests and Range) as set out in Section 4 of the *Ministry of Forests and Range Act*, and of my responsibilities under the *Forest and Range Practices Act (FRPA)*.

The role of the base case

In considering the factors required under Section 8 of the *Forest Act* to be addressed in AAC determinations, I was assisted by timber supply forecasts and related analysis results provided by a joint technical working group (JTWG) with representatives of the Council of the Haida Nation and the British Columbia provincial government.

For most AAC determinations, a timber supply analysis is carried out using a package including data and information from three categories: land base inventory, timber growth and yield, and management practices. Using this set of data and a computer model, a series of timber supply

forecasts are produced to reflect different starting harvest levels, rates of decline or increase, and potential trade-offs between short- and long-term harvest levels.

From a range of possible forecasts, one is chosen in which an attempt is made to avoid both 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. The base case is designed to reflect current management objectives and practices.

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 model used to generate it.

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

These adjustments are made on the basis of informed judgment using currently available information about forest management, and that information may well have changed since the original data package was assembled. Forest management data are particularly subject to change during periods of legislative or regulatory change, as a result of catastrophic impacts to forest resources, or during the implementation of new policies, procedures, guidelines or plans.

Thus, in reviewing the considerations that lead to an AAC determination, it is important to remember that the AAC determination is not simply a calculation. Even though the timber supply analysis I am provided is integral to those considerations, an AAC determination is a synthesis of judgment 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. Judgments that in part may be based on uncertain information are essentially qualitative in nature and, as such, are subject to an element of risk. Consequently, once an AAC has been determined, no additional precision or validation would be gained by attempting a computer analysis of the combined considerations.

Timber supply analysis and the base case forecasts

The April 4, 2012 timber supply analysis report for Haida Gwaii, which contains forecasts for TFL 58, TFL 60, and TSA 25, was prepared by the JTWG. The timber supply analysis was performed using the Forest Service Spatial Analysis Model (FSSAM), a spatially explicit harvest scheduling model developed by Forest Analysis and Inventory Branch (FAIB) of the Ministry of Forests, Lands, and Natural Resource Operations (MFLNRO). FSSAM was used to project harvesting and growth over an analysis horizon of 400 years.

Several general rules were followed in deriving harvest forecasts. These are described in detail Appendix 8 of the HGMC rationale.

Base case forecasts

The ‘base-case’ forecast for the Haida Gwaii Management Area is an aggregate of individual forecasts for the TSA, TFL 58, and TFL 60. Each of these forecasts was designed to represent sustainable timber harvest levels according to current practice and management requirements,

including the legal requirements in the LUOO. The model data set was prepared to provide a reasonable representation of current forest management practices based on evidence of actual practices, and a pre-cautionary approach to EBM requirements from the LUOO, with effort made to use the best available information. The base cases are used as reference points to assess the timber supply on Haida Gwaii, including exploration of the potential impacts of uncertainties through sensitivity analyses.

The forecasts are not predictions, because many unforeseeable events will certainly occur, and practices and knowledge will change and evolve. Given this change and uncertainty, the projections may change in the future. Changes in practices and information will be incorporated into future AAC determinations. However, the forecasts developed to support this AAC determination were designed to provide a rigorous and reasonable basis for these AAC decisions.

The base case for each management unit represents only one in a number of possible forecasts, and because it incorporates information about which there may be some uncertainty, the base case forecasts are not AAC recommendations. Their validity – as with all the other forecasts provided – depends on the validity of the data and assumptions incorporated into the computer analysis used to generate them.

Much of what follows in the considerations outlined below is an examination of the degree to which the assumptions made in generating the base case forecasts are accurate, realistic and current, and of the degree to which resulting predictions of timber supply must be adjusted to more properly reflect the current situation. These adjustments are made on the basis of informed judgement, using currently available information about forest management some of which may have changed since the original data package was assembled. Even though the timber supply analysis was integral to my considerations, the AAC determinations are syntheses of judgement and analysis in which numerous risks and uncertainties are weighed. The AAC determinations I have made reflect the outcomes of these considerations. As a result, the AACs determined may or may not coincide with the base case forecasts. Judgements that in part may be based on uncertain information are often qualitative and general in nature and, as such, are subject to an element of risk.

The base cases for each management unit area as follows:

- For TSA 25, the projected harvest level is initially 492 964 cubic metres per year, which is maintained for the first 80 years of the forecast, and then increases to 521 256 cubic metres per year, which is maintained for the long term.
- For TFL 60, the harvest projection is an evenflow at 329 437 cubic metres per year.
- For TFL 58, the harvest projection is an evenflow at 72 865 cubic metres per year.

These forecasts combine to a base case forecast for the Haida Gwaii Management Area with an initial harvest rate of 895 266 cubic metres per year for the first 80 years, followed by one-step rise to the sustainable long-term harvest level of 923 558 cubic metres per year.

As noted in the HGMC rationale (p. 6), one public comment received during the review and comment period for the Public Discussion Paper stressed that the base case harvest forecast is:

“... just the maximum harvest level that can be sustained from the identified contributing land base, while all the other environmental objectives are met.”

As did the HGMC, I agree with this characterization of the base case forecasts, as a reflection of the timber supply forecast that represents management consistent with environmental objectives and with provision of socioeconomic benefits.

In addition to the base-case harvest projections, analysis was done to establish if timber supply could be increased above the base case levels in the short term while using the same land base,

growth and yield, and management inputs as in the base case, without requiring reductions below the base case in later years.

As the HGMC noted (p. 7), this analysis demonstrated that there was very little flexibility in timber supply to allow for short-term increases, and that:

“It was possible to raise the initial level on the TSA alone by 7.4 percent or 36 520 cubic metres per year, but only for 10 years if harvest failures relative to the base case were to be avoided further into the future. No increases in the initial level were possible for the TFLs without causing future disruptions.”

It would also have been possible to generate harvest forecasts that are lower than the base case while using the same land base, tree growth and management inputs as used in the base cases. Those possibilities are very numerous, and any specific lower forecast would be based on judgement, such as an approach to addressing risk and uncertainty.

I used the base cases only as a point of reference for the consideration of many factors that affect timber supply and the determination of the AACs. I carefully reviewed all of the inputs to the base cases, including the manner in which legally required environmental objectives in the LUOO were incorporated into the analysis.

I have reviewed in detail the assumptions and methodology incorporated in the base cases, as well as the model output, including species distribution over time; growing stock projections by age class over time; average age, area, and volume harvested annually; and other factors as described in my considerations below. For this determination I am satisfied that the base case harvest forecasts and the sensitivity analyses have provided a suitable basis for my assessment of the timber supply for TSA 25, TFL 58, and TFL 60.

Consideration of factors as required by Section 8 (8) of the *Forest Act*

I have reviewed the information for all of the factors required to be considered under Section 8 of the *Forest Act*. Where I have concluded that the modelling of a factor in the base case appropriately represents current management or the best available information, and uncertainties about the factor have little influence on the timber supply projected in the base case, no discussion is included in this rationale. These factors are noted in Table 1.

Factors considered in the determination

Table 1. List of factors informing the determinations

Forest Act section and description	Factors	Decision
8(8)(a)(i) Composition of the forest and its expected rate of growth (Land base contributing to timber harvesting—deletions in deriving the timber harvesting land base)	1. Water bodies and non-productive forest 2. Non-forest, no typing, no species information 3. Low-productivity sites 4. Non-merchantable forest types 5. Roads, trails and landings 6. Low productivity sites	Accepted base case
	7. Unstable terrain 8. Economically inoperable forest 9. Administrative classes not contributing to forest management	Adjustment to base case required
8(8)(a)(i) Composition of the forest and its expected rate of growth (Growth and yield, and site productivity estimates)	10. Volume estimates for existing natural stands 11. Operational adjustment factors for managed stands 12. Yield table development	Accepted base case
	13. Existing natural and future managed stands 14. Minimum harvestable age	Accepted base case with comments
	15. Site productivity estimates	Accepted base case with recommendations
	16. Inventory audit and volume and decay sampling studies	Adjustment to base case required
8(8)(a)(iv) Standard of timber utilization and allowance for decay, waste and breakage	17. Decay, waste and breakage	Accepted base case
	18. Utilization levels	Accepted base case with comments
8(8)(a)(ii) Expected time it will take the forest to become re-established following denudation	19. Regeneration delays and impediments to prompt regeneration 20. Backlog and current Not Satisfactorily Restocked (NSR)	Accepted base case with comments
8(8)(a)(iii) Silvicultural treatments to be applied	21. Species composition of regeneration 22. Stand density 23. Stand rehabilitation 24. Incremental silviculture and commercial thinning 25. Genetic resource—use of select seed 26. Silviculture history 27. Harvest rules (oldest first queue) 28. Harvest profile (except issues respecting cedar) 29. Deciduous volume exclusions 30. Disturbance outside the timber harvesting land base	Accepted base case

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Forest Act section and description	Factors	Decision
	31. Silvicultural systems 32. Harvest priority rules 33. Partitioning 34. Cut control and actual harvest performance 35. Woodlot licences	Accepted base case with comments Accepted base case with recommendations
8(8)(a)(v) Constraints on the amount of timber produced by use of the area for purposes other than timber production (Forest management objectives)	36. Visual quality management 37. Stand-level biodiversity 38. Cutblock adjacency 39. FPPR requirements for non-fish habitat 40. Identified wildlife: Queen Charlotte' Northern Saw-whet Owl Marbled Murrelet, 'Queen Charlotte' Northern Saw-whet Owl, Cassin's Auklet, Ancient Murrelet, Sandhill Crane, 'Queen Charlotte' Hairy Woodpecker (<i>picoideus</i> subspecies), Keen's Long-eared Myotis 41. Community watersheds 42. Karst features 43. Recreation 44. Identified wildlife	Accepted base case Accepted base case with recommendations Adjustment to base case required
8(8)(a)(v) Constraints on the amount of timber produced by use of the area for purposes other than timber production (Land Use Objectives Order (LUOO) Requirements)	45. Protected Area removals 46. Type I and Type II fish habitat 47. Buffers for lakes and wetlands 48. Active fluvial units 49. Tree lengths 50. Cedar stewardship areas 51. Monumental cedar, including cultural cedar stands 52. Culturally modified trees 53. Haida Traditional Heritage Features 54. Haida Traditional Forest Features 55. Cedar retention 56. Western yew trees 57. Black bear 58. Northern Saw Whet Owl 59. Marbled Murrelet 60. Landscape-level biodiversity 61. Forested swamps 62. Red and blue listed ecological communities 63. Sensitive watersheds and upland streams 64. Risk managing Haida Gwaii LUOO 65. Great Blue Heron 66. Northern Goshawk.	Accepted base case Accepted base case with recommendations Adjustment to base case required
8(8)(d) the economic and social objectives of the government, as expressed by the minister, for the area, for the general region and for British Columbia	67. Minister's letter to the chief forester expressing the social and economic objectives of the provincial government	

Forest Act section and description	Factors	Decision
Socio Economic Considerations 8(8)(a)(vi) Any other information and 8(8)(b) the short and long term implications to British Columbia of alternative rates of timber harvesting from the area	68. Alternative harvest flows 69. Economic and employment implications 70. Summary of public input 71. Timber volume commitments made by province	Accepted base case
	72. Cut control and actual harvest performance	Accepted base case with comments
8(8)(e) Abnormal infestations in and devastation of, and major salvage program planned for, timber on the area	73. Unsalvaged losses	Accepted base case with recommendation
8(11) The aggregate of the allowable annual cuts determined under subsections (6), (7) and (10) that apply in the management area, as defined in section 1 (1) of the <i>Haida Gwaii Reconciliation Act</i> , must not exceed the amount set out in a notice to the chief forester under section 5 (4) (a) of that Act.	74. Consistency with Haida Gwaii Management Council determination	Adjustment to base case required

The AAC rationale released by the HGMC on April 4, 2012 formed an important basis for my considerations. I reviewed a similar package of information on land base, growth and yield, and management factors – which are detailed in Table 1 – as did the HGMC. I independently reviewed and concluded on each of those factors. However, with respect to issues on which I agree with the HGMC reasoning and conclusions, I note such agreement in my discussion of each factor, below, and in many cases reference the HGMC rationale.

For other factors, where more uncertainty exists, or where public or Haida input indicates contention regarding the information used, modelling, or some other aspect under consideration, this rationale incorporates an explanation of how I considered the essential issues raised and the reasoning leading to my conclusions.

Factors requiring additional explanatory consideration**Section 8 (8)**

In determining an allowable annual cut under subsection (1) the chief forester, despite anything to the contrary in an agreement listed in section 12, must consider

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

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

In this section I outline my considerations and reasoning for factors that are listed in Table 1 as requiring adjustments in the base cases.

Land base contributing to timber harvesting

- general comments

Table 2 below lists the total areas and the current and future timber harvesting land bases for the TSA and the two TFLs on Haida Gwaii. The current timber harvesting land base is the area that is currently suitable and available for commercial forest harvesting operations. The future timber harvesting land base accounts for roads, trails and landings constructed in the future. For the timber supply analysis, adjustments were applied to timber volumes yield curves to account for future roads, trails, and landings. The future timber harvesting land bases shown in Table 2 show area reductions that would have the equivalent effect of the yield adjustments over the long term.

Table 2. Total and timber harvesting land base areas for each management unit

	Total area (ha)	Current timber harvesting land base (ha)	Future timber harvesting land base (ha)
Timber Supply Area	798 301	126 311	120 301
TFL 58	27 873	13 222	12 843
TFL 60	180 133	57 809	55 574
Total	1 006 310	197 342	188 718

As noted by the HGMC in its rationale, although the best currently available inventory information was used in the analysis, with respect to a number of the land base factors, future analyses would benefit from improved inventory information. The HGMC made corresponding recommendations to, where possible and practicable, improve and consolidate the inventory and forest management information on the management units on Haida Gwaii. I agree that improved information could help improve the level of certainty associated with future AAC determinations. Since the Council has made related recommendations, there is no added benefit for me also to make one in my rationale related generally to collecting and consolidating information.

- unstable terrain

Areas classified as unstable terrain, that is, which are at risk of disturbances such as landslides, may not be entirely suitable for timber harvesting. Areas in terrain classes IV or V are generally thought of as potentially unstable terrain. Terrain stability class IV includes land where there is moderate likelihood of landslides due to timber harvesting or road construction, and class V includes land where the risks are high. As noted by the HGMC, there is uncertainty about how much area within terrain stability classes IV and V may be harvestable, and in previous timber

supply reviews different approaches were employed in the various management units to account for the contribution of these areas to the timber harvesting land base. For the base case, a consistent approach was applied for all management units, based on assessment of harvests in the 2000 to 2010 period from the Electronic Commerce Appraisal System. The findings of this assessment were that exclusions from the timber harvesting land base of 25 percent of the area in class IV and 50 percent in class V would reflect that the areas in those stability classes have not been harvested in proportion to their presence on the forest management land base. The above percentages were applied in making land base exclusions over the whole of the HGMA, that is, to each of the management units in the interest of representing consistent management across Haida Gwaii.

I note, as did the HGMC in its rationale, that simply because a particular type of area was harvested in the past does not mean such practice constituted sound forest management. However, input from staff of the Haida Gwaii Natural Resource District indicated that harvesting since 2006 in terrain class IV and V areas has been consistent with sound forest management.

Based on concerns that changes in markets and operational economics, and that harvesting on potentially unstable terrain may have negative impacts on fish streams and other land values on which the Haida people depend, the HGMC concluded that it is now less likely that harvesting will occur in areas in terrain classes IV and V. The Council concluded that the overall timber harvesting land base would be 3% smaller than in the base case due to this factor. Based on the information available, I consider this conclusion to be reasonable. The task I have is to decide on how this downward pressure on the timber harvesting land base applies to each of the management units.

Assessment done subsequent to the HGMC determination showed that the harvest history on the management units varied slightly from the overall average. Using the same methodology as used for the HGMA as a whole:

- for TFL 58, the exclusion percentage for terrain stability class IV would be about 21% and for class V would be about 63%
- for TFL 60, the exclusion percentage for terrain stability class IV would be about 26% and for class V would be about 44%
- for the TSA, the exclusion percentage for terrain stability class IV would be about 18% and for class V would be about 57%

While the percentages applicable to the individual units vary from the overall average, the differences are not large, and an additional land base assessment showed that significant increases in the percentage exclusion percentages for terrain stability would have only small impacts on the ultimate size of the timber harvesting land base.

In this additional land base assessment, which was done to explore the implications of uncertainty about the contribution of unstable terrain to the timber harvesting land base, the percentage exclusions were increased to 50 percent for terrain class IV, and to 100 percent for class V. While the area that was excluded in defining the timber harvesting land base due to this factor doubled relative to the base case from 54 292 hectares to 108 585 hectares overall, the presence of overlaps with exclusions for other factors resulted in a net decrease in the timber harvesting land base relative to the base case of just 4.3 percent.

Therefore, the much smaller changes in the implied exclusion percentages for each of the management units relative to what was applied in the base case would have negligible effects on how the 3% downward pressure is attributable to the individual management units. Therefore, I conclude that due to uncertainty about the contribution of terrain stability class IV and V areas to the timber harvesting land base, related to economic constraints on use of expensive harvesting

systems and to the potential negative effects on environmental and cultural values, the timber harvesting land base of the TSA, TFL 58, and TFL 60 were each overestimated in the base case by approximately 3%. I have accounted for these overestimations in my determinations as discussed in ‘**Reasons for Decision**’.

In view of the need to resolve the complexity of related assessments of the extent of harvestable land in these terrain classes, in the ‘**Implementation**’ section I have made a recommendation that harvesting on potentially unstable terrain should be monitored to assess the appropriate contribution of class IV and V terrain to the timber harvesting land base for future AAC determinations. The review should consider both the economic feasibility of harvesting and the potential impacts on ecological and cultural values.

- economically inoperable forest

The HGMC rationale (p. 17) contains a characterization of issues associated with economic operability, with which I concur:

“Economically inoperable forest consists of areas that are not likely to be harvested because the costs of accessing, harvesting and removing timber outweigh the value of the harvestable timber. Accurately assessing economic operability is difficult, due to uncertainty about several factors. Average costs, which are often the most readily available source of information, may not reflect specific local conditions, and in general accurate information on anticipated costs and revenues is seldom available. The ability to ‘blend’ differently valued stands in cutting permits makes it difficult to develop accurate operability assessments for specific stands. Although the general relationship between markets and economic operability is known—that is, when markets are poor the economically operable area shrinks—the nature of future markets is highly uncertain, which adds to the challenge of defining the operable area.”

For the base case, the JTWG used an empirical approach, correlating slope class – to represent relative costs of accessing and harvesting – and forest types – to acknowledge the relative difference in timber values among tree species – with actual harvests over the 2000 to 2010 time period. This approach was used to define minimum volume thresholds for operability for each grouping of stand type and slope class. The volume threshold was set at the stand volume above which 99 percent of all harvested volume was taken. Use of the 99 percent threshold excluded potential outliers in the inventory and harvesting data, while including as economically operable most types of areas that the available information indicates were harvested in the 2000-2010 period. This approach resulted in exclusion of a total of 85 644 hectares from the timber harvesting land case.

Since uncertainty surrounds economic operability in virtually all timber supply analyses, the JTWG performed an assessment to explore the potential effect on the size of the timber harvesting land base of increasing the amount of forest area that is believed to be uneconomic to harvest. In this assessment, instead of excluding the stands with volumes per hectare at or below the bottom one percent threshold as in the base case, stands with volumes per hectare in the bottom 10 percent were excluded. As noted by the HGMC, this change increased the total forest area that was classified as ‘inoperable’ by about 80 percent above the base case level; however, the timber harvesting land base was reduced by only 5.6 percent, because of overlaps with other exclusions, mostly related to ecosystem-based management.

A source of uncertainty affecting the size and location of the economically operable land base relates to the potential that geographic isolation and lack of access infrastructure may increase access costs and make forests uneconomic to access and harvest. This issue was not incorporated into the approach used in either the base case or in the sensitivity assessment. The HGMC

concluded that issues of isolation and lack of access would likely reduce the timber harvesting land base of the HGMA by about 3%. Based on the information presented on this issue – related to areas such as the Sewell landscape unit, which have been harvested but are now occupied by younger forest and isolated and dispersed patches of older forest without maintained roads and bridges – I agree that there is some likelihood that the timber harvesting land base was overestimated in the base case. Although the overestimation in the size of the timber harvesting land base due to isolation is itself uncertain, the HGMC conclusion is not unreasonable.

Therefore, I accept that the HGMC conclusion that HGMA timber harvesting land base was overestimated by 3%, and must determine how that overestimation affects each management unit.

The JTWG undertook a land base assessment subsequent to the HGMC determination to identify poorly serviced and remote areas, and define how the overall 3% may be distributed. In this assessment, the following areas were identified as poorly serviced and remote: northern portions of the Rennell landscape unit; the portion of the Hibben landscape unit that is within the timber harvesting land base; the Sewell landscape unit; the Tasu landscape; and Louise Island.

Of the timber harvesting land base area identified as poorly serviced and remote, 56% is in the TSA and 44% is on TFL 60. None is in TFL 58. If it is assumed that inclusion of the timber harvesting land base within these areas is the source of the overall 3% overestimation – which can be correlated roughly to 3% of the base case timber harvesting land base (i.e., 197 342 hectares), or 5920 hectares – the individual management unit impacts can be derived by multiplying the percentage of the poorly service area in each management unit by the overall impact, and dividing by the timber harvesting land base for the applicable management unit. That is:

- for the TSA, a 2.6% overestimate in the timber harvesting land base (56% * 5920 ha/126 311 ha)
- for TFL 60, a 4.5% overestimate in the timber harvesting land base (44% * 5920 ha/57 809 ha)

These overestimates in the timber harvesting land base related to uncertainty about the economically operable area are discussed in **‘Reasons for Decision’**. During efforts to define the area of poorly serviced and expensive-to-harvest areas, it became apparent that economic operability is a significant issue that should be explored in detail in preparation for the next TSR. I include a related point in **‘Implementation’**.

- administrative classes not contributing to forest management

I agree with the HGMC assessment that in deriving the base case timber harvesting land base, for the most part the appropriate exclusions of administrative classes were made. The following classes were appropriately excluded: Private - Crown Grant; Federal Reserve; National Park; Indian Reserve; Military Reserve; Crown Ecological Reserve; Crown UREP (Use, Recreation and Enjoyment of the Public); Crown Provincial Park Class A; Crown Provincial Park equivalent or Reserve; Crown Miscellaneous Reserve; Crown Miscellaneous Lease, as well as Heritage Sites/Conservancies. Other than these categories, the HGMC noted that adjustments to the timber harvesting land base were required to account for areas within municipalities and for non-reverted Timber Licences (TLs).

The HGMC noted that since municipal areas were included in the base case timber harvesting land base, but are not within the Haida Gwaii Management Area, an adjustment was required to exclude those areas from contributing to the HGMC determination. However, while an adjustment was necessary for the HGMC determination, no adjustment is required for mine, since municipal areas fall within the jurisdiction of my determination under Section 8 of the *Forest Act*.

I have noted in my determination and in '**Reasons for Decision**' the contribution of municipal areas to the timber supply of the TSA and TFL 60. There is no municipal area in TFL 58.

The other consideration related to administration for which the HGMC made an adjustment was TLs. In TFLs, TLs are managed as part of the licences, and therefore are included in the TFL timber harvesting land base. In TSAs, however, TLs provide the right to harvest the old-growth timber on the licence areas, and those areas are managed separately from the TSA. Once the old-growth timber on licence areas is harvested, the areas revert to provincial government administration, and are managed together with the remainder of the TSA. Therefore, in the TSA, prior to reversion of the areas to the TSA, the TL areas do not contribute to the AAC of the TSA.

However, for the Haida Gwaii analysis the TL areas were not excluded from the timber harvesting land base. In their determination, the HGMC accounted for the inclusion of the non-reverted areas by assuming a 0.4 percent overestimation of the total timber harvesting land base of the HGMA. That approach reflected that TLs contributed 6487 hectares in the TSA, of which only about 800 hectares is occupied by old forest, and is therefore assumed to be unreverted. While this area amounts to 0.4 percent of the total HGMA timber harvesting land base, it is about 0.6 percent of the TSA timber harvesting land base.

Therefore, since unreverted old-growth forest area in TL was included in the timber harvesting land base of the TSA, but will not contribute to the timber supply of the TSA in the short term, I have accounted for an overestimation of 0.6 percent of the timber harvesting land base for the TSA in the short term, as noted in '**Reasons for Decision**'.

Growth and yield and site productivity

- volume estimates for existing and future managed stands

Like the HGMC, while recognizing that there are uncertainties in the growth and yield projections for existing and future managed stands, I am satisfied that the best available information was incorporated into the timber supply analysis base case.

- inventory audit and volume and decay sampling studies

A key factor in the HGMC AAC determination was the results of a volume and decay sampling study carried out on Haida Gwaii in the late 1990s and published in 1999 in *Queen Charlotte Islands TSA Timber Supply Analysis Adjustment; FIP File Adjustment Process*. I have reviewed the information available on the volume-and-decay study and on the inventory audit completed just prior to the volume and decay study, as well as the reasoning provided by the HGMC with respect to these studies.

The audit results do not appear to be highly relevant to my determinations, since they were based on an older version of the Variable Density Yield Prediction model, that is, VDYP6. Also, the audit did not incorporate the results of the volume and decay study, the latter which was based on unbiased sampling of the entire forest management land base of Haida Gwaii, including the TSA and TFLs.

An outcome of the volume and decay study was refined taper equations and loss factors, which provided refined sound wood proportions for red and yellow cedar, hemlock, and spruce. The study indicated that the old taper and loss factors were underestimating sound wood volumes.

As noted by the HGMC in its rationale (p. 20):

“Since the new taper equations and sound wood factors are not yet incorporated into the MFLNRO Vegetation Resource Inventory Management System which uses the VDYP7 model, they were not applied to the forest cover inventory information used in the base

case forecast. Neither were the new factors incorporated into the yield estimates for existing older (unmanaged) stands in the base case.”

The JTWG performed sensitivity analysis to define the implications of the new taper and loss factors. For this analysis, factors were developed by a volume and decay expert from the BC MFLNRO Forest Analysis and Inventory Branch, and applied to the timber yield tables used in the timber supply analysis.

Again as noted by the HGMC, the results of this sensitivity analysis indicated that application of the yield adjustments based on the new loss factor and taper equations significantly increased timber supply relative to the base case, as follows:

- For the first 20 years, the base case initial harvest level is increased by 21.0 percent.
- From 21 to 40 years into the forecast, the harvest level is increased by 13.7 percent.
- From 41 to 80 years, the harvest level is 6.7 percent higher than base case.

These results apply equally to the HGMA and to each of the TSA, TFL 58, and TFL 60.

The HGMC noted several reasons for treating with caution the impacts of the taper and loss study. These included uncertainties associated with: (1) the applicability of the results to the current inventory given the amount of harvesting in old forests since the studies were completed; (2) the fact that for the sensitivity analysis, stand-level yields were adjusted based on the new taper and loss factors that actually apply at the individual tree level, together with species composition percentages from the inventory, which is appropriate but only an approximation; and (3) the stratification of the taper and loss ratios into broad age categories, whereas the new taper equations and loss factors would affect volumes differently at different ages and in different types of forests. Overall, the HGMC noted that the ratios used in the sensitivity analysis can provide only a general idea of the potential volume underestimation, and I agree with that assessment. I also agree with the HGMC acceptance of advice from the forest inventory specialist who led the volume and decay study that in relation to the base case timber supply projection *‘there is likely an upward influence [on the timber supply] that can’t be strictly quantified but is probably fairly large’* corresponding to the results of the taper and loss study.

Based on all of this information, the HGMC concluded that “a reasonably conservative application of the [volume and decay] study would be to conclude that the short-term impact is a 12 percent increase above the base case initial timber supply” and that “Given a conservative application, the timber supply impact would decline over the next few decades, in parallel with the results of the sensitivity analysis, as the contribution of existing old stands to harvests declines and second growth contributes more.”

I agree that the adjustment made by the HGMC reflects a reasonable, conservative – that is, precautionary – approach to the information available, including the results of the taper and loss study and advice provided by inventory experts. In this context, by “precautionary” I mean that the timber supply sensitivity analysis results suggest that a larger upward adjustment would have been possible in the short term, although the upward pressure would be smaller further into the future. Therefore, I accept that overall a 12 percent upward pressure on timber supply in the short and medium term is a reasonable manner in which to account for the results of the taper and loss study.

Sensitivity analysis suggests that the influence associated with the taper and loss study will be the same in each of the management units. Therefore, I conclude that there is a 12 percent upward pressure on timber supply in the short and medium term in the TSA, TFL 58, and TFL 60, and I have reflected this conclusion in **‘Reasons for Decision.’**

As noted by the HGMC, the large magnitude of the impact of this factor on timber supply warrants assurance that the results be incorporated into the Variable Density Yield Prediction model, and that the outcome of the ongoing VRI ground sampling and analysis on Haida Gwaii be compared to the inventory information used in the timber supply analysis used to support these determinations to assess both if the conclusions reached with respect to the volume adjustment are sound, and if there may be a need to consider an early revisiting of the AAC determination. These recommendations are included in the '**Implementation**' section.

- site index estimates

In support of the AAC determinations by the HGMC and by me, the JTWG presented information on the derivation of site index estimates from various sources including correlation of SIBEC site index estimates with site series from Terrestrial Ecosystem Mapping, old-growth stump site index studies, the 'Reporting Silviculture Updates and Land status Tracking System' (RESULTS) database, and the inventory data. While acknowledging that there is uncertainty, the base cases employ the best available information on ecosystem classification and on site index assignment, and they reflect a reasonable approach to site index given that research has consistently indicated that inventory information on old-growth forests generally under-estimate site productivity.

Sensitivity analyses undertaken by the JTWG to examine the potential timber supply implications of uncertainty in the information suggest a fairly large range of variability in timber supply. Therefore, as suggested by the HGMC, completion of work to bring the terrestrial ecosystem mapping to a common, satisfactory standard would help reduce uncertainty in future timber supply analyses and AAC determinations. This recommendation is included in '**Implementation**'.

Timber management and harvesting

- minimum harvestable age

The JTWG undertook a substantial amount of background work to explore the potential range of minimum harvestable age (MHA) for forest stands, examining both product-based and more financial criteria. The HGMC rationale (pp. 23-25) provides a detailed discussion of the manner in which MHAs were developed for the base case, the supporting work on different options for deriving MHAs, and the public input received on MHAs. I will not repeat that discussion; however, I will note that I agree with the HGMC characterization of the issues. In particular, I concur that the MHAs used in the base case, which were set at the youngest age by which a stand type is projected to reach 95 percent of its maximum average growth rate, was a reasonable approach and represents a balance between MHA options based on longer rotations for growing high-quality timber and shorter rotations based on financial criteria such as recovering costs as soon as practicable. I also concur that a forest management strategy for Haida Gwaii could assist greatly in developing more clarity on how to integrate economic, social, cultural, and environmental objectives, and on specific objectives for timber management to support those broader objectives. Such a strategy could be used to assist in defining MHAs for use in future timber supply reviews and AAC determinations.

In conclusion, I accept the approach used in the base case for deriving MHAs as reasonable, and no adjustments are needed in my determinations with respect to this factor.

Section 8 (8) (a) (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:

As noted in Table 1, above, I have considered information on decay, waste and breakage, and I agree that the inputs incorporated in the base cases were appropriate.

- utilization standards

In preparing timber yield estimates for the base cases, the assumed utilization levels were 30-centimetre stump height, 10-centimetre top diameter, and minimum 12.5-centimetre diameter at breast height (DBH). A common minimum DBH for coastal units for old-growth stands is 17.5 centimetres. Therefore there is some possibility that there may be over-estimation of existing stand yields. However, since most trees in old stands are larger than 17.5 centimetres DBH, it is in fact unlikely that substantial additional volume would exist in stems between 12.5 centimetre and 17.5 centimetre DBH. Consequently, the base case inputs are satisfactory, and no adjustment is needed on account of this factor.

Section 8 (8) (a) (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 time taken to establish a stand after harvest. The HGMC accepted as reasonable the inputs to the base case for regeneration delay – specifically that, on average the delay would be zero. That approach was accepted since stands are generally re-established with ease on Haida Gwaii, and since planting stock that is 1 or 2 years old can make up for some delay in planting. In general, licensees plant as soon as possible after harvesting to ensure their reforestation obligations are met quickly. A summary from the RESULTS database indicated that the average time between harvest and first planting on Haida Gwaii from 2000 to 2010 was 1.3 years, which is well within the range of planting stock age. Therefore, I conclude that the base case approach is reasonable, and have made no adjustments on this account.

- 'backlog' and 'current' not-satisfactorily restocked areas

As outlined in the HGMC rationale (p. 22), not satisfactorily restocked (NSR) area was identified from three information sources: the RESULTS; the NSR label on the forest inventory; and the absence of species variables on the forest inventory for forest cover polygons with other forest cover information. I concur with the JTWG and the HGMC that the best available information was used in identifying NSR areas. In addition, I concur that it is reasonable to expect few regeneration problems on Haida Gwaii given the generally good growing conditions, and further that it was reasonable to assume in the base case that areas identified as NSR will regenerate satisfactorily, and should be included in the timber harvesting land base as stocked, managed stands.

I acknowledge the HGMC recommendation that forest professionals provide information to allow all relevant databases related to post-harvest regeneration to be kept up-to-date. I would expect that such databases would be kept up-to-date as part of normal business. I also expect that the ongoing VRI will provide consistent forest classification and help to resolve some of the difficulties experienced in identifying NSR for this timber supply review.

Section 8 (8) (a) (iii) silvicultural treatments to be applied to the area:

In addition to the factors listed under this section in Table 1 above for which I accept the inputs and approaches used in the base cases, I have also considered the following factors, which warrant additional comment.

- silvicultural systems

In the timber supply analysis base cases, all harvesting was modeled using the clear-cut with reserves silvicultural system. As noted in the HGMC rationale (p. 22), while some single tree select partial harvesting has occurred on Haida Gwaii, the area of application is small, and it is not likely that high-retention partial harvesting will be used frequently due to high costs and the desire to promote regeneration of the currently more valuable cedar and spruce rather than of hemlock, which is promoted by high-retention partial harvest systems.

Also as noted by the HGMC, the forest retained in clear-cut with reserve systems causes shade which could reduce growth rates in the regenerating stands. However, modeling of such effects requires information on the regimes, such as, top height of the residual stand at the next entry, whether retention is in aggregated groups or dispersed single trees, and the percentage of the crown cover retained in the stand. Such information is not currently available since silviculture systems that are designed to meet the LUOO have only recently been implemented on Haida Gwaii. In addition there is limited research on the BC coast and none on Haida Gwaii that would enable quantitative conclusions about the potential shading impacts without more knowledge about the specifics of the harvesting regimes. Therefore, the base cases did not incorporate any growth and yield effects of shading.

While there is likely an over-estimation in the projected long-term timber supply as a result of not making adjustments to account for shading effects, the approach used in the base cases was suitable since the growth and yield impacts from shading will occur in managed stands, and will affect timber supply in the longer term not in the short term. Therefore, I accept the approach used in the base cases, and no adjustments are necessary on account of this factor for these determinations.

I acknowledge that the HGMC made a recommendation for systematic collection of information on silvicultural regimes used to achieve EBM objectives under the LUOO. I expect that information on silviculture regimes used on Haida Gwaii will be collected as a matter of course in meeting reporting obligations, and therefore that more information to enable modeling of the potential effects of retention on growth and yield will be available to support the next timber supply review. In addition, I am aware of some research installations designed to explore the implications of variable retention silvicultural systems on the coast. I would encourage continued work on these projects because they could prove critical in furthering our understanding both of how different silvicultural systems can meet EBM objectives, and of how they affect timber growth and yield.

- harvest priority rules

In developing the base case forecasts, an “oldest first” harvest priority rule was used, whereby the highest priority for harvest was placed on the oldest available forest stands. Intuitively, harvesting operations do not likely follow such an approach consistently. For example, it is likely that merchantable stands that are accessible from roads already constructed and nearby recently harvested areas would be harvested first, regardless of their age, assuming such harvesting would be consistent with meeting applicable management objectives. Consequently, it may appear to be a better modeling approach to set harvest priorities based on distance from roads or minimization of costs of access development. However, to have an effect on timber supply, constraints would need to be placed on the overall cost of access construction, and such a figure is not readily

available. Therefore, it is difficult to develop a practical alternative approach to the rule used in the base cases.

In light of these considerations, I accept as reasonable the “oldest first” harvest priority rule used in the base cases, at least until more explicit information or direction from a set strategy is available. The HGMC recommended (rationale p. 26) that “MFLNRO timber supply analysts work with staff from the district, licensees, and the CHN to develop analyses that explore the range of approaches to harvest sequencing and priority setting, and develop recommendations for improved modeling approaches for modeling for inclusion in the next timber supply review for Haida Gwaii.” I agree that, resources allowing, such work would be useful and should be considered in preparation for the next timber supply review and AAC determinations on Haida Gwaii.

- partitioning the AAC

Section 8(5)(1) of the *Forest Act* allows the BC chief forester to specify portions of an AAC as attributable to different types of timber or terrain.

In this section of the rationale I discuss the existing partition for low-productivity cedar sites, and the HGMC recommendations for consideration of partitions for second growth and for red and yellow cedar.

First, I concur with the HGMC that a partition for low-productivity cedar sites, as currently exists on the TSA, is no longer necessary. As noted by the HGMC on page 27 of its rationale, “... exclusion of inoperable areas in deriving the timber harvesting land base used in the current timber supply analysis, in combination with definitions of minimum harvest ages, has reduced significantly the need for specifying a particular harvest level from these stands.”

The HGMC recommended that I consider establishing partitions to specify appropriate portions of the AAC as attributable to:

1. second-growth timber, to ensure an orderly transition to eventual dependence on second growth; and
2. cedar-leading stands, to ensure a sustainable harvest in proportion to their contribution to the inventory, to ensure their continuing contribution to the harvest through the transition period to dependence on second growth.

Some members of the public in their input on the Public Discussion Paper also expressed opinions that measures should be put in place to ensure that second growth contributes to harvests, and that cedar is not excessively harvested.

In this section I review my considerations, perspectives, and decisions regarding the recommendations to control the level of harvest for second growth and cedar.

Limits on second-growth harvest

Outputs from the base case forecasts show that second growth in the 81-100 year age class is projected to contribute to harvests beginning in just over 20 years in TFL 58, in about 30 years in TFL 60, and in about 10 years in the TSA. Therefore, there is some indication that second growth will need to begin contributing to harvests in the near future in order to support harvests at the base case levels.

Currently there is a second-growth partition in place in TFL 58. It was established prior to completion of the SLUA and the LUOO, and was intended both to ensure that the old growth remaining on the TFL land base was not overly utilized, and to provide explicit acknowledgement that the licensee’s timber supply analysis included assumptions of young minimum harvestable

ages for second growth, which implied the need to begin harvesting of second growth in the near term. Given the establishment of the LUOO, the partition is no longer necessary to take pressure off of the remaining old growth in the management unit in relation to management of non-timber values. In addition, it is my understanding from Haida Gwaii Natural Resource District staff that the contribution of second growth to harvests is increasing in TFL 58.

While the HGMC recommended establishment of a partition to ensure that second growth contributes to harvests, an unintended outcome associated with such a partition could be to force licensees to harvest second growth when it could accumulate higher quality fibre if allowed to age further. The degree to which second growth contributes to harvests ultimately will be a function of the economics of second growth harvest, processing, and marketing.

In addition, changes in land use and management constraints related to EBM, together with the associated substantial reduction in timber supply will increase the costs faced by forest operators on Haida Gwaii. In this context, in order for a partition to be justified, the additional costs associated with administering, planning, and implementing the partition should be outweighed by the associated benefits. At this time it is not clear to me that the cost would be warranted with respect to a potential second growth partition.

Further, the projected harvest of second growth in the relative short term in the TSA base case and to a lesser extent in the TFL 60 base case is due to forest cover requirements related to the LUOO and other non-timber objectives that preclude harvesting of old growth on the timber harvesting land base. Therefore, the analysis suggests that achievement of objectives for non-timber forest values will require that some second growth be harvested if harvest levels close to those shown in the base cases are to be achieved.

Based on these considerations, it would appear that a partition to attribute a portion of the AAC to second growth stands is not the best option at this time. However, given the results of the timber supply analysis that suggest second growth will need to begin contributing to harvests within the next 10 to 20 years, and will be an important component of timber supply in the decades after that, it is important for the parties involved in development of the forest management strategy for Haida Gwaii to include a strategy for second growth contribution to the timber supply, which will need to consider the economics of harvesting, transporting, and processing second-growth timber.

Limits on cedar harvest

The HGMC concern about the level of cedar harvest appears to have been based on two sources of information. The first, which was highlighted in the Public Discussion Paper and in the public input received in response, is that over the 1995–2010 timeframe, western redcedar and yellow cedar (collectively referred to as “cedar” in this section) contributed to harvests in substantially greater proportion than their contribution to the timber harvesting land base. Specifically, information presented to the HGMC showed that while cedar comprises 34% of the area of the timber harvesting land base, those species contributed 49% of the harvest for 1995–2010. The second, and closely related piece of information is that the base case timber supply projection showed that even if old cedar were used in proportion to its contribution to the timber harvesting land base, almost all of the supply of old cedar on the timber harvesting land base will be used by about 80 years from now, followed by a 40-year gap in availability of mature cedar for harvest. Harvesting at a rate that exceeds the contribution of cedar to the timber harvesting land base would accelerate the use of the limited old cedar stock and potentially hasten a shortage of high-quality old cedar.

Subsequent to the HGMC AAC determination for the Haida Gwaii Management Area, the JTWG undertook further work on the issue of cedar harvests. This work consisted of:

- More in-depth examination of the contribution of red and yellow cedar to the timber harvesting land base (i.e. by age and by volume as well as area);
- More in-depth characterization of the contribution of cedar to the timber supply base case forecasts and to historic harvests; and
- Additional timber supply runs to explore the effects of placing a maximum “ceiling” on cedar harvests.

The JTWG compiled statistics on the contribution of cedar to various aspects of the timber harvesting land bases including: percent of cedar in the full timber harvesting land base by area, percent of cedar in the full timber harvesting land base by volume, percent of cedar in the timber harvesting land base older than 100 years (“mature” forest) by area, and percent of cedar in the timber harvesting land base older than 100 years (“mature” forest) by volume. Table 3 shows those statistics for each management unit. For context, the table also displays the cedar contribution to the base case forecasts over the short (20 years) and full mid-term (first 100 years), as well as the harvest billing for the 2000 to 2011 period.

Table 3: Summary of information on cedar contribution to timber harvesting land base area and volume, base case forecasts, and recent harvests on Haida Gwaii

	All units	TSA	TFL 58	TFL 60
[1] Percent of cedar in THLB by area	33%*	39%	25%	23%
Corresponding harvest (% x base case initial level) (m ³ /yr)	295,438	192,256	18,216	75,771
[2] Percent cedar by area on THLB older 100 yrs	51%	52%	53%	45%
Corresponding harvest (% x base case initial level) (m ³ /yr)	456,586	256,341	38,618	148,247
[3] Percent of cedar by volume in THLB (all ages)	36%	39%	31%	31%
Corresponding harvest (% x base case initial level) (m ³ /yr)	322,296	192,256	22,588	102,125
[4] Percent cedar by volume on THLB older 100 yrs	44%	47%	47%	39%
Corresponding harvest (% x base case initial level) (m ³ /yr)	393,917	231,693	34,247	128,480
Base case results:				
[5] Base case average cedar harvest years 1-20 (m³/yr)	401,669	220,061	36,607	145,001
Percent of base case initial level (cedar-leading stands)	45%	45%	50%	44%
[6] Base case average cedar harvest years 1-100 (m³/yr)	235,757	149,600	15,973	70,184
Percent of base case initial level (cedar-leading stands)	26%	30%	22%	21%
Harvest billing:				
[7] Harvest billing 2000-2011 (m³/yr)	914,917	381,051	81,200	451,980
Cedar composition of billing (m ³ /yr)	472,976	200,258	43,606	229,111
Cedar composition (% of total billing)	52%	53%	54%	51%

Note: * The PDP reported that cedar contributed 34% to the timber harvesting land base area. This updated figure of 33% is slightly smaller than the original percentage. This difference is not significant for this discussion; cedar occupies about one-third of the area of the timber harvesting land base.

Examination of these statistics shows that cedar contributes 44% of the volume on the overall timber harvesting land base occupied by stands over 100 years old. This is substantially higher

than the contribution of cedar to the area of the timber harvesting land base as a whole (33%). Since harvests currently come from older stands, a comparison of harvested volume to volumes on the older timber harvesting land base could be viewed as a more accurate indication of whether cedar has been harvested disproportionately.

While this comparison still suggests that cedar stands have been preferred to an extent (52% of the billed volume compared to 44% of the volume on the timber harvesting land base occupied by older forests), the difference of 8% is substantially smaller than the 16% difference reported in the Public Discussion Paper for 1995–2010 (49% of the harvest less 33% contribution to the timber harvesting land base).

However, as discussed previously, the base case results suggest that there could be a 40-year period without significant amounts of commercial cedar even if cedar is harvested in proportion to its contribution to the timber harvesting land base. The short-term harvest projected for cedar in the overall base case is about 400 000 m³/year (see row 5 of Table 3). This is over 15% lower than the actual average cedar harvest over 2000-2011 (472 976 m³/year). Therefore, continuation of past harvesting preferences will accelerate the depletion of old cedar beyond what is shown in the base cases, which would in turn hasten the mid-term cedar shortage.

Old cedar has been a central component of the coastal industry for some time, and there could be significant impact on the Haida Gwaii economy if old cedar is depleted before high-quality second growth is available.

Although a decline over time in the contribution of old forest to harvests is a logical outcome of managing timber on cycles of the lengths defined for this Timber Supply Review (i.e. between 66 and 170 years, averaging about 115 years), there is a question about the rate of decline in old-growth contribution. The HGMC recommended consideration of a partition to “cedar-leading stands, to ensure that allowable harvests in such stands are in proportion to their contribution to the inventory, *so that they are available to contribute to harvests through the transition period to dependence on second growth* [emphasis added].”

Overall, this information indicates that there is clear reason to consider placing limits on the contribution of cedar to harvests in Haida Gwaii management units.

Three further concerns are (a) at what levels the limits should be set, (b) whether the limits should be legally established, and (c) what basis should be used for the limits (i.e., actual volume harvested or percentage of AAC).

The third of these issues is the simplest to address. Much of the discussion about the extent to which there is a problem with the level of cedar harvesting focuses on the percentage contribution of cedar to harvests. Using percentage contribution is problematic however, since actual harvests can differ from AACs, sometimes quite substantially. For instance, if a harvest forecast indicated that cedar could contribute 50% of the overall harvest, and the overall projected harvest was 100,000 m³/year, the sustainable level of cedar harvest would be 50,000 m³/year. If the actual overall harvest was 60,000 m³ and the cedar component of that was 40,000 m³ (67% of the overall harvest) it would not necessarily follow that cedar was being overharvested relative to its contribution to the inventory or that harvesting at that rate would result in a gap in supply. Therefore, it would be best to establish any limit on the harvest of a species on a specified volume rather than a percentage of the actual harvest.

To examine if limits on cedar harvest should be legally established, several issues warrant consideration, including:

- The impacts on overall timber supply and on the availability of old cedar over time of placing a cap on the cedar harvest

- The operational, administrative, and economic implications of placing limits
- The impact on the availability of old cedar of deferring placement of a limit on cedar harvests

Additional analysis – mitigating the mid-term gap in cedar supply

To help address the first of these issues, the JTWG undertook additional timber supply analysis.

A sensitivity analysis was run in which a cap was placed on the contribution of old growth cedar-leading stands (that is, stands in which the greatest percentage of the volume is from cedar). The objective of the cap was to offset or mitigate the low availability of commercial cedar shown in the base cases in the midterm. The objective was to determine the lowest cap on cedar in each management unit that could be set while retaining the overall base case forecast. The harvest forecasts are shown in Figure 1. Since cedar harvests in these forecasts are substantially lower in the short term than in the base cases, the implication is that other species would make up the difference. The cedar harvests shown in Figure 1 are the lowest that would still allow for achievement of the base case forecasts.

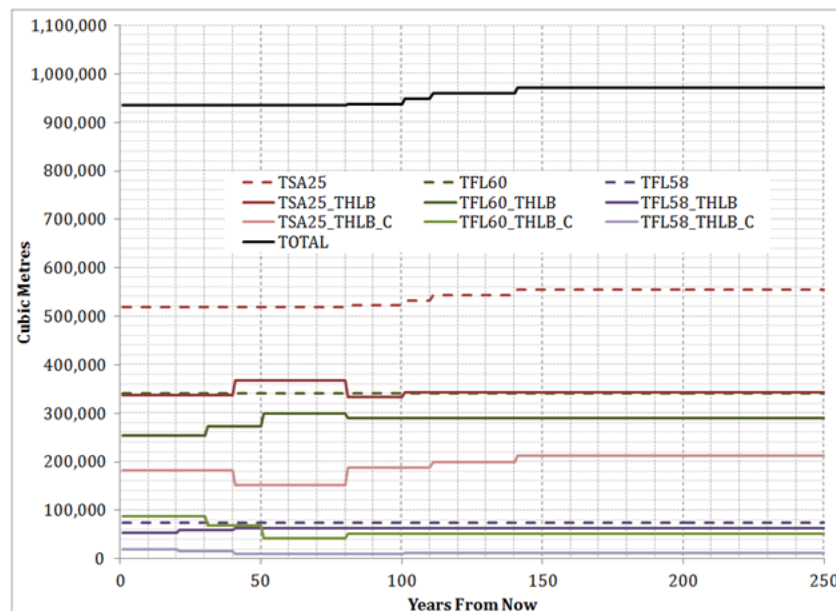


Figure 1: Harvest forecasts for a sensitivity analysis in which the cedar contribution is capped

Restricting cedar harvests to the extents shown in Figure 1 would extend the time over which old growth cedar is available for harvesting. For the Haida Gwaii Management Area, the cap on cedar harvest decreases the volume of cedar harvested in the short term, and extends the time during which old-growth cedar contributes to harvests from just over 80 years in the base case to slightly over 100 years in the sensitivity analysis, while maintaining the overall base case harvest level. Table 4 shows the percentage contribution of cedar to the base case forecasts in the short term and to the sensitivity analysis forecasts.

It should be noted that cedar harvest projected in the forecasts could be measured in two ways. One is based on cedar-leading stands; that is, all volume in stands dominated by cedar could be tracked as cedar volume. In this approach, cedar in stands dominated by other species would not be attributed to cedar during harvest accounting, but non-cedar volume in cedar-leading stand would be counted as cedar. The second approach is to calculate the cedar volume harvested in all stands, using the percentage composition for each species in the forest inventory. For example, if

the estimate in the inventory is that 50 percent of a stand is cedar, then half of the volume harvested would be attributed to cedar.

Table 4: Cedar contribution to base case harvest forecast and the controlled cedar contribution sensitivity analysis for Haida Gwaii.

	Average cedar contribution to base case forecast over years 1–20 Based on percent cedar contribution at the stand level	Sensitivity analysis: cap cedar harvest level (see figure 1) (average cedar contribution to years 1-20 of the forecast as % of base case initial level)	
		Based on percent cedar contribution at the stand level	From cedar-leading stands
TSA 25	42%	33%	35%
TFL 58	49%	34%	27%
TFL 60	42%	35%	26%
TOTAL	43%	34%	31%

Controlling the rate of harvest of cedar in the short to medium term as shown in the sensitivity analysis could result in less extreme fluctuations in cedar harvest over time. However, the situations in the management units differ. Setting of the cedar contribution cap extends the time during which old-growth cedar contributes to harvests by 20-25 years in the TSA, by about 50 years in TFL 58, and by about 35 years in TFL 60. However, in TFL 58, the volume available in later years is quite low at the cost of a substantial percentage reduction in the contribution of cedar in the short term. Conversely, capping the short-term cedar contributions in the TSA and TFL 60 results in substantial extension in the time frame over which old cedar is available.

Restricting harvests to the levels shown for the sensitivity analysis would significantly reduce cedar contribution relative to the base case forecasts, and relative to actual harvests over the last decade (the 2000-2011 harvest billing), to a level close to the presence of cedar on the timber harvesting land base. An implication would be that hemlock and spruce would need to contribute much more significantly to harvests.

Economic and administrative considerations

Some operational, administrative and economic considerations are relevant in assessing the appropriate level of control of cedar harvest, and whether the control should be legally binding or established as Chief Forester direction or expectation. First, as I commented in my considerations related to second growth above, substantial changes in land use and management constraints associated with the SLUA and LUOO, and the related timber supply reductions, will increase the costs of forest operations on Haida Gwaii. For a legal partition to be justified, the additional costs associated with administering, planning, and implementing the partition should be outweighed by the associated benefits.

The district manager of the Haida Gwaii Natural Resource District informed MFLNRO staff on the JTWG that given current markets and the practices needed to meet LUOO requirements, defining economically viable harvesting opportunities for licensees on the TSA could be difficult. I would expect that additional restrictions on operations, such as placement of a legal limit on cedar harvest, would increase the difficulties noted by the district manager.

Administratively, controls could be placed either on the volume from cedar-leading stands or on the volume of cedar regardless of the stand type from which it is harvested. I believe it would be simpler to track the billed cedar volume as opposed to the harvest of cedar-leading stands. I note that the Coast Region FRPA Implementation Team, Resource Planning Working Group is

currently exploring issues associated with cedar management on the coast. A discussion paper on cedar management considerations produced by the working group noted that since AACs are based on the forest inventory, it would be more logical to use volumes defined using the inventory attributes of harvested blocks as the basis for comparison with harvest level direction for cedar harvest, rather than to use harvest billings. For example, if volumes not reported in the inventory, such as from dead potential wood, are recovered, harvest billing information would tend to overstate the harvested volume in relation to the inventory. Similarly, if volumes have been underestimated in inventory information, as discussed in *inventory audit and volume and decay sampling studies*, above, the harvest billing system would indicate higher harvested volumes than would be in the inventory. However, since I have accounted for an underestimate in volumes related to the findings of the volume and decay study, this latter point could be addressed in harvest tracking. However, I agree in principle with the assertion that use of inventory attributes would form a more consistent basis for harvest tracking than harvest billing information. Nevertheless, harvesting information would need to be up-to-date to enable timely tracking based on inventory attributes of harvested blocks, and tracking harvests by cutblock would be more administratively burdensome than using harvest billing information. Therefore, while the first priority for tracking of cedar harvests is the inventory of harvested blocks, harvest billing information can provide a reasonable source for harvest tracking if it proves to be substantially easier to implement, and up-to-date block level information is not available.

I also note that if I were to establish a legal partition under section 8(5) for the *Forest Act*, it would be important to institute a clear monitoring protocol. Given the issues I have outlined above, reaching agreement on a protocol that is accurate, feasible to implement, and fair within the context of regulatory and business realities would be challenging.

While I note that there would be short-term economic costs associated with implementing a limit on cedar harvests, there could also be significant longer term costs of not doing so. One possibility is to set a legal partition at a fairly high level and phase in more limitation over time. Another approach likely to have similar results is to defer control (or partition) of the harvest of old cedar into the future. While it would be possible to defer a reduction in the harvest of old cedar, the longer the deferral the greater the required future adjustment and the sooner a shortage of old cedar will be experienced. Deferral will also result in increased difficulty in mitigating mid-term gaps in cedar availability.

I also note that there currently is no strategy that has been defined based on broad consultation and discussion that sets a target or threshold for minimum cedar availability in the mid-term.

Options –legally enforceable partition or formal direction

While a legally enforceable partition could be established under section 8(5) of the provincial *Forest Act*, another option would be to provide clear formal direction in the current determinations on the expected maximum level of cedar contribution, with a potential outcome being a section 8(5) partition at the next determinations, depending on harvest performance and development of a cedar management strategy for Haida Gwaii.

The primary advantage of section 8(5) partitions is the ability to incorporate the attributions into licences as legally enforceable requirements. Disadvantages of a legal partition include: establishment of inflexible limits derived in the absence of a strategy for cedar management that otherwise could be developed in consultation with all affected parties and with all relevant information; placement of significant additional constraints on tenure holders on top of generally poor markets coupled with economic uncertainties associated with the recent and significant land and forest management changes on Haida Gwaii; and the need for a clear, accurate, fair, and feasible-to-implement monitoring protocol.

The second option is to provide clear direction and expectations regarding the appropriate maximum contribution of old cedar together with harvest monitoring, as well as a recommendation for development of a cedar management strategy that outlines how the various parties will manage the supply of cedar over time. This formal, but not legally binding direction would clarify the issue for the governments of the Haida, province, and communities, for tenure holders, and for other stakeholders. It would also establish a foundation for future consideration such as the potential needs for an earlier Timber Supply Review and for conservative partitions on old cedar harvests at the next AAC determination if an appropriate cedar management strategy is not developed and implemented. Key advantages of this approach are that it provides the opportunity to develop a strategy with full stakeholder involvement, while affording short term flexibility to licensees to address uncertain and changing market conditions as they implement the LUOO. The key disadvantage of this approach is that it is not legally enforceable so there is greater risk that old cedar will be harvested at rates that will further exacerbate the issues associated with future cedar harvests described above. This risk is mitigated by the ability to revisit the determinations earlier than scheduled.

A further issue is deciding on the appropriate level at which to set limits on old cedar harvesting. My review of the various potential alternatives presented in Table 3 and in the sensitivity analysis, suggests that to be consistent with recommendation of the HGMC, and to be mindful of the important role of cedar in maintaining economically viable operations at least under current markets, a reasonable range for consideration is encompassed by the cedar contribution in the first 20 years of the base case forecasts, and the cedar contribution over the first 20 years in the sensitivity analysis in which the contribution from cedar-leading stands was capped. Other statistics presented in Table 3 related to the contribution of cedar are static indicators of land base or timber volume composition. While these statistics are good approximations useful for highlighting the extent of the overall issue of cedar harvest rates, the harvest projections resulting from detailed modeling of the dynamics of timber supply seem to me to be a better basis for defining limits on cedar harvesting.

Table 5 displays the percentage contribution of cedar at the two benchmarks. The table also shows the cedar harvest level that corresponds to these contributions. As noted above, I believe that the cedar harvest from all stand types based on the cedar contribution at the stand level is a more suitable administrative approach than the volume from cedar-leading stands, and the numbers in Table 5 correspond to the overall cedar harvest from all stand types based on stand-level percentage contributions.

Table 5: Potential levels of control on cedar harvest for Haida Gwaii.

	(1) Cedar contribution to base case forecast (average for years 1–20)	(2) Sensitivity analysis: cap cedar harvest level (average cedar contribution for years 1-20)
TSA 25	42.1% (207,400m ³)	34.3% (169 000 m ³) 19% less than base case
TFL 58	49.1% (35,800 m ³)	32.6% (23,700 m ³) 34% less than base case
TFL 60	42.3% (139,500 m ³)	34.9% (115,000 m ³) 18% less than base case
TOTAL	42.7% (382,500 m ³)	34.4% (307,700 m ³) 20% less than base case

Notes:

- (a) Columns 1 and 2 are based on contributions from all stand types based on stand-level cedar composition
- (b) The volumes for the management units do not sum to the volume for all of the HGMA due to rounding of the percentages.

To provide context for the numbers shown in this table, the average cedar harvests for 2000-2011 were:

- 200 258 cubic metres/year for the TSA (53% of the overall harvest)
- 43 606 cubic metres /year for TFL 58 (54% of the overall harvest)
- 229 111 cubic metres /year for TFL 60 (51% of the overall harvest)

The 2000-2011 harvest figures should be interpreted with caution since the boundaries of the TSA and TFL 60 changed during that period. The combined average harvest for the TSA and TFL 60 during that period was 472 975 cubic metres, or about 106 000 cubic metres per year more than the cedar contribution to the base cases in the short term.

Cedar partition conclusion

Weighing all of this information, I have concluded as follows.

At this time, I will provide direction that the harvested cedar volume should be a maximum based on the following percentages of the AACs that I will establish at the conclusion of this rationale:

- 38 percent in the TSA;
- 41 percent in TFL 58; and
- 39 percent in TFL 60

These percentages are part way between the upper and lower end of the ranges I outlined above, as presented in Table 5. I believe these limits represent reasonable starting points in moving

towards levels of cedar harvest that will help ensure the availability of merchantable cedar throughout the transition to the harvesting of second growth.

These limits are not attributions under section 8(5) of the *Forest Act*. The significant recent change in the land use and forest management regime on Haida Gwaii; the fact that the various parties including the HGMC, the Haida Nation, communities, tenure holders, and the general public have not had the opportunity to review and discuss detailed information on the various options for partitions and how the desire for commercial cedar balances with other aspects of forest management; the challenges in locating economically viable forest operations associated with the LUOO; and the currently poor markets, all suggest to me that a legal partition would not be the best option at this time and could have unintended or unexpected consequences. I believe that the clear direction I have provided can inform discussions on Haida Gwaii on a forest management strategy, including agreement on appropriate targets or limits on the harvest of old cedar. I also believe that clear direction will provide forest operators the flexibility to adjust to the new forest management regime on Haida Gwaii and to develop strategies that integrate the limits on cedar harvest.

My directions on maximum limits of cedar harvest are included in ‘**Reasons for decision**’, below.

If harvesting of cedar in the various management units is not consistent with the direction I have provided here, the need for firm and more conservative limits will increase and should be considered in the next AAC determinations for these units. The harvest of cedar should be monitored, and failure to implement the limits on cedar harvest levels I have noted could be a trigger for earlier AAC determinations. I have included guidance on this issue in ‘**Implementation**’, below.

- cut control and actual harvest performance

As noted in the HGMC rationale (p. 28), actual harvests have been well below AACs for Haida Gwaii as a whole for the past decade. Between 2000 and 2008 almost all of the undercut was associated with the TFLs. After 2008 when portions of TFL 60 and the Haida Gwaii block of TFL 25 were transferred to the TSA and the TSA AAC increased correspondingly, actual harvests in the TSA have been less than the AAC.

None of this affects my AAC determinations; however, I note that given the substantial reductions in timber supply associated with implementation of the LUOO and the corresponding reductions in the management unit AACs that I am making in these determinations, there could be substantial forest management implications if the undercut from the last several years were to be allocated under provisions of section 75.8(2) of the *Forest Act*. These implications should be carefully considered if any allocation of undercut associated with the management unit on Haida Gwaii is being contemplated.

- woodlot licences

The non-private portions of woodlot licence (WL) areas were included in the timber supply analysis base case for the TSA (no WLS overlap with TFLs). The private lands in WLS were excluded from the base cases. Since the Haida Gwaii Management Area includes WLS in general, but excludes private land, the base case therefore was consistent with the scope of the HGMC determination, and the council did not make adjustments to the base case projection. However, section 8(1) of the *Forest Act* explicitly excludes WL areas from the chief forester’s jurisdiction for AAC determinations. Therefore, I must determine the extent to which excluding WL areas would affect the base case projections.

The total aggregate of current WL AACs is 9293 cubic metres. Of that volume, 7476 cubic metres is applicable to non-private lands within WLs, all of which is in the TSA.

I acknowledge that analysis was done to define the contribution of the WL areas to the base case forecasts; this analysis was discussed in the HGMC rationale (p. 29). However, section 8(11) of the *Forest Act* requires that the aggregate of AACs for TSAs, TFLs, WLs, community forest agreements, and First Nations woodland licences on Haida Gwaii must not exceed the HGMC determination for the HGMA. Therefore, to be consistent with this legislative requirement I must exclude the full amount of the current non-private WL AAC from my determinations. Consequently, since all of the WL area was included in the TSA for the analysis, the base case for the TSA overstates the volume I can include in my determination by 7476 cubic metres. I have accounted for this in ‘**Reasons for Decision**’.

Forest management objectives

Section 8 (8) (a) (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:

Table 1 above lists the factors that I have considered and have accepted the inputs and approaches used in the base cases. In the following sections I discuss factors for which I have recommendation or which warrant adjustments in relation to the timber supply projected in the base cases.

- community watersheds

For the base case forecasts, a forest cover requirement was applied to all community watersheds listed in section 8.2 of the provincial Forest Planning and Practices Regulation objective for community watersheds. That requirement limited the area occupied by forest younger than 10 years old at any time to a maximum of 10 percent, which has an equivalent effect to the maximum limit on harvesting of five percent every five years that is commonly applied to community watersheds in timber supply analysis in BC. The community watersheds on Haida Gwaii are also listed as sensitive watersheds under the LUOO, and are therefore subject to both sensitive watershed and the community watershed forest cover requirements.

The HGMC, in its rationale (p. 29) discussed input from the Council of the Village of Queen Charlotte in which the village council expressed opposition to timber harvesting in its community watershed. The HGMC rationale provides information on a review of analysis results that indicated that on average only 1.8 percent of the area in each watershed was forecast to be logged over a five-year period.

I concur with the HGMC conclusion that the base case modeling is consistent with constraints on harvesting that will be imposed operationally in community watersheds, and that objectives for sensitive watersheds under the LUOO will provide additional requirements that must be met prior to approval of any harvesting by the Haida Gwaii District Manager. In addition, the assessment of base case results showed that forecast harvest levels are consistent with disturbance levels significantly lower than the maximum permitted disturbance of five percent of the area in five years incorporated into the base cases. As suggested by the HGMC, village council members can work with the district manager to discuss related issues. I accept the manner in which management in community watersheds was modeled in the base cases.

- recreation management

I concur with the HGMC reasoning and conclusions with respect to recreation sites. Specifically, I agree that significant sites were adequately accounted for in the base cases through land base exclusions for EBM or through management requirements that were applied to visually sensitive areas. However, several important but unofficial sites were not accounted for in the base cases. The HGMC concluded that the timber harvesting land base in the base case is overestimated by 0.1 percent for the whole Haida Gwaii Management Area. I agree with this conclusion, and must therefore, determine how this adjustment applies to the individual management units.

All of the unofficial recreation sites are within the TSA; none fall within the TFLs. An adjustment to the TSA timber harvesting land base that is equivalent to the 0.1 percent impact on the Haida Gwaii Management Area is 0.16 percent (this percentage was established by multiplying 0.1 percent by the full Haida Gwaii Management Area timber harvesting land base divided by the TSA timber harvesting land base). I have therefore accounted for a 0.16 percent overestimation of the TSA timber harvesting land base in '**Reasons for Decision**'.

I also acknowledge that the HGMC included a recommendation in their rationale that the various inventory data sources for recreation be consolidated and rationalised, and that the ongoing work on visual quality management be coordinated with work on recreation feature inventories. I agree that, subject to resource availability, such work would be useful and should be considered in preparation for the next timber supply review and AAC determinations on Haida Gwaii.

- Identified Wildlife

Identified wildlife are wildlife species and plant communities that have been designated under BC's Identified Wildlife Management Strategy (IWMS) as requiring special management attention, usually in the form of protection through establishment of wildlife habitat areas with defined objectives or by general wildlife measures. I have reviewed information on the nine identified wildlife species known to be present on Haida Gwaii, and have reviewed the HGMC considerations and conclusions with respect to these species. The nine species are: 'Queen Charlotte' Northern Goshawk; Marbled Murrelet; Great Blue Heron; 'Queen Charlotte' Northern Saw-whet Owl; Cassin's Auklet; Ancient Murrelet; Sandhill Crane; 'Queen Charlotte' Hairy Woodpecker (*picoides* subspecies); and the red-listed bat, Keen's Long-eared Myotis. The LUOO includes specific requirements for some of these species, specifically, Northern Goshawk, Marbled Murrelet, Great Blue Heron, and Northern Saw-whet Owl.

I concur with the reasoning and conclusions of the HGMC that the requirements for Marbled Murrelet, Northern Saw-whet Owl, Cassin's Auklet, Ancient Murrelet, Sandhill Crane, Hairy Woodpecker, and Keen's Long-eared Myotis have been adequately accounted for in the analysis base cases. The applicable reasoning is documented in the HGMC rationale on pages 30-31, with specific attention to the Saw-whet owl on pages 31-32. These seven species are listed in Table 1 as being within the "accepted base case" category.

For the other two identified wildlife species – Great Blue Heron and 'Queen Charlotte' Northern Goshawk – adjustments with respect to the base cases were warranted. Considerations on these two species are discussed below.

- Great Blue Heron

The HGMC noted, and I concur, that allowance is needed for reserve zones around each active Great Blue Heron nest site of at least 45 hectares, and that such allowance was not made when developing the base case forecasts. The HGMC concluded that the failure to incorporate the reserve zones resulted in a 0.35 percent overestimate in the timber harvesting land base of the

Haida Gwaii Management Area. I agree with this conclusion, and must define how the over-estimate is distributed among the three management units.

Assessment provided by the JTWG showed that of the 76 hectares that should have been removed for reserve zones after other overlapping exclusions, 34 hectares were in the TSA, 42 hectares were in TFL 60, and no area was in TFL 58. These exclusions are equivalent to over-estimates of 0.02 percent for the TSA and 0.05 percent for TFL 60. I have accounted for these over-estimates in the timber harvesting land bases for these two units, in **'Reasons for Decision'**, although I note that these percentages are very small, and I have included them only for completeness.

- 'Queen Charlotte' Northern Goshawk

In its rationale, the HGMC (pp. 32-34) provided a detailed discussion of the modeling approach used in the timber supply analysis for, and of the planning and management issues associated with the 'Queen Charlotte' subspecies of the Northern Goshawk (*Accipiter gentilis laingi*). The HGMC rationale also included a detailed discussion in response to a BC Forest Practices Board recommendation that forest cover constraints for goshawk foraging habitat be incorporated into the HGMC AAC.

I concur with the HGMC discussion and conclusions with respect to nesting and foraging habitat for the goshawk, specifically that an adjustment relative to the base cases is warranted with respect to potential nest sites that were not included when generating the base case harvest forecasts, and that "the current base case allows for reasonably adequate foraging habitat for known territories in the absence of an approved Federal or Provincial recovery strategy that defines a threshold for minimum habitat protection" (HGMC rationale, p. 34).

I do not believe it would be worthwhile for me to repeat the in-depth discussion already provided by the HGMC. However, I will discuss here the manner in which the HGMC adjustment for the whole of the HGMA applies to the individual management units, and reiterate the prerequisites for fully incorporating any future strategy on foraging habitat.

First, with respect to potential goshawk nesting sites, the HGMC concluded that for the whole of the HGMA, since potential nesting sites were included in the timber harvesting land base used in generating the base case harvest forecasts (although the potential nest sites were excluded from the timber harvesting land base areas reported in the analysis report), the timber harvesting land base was overestimated by 1.1 percent, or 2154 hectares. As noted, I concur with this conclusion, and must allocate this impact among the management units.

Management-unit level assessment provided by the JTWG indicated the timber harvesting land base overestimates to be 1.9 percent for TFL 58, 1.6 percent for TFL 60, and 0.6 percent for the TSA. I have accounted for these over-estimations in **Reasons for Decision**.

Second, with respect to foraging habitat, I acknowledge the BC Forest Practices Board concerns, and reiterate the HGMC conclusion that Federal and Provincial agencies are working on a Federal Northern Goshawk Recovery Strategy that will provide specific targets for the protection of goshawk foraging habitat. Prior to completion of that strategy, it would be speculative for me to assume the specific nature of management requirements that will be defined for foraging. I also note that assessment of the area of foraging habitat provided under the base cases, and the results of sensitivity analysis that examined the effect on timber supply of applying different levels of requirements for foraging habitat showed that a substantial amount of foraging habitat for known territories is provided without reducing the timber supply projected in the base cases.

To conclude, I must make determinations that reasonably reflect current forest management and the approved policies and regulations that guide that management. As such, I conclude that the base cases allow for reasonably adequate foraging habitat for known territories in the absence of

an approved Federal or Provincial recovery strategy that defines a threshold for minimum habitat protection. It is anticipated that decisions will be reached on targets for protection as part of recovery strategies. It would be premature for me to apply an unapproved recovery strategy. I concur with the HGMC recommendation that when a strategy is approved, its implications for timber supply should be reviewed, and the potential need for a new redetermination of an AAC should be assessed. This consideration is reflected in the '**Implementation**' section, below.

- karst features

I have reviewed information on karst features, including information about the Government Action Regulation order identifying karst elements as resource features and about inventory data from the Geological Survey of Canada on high potential karst sites, and the HGMC considerations and conclusions.

The information available to me indicates that while there are high potential karst sites on Haida Gwaii, to date the operations have been modified to protect karst features when they are found without constraining timber supply, and karst features are often not found in areas classified as high potential for karst.

I agree with the HGMC that karst features can likely continue to be managed without constraining the timber supply. Given my guiding principles not to incorporate possible or potential occurrences, unless there is specific legal direction to do so together with reasonably certain information, I accept that no land base exclusions for karst features were necessary in the base cases, and therefore I accept the base cases as reasonable with respect to this factor.

I am aware that the HGMC made a recommendation respecting the benefits of resource managers becoming more informed about karst. I agree with that assessment, and do not believe further statements by me on this matter are warranted. If additional information becomes available on karst in the future, it can be incorporated into future timber supply reviews.

Land Use Objectives Order

The LUOO established legal objectives for several forest-based values to support the implementation of EBM. These objectives protect important Haida cultural values, support ecosystem integrity, and provide environmental benefits by maintaining the diversity and abundance of organisms on Haida Gwaii.

I have considered the same information as did the HGMC with respect to management issues related to the LUOO, and I have reviewed the HGMC reasoning and conclusions.

LUOO objectives for which I have concluded that the methods used in the base cases for developing inputs and for modeling appropriately represent the objectives, and for which where there were no related public comments, are listed above in Table 1 in the "accepted base case" category. These include:

- Type I and Type II fish habitat
- Active fluvial units
- Cedar stewardship areas
- Forest reserves

I have also discussed some other factors for which there are objectives in the LUOO, including Northern Goshawk, Marbled Murrelet, Great Blue Heron, and Northern Saw-whet Owl, under '*Identified Wildlife*' above.

Further, based on the information available to me, I concur with the HGMC reasoning and conclusions, and have concluded that the best available information and approaches were used in developing inputs to the base cases for the following LUOO objectives:

- Monumental cedar, including cultural cedar stands
- Haida traditional heritage features
- Haida traditional forest features
- Western yew trees
- Black bear dens
- Ecosystem representation (landscape-level biodiversity)
- Forested swamps
- Red- and blue-listed ecological communities

However, since the LUOO has been in place for a fairly brief period of time, there is currently limited information on which to base modeling of practices needed to meet the objectives, and hence some uncertainties about the related timber supply analysis inputs. Therefore, compilation of information collected as implementation of the LUOO proceeds, including data provided as part of licensee reporting requirements, will enable improvement of the modeling in future timber supply reviews. This is consistent with a recommendation made by the HGMC with respect to the LUOO objectives listed in the above bullets. I have included a related comment in **‘Implementation’**, below.

I discuss issues associated with other objectives listed in the LUOO, specifically culturally modified trees, cedar retention, sensitive streams, and upland watershed, in the following sections. In addition, although I accept the related inputs and modeling, I discuss ecosystem representation below since I have additional related conclusions to those reached by the HGMC.

- culturally modified trees

I generally concur with the HGMC reasoning and conclusions with respect to how requirements for protecting culturally modified trees (CMTs) were incorporated into the base cases. As noted in the HGMC rationale (p. 35-36), those requirements were based on an assessment of CMTs in 396 cutblocks harvested on Haida Gwaii between 1995 and 1998. The information collected in that assessment still represents the best available information on CMTs. The percentage area exclusion to represent reserves designed to protect CMTs was updated because buffers required under the LUOO are wider than those required in the 1990s. An exclusion of 7.7 percent was applied to each hectare of old forest on the timber harvesting land base (increased from 6.4 percent derived in the original study). In applying this percentage, it was assumed that there are no overlaps of CMTs with reserves for other objectives.

Input received during the public review process raised the question of whether potential paleo inland trails and their related archaeological sites that were not accounted for in the base cases may affect timber supply. This input referred specifically to a potential trail from Naden Harbour to Otard Bay. The input noted the potential for there being CMTs, inland camps, and other subsurface archaeological features associated with these potential sites.

I concur with the HGMC in accepting that paleo inland trails almost certainly exist, and also acknowledge input from the JTWG that it is difficult to quantify timber supply implications related to such sites. CMTs – which are potential indicators for such trails – were excluded from the timber harvesting land base, and the JTWG informed me that a review of subsurface archaeological features in forestry archaeological impact assessments (AIAs) demonstrated that

such sites are likely to have a very limited impact on harvesting. Therefore, I also concur with the HGMC that while additional paleo inland trails and related sites are likely to be found, they will also likely be isolated and therefore have a only a limited impact on the size of the timber harvesting land base. In addition, I note that all of the land base exclusions in the base cases related to cedar were additive; that is, no overlaps were assumed. Therefore, it is likely that the area needed to be reserved to account for cedar-related objectives was over-estimated in the base cases to some extent; that over-estimation would offset at least to a degree the potential small under-estimation in the timber harvesting land base associated with the likelihood that additional CMTs associated with paleo trail and sites will be found.

Overall, from these considerations I am satisfied that the best available information was used in developing a percentage land base exclusion factor to account for protection of CMTs for the base cases that is consistent with the LUOO. Information on newly-discovered features can be included in future timber supply reviews. As noted earlier, it will be important to track practices used to meet all LUOO objectives, including CMTs, and compile that information to support future AAC determinations.

- cedar retention

Section 7 of the LUOO specifies retention requirements for western redcedar and yellow-cedar. The order specifies conditions under which a minimum of 15 percent of the pre-harvest composition of cedar should be retained, with a minimum of a one-hectare retention area. The requirement applies to both old as well as young forest containing cedar.

I concur with the HGMC reasoning and conclusions with respect to the cedar retention requirement. That is, for old forest, the retention requirements are met coincidentally by the 21.4 percent stand-level retention modeled for monumental cedar, cultural cedar, and culturally modified trees. Further, for currently younger stands, while retention requirements were applied to existing managed stands, they were not applied to future managed stands. Therefore, as noted by the HGMC in its rationale (p. 36-37) there was a small over-estimation of mid- to long-term timber supply related to LUOO cedar retention requirements that apply to future managed stands. The over-estimate of the timber harvesting land base in mid- and long term was 0.4 percent for the whole of the Haida Gwaii Management Area. Since the timber growing on these areas would not be available for harvest for several decades after harvest, the impact on timber supply would not occur until several decades into the analysis horizon and over the long term. Therefore, this over-estimate does not affect my determinations.

In its rationale the HGMC mentioned this issue as a potential factor in emphasizing the need for control on cedar harvesting, such as a partition. I have discussed the need for controls on cedar harvesting elsewhere in this rationale (see Limits on cedar harvest, under *partitioning the AAC*, above). Since there is no consequence for my determinations I will not define the distribution among the management units, and will not discuss the issue further.

- ecosystem representation (landscape-level biodiversity)

The HGMC concluded that the manner in which the requirements to maintain old forest representations specified in Section 16 of the LUOO were generally appropriate, but that there may have been a small overestimation in the area needed to be reserved in the timber harvesting land base to meet the forest cover requirements. Having reviewed the same information as did the HGMC, I agree that the approach used in the base case appropriately accounted for the ecosystem representation requirement. However, my conclusion with respect to the potential for a small overestimation in the reserved timber harvesting land base differs from the HGMC.

Specifically, the HGMC was presented information that suggested the manner in which ecosystem polygons were identified for the purposes of deriving the existing degree of ecosystem

representation may have under-stated the contribution of forest outside of the timber harvesting land base. That is, it was assumed that an ecosystem polygon was occupied entirely by what is sometimes referred to as the 'primary decile', which is technically the percentage contribution to the ecosystem polygon of the most dominant site series, but is frequently used to mean simply the most dominant site series. Therefore, it would have been assumed that ecosystem polygons with minor components of a desired site series would not contribute to representation. However, since the total forest management land base in each site series, the non-timber harvesting land base area in each site series (i.e., areas in protected areas, fixed EBM reserves, LUOO Schedule 8 forest reserves and other excluded areas), and finally the required timber harvesting land base area were all defined using the 'primary decile', I believe that the calculations were internally consistent and would no more likely have led to an under-estimate than an over-estimate in the area needing to be reserved. Therefore, I am satisfied that the requirements for ecosystem representation in the base cases were based on the best available information.

I also agree with the HGMC that completion of ecosystem mapping to a common and acceptable standard for all of the forest management land base on Haida Gwaii, or continued work to rationalize the disparate mapping, would be beneficial for supporting forest management and planning for ecosystem representation, and for protection of forested swamps and red and blue listed ecological communities, as well as for the application of site index information. Consequently, I have included this issue in the '**Implementation**' section, below.

- sensitive watersheds and upland streams

I concur with the HGMC reasoning and conclusions with respect to the modeling of objectives for upland stream areas and sensitive watersheds. I include the following discussion to be clear and explicit about my reasoning.

The LUOO includes objectives for management in upland stream areas (section 13) and sensitive watersheds (section 14), which are identified in schedules to the order. The LUOO requires that the area that is hydrologically recovered must be at least 70 percent for each upland stream area and at least 80 percent for each sensitive watershed. Hydrological recovery is the degree to which the hydrological properties of a regenerating forest are similar to those of old forest, and is usually correlated with the height of trees in the stand.

In the base cases, the LUOO requirements were represented by applying forest cover requirements that allowed no more than 20 percent of each sensitive watershed, and no more than 30 percent of each upland stream area to be hydrologically unrecovered at any time.

While research has shown that hydrological recovery increases as stands age and grow in height, the timber supply model used for the analysis employs a threshold representation of forest cover requirements. That is, for modeling, each upland stream area and sensitive watershed must be assigned an age prior to which forests are not hydrologically recovered and after which they are recovered. For each upland stream area and sensitive watershed, an area-weighted average age at which hydrologic recovery is projected to be reached was calculated.

To identify the age at which stands are projected to be hydrologically recovered, the JTWG worked with a MFLNRO hydrologist to ensure the most up-to-date science was used to inform the analysis and AAC decisions. The hydrologist provided a recovery curve that detailed the relationship between stand age and degree of hydrologic recovery. This hydrologic recovery curve was based on recent research on the coast of BC. During the modeling process, the JTWG calibrated the recovery ages used for the base cases with the hydrologic recovery curves supplied by the research hydrologist by examining the results of base case timber supply projections to ensure that the forest conditions that resulted in the base case from application of the forest cover requirements and the area-weighted hydrological recovery ages were consistent with the

hydrological recovery curves. The results showed that over the Haida Gwaii Management Area on average, compliance was achieved throughout the timber supply forecast period.

Therefore, I am satisfied both that the best available information was used in developing analysis inputs with respect to LUOO requirements for upland stream areas and sensitive watersheds, and that the approaches are generally consistent with the LUOO.

However, in a minor way the modeling approach used in the base cases for upland streams deviated from the LUOO requirements. Specifically, in the base case, the hydrological recovery forest cover requirement was applied to the full upland stream area; however, the LUOO definition specifies that upland stream areas do not include riparian reserve zones and management zones adjacent to Type I and Type II fish habitat. Sensitivity analysis showed that when the area was adjusted to exclude riparian buffers from the upland stream areas, the forecast harvest level was one percent lower than in the base case in the short, medium, and long terms in both the TSA and TFL 60, while TFL 58 was unaffected. This finding that the base case projections overestimate timber supply in the TSA and TFL 60 is accounted in **‘Reasons for Decision’**.

- risk-managing the Haida Gwaii LUOO

I concur with the reasoning and conclusions of the HGMC discussed on page 40 of their rationale. Specifically, while the LUOO allows for variances in, or risk management with respect to its default objectives to provide operational flexibility in harvesting, the variances are not intended to be used frequently. The SLUA stipulates that risk management is acceptable only if conditions outlined in the LUOO for each relevant objective are met, including: the issue is discussed in an intergovernmental process between the Haida and the Province, the resource value being risk-managed is protected or sustained, no practicable alternatives are available, and a risk management approach is necessary for legitimate reasons such as safety or feasibility of access construction.

A sensitivity analysis was undertaken to determine the effect on projected timber supply of applying all of the risk-management requirements in the LUOO throughout the analysis horizon. The sensitivity analysis indicated the following effect of full application of the risk-managed requirements:

- On TFL 58, the projected timber supply would be 7.3 percent higher than in the base case for the first 100 years, with no change in the long-term level.
- On TFL 60, the increase would be 5.6 percent for the first 100 years, with a 3.1-percent increase in the long term.
- On TSA 25, the increase would be 8.0 percent for the first 100 years, with a 3.2-percent increase in the long term.
- On the Haida Gwaii Management Area as a whole the increase would be 7.1% percent for the first 100 years, with a 3.1-percent increase in the long term.

The HGMC reasoned that risk management of LUOO objectives may occur in 10 to 20 percent of forest operations applications, and concluded that while the actual increase relative to the base case timber supply is uncertain, it would likely range between one and two percent. In the final calculations, the council used an increase of 1.5 percent.

I concur with the HGMC that the ultimate impact of risk management allowances in the LUOO is uncertain, and believe the council’s conclusion on the potential quantitative magnitude is reasonable. I will therefore use the conclusion that risk management could increase the timber supply projection by 1.5 percent above the base case in the short and medium terms.

Since the 1.5 percent impact of the HGMC conclusion is slightly more than 21 percent of the total impact shown in the sensitivity analysis (7.1 percent), the impacts shown for each management unit in the sensitivity analysis can be factored down using this percentage, meaning the potential timber supply increases in the short and medium terms due to risk-management of LUOO objectives may be 1.7 percent in the TSA, 1.6 percent in TFL 58, and 1.2 percent in TFL 60. I have accounted for these upward influences relative to the base cases in **'Reasons for Decision'**.

Section 8 (8) (a) (vi) any other information that, in the chief forester's opinion, relates to the capability of the area to produce timber;

Consultation with the Haida Nation

The BC government has a duty to consult with, and if warranted accommodate First Nations when the province has knowledge of aboriginal interests that may be affected by a proposed decision, including strategic-level decisions such as AAC determinations. Therefore, in general as deputy chief forester I must consider information arising from consultation processes with First Nations respecting aboriginal interests and treaty rights that may be affected by my AAC determination. As well, I consider other relevant information available to the ministry regarding aboriginal interests, including information gathered during other consultation processes. The Haida Nation is the only First Nation with expressed interests on Haida Gwaii.

Firstly, I note that over the full course of work on the Haida Gwaii Timber Supply Review, which began in mid-2010, representatives of the Haida Nation and of the Province worked jointly on the JTWG to prepare the timber supply analysis and other information to support my AAC determinations, as well as the HGMC AAC determination.

Secondly, my determination reflects both the SLUA and LUOO, which were based on substantial cooperative work by the Haida Nation and the Province.

Finally, during the process leading to my AAC determinations for TSA 25, TFL 58, and TFL 60, MFLNRO staff contacted a Haida representative on the HGMC to seek guidance on the manner in which the Haida Nation wished to be consulted on my determinations. The ministry was notified that it would be suitable from the viewpoint of the Council of the Haida Nation executive for consultation on the determinations to be undertaken through the Haida representatives on the HGMC. Together with MFLNRO staff, I presented information on my proposed determinations and the underlying considerations to the HGMC on August 13, 2012. My rationale includes revisions related to ensuring clarity about expectations for maximum cedar harvests, the process for monitoring cedar harvests, and the consequences if the expectations are not achieved, all designed to address comments provided by members of the HGMC and other Haida representatives during that presentation.

I believe that the joint technical process that supported my determinations, the role of the HGMC in jointly determining the AAC under the *Kunst'aa guu – Kunst'aayah* Reconciliation Protocol, as well as my presentation to the HGMC and associated revisions of this rationale to address issues raised by Haida representatives meet the Crown's duty to consult with the Haida Nation.

Socioeconomic considerations

Section 8(8) (b) the short and long term implications to British Columbia of alternative rates of timber harvesting from the area,

- alternative rates of harvest

As discussed above under *Timber supply analysis and base case harvest forecasts*, there was little flexibility to increase the short- or mid-term projected harvests without causing future timber supply shortages relative to the base cases. Only in the TSA was there was some ability for a

short-term increase: 7.4 percent (about 36 500 cubic metres) for 10 years. From a socioeconomic viewpoint, it may be possible to view this short-term increase as an upward influence. However, the HGMC chose not to take that perspective, and given the short-term nature of the increase and other uncertainties in inputs, the HGMC's approach is reasonable. Therefore, to enhance consistency with the HGMC determination, I will not include the indicated potential for short-term flexibility in the TSA as an upward influence.

Section 8(8) (d) the economic and social objectives of the government, as expressed by the minister, for the area, for the general region and for British Columbia;

- Minister's letter

The Minister of Forests and Range (now the Minister of Forests, Lands and Natural Resource Operations) expressed the economic and social objectives of the Crown for the province in a letter to the chief forester, dated July 4, 2006 (attached as Appendix 3). Two of the government's stated goals are to create more jobs per capita than anywhere else in Canada, and to lead the world in sustainable environmental management. The Minister asked for consideration, during AAC determinations, of the importance of a stable timber supply in maintaining a competitive and sustainable forest industry while being mindful of other forest values. In respect of this, a primary objective in developing the base case projections was to attain a stable, long-term harvest level in which the growing stock of timber volume is stable or growing. As indicated in my discussion of the various factors in this rationale, I have also considered the adequacy of the provisions made both in current practice, and incorporated as inputs to the analysis, for maintaining a range of forest values.

The Minister also suggested that the chief forester should consider the local social and economic objectives expressed by the public, and relevant information received from First Nations. To a large extent, I view the various elements of the SLUA and LUOO that I have discussed in this rationale as expressions of local public and Haida values.

Public comment was sought as part of the release of the Public Discussion Paper in November 2011. I have been presented with a detailed summary of comments received in response to the Public Discussion Paper. I have incorporated responses to comments received in other sections of this rationale. In particular, in the following section on '*economic and employment implications*' I discuss issues associated with public input on socioeconomic issues.

In addition, I should note that forest sector licensees were provided with the opportunity to review a draft version of the timber supply analysis data package. In response to comments received from licensees changes were made to the data package by the JTWG, and a detailed written response was sent to licensees.

During my consideration of the factors required under Section 8 of the *Forest Act*, I have been mindful of the local objectives as provided in the Haida Gwaii SLUA and LUOO. I have also reviewed the public consultation process and considered the input received in making my determinations. On this basis, I am satisfied that these determinations are in accord with the objectives of government as expressed by the Minister.

- economic and employment implications

The HGMC summarized and discussed information on population, employment, and socioeconomic implications of the base case timber supply projection for the Haida Gwaii Management Area on pages 40-42 of its rationale. I will not repeat that information here. However, I will emphasize that I concur with the HGMC that the forest sector is an important component of the economy of Haida Gwaii, and it will be important in development of a forest management strategy for the islands to assess how forest management including timber harvesting can best continue to contribute to the socioeconomic well-being of people living on

Haida Gwaii, in concert with the environmental and cultural protections afforded by the SLUA and LUOO.

It would appear based on comparison of the population projection provided by BCStats, which suggests a 2011 population of 4,734 (from the page 9 of the Public Discussion Paper), to results from the 2011 census, which indicate a population of 4,370 (see page 41 of the HGMC rationale) that the Haida Gwaii population may be declining more quickly than previously projected. I note also, as did the HGMC, that over the 2001 to 2006 period while employment and income decreased in the forestry sector, they increased significantly in the tourism sector, suggesting that the Haida Gwaii economy is diversifying. Given this context, it will be even more important to ensure that forestry contributes in a sustainable way to support the islands' economy, culture, and environment.

As noted in the HGMC rationale, several public comments related to socioeconomic concerns were received in response to the Public Discussion Paper. One comment was that AAC should be set at not less than the Parties' commitment in the 2007 SLUA to achieve an initial harvest opportunity of 800 000 cubic metres. Since the HGMC has already determined the AAC for the Haida Gwaii Management Area at 929 000 cubic metres, this point has largely been addressed. As noted throughout this rationale, my reasoning has not differed significantly from that of the HGMC.

A second public comment was that the base case should be considered a maximum level, implying that a lower level could be chosen. I acknowledge that the base cases represent an upper limit on timber supply within the context of the objectives of LUOO, of the establishment of new protected areas, and of other components of current management. Throughout this rationale I have considered the inputs and approaches used in developing the base case, and where warranted provided reasoning for any needed adjustments. The only reason that I would consider establishing an AAC at a level lower than could be achieved given the base cases as adjusted to account for my considerations would be in response to risk and uncertainty. Given the broad coverage of land use and management issues within the SLUA and LUOO, and the absence of an explicit, clear, and broadly agreed-upon approach to risk and uncertainty, I do not believe it would be appropriate for me to make any further adjustments to account for risk and uncertainty beyond what I have discussed under specific factors.

A third public comment was that that it will be important to achieve a geographic distribution of harvest areas that would provide an equitable distribution among the Island's communities of both the impacts and the maximized socio-economic benefits from harvesting. While I acknowledge that equitable distribution of timber supply is an important socioeconomic goal, I am constrained by the existing definitions of, and timber supply projections associated with each of the three management units for which I am determining AACs. As noted by the HGMC, the correspondence requesting consideration of a Community Forest for Port Clements, and 80 000 cubic metres for the Misty Islands Development Society, have been forwarded to the office responsible for supporting decisions by the minister on allocation of the TSA AAC to different types of forest tenures, and on provision of different tenures on Haida Gwaii.

I appreciate the time taken by those who have contributed input related to this timber supply review for the current major management units on Haida Gwaii. As noted in the HGMC rationale (p. 42) comments received during the public input period that do not relate specifically to these AAC determinations have been forwarded to those responsible for making decisions that more directly relate to the concerns raised. Such concerns relate to the apportionment of the AAC in the TSA, stumpage, allocation of timber to particular operators, and provision of forest management tenures.

Disturbances and losses

Section 8(8)(e) abnormal infestations in and devastations of, and major salvage programs planned for, timber on the area.

- unsalvaged losses

I concur with the HGMC that the best available information was used to generate an estimate of the average unsalvaged, or non-recovered, losses due to defoliators, specifically Black Headed Budworm and Green Spruce Aphid, and abiotic factors, specifically yellow cedar decline, wind-throw, and landslides. I note also, as did the HGMC that the total average unsalvaged loss estimate of 44 913 cubic metres per year is approximately ten times the total of estimates derived in previous timber supply reviews. As noted by the HGMC, some of this increase may be due to increased disturbance frequency and intensity in turn resulting from climate change and changes in the age class composition of the forest that affects the risk of attack from defoliators. Given the thoroughness of the methods used in deriving the estimate for the unsalvaged loss estimates, I do not doubt their validity, but still believe that it will be important to monitor as closely as practicable the disturbance and associated losses and salvage on Haida Gwaii for future timber supply reviews. I therefore strongly concur with the HGMC recommendation that improved monitoring and reporting of disturbances from wind-throw and from insects should be undertaken to improve the accuracy of unsalvaged losses estimates for timber supply reviews. I have included a recommendation to this effect under ‘**Implementation**’.

Consistency with Haida Gwaii Management Council AAC Determination

8(11) The aggregate of the allowable annual cuts determined under subsections (6), (7) and (10) that apply in the management area, as defined in section 1 (1) of the *Haida Gwaii Reconciliation Act*, must not exceed the amount set out in a notice to the chief forester under section 5 (4) (a) of that Act.

- consistency with Haida Gwaii Management Council determination

Section 8(11) of the *Forest Act* requires that the aggregate of the AACs for all of the various management units on Haida Gwaii – the TSA, TFLs, WLs, and any future community forest agreement and First Nations woodland licences – that apply to the Haida Gwaii Management Area must not exceed the total AAC determined by the HGMC.

Throughout this rationale I have discussed the relationship between my reasoning and conclusions and those of the HGMC. In no cases are there substantial differences, and therefore my determinations are consistent with the requirement noted in section 8(11) of the *Forest Act*.

The Haida Gwaii Management Area, to which the HGMC AAC determination applies under the *Haida Gwaii Reconciliation Act*, excludes municipal areas, while my determinations under the *Forest Act* include the contributions from such areas. The contributions of municipal areas to the base case harvest forecasts are an average of 2000 cubic metres per year for TFL 60, and an average of 7500 cubic metres per year for TSA 25. No municipal areas overlap with TFL 58. In the sections of ‘**Reasons for Decision**’ relating to the TSA and TFL 60, I note the contributions of municipal areas. At the end of ‘**Reasons for Decision**’ I note the aggregate of the AACs for the TSA, TFL 58, and TFL 60 that applies to the Haida Gwaii Management Area as defined in the *Haida Gwaii Reconciliation Act*.

As discussed under *woodlot licences*, above, to ensure consistency with the section 8(11) requirement, I must exclude the full amount of the current non-private WL AAC from my AAC determinations. Since all of the WL area was included in the TSA for the analysis, I have accounted for an overestimate of 7476 cubic metres per year in the base case for the TSA.

Reasons for Decision

In reaching my AAC determinations for TSA 25, TFL 58 and TFL 60, I have considered all of the factors set out above in this rationale. A primary function of my considerations has been to assess the extent to which the assumptions incorporated in the base cases for the three units are currently, and can reasonably be expected to remain reliable and accurate, and in the event of uncertainty or new or more accurate information that has been developed since completion of the timber supply analysis, the extent to which the base cases may represent over- or underestimations in the timber supply that is likely to be actually available.

The base cases for each management unit are as follows:

- For TSA 25, the projected harvest level is initially 492 964 cubic metres per year, which is maintained for the first 80 years of the forecast, and then increases to 521 256 cubic metres per year, which is maintained for the long term.
- For TFL 60, the harvest projection is an evenflow at 329 437 cubic metres per year.
- For TFL 58, the harvest projection is an evenflow at 72 865 cubic metres per year.

Through my considerations, I have identified a number of cases in which the inputs used in the base case represent over- or underestimations in the timber supply that is likely to be actually available. These cases are discussed below for each management unit. In some cases the over or underestimation has been quantified as a percentage of the timber harvesting land base, and in others, as a percentage of the base-case harvest level. I concur with the HGMC that strictly speaking, percentage impacts on the timber harvesting land base and on the projected timber supply are not fully interchangeable due to variations in productivity across the land base, but that any error introduced by treating these quantities as numerically compatible is not significant in the context of the overall projected timber supply. Therefore, in quantifying adjustments to the base case projections of timber supply, I have added or subtracted percentage areas and volumes that relate to each of the factors considered.

Reasons for Decision – TSA 25

With respect to TSA 25, I have considered all of the factors set out above and have reasoned as follows.

I have identified that the following factors have introduced over or underestimations in the projected timber supply are described as follows.

- overestimations in the projected timber supply in relation to the base case:

- **Terrain stability:** My considerations have identified the likelihood of an overestimation in the extent to which harvesting may take place appropriately on potentially unstable areas, resulting in a roughly 3-percent overestimation in the size of the timber harvesting land base.
- **Economic inoperability:** I have concluded that due to the reduced possibility of harvesting for the foreseeable future in expensive and poorly serviced areas in the TSA, the size of the TSA timber harvesting land base in the base case is overestimated by 2.8 percent.
- **Timber Licences:** In the base case analysis, due to the inclusion of timber in unrevetted Timber Licences, the TSA timber harvesting land base was overestimated by 0.6 percent.
- **Recreation:** Due to unaccounted for buffers for trails and recreation sites, the TSA timber harvesting land base is overestimated by about 0.16 percent.

- **Potential Northern Goshawk nests:** In respect of unaccounted for potential Northern Goshawk nest sites, the TSA timber harvesting land base is overestimated by about 0.8 percent.
- **Great Blue Heron nests:** The need to ensure adequate provision for heron nests indicates a very small overestimation in the TSA timber harvesting land base of 34 hectares, or 0.02 percent of the timber harvesting land base.
- **Upland streams:** since the assumptions in the sensitivity analysis are a more precise representation of the LUOO hydrology requirements for upland stream areas than those in the base case, the base case forecast harvest level is overestimated by one percent throughout the forecast.

- *underestimations in the projected timber supply in relation to the base case:*

- **Taper and loss:** The taper and loss study completed in 1999 indicates the strong likelihood of a substantial underestimation in the timber supply forecasted in the base case for the short term, which consistent with the HGMC and with a sensitivity analysis, I have estimated to be approximately 12 percent for the TSA.
- **Risk managing the LUOO:** I concur with the HGMC that while the ultimate extent of application of risk management of objectives under the LUOO is uncertain, it is reasonable to expect that risk management will occur in 10 to 20 percent of cutting permit applications. Since no risk management was incorporated in the base case, the implication is that over the Haida Gwaii Management Area the timber supply impact would be an underestimate of about 1.5 percent relative to the base case. For the TSA, adjustment of the impact of full application of risk management shown in sensitivity analysis to correspond with implementation of risk management about 15 percent of the time indicates a 1.7 percent underestimate of short and mid-term timber supply relative to the base case.

The sum of all of the overestimations in the near term is roughly 8.2 percent, and the sum of the underestimations is 13.7 percent, for a net underestimation of about 5.5 percent.

Another adjustment required in the TSA relates to the current AACs attributable to public (i.e., non-private) land on woodlot licences (WLs) – amounting to 7476 cubic metres – which must be subtracted from the TSA timber supply, since WLs were included in the TSA for the base case.

Accounting for the net underestimation of about 5.5 percent, and the public-land WL AACs, the short-term timber supply for the TSA, rounded to the nearest 1000 cubic meters, is 512 000 cubic metres. This is the new AAC for the TSA.

Under ‘*partitioning the AAC*’ above, I noted that the harvested cedar volume should be a maximum of approximately 38 percent of the AAC I determine for the TSA. Therefore, of the total AAC of 512 000 cubic metres, the harvested cedar volume should be a maximum of approximately 195 000 cubic metres per year. This limit is not an attribution under section 8(5) of the *Forest Act*. I am providing clear direction on this matter to provide a basis for further discussion among the various parties including tenure holders, the HGMC, the Haida Nation, communities, and the general public on the options for defining limits on cedar harvesting, and how to achieve a balance between the desire for allocation of commercial cedar over time with other aspects of forest management, and the need to consider the economic viability of operations. This direction provides forest operators the flexibility to adjust to the new forest management regime on Haida Gwaii and time to develop cedar management strategies that recognize the necessity of limits on cedar harvest noted by the HGMC.

Determination – TSA 25

I have considered and reviewed all the factors as documented above, including the risks and uncertainties of the information provided. It is my determination that a timber harvest level that accommodates objectives for all forest resources during the next 10 years and that reflects current management practices as well as the socioeconomic objectives of the Provincial government, can be best achieved in TSA 25 by establishing an AAC of 512 000 cubic metres. Of this AAC, it is my expectation that on average the harvest of red and yellow cedar will not exceed a maximum of about 195 000 cubic metres.

This AAC represents a reduction of 41 percent from the previous AAC. The reduction in large part reflects the changes in land use and management related to the SLUA and LUOO. The environmental and cultural benefits associated with the SLUA and LUOO are substantial locally, provincially, and globally. The socioeconomic impact of this determination is moderated somewhat because actual harvest levels on Haida Gwaii over the last few years have been less than AACs, thus the adjustment relative to recent activity is substantially less than the full percentage indicated.

The new AAC for TSA 25 includes an average contribution from municipal areas of approximately 7500 cubic metres per year, while the AAC determined by the HGMC, as required by the *Haida Gwaii Reconciliation Act*, did not include the contribution of municipal areas. This amount does not constitute an attribution under section 8(5) of the *Forest Act*, but rather is noted for the purposes of monitoring consistency with section 8(11) of the *Forest Act*, which requires that the aggregate of AACs for the TSA, TFLs, woodlot licences, community forest agreements, and First Nations woodland tenures that apply to the HGMA not exceed the AAC determined by the HGMC for the HGMA.

This determination is effective on September 20, 2012 and will remain in effect until a new AAC is determined, which must take place within 10 years after the date of this determination.

If additional significant new information is made available to me, or major changes occur in the management assumptions upon which I have predicated this decision, then I am prepared to revisit this determination sooner than the 10 years required by legislation. In addition, if there is a failure to harvest red and yellow cedar within the limit I have outlined above, or in accordance with an approved cedar management strategy, I will consult with the HGMC and consider revisiting this determination sooner than the legislated requirement, noting that my considerations may be modified by any future planning on Haida Gwaii with respect to cedar management.

Reasons for Decision – TFL 58

With respect to TFL 58, I have considered all of the factors set out above and have reasoned as follows.

I have identified that the following factors have introduced over or underestimations in the projected timber supply are described as follows.

- *overestimations in the projected timber supply in relation to the base case:*

- **Terrain stability:** My considerations have identified the likelihood of an overestimation in the extent to which harvesting may take place appropriately on potentially unstable areas, resulting in a roughly 3-percent overestimation in the size of the timber harvesting land base.

- **Economic inoperability:** No adjustment is required to account for the reduced possibility of harvesting for the foreseeable future in expensive and poorly serviced areas in TFL 58, as it is in the TSA and TFL 60.
- **Timber Licences:** No adjustment is required to account for the inclusion of timber in unreverted Timber Licences in the base case, as it was in the TSA, since TLs are managed as part of the TFL.
- **Recreation:** No adjustment is required with respect to unaccounted for buffers for trails and recreation sites, as it was in the TSA.
- **Potential Northern Goshawk nests:** In respect of unaccounted for potential Northern Goshawk nest sites, the timber harvesting land base is overestimated by about 1.9 percent.
- **Great Blue Heron nests:** No adjustment is required with respect to provision for heron nests as it was in the TSA and TFL 60.
- **Upland streams:** No adjustment is required for TFL 58 with respect to corrections to account for the inclusion of riparian buffers in upland stream areas, as it is in the TSA and TFL 60, since sensitivity analysis indicated that the correction has no timber supply impact in TFL 58

- *underestimations in the projected timber supply in relation to the base case:*

- **Taper and loss:** The taper and loss study completed in 1999 indicates the strong likelihood of a substantial underestimation in the timber supply forecasted in the base case for the short term, which consistent with the HGMC and with a sensitivity analysis, I have estimated to be approximately 12 percent for TFL 58
- **Risk managing the LUOO:** I concur with the HGMC that while the ultimate extent of application of risk management of objectives under the LUOO is uncertain, it is reasonable to expect that risk management will occur in 10 to 20 percent of cutting permit applications. Since no risk management was incorporated in the base case, the implication is that over the Haida Gwaii Management Area the timber supply impact would be an underestimate of about 1.5 percent relative to the base case. For the TSA, adjustment of the impact of full application of risk management shown in sensitivity analysis to correspond with implementation of risk management about 15 percent of the time indicates a 1.55 percent underestimate of short and mid-term timber supply relative to the base case.

The sum of all of the overestimations in the near term is roughly 4.9 percent, and the sum of the underestimations is 13.55 percent, for a net underestimation of about 8.65 percent. Calculating 108.65 percent of the base case initial harvest level of 72 865, rounded to the nearest 1000 cubic metres, is 79 000 cubic metres.

Under '*partitioning the AAC*' above, I noted that the harvested cedar volume should be a maximum of approximately 41 percent of the AAC I determine for TFL 58. Therefore, of the total AAC of 79 000 cubic metres, the harvested cedar volume should be a maximum of approximately 32 000 cubic metres per year. This limit is not an attribution under section 8(5) of the *Forest Act*. I am providing clear direction on this matter to provide a basis for further discussion among the various parties including tenure holders, the HGMC, the Haida Nation, communities, and the general public on the options for defining limits on cedar harvesting, and how to achieve a balance between the desire for allocation of commercial cedar over time with other aspects of forest management, and the need to consider the economic viability of

operations. This direction provides forest operators the flexibility to adjust to the new forest management regime on Haida Gwaii and time to develop cedar management strategies that recognize the necessity of limits on cedar harvest noted by the HGMC.

Determination – TFL 58

I have considered and reviewed all the factors as documented above, including the risks and uncertainties of the information provided. It is my determination that a timber harvest level that accommodates objectives for all forest resources during the next 10 years and that reflects current management practices as well as the socioeconomic objectives of the Provincial government, can be best achieved in TFL 58 by establishing an AAC of 79 000 cubic metres. Of this AAC, it is my expectation that on average the harvest of red and yellow cedar will not exceed a maximum of about 32 000 cubic metres.

This AAC represents a reduction of 21 percent from the previous AAC. The reduction in large part reflects the changes in land use and management related to the SLUA and LUOO. The environmental and cultural benefits associated with the SLUA and LUOO are substantial to locally, provincially, and globally. The socioeconomic impact of this determination is moderated somewhat because actual harvest levels on Haida Gwaii over the last few years have been less than AACs, thus the adjustment relative to recent activity is substantially less than the full percentage indicated.

This determination is effective on September 20, 2012 and will remain in effect until a new AAC is determined, which must take place within 10 years after the date of this determination.

If additional significant new information is made available to me, or major changes occur in the management assumptions upon which I have predicated this decision, then I am prepared to revisit this determination sooner than the 10 years required by legislation. In addition, if there is a failure to harvest red and yellow cedar within the limit I have outlined above, or in accordance with an approved cedar management strategy, I will consult with the HGMC and consider revisiting this determination sooner than the legislated requirement, noting that my considerations may be modified by any future planning on Haida Gwaii with respect to cedar management.

Reasons for Decision – TFL 60

With respect to TFL 60, I have considered all of the factors set out above and have reasoned as follows.

I have identified that the following factors have introduced over or underestimations in the projected timber supply are described as follows.

- overestimations in the projected timber supply in relation to the base case:

- **Terrain stability:** My considerations have identified the likelihood of an overestimation in the extent to which harvesting may take place appropriately on potentially unstable areas, resulting in a roughly 3-percent overestimation in the size of the timber harvesting land base.
- **Economic inoperability:** I have concluded that due to the reduced possibility of harvesting for the foreseeable future in expensive and poorly serviced areas in TFL 60, the size of the TFL timber harvesting land base in the base case is overestimated by about 4.5 percent.
- **Timber Licences:** No adjustment is required to account for the inclusion of timber in unreverted Timber Licences in the base case, as it was in the TSA, since TLs are managed as part of the TFL.

- **Recreation:** No adjustment is required with respect to unaccounted for buffers for trails and recreation sites, as it was in the TSA.
- **Potential Northern Goshawk nests:** In respect of unaccounted for potential Northern Goshawk nest sites, the timber harvesting land base is overestimated by about 1.6 percent.
- **Great Blue Heron nests:** The need to ensure adequate provision for heron nests indicates a very small overestimation in the timber harvesting land base of 42 hectares, or 0.05 percent of the timber harvesting land base.
- **Upland streams:** since the assumptions in the sensitivity analysis are a more precise representation of the LUOO hydrology requirements for upland stream areas than those in the base case, the base case forecast harvest level is overestimated by one percent throughout the forecast.

- *underestimations in the projected timber supply in relation to the base case:*

- **Taper and loss:** The taper and loss study completed in 1999 indicates the strong likelihood of a substantial underestimation in the timber supply forecasted in the base case for the short term, which consistent with the HGMC and with a sensitivity analysis, I have estimated to be approximately 12 percent for TFL 60.
- **Risk managing the LUOO:** I concur with the HGMC that while the ultimate extent of application of risk management of objectives under the LUOO is uncertain, it is reasonable to expect that risk management will occur in 10 to 20 percent of cutting permit applications. Since no risk management was incorporated in the base case, the implication is that over the Haida Gwaii Management Area the timber supply impact would be an underestimate of about 1.5 percent relative to the base case. For the TSA, adjustment of the impact of full application of risk management shown in sensitivity analysis to correspond with implementation of risk management about 15 percent of the time indicates a 1.2 percent underestimate of short and mid-term timber supply relative to the base case.

The sum of all of the overestimations in the near term is roughly 10.15 percent, and the sum of the underestimations is 13.2 percent, for a net underestimation of about 3.05 percent. Calculating 103.05 percent of the base case initial harvest level of 329 437, rounded to the nearest 1000 cubic metres, is 340 000 cubic metres per year.

Under '*partitioning the AAC*' above, I noted that the harvested cedar volume should be a maximum of approximately 39 percent of the AAC I determine for TFL 60. Therefore, of the total AAC of 340 000 cubic metres, the harvested cedar volume should be a maximum of approximately 133 000 cubic metres per year. This limit is not an attribution under section 8(5) of the *Forest Act*. I am providing clear direction on this matter to provide a basis for further discussion among the various parties including tenure holders, the HGMC, the Haida Nation, communities, and the general public on the options for defining limits on cedar harvesting, and how to achieve a balance between the desire for allocation of commercial cedar over time with other aspects of forest management, and the need to consider the economic viability of operations. This direction provides forest operators the flexibility to adjust to the new forest management regime on Haida Gwaii and time to develop cedar management strategies that recognize the necessity of limits on cedar harvest noted by the HGMC.

Determination – TFL 60

I have considered and reviewed all the factors as documented above, including the risks and uncertainties of the information provided. It is my determination that a timber harvest level that

accommodates objectives for all forest resources during the next 10 years and that reflects current management practices as well as the socioeconomic objectives of the Provincial government, can be best achieved in TFL 60 by establishing an AAC of 340 000 cubic metres. Of this AAC, it is my expectation that on average the harvest of red and yellow cedar will not exceed a maximum of about 133 000 cubic metres.

This AAC represents a reduction of 58 percent from the previous AAC. The reduction in large part reflects the changes in land use and management related to the SLUA and LUOO. The environmental and cultural benefits associated with the SLUA and LUOO are substantial locally, provincially, and globally. The socioeconomic impact of this determination is moderated somewhat because actual harvest levels on Haida Gwaii over the last few years have been less than AACs, thus the adjustment relative to recent activity is substantially less than the full percentage indicated.

The new AAC for TFL 60 includes an average contribution from municipal areas of approximately 2000 cubic metres per year, while the AAC determined by the HGMC, as required by the *Haida Gwaii Reconciliation Act*, did not include the contribution of municipal areas. This amount does not constitute an attribution under section 8(5) of the *Forest Act*, but rather is noted for the purposes of monitoring consistency with section 8(11) of the *Forest Act*, which requires that the aggregate of AACs for the TSA, TFLs, woodlot licences, community forest agreements, and First Nations woodland tenures that apply to the HGMA not exceed the AAC determined by the HGMC for the HGMA.

This determination is effective on September 20, 2012 and will remain in effect until a new AAC is determined, which must take place within 10 years after the date of this determination.

If additional significant new information is made available to me, or major changes occur in the management assumptions upon which I have predicated this decision, then I am prepared to revisit this determination sooner than the 10 years required by legislation. In addition, if there is a failure to harvest red and yellow cedar within the limit I have outlined above, or in accordance with an approved cedar management strategy, I will consult with the HGMC and consider revisiting this determination sooner than the legislated requirement, noting that my considerations may be modified by any future planning on Haida Gwaii with respect to cedar management.

Portion of AACs that Apply to the Haida Gwaii Management Area

For the purposes of monitoring consistency with section 8(11) of the *Forest Act*, the aggregate of the AACs for the TSA, TFL 58, and TFL 60 that applies to the Haida Gwaii Management Area as defined in the *Haida Gwaii Reconciliation Act* is 921,500 cubic metres.

The AACs I have determined sum to 931,000 cubic metres. The difference between this sum and the HGMC determination of 929,000 cubic metres is due to the fact that my determinations include contributions from municipal areas, which the HGMC determination excludes, and the HGMC determination includes non-private portions of WLs, which my determinations exclude. The difference between the approximate contribution of municipal areas and the current AAC of non-private WL areas is about 2000 cubic metres, which is reflected in the difference between the HGMC AAC and the sum of my AACs.

Implementation

In the period following these determinations and leading to subsequent determinations, I encourage MFLNRO staff, licensees, and members of the Haida Nation to undertake work noted below. I recognize that the ability to undertake this work depends on the availability of resources, including people, time and funding. This work is, however, important to help reduce uncertainties

and associated risks associated with projecting timber supply. I recognize that the HGMC outlined a comprehensive list of information and monitoring needs in its rationale. I have highlighted here what I view to be the most critical needs.

Inventories and databases

1. Forest cover inventory – Once the new Vegetation Resource Inventory is completed, it should be compared with the inventory information used in this timber supply review. If there are any large differences that would affect timber supply projections, an early timber supply review may be warranted.
2. Ecosystem mapping – Work should be undertaken to develop consistent and complete terrestrial ecosystem mapping (TEM) for Haida Gwaii. Improved TEM will support implementation of aspects of the LUOO associated with ecosystem representation and protection, as well as application of site index information in timber supply analysis. Given the resources required, ecosystem mapping efforts will need to be planned and implemented strategically in higher priority areas where existing uncertainties are greatest.
3. Volume estimates for existing stands – Once the VRI ground sampling and analysis are completed the new information should be compared to the inventory information used in the timber supply analysis to assess the validity of the conclusion reached by the HGMC and me that existing stand volumes have been substantially underestimated. If there are concerns that the degree of underestimation may be different from the conclusion underlying my determinations, earlier AAC determinations may be warranted.

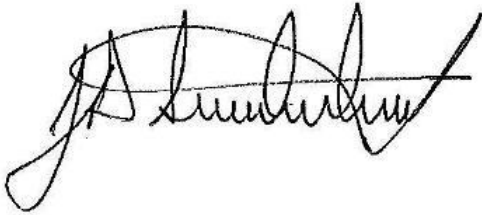
Monitoring

4. Unstable terrain –Harvesting on potentially unstable terrain should be monitored to assess the appropriate contribution of class IV and V terrain to the timber harvesting land base for future AAC determinations. The review should consider both the economic feasibility of harvesting and the potential impacts on ecological and cultural values.
5. Economic operability (including isolation of stands) – In preparation for the next TSR, the economic feasibility of operating in the various parts of Haida Gwaii should be reviewed. This review should include assessment of the economic effects of infrastructure limitations, remoteness, and EBM-related retention patterns under the LUOO.
6. EBM requirements in the LUOO – In preparation for the next timber supply review, information collected as part of normal reporting requirements should be used to improve modeling inputs related to deriving the timber harvesting land base, assigning silvicultural regimes, and assessing growth and yield impacts to reflect management for LUOO values.
7. Disturbance and unsalvaged losses – Given the emerging and extensive nature of some disturbances on Haida Gwaii, monitoring and reporting on disturbances will be important to provide improved information on losses and salvage potential for future timber supply reviews.

Specific values

8. Northern Goshawk – When a final recovery plan is released for management and protection of Northern Goshawk habitat (currently being developed by the federal and provincial governments), the requirements under the plan should be compared to the management objectives modeled in the timber supply analyses done to support of these AAC determinations. Substantial differences may warrant an early timber supply review.
9. Cedar harvest – FAIB staff working in collaboration with staff representing the Haida Nation, and staff from the Haida Gwaii Natural Resource District, should report out

annually on the harvest of red and yellow cedar in each of the management units and compare the harvests to the expectations regarding maximum cedar harvests I have outlined in the determination for each of the units. At minimum the harvest report should include information from the Harvest Billing System on the volume of red and yellow cedar billed or scaled (depending on advice from MFLNRO Pricing Branch as to which approach will provide the most complete information depending on the time of summaries). In addition, if practicable, the report should also include statistics on what was harvested according to the inventory information. Such statistics could be derived by combining information on areas harvested from RESULTS or other comparable geographic linework, with the forest inventory composition that existed prior to harvest. If the comparison indicates that after the three years following my determinations documented in this rationale there has been a failure on average to harvest red and yellow cedar at approximately the rates I have outlined in my expectations, I will consult with the HGMC and consider revisiting the determinations sooner than the legislated requirement.



Jim Sutherland, RPF
Deputy Chief Forester



September 20, 2012

Appendix 1: Section 8 of the *Forest Act*

Section 8 of the *Forest Act*, Revised Statutes of British Columbia 1996, c. 157, (current to July 13, 2012), reads as follows:

Allowable annual cut

8 (1) The chief forester must determine an allowable annual cut at least once every 10 years after the date of the last determination, for

(a) the Crown land in each timber supply area, excluding the Crown land in the following areas:

- (i) tree farm licence areas;
- (ii) community forest agreement areas;
- (iii) first nations woodland licence areas;
- (iv) woodlot licence areas, and

(b) each tree farm licence area.

(2) If the minister

(a) makes an order under section 7 (b) respecting a timber supply area, or

(b) amends or enters into a tree farm licence to accomplish a result set out under section 39 (2) or (3),

the chief forester must make an allowable annual cut determination under subsection (1) for the timber supply area or tree farm licence area

(c) within 10 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 10 years after the date of the last determination.

(3) If

(a) the allowable annual cut for the tree farm licence area is reduced under section 9 (3), and

(b) the chief forester subsequently determines, under subsection (1) of this section, the allowable annual cut for the tree farm licence area,

the chief forester must determine an allowable annual cut at least once every 10 years from the date the allowable annual cut under subsection (1) of this section is effective under section 9 (6).

(3.1) If, in respect of the allowable annual cut for a timber supply area or tree farm licence area, the chief forester considers that the allowable annual cut that was determined under subsection (1) is not

likely to be changed significantly with a new determination, then, despite subsections (1) to (3), the chief forester

(a) by written order may postpone the next determination under subsection (1) to a date that is up to 15 years after the date of the relevant last determination, and

(b) must give written reasons for the postponement.

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

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

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

(4) If the allowable annual cut for the tree farm licence area is reduced under section 9 (3), the chief forester is not required to make the determination under subsection (1) of this section at the times set out in subsection (1) or (2) (c) or (d), but must make that determination within one year after the chief forester determines that the holder is in compliance with section 9 (2).

(5) In determining an allowable annual cut under subsection (1) the chief forester may specify that portions of the allowable annual cut are attributable to one or more of the following:

(a) different types of timber or terrain in different parts of Crown land within a timber supply area or tree farm licence area;

(a.1) different areas of Crown land within a timber supply area or tree farm licence area;

(b) different types of timber or terrain in different parts of private land within a tree farm licence area.

(c) [Repealed 1999-10-1.]

(6) The minister must determine an allowable annual cut for each woodlot licence area, in accordance with the woodlot licence for that area.

- (7) The minister must determine an allowable annual cut for
- (a) each community forest agreement area in accordance with the community forest agreement for that area, and
 - (b) each first nations woodland licence area in accordance with the first nations woodland licence for that area.
- (8) In determining an allowable annual cut under subsection (1) the chief forester, despite anything to the contrary in an agreement listed in section 12, must consider
- (a) the rate of timber production that may be sustained on the area, taking into account
 - (i) the composition of the forest and its expected rate of growth on the area,
 - (ii) the expected time that it will take the forest to become re-established on the area following denudation,
 - (iii) silviculture treatments to be applied to the area,
 - (iv) the standard of timber utilization and the allowance for decay, waste and breakage expected to be applied with respect to timber harvesting on the area,
 - (v) the constraints on the amount of timber produced from the area that reasonably can be expected by use of the area for purposes other than timber production, and
 - (vi) any other information that, in the chief forester's opinion, relates to the capability of the area to produce timber,
 - (b) the short and long term implications to British Columbia of alternative rates of timber harvesting from the area,
 - (c) [Repealed 2003-31-2.]
 - (d) the economic and social objectives of the government, as expressed by the minister, for the area, for the general region and for British Columbia, and
 - (e) abnormal infestations in and devastations of, and major salvage programs planned for, timber on the area.
- (9) Subsections (1) to (4) of this section do not apply in respect of the management area, as defined in section 1 (1) of the *Haida Gwaii Reconciliation Act*.

(10) Within one year after the chief forester receives notice under section 5 (4) (a) of the *Haida Gwaii Reconciliation Act*, the chief forester must determine, in accordance with this section, the allowable annual cut for

- (a) the Crown land in each timber supply area, except the areas excluded under subsection (1) (a) of this section, and
- (b) each tree farm licence area

in the management area, as defined in section 1 (1) of the *Haida Gwaii Reconciliation Act*.

(11) The aggregate of the allowable annual cuts determined under subsections (6), (7) and (10) that apply in the management area, as defined in section 1 (1) of the *Haida Gwaii Reconciliation Act*, must not exceed the amount set out in a notice to the chief forester under section 5 (4) (a) of that Act.

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

Section 4 of the *Ministry of Forests and Range Act* (current to July 11, 2012) reads as follows:

Purposes and functions of ministry

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

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

Appendix 3: Minister's letter of July 4, 2006



JUL 04 2006

Jim Snetsinger
Chief Forester
Ministry of Forests and Range
3rd Floor, 1520 Blanshard Street
Victoria, British Columbia
V8W 3C8

Dear Jim:

Re: Economic and Social Objectives of the Crown

The *Forest Act* gives you the responsibility for determining Allowable Annual Cuts—decisions with significant implications for the province's economy, communities and environment. This letter outlines the economic and social objectives of the Crown you should consider in determining Allowable Annual Cuts, as required by Section 8 of the *Forest Act*. This letter replaces the July 28, 1994 letter expressing the economic and social objectives of the Crown, and the February 26, 1996 letter expressing the Crown's economic and social objectives for visual resources. The government's objective for visual quality is now stated in the Forest Practices and Planning Regulation of the *Forest and Range Practices Act*.

Two of this government's goals are to create more jobs per capita than anywhere in Canada and to lead the world in sustainable environmental management. The Ministry of Forests and Range supports these objectives through its own goals of sustainable forest and range resources and benefits. In making Allowable Annual Cut determinations, I ask that you consider the importance of a stable timber supply in maintaining a competitive and sustainable forest industry, while being mindful of other forest values.

The interior of British Columbia is in the midst of an unprecedented mountain pine beetle outbreak. Government's objectives for management of the infestation are contained in British Columbia's Mountain Pine Beetle Action Plan. Of particular relevance to Allowable Annual Cut determinations are the objectives of encouraging long-term economic sustainability for communities affected by the epidemic; recovering the greatest value from dead timber before it burns or decays, while respecting other forest values; and conserving the long-term forest values identified in land use plans.

Page 1 of 2

Minister of
Forests and Range
and Minister Responsible
for Housing

Office of the
Minister

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Jim Snetsinger

To assist the province and affected communities in planning their responses to the beetle infestation, it would be best to have realistic assessments of timber volumes that can be utilized economically. Therefore, in determining the best rate of harvest to capture the economic value from beetle-killed timber, I ask that you examine factors that affect the demand for such timber and products manufactured from it, the time period over which it can be utilized, and consider ways to maintain or enhance the mid-term timber supply.

The coast of British Columbia is experiencing a period of significant change and transition. In making Allowable Annual Cut determinations I urge you to consider the nature of timber supply that can contribute to a sustainable coast forest industry, while reflecting decisions made in land and resource management plans.

You should also consider important local social and economic objectives expressed by the public during the Timber Supply Review process, where these are consistent with the government's broader objectives as well as any relevant information received from First Nations.

Sincerely yours,

A handwritten signature in black ink, appearing to be 'Rich Coleman', with a long horizontal stroke extending to the right.

Rich Coleman
Minister

Appendix 4: History of the AAC

The complex history of the AACs for the various land bases (management units) now comprising the two TFLs and the TSA on Haida Gwaii is provided in abbreviated form in **Table A-1**, next page:

TABLE A-1. HISTORY OF THE AAC FOR HAIDA GWAII (EXCLUDING WOODLOT LICENCES*)

Year	TSA 25	TFL 25 'Blk 6'	TFL 47 'Moresby Blk', now TFL 58	TFL 39 'Blk 6', now TFL 60	Haida Gwaii Total
2000	361 000 m³ (due to Part 13 reduction of 114 000 m ³ , Dec 99)	115 000 m³ (from 1998 incorporation of ex-TFL 24)	100 000 m³ (from Dec 1996 determination)	1 210 000 m³ (from 1996 determination – not official partition)	1 786 000 m³
2001				1 150 000 m³ (contrib in Nov 2001 determination – not an official partition)	1 726 000 m³
2002					1 726 000 m³
2003	No change, but 114 000 m ³ Part 13 reduction replaced		100 000 m³ (re-determined in Aug 2003)		1 726 000 m³
2004				1 082 616 m³ (Oct 2004, due to private land removal – not an official partition)	1 658 616 m³
2005					1 658 616 m³
2006	245 000 m³ (Part 13 reduction of 116 000 m ³)	106 500 m³ (Part 13 reduction of 8500 m ³ Oct 2006)	83 000 m³ (Part 13 reduction of 17 000 m ³ Oct 2006; TFL 58 formed Dec '06)	789 616 m³ (Part 13 reduction of 293 000 m ³ Oct 2006)	1 224 116 m³
2007					1 224 116 m³
2008		106 500 m³ (base level and Part 13 reduction re-affirmed in Feb 2008 determination)			1 224 116 m³
2009	475 000 m³ (Part 13 reductions end Dec 31, 2009)	115 000 m³ (Part 13 reductions end Dec 31, 2009)	100 000 m³ (Part 13 reductions end Dec 31, 2009)	1 082 616 m³ (Part 13 reductions end Dec 31, 2009)	1 772 616 m³
2010	869 748 m³ (115 000 m ³ added from TFL 25; 279 748 m ³ added from TFL 60, Dec 2010)	Block added to TSA	100 000 m³	802 868 m³ (Dec 2010; Jan 2010, TFL 39 Blk 6 deleted, TFL 60 formed)	1 772 616 m³

The AAC for the total area of the TSA and the two TFLs is **1 772 616** cubic metres.

The current AAC for Woodlots is 9293 cubic metres (1817 cubic metres attributable to private lands, and **7476** cubic metres attributable to non-private land).

Hence, the current AAC for the entire Haida Gwaii Management Area is **1 780 092** cubic metres.

Appendix 5: Haida Gwaii Reconciliation Act, Sections 3 and 5

Sections 3 and 5 of the *Haida Gwaii Reconciliation Act* read as follows.

Haida Gwaii Management Council

- 3** (1) The Haida Gwaii Management Council is established by the joint operation of a resolution of the Haida Nation and this Act.
- (2) The council consists of
- (a) 2 members appointed by resolution of the Haida Nation after consultation with British Columbia,
 - (b) 2 members appointed by the Lieutenant Governor in Council after consultation with the Haida Nation, and
 - (c) a chair appointed both by resolution of the Haida Nation and by the Lieutenant Governor in Council.
- (3) A decision of the council must be made by consensus of the members referred to in subsection (2) (a) and (b), but failing consensus, by majority vote of those members.
- (4) In the event of a tie vote under subsection (3), the chair must cast the deciding vote.
- (5) A decision of the council must be published in the Gazette.

Allowable annual cut

- 5** (1) In this section, "**allowable annual cut**" and "**chief forester**" have the same meanings as in section 1 (1) of the *Forest Act*.
- (2) The council must determine the allowable annual cut for the management area at least once in every 10 years after the date of the last determination.
- (3) For the purposes of subsection (2), on request of the council, the chief forester must provide to the council all information that the chief forester would consider under section 8 (1) of the *Forest Act* if the chief forester were making the determination under subsection (2) of this section, including, without limitation, information respecting the matters, as they relate to the management area, set out in section 8 (8) of the *Forest Act*.
- (4) Promptly after making a determination under subsection (2), the council must
- (a) give written notice of the determination to the chief forester, and
 - (b) publish the determination on a publicly accessible website.