BRITISH COLUMBIA MINISTRY OF FORESTS AND RANGE

Strathcona Timber Supply Area

Rationale for Allowable Annual Cut (AAC) Determination

Effective December 17, 2015

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Chief Forester

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Objective of this Document

This document provides an accounting of the factors I have considered and the rationale I have employed in making my determination, under Section 8 of the *Forest Act*, of the allowable annual cut (AAC) for the Strathcona Timber Supply Area (TSA). This document also identifies where new or better information is needed for incorporation in future determinations.

Acknowledgement

For preparation of the information I have considered in this determination, I am indebted to staff of the BC Ministry of Forests, Lands and Natural Resource Operations in the Campbell River Natural Resource District and the Forest Analysis and Inventory Branch. I am also grateful to local residents, First Nations, and stakeholders who contributed to this process.

Statutory framework

Section 8 of the *Forest Act* requires the chief forester to consider a number of specified factors in determining AACs for TSAs and TFLs. Section 8 of the *Forest Act* is reproduced in full as Appendix 1 of this document.

Description of the Strathcona Timber Supply Area

The Strathcona TSA encompasses a total land area of 1.36 million hectares from the west coast of Vancouver Island (Nootka Sound to Brooks Peninsula) to the east coast (Fanny Bay to Sayward), and including islands in the Johnstone Strait and the northern Gulf Islands as well as a large area lying between Knight and Bute Inlets on the mainland. A significant number of large provincial parks, including Strathcona, Tahsish-Kwois and Brooks-Nasparti are located partially or wholly within the boundaries of the TSA. The TSA is comprised of the Kyoquot, Sayward and Loughborough timber supply blocks (TSB), with the Kyuquot TSB located on the western portion of Vancouver Island, the Sayward TSB on the eastern portion and the Loughborough TSB mostly on the mainland.

The Strathcona TSA is administered from the Ministry of Forests, Lands and Natural Resource Operations (FLNR) Campbell River Natural Resource District office. The natural resource district contains the communities of Gold River, Tahsis, Zeballos, Kyuquot, Campbell River, Courtenay, Comox, Sayward and Cumberland.

The total Crown forest land base (CFLB) of the TSA is approximately 345 000 hectares. Following land base exclusions applied for a number of different factors, including operability, terrain stability, unsuitable forest types, and reserves for resource values such as ungulates and riparian habitat, the land base considered to be available for timber harvesting is about 174 000 hectares.

The forests of the TSA are within three biogeoclimatic zones: coastal western hemlock, which forms the bulk of the TSA, mountain hemlock and coastal mountain heather-alpine heather. Dominant tree species include western hemlock, balsam fir, Douglas-fir and western redcedar. The TSA's varied topography and climate support a diverse and rich variety of wildlife.

Fifteen First Nations claim traditional territory in the Strathcona TSA. The Da'naxda'xw First Nation, Klahoose First Nation, Mamalilikulla-Qwe'Qwa'Sot'Em, Namgis First Nation, and the Sliammon First Nation claim traditional territory within the TSA. The Ehattesaht Tribe, Homalco First Nation (Xwemalhk wu), Ka:'yu:'k't'h/Che:k:tles7et'h' First Nation (Maa Nulth Treaty), K'omoks First Nation, Kwiakah First Nation, Mowachaht/Muchalaht First Nation, Nuchatlaht Tribe, Tlowitsis Tribe, We Wai Kai/ Cape Mudge First Nation and the Wei Wai Kum (Campbell River) First Nation claim traditional territory and also have reserves within the TSA.

History of the AAC for the Strathcona TSA

The Strathcona TSA was established in 1986 from the Quadra, Nootka, and Kingcome Public Sustained Yield Units (PSYUs), and the AAC was determined at 1 645 030 cubic metres. The AAC was increased in 1989 to 1 661 030 cubic metres and a temporary timber sale licence was issued for 16 000 cubic metres per year for deciduous stands. In 1992, to account for land withdrawn from TFL 47 and allocated to the Strathcona TSA, the AAC was increased to 1 693 745 cubic metres. In 1993, to address several large study areas under the Protected Areas Strategy, the AAC was temporarily reduced by 188 000 cubic metres under Part 15 (now Part 13) of the *Forest Act*. In January 1996, the AAC was reduced under Section 7 (now Section 8) of the *Forest Act*, by approximately 16 percent from 1 693 745 cubic metres to 1 420 000 cubic metres, including a partition of 16 000 cubic metres for harvesting predominantly deciduous stands. In January 2000, the AAC was reduced by 10 percent to 1 278 000 cubic metres, and the deciduous-leading partition was discontinued.

In August 2005, the AAC was reduced by 4.8 percent to 1 217 000 cubic metres. Of this AAC, 1 189 845 cubic metres have been apportioned by the Minister of Forests, Range and Natural Resource Operations under Section 10 of the *Forest Act* as follows:

Table 1. Minister of Forests, Range and Natural Resource Operations apportionment of the current AAC.

Form of agreement	Cubic metres	Percent of AAC
Forest Licences – replaceable	659 223	54.2
Forest Licences – non replaceable	58 753	4.8
Non-replaceable Forest Licences – First Nations	57 854	4.8
Forestry Licences to Cut – salvage	1 938	0.2
BCTS Timber Sale Licence	358 899	29.5
Woodlot licences	28 738	.24
Forest Service Reserve	24 440	2
Total	**1 189 845**	**97.8**

In June 2015, the AAC for the Strathcona TSA was decreased to an effective level of 1 203 576 cubic metres under the AAC Adjustment Regulation to account for the transfer of area from the TSA to a First Nations Woodland Licence.

New AAC determination

Effective December 17, 2015, the new AAC for the Strathcona TSA is 1 138 000 cubic metres, of which 152 000 cubic metres per is attributable to harvest from the Loughborough Timber Suppy Block, and 986 000 cubic metres is attributable to harvest from the Sayward and Kyuquot Supply Blocks.

This AAC will remain in effect until a new AAC is determined, which must take place within ten years of this determination.

Information sources used in the AAC determination

The information sources considered in determining this AAC for the Strathcona TSA include, but are not limited to, the following:

- *Strathcona Data Package*, Ministry of Forests, Lands and Natural Resource Operations (FLNR), Forest Analysis and Inventory Branch (FAIB), October 2012;
- Strathcona Timber Supply Area Analysis, FLNR, FAIB, December 2014;
- *Strathcona Timber Supply Area Public Discussion Paper*, FLNR, FAIB, December 2014;
- *Strathcona Timber Supply Area Summary of Public Input*, FLNR, June 2015;
- *Strathcona Timber Supply Area Analysis Report*, British Columbia Forest Service (BCFS) Forest Analysis Branch, September 2004;
- *Biodiversity Guidebook*, Province of British Columbia, September 1995;
- *Procedures for factoring visual resources into timber supply analyses*. BC MoF, Forest Practices Branch, 1998: Victoria, B.C. REC-029;
- *Bulletin — Modelling visuals in TSR3.* BC MoF, Forest Practices Branch, 2003. Victoria, B.C.;
- *Community Watershed Guidebook*, Province of British Columbia; October 1996;
- *Incorporation of the Inventory Audit in the Strathcona TSA Timber Supply Review*, BCFS, 1996;
- *Riparian Management Area Guidebook*, Province of British Columbia, December 1995;
- *Letter from the Minister of Forests and Range* to the chief forester stating the economic and social objectives of the Crown. July 4, 2006;
- *Letter from the Minister of Forests, Lands and Natural Resource Operations* to the chief forester stating the economic and social objectives of the government for signatory First Nations of the Nanwakolas Reconciliation Protocol. April 12, 2013;
- *Letter from the Vancouver Forest Regional Manager* to licensees, May 22, 1996, providing direction on landscape-level biodiversity strategies;
- *Memo from the Vancouver Forest Regional Manager* to district managers and regional team leaders, dated December 15, 1997, regarding wildlife tree patch implementation;
- *Forest Practices Code of British Columbia Act and Regulations*, July 1995;
- *Forest Practices Code of British Columbia* Guidebooks, BCFS and MOELP;
- *Forest Practices Code Timber Supply Analysis*, February, 1996, BCFS and MOELP;
- *Forest and Range Practices Act and Regulations, January 31, 2004;*
- Strathcona TSA – Documentation of vegetation resource inventory statistical adjustment. Churlish, G. and Jahraus, K. 2011. For. Anal. Inven. Br., Victoria, B.C. Unpubl. Rep.;

- Estimating the Non-productive Losses Associated with Roads and Landings in the Mid Coast TSA. 2010. International Forest Products and Forsite Consultants;
- Comparison of Harvest and Species Profiles, Adrian Walton and Huapeng Chen, Forest Analysis and Inventory Branch, June 16th, 2015;
- Sayward Landscape Unit Plan;
- *Order to Establish a Landscape Unit Plan and Objectives*; MSRM, February 2003;
- *Order for Establishment of Scenic Areas and Visual Quality Objectives for the Campbell River Forest District, MoFR, December 2005;*
- *Order to Identify Recreation Resource Features for the Campbell River Forest District, MoFR, April 2006;*
- *Order to Identify Karst Resource Features for the Campbell River Forest District, MoFR, May 2007;* and,
- Technical review and evaluation of current operating conditions through comprehensive discussions with staff of FLNR and the Ministry of Environment (MOE), including the AAC determination meeting held in Campbell River, June 23 and 24, 2015.

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 have differing levels of uncertainty associated with them, 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 this AAC for the Strathcona TSA, I have considered known limitations of the technical information provided. I am satisfied that the information provides a suitable basis for my determination.

Guiding principles for AAC determinations

Section 8 of the *Forest Act* requires the chief forester to consider particular factors in determining the AACs for timber supply areas and tree farm licences.

Given the large number of periodic AAC determinations required for British Columbia's many forest management units, administrative fairness requires a reasonable degree of consistency of approach in addressing relevant factors associated with AAC determinations. In order to make our approach in these matters explicit, we, the chief forester and deputy chief forester, jointly established the following body of guiding principles. However, in any specific circumstance in a determination where we consider it necessary to deviate from these principles, we will explain our reasoning in detail.

When considering the factors required under Section 8, we are also mindful of our obligation as stewards of the forests of British Columbia, of the mandate of the Ministry of Forests, Lands and Natural Resource Operations as set out in Section 4 of the *Ministry of Forests and Range Act*, and of our responsibilities under the *Forest Act* and *Forest and Range Practices Act (FRPA).*

Integrated decision making

One of the key objectives of the Ministry of Forests, Lands and Natural Resource Operations is to take an integrated approach to all resource management decisions that considers all resource values. In considering the factors outlined in Section 8 of the *Forest Act*, we will continue to consider all available information on timber and non-timber resources in the management unit, and all available information on the interactions of the management of those resources on timber supply.

Information uncertainty

Given the complex and dynamic nature of forest ecosystems coupled with changes in resource use patterns and social priorities there is always a degree of uncertainty in the information used in AAC determinations.

Two important ways of dealing with this uncertainty are:

(i) managing risks by evaluating the significance of specific uncertainties associated with the current information and assessing the various potential current and future, social, economic and environmental risks associated with a range of possible AACs; and

(ii) re-determining 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, it is important to reflect those factors, as closely as possible, that are a reasonable extrapolation of current practices. It is not appropriate to base decisions on proposed or potential practices that could affect the timber supply but 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, this uncertainty is taken into account to the extent possible in the context of the best available information.

It is not appropriate 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 FRPA. In cases where there is a clear intent by government to implement these decisions that have not yet been finalized, we 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 on-going plan implementation decisions.

Where appropriate, information will be considered regarding 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.

We acknowledge the perspective that alternate strategies for dealing with information uncertainty are to delay AAC determinations or to generally reduce AACs in the interest of caution. However, given that there will always be uncertainty in information and due to the significant impacts that AAC determinations can have on communities, we believe that no responsible AAC determination can be made solely on the basis of a response to uncertainty.

Nevertheless, in making a determination, allowances may need to be made to address risks that arise because of uncertainty by applying judgement to the available information. Where appropriate, the social and economic interests of the Crown, as articulated by the Minister of Forests, Lands and Natural Resource Operations, can assist in evaluating this uncertainty.

Climate change

One key area of uncertainty relates to climate change. While some controversy appears to remain on the causes of climate change, there is substantial scientific agreement that climate is changing, that the changes will affect forest ecosystems, and that forest management practices will need to be adapted. Nevertheless, the potential rate, amount, and specific characteristics of climate change in different parts of the province are uncertain. As research provides more definitive information on climate change, we will consider the findings in AAC determinations. Where forest practices are implemented to mitigate or adapt to the potential effects of climate change on forest resources, we will consider related information in our determinations.

In addition, vulnerability assessments can provide information on the potential risks associated with climate change, and could be useful in defining how to consider climate change in different AAC determinations. Such assessments could also highlight key topics in need of research that could improve climate change considerations for future determinations.

We note, however, that even with better information on climate change there will be a range of reasonable management responses. Considerations of how to respond in anticipation of uncertain, potential future impacts and risks differ from those related to responding to known

or on-going processes such as the recent MPB infestation. For example, it is not clear if either increases or decreases to current harvest levels would be appropriate in addressing potential future increases in natural disturbance due to climate change. Conversely, the present forest conditions resulting from the MPB infestation provide a clearer circumstance to which to respond.

To some extent, decisions on the preferred management responses to potential future risks, including potential changes to allowable timber harvests, are appropriately informed by broad discussion among interested parties. We will monitor such discussions and consider them insofar as they are relevant to AAC determinations. In general, the requirement for regular AAC reviews will allow for the incorporation of new information on climate change and its effects on forests and timber supply as it emerges.

First Nations

Aboriginal Title Lands and other areas, such as Treaty Lands or Indian Reserves, are not provincial Crown land. Consequently, the timber on these lands does not contribute to the AAC of the timber supply area or tree farm licence with which they overlap. For other areas, where aboriginal title has not been legally proven, the Crown has a legal obligation to consult with First Nations regarding their 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, full consideration will be given to:

(i) the information provided to First Nations to explain the timber supply review process;

(ii) any information brought forward respecting First Nations' Aboriginal Interests, including how these interests may be impacted; and

(iii) any operational plans and/or other information that describe how First Nations' Aboriginal Interests are addressed through specific actions and forest practices.

Aboriginal Interests that may be adversely impacted by an AAC decision will be considered, and where appropriate, addressed in a manner that is consistent with the scope of authority granted to the chief forester under Section 8 of the *Forest Act*. When information is brought forward that is outside of the chief forester's jurisdiction, this information will be forwarded to the appropriate decision makers for their consideration. Specific considerations identified by First Nations in relation to their Aboriginal Interests and the AAC determination are addressed in the various sections of this rationale.

AAC determinations should not be construed as limiting the Crown's legal obligations owed to First Nations in any way, and in this respect it should be noted that the determinations do not prescribe a particular plan of harvesting activity within the management units. 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.

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 am assisted by timber supply forecasts provided to me through the work of the Timber Supply Review Program (TSR) for TSAs and TFLs.

For most AAC determinations, a timber supply analysis is carried out using an information 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 can be 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" and forms the basis for comparison when assessing the effects of uncertainty on timber supply. The base case is designed to reflect current management 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 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 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 information package was assembled. Forest management data are particularly subject to change during periods of legislative or regulatory change, or during the implementation of new policies, procedures, guidelines or plans.

Thus, in reviewing the considerations that lead to the AAC determination, it is important to remember that the AAC determination itself is not simply a calculation. Even though the timber supply analysis I am provided is integral to those considerations, the 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. 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.

Base case for the Strathcona TSA

The current base case showed that an initial harvest level of 1 220 000 cubic metres per year – a level slightly higher than the current effective AAC - could be maintained for two decades, before declining each subsequent decade in steps of five percent, 10 percent and 10 percent, respectively, to a mid-term level of 933 000 cubic metres per year. After three decades at this level, the harvest level increases by five percent to 981 000 cubic metres per year. After an additional three decades, it increases again, by 6 percent, to 1 037 000 cubic metres per year. The base case long-term harvest level, achieved in decade 20, is 1 091 000 cubic metres per year.

The base case described above differs from the original base case presented in the December 2014 public discussion paper. The original base case was adjusted based on input received during the public review and First Nations consultation processes. Specifically, changes were made to the assumptions for minimum harvest age, the reductions applied to account for red- and blue-listed plant species and existing roads, trails and landings. I have discussed these changes with staff, and I am satisfied that the revisions to the assumptions were appropriate. For the remainder of this document, any references to the "base case" refer to the revised base case described above, unless stated otherwise.

In addition to the base case, I was provided with a number of sensitivity analyses and alternative harvest forecasts carried out using the base case as a reference. These analyses and others as noted have been helpful in specific considerations and reasoning in my determination as documented in the following sections. I am satisfied that the base case, and the other analyses, as noted and described, represent the best information currently available to me respecting various aspects of the projection of the timber supply in this TSA, and that as such they are suitable for reference in my considerations in this determination.

Consideration of Factors as Required by Section 8 of the *Forest Act*

I have reviewed the information for all of the factors I am required to consider 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 listed in Table 2.

Table 2. Section 8 of the Forest Act: factors accepted as modelled in the base case

***Forest Act* section and description**	**Factors accepted as modelled**
8(8)(a)(i) Composition of the forest and its expected rate of growth	• Non-Forest Areas • Parks and Protected Areas • Low Productivity Sites and Problem Forest Types • Estimates for Roads, Trails and Landings • Timber Licence Reversions

	• Designated Areas • Age Class Structure and Species Profile • Volume Estimates for Existing Stands • Site Productivity Estimates • Volume Estimates for Regenerating Stands
8(8)(a)(ii) Expected time that it will take the forest to become re-established following denudation	• Not Satisfactorily Restocked/Backlog
8(8)(a)(iii) Silvicultural treatments to be applied	• Silvicultural Systems
8(8)(a)(iv) Standard of timber utilization and allowance for decay, waste, and breakage	• Utilization standards and Compliance • Decay, waste, and breakage
8(8)(a)(v) Constraints on the amount of timber produced by use of the area for purposes other than timber production	• Land Use Plans, VILUP, Sayward and GBR • Rare and Endangered Plant Communities • Fisheries Sensitive Watersheds • Grizzly Bear Habitat • Scenic Resources - Visual Quality Objectives • Recreation • Karst • Community and Domestic Watersheds • Research Installations and Growth and Yield Plots • EBM Objectives for Other Aquatic Habitat • Identified Wildlife Species – Marbled Murrelet, Northern Goshawk, and Other Species • Landscape Level Biodiversity and Old Growth Management Areas
8(8)(a)(vi) Any other information	
8(8)(b) The short and long term implications to British Columbia of alternative rates of timber harvesting from the area	• Harvest Sequencing and Alternative Harvest Flows

8(8)(d) Economic and social objectives of the government	• Socio-economic information
8(8)(e) Abnormal infestations in and devastations of, and major salvage programs planned for, timber on the area	• Non-recoverable Loss Estimates

For other factors, where more uncertainty exists, or where public or First Nations' 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.

Section 8 (8)

In determining an allowable annual cut under this section 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

Land base contributing to timber harvesting

- *general comments*

The Strathcona TSA covers about 1.36 million hectares, of which about 345 000 hectares is Crown forest land base (CFLB). After all of the areas that are reserved from timber harvesting to provide for other resource values (e.g., riparian areas, wildlife tree patches, wildlife habitat) or that are not suitable for timber harvesting have been excluded, the remaining area of about 174 000 hectares, or about 51 percent of the CFLB is assumed to be timber harvesting land base (THLB).

The THLB is an estimate of the land where timber harvesting is considered both available and economically feasible, given the objectives for all relevant forest values, existing timber quality, market values and applicable technology. It is a strategic-level estimate used for timber supply analysis, and as such could include some areas that may never be harvested or could exclude some areas that may be harvested. Consequently, the estimate of the THLB used in the base case has limited utility outside of the timber supply review process.

As part of the process used to define the THLB, a series of deductions was made from the Crown forest land base. These deductions account for economic or ecological factors that reduce the forest area available for harvesting. In reviewing these deductions, I am aware that some areas may have more than one classification. To ensure accuracy in defining the THLB, care has been taken to avoid any potential double-counting associated with overlapping objectives. Hence, a specific deduction for a given factor in the analysis or in this document does not necessarily reflect the total area with that classification, as some portion of it may have been deducted earlier under another classification.

For this determination, I accept that the approach used to determine the THLB for the Strathcona TSA base case was appropriate.

- *land ownership and land tenures not contributing to timber supply*

Lands not administered by FLNR for the timber supply of the TSA, including parks and protected areas, private land, municipal land, federal land, Tree Farm Licences, Community Forest Agreements, First Nations Woodland Licences and Woodlot Licences are excluded in the derivation of the THLB. Parks and protected areas are maintained in the CFLB as they contribute to meeting biodiversity and wildlife habitat objectives.

The Beaver Lodge forest lands are an area totalling 502 hectares designated as an experimental forest under the *Beaver Lodge Forest Trust Renewal Act* (1993) within the municipal boundaries of Campbell River. Although this designation does not preclude timber harvesting, this area was excluded in the derivation of the THLB for the base case. District staff indicate that no harvesting is currently anticipated in this area apart from any requirements to meet research or public safety needs.

Having reviewed the information for this factor, I am satisfied that the majority of areas were excluded appropriately. With respect to the Beaver Lodge forest lands, I accept that they do contribute to the THLB of the TSA. However, due to the very small size of the area, I accept that the impact to timber supply of their inadvertent exclusion from the THLB is negligible, and I make no adjustments on this account.

- *economic and physical operability*

In the Strathcona TSA, a total of about 67 000 hectares or about 19 percent of the CFLB, was excluded from the THLB to account for areas determined to physically inaccessible or uneconomnic for timber harvesting.

The operability information used in the previous timber supply review for the TSA was based on mapping from 1997. To update this information an operability study was undertaken in 2010 to define a land base that was likely to be economic for timber harvesting throughout a full ten-year market cycle. The methodology included mapping of both current and projected road networks, classification of areas by expected harvest method, and harvest costs as well as net value estimates for each forest type using the inventory classification. This information was then put into a forest estate model to determine the largest operable land base capable of generating a reasonable economic return over time. The resulting operable land base was approximately seven percent larger than that outlined by the 1997 operability mapping.

A stand classification of ‘inoperable – logged’ was used to describe previously logged stands with projected stand values relative to their cost of harvest that did not meet the economic criteria used in the operability modelling. As a result, these stands were not included in the operable land base for the base case. This approach differs from that used in the previous timber supply review, where any previously harvested stands were included in the operable land base by default.

District staff reviewed the assumptions for operability used in the base case and, with some reservations about the reliability of future road projections in areas with sensitive soils, concluded that they are a reasonable reflection of current practice.

During the public review, licensee staff disagreed with the exclusion of previously harvested areas from the operable land base and were concerned that this approach might imply that some historical harvesting was not sustainable.

District staff indicate that the majority of these previously harvested stands are relatively remote, lower grade hemlock-balsam stands that are not likely to be selected for harvest under current economic conditions. FAIB staff state that the 2010 operability study provides a better assessment of future economic viability of operations in all stands, logged or unlogged, due to the model's ability to consider the location of stands relative to the road network, harvest system required for harvesting, harvest costs and stand value.

BC Timber Sales staff reviewed the ortho-photo mapping from the operability assessment and expressed concern that the operability mapping may overestimate operability for their operating areas. They requested that a new operability review be completed prior to the next timber supply review for the TSA.

With regard to the concerns expressed by district staff, licensees and BCTS staff, I note that estimates of the operable land base in any management unit are always subject to a degree of uncertainty. As a result, the operable land base may include areas that will never be logged and exclude areas that could be logged in the future. I am also aware that the some historically harvested areas may not be an economically viable source of timber in the future for a number of reasons. These include: changes in road building standards, unstable slopes, market conditions, the amount of time required for regenerating stands on lower productivity sites to reach merchantable condition and the reduced value of the residual or regenerated stand.

In consideration of the available information for the Strathcona TSA, I accept that the 2010 operability assessment provides a better basis for this determination than the 1997 operability mapping used in the previous timber supply review. On this basis I will make no adjustments to the base case on this account or consider this factor any further in this determination.

In order to reduce uncertainty for future determinations, however, and in acknowledgement of the input received, I request that district, BCTS and licensee staff review the operability assumptions and either confirm or adjust the assumptions prior to the next timber supply review for the Strathcona TSA.

- *terrain stability mapping*

Reconnaissance level terrain stability mapping was completed by a qualified professional for the entire Strathcona TSA between 1992 and 1998. Areas with sensitive soils were classified as either unstable or potentially unstable terrain. In the base case, unstable terrain was 95 percent excluded from the THLB. For the Kyuquot, Sayward and Loughborough TSBs potentially unstable terrain was 40, 50 and 50 percent excluded from the THLB. respectively.

These perentages were based on professional geotechnical advice, and reflect that some harvesting does occur on areas with sensitive soils. District staff reviewed and accepted the mapping as the best available information regarding unstable and potentially unstable terrain in the TSA, and accept the percentage reductions applied as a reasonable representation of current practice.

All stands harvested after 1991 on sites classified as sensitive through the terrain stability mapping were included in the THLB, unless they were excluded to account for another factor in the derivation of the THLB. This approach reflects the assumption that forest engineers since 1991 have had the terrain stability mapping available to assist with locating roads and harvesting operations on sites with unstable or potentially unstable terrain. Using this methodology, a total of 29 411 hectares across the TSA were excluded from the THLB in the base case.

Input received from BC Timber Sales questioned the inclusion of previously logged sites on unstable or potentially unstable terrain in the THLB. They note that in some of these areas, roads may have failed or slides may have occurred that would prevent accessibility in the future. Input received from other licensees expressed the opinion that the reduction percentages to account for unstable and potentially unstable terrain appear to be high.

District staff indicate that areas logged after 1991 and before 1995 in areas with terrain stability concerns should only partially contribute to the THLB and be subject to the same netdowns as all unharvested terrain areas, as many of the roads in this set of harvested stands have been deactivated and there is a lower likelihood of future harvesting in these areas.

In reviewing the information, district staff found that during the period after 1991 and before 1995, 1673 hectares of unstable or potentially unstable terrain had been harvested. Applying the same percentage of unstable or potentially unstable terrain harvested relative to the total area harvested in the base case shows that an additional 785 hectares should have been excluded from the THLB.

The Forest Practices Code was initiated in 1995, and staff maintain that areas with terrain stability concerns planned for harvesting since that time would have been subject to review by geotechnical engineers prior to operations occurring on the areas. As a result, staff recommend that the stands on areas with terrain stability concerns harvested since 1995 should contribute to timber supply.

I have considered the information regarding the assumptions used in the base case to account for unstable and potentially unstable terrain. In my assessment, it is appropriate to include in the THLB those areas harvested after the implementation of the Forest Practices Code, as this resulted in a significant change in practices for managing operations on areas of unstable terrain. With respect to the areas harvested after 1991 and before 1995 that were included in the THLB, I accept that some of these unstable areas will not be harvested again due to inaccessibility or increased instability. Therefore the same exclusion percentages applied to account for unstable and potentially unstable terrain in the base case should also have been applied to these areas.

I conclude that the THLB has been overestimated by 785 hectares, leading to a 0.4 percent overestimation of the midterm harvest levels in the base case. I will discuss my reasoning of this factor further under "Reasons for Decision".

- *area based tenures*

The *Forest Act* requires AACs determined for TSAs to be exclusive of the areas and timber volumes allocated to area-based tenures, including woodlot licences, community forest

agreements (CFA), and First Nations Woodland Licences (FNWL). All issued woodlot licences were excluded from the THLB and district staff indicate that no new woodlot licences are proposed for the TSA at this time. There are no CFAs in the Strathcona TSA.

District staff indicate that since the base case was prepared, one of two FNWLs proposed in the Strathcona TSA was issued to the Wei Wai Kum First Nation (Campbell River Indian Band). In June 2015, in accordance with the AAC Administration Regulation, the Strathcona TSA AAC was reduced to 1 203 576 cubic metres to account for the transfer of 1714 hectares of THLB, with an associated AAC of 13 424 cubic metres from the TSA to the Wei Wai Kum FNWL. The second FNWL for the Kyuquot/Checleset for 14 400 cubic metres has not been issued at this time; therefore the area associated with the proposed tenure was included in the THLB.

During the review of the information associated with the recently issued FNWL, the FAIB analyst identified a 595-hectare area of THLB in the Strathcona TSA that had been incorrectly coded as being part of an adjacent TFL. The net effect of the issuance of the new FNWL and the coding error is an 1119-hectare overestimation of the THLB and an 8914-cubic metre per year overestimation of the base case harvest levels for the entire forecast period.

With the exception of the Wai Wei Kum FNWL and the mis-coding of 595 hectares of THLB, I accept that the base case assumptions regarding area-based tenures were correct. In consideration of the recently issued Wei Wai Kum (Campbell River Indian Band) FNWL and the coding error, I agree that the THLB used in the base case is overestimated by 1119 hectares and that the harvest levels projected in the base case are overestimated by 8914 cubic metres per year or about 0.7 percent throughout the forecast period. I will discuss this factor further in my "Reasons for Decision".

Regarding the proposed Kyuquot/Checleset FNWL, I note that when the tenure is issued the AAC for the Strathcona TSA will automatically be reduced under the AAC Administration Regulation to account for the transfer of THLB and AAC to the new tenure.

- current inventory

A new phase I vegetation resource inventory (phase I) was completed for the Strathcona TSA between 2005 and 2007 using aerial photography from 2003. This inventory replaced the forest cover inventory based on data from 1987 and 1991 that was used in the previous timber supply review for the TSA.

The re-inventory was submitted for review to FAIB staff in 2007. During the review, staff noted some concerns with the information. In 2010, the data attributes for approximately 23 percent of the 2007 inventory were reviewed and modified. Areas selected for priority review included the free-to-grow stands, primarily those in the Sayward TSB; stands whose attributes had been carried over from the previous inventory due to a lack of aerial photography; and, areas where it had been noted that a low number of calibration points had been established. The revised phase I subsequently passed an internal quality assurance process.

In 2011, a statistical analysis compared the revised phase 1 inventory with ground sampling data gathered in 2006/07 and in 2010 during phase II of the VRI. Overall, this statistical analysis suggests that existing stand volumes could be underestimated by an average of 14 percent for all species. However, the analysis found that there was a high level of variability, with the adjustments ranging from 95 percent to 134 percent across the samples. As a result, FAIB staff concluded that there is significant uncertainty regarding the statistical validity of the phase II sampling.

In consideration of the statistical analysis, FAIB staff recommended that the 2007 phase I inventory with the 2010 modifications be used for the base case. The inventory was updated for depletions (harvesting) through to 2012 using the available spatial data of existing cutblocks. Staff noted that the approach taken with the spatial data assumed the entire area within a mapped cutblock had been harvested. However, a review of licensee maps as well as satellite imagery confirmed that areas are retained in reserves within cutblocks. The in-block reserves were therefore identified, the stand attributes for these areas from the inventory file were assigned, and the areas were added back into the inventory.

In order to assess the effect on the timber supply of using the phase II results, a sensitivity analysis was prepared in which the yields for all stands older than 30 years were increased by 14 percent. The results of the sensitivity analysis show that if existing stand yields are underestimated by the amount suggested by the phase II information, the short-, mid- and long-term harvest levels projected in the base could be 14, 8 and 5 percent higher than in the base case, respectively.

Input received from one licensee noted that the phase II sampling highlighted a significant lack of accuracy in the inventory data, and requested that the disparity around existing stand volumes be quantified before being used to support the determination. Another licensee commented on the uncertainty and expressed appreciation for the completion of the sensitivity analysis to provide some assessment of the potential timber supply implications if volumes are underestimated. They noted that other information sources such as operational cruises or harvest billing and waste data could potentially be used to provide additional insights into the extent of the concern. However, FLNR staff note that the harvested portions of stands are likely to be comprised of the highest volume components of the stands, and using this data as a determinant of expected stands yields for the entire stand would be problematic.

Input received from the Ehattasaht First Nation requested that the determination be delayed until the Ehattasaht First Nation has completed a project of capturing LiDAR imagery for their traditional territory and the corresponding analysis of the results. Following a meeting with FAIB staff, the Ehattasaht withdrew their request based on the understanding that the results of the LiDAR study can be incorporated in the timber supply analysis for the next TSR.

I commend the Ehattasaht First Nation for the work they have undertaken to acquire data on the forest stands within their traditional territory. Knowing that this work is underway, I look forward to the results of the complete analysis, which will help to improve the information used in the next timber supply review.

Having considered the information regarding the forest inventory and discussed the information with FLNR staff, I am aware that there is uncertainty as to whether the inventory information used for the base case provides an accurate reflection of expected yields from

existing stands in the TSA. The phase II inventory plots suggest that existing stand volumes are underestimated; however, concerns with the methodology applied in the phase II study prevent this information from providing an accurate enough assessment of stand volumes upon which to base an adjustment for the purposes of the timber supply review.

For this determination, I accept that the forest inventory information used in the base case is the best available information. I expect staff to include the results of the Ehattsaht First Nation's LiDAR project and validate the forest inventory information over the term of this determination so that the next timber supply review for the Strathcona TSA can be based on a reliable assessment of the attributes of and corresponding yields for existing stands.

Expected rate of growth

- *minimum harvest criteria*

Minimum harvest criteria determine when existing and future managed stands become merchantable and available for harvest in the timber supply model.

In the base case for the Strathcona TSA, these criteria were based on the estimated age at which a stand was expected to reach a certain minimum volume. These volumes were set at 350 cubic metres per hectare for Douglas-fir-, cedar-, hemlock balsam-, and spruce-leading stands, and 299 cubic metres per hectare for alder stands. In addition to the minimum volume criteria, stands were also required to reach a minimum harvest age. Minimum harvest ages were set at the lowest age at which the average annual growth for a stand (mean annual increment) achieves a value that is 95 percent of the maximum (known as culmination age). In order to be eligible for harvesting stands had to reach both the minimum volume and age criteria. Application of these criteria in the base case resulted in minimum harvest ages for stands that ranged from 54 years for Douglas-fir leading stands on good sites to 86 years for hemlock balsam-leading stands on low sites.

District staff accept the resultant ages as reasonable; however, they expressed concern about the degree to which the base case harvest levels are dependent on the volume contribution from lower volume stands, primarily hemlock-balsam stands, noting that there has not been much demonstrated harvest performance in such stands.

To determine what has been occurring in operational practice, staff reviewed harvest performance using inventory depletion data to evaluate the ages and volumes of the harvested stands. The review showed that between 2003 and 2012, approximately 6017 hectares or 32 percent of the harvested area over that period was from stands less than 81 years of age. Over this same period, harvested stand volumes averaged 617 cubic metres per hectare. From the study, most of the lower volume harvest performance was found in Douglas-fir stands in the Sayward TSB which are accessible using ground-based harvesting techniques. There was little indication of harvest activity in the lower volume stands in the Loughborough TSB or in hemlock stands, and none in the lower volume stands in areas that need to be harvested using grapple or helicopter systems.

To further explore this concern, I requested that FAIB staff determine the proportion of harvest in the base case that originates from hemlock balsam stands with volumes between 350 and 450 cubic metres per hectare. This evaluation found that in the first decade of the

forecast, only about 3 percent of the harvest is from such stands. However, this contribution increases gradually such that by decade 5, approximately 31 percent of the base case harvest is from these lower volume, hemlock balsam stands. The mid-term timber supply in the forecast depends on a significant contribution from these stands.

Having reviewed the information regarding minimum harvest criteria, I conclude that the assumptions applied in the base case were reasonable and suitable for use in this determination.

I am aware that the timber supply as forecasted in the base case is dependent in the mid-term on the harvest contribution of lower volume hemlock balsam stands. In this regard, I caution licensees that performance needs to be demonstrated in these stands over time in order to achieve the harvest forecasts projected in the base case, and further to confirm the appropriateness of their assumed contribution to timber supply in harvest projections.

Over the term of this determination, I expect district staff to monitor harvest performance by species and volume and provide this information for the next timber supply review for the Strathcona TSA, such that it will be possible to evaluate the appropriateness of including lower volume hemlock balsam stands in the timber harvesting land base.

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

Approximately 87 percent of the seedlings planted in the Strathcona TSA are Douglas-fir or western redcedar, with a mix of other species making up the additional 13 percent.

In the base case, a regeneration delay of one year was assumed for all future managed stands. This regeneration delay was determined by subtracting the year of harvest from the planting date for stands and then averaging the corresponding value by analysis unit. This value was lower than that suggested in the data package, where one to three year regeneration delays were proposed, depending on planted species and the productivity of the site.

A licensee commented that the regeneration delays proposed in the data package were too long, indicating that all of their sites are planted within one year. District staff confirm that this comment is substantiated by their data for this licensee; however, it cannot be broadly applied to all planted sites. Subsequent to the completion of the analysis, district staff ran a report that showed regeneration delays across the TSA ranged from 1.2 to 1.74 years and on average, a delay of 1.5 years is likely appropriate. District staff consider this as the best available information for the stands in the TSA.

In considering the information regarding the assumptions applied for this factor and the discussions with district staff, I accept that the value used in the base case slightly underestimates regeneration delay for stands. On this basis I conclude that the mid- to long-term timber supply in the base case has been overestimated by a small, unquantified amount, and I will discuss this further in my "Reasons for Decision".

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

Incremental silviculture

Historically in the Sayward TSB of the Strathcona TSA, aerial fertilization of Douglas-fir leading stands at mid-stand rotation has occurred. Stands fertilized prior to 2004 had volume adjustments which were captured in the forest inventory file, and therefore the fertilization of these stands was accounted for in the base case. However, approximately 16 000 hectares of stands were fertilized since 2004 whose treatment was not captured in the inventory, and therefore no incremental volume from these stands was accounted for in the base case. Staff indicate that the likelihood of future fertilization is uncertain, and it would not be appropriate to factor it in at this time.

District staff indicate that the expected increase to stand volumes as a result of the fertilization since 2004 is approximately 30 cubic metres per hectare resulting in approximately 480 000 cubic metres of additional volume. FAIB staff indicate that this incremental volume contributes more resiliency to the short- and mid-term timber supply, and may serve to slightly offset the reduction to the lower mid-term harvest levels.

Having considered the information, I accept that it is appropriate to take into account this incremental volume totalling 16 000 cubic metres per year over the next three decades as a contribution to the short- and mid-term timber supply and I will discuss this further under "Reasons for Decision".

I acknowledge the licensees for their efforts with fertilization of stands in the Strathcona TSA, and I support continued fertilization programs where it seems appropriate and beneficial to stand volumes.

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:

No factors considered under this section require additional comment.

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:

Integrated Resource management objectives

The Ministry of Forests, Lands and Natural Resource Operations is required under the *Ministry of Forests Act* to manage, protect and conserve the forest and range resources of the Crown and to plan the use of these resources 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. Accordingly, the extent to which integrated resource management (IRM) objectives for various forest resources and values affect timber supply must be considered in AAC determinations.

- *cutblock adjacency, forest cover and green-up*

To manage for resources such as water, wildlife and scenic areas, and to avoid concentrating harvesting-related disturbance in particular areas, operational practices limit the size and shape of cutblocks as well as the maximum permissible level of disturbance (area covered by stands of less than a specified height at one time), and prescribe minimum 'green-up' heights required for regeneration on harvested areas before adjacent areas may be harvested.

In the base case for the Strathcona TSA, green-up heights and cutblock adjacency assumptions were based on the integrated resource management (IRM) zone requirements specified in the Vancouver Island Land Use Plan (VILUP). A green up height of 3 metres was assumed and used in the base case for the IRM zone. For the enhanced zone under the VILUP, a 1.3-metre green up height is required; however, in the modelling a 1-metre height was used due to limitations in the model to accommodate a 1.3-metre height. These heights were applied as forest cover constraints in the base case; in the IRM zone, no more than 25 percent of the THLB at any one time could be covered in stands less than 3 metres in height and in the enhanced zone, no more than 25 percent of the area could be covered in stands less than 1 metre in height at any one time.

BC Timber Sales expressed concern that the modelling of adjacency as a forest cover constraint does not adequately reflect the spatial constraint operationally on the land base. They provided an analysis in which 300 metre buffers were applied to previously harvested areas that showed significant constraint on the availability of timber in their chart area in the Sayward TSB.

I have considered the information about how green up and adjacency were modelled in the base case and discussed the information with FLNR staff. I understand the difficulty of reflecting operational adjacency considerations through green-up assumptions in a strategic-level timber supply model, in that the constraint experienced by operations in local areas may be greater than what is broadly projected over the TSA. I am aware that adjacency can limit the short-term availability of timber in local areas to a greater extent than shown in the modelling. In areas such as the Sayward TSB, where there are larger contiguous areas of operable forest, the impacts seen by operations are related to leave strips being unavailable to harvest until adjacent areas are sufficiently greened-up. In such cases the short-term timber supply in an area may be less than what is reflected by the model. However, I expect that these impacts are limited to specific areas and are not necessarily indicative of operations occurring throughout the TSA.

Nevertheless, I acknowledge the concerns that green-up constraints appear to impact the ability of BCTS and other licensees to locate harvesting operations on the landbase in the immediate term, and I will discuss this further in my "Reasons for Decision".

- *ungulate winter range*

Formal legal establishment of Ungulate Winter Ranges (UWRs) and associated objectives began under the Forest Practices Code and continued under the *Forest and Range Practices Act* (FRPA). Ungulate winter range (UWR) mapping and general wildlife measures for the Strathcona TSA were approved as a Government Actions Regulation (GAR) order in 2006. The general wildlife measures under the order prohibit timber harvesting except under specific

conditions and as a result, a net area of 5265 hectares were excluded from the THLB to account for the UWRs.

Provincial policy, in the absence of strategic plan direction, indicates that UWR habitat should have timber supply impacts similar to those assumed in the second timber supply review, completed for the Strathcona in 2005. This policy allowance for UWR at the time of the GAR order permits a THLB impact of up to 6662 hectares. Given that the total area currently occupied by UWR is 5265 hectares, it is possible to establish additional UWR, covering up to 1397 hectares of timber harvesting land base, in the TSA.

An analysis is currently underway in the Coast Region to assess whether the UWR reserves in areas including the Strathcona TSA are sufficient to provide for the habitat requirements of ungulates. This analysis is not yet complete, but when finished may include recommendations for increasing the areas contained in UWRs.

I have considered the information regarding UWRs in the Strathcona TSA and the assumptions applied in the base case to reflect the management and habitat needs for ungulates, and I accept the information as the best available and suitable for use in this determination. I commend the work underway by staff to assess the sufficiency of the current UWRs for the various management units in the region. This work will help to ensure that an appropriate amount of UWR area is maintained, in the right portions of the land base, and that therelevant management regimes are followed to provide for the needs of these important species. Any changes in the legal requirements that result from the current UWR assessment can be factored into future timber supply reviews for the Strathcona TSA.

- *stand-level biodiversity*

Stand-level biodiversity is managed in part by retaining reserves of mature timber or wildlife tree patches within cutblocks to provide structural diversity and wildlife habitat. The assumptions used to account for stand level biodiversity in the base case were based on the premise that majority of the forested area retained within cutblock overlap areas and features removed from THLB for other purposes such as riparian areas, inoperable areas and blue-listed plant communities. The application of this assumption varied by TSB , due to the varied levels of retention required for other purposes. In the Sayward and Kyuquot TSBs reductions of 1 and 2 percent were applied to the entire THLB, respectively. In the Loughborough TSB, no additional area was excluded from the THLB as it was assumed that the requirement for wildlife tree retention was met through other exclusions.

Following completion of the timber supply analysis, district staff indicated that data from recent surveys under the Forest and Range Evaluation Program (FREP) suggest that stand-level retention is significantly higher than the amount assumed in the base case.

The FREP data, collected from areas harvested since 2004, suggests that after accounting for other area exclusions, 7.8 percent of the THLB was being reserved exclusively to meet wildlife tree retention requirements. These data suggest that, an additional 6 percent of the THLB is being retained for stand level biodiversity than was assumed in the base case.

I have considered the assumptions applied to account for stand level retention and discussed the information with FLNR staff. I am advised that licensees have recently been working to

co-locate reserves where possible so that reserve areas can meet multiple objectives including those for stand level biodiversity. I encourage this practice, as co-location can be a sound management approach for multiple complementary resource values. Any changes in the requirements for wildlife tree retention that result form this work can be incorporated into subsequent timber supply reviews for the Strathcona TSA.

For this determination, I accept that the retention applied in the base case to account for stand level biodiversity underestimates the THLB currently being retained by up to 6 percent. Therefore, I will account for an overestimation of up to 6 percent in the base case across the entire forecast period. I will discuss the timber supply implications of this further in my "Reasons for Decision".

- *climate change*

Climate change predictions suggest that forest ecosystems will be impacted in a number of different ways as a result of increased temperatures, altered participation patterns, and increased frequency of as well as severity of disturbance. Although research is ongoing, it is difficult to determine the magnitude of the climate changes and the implications for forests. For the area of the Strathcona TSA overall, the expectations are that winters will have increased rainfall and milder temperatures, summers will be drier, and weather will have greater variability than historical patterns. Fires are expected to become more frequent and forest pests, such as Douglas-fir bark beetle, balsam woolly adelgid, and hemlock looper, are expected to increase as forest stands are weakened by stress from summer droughts.

District staff completed a project in 2009 to model possible climate change in the Strathcona TSA. The results suggest that the changes to the ecosystems will be more pronounced on the east coast of the TSA than on the west coast. Impacts include a reduction in the amount of area considered to be in the alpine and mountain hemlock biogeoclimatic zones, with a corresponding increase in the area of the coastal Douglas-fir zone, along the east coast of the island as far north as Quadra Island by the year 2050.

This information was then used to assess the potential sensitivity of the ecosystems and their corresponding tree species to these climate changes. It is believed that the longer growing seasons would benefit many tree species. However, the increase in summer drought conditions for these forest stands, which have been established during different climatic conditions, is expected to be difficult. Douglas-fir and rust-resistant western white pine are expected to continue to grow well under these warmer temperatures, even given the increased summer droughts. However, western hemlock, western redcedar and grand fir are expected to experience drought stress, particularly on the drier sites, which would lead to slower growth and increased mortality if the climate cycles include a series of hot and dry years.

In consideration of the information regarding climate change, I commend the work done by district staff to attempt to better understand the likely impacts to the forested ecosystems of the Strathcona TSA. Collecting this kind of information is useful to enable us to ensure forest management decisions will, to the extent possible, support healthy productive forests. I encourage district staff to continue this analysis and conduct further assessments, as time permits, including working with Tree Improvement Branch staff to assess implications for seedlot selection given the expected expansion of the Coastal Douglas-fir biogeoclimatic zone.

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:

The Great Bear Rainforest

A land use planning process was initiated by government in 1996 for the north and south Central Coast areas of British Columbia with the intent to provide an appropriate balance of social, economic, and environmental benefits for the province. A multi-stakeholder process involving First Nations, provincial and local governments, non-governmental organizations, and representatives from various sectors including forestry, tourism, and mining, resulted in the development of an ecosystem-based management (EBM) framework for this area. The land use objectives for this area as they applied to the Strathcona TSA were established under the South Central Coast Order (SCCO) dated August 2007.

The SCCO established objectives for important First Nations values, aquatic habitats, and biodiversity values. Parallel to the SCCO process, government also designated a number of conservancy areas as well as biodiversity, mining, and tourism areas in 2009.

In March 2009, all parties agreed to a five-year implementation plan for ecosystem-based management in the area which has become known as the Great Bear Rainforest (GBR). The commitment was for all parties to review the Land Use Objectives Orders by March 31, 2014, with the goal of "concurrently moving to high levels of ecological integrity and high levels of human wellbeing and if that is not possible, to make meaningful increments to both." The final implementation date has been extended due to the complexity of negotiations.

The GBR encompasses the entire area of the Loughborough TSB of the Strathcona TSA, an area of 34 063 hectares or approximately 20 percent of THLB of the TSA. All protected areas and objectives under the SCCO that are applicable to the Strathcona TSA were modelled in the base case. Legislation is currently being developed for the area that could result in the separation of the Loughborough TSB from the remainder of the Strathcona TSA.

District staff indicate that approximately 13 percent of the TSA's harvest over the past 10 years has been from the Loughborough TSB.

To assess the impact of managing the Loughborough TSB separately from the remainder of the TSA, a sensitivity analysis was prepared in which the harvest for the two areas of the TSA were projected separately and the independent harvest forecasts summed. For the Loughborough TSB area, the analysis showed a harvest level of 152 000 cubic metres per year could be maintained until decade 20, at which point it was projected to increase by 33 percent to 202 000 cubic metres per year for the remainder of the forecast. The harvest forecast for the remainder of the Strathcona TSA showed an initial harvest level of 1.039 million cubic metres could be maintained for two decades before declining in two steps of 10 percent to a mid-term level of 831 000 cubic metres per year. This level was maintained until decade 20, when the harvest level increased by 7 percent to 889 000 cubic metres per year for the remainder of the forecast.

Summing these two harvest forecasts together results in an initial harvest level of 1 191 000 cubic metres per year, 29 000 cubic metres per year or 2 percent lower than the initial harvest level in the base case. The summed initial harvest level can be maintained for

two decades before declining over the subsequent two decades in two 10-percent decadal decreases to a mid-term level of 972 000 cubic metres cubic metres per year. Although the summed forecast demonstrates a more rapid decline to a mid-term level, the summed mid-term level is about 5 percent higher than in the base case.

In consideration of the information regarding the GBR area and the base case, I am satisfied that the management regime as described under the SCCO was well reflected in the base case. However, in recognition of the existing differences in forest management between the two areas of the TSA (Loughborough TSB vs the Sayward and Kyoquot TSBs) and the results of the sensitivity analysis that suggest that the summed mid-term timber supply is 4 percent higher than in the base case, I am establishing a partition in the AAC attributable to the two separate areas. I will consider the appropriate levels for the partitioned AAC in the context of my other considerations in my "Reasons for Decision".

First Nations Consultation

The Supreme Court of Canada released its decision in June 2014 on the *Tsilhqot'in Nation v. British Columbia* case (Tsilhqot'in decision), providing further clarification on the nature of and tests for aboriginal title and establishing that the Tsilhqot'in Nation holds aboriginal title over an extensive area in the central interior of the province. I have considered the Tsilhqot'in decision and its relevance for this AAC determination. Consultation obligations with respect to asserted aboriginal rights and title (Aboriginal Interests), as outlined in the SCC Haida and Sparrow decisions, also apply in the Strathcona TSA.

Consultation was undertaken with the fifteen First Nations whose claimed traditional territories overlap with the Strathcona TSA. The Da'naxda'xw First Nation, Klahoose First Nation, Mamalilikulla-Qwe'Qwa'Sot'Em, Namgis First Nation, and the Sliammon First Nation claim traditional territory within the TSA. The Ehattesaht Tribe, Homalco First Nation (Xwemalhk wu), Ka:'yu:'k't'h/Che:k:tles7et'h' First Nation (Maa Nulth Treaty), K'omoks First Nation, Kwiakah First Nation, Mowachaht/Muchalaht First Nation, Nuchatlaht Tribe, Tlowitsis Tribe, We Wai Kai/ Cape Mudge First Nation and the Wei Wai Kum First Nation claim traditional territory and also have reserves within the TSA. Some of the above First Nations are signatories to the Nanwakolas Reconciliation Protocol.

Many of the First Nations who claim traditional territory in the Strathcona TSA are involved in forestry activities and have forest tenures in the Campbell River Forest District.

Consultation in general was initiated with all First Nations by Campbell River Natural Resource District staff in May 2012 with an introductory letter. The Nanwakolas Council referrals office responded and met with district staff to discuss the timber supply review process. The Nanwakolas referrals office advised that their member nation, the Mamalilikulla Qwe'Qwa'Sot'Em, would not be engaged in the consultation process as there was negligible overlap of their traditional territory with the Strathcona TSA. No responses were received to this general request for consultation from any other First Nations.

Consultation on the data package for the analysis was initiated by Campbell River Natural Resource District staff in October 2012 with a letter. The southern Maa nulth First Nations responded that they would defer response to the Ka:'yu:'k't'h/Che:k:tles7et'h', whose traditional

territory is within the TSA. The Sliammon First Nation responded that they deferred responsibility for response to Vancouver Island bands. The Da'naxda'xw, Tlowitsis, Wei Wai Kum, K'omoks and Kwiakah First Nations, all signatory members of the Nanwakolas RPA at the time, all responded with similar language that they are not satisfied that monumental cedar was being adequately addressed in the data package. They also referenced the Large Cultural Cedar Strategy (LCCS) under development in conjunction with industry and the Nanwakolas Council and mentioned the need for the strategy to be incorporated in all topics affecting the timber harvest of old growth cedar, including that it be better incorporated into all forestry administrative decisions and data packages. They requested that until the strategy can be achieved, all rare cultural cedar be preserved.

District staff advise me that the Nanwakolas Council have been working with forest licensees and BCTS to develop a known inventory of large cultural cedar. Through a number of collaborative strategies and initiatives, efforts are being undertaken to identify and track on the ground large cultural cedar for potential cultural heritage uses. First Nations have indicated that based on their estimates of large cultural heritage cedar requirements there is still an adequated supply available but they would like to see a more proactive approach to management of this important cultural resource.

I am encouraged by the collaborative work currently underway to ensure that First Nations have continued access to large cultural cedar and support the First Nations request for a proactive approach to managing this resource.

The Namgis First Nation expressed concern that reductions for cultural heritage resources were inadequate. They maintain that the assumptions for cultural heritage resources did not sufficiently recognize traditional land use and occupancy activities and that the projected harvest levels would conflict with their ability to access harvest sites for sustenance means, in particular in riparian areas, and requested ecosystem based management be implemented on Vancouver Island.

There was no response from the Ehattesaht, Homalco, Ka:'yu:'k't'h/Che:k:tles7et'h', Klahoose, Mowachaht/Muchalaht, Nuchatlaht or We Wai Kai (Cape Mudge) First Nations to the consultation letter for the data package.

Consultation on the public discussion paper was initiated by Campbell River Natural Resource District staff in March 2015.

The Maa nulth First Nations concluded the Maa nulth Treaty since the previous timber supply review for the Strathcona TSA, providing rights to harvest cultural cedar, fish, wildlife and migratory birds to each of the five Maa nulth First Nations within the collective area of their traditional territories. The Maa nulth First Nations in the Strathcona TSA are the Ka:'yu:'k't'h/Che:k:tles7et'h' First Nation. District staff did not consult with the Maa nulth First Nations, including the Ka:'yu:'k't'h/Che:k:tles7et'h', as neither the Maa nulth Treaty nor the Reasonable Opportunity Agreement, implemented since the data package, require engagement or consultation for the timber supply review process.

The Nawakolas Council referrals office responded March 12, 2015 that the K'omoks, Kwiakah, Tlowitsis, Da'naxda'xw, WeWai Kai and WeiWai Kum First Nations would be engaged in the consultation process. The Namgis and the Mamalilikulla Qwe'Qwa'Sot'Em

would not be engaged in consultation as there was limited overlap of their traditional territories with the TSA.

The WeiWai Kai responded that they had no comments to provide at this time. The K'omoks First Nation, which has reached an Agreement-in-Principle for a treaty and is negotiating towards a final approved treaty, did not provide comment. The Tlowitsis Nation is participating in treaty discussions and did not provide comment. There was no response to consultation from the Homalco First Nation who are currently engaged in an incremental Treaty Agreement in progress with the Homalco First Nation.

The Da'naxda'xw, Tlowitsis, K'omoks, Kwiakah First Nations and WeiWaiKum are all signatory members of the Nanwakolas Reconciliation Protocol (NRP), which outlines a shared decision making process for allowable annual cut and land use objective decisions, and provides for the opportunity to make recommendations regarding allowable annual cut decisions and conditions that may apply to allowable annual cut decisions related to their asserted traditional territories.

In their responses, the signatory First Nations to the NRP expressed with similar language that they maintain the jurisdiction and the right to make decisions concerning the use of all lands, waters and resources within the area and noted that the Nanwakolas Council is working with the province on the new land use objectives in the Great Bear Rainforest. They noted that no response could be given until the work on the unintended consequences of the new land use objectives is completed. Additionally, in October 2015, a representation of the Nanwakolas Council responded via email with recommendations to the Chief Forester regarding the allowable annual cut determination. These included a recommendation that an overall allowable annual cut of 1 191 000 cubic metres should be established, of which 152 000 cubic metres would be partitioned to the Loughborough TSB that is expected to be included in the Great Bear Rainforest, and that I outline how the determination is consistent with the Minister's April 12, 2013 letter.

The recommendations also included that the chief forester follow through on a previous commitment to not allow the 2015 GBR decision to negatively impact economic opportunities on Vancouver Island by recommending the Minister amalgamate the mainland and Vancouver Island portions of the Strathcona and Kingcome TSAs. Although this recommendation does not relate directly to the AAC determination for the Strathcona TSA, I do agree that if the GBR is established that the remaining, non-GBR portions of the Strathcona and Kingcome TSAs should be amalgamated and I recommend that the minister undertake this action. Establishment of a single, larger management unit would increase operational flexibility and help to optimize the timber flows from these areas.

With respect to the recommendation to outline how this determination is consistent with the Minister's April 2013 letter, I note that my consideration of this letter is discussed in the appropriate section of this document.

In consideration of the input provided by the Nanwakolas First Nations, I am aware of the recommendations provided and have considered them in this determination for the Strathcona TSA. I will discuss my considerations of all the information provided to me, including these recommendations and other First Nations input, further in my "Reasons for Decision".

The Ehattasaht First Nation provided a letter to the Deputy Minister of FLNR in September 2015 regarding the undercut decision for Tree Farm Licence 19. In this letter, reference was made to the timber supply review process underway for the Strathcona TSA and reiterated concerns regarding the level of cut in the TSA, requesting that the level of cut be reduced, in particular with reference to the Kyuquot Supply Block.

I am aware that in general during the consultation process, First Nations emphasized their view that the current AAC is the maximum rate of harvest for the TSA, and that the apportionment of volume, licensing and forest practices are unsustainable to maintain adequate wildlife habitat and other resources that support their aboriginal interests. Of particular concern to First Nations are elk and deer populations as well as habitat management, and riparian values including fish, streams and estuary management,

I have considered the input provided by First Nations during the consultation for the AAC determination for the Strathcona TSA and discussed the information in detail with FLNR staff. I have also discussed some of the input received during consultation in various sections in this document.

I acknowledge the progressive good work by government staff, First Nations and licensees on developing an LCCS. It was useful to see this work reflected in the base case so that I can ensure that First Nations needs will be met. With regard to the concerns about wildlife, I conclude that these values are being managed through the various "set asides" and forest management practices of stand retention.

I am satisfied from reviewing the information regarding the consultation process followed for the Strathcona TSA that the consultation obligations have been appropriately met for this determination.

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

Harvest performance

The base case harvest forecast sequenced harvest of stands from the three supply blocks using a harvest rule that selected available stands with maximum volumes, from the set of stands meeting the minimum harvest criteria and subject to the applied forest cover and other constraints to ensure provision for various forest values. This assumption was intended to reflect operational practices.

An objective in timber supply analysis is to reflect as accurately as possible the actual harvesting behaviour in the TSA. FLNR staff compared the assumed contribution from each component of the profile in the base case for the first decade of the harvest forecast with operational data from the most recent 10-year period to assess the extent to which the harvest sequencing assumed in the base case reflected operational practices on the ground. Timber cruise data was used to validate and confirm the accuracy of the actual harvest performance reported. Comparisons were made for species contributions and harvest method associated with operability classifications.

In terms of species contributions, it was possible to evaluate harvesting assumptions in the base case by component species in the stand. The assessment showed that in the first decade in the modelling, 48 percent of the volume assumed to be harvested was from hemlock and balsam trees, 34 percent from Douglas-fir trees and 16 percent from western redcedar trees. District staff indicate operationally the mature volume by component species across the timber harvesting land base is 53 percent hemlock and balsam, 24 percent Douglas-fir and 20 percent cedar. The review of actual harvest data from the harvest billing system by component species showed 47 percent of the harvest volume was from hemlock and balsam, 25 percent from Douglas-fir and 27 percent from western redcedar.

The economic operability classification of the timber harvesting land base in the base case shows 31 percent of the land base classified as cable, 52 percent as ground and 17 percent as helicopter. Actual performance by harvest method showed, on average, 30, 62 and 8 percent, respectively.

Staff indicate that operations have focused on the accessible, higher volume hemlock balsam stands with a higher proportion of western red cedar, and that the more remote stands on steeper slopes - primarily hemlock balsam stands - are underrepresented in the harvest when compared to the contribution of these stands to the timber harvesting land base.

Staff explored this concern about the contribution of lower volume hemlock and balsam stands further by conducting a sensitivity analysis in which hemlock balsam stands containing less than 20 percent cedar by volume were excluded from the timber harvesting land base. These stands comprise 35 percent of the current timber harvesting land base in the TSA. The sensitivity analysis results show an initial harvest level of 1 million cubic metres per year, or 18 percent lower than the initial level in the base case, can be achieved before declining after one decade to a significantly lower mid-term level. If the initial harvest level of 1 220 000 cubic metres per year shown in the base case is maintained, the timber supply would collapse during the second decade with the complete removal of these stands from the timber harvesting land base.

I have considered the information regarding harvest profile, including the assumptions in the base case and the detailed analysis conducted by FLNR staff. I am aware that currently, harvest from hemlock and balsam stands is largely focused on those stands that contain a significant proportion of western redcedar.

As discussed under ‘minimum harvest criteria’, the timber supply contribution as projected in the base case from lower volume hemlock balsam stands increases gradually from the start of the forecast period to 31 percent of the forecasted harvest by the fifth decade. Thus, timber supply in the Strathcona TSA is highly dependent on the assumed volume contribution from these stands, and licensees must move much closer to harvesting the profile over the term of this determination if the available timber supply projected in the base case is to be realized. I am aware that many of these stands are in portions of the operable land base classified as helicopter or cable systems.

The results of the analysis conducted by FLNR staff suggest that without significant ongoing focus on harvest of these lower value hemlock balsam stands, mid-term timber supply will be compromised, in fact leading to a future largely dependent on challenging operational conditions of less valuable species selection paired with higher cost harvesting. The results of

the sensitivity analysis in which all hemlock balsam leading stands that are comprised of less than 20 percent western redcedar were excluded from contributing to timber supply provides an assessment of the seriousness of continued avoidance of these lower value, higher harvesting cost stands.

In consideration of the information presented regarding the harvest performance in the Strathcona TSA. I expect that over the term of this determination, district staff monitor and report on harvesting performance in both hemlock and balsam stands as well as areas requiring helicopter systems.

I caution licensees that continued avoidance of harvest over the term of this determination in lower volume hemlock and balsam stands, particularly in helicopter and cable operability areas, will precipitate the need to rely heavily on hemlock-balsam stands in the future, potentially compromising the viability of harvesting operations.

Section 8 (8) (c) the nature, production capabilities and timber requirements of established and proposed timber processing facilities:

This section of the *Forest Act* has been repealed [2003-31-2 (B.C. Reg. 401/2003)]

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:

Mi nist er's letter and memorandum

The Minister of Forests and Range (now Forests, Range and Natural Resource Operations) has expressed the economic and social objectives of the Crown in several letters to the Chief Forester.

The first letter is dated July 4, 2006 (attached as Appendix 3). In this letter, 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 giving consideration to other non-timber forest values. As well, the Minister suggested that the Chief forester should consider the local social and economic objectives expressed by the public, and relevant information received from First Nations.

With respect to the 2006 letter, I note that in the base case and in the alternative harvest flow projections described above, a primary objective has been to attain a stable, long-term harvest level where the growing stock is also stable.

The minister, in another letter dated October 27, 2010 provided the Crown's objectives with respect to mid-term timber supply in areas affected by the mountain pine beetle. I note that the contents of the second letter do not apply to the Strathcona TSA, as the stands in the TSA has not been subject to mountain pine beetle damage.

In a third letter dated April 12, 2013 (attached as Appendix 4), the Minister expressed the government's social and economic objectives for signatory First Nations of the Nanwakolas Reconciliation Protocol (NRP), and asked the chief forester to consider these objectives, in

addition to others expressed in the earlier letters, when making determinations of allowable annual cut within the traditional territories of Nanwakolas First Nations. I am aware that the asserted traditional territories of the Nanwakolas First Nations overlap with the Strathcona TSA.

During my consideration of the factors required under Section 8 of the *Forest Act*, I have been aware of both the local objectives, as provided in the VILUP and associated plans and orders, as well as the objectives of First Nations including the Nanwakolas First Nations. I note that I have considered the socio-economic objectives expressed in the 2013 letter in this determination for the Strathcona TSA. I have also reviewed the public consultation process undertaken by the district and considered the input received in making my determination. On this basis, I am satisfied that this determination accords with the objectives of Government as expressed by the Minister.

Local objectives

The Minister's letter of July 4, 2006, suggests that the chief forester should consider important social and economic objectives expressed by the public during the timber supply review process, where these objectives are consistent with the government's broader objectives as well as any relevant information received from First Nations. In the applicable sections of this document I have provided my consideration of input from the public as well as First Nations.

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

No factors considered under this section require additional comment.

Reasons for Decision

In reaching my AAC determination for the Strathcona TSA, I have made the considerations documented above, all of which are integral to my reasons for my decision, and from which I have also reasoned further as follows.

First, I look to the base case harvest forecast as an indication of available timber supply for the TSA. The base case harvest forecast for the Strathcona TSA showed that an initial harvest level of 1 220 000 cubic metres per year could be maintained for two decades, before declining each subsequent decade in steps of five percent, 10 percent and 10 percent, respectively, to a mid-term level of 933 000 cubic metres per year. After three decades at this level, the harvest level increases by five percent to 981 000 cubic metres per year, and after an additional three decades, it increases again, by 10 percent, to 1 032 000 cubic metres per year. The base case long-term harvest level, achieved in decade 20, is 1 091 000 cubic metres per year.

In determining AACs, my considerations will typically identify factors which, considered separately, indicate reasons why the timber supply may be either greater or less than the harvest levels projected for various periods throughout the base case. Some of these factors can be quantified and their implications assessed with reliability. Others may influence the

assessment of the timber supply by introducing risk or uncertainty, but cannot be quantified reliably at the time of the determination and must be accounted for in more general terms.

As detailed in my considerations, I have identified the following factors as reasons why the timber supply as projected in the base case may have been overestimated to reasonably quantifiable degrees:

- Unstable & potentially unstable terrain - applying the appropriate exclusion percentages to areas harvested between 1991 and 1995 on unstable and potentially unstable terrain results in an overestimation of mid-term timber supply as projected in the base case of 0.4 percent;
- Area based tenures - due to the combined effect of the issuance of a First Nations Woodland Licence since the analysis was prepared and a coding error, timber supply projected in the base case has been overestimated by 8914 cubic metres per year or 0.7 percent across all time horizons;
- Stand level biodiversity – up to 6 percent of additional timber harvesting land base is being set aside operationally at the stand level for biodiversity than accounted for in the base case, resulting in a 6 overestimation of timber supply across all time horizons;

In addition, the following factors were identified as indicative of a potential overestimation in the timber supply to a degree that currently cannot be quantified with accuracy:

- Regeneration delay – a slight underestimation of regeneration delay for managed stands results in a small, unquantified overestimation of mid- to long-term timber supply;
- Cutblock adjacency, forest cover and green-up – operationally, adjacency and green up appear to restrict availability of harvest in the short term to a degree not adequately reflected in the base case;

I am aware of one factor that suggests timber supply as projected in the base case may have been underestimated:

- the potential of additional volume from fertilization activities not included in the base case that suggests a 16 000 cubic metre per year additional contribution to timber supply over the next 3 decades.

The above set of factors acting in combination suggest that the short timber supply projected in the base case has been overestimated by an amount between 5 and 6 percent, and mid-term timber supply is less than projected in the base case by approximately 7 percent.

There are also several factors which introduce uncertainty into the decision, such as the forest inventory, minimum harvestable ages and current harvest performance, and for these factors although I accept the assumptions applied in the base case as the best available information, it is my expectation that following this determination, staff will monitor performance and collect new information for use in the next timber supply review for the Strathcona TSA, as discussed under “Implementation”.

I am aware at the time of this determination that the Loughborough Supply Block may in the future be managed separately from the remainder of the Strathcona TSA. As a result, projecting the timber supply separately for these two areas provides relevant information about sustainable harvest levels in the event of separate management regimes. I look to the

sensitivity analysis in which the impact of managing these areas independently on timber supply as an important consideration in my decision. This sensitivity analysis shows for the Loughborough Supply Block area, a harvest level of 152 000 cubic metres per year could be maintained for 20 decades before increasing by 33 percent to a long term level of 202 000 cubic metres per year. For the remainder of the TSA, an initial harvest level of 1 039 000 cubic metres could be maintained for two decades before declining in two steps of 10 percent to a mid-term level of 831 000 cubic metres per year, and then increasing in decade 20 by 7 percent to 889 000 cubic metres per year.

This sensitivity analysis, which included the majority of the base case assumptions while flowing the timber supply separately, does not include consideration of the factors noted above as acting to either reduce or increase timber supply projected by the base case. Of the factors noted above, I am aware that three of them – cutblock adjacency, stand level biodiversity and area based tenures – do not impact the Loughborough portion of the TSA. The remaining two factors – unstable and potentially unstable terrain and regeneration delay - act on both harvest forecasts; however, the two factors are small, in the vicinity of 0.5 percent.

In consideration of all of the above information, I reason as follows. I include a partition in my determination for the Loughborough Supply Block, and I am satisfied that the factors acting to reduce timber supply as shown in the sensitivity analysis are sufficiently small as to not impact the projected initial harvest level of the partitioned area at 152 000 cubic metres per year. For the remainder of the Strathcona TSA, I look to the projection of 1 039 000 cubic metres per year in combination with the factors acting to reduce timber supply or increase timber supply, which for non-Loughborough portion of the TSA when considered together add to an approximately 5 percent reduction in timber supply as compared to the base case.

I consider it reasonable, therefore, to set a harvest level for the entire TSA of 1 138 000 cubic metres per year, of which 152 000 cubic metres per year is attributable to the Loughborough Timber Supply Block and 986 000 cubic metres per year is attributable to the Sayward and Kyuoqout Supply Blocks.

Determination

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 socio-economic objectives of the Crown, can be best achieved in the TSA by establishing an AAC of 1 138 000 cubic metres. Of this harvest level, 152 000 cubic metres per year is attributable to harvest from the Loughborough Timber Suppy Block, and 986 000 cubic metres is attributable to harvest from the Sayward and Kyuquot Supply Blocks.

This determination is effective December 17, 2015, and will remain in effect until a new AAC is determined, which must take place within ten years of the effective 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.

Implementation

In the period following this decision and leading to the subsequent determination, I expect Ministry of Forests, Lands and Natural Resource Operations (FLNR) staff, licensees and other major project proponents to undertake or support the tasks and studies noted below, the particular benefits of which are described in appropriate sections of this rationale document. I recognize that the ability of all parties to undertake or support these projects is dependent on provincial priorities and available resources, including funding. However, these projects are important to help reduce the risk and uncertainty associated with key factors that affect the timber supply in the Strathcona TSA.

- I expect staff to review the assumptions for the economic operability assessment and either confirm or adjust the assumptions prior to the next timber supply review for the Strathcona TSA;
- I expect staff to include the results of the Ehattsaht First Nation's LiDAR project and validate the forest inventory information over the term of this determination so that the next timber supply review for the Strathcona TSA can be based on a reliable assessment of the attributes of and corresponding yields for existing stands;
- I expect staff to work to ensure better information on the forest inventory is collected so that the next timber supply review can be based on a more robust assessment of the attributes of and corresponding yields for existing stands;
- I expect staff to monitor the operational constraints resulting from green up and adjacency concerns and the impact to the placement of harvesting operations;
- I expect district staff to monitor and report on harvest performance by species and volume, including helicopter harvest areas such that it will be possible to evaluate at the next timber supply review the appropriateness of including lower volume hemlock balsam stands in the timber harvesting land base; and
- I expect district staff to continue analysis on the implications of climate change and conduct further assessments, as time permits, including working with Tree Improvement Branch staff to assess implications for seedlot selection given the expected expansion of the Coastal Douglas-fir biogeoclimatic zone.

Diane Nicholls, RPF
Chief Forester December 17, 2015

Appendix 1: Section 8 of the *Forest Act*

Section 8 of the *Forest Act*, Revised Statutes of British Columbia 1996, c. 157, (current to February 18, 2015), 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 February 18, 2015) 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 sector

in 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

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Jim Snetsinger
Chief Forester
Ministry of Forests and Range
3nl Floor, I*S20* Blanshard Street
Victoria, British Columbia
V8W3C8

Dear Jim:

Re: Economic: and Soelal Objectives of tbe CI"OWII

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 rcqui,red 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, 1996letter expressing the Crown's economic and social objectives for visual resources. The govermnent's objective for visual quality is now stated in the Forest Practices and Planning Regulation of the *Forest and Rmlge Practica 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 dcterminations, 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. Govermnent'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 dcterminations arc the objectives of encouraging long-term economic sustainshility 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.

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and MInlatar R-nalbla
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Offace of the
Minister

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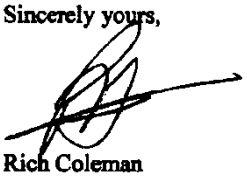
Jim Snetsinger

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,



Rich Coleman
Minister

Appendix 4: Minister's letter of April12, 2013

Ref: 196701

April 12, 2013

Dave Peterson
Chief forester and Assistant Deputy Miuister
Ministry of forests, Lands & Natural Resource Operatious
Tenures, Competitivene.ss and Innovation Division
PO Box 9352 Stn Prov Govt
Victoria, British Colwubia
VSW9MI

Dear Dave Peterson:

The *Forest Act* gives you the responsibility and authority to make allowable aruma! cut detennination.s.

Section S of *the Forest Act* requires you to consider the government's social and economic objectives, as expressed by *the* Minister, as well as *the* other items listed in section 8.

As provided for in Sectiou 1.1 of the Sbared Decisiou Making Process agreed to as part of Schedule B, Appeudix 2 (the Forestry Schedule) of the Nanwakolas Reconciliation Protocol, this letter provides government's social and economic objectives for signatocy First Nations. In addition to government's social and economic objectives provided in other letters, please consider these objectives when making detennination.s of Allowable Aruma) Cut \\ithin the traditional territories of Nanwakolas First Nations:

- To share in economic development initiatives within *the* Traditioru.l Tenitories of the Nanwakob.Fin:.t NMiontbat far:ilitah, ovP.r rimP.. thP indi\\idual mPmhPn:. of th.,. NJlllwaJ,;.olas Fitst Nations obtaining a quality of life that is equal to or better than the national Canadian average;

- To become full partnen with the Province (*i.e.* to the fullest or ma:timum e.'\ent possible) in the forest sector within the NJlllwakolas Traditional Tenitories including, but not limited to, opporttmities for shared decision-making, forest tenures and revenue sharing;

- To develop signEkant involvement with the forest industry operating within their Traditional Ten:ilories, through the development of measures that \ ill facilitate new relationships \\i th industry;

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- To significantly increase employment opportlmities in the forest industry. over time, for N! !nwall olas First Nations members. within their Traditional Ten:itories; and

- To consider the value of forest reso\u-ce development in *the* Traditional Territories of NAO\Vakolas First Nations when developing appropriate strategies for full NAOwakolas First Nations participation in the management and operation of the forest resource sector in the Traditional Territories.

Sincerely,

Steve Thomson
Minister