

**BRITISH COLUMBIA
MINISTRY OF FORESTS AND RANGE**

Arrowsmith Timber Supply Area

**Rationale for
Allowable Annual Cut (AAC)
Determination**

Effective July 22, 2009

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Chief Forester**

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Objective of this document

This document is intended to provide an accounting of the factors I have considered and the rationale I have employed as chief forester of British Columbia (BC) in making my determination, under Section 8 of the *Forest Act*, of the allowable annual cut (AAC) for the Arrowsmith 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 and Range (MFR) in the South Island Forest District, the Coast Forest Region, and the ministry's Forest Analysis and Inventory Branch. I am also grateful to the First Nations, individuals and companies who contributed to this process.

Description of the TSA

Administered by the MFR, Southern Vancouver Island Forest District (the district), the Arrowsmith TSA is located on the southern half of Vancouver Island, south of the Strathcona TSA (Campbell River) and bordering on Tree Farm Licences (TFLs) 25, 44, 46, 54, and 57. In contrast to other TSAs in British Columbia, this TSA is made up of many disconnected parcels of land ranging in size from a few hectares to a few thousand hectares. These parcels are interspersed with private land, including TFLs, with urban and sub-urban areas, rural agricultural lands, and with parks and reserves. Although the forest district covers 1 574 719 hectares, the actual timber supply area covers only 122 445 hectares of productive forest land managed by the British Columbia Forest Service.

In 1993, the provincial government's Clayoquot Sound Land Use Decision established management practices for a 265 000-hectare area on the west coast of Vancouver Island. Of this area, 7347 hectares contribute to the Arrowsmith TSA timber harvesting land base (THLB) – the area of productive forest available for timber production.

Spanning Vancouver Island from the west to east coast, the terrain of the TSA varies from lowland valleys, with nutrient rich, moist sites to mountainous areas, with poorer, drier sites. Most of the productive forest land lies within the Coastal Western Hemlock (CWH) biogeoclimatic zone, where cool, wet summers and mild winters support stands with a significant proportion of western hemlock. The Coastal Douglas-fir (CDF) zone occurs on the eastern side of the southern portion of the TSA, which is comparatively drier with gentler topography than the western portions of the TSA. Here warm, dry summers and cool, wet winters result in stands dominated by Douglas-fir. At higher elevations, the Mountain Hemlock (MH) zone occurs and at the highest elevations, isolated occurrences of Coastal Mountain-heather Alpine (CMA) zone.

The forests of the TSA are diverse, and slightly more than half of the forests on the land base contributing to timber supply are considered to have medium or good site productivity. Major tree species include: Douglas-fir, hemlock and true firs, while other

species such as western redcedar, cypress, spruce, red alder, and maple also occur. The forests of the TSA have a relatively long history of harvesting, and as a result there are rapidly maturing second-growth forests on the lower elevation sites, that are accessible and highly productive. Almost half of the stands on the THLB are between 21 and 100 years of age.

In 2007, the population of the South Island Forest District (SIFD) was 600,000 people, of which about 60 percent reside within the Capitol Regional District, including the City of Victoria. Other major population centres include Duncan, Ladysmith, Nanaimo, North Cowichan, Parksville, Qualicum Beach and Port Alberni; smaller communities include Tofino, Ucluelet, Lake Cowichan, Nanoose, Chemainus, Union Bay and Fanny Bay.

Thirty-six First Nations and three treaty organizations have asserted traditional territories within the SIFD that overlap the Arrowsmith TSA, including: the Ahousaht Band, Beecher Bay Band, Campbell River Band, Cape Mudge Band, Chemainus Band, Clayoquot Sound Central Region Board, Comox Band, Cowichan Tribes, Ditidaht Band, Esquimalt First Nation, Halalt First Nation, Hamatla Treaty Society, Hesquiaht First Nation, Homalco Band, Hul'qumi'num Treaty Group, Huu-ay-aht First Nation, Lake Cowichan First Nation, Lyackson First Nation, Malahat Band Nation, Mowachaht/Muchalat First Nations, Nanoose First Nation, Pacheedaht Band, Pauquachin First Nation, Penelakut Band, Qualicum First Nation, Sliammon Band, Snuneymuxw First Nation, Songhees First Nation, Te'mexw Treaty Association, Toquaht Band, Tla-o-qui-aht First Nation, Tsheshaht Band, T'Sou-ke First Nation, Tsartlip Band, Tsawout First Nation, Tseycum First Nation, Uchucklesaht First Nation and Ucluelet First Nation.

All but three First Nations are represented by the following four tribal councils and three treaty associations: the Alliance Tribal Council; the First Nation South Island Tribal Council; the Mid-Island Tribal Council; the Nuuchahnulth Tribal Council; the Hul'qumi'nun Treaty Group; the Te'mexw Treaty Association; and the Kwakiutl Laich-Kwil-Tach Nations Treaty Society.

History of the AAC

In 1986, the Arrowsmith TSA was formed from portions of the former Nootka and Quadra TSAs. At that time, the AAC was set at 392 890 cubic metres. An additional allocation of 3870 cubic metres was made in 1989 for deciduous species. In 1992, the AAC was increased to 498 250 cubic metres to account for a transfer of land from TFL 46 to the TSA.

In December 1996, the chief forester set the AAC at 400 000 cubic metres, a decrease of 17 percent from the previous level. This AAC was partitioned as follows: 380 000 cubic metres for areas outside of Clayoquot Sound, 13 700 cubic metres for areas inside Clayoquot Sound, and 6300 cubic metres for red alder-leading stands.

September 1, 2002 the AAC was set at 373 300 cubic metres and the partitions for Clayoquot Sound and deciduous tree species continued. Since 2002, the AAC for the Arrowsmith TSA increased to 393 496 cubic metres due an additional transfer of land from TFL 46. A Part 13 Order for the Hill 60 Designated Area issued, April 1, 2004,

reduced the AAC to 391 796 cubic metres. On April 22, 2004 transfer of land from TFL 44 resulted in an increase in the AAC to the current level of 418 796 cubic metres. The AAC of 418 796 cubic metres is apportioned by the Minister of Forests and Range as follows:

Apportionment	Cubic metres/year	Percentage
Forest licences – replaceable	151,895	36.27
Forest licences – non-replaceable	57,519	13.73
Non-replaceable Forest Licence	40,000	9.55
BCTS Timber Sale Licence	117,293	28.01
Community Forest Agreement	37,000	8.83
Forest Service Reserve	2,589	0.62
Woodlot licences	12,500	2.98
Total	418,796	100.00

New AAC determination

Effective July 23, 2009, the new AAC for the Arrowsmith TSA will be 420 000 cubic metres. This annual harvest level includes a partition of 6300 cubic metres for red alder-leading stands with at least 50 percent deciduous species by volume, and 13 700 cubic metres for the Clayoquot Sound area. This AAC excludes all volume issued to woodlot licences since the 2002 determination.

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

Information sources used in the AAC determination

Sources of data and information referenced for this AAC determination include references listed in the licensee's Timber Supply Information Package and Analysis Report and the following:

- *Forest and Range Practices Act, 2002* and amendments;
- *Forest and Range Practices Regulations, 2004* and amendments;
- *Forest Practices Code of British Columbia Act, 1995*, and amendments;
- *Forest Practices Code of British Columbia Act Regulations, 1995*, and amendments;
- *Forest Practices Code of British Columbia, Guidebooks, BCFS and MELP*;
- *Ministry of Forests and Range Act*, (consolidated to March 30, 2006);
- Letter from the Minister of Forests and Range to the Chief Forester stating the economic and social objectives of the Crown. July 4, 2006;
- Technical review and evaluation of current and expected operating conditions through comprehensive discussions with MFR staff, including the AAC determination meeting held in Port Alberni on June 11 and 12, 2008;

- First Nations Consultation Summary review, including input received from First Nations through the consultation process and comprehensive discussions with MFR staff, including the AAC determination meeting held in Port Alberni on June 11 and 12, 2008;
- Information received at a meeting in South Island District Office on June 10, 2008, with licensee representatives;
- Information received from the major licensees through the referral process;
- DFAM interim standards for data package preparation and timber supply analyses. BC Ministry of Forests. 2003 Timber Supply Branch;
- DFAM interim standards for public and First Nations review. BC Ministry of Forests. 2003. Timber Supply Branch;
- Landscape Unit Planning Guide, BCFS and MELP, March 1999;
- Letter from the Deputy Ministers of Forests and Environment, Lands and Parks, dated August 25, 1997, conveying government's objectives regarding the achievement of acceptable impacts on timber supply from biodiversity management;
- The Scientific Panel for Sustainable Forest practices in Clayoquot Sound. 1995. Report 5 – Sustainable Ecosystem Management in Clayoquot Sound. Planning and Practices. Victoria, BC 296 p.;
- Identified Wildlife Management Strategy, Volume 1, Ministry of Environment, Lands and Parks and Ministry of Forests, February 1999;
- Identified Wildlife Management Strategy, Procedures for Managing Identified Wildlife, Version 2004;
- Data Package Arrowsmith Timber Supply Area, Timber Supply Review 2007. Arrowsmith TSA Licensee Group, April 2007;
- Timberline Natural Resources Group. Site Index Adjustment of the Arrowsmith Timber Supply Area. 2007;
- Timber Supply Analysis Report: Arrowsmith Timber Supply Area, Timber Supply Review 2007. Arrowsmith TSA Licensee Group, February 2008;
- RESULTS data from January 2001 to March 4, 2008, Mei-Ching Tsoi;
- Summary of Harvesting, Planting, and Regeneration Trends for Western Redcedar in Coastal TFLs and TSAs, 1991-2005. FORCOMP Forestry Consulting Ltd. March 2008;
- Single-tree and Group Selection in Old-growth Forests on the West Coast of Vancouver Island and Queen Charlotte Island. Brian D'Anjou, MFR Coast Forest Region, April 25, 2003;
- Forest Research Technical Report 018, Roberts Creek Study Forest: Harvesting, wind throw and conifer regeneration within alternative silvicultural systems in Douglas-fir

dominated forests on the Sunshine Coast. Brian D'Anjou, MFR Coast Forest Region, March 2002; and

- Forest Health Losses in the Arrowsmith, Strathcona, Kingcome, Mid Coast, North Coast and Queen Charlotte TSAs: A review of Timber Supply Review loss estimates and recommendations for addressing knowledge gaps. JCH Forest Pest Management, March 2004.

Role and limitations of the technical information used

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

The computerized analytical models currently used to assess timber supply purposely simplify the real world and unavoidably involve uncertainty in many of the inputs, due in part to variations in physical, biological and social conditions. While ongoing, science-based improvements in the understanding of ecological dynamics will help reduce some of these uncertainties, technical information and analytical methods alone cannot incorporate all of the social, cultural and economic factors relevant to forest management decisions, nor do they necessarily provide complete answers or solutions to the forest management problems addressed in AAC determinations. However, they do provide valuable insight into potential outcomes of different resource-use assumptions and actions—important components of the information that must be considered in AAC determinations.

In determining the AAC for the Arrowsmith TSA I have considered and discussed known limitations of the technical information provided, and I am satisfied that the information provides a suitable basis for my determination.

Statutory framework

Section 8 of the *Forest Act* requires the chief forester to consider a number of specified factors in determining AACs for timber supply areas and tree farm licences. Section 8 is reproduced in full as Appendix 1 of this document.

Guiding principles for AAC determinations

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

Two important ways of dealing with uncertainty are:

- (i) minimizing risk, in respect of which in making AAC determinations I consider particular uncertainties associated with the information before me and attempt to assess and address the various potential current and future, social, economic and environmental risks associated with a range of possible AACs; and
- (ii) redetermining AACs frequently, in cases where projections of short-term timber supply are not stable, to ensure they incorporate current information and knowledge—a principle that has been recognized in the legislated requirement to redetermine these AACs every five years. This principle is central to many of the guiding principles that follow.

In considering the various factors that Section 8 of the *Forest Act* requires the chief forester to take into account in determining AACs, I attempt to reflect, as closely as possible, operability and forest management factors that are a reasonable extrapolation from current practices. It is not appropriate to base my decision on unsupported speculation with respect to factors that could work to increase the timber supply—such as optimistic assumptions about harvesting in unconventional areas, or using unconventional technology, that are not substantiated by demonstrated performance—or with respect to factors that could work to reduce the timber supply, such as integrated resource management objectives beyond those articulated in current planning guidelines or the *Forest and Range Practices Act*.

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

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

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

In the Arrowsmith TSA, management of the forest and range is guided in part by the Vancouver Island Land Use Plan (VILUP) and the Clayquot Sound Watershed Plans.

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

Some persons have suggested that, given the large uncertainties present with respect to much of the data in AAC determinations, any adjustments in AAC should wait until better data are available. I agree that some data are not complete, but this will always be true where information is constantly evolving and management issues are changing. Moreover, in the past, waiting for improved data created the extensive delays that resulted in the urgency to redetermine many outdated AACs between 1992 and 1996. In any case, the data and models available today are superior to those available in the past, and will undoubtedly provide for more reliable determinations.

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

With respect to First Nations' issues, I am aware of the Crown's legal obligation resulting from decisions in recent years made by the Supreme Court of Canada. I am aware of the Crown's legal obligation to consult with First Nations regarding aboriginal interests in a manner proportional to the strength of their aboriginal interests and the degree to which the decision may impact these interests. In this regard, I will consider the information provided to First Nations to explain the TSR process for the Arrowsmith TSA timber supply review, any information brought forward respecting First Nations' aboriginal interests, including how these interests may be impacted, and any operational plans and actions that describe forest practices to address First Nations' interests before I make my decision. As I am able, within the scope of my authority under Section 8 of the *Forest Act*, where appropriate I will seek to address those interests that will be impacted by my decision. When aboriginal interests are raised that are outside my jurisdiction, I will endeavour to forward these interests for consideration by appropriate decision makers.

The AAC that I determine should not be construed as limiting the Crown's obligations under the Court's decisions in any way, and in this respect it should be noted that my determination does not prescribe a particular plan of harvesting activity within the Arrowsmith TSA. It is also independent of any decisions by the Minister of Forests and Range with respect to subsequent allocation of wood supply.

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

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 (TSR) program for TSAs and Tree Farm Licences (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 simulation model, a series of timber supply forecasts can be produced, reflecting 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 forestlands. This is known as the ‘base case’ forecast, and forms the basis for comparison when assessing the effects of uncertainty on timber supply. The base case is designed to reflect current management practices.

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

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

Such adjustments are made on the basis of informed judgement using current, available information about forest management that may well have changed since the original information package was assembled. Forest management data is particularly subject to change during periods of legislative or regulatory change, or during the implementation of new policies, procedures, guidelines or plans. Thus it is important to remember that while the timber supply analysis with which I am provided is integral to the considerations leading to the AAC determination, the AAC is not determined by calculation but by a synthesis of judgement and analysis in which numerous risks and uncertainties must be weighed. Depending upon the outcome of these considerations, the resulting AAC may or may not coincide with the base case forecast. Moreover, because some of the risks and uncertainties considered are qualitative in nature, once an AAC has been determined, further computer analysis of the combined considerations may not confirm or add precision to the AAC.

Base case for the Arrowsmith TSA

The timber supply analysis was completed by the Timberline Natural Resource Group Ltd. (Timberline), using its proprietary forest estate model CASH 6 on behalf of the Arrowsmith TSA Licensee Group (licensees) under MFR direction.

Assumptions used in the base case harvest projection included; a non-declining harvest flow, stable long-term harvest level, and use of the 'relative oldest first' harvesting rule. Harvest levels were assumed to include unsalvaged losses of 2000 cubic metres per year and an annual harvest quota for the eastern side of Vancouver Island of 100 000 cubic metres per year for the first two decades of the forecast. According to the licensees, the annual harvest quota was based on a planned British Columbia Timber Sales (BCTS) harvest of 425 000 cubic metres over the next five years and an additional allowance for non-BCTS harvesting. MFR staff reviewing the timber supply analysis indicated that removing the annual harvest quota assumption had no significant effect on the base case.

In the 2007 base case projection, an initial harvest level of 465 000 cubic metres per year, which represents an increase of 11 percent from the current AAC, was maintained for eight decades before increasing to a long-term harvest level of 530 000 cubic metres per year for the remainder of the 250-year forecast.

The initial volume of stands growing on the THLB – of 24.5 million cubic metres – decreases to 18 million cubic metres after the first four decades in the harvest projection, as the oldest stands are harvested. After 25 decades, the total volume of growing stock increases to over 22 million cubic metres. Harvesting of managed stands begins in the third decade and by the fifth decade most of the harvested volume originates from managed stands. Some existing stands – both natural and managed – are not harvested until late in the forecast period, either because they are required to meet old forest retention targets or because they are required to meet visual quality objectives.

The average area harvested is stable, between 800 hectares and 1000 hectares per year, with an average of 869 hectares harvested per year over the entire forecast. With the exception of a decrease to 500 cubic metres per hectare when the youngest stands are harvested, the average volume of harvested stands over the entire planning horizon is stable at 592 cubic metres per hectare, in spite of the transition from old-growth to second-growth harvesting. The average age of harvested stands is high in the early portion of the planning horizon, but falls steadily to 72 years after the first seven decades in the simulation period as the existing stock of old timber available for harvesting is reduced.

I have reviewed in detail the assumptions and methodology incorporated in the base case, as well as: the total growing stock; the harvest contributions from managed and unmanaged stands; the average volumes per hectare; the total area harvested annually; and the average ages of the forest stands harvested. Based on my review, I am satisfied, subject to the qualifications accounted for in various sections of this document, that the information presented to me provides a suitable basis from which I can assess the timber supply for the Arrowsmith TSA.

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

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 the timber harvest

- general comments

The total area of the Arrowsmith TSA, as reported in the February 2008 timber supply analysis report, is 155 471 hectares. Of the total TSA area, 122 445 hectares (78.8 percent) are classified as productive Crown forest land.

As part of the process used to define the timber harvesting land base (THLB), i.e., the land base estimated to be economically and biologically available for timber harvesting, a series of deductions was made from the productive forest land base. These deductions account for economic or ecological factors that operate to 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 must be taken to avoid any potential double-counting associated with overlapping objectives. Hence, a specific deduction for a given factor reported in the analysis or the AAC rationale does not necessarily reflect the total area with that classification; some portion of it may have been deducted earlier under another classification.

For the Arrowsmith TSA, I acknowledge that the above approach was used in the timber supply analysis, resulting in a long-term THLB of 69 361 hectares, or approximately 45 percent of the total TSA area.

- economic and physical operability

In the *Arrowsmith TSA, Rationale for AAC Determination (2002)*, the chief forester recommended that the operability of stands in the TSA be reviewed prior to this determination. In response, the licensees conducted a new operability analysis in March 2006 that examined the effect of timber values and delivered wood costs on timber supply. Stands were deemed to be inoperable if the net value of a stand was less than a negative ten dollar profit margin. The model used delivered wood costs (2006), 10-year median log-selling prices and representative log-grade distributions. Operability modelling was updated in 2007 to incorporate the newly revised site index estimates, which improved the projected volumes of second-growth stands; and the stand values. The values for second-growth timber were also adjusted using industrial end-use sort information. Based on this information, the total economically-inoperable area in the Arrowsmith was 11 443 hectares.

Timberline prepared a sensitivity analysis to examine the effect of economic operability assumptions on the harvest levels projected in the base case. Increasing the profit margin

requirement to zero dollars resulted in an eight percent decrease in the short-term harvest level and a 12 percent decrease in the long-term harvest level. Decreasing the profit margin requirement to negative 20 dollars resulted in an eight percent increase in the short-term harvest level and a 4.7 percent increase in the long-term harvest level.

Greenmax Resources Ltd. and the Chemainus First Nation indicated in their review comments that portions of the TSA deemed to be operable in the timber supply analysis could not be harvested under current market conditions and questioned whether more conservative assumptions should be used to define the economic operability of stands.

In response, MFR staff indicated that the assessment considered what would be operable over an entire business cycle in order to account for stands that could be harvested at top-of-market conditions, but would not be operable at low-market conditions. MFR district staff reviewed the assumptions used in the economic operability analysis and operability mapping and concluded that they reflect current conditions in the TSA.

I have reviewed the results of the sensitivity analysis and note that changes in the profit margin assumptions used in the base case have an effect on the short- and long-term timber supply. However, forest product markets are always highly variable and subject to uncertainty and any projections based on market conditions must reflect this variability. Therefore, I concur with MFR district staff that it was appropriate to base the market condition assumptions used in the base case on information from the entire business cycle.

For this determination, I am satisfied that the operability assumptions used in the base case represent the best available information and therefore, are appropriate for use in this determination.

- environmentally sensitive areas

For the analysis, 19 412 hectares were excluded from the THLB to account for environmentally sensitive areas where: regenerating trees would be difficult; there is a high avalanche hazard and soils are sensitive to disturbance and for mapped landslides in the Clayoquot portion of the TSA.

District staff indicated that the estimates for environmentally sensitive areas and landslides were based on forest cover and landslide mapping and that these estimates represent current conditions in the TSA.

Based on my review of the information regarding environmentally sensitive areas and landslide areas, I conclude that the estimates used in the analysis reflect current conditions in the TSA and are; therefore, appropriate for use in this determination.

- low-productivity sites

Stands that are physically operable but have low growing potential were excluded from the THLB. These areas included 1217 hectares of stands growing on low productivity sites and 7083 hectares of stands with low stocking densities. Excluded stands included: stands older than 250 years with volumes of less than 300 cubic metres per hectare coniferous stands older than 150 years with less than 300 cubic metres per hectare and deciduous stands older than 70 years with less than 200 cubic metres per hectare.

In addition to these areas, an estimated 250 hectares of stands within the THLB are growing on sites with colluvial soils. These sites, which are difficult to regenerate once harvested, were grouped in a separate analysis unit and assigned to a yield curve that was adjusted to reflect the decrease in stand productivity.

Greenmax Resources Ltd. questioned whether a low productivity limit of 300 cubic metres per hectare at age 150 years accurately reflected current harvesting practices and indicated that a 400 to 450 cubic metres per hectare criterion would be more appropriate. District staff informed me that stands with volumes of 300 cubic metres per hectare are harvested in the TSA.

I have reviewed the criteria used to exclude low productivity and low merchantability stands, including those growing on colluvial soils, from the timber harvesting land base. Based on my discussions with district staff and my own experience reviewing similar information for other coastal units, I conclude that the assumptions used in the base case represent current conditions in the TSA and are, therefore, appropriate for use in my determination. Subsequent to this determination, I request that district staff continue to monitor the occurrence of stands growing on sites with colluvial soils and that the assumptions used in the next timber supply analysis be adjusted to reflect their findings.

- unmerchantable forest types

Unmerchantable forest types, are physically-operable, productive forest stands that exceed the criteria for low growing potential that are excluded from the THLB as they are not currently being utilized or are marginally-merchantable. For this analysis, 145 hectares of coniferous and deciduous stands, in which cottonwood is the leading species and stands in which maple is the leading species were excluded from contributing to timber supply.

District staff indicated that this assumption is consistent with current practices in the TSA and that no comments specific to this factor were received.

Based on my review of the information, I conclude that the information regarding unmerchantable forest types reflects current management in the TSA and is therefore appropriate for use in this determination.

- deciduous forest types

Deciduous tree species present in the Arrowsmith TSA include: maple, cottonwood and alder. Maple and cottonwood are currently considered unmerchantable forest types and were excluded from the THLB (see *unmerchantable forest types*) used in the base case.

In 2002, increased interest in the commercial harvesting of alder contributed to the chief forester's decision to establish a partition of 6300 cubic metres per year for deciduous forest stands. The standing inventory volume of alder in 2004, prior to the transfer of TFL lands to the TSA, was estimated to be 1.7 percent of the overall volume in the TSA. Alder harvesting continues to be current practice in the TSA; therefore, alder was included in the yield tables and harvest summaries used in this analysis.

Weyerhaeuser Hardwoods Ltd. and Industrial Products Ltd. indicated their preference for continuing the deciduous partition in the TSA in order to focus attention on hardwood resources and products. According to their estimates, the current volume of alder

attributable to stands within the THLB is about 490 000 cubic metres. Licensees noted that alder stands are harvested at younger ages and are more economically operable than was assumed in the analysis. Consequently, the contribution of alder to the timber supply projected in the base case has likely been underestimated.

Greenmax Resources Ltd. noted that alder is a commercial species and indicated that the associated harvest volume should be partitioned from the softwood harvest. BCFS staff explained that the current alder partition was established, in part, because it was newly classified as a commercial species and the chief forester wanted to track alder harvest performance. Furthermore, they indicated that the commercial viability of alder and the established practice of alder harvesting on the TSA resulted in its inclusion in the inventory and yield tables used in the base case. BCFS staff acknowledged that there may be some uncertainty with the economic operability assumptions and yield curves used in the analysis for alder. However, they noted that as the current deciduous partition of 6300 cubic metres per year only represents about 1.5 percent of the total standing inventory volume it is unlikely that these uncertainties would have any significant affect on the base case harvest levels.

The district manager informed me that the BCFS does not have any information regarding alder volumes on the TSA. However, he indicated that based on data provided by the licensees, the alder volume attributable to the two oldest age classes for this species is about 21 000 cubic metres.

Ministry of Environment (MOE) staff noted that some of the deciduous volume may be attributable to alder growing in riparian areas. MFR analysis staff indicated that the alder volumes were based on the THLB, from which riparian areas have been already been excluded.

In addition to the information regarding the alder assumptions used in the base case, I note that alder is a commercially-viable tree species and has the potential to contribute significantly to the local economy. Furthermore, utilization of deciduous tree species, including alder, is consistent with the objectives of the Coast Revitalization Strategy and the MFR Regional Management Team's Hardwood Strategy.

Based on my discussions with district and licensee staff, I conclude that there is sufficient alder available in the Arrowsmith TSA to support continued harvesting of alder stands. Preliminary information suggests that the alder harvest level could be increased above the current level. However, given the uncertainty of this information, I am unwilling to increase the harvest level at this time. I am also mindful of the importance of encouraging the management of alder as a commercial tree species in its own right, rather than as a by-product of conifer harvesting. Therefore, for this determination, I am continuing the current partition of 6300 cubic metres per year for alder. Prior to the next determination, I encourage district and licensee staff to continue to collect data regarding the inventory, growth and yield and utilization of alder in the Arrowsmith TSA.

- existing and future roads

In the timber supply analysis, 3895 hectares and 1033 hectares, of productive forest area associated with existing and future roads, respectively, were excluded from the THLB.

These areas were derived by applying a 10-metre wide buffer to all existing and future roads identified as line features in the consolidated road coverage compiled for this analysis.

District staff reviewed the estimates for existing and future roads, and are satisfied that they represent current conditions.

I have reviewed the information and procedures used in estimating the requirements for existing and future roads, and I find that in each case the best available information was used and accepted methodologies were followed. Therefore, I consider that the base case harvest projection accounts for the areas excluded from the timber harvesting land base.

- issued woodlot licences and reversion of TFL lands

The *Forest Act* requires AACs determined for TSAs to be exclusive of the areas and timber volumes allocated to woodlot licences. When woodlot licences are issued from a TSA, the required volumes are first allocated from an appropriate apportionment under the AAC for the TSA, then in the next AAC determination for the TSA, the TSA land base is reduced by the area of Crown land in all the woodlot licences issued since the previous determination, and the total volume in the issued woodlot licences is excluded from contributing to the AAC for the TSA.

Subsequent to the 2002 AAC determination, the Minister allocated 12 500 cubic metres per year for the issuance of new woodlots and the expansion of existing woodlots. Currently there are 25 woodlot licences in the Arrowsmith TSA, with a total area of 7000 hectares of Crown land and an associated AAC of 40 000 cubic metres.

Transfer in ownership of TFLs 46 and 44 resulted in the reversion of 4548 hectares and 9588 hectares, respectively to the Arrowsmith TSA. This resulted in AAC increases of 20 196 cubic metres and 27 000 cubic metres associated with the areas returned to the TSA from TFL 46 and TFL 44, respectively.

Based on the volume associated with the reverted TFL area, British Columbia Timber Sales (BCTS) offered woodlot licences with a combined harvest level of 16 000 cubic metres per year to First Nations under Interim Agreements on Forest and Range Opportunities (FRO). District staff indicated that three of the woodlots offered have not yet been issued; however, these areas were excluded from the base case given the specific area commitments made by government in the FROs.

One submission received from the public noted that areas on the east coast of Vancouver Island should be managed through the woodlot licence program and that this should be reflected in the apportionment of the AAC. In response, I note that identification of areas suitable for the issuance of woodlot licences is made at the operational level by MFR district and BCTS staff. Actual apportionment of the AAC to the woodlot program is outside of my authority under Section 8 of the *Forest Act* and is the responsibility of the Minister for Forests and Range.

Having considered the woodlot licence information, I am satisfied that the volume associated with licences issued since the previous AAC determination have been appropriately accounted for in the timber supply analysis.

- *designated areas*

Part 13, Section 169 of the *Forest Act* enables the Lieutenant Governor in Council (Cabinet) to restrict land use and forest development, including timber harvesting, on designated areas of Crown land. Once an area within a forest management unit has been designated, and the Minister of Forests and Range (the Minister) suspends forestry, the chief forester, under Part 13, Section 173 of the *Forest Act*, may reduce the AAC in order to maintain harvesting at a level appropriate to the size of the THLB.

On April 12, 2001, Cabinet issued a Section 169 order establishing an area west of Duncan within the Arrowsmith TSA as the 'Hill 60 Designated Area'. The Minister then suspended forestry and the chief forester issued an order reducing the AAC by 1700 cubic metres – the amount attributable to the Hill 60 Designated Area. These orders were in effect at the time of the analysis; however, the THLB assumed in the base case included the designated area. Cabinet designation of Hill 60 and the chief forester's AAC reduction expired June 30, 2009.

Given that designation of the Hill 60 area has expired, I accept the assumptions used in the base case. In the event that Cabinet re-designates the Hill 60 area, I am prepared to review this information and consider issuance of an order under Section 173 of the *Forest Act* to adjust the AAC.

On March 30, 2007, Cabinet issued a Section 169 order, which expires March 31, 2010, to protect the Maa-nulth Treaty lands pending finalization of the Maa-nulth Treaty. The Minister has suspended forestry within the designated area. The Maa-nulth Treaty received Royal Assent from Canada on June 12, 2009 and signature of the treaty is anticipated in 2010. District staff indicate that there is no harvesting occurring within the designated area and that no plans for future harvesting have been approved.

Of the 22 342 hectares of provincial Crown land included in the Maa-nulth Designated Area, 4703 hectares overlap with the Arrowsmith TSA. Of this area, 3260 hectares were included in the THLB and MFR staff indicate that these areas contribute about 21 390 cubic metres per year to the harvest levels projected in the base case.

For this determination, I note that the Cabinet order establishing the Maa-nulth Designated Area and the subsequent suspension of forestry by the Minister are in effect until March 31, 2010. Inclusion of this designated area in the derivation of the base case THLB in the absence of harvesting within the area may result in a concentration of harvest activity in the rest of the TSA. Therefore, following this determination I will review the information regarding the Maa-nulth Designated Area and consider whether a Section 173 order to reduce the AAC is necessary to ensure the sustainability of timber and non-timber resources in areas of the TSA outside of the designated area.

- *community forest agreements/head leases*

There are currently two Community Forest Probationary Agreements (CFPA) in the Arrowsmith TSA. The Bamfield/Huu-ay-aht CFPA, which covers an area of 439 hectares and has an AAC of 1000 cubic metres expires in 2011. The Cowichan Tribes CFPA, which covers 1673 hectares and has an AAC of 10 000 cubic metres expires in 2009. Both of these CFPAs are expected to be renewed prior to expiry. The

AACs for CFAs are determined separately from the TSA and; therefore, the associated areas were excluded from the THLB assumed in the base case.

Head Leases, which allow the leaseholder to tenure other parties, have been issued to the Toquaht FN for Diana Island and the Stopper Islands by the Integrated Land Management Bureau (ILMB). Of the 265 hectares associated with these head leases, 200 hectares are included in the Barkley Community Forest Agreement (CFA). At the time of the timber supply analysis, the Barkley CFA, which is held by Toquaht FN in partnership with the District of Ucluelet, had not been finalized. However, district staff indicated that the CFA has now been issued and the 5758 hectares of productive forest land associated with the area should be excluded from the THLB, as the AACs for CFAs are determined in a separate process.

I have reviewed the information regarding Community Forest Agreements and Head Leases and conclude that the areas associated with the Bamfield/Huu-ay-aht and Cowichan Tribes Probationary Community Forest Agreements were appropriately excluded from the base case timber harvesting land base. However, I agree with district staff that the 5758 hectares of productive forest associated with the Barkley Community Forest should no longer be included in the timber harvesting land base. Therefore, for this determination I conclude that the timber harvesting land base has been overestimated by 5758 hectares or 8.2 percent and I will account for this as discussed in *Reasons for decision*.

- Crown forest fragmentation

Development of south-eastern Vancouver Island has resulted in fragmentation of the provincial forest and an increased interface with rural/urban areas. In general, a large proportion of land in the Coastal Douglas-fir (CDFmm) and Coastal Western Hemlock (CWHxm) biogeoclimatic zones is under intense pressure, both from an ecological perspective and to provide a wide range of non-timber values. District staff indicated that this is most evident on the 600 hectares of provincial forest on Saltspring and Gabriola Islands, where timber harvesting has not occurred for at least 15 years.

In the previous timber supply analysis, efforts were made to model the approximately 5000 hectares of fragmented forest on south-eastern Vancouver Island, either by exclusion of areas from the THLB or by use of forest cover constraints. This resulted in a decrease of six percent in the long-term harvest levels projected in the base case for the previous TSR.

In the timber supply analysis for this determination, no specific assumptions were developed to account for forest fragmentation. However, a sensitivity analysis in which the approximately 17 500 hectares classified as CDFmm and CWHxm were excluded from the THLB, the short-term harvest level declined by 24.7 percent to 350 000 cubic metres per year and the long-term harvest level declined by 19.8 percent to 425 000 cubic metres per year.

Greenmax Resources Ltd. commented that fragmented forests could be managed through the woodlot licence program. District staff responded that efforts have been made to include some of these areas in the program.

According to district staff, First Nations are concerned that forest operations on the east coast of Vancouver Island may further limit the availability of Crown land for potential treaty land selection.

Based on my review of the information on Crown forest land fragmentation, I note that as the population in south-eastern Vancouver Island continues to increase, so will the pressure to manage these lands for non-timber values that may be incompatible or be perceived to be incompatible with timber harvesting. With respect to the 600 hectares of Crown forest on the Gulf Islands, I note that there has been no harvesting on these lands for the last 15 to 20 years. Including these lands in the timber harvesting land base increases the harvesting pressure on other areas in the Arrowsmith TSA; therefore, until such time as harvesting resumes in these areas or there is a land use decision made by government and I can consider a Part 13 Order, I will assume that these areas do not contribute to timber supply. Therefore, for this determination I conclude that the timber harvesting land base has been overestimated by 600 hectares which has resulted in a 0.85 percent overestimation in the base case harvest levels and I will account for this in my determination as discussed under *Reasons for decision*.

Existing forest inventory

The Arrowsmith TSA was re-inventoried in 1988 – 1989. More recently (1992), the Toquart River watershed was re-inventoried. The inventory information used in the timber supply analysis was updated for disturbance and forest cover attributes were projected to 2005. As part of the Vegetation Resources Inventory (VRI) program, the forest cover inventory for the TSA has been transferred into the VRI data structure to facilitate data management.

Based on my review of the forest cover information and discussions with MFR staff, I conclude that the forest cover inventory used in the timber supply analysis represents the best available data and is therefore suitable for use in this determination.

- volume estimates for existing stands

Volumes for existing natural coniferous stands older than 55 years and all alder-leading stands were estimated using the Variable Density Yield Prediction (VDYP) model. In 1999, the Arrowsmith TSA Inventory Audit was completed and the results showed that the mature volume component of the forest inventory is statistically acceptable. MFR Research Branch reviewed and accepted the existing stand yield information used in this analysis.

I have considered the information regarding the volume estimates for existing stands as applied in the analysis. I am satisfied that the analysis assumptions were appropriate for this determination.

Expected rate of growth

- site productivity estimates

In the previous timber supply review, no data was available from which to assess whether the site indexes (SI) – a measure of site productivity – of managed stands required adjustment. For this analysis, the height and age information from the forest cover inventory were used to calculate SI values for all existing stands. However, for managed stands, the inventory-based SI values for Douglas-fir and hemlock-dominated stands were adjusted, as described in the report prepared by Timberline Natural Resources Group entitled *Site Index Adjustment of the Arrowsmith Timber Supply Area* (2007). For Douglas-fir stands, inventory SIs were increased by 3.7 metres, which resulted in an increase of 28 percent in the mean annual increment. For hemlock stands, inventory SIs were increased by 8.6 metres, which resulted in a 90 percent increase in mean annual increment. The SIs for second-growth cedar stands were adjusted based on the results of paired cedar and hemlock site trees.

The Forestry Manager for the Chemainus First Nation disagreed with the use of adjusted SIs for all managed stands based on results from a limited number of stands and; therefore, requested that the unadjusted forest cover inventory SIs be used for both existing and managed stands.

Two public responses were also received that also expressed concern regarding the validity of using adjusted SIs for all managed stands.

MFR district staff indicated that not adjusting the SIs of managed stands would likely result in a decrease in the mid- to long-term harvest levels projected in the analysis. Based on the expert review of the SI adjustment study, district staff concluded that it was appropriate to incorporate the adjustments in the timber supply analysis.

In order to assess the effect of adjusting SIs, timber supply was also projected using the unadjusted, inventory SI for both existing and managed stands. The results of this analysis indicated that the current AAC of about 420 000 cubic metres could be sustained for five decades before declining in three 10-year steps to a long-term harvest level of 323 000 cubic metres per year, which is 39 percent lower than the long-term harvest level in the base case. However, analysis also indicated that in the absence of SI adjustment the initial harvest level of 465 000 cubic metres per year projected in the base case could not be attained.

I have considered the input received from the Chemainus First Nation Forest Manager, the public and district staff and note that the results of second-growth site index research and sampling conducted throughout British Columbia, as well as my personal observations of the growth performance of second- and third-growth stands, are consistent with the assumptions used in the timber supply analysis for this TSA. In addition, the methodology and results for the site index adjustment study conducted in the Arrowsmith TSA were reviewed and accepted by provincial experts. Sensitivity analysis results indicating that the current AAC could be maintained for five decades leads me to conclude that the short-term timber supply is sufficiently robust to offset any potential risk associated with the use of adjusted site indexes for this analysis. Therefore, for this determination, I conclude that the site index assumptions used in the

base case represent the best available information and are suitable for use in this determination.

- operational adjustment factors (OAFs)

The OAF values used in the base case analysis are unchanged from those used in the previous timber supply analysis. The standard OAF 1 value of 15 percent – accounting for less than ideal tree distribution, small non-productive areas, endemic pests and disease, and random risk factors such as wind throw – was applied to all stands. The standard OAF 2 value of five percent – accounting for decay, waste and breakage – was used for existing and future managed stands, in which Douglas-fir was not the dominant species. OAF 2 values of 12.5 percent and 10 percent were applied to Douglas-fir stands less than 50 years of age and for future Douglas-fir stands, respectively. These adjusted OAF 2 values were calculated by the regional pathologist based on information from a report entitled, *Laminated Root Rot: Ecological Relationships and Stand Productivity Impacts in Coastal Douglas-fir Ecosystems of British Columbia* (Beale, 1992).

In 2007, district staff conducted a forest health overview flight of the Arrowsmith TSA and noted there were no significant forest health concerns. District staff have reviewed the OAF values used in the analysis and indicated that no additional forest health monitoring results have been reported and that the regional forest health expert has confirmed that the OAF values used in the base case analysis are still valid.

BCTS staff indicated that as harvesting shifts to less productive, higher-elevation stands, OAF 1 values for these stands may need to be adjusted. However, district staff indicated that at present, there is insufficient information regarding these stands to support adjustment of the OAF 1 values used in the analysis.

In conclusion, the OAF 2 values assumed in this analysis for stands dominated by Douglas-fir are higher than the provincial default values; however, they are based upon an expert review of the productivity of Douglas-fir stands subject to root disease. Any new information regarding stand openings in less productive, higher-elevation stands, can be reviewed prior to the next timber supply analysis and if warranted the OAF 1 values can be adjusted. For this determination, I accept that the OAFs on which the timber supply analysis was based represent the best available information and are appropriate for use in this determination.

- volume estimates for managed stands

The Arrowsmith TSA has a long history of stand management, planting and juvenile spacing. Planting was first used to re-establish harvested stands in 1914 and has been common practice since 1941.

For the timber supply analysis, the Table Interpolation Program for Stand Yields (TIPSY) model was used to estimate the growth and yield of managed stands – stands 55 years of age or younger – and future regenerated stands. Volume estimates for future regenerated stands were based on adjusted SIs and incorporated the projected volume gains expected from the use of improved seed for reforestation. Based on information from the MFR Tree Improvement Branch, TIPSY managed stand yields incorporated volume gains of 2.7 percent for Douglas-fir, 1.9 percent for hemlock, and

1.3 percent for cedar were in the base case. Operational adjustment factors (OAFs) were applied to adjust the projected yields to reflect operational conditions (see *operational adjustment factors*).

The Forestry Manager for the Chemainus First Nation disagreed with the use of the TIPSYS model to estimate the yields of all stands younger than 55 years of age and indicated that genetic gains were not specified in the analysis data package. The Forestry Manager noted that the TIPSYS model is only valid for stands that have or will have some form of density management and that the majority of harvested stands on the west coast of the TSA had not been subject to density management. She requested that either the yield of the stands on the west coast be validated or that the age criteria for managed stands be reduced to less than 30 to 35 years of age.

MFR district staff agreed that some naturally regenerated stands in the TSA had not been subject to density management and that this resulted in some uncertainty in the yield estimates for managed stands. However, they indicated that the age criterion of 55 years or less was based on the long planting and stand management history in the district. They also noted that the expected genetic gains were included in the data package.

Weyerhaeuser Hardwoods Ltd. noted that the stand yields for future regenerating alder-dominated stands used in the analysis were conservative when compared to information from the Pacific Northwest Hardwood Cooperative and alder yield curves developed using the TASS model.

MFR district staff agreed with Weyerhaeuser Hardwoods Ltd., indicating that the yield estimates used in the analysis were based on the forest cover inventory and that these estimates may not be a good indicator of the potential yield of these sites. However, they also noted that alder-leading stands only occupy 2.7 percent of the THLB and that further inventory work is required in order to validate the TASS model volume estimates for these stands.

Input received from one stakeholder questioned the validity of the growth and yield models VDYP and TIPSYS in view of climate change, which in their opinion will increase regeneration delays and slow growth. Specifically they wanted to know if the yield tables used in the analysis had been revised to account for changes in climate.

In response, MFR staff indicated that the current growth and yield models are not equipped to incorporate climate change and no revisions were made to the yield tables to account for changing climate.

Sensitivity analysis was used to examine the effect of varying the managed stand yields used in the base case. Increasing the regenerating stand yields by 10 percent resulted in a long-term harvest level of 590 000 cubic metres per year, or about 11 percent above the base case level; whereas, decreasing the regenerating stand yields by 10 percent resulted in a long-term harvest level of 470 000 cubic metres per year or about 13 percent lower than the base case level.

In reaching my conclusion regarding managed stand yields, I have reasoned as follows. I accept that the growth of regenerating alder-leading stands has likely been underestimated for 2.7 percent of the timber harvesting land base resulting in a small,

unquantified underestimation of the base case mid- to long-term harvest level. I also accept that not all of the existing managed stands in the TSA were regenerated using select seed, nor were all of these stands subject to density management and conclude that this has resulted in an unquantified overestimation in the mid- to long-term timber supply. However, the overestimation in managed stand yields has also been somewhat offset by the use of increased OAF 2 values of 10 to 12.5 percent in Douglas-fir dominated stands 50 years of age or less.

The extent to which the opposing impacts, associated with the uncertain information used to estimate managed stand yields counteract one another is unclear. Furthermore, the results of the sensitivity analysis indicate that variation in managed stand yields has no effect on the short- to mid-term harvest levels projected in the base case. Therefore, for this determination, I will make no adjustment to the base case harvest forecast on account of the uncertainties associated with managed stand yields. However, prior to the next determination I request that MFR staff and licensees review the assumptions for regenerating alder-leading stands and clarify the extent that the density of regenerating stands on the TSA has been managed. At present, the early results of climate change projections for coastal areas in British Columbia do not indicate any significant stand productivity changes. However, over the course of the next five years, the MFR will continue to refine climate change projections and how this information can be incorporated into decision making.

- minimum harvestable age (MHA)

For this analysis, an analysis unit was considered to be available for harvest when it had attained a minimum volume of 300 cubic metres per hectare; a quadratic mean diameter of 25 centimetres; and was within 90 percent of maximum mean annual increment. It was assumed that when these criteria were met, the stands in the analysis unit were merchantable under contemporary market conditions.

Based on these assumptions, the MHA of existing stands ranged between 50 years to 230 years. For future, managed stands the MHA ranged between 50 years and 90 years. Differences between the MHAs of existing and managed stands were greatest for cedar-dominated stands growing on poor sites, where the managed stand MHA decreased to 70 years from the existing stand MHA of 230 years.

Due to the lack of harvest history information for younger stands, it was difficult to compare actual performance with the calculated MHAs. In addition, there was a great deal of variability in the MHA of stands within individual analysis units. Therefore, sensitivity analyses were conducted in which the MHA was varied by 10 percent.

Increasing the MHA resulted in a short-term harvest level of 435 000 cubic metres per year or 6.5 percent lower than the base case level. The long-term harvest level increased slightly to 540 000 cubic metres per year or about two percent higher than the base case level.

Decreasing the MHA resulted in a short-term harvest level of 470 000 cubic metres per year or about one percent higher than the base case level and the long-term harvest level was unchanged.

One stakeholder noted that the average MHA in the previous timber supply review was 96 years; whereas, in the current timber supply analysis the average MHA had decreased to 72 years. He also indicated that a partition for old-growth stands might be prudent in order to ‘stretch out the remaining old growth’, particularly in light of the accelerated harvest on private lands; and to compensate for the loss of old-growth management areas previously located on these private lands. He concluded that extending the harvest of the existing old-growth stands beyond the next 50 years would require the assumption of lower SIs and would result a downward pressure on harvest levels, which he indicated might be ‘desirable for First Nations and the greater public’.

MFR district staff indicated that the MHAs in the analysis reasonably reflect the current situation in the TSA. In response, to stakeholder input they noted that it was the adjusted SI values that contributed to the decrease in MHAs between the previous and current timber supply reviews.

Based on my review of the minimum harvestable age information used in the base case, I conclude that it appropriately reflects current practice and is; therefore, suitable for use in this determination.

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

Regeneration delay

I have reviewed the information regarding the regeneration of harvested stands and note that the average planted regeneration delay is two years. The extent to which stands regenerate without planting is unknown; however, a review of RESULTS data indicated that about five percent of the THLB was planted per year to fill in areas in naturally regenerated stands in the TSA.

Based on my review of the information, I conclude that the information regarding regeneration delay reflects current management in the TSA and; therefore, is appropriate for use in this determination.

Impediments to prompt regeneration

District staff indicated that there continue to be mortality losses in young stands due to root diseases. As well, animal damage from black-tailed deer and elk results in significant staff effort to protect seedlings from browse. Dwarf mistletoe on hemlock is a concern in the Coastal Western Hemlock zone and reforestation regimes for these sites include sanitation treatments of infected trees and planting resistant species. However, staff are satisfied that losses from these sources were accounted for in the operational adjustment factors applied in the base case to regenerated stand yields (see *operational adjustment factors*).

BCTS staff indicated that application of a minimum inter-tree distance around logging slash piles and areas of coarse woody debris has resulted in prompt regeneration of these areas. District staff indicated that post-harvest waste is not impeding regeneration at this time.

In addition to information regarding stands growing on colluvium sites, as discussed in *low productivity sites*, district staff have expressed concern regarding the difficulty regenerating these sites after harvesting.

I have reviewed the information about impediments to regeneration for stands in the Arrowsmith TSA. As noted above under *operational adjustment factors*, the operational adjustment factor (OAF 2) that was applied to regenerating Douglas-fir stands is higher (up to 7.5 percent) than the typical provincial estimate of five percent. I request that for future timber supply analyses, district staff continue to assess and monitor the losses from root disease, but in this regard I will not adjust the base case harvest forecast prepared for this determination. With regard to the difficulty of regenerating stands on colluvium sites, I have already considered these areas and issued instructions to improve the estimates used for the next timber supply review under *low productivity sites*.

Not-satisfactorily-restocked (NSR) areas

I have reviewed the information regarding current and backlog not-satisfactorily-restocked – areas that have been denuded either through harvesting or natural causes and a stand of suitable forest species and stocking has yet to be established. Based on this review, I conclude that the information regarding NSR reflects current management in the Arrowsmith TSA and is; therefore, appropriate for use in this determination.

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

Silvicultural systems

In the base case, clearcut was assumed to be the predominant harvesting system. Stand yields were reduced by a total of 9.6 percent; eight percent to account for wildlife tree retention and 1.6 percent for variable retention.

Based on a review of RESULTS data from 2002 to 2007, district staff indicated that 57 percent of the harvesting in the Arrowsmith TSA included variable retention, 31 percent was clearcut with reserves, and six percent was clearcut. Of the gross forest cover reported in RESULTS, 13 percent was retained as dispersed reserves and 11 percent was retained as aggregated reserves. After accounting for eight percent wildlife tree retention, the gross forest cover retention was 16 percent or 14.4 percent higher than assumed in the base case.

These findings are consistent with those reported in, *Summary of Harvesting, Planting and Regeneration Trends for Western Redcedar in Coastal TFLs and TSAs 1991-2005* (FORCOMP, March 2008), that indicated the total harvested area affected by some level of reserved mature timber has increased from 28 hectares in 2000 to 1800 hectares in 2005. The net area of reserved mature timber within harvested openings increased from 22 hectares to 760 hectares during the same period.

In order to compare historic performance to currently planned harvesting, district staff reviewed a sample of site level plans in the TSA, weighted by licensee. Of the 385 hectares sampled, 21 percent or 82.5 hectares, were to be retained as long-term reserves, either in patches or dispersed across the cutblocks.

District staff also noted that the future stand yields assumed in the base case did not account for the impact of increased shading due to higher retention levels on regenerating stand growth. Recent research conducted by the regional silviculturalist indicated that seedling growth declined significantly as overstory retention increased. Retention levels as low as five trees per hectare resulted in understory conifer growth suppression to levels 70 percent to 80 percent of conifer growth in clearcuts (D'Anjou, 2003).

In the previous timber supply analysis, variable retention was assumed to be 8.5 percent of the area harvested. Based on the assumption that about 50 percent of the area retained would be harvested in the future, existing stand yields were reduced by 4.25 percent. In order to account for the impact of variable retention on future stand growth, regenerating stand yields were reduced by an additional five percent. District staff noted that using the same approach for this analysis would have resulted in an eight percent reduction in existing stand volumes. Furthermore, they indicated that future stand yields should have been reduced by an additional eight percent to account for understory conifer growth suppression.

In a sensitivity analysis, a 10 percent decrease in existing stand yields resulted in about a nine percent decrease in the short-term timber supply. When future stand volumes were decreased by 10 percent, the mid- to long-term timber supply projected in the base case decreased by 11 percent.

Public input from a variety of respondents expressed concern regarding the assumption that clearcut harvesting was the predominant silviculture system in use in the Arrowsmith TSA and questioned whether this would result in a sustainable timber supply.

In response, district staff indicated that clearcut harvesting only accounts for six percent of the area harvested in the TSA and that the silviculture system assumptions used in the timber supply analysis do not represent current practice.

Based on my review of the information regarding silvicultural systems and discussions with district staff, I conclude that the level of forest cover retention assumed in the base case was underestimated by about 14 percent. After accounting for volume removal during subsequent harvesting, retention of unmerchantable trees, and growth suppression due to shading, I conclude that the existing and future stand yields used in the base case have been overestimated by about 10 percent. In the short term, increased stand retention will likely be offset by an increase in harvest area. Therefore, for this determination I will account for a 10 percent overestimation of the mid- to long-term timber supply projected in the base case, as discussed in my *Reasons for decision*.

Silvicultural treatments

I have reviewed the information regarding stand fertilization, spacing and commercial thinning carried out in the Arrowsmith TSA and conclude that the assumptions used in the base case are a reasonable reflection of current practices and are; therefore, appropriate for use in this determination.

(iv) the standard of timber utilization and the allowance for decay, waste and breakage expected to be applied with respect to timber harvesting on the area:

Utilization standards

Wood utilization standards define the species, dimensions and quality of trees that are harvested and removed during harvesting operations. I have reviewed the utilization standards as implemented in practice and as incorporated in the analysis for the Arrowsmith TSA.

From this, I am satisfied that the utilization standards used in the base case reasonably reflect current practice and are; therefore, appropriate for use in this determination.

Decay, waste and breakage

Licensees have indicated that the volume in old cedar stands has been underestimated. District staff compared the cruise volumes prior to harvest with the scaled volumes after harvesting on a random selection of cutting permits, and concluded that the volumes of cedar from old stands was on average underestimated by 49 percent.

District staff indicated that destructive sampling to determine the local loss factors for cedar has not been undertaken. However, they noted that sampling results from similar stands in other management units suggest that cedar volumes may be underestimated by 58 percent.

Cedar is the dominant tree species in about one-third of the stands in the THLB. Of these stands, about 77 percent are classified as either mature or over mature. At the time of this timber supply review, the estimated volume of cedar older than 120 years of age is 4.6 million cubic metres or about 22 percent of the current merchantable growing stock in the Arrowsmith TSA.

In sensitivity analysis, when existing stand volumes were increased by 10 percent, the short-term timber supply increased by about 10 percent; however, the long-term timber supply was unaffected.

I have reviewed the information regarding decay, waste and breakage used in the analysis and note that the volume of cedar in the Arrowsmith TSA has likely been underestimated by about 49 percent. Given that cedar represents 22 percent of the current merchantable growing stock, this results in about a 10 percent underestimation in existing stand volume. Therefore, based on the results of the sensitivity analysis, I conclude that the short- to mid-term timber supply projected in the base case has been underestimated by 10 percent and I will account for this in my determination, as discussed in my *Reasons for decision*.

(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 and Range is required under the *Ministry of Forests and Range 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. The *Forest and Range Practices Act (FRPA)* and other legislation provide for, or enable, the legal protection and conservation of timber and non-timber values. 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.

The Alberni Environmental Coalition and members of the general public expressed concern regarding the potential changes in forest management practices that may be required to mitigate the impact of climate changes on non-timber resources. I accept that forest management practices will require ongoing adaptation as new information becomes available regarding the effects of climate change on forested ecosystems. In order to reduce the risks associated with uncertain information, provincial legislation requires that the AAC for each forest management unit be determined every five years. Therefore, as new information regarding the effect of climate change on forest resources and management becomes available, it will be incorporated into subsequent timber supply reviews.

- *cutblock adjacency 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 disturbances (areas covered by stands of less than a specified height), and prescribe minimum 'green-up' heights required for regeneration on harvested areas before adjacent areas may be harvested.

In the analysis, 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). Separate forest cover constraints were applied to stands within visual quality zones or in Clayoquot Sound (see the *visually sensitive areas* and *Clayoquot Sound* sections, below). MFR district staff reviewed these assumptions and indicated that they reflect the provisions of the VILUP and current management practices within the TSA.

Based on my review of the information regarding green-up heights and adjacency, I conclude that the forest cover constraints used in the analysis reflect the requirements of the VILUP and current management practices in the TSA and are, therefore, appropriate for use in this determination. I will make no adjustments to the base case harvest forecast on this account.

- *visually sensitive areas*

Legally-designated scenic areas and visual quality objectives (VQO) have been established by the MFR district manager for the Arrowsmith TSA, to reduce the visual impact of harvesting activities in visually-sensitive areas. In total, 41 855 hectares of productive forest on Crown land or private land within Woodlot Licences (WL) and Tree Farm Licences (TFL), of which 24 357 hectares were included in the THLB, are within legally-designated scenic areas subject to harvesting restrictions.

Except for areas within Clayoquot Sound, productive forests within scenic areas subject to the same VQOs were grouped into the same resource emphasis areas (REA). Areas included in the THLB that were not classified as visually-sensitive were assigned to the integrated resource management REA, in which fewer harvesting restrictions were applied (see *forest cover constraints for green-up and cutblock adjacency*). Visually sensitive areas were classified as either ‘zone 1 – highly sensitive’ or ‘zone 2 – moderately sensitive’ and by the level of permissible disturbance, i.e. ‘retention’, ‘partial retention’, or ‘modification’.

A visually-effective green-up height (VEG) of five metres was assumed for all of the visually-sensitive REAs. A maximum of either three or five percent of productive forests within retention REAs, 10 or 15 percent of productive forests within partial-retention REAs and 20 or 25 percent of modification REAs were permitted to be below the five-metre VEG at any one time in the analysis.

The Clayoquot Sound scenic resources inventory differs from the visual inventories completed for the rest of the province in two significant ways: visual area classifications are unique; and landscape alteration levels are qualitative rather than quantitative. Clayoquot Sound visual classes include: ‘natural appearing’; ‘minimal alteration’; and ‘small scale alteration’.

For the timber supply analysis, the Clayoquot Sound visual class alteration levels were quantified. The maximum proportion of each visual class that could exceed VEG height at one time in the analysis were: 20 percent of productive forest less than eight metres in height; 30 percent of productive forest less than seven metres in height; and 40 percent of productive forest less than six metres for ‘natural appearing’, ‘minimal alteration’ and ‘small scale alteration’, respectively.

According to district staff, the impact of harvesting on visual quality is perceived to be higher on Crown lands on the eastern side of Vancouver Island due to fragmentation of the land base, where many Crown land parcels are surrounded by private land that is not subject to visual quality requirements. MFR and licensee staff plan harvesting to minimize the impact of visual quality constraints on subsequent forestry activities. However, the same does not usually occur on private lands outside of WLS and TFLs. Therefore, VQOs occasionally need to be amended or updated in order to conserve scenic resources.

Sensitivity analyses in which green-up heights were increased by one metre had no effect on short-term harvest levels; however, the long-term harvest level decreased by two percent to 520 000 cubic metres per year. Decreasing the green-up height by one metre had no effect on the harvest levels projected in the base case.

Based on my discussions with district staff, I conclude that the assumptions for visually sensitive areas in the Arrowsmith TSA – with the exception of some areas on the eastern coast of Vancouver Island – reasonably reflect legal requirements and current management practices and are; therefore, suitable for use in this determination. For areas of eastern Vancouver Island where harvesting on private lands outside of WLS and TFLs may increase visual quality constraints on Crown land, I note that increasing the green-up height for all visually sensitive areas in the Arrowsmith TSA had no effect on

the short- to mid-term timber supply. Given there is no information regarding the extent or magnitude of potential impacts on visual quality objectives for eastern Vancouver Island, and the relative insensitivity of the short- to mid-term timber supply to changes in green-up height, I will make no adjustment to the base case harvest forecast on this account. However, I request that district staff monitor implementation of visual quality objectives and that any changes are reflected in the timber supply analysis for the next determination.

- recreation areas

Recreation sites, reserves, unique features managed exclusively for recreation, and areas 'for the use, recreation and enjoyment of the public' (UREP) were fully excluded from the THLB. A 25-metre buffer was applied to both sides of mapped trails and the resultant area was excluded from the THLB. Between 10 to 50 percent of the productive forest area associated with features identified in the recreation feature inventory as 'common' or 'very common' and of 'limited recreational value', was also excluded from the THLB. After accounting for overlap with areas previously excluded for other factors, a total of 2224 hectares of productive forest were excluded from the THLB to account for recreation areas.

District staff informed me that about half of the recreation sites and trails in the TSA were established as resource features in 2005 under Government Actions Regulation (GAR) Orders. While the assumptions used in the analysis appropriately reflect the exclusion of harvesting within these features – with the exception of salvage and site improvement – the harvesting of nearby stands that are not part of the mapped feature may also be constrained in order to comply with the requirements of the GAR Orders and provisions under *FPPR* and this was not reflected in the analysis. Furthermore, staff indicated that there are hundreds of unauthorized trails, particularly in the eastern portion of the TSA that may limit harvesting activity but were not accounted for in the analysis.

In the analysis, UREPs were fully excluded from the THLB. However, district staff indicated that UREPs are mapping designations that do not preclude timber harvesting. The Integrated Land Management Bureau (ILMB) is planning to review UREPs in the Arrowsmith TSA in order to assess which sites would be suitable for protection under a GAR Order. At the time of this determination, no GAR Order has been issued for these sites.

The Alberni Environmental Coalition noted that recreation trails are significant tourist attractions. In order to improve trail protection from risks such as blowdown, they recommended the buffer be increased to 50 metres. District staff indicated that there is little evidence of blowdown in the current 25-metre trail buffers to support an increase in buffer width.

The Central Island Caving Club asked whether karst and related features, including caves, were taken into account in the timber supply review. In response, district staff indicated that it is working with Central Island caving organizations to establish karst management by means of a GAR Order.

Members of the public were concerned that the TSR does not address the effects of forestry activities on fish, animals and humans, as well as the effects of climate change. Absence of these considerations is in direct conflict with government's aim to increase ecotourism. Another respondent indicated that public forests should not be logged as they are needed for protected areas for recreation.

I note that the restrictions on harvesting in areas adjacent to GAR Order established recreation resources were not included in the assumptions used in the base case. However, in the absence of any information to guide me quantifying the potential effect, I accept the recreation area assumptions used in the analysis are based on the best available information and are adequate for use in this determination.

With regards to the concern that the TSR does not address the effects of forestry activities on fish, animals and humans, I note that the timber supply analyses prepared for this determination include assumptions for a wide range of non-timber resources. These assumptions reflect the legally-binding direction from government approved land use plans, such as the Vancouver Island Land Use Plan and the requirements of Section 8 of the *Forest Act*, which seek to balance a wide range of interests, such as the need for recreational resources with the economic need to harvest timber. However, in recognition of the increasing population on Vancouver Island and the associated increase in demand for recreational resources, I recommend that district staff, in collaboration with staff from other government agencies review the UREPs and inventory unauthorized trails and pursue GAR Orders to legally-establish those identified as suitable for protection as recreation resources.

- *watersheds*

Eight community watersheds have been designated within the Arrowsmith TSA. In the analysis, harvesting of the 3211 hectares of THLB within these watersheds was assumed to occur at a rate of up to one percent of the productive forest within each watershed per year.

The Alberni Environmental Coalition commented that there was no mention of karst management within community watersheds in the analysis report and were concerned that logging could lead to siltation in underground water sources. In response, district staff indicated that it is working with Central Island caving organizations to establish karst management by means of a GAR Order.

For Clayoquot Sound, watershed management assumptions were based on the Clayoquot Sound Scientific Panel (CSSP) recommendations. In the analysis, either a maximum of five percent of the productive forest could be less than five years of age or a maximum of 10 percent of the productive forest could be less than 10 years of age, within identified watersheds. Where watershed boundaries overlapped park boundaries, the park areas were excluded from harvesting. Up to five percent of the productive forest in community watersheds was allowed to be less than five years of age.

Based on my review of the watershed assumptions used in the analysis, I am satisfied that adequate provision for the maintenance of water quality was incorporated in the base case timber supply projection.

- *riparian management*

Riparian management areas (RMAs) along lakes, wetlands, streams and rivers provide key habitat for fish and wildlife and help conserve water quality and biodiversity. The FRPA provides for RMAs, which include both riparian reserve zones (RRZ) that exclude timber harvesting and riparian management zones where constraints are placed on timber harvesting.

For the Clayoquot Sound portion of the TSA, watershed reserve networks from the completed and draft watershed plans were consulted for riparian areas. These plans delineate reserve networks that are designed to protect all non-timber resource values, including riparian areas. No timber harvesting occurs within these areas and they were excluded from the THLB.

For areas of the TSA outside of Clayoquot Sound, a 15-metre wide riparian area buffer was applied to both sides of all mapped streams in order to account for RRZs. The resultant area, which represents 4.8 percent of the total productive land base of the TSA, was excluded from the THLB. In order to account for limited harvesting in the RMZs, but to prevent these areas from contributing to old seral-stage requirements, yield curves were reduced by 4.2 percent.

MOE staff reviewed the riparian management assumptions and expressed concern that they did not distinguish between fish-bearing and non-fishing bearing streams nor account for unmapped streams.

District staff indicated that the method used to account for riparian management in the analysis was generally sound and based on the best available information. However, they agreed with the concern expressed by MOE staff and noted that there was some uncertainty regarding the assumptions used for riparian management zones in the original areas of the TSA, i.e. excluding the areas transferred from TFLs 46 and 44.

MFR staff reviewing the analysis results indicated that the proposed 4.2 percent yield curve reduction was not implemented in the analysis. Consequently, the effect of harvesting restrictions within RMZs – for areas outside of Clayoquot Sound – was not accounted for in the base case forecast.

The Alberni Environmental Coalition indicated that a 30-metre buffer should have been used in the analysis to account for ‘global heating and severe weather events such as floods and drought’.

Based on my review of the riparian management assumptions used in the base case and discussions with staff, I conclude that the productive forest associated with riparian reserve zones was appropriately excluded from the timber harvesting land base. However, I agree that a 4.2 percent yield curve reduction should have been implemented to account for harvesting restrictions in riparian management zones outside of Clayoquot Sound or on 90 percent of the TSA. Therefore, I conclude that the base case timber harvesting land base has been overestimated by 3.4 percent resulting in a 15 900 cubic metres per year overestimation in timber supply across the entire forecast period and I will account for this in my determination as discussed under *Reasons for Decision*.

-ungulate winter range

A November 2003 GAR Order established ungulate winter ranges (UWR) covering 4137 hectares for black-tailed deer and Roosevelt elk. Of this area, 2174 hectares were excluded from the THLB and forest cover constraints were applied to the remaining 1963 hectares.

MFR and MOE staff reviewed the assumptions used in the analysis and indicated that they are consistent with the GAR Order and reflect current practice in the TSA.

One public response to the analysis report stressed the important role 'heritage forests' have in maintaining water quality and quantity, biodiversity, ethno-botanical needs of First Nations, ungulate winter range and salmon habitat, especially considering the increased stresses due to climate change. In response, district staff indicated that the analysis accounted for many non-timber values.

I have reviewed the ungulate winter range information used in the analysis and conclude that it reflects current requirements and management practices and is; therefore, suitable for use in this determination. At present, the early results of climate change projections for coastal areas in British Columbia do not indicate any significant stand productivity changes. However, over the course of the next five years, the MFR will continue to refine climate change projections and how this information can be incorporated into decision making.

- identified wildlife

In the Arrowsmith TSA, wildlife habitat areas (WHA) totalling 2427 hectares have been established for marbled murrelet (MAMU), northern goshawk, and Douglas-fir/Gary oak plant communities. Additional draft WHAs are being developed for marbled murrelets, red-legged frogs and white-tailed ptarmigan. In order to account for MAMU WHAs in the Clayoquot Sound part of the TSA and in areas previously in TFL 46; 806 hectares and 242 hectares, were excluded from the THLB, respectively.

MFR staff indicated that six additional MAMU WHAs established in January 2008, totalling 398 hectares, were not included in the analysis. In order to account for five of the WHAs, an additional 99 hectares of productive forest should have been excluded from the THLB. The sixth WHA is located within the Barclay Community Forest and this area has already been accounted for earlier in this rationale.

MOE staff noted that there are numerous species at risk and rare plant communities in the SIFD and an evaluation is underway to assess whether the habitat requirements of IWMS species are being met within the one percent short-term harvest level impact budget for identified wildlife species. If the results of the evaluation indicate that the one percent limit is inadequate to support species at risk planning, it will be pursuing an increase in the threshold. The MOE is also exploring options for utilizing the SIFD long-term THLB impact budget of 1600 hectares, some of which will be deployed in the Arrowsmith TSA.

I have reviewed the information regarding identified wildlife species and conclude that the timber harvesting land base used in the base case has been overestimated by 99 hectares or about 0.14 percent. This represents a 645 cubic metre per year

overestimation in the base case harvest levels throughout the forecast period and I will account for this in my determination as discussed in *Reasons for Decision*. With respect to the habitat evaluation being conducted by the MOE and the eventual deployment of the long-term THLB budget of 1600 hectares, the outcome of the evaluation and the establishment of additional habitat can be incorporated in the analysis for the next determination.

- stand-level biodiversity and wildlife tree retention

The managed stand yield curves used in the analysis were reduced by seven percent to account for in-block retention of trees for WTPs. District staff reviewed this approach and indicated that it adequately reflects current harvesting practices in the TSA. Therefore, for this determination, I will make no adjustment to the base case harvest forecast on this account.

- landscape-level biodiversity and old forest retention

At the time of this determination, the Renfrew Landscape Unit Plan (RLUP) has been approved. In order to account for the old-growth management area (OGMA) provisions in the RLUP, an additional 102 hectares of productive forest were excluded from the THLB. Integrated Land Management Bureau (ILMB) and district staff indicated that OGMAs identified in the RLUP were appropriately excluded from the timber harvesting land base used in the analysis.

In early 2008, ILMB identified a 'New Direction' for landscape unit planning, which will require an approved business case for the continuation of LUPs after March 31, 2008. ILMB and some of the forest licensees have submitted business cases to continue LUPs in the SIFD.

One member of the public noted that 'there are areas of old growth that are not included in the old-growth strategy, specifically areas along the Kennedy River, Highway 4 tourist corridor.' District staff noted that while there are no approved OGMAs in this area, old-growth values are protected to a significant extent due to the presence of two ungulate winter ranges that include old-growth provisions. The tourist corridor is part of a scenic area and is also subject to visual quality objectives.

Greenmax Resources Ltd. commented that 'in 50 years two-thirds of the old growth will be harvested' and indicated that the chief forester should consider partitioning the old growth in order to reduce the rate of old-growth harvesting, particularly in light of the accelerated harvesting on private land.

Alberni Environmental Coalition noted that 'one of the best ways to fight climate change is to stop logging old-growth forests... the Alberni Environmental Coalition believe that all logging of old-growth forests should cease immediately not only because of climate change but also because of biodiversity in old growth which provides habitat for a multitude of birds and animals.'

A number of public comments were received which objected to harvesting old growth and one member of the public objected to all cutting of trees on Crown land.

Based on my review, I conclude that the landscape-level biodiversity and old-stand retention information used in the analysis is consistent with the legal requirements and land use direction provided by the Renfrew Landscape Unit Plan. Therefore, I will make no adjustments to the base case on this account. With regards to the harvesting of old-growth stands, I acknowledge that individual opinions regarding the level of old-growth retention on Crown lands is very diverse, the assumptions used in the base case reflect the legally-established requirements and the agreed on land-use objectives of the Renfrew Landscape Unit Plan.

- First Nations archaeological sites and cultural heritage resources

An archaeological overview assessment and traditional use studies have been prepared for the Arrowsmith TSA. Archaeological sites within the Arrowsmith TSA and most of the recorded cultural heritage sites are located on the west coast of Vancouver Island in close proximity to the coastline. These sites generally overlap with areas already excluded from the THLB to account for non-timber resources, e.g. riparian reserves and wildlife tree patches, thus impact assessments have found few archaeological sites on the THLB. Where sites are found—and the primary feature has been culturally modified trees (CMTs)—operations have avoided the sites, either by including the feature in a wildlife tree patch or riparian reserve, or by adjusting the cutblock boundary to avoid and protect the feature.

District staff indicated that the results of traditional use studies completed within the TSA are not generally made available to government agencies, including the MFR by First Nations. Where traditional use information is available, the information was included in the analysis assumptions.

Cultural heritage resources were accounted for in two ways in the analysis. Of the 214 hectares of mapped archaeological sites in the TSA, 178 hectares are productive forest. After accounting for areas previously excluded for other non-timber resources an additional 128 hectares of productive forest were excluded from the THLB.

Based on the recommendations of the Clayoquot Sound Scientific Panel (CSSP), an aspatial netdown of seven percent was applied to all stands: older than 80 years; within 200 metres of a shoreline and, that have a cedar/cypress component of more than 20 percent in order to account for culturally modified trees. The aspatial netdown resulted in the exclusion of 3667 hectares of productive forest. After accounting for overlap with areas already excluded from the THLB, resulted in the exclusion of 176 hectares of productive forest from the THLB.

The Chemainus, Ditidaht and Hupacasath First Nations and the Hul'qumi'num Treaty Group indicated that cedar resources were not adequately reflected in the analysis because it only accounted for cedar resources that were within 200 metres of the shoreline.

District staff noted that the analysis reasonably reflected current management of known archaeological sites and cultural heritage resources. However, they indicate that during operational planning previously unknown information is sometimes made available to licensees by First Nations, so that the licensees can modify their operations accordingly. The location of these sites or resources and the extent to which additional productive

forest is reserved from harvesting is often held in confidence by the licensee and/or First Nations.

Based on my discussions with staff, I am aware that a monumental cedar inventory, which summarizes First Nations identified needs for old-growth cedar, has been completed for the SIFD. In conjunction with this inventory, the Forest and Range Evaluation Program (FREP) assesses the effectiveness of the FRPA in achieving stewardship of cultural heritage resource values such as cedar and cypress. Under the FREP, a joint First Nations and government working group was formed to develop a process indicator framework. This framework outlines key indicators of effective forest management planning and implementation processes that meaningfully incorporate First Nations' cultural heritage values, resources and interests. I believe that with the combined use of the monumental cedar inventory and use of the key indicators developed by the FREP working group, cedar and cypress will be managed for and protected in the long term. I also encourage the Hul'qumi'num Treaty Group and its member nations to continue working with district staff to manage for cedar and cypress at the operational level.

The Chemainus, Ditidaht and Hupacasath First Nations and Hul'qumi'num Treaty Group also noted that the decline of over mature cedar and cypress could limit the availability of these resources in the future, and were concerned with the lack of retention and recruitment of younger cedar and cypress stands to provide for future monumental cedar requirements. With respect to this concern, the analysis report indicates 32 percent (22 698 hectares) of the THLB is occupied by stands in which cedar or cypress tree species predominant. Of these stands, 77 percent (22 698 hectares) are over 80 years of age. This concern will be addressed later in this document (see *waste, decay and breakage*).

District staff indicated that over the last seven years, harvesting of cedar by the forest industry was 65 percent higher than the cedar profile; over the last two years the cedar harvest was 115 percent higher than the cedar profile and that this could impact the availability of cedar for meeting cultural heritage resources. However, they also noted that the scaled cedar volume is on average 49 percent higher than the cruised cedar volume indicating that the loss factors for old cedar have been significantly overestimated (see *waste, decay and breakage*). As a consequence, the volume of cedar in the inventory is likely underestimated; therefore, the percentage of the cedar profile harvested has likely been significantly overestimated.

The Hupacasath First Nation indicated that consideration should be given to manage timber supply on longer rotations to provide for future old-growth requirements. In order for sensitivity analyses to be conducted with longer rotations for cedar and cypress, information on the nature of these management regimes would need to be gathered. I encourage the Hupacasath First Nation to continue to work with the SIFD staff to collectively gather this information so that cedar management involving longer rotations may be included in future timber supply reviews.

The Hul'qumi'num Treaty Group expressed concern that the report entitled, *Guidelines for Managing Cedar for Cultural Purposes* (MFR) did not reflect the quality and quantity of cedar needed by First Nations for cultural and traditional uses, and that First

Nations were excluded from the process that led to the development of these guidelines. They also indicated that the current quantity and quality of cedar on the coast and how cedar is being conserved to ensure long-term supply remains unknown. They provided an overview of their annual cultural and traditional fibre requirements as described in the *Report on Cultural Wood for the Hul'qumi'num Treaty Group*.

I acknowledge the Hul'qumi'num Treaty Group's concerns with the report, *Guidelines for Managing Cedar for Cultural Purposes*. These guidelines may not explicitly determine the quality or quantity of cedar needed by First Nations for cultural and traditional uses; however, they do provide an approach for Ministry staff to work with First Nations to manage cedar for cultural purposes. In addition, the report provides guidance when considering First Nation's cedar interests and assesses the current supply of available cedar. I encourage the Hul'qumi'num Treaty Group and their member nations to continue working with district staff so that their fibre requirements are met.

Some of the First Nations associated with the Arrowsmith TSA are actively involved in negotiations under the British Columbia Treaty Process. Other First Nations have represented themselves to government as Douglas Treaty First Nations, including the Nanoose, Malahat, T'Sou-ke and Snuneymuxw.

The Cowichan Tribes have expressed interest in a pre-treaty land package of approximately 7000 hectares of Crown land in the vicinity of the Cowichan River in their CFA area. Two BCTS cutblocks (60 hectares) in the area were cancelled in 2007 in response to concerns expressed by the Cowichan Tribes.

The Snuneymuxw First Nation was offered about 1800 hectares at Mount Benson in 1999 as part of a proposed Treaty-Agreement-In-Principle. The Snuneymuxw have not formally declined the offer; therefore, this area has been reserved from harvesting since that time. The SIFD has approached the Snuneymuxw regarding an economic opportunity on Mount Benson.

In a meeting held on April 10, 2008, representatives of the Ditidaht First Nation identified and provided information on several culturally-significant sites, including Kaakaapiyaa also known as Mount Rosander. Although Kaakaapiyaa has no legal status, the area within the boundaries provided by the Ditidaht is being respected by MFR and licensee staff and is reserved from all operational activities, including harvesting.

The Te'mexw Treaty Association is currently involved in negotiating a Treaty-Agreement-In-Principle. Ratification of this treaty is expected to take several years. In the interim, it is unlikely that any licensee would be successful in harvesting any area identified in this process.

I have considered the information regarding First Nations heritage sites and cultural heritage resources, including land interests, and have reasoned as follows:

First Nations indicated that the timber harvesting land base derived for the base case should be reduced by 15 percent to account for heritage sites and cultural heritage resources. Although staff cannot inform me of the exact number of archaeological sites and cultural heritage resources, I note that there are a large number of First Nations associated with the TSA. This leads me to conclude that the numbers of archaeological sites and cultural heritage resources have likely been significantly underestimated.

Where these sites or cultural heritage resources have been identified, there has been significant overlap with areas reserved from harvesting for other factors. However, even after accounting for overlap, it is likely that additional productive forest will be required for the protection and conservation of archaeological sites and to provide access to cultural heritage resources.

Lacking spatial data, I am unable to quantify the exact amount of additional productive forest to exclude from the timber harvesting land base. While there is sufficient flexibility in the short term to maintain harvest levels by adjusting or relocating operational activities, I find it prudent to account for up to a two percent overestimation in the mid- to long-term timber supply to account for unidentified archaeological sites and cultural heritage resources.

With respect to First Nations' concerns regarding the continued availability of cedar in the TSA, I note that the current volume of cedar in older stands is robust. Furthermore, as discussed under *decay, waste and breakage*, cedar volumes from existing stands have likely been significantly underestimated. District staff indicate that the current Forest Service Reserve apportionment of 4200 cubic metres per year is being fully utilized, primarily to provide for the salvage of windthrow. To date, all First Nations' requests for access to cedar for traditional and cultural activities have been met by means of free use permits under the Forest Service Reserve.

Although it is not within my authority to apportion the AAC that I determine, I recommend that regional and district staff, in making their apportionment recommendations to the Minister of Forests and Range, consider whether the Forest Service Reserve allocation is sufficient to accommodate both the current and future levels of First Nations requests for cedar.

In keeping with my guiding principles, should new significant information become available regarding First Nations archaeological sites and cultural heritage resources, including any new findings or recommendations by government, I can revisit the AAC determination for the Arrowsmith TSA prior to the five-year deadline provided for in legislation. For this determination, I note that the AAC I determine does not prescribe any particular plan of harvesting activity within the TSA by requiring any particular area to be harvested or to remain unharvested. Harvesting activities are guided by requirements such as those contained in the *Heritage Conservation Act, Forest Act, FRPA*, the CSSP and other resource management legislation.

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

Other information

- *strategic land use planning and objectives*

The Vancouver Island Summary Land Use Plan (VISLUP) and associated Higher Level Plan Order (HLPO) cover all of the SIFD outside of the Clayoquot Sound Land Use Decision area and the Gulf Islands. The VISLUP and HLPO identify three management zone classifications: Special Management Zones (SMZ); Enhanced Forestry Zones (EFZ) and General Management Zones (GMZ). The analysis has incorporated specific aspects of the SMZ and EFZ that influence harvesting rates.

The SMZ resource management zone within the Arrowsmith TSA includes 12 638 hectares or about 18 percent of THLB. The SMZs associated with the TSA include: Barkley Sound, Alberni Canal, San Juan Ridge, Upper Qualicum and Nahmint. The forest cover constraints used in the analysis assumed a three-metre green-up height and a 25-percent maximum disturbance level within SMZs.

The EFZ resource management zone within the Arrowsmith TSA includes 11 885 hectares or about 17 percent of the THLB. The EFZs associated with the TSA include: Effingham, Maggie, Corrigan, Sarita and Loss-Jordan. The forest cover constraints used in the analysis assumed a 1.3 metre green-up height and a 25-percent maximum disturbance level within EFZs.

District staff noted that licensees operating in the TSA have included results and strategies in their Forest Stewardship Plans that are consistent with all legal requirements, including those associated with strategic land-use plan and HLP objectives. However, staff indicated that HLPO objectives 1(a), (c) and 4 were not addressed in the analysis. And based on the information provided in the data package and analysis they indicated that there was insufficient information to estimate the magnitude of any effects on the short- to mid-term timber supply that might be associated with these objectives.

Based on my review of the strategic land-use planning and objectives information and my discussions with staff, I conclude that the analysis did not specifically address all of the HLP objectives and that this makes it difficult to assess the impacts of these objectives on timber supply. For this determination I am prepared to accept that the licensees current practices, as outlined in their Forest Stewardship Plans (FSP), are consistent with all of the legally-required HLP objectives and that these practices have informed, to some extent, the assumptions associated with other factors used in the base case. However, for the next determination, I expect that the assumptions used in the timber supply analysis clearly reflect Higher Level Plan objectives.

Clayoquot Sound

In April 1993, the provincial government announced the Clayoquot Sound Land Use Decision. As a result, almost 900 square kilometres – 34 percent of Clayoquot Sound is now preserved, including over 700 square kilometres of coastal temperate rain forest. The decision placed a further 21 percent of the Sound under special management, which allows some sensitive logging while emphasising the protection of wildlife, recreation and scenic values. Following this announcement in 1995, the provincial government adopted the recommendations of the Clayoquot Sound Scientific Panel (CSSP).

The recommendations for the Clayoquot Sound area include completion of 15 watershed plans, which reserve areas for ecosystem representation, red- and blue-listed plant and wildlife species, cultural values, recreation, hydro-riparian resources, sensitive soils and unstable terrain and interior forest conditions. Areas outside of the watershed reserves are available for harvesting subject to further CSSP recommendations for rate-of-cut, old-seral forest requirements, visual quality objectives and variable retention silviculture systems.

The total productive forest area in the Arrowsmith TSA portion of Clayoquot Sound is 18 865 hectares of which 7347 hectares are available for harvesting.

For the timber supply analysis, all watershed reserves – which account for the non-timber values described above – and landslides were excluded from the THLB. Areas outside of the reserves were subject to a maximum rate-of-cut of five percent per five-year period or 10 percent per decade. Where watersheds and parks overlapped, these rates were adjusted to reflect that the park areas were unavailable for harvesting.

The CSSP landscape-level biodiversity constraint recommendation was applied in the analysis as a 40 percent old-seral stage requirement within each watershed, including reserve areas. The CSSP recommends a 15 percent minimum stand-level retention, or higher for areas with significant non-timber resource values or sensitive sites. In the analysis, 35 percent of stand volume was retained for stand-level biodiversity. The CSSP recommendations for visual quality are described earlier in this document (see *visual quality*).

Since 1996, there has been little harvesting in the Clayoquot Sound portion of the TSA. The estimated volume harvested since 2002 is 21 319 cubic metres, which represents 31 percent of the 68 500 cubic metres partitioned for this area. District staff indicated that there are currently no approved Forest Stewardship Plans and only one licensee has expressed tentative interest in harvesting in the area.

On March 20, 2008, a meeting was held with the Clayoquot Sound Central Region Board, SIFD, and the licensee representatives, during which several comments on the analysis report were received. These included a request for mapping in support of the analysis that indicated the impacts specific to Clayoquot Sound, acknowledgement of the long history of First Nations involvement in resource stewardship in the area and that First Nations values and their watershed planning be incorporated into the analysis. Finally, concerns were raised that the timber supply analysis was inconsistent with the CSSP recommendations.

District staff reviewed the assumptions used in the analysis and indicated that the base case reasonably reflects the recommendations of the CSSP and current practice in the Clayoquot Sound portion of the TSA. However, they are concerned that the analysis did not account for the low level of current or planned harvesting in this area. In order to avoid over-harvesting in areas of the TSA outside of Clayoquot Sound, staff recommended that the AAC volume attributable to this area continue to be partitioned.

I concur with district staff that the Clayoquot Sound Scientific Panel recommendations have been appropriately modelled in the analysis and that although there has been some harvesting, the full volume attributable to Clayoquot Sound is not being harvested. Therefore, for this determination I will make no adjustments to the base case on this account; however, in order to prevent an over concentration of harvesting in areas of the Arrowsmith TSA outside of Clayoquot Sound, I will continue a partition in the AAC, as discussed in *Reasons for decision*.

- First Nations participation in the forest sector

The Ahousaht First Nation, Campbell River First Nation, Cape Mudge Band, Comox Band, Cowichan Tribes, Ditidaht First Nation, Halalt First Nation, Hesquiaht First Nation, Lake Cowichan First Nation, Lyackson First Nation, Pacheedaht First Nation, Penelakut First Nation, Tla-o-qui-aht First Nation, Tseshah First Nation, Uchucklesaht

First Nation, and Ucluelet First Nation have five-year Forest and Range Agreements (FRA). FRAs allow for Non-Replaceable Forest Licences (NRFL), and in some cases, area-based tenures, such as Woodlot Licences or Community Forest Agreements. The T'Sou-ke, Toquaht and Huu-ay-aht First Nations have Interim Measures Agreements on Forest and Range Opportunities (FRO) with the South Island Forest District and the Toquaht FN has a Community Forest Agreement under its FRO.

All FROs and Forest and Range Agreements (FRAs) include a requirement for consultation on administrative and operational decisions related to forest and range management. I have reviewed the consultation process that was carried out during the TSR and I am satisfied that this process met the requirements as reflected in these agreements.

The Nanoose and the Hupacasath First Nations expressed concern regarding the availability of timber to meet their tenure commitments and indicated that any allocation of timber would impact them. The Hupacasath noted that the entire AAC was only harvested on two occasions indicating the lack of timber available.

As chief forester, I do not have the authority to apportion the AAC, as this is the responsibility of the Minister of Forests and Range. I would like to assure the Nanoose and Hupacasath First Nations that there is no cause for concern regarding the availability of timber to meet their tenure agreements. The base case and alternative harvest forecasts, as well the sensitivity analyses prepared for this determination indicate that the timber supply for the Arrowsmith TSA is robust. Recent undercutting of the AAC is due to a wide range of issues, including implementation of the Clayoquot Sound Land Use Decision, the fragmented nature of Crown forests on south-eastern Vancouver Island, where timber harvesting is often perceived as being incompatible with non-timber values, and poor market conditions. These factors along with others have influenced harvesting in the TSA; whereas, the available timber supply has not been a factor.

- FN consultation process for AAC determination

Thirty-six First Nations and 3 treaty organizations were provided with opportunities to comment on the data package and analysis report, and were notified when the TSR was coming to an end, in the event they had any further comments to provide. Opportunities to meet with district staff and Timberline Natural Resource Group were also provided to discuss the data package and analysis report.

The SIFD sent an initial letter in March 2006 informing First Nations of the upcoming TSR process for the Arrowsmith TSA. In April 2007, Timberline Natural Resource Group, on behalf of the Arrowsmith TSA licensees, sent the data package and a letter to all First Nations listed above, asking for their input. The SIFD sent an additional letter in May 2007 formally asking First Nations for their comments on the data package. In February 2008, Timberline Natural Resources Group sent the analysis report to all First Nations asking for their input and offering to meet. A final reminder was given by the SIFD indicating the TSR would be ending soon and asking First Nations to comment. A more detailed consultation summary was provided for my review that outlines the efforts made to consult including all letters that were sent and received by the SIFD.

From my review of the consultation summary, I conclude that the MFR has made substantial efforts to engage First Nations in consultation respecting interactions between their aboriginal interests and this AAC determination. Of the many issues raised in the consultation process, some lie within the scope of my statutory authority under Section 8 of the *Forest Act*, and some are matters for consideration by other statutory decision makers and will be forwarded to these decision makers for consideration when making future decisions.

The Chemainus First Nation indicated that the area examined in this timber supply review is too large. The First Nation indicated that the area should not be larger than a watershed and that their traditional territory should be analyzed separately. Other input received from the Chemainus First Nation regarding this timber supply review has been addressed throughout this document.

I am aware that the regional executive director responded to the Chemainus First Nation's concerns in a letter dated September 28, 2007. In his response, the regional executive director explained that the Arrowsmith TSA is a small TSA with a total area of about 155 000 hectares, and that as chief forester I do not have the authority to redefine the size of the Arrowsmith TSA, or to conduct independent AAC determinations for portions of the TSA. Regarding the concerns of operability and the timber profile, it was explained that I need to consider what would be operable over an entire business cycle, in order to account for stands that could be harvested at top market conditions.

A sensitivity analysis in which TIPSy yield curves were varied by 10 percent indicated that short-term timber supply is not sensitive to changes in managed stand yields of this magnitude. The site index values used in the base case represent the best available information and are appropriate for this timber supply analysis. Concerns and uncertainty about overestimating timber volumes because of the use of adjusted site indexes was addressed using a sensitivity analysis. I am satisfied that the regional executive director's letter to the Chemainus First Nation along with my consideration of the information presented to me have addressed their concerns.

On June 11, 2008, the Hul'qumi'num Treaty Group (HTG), which represents six nations: Chemainus First Nation, Cowichan Tribes, Halalt First Nation, Lake Cowichan First Nation, Lyackson First Nation, and Penelakut Tribe, sent a package containing a letter from the HTG, a report entitled *Implications of the Arrowsmith TSA – TSR #3: Allowable Annual Cut Determination*, a map indicating the HTG statement of intent area, the HTG consultation policy, and a summary of the HTG interim strategic land plan.

Concerns outlined in the report, *Implications of the Arrowsmith TSA – TSR #3, Allowable Annual Cut Determination* include:

- There is a discrepancy in land base values between the data package and the analysis report.
- The removal of marginal quality stands that are uneconomic or have low stocking characteristics from the THLB results in higher average site index values and volumes per hectare and increases the short-term harvest level. Removal of economically inoperable areas from the THLB would also result in an upward trend of the base case.

- There is a Part 13 reduction for the Hill 60 Designated Area, and this was not deducted from the initial harvest level in the data package.

Additional concerns expressed by the Hul'qumi'num Treaty Group are discussed under the appropriate sections of this document, such as *Cultural Heritage Resources*.

With regards to the HTG's concerns, I note the following:

- The discrepancy in the numbers between data packages and the analysis reports occurs because the data packages released for review are subsequently updated prior to the analysis to reflect new information or address First Nations and public input.
- The exclusion of marginal quality stands, inoperable and low-stocking areas, and low-growing potential lands from the THLB may increase site index values; however, exclusion of these areas also decreases the size of the THLB. This would reduce the timber supply more than if these areas were included in the THLB.
- Inclusion of stands that cannot be harvested under average market conditions would result in an overestimation of the THLB and consequently an overestimation of timber available for harvesting.
- Cabinet designation of the Hill 60 area under Part 13, Section 169 of the *Forest Act* and the Chief Forester's Order issued under Part 13, Section 173 of the *Forest Act* expired June 30, 2009.

In keeping with my guiding principles, I will not speculate on land-use decisions, including the establishment of designated areas, until such decisions have been finalized by government. With regard to the Hill 60 area, I am prepared to consider adjusting the AAC for this management unit once Cabinet redesignates the Hill 60 area and the Minister suspends forestry in the area (see *designated areas*).

The Hupacasath indicated government should provide funding to First Nations to review information sent to them and have a greater role in AAC determinations than just information sharing. The Hupacasath also indicated that they should be approached prior to any decisions being made regarding 'take back' areas reverting to the Arrowsmith TSA.

The Hupacasath's requests for funding to review information provided by government and shared decision-making are beyond the scope of my statutory authority to determine an AAC for the Arrowsmith TSA. Regarding consultation over 'take back areas', provincial legislation has been amended and transfers in ownership of Tree Farm Licences (TFL) no longer provide the government with an opportunity to transfer five percent of the Crown land in the TFL to TSAs.

On July 11, 2008 a meeting was held with the Hupacasath First Nation and the SIFD during which the comments above were reiterated. In addition, the Hupacasath were concerned that the timber supply review did not address the Hupacasath land-use plan and cedar strategy; community watersheds; use of longer rotation ages to allow for the development of future old-growth cedar and cypress stands, and that the 1000 cubic

metres per year estimate of blowdown used in the analysis was insufficient and that a level of 10 000 to 20 000 cubic metres per year should have been used.

Based on my consideration of the comments received from the Hupacasath First Nation, I note the following: There is insufficient information regarding the management of cedar and cypress on longer rotations for me to assess the impact on the future availability of old-growth cedar/cypress. Therefore, I encourage the Hupacasath to continue to work with the district staff to collectively gather information regarding the nature of these management regimes, so that this information can be used in subsequent timber supply analyses.

In areas of the TSA outside of Clayquot Sound, the assumptions used in the analysis reflect the current legal requirements for domestic and community watershed management. For areas within Clayquot Sound, the analysis assumptions were consistent with the government approved watershed plans and the CSSP recommendations for Clayquot Sound.

Information from the district's salvage program, which includes active searches for salvage opportunities, indicates that there is an average annual blowdown of 2500 cubic metres. Of this volume, 1000 cubic metres is too remote to be salvaged and the remaining 1500 cubic metres is salvaged. This information was used in the base case and represents the best available information. Therefore, I concluded that the base case accounted for an appropriate amount of unsalvaged losses and made no adjustment to the base case on this account (see *non-recoverable losses*).

The Chemainus First Nation indicated that they did not concur with the concept of determining timber supply and the allowable annual cut rate on the basis of a 'super unit' such as the Arrowsmith TSA, which spans numerous watersheds, traditional territories and includes more than one-third of Vancouver Island. In order to 'move TSR analysis into the vicinity of being credibly sustainable', they recommended that the analysis units not be larger than a watershed. At the very least, they indicated the rate of cut within the traditional territory of the Chemainus First Nation should be analyzed separately, and that the AAC be established and consequently controlled separately.

As chief forester, I do not have the authority to establish TSAs or TFLs, nor can I determine AACs on areas other than those defined in the *Forest Act*. With regards to the size of the Arrowsmith TSA, I note that this TSA is one of the smallest in the province. In the timber supply analysis, the assumptions for some factors, such as visual quality and community watersheds were based on the watershed level. However, for other non-timber values, such as biodiversity, the impact of management activities is best assessed at the landscape level.

Throughout my consideration of the information provided to me for this determination, I am mindful that parts of the Arrowsmith TSA are subject to Douglas Treaties that provide signatory First Nations with hunting and fishing rights. In general, I believe that these rights are accounted for during my consideration of other factors in this determination such as wildlife habitat, landscape and stand-level biodiversity and riparian management. In general, I believe that hunting, fishing, and other traditional uses within the TSA can continue without timber supply impacts.

Throughout my determination, I have considered the input received from First Nations and the potential impact that timber harvesting may have on resources associated with aboriginal interests. In reviewing First Nations input, I believe my determination has reflected those interests and concerns that are within my jurisdiction. Where First Nations interests and concerns are beyond my authority, I will convey them to those government agency officials or staff who are in a position to address them. Based on my review of the consultation process, I am satisfied that First Nations were provided with adequate opportunities to participate and that district staff made significant efforts to engage in meaningful consultation.

- Coastal Douglas-fir

The Conservation Data Centre has 'red-listed' most of the subzones within the Coastal Douglas-fir (CDFmm) biogeoclimatic zone and designated them as 'globally-imperilled'. Timber harvesting in the CDFmm has been of increasing public concern and recently the Carmanah Forestry Society has been critical of harvesting in the CDFmm and has initiated several complaints and two investigations by the Forest Practices Board.

About 3000 hectares of the Arrowsmith TSA is within the CDFmm and managed by British Columbia Timber Sales (BCTS). Of this area, 600 hectares located within the Gulf Islands are unlikely to be harvested (see *Crown forest fragmentation*). In 2007, BCTS committed to refrain from harvesting in the CDFmm until a provincial management strategy has been developed. The SIFD has also agreed not to award any additional tenures in the CDFmm, most of which have been Woodlot Licences in the past.

District staff indicated that ILMB is currently developing Land Use Objectives (LUO) for the CDFmm and identifying 1600 hectares, mostly in the Arrowsmith TSA, for protection. There has also been discussion of expanding the CDFmm conservation strategy to include areas classified as Coastal Western Hemlock (CWHxm1).

In the analysis, productive forest within the CDFmm and CWHxm1 was not excluded from the THLB, unless the area was excluded for other factors. District staff reviewed the assumptions used in the analysis and indicated that the nature of the LUOs and extent and location of the areas to be protected are currently unknown. In a sensitivity analysis, exclusion of the CDFmm from the base case THLB resulted in a 3.2 percent decrease in the short-term timber supply to 450 000 cubic metres per year and a 2.8 percent decrease in the long-term harvest level to 515 000 cubic metres per year.

I have considered the information regarding the CDFmm and have reasoned as follows: Provincial government agencies recognize the importance of protecting and conserving the CDFmm biogeoclimatic zone and are in the process of establishing legally-binding provisions for the management of these endangered forests. In the absence of legal provisions, BCTS and MFR staff are managing conservation of the CDFmm at an operational level by not harvesting and not issuing any new licences that would permit harvesting. While I recognize the endangered nature of the CDFmm, I am aware that the exact extent and nature of the protective measures currently being developed have not yet been finalized and are, therefore; subject to uncertainty. In keeping with my guiding principles, I will not speculate on the eventual outcome of land-use planning processes being undertaken by government, as these are often subject to change. Furthermore, as

discussed under *Crown land fragmentation*, I intend to account for an overestimation of 600 hectares in the size of the timber harvesting land base due to a lack of harvesting activity in areas of the CDFmm on the Gulf Islands in recent years.

Therefore, for this determination I accept the assumptions used in the base case for areas of the CDFmm outside of the Gulf Islands and will make no further adjustments to the base case on this account. In any event, I note that the base case timber supply is sufficiently robust and stable for the first five decades that including the CDFmm areas in the timber harvesting land base, while harvesting in these areas is restricted, poses no immediate risk to timber supply. I look forward to the introduction of legal provisions to protect these endangered areas and to accounting for them at a future determination.

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

- alternative harvest flows

The nature of the transition from harvesting old growth to harvesting second growth is a major consideration in determining AACs in many parts of the province. In keeping with the objectives of good forest stewardship, AACs in British Columbia have been and continue to be determined to ensure that short-term harvest levels are compatible with a smooth transition to medium- and long-term levels. Timber supplies need to remain sufficiently stable so that there are no inordinately adverse impacts on current or future generations. To achieve this, the AAC determined must not be so high as to cause later disruptive shortfalls in supply nor so low as to cause immediate social and economic impacts that are not required to maintain forest productivity and future harvest stability.

In the base case, the highest priority for harvest was given to stands that were oldest relative to their minimum harvestable age. However, if harvest scheduling had been based solely on this assumption, most of the short-term harvesting would have occurred in the western portion of the Arrowsmith TSA. In order to reflect the effect of increased harvesting constraints in the eastern portion of the TSA on harvest levels, it was assumed that 100 000 cubic metres per year of the annual harvest had to come from this area for the first two decades in the harvest forecast.

In addition to the base case, two alternative harvest forecasts were prepared to examine the effect of harvest priorities on timber supply. In the first alternative, stands that regenerated to the fastest growing regenerated stands were given priority for harvesting in order to maximize the rate of growth. Based on this approach, a short-term harvest level of 465 000 cubic metres per year was maintained for the first eight decades in the analysis before declining to a long-term level of 520 000 cubic metres per year or two percent less than in the base case.

In the second alternative, stands with the highest volume per hectare were harvested first. This approach required an immediate four percent decrease in the short-term harvest level to 445 000 cubic metres per year. This level was maintained until the end of the eighth decade, after which the harvest level declined to 505 000 cubic metres per year or about five percent less than in the base case level.

Based on my review of the alternative harvest forecasts, I conclude that the modified relative oldest first harvest scheduling, which required that 100 000 cubic metres per year

be harvested in the eastern portion of the Arrowsmith TSA, best reflects current management in the TSA.

- community dependence on harvest level

The total volume harvested from the Arrowsmith TSA during the three-year period from 2004 to 2006 was 400 000 cubic metres per year, which represents about 97 percent of the current AAC. This level of harvest activity supported 467 person-years of employment in the SIFD; 283 person-years of direct employment and 184 person-years of induced or indirect employment. The total income generated was \$19.52 million and a further \$28.6 million of provincial government revenue.

Just over half of the harvesting and processing jobs associated with recent harvesting accrued to residents of the forest district. The remaining direct employment, particularly in sawmilling, was generated in the lower mainland of British Columbia. About 60 percent of the induced and indirect employment also occurred outside of the forest district. An economic impact analysis was completed for the first 20 years of the harvest forecast.

Recent harvest levels have been close to the level of the current AAC. The base case initial harvest level of 465 000 cubic metres per year, which is 11 percent higher than the current AAC, was estimated to support an additional 53 person-years of direct employment and increase the total income accruing to residents of the forest district by \$2.4 million.

Public input included one submission that noted that small mill operators in the SIFD were having difficulty accessing adequate volumes of affordable, quality timber to maintain their operations. I have reviewed the information regarding community dependence on harvest levels and am mindful that the volume harvested from the Arrowsmith TSA provides a significant contribution to the employment in the local area.

(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;

Economic and social objectives

- Minister's letter

The Minister of Forests and Range has expressed the economic and social objectives of the Crown for the province in a letter to the chief forester, dated July 4, 2006 (attached as Appendix 3).

The letter stresses the importance of a stable timber supply to maintain a competitive and sustainable forest industry while being mindful of other forest values. In respect of this, in the base case projection and in all of the alternative harvest flow projections with which I have been provided for reference in this determination, a primary objective in the harvest flow has been to attain a stable, long-term harvest level where the growing stock becomes stable, neither increasing nor decreasing over time. In my determination, I have been mindful of the need for the allowable harvest in the short term to remain consistent with maintaining the integrity of the timber supply projection throughout the planning horizon. I have also considered with care the adequacy of the provisions made both in current practice, and assumed in the analyses, for maintaining a range of forest values.

I am; therefore, satisfied that this determination accords with the objectives of government as expressed by the Minister.

- local objectives

Although the timber harvest in the Arrowsmith TSA accounts for only seven percent of the South Island Forest District harvest, it is a very important supply for small independent loggers, value-added mill owners and First Nations' enterprises. However, due to the interspersed nature of many smaller blocks of Crown forest with suburban and populated rural areas, as well as increased harvesting on privately-owned forest land, the importance of the Crown forest land parcels to local communities for the non-timber values they provide is increasing. These non-timber values may be incompatible or perceived as incompatible with timber harvesting.

In considering the socio-economic implications associated with harvest levels in the Arrowsmith TSA, as described throughout this document, I am mindful of the need to balance the economic importance of the timber resource with the role that Crown forest lands occupy in providing non-timber benefits to local communities. In achieving this balance, I have considered both the land use direction provided by the Vancouver Island Land Use Plan and the letter provided by the Minister of Forests and Range (see *Minister's Letter* below) that expresses the socio-economic objectives of government.

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

Non-recoverable losses

As in the previous timber supply analysis, total annual loss estimates were 1000 cubic metres and 2500 cubic metres due to fire and windthrow, respectively. Non-recoverable losses were assumed to be 2000 cubic metres per year.

Input received from Greenmax Resources Ltd. noted that the wind storms of March 2003 and December 2006 resulted in losses in excess of historic trends and indicated that these differences should be reflected in the short-term harvest projections. District staff indicated that wind throw losses were based on district estimates of salvaged timber. Unless the windthrown stands are too remote or uneconomic, most of the volume is recovered through an aggressive district salvage program. Unsalvaged loss factors on the coast were reviewed between TSR 2 and 3 and this review indicated that loss factors in TSR 2 were reasonable.

I accept the assumptions used in the base case for non-recoverable losses reasonably reflect current conditions in the TSA and are, therefore; suitable for use in this determination.

Reasons for decision

In reaching my AAC determination for the Arrowsmith TSA, I have made, reviewed and confirmed all of the considerations documented above, and have reasoned from them as follows.

In the 2007 timber supply analysis, the initial level in the base case forecast was 465 000 cubic metres per year, representing an 11 percent increase from the current AAC

of 418 796 cubic metres. This harvest level was maintained for eight decades before increasing to 530 000 cubic metres per year. The base case forecast is comprised of 13 700 cubic metres per year attributable to stands in Clayoquot Sound, 6300 cubic metres per year attributable to red alder-leading stands and 445 000 cubic metres per year attributable to conifer-leading stands outside of Clayoquot Sound.

I am satisfied that the assumptions applied in the base case forecast for the majority of the factors applicable to the Arrowsmith TSA were appropriate. Following is my consideration of those factors for which I consider it necessary in this determination to further take into account implications to the timber supply as projected in the base case forecast.

Factors which indicate that the timber supply projected in the base case forecast may be overestimated, to a degree that can be quantified to some extent, are as follows:

- *Community Forest Agreements*: The need to account for the Barkley Community Forest Agreement, which is now awarded, necessitates a 5758-hectare reduction to the THLB, which results in an 8.2 percent overestimation in the projected mid-to long-term timber supply.
- *Crown forest fragmentation*: The need to account for Crown forest on the Gulf Islands, in which there has been no harvesting activity for 15 to 20 years, necessitates a 600-hectare reduction to the THLB, which results in a 0.85 percent overestimation in the projected mid- to long-term timber supply.
- *silvicultural systems*: The need to account for a 14 percent underestimation in forest cover retention results in a five percent and 10 percent overestimation in the projected short- and mid-term timber supply, respectively.
- *riparian management*: The need to account for a 4.2 percent yield curve reduction to account for the harvesting restrictions in riparian management zones in 90 percent of the TSA results in a 3.4 percent overestimation in the size of the THLB, and a 15 900 cubic metres per year overestimation in the projected timber supply throughout the forecast period.
- *identified wildlife*: The need to account for a 99 hectare overestimation in the size of the THLB, results in a 645 cubic metres per year overestimation in the projected timber supply throughout the forecast period.
- *First Nations cultural heritage resources and land interests*: The need to account for an unquantified underestimation in the area associated with FNs archaeological sites and cultural heritage resources results a two percent overestimation in the projected timber supply throughout the forecast period.

Offsetting the above overestimations, I have identified the following factor in my considerations as a reason why the actual timber supply may have been underestimated in the base case projection, to a degree that can be quantified to some extent:

- *decay, waste and breakage*: The need to account for a 49 percent underestimation in the volume of cedar in the Arrowsmith TSA results in a 10 percent underestimation in the projected short- to mid-term timber supply.

From reviewing all of the over- and underestimations in the projected timber supply listed above, the combined result is a 9.6 percent net overestimation in the initial harvest level of 465 000 cubic metres per year projected in the base case.

Decreasing the base case initial harvest level by 9.6 percent results in an initial harvest level of 420 360 cubic metres per year.

As discussed earlier in this document (see *deciduous forest types* and *Clayoquot Sound*), I am continuing a partition in the AAC of 6300 cubic metres for alder-leading stands with at least 50 percent deciduous species by volume, with the intention of encouraging management of alder as a commercial species in its own right, rather than as the by-product of conifer harvesting. And I am continuing a partition in the AAC of 13 700 cubic metres for Clayoquot Sound, in order to avoid the over-concentration of harvesting in areas of the Arrowsmith TSA outside of the Clayoquot Sound area.

With regard to the Maa-nulth Designated Area, following this determination it is my intention to review the information regarding this area and to consider issuance of an order under Part 13, Section 173 of the *Forest Act*.

Determination

Having considered and reasoned from all of the factors as documented above, including the risks and uncertainties in the information provided, it is my determination that:

A timber harvest level that accommodates, as far as possible, the objectives for all forest resources during the next five years, that reflects current management practices as well as the socio-economic objectives of the Crown can be best achieved in the Arrowsmith TSA by establishing an AAC of 420 000 cubic metres.

This new AAC includes partitions specifying allowable annual harvest volumes attributable to the following:

- for harvesting in red-alder stands with 50 percent or more deciduous species by volume, a maximum of 6300 cubic metres; and
- for harvesting in stands in the Clayoquot Sound area, a maximum of 13 000 cubic metres.

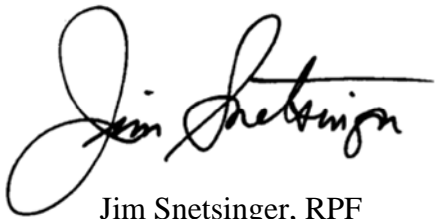
This determination, which excludes all woodlot licence volumes, becomes effective on July 23, 2009, and will remain in effect until a new AAC is determined, which must take place within five years of the effective date of this determination.

Implementation

I recognize that the ability of staff and licensees to undertake projects is dependent on available resources, including funding. However, the following projects are important to help reduce the risk and uncertainty associated with key factors that affect the timber supply in the Arrowsmith TSA. Therefore, in the period following this decision and leading to the subsequent determination, I encourage MFR staff and licensees to undertake the following tasks and studies:

- provide an estimate of potential deciduous volume available for harvest;
- improve the yield estimates for alder stands;

- improve the genetic gain information, past and future, for Douglas-fir, western hemlock, and cedar;
- quantify the area and monitor stocking densities and regeneration success on sites with colluvial soils;
- quantify decay, waste and breakage for cedar with the aim of improving cedar volume estimates and assessing the magnitude of any discrepancy between the inventory and harvest billing system cedar volumes;
- monitor the impacts of VQO GAR orders on harvesting;
- refine riparian management assumptions;
- quantify the area associated with the management of lakes and wetland reserves;
- work with other agencies to better account for recreation (sites and trails), including a review of areas classified as UREPs;
- ensure that next timber supply review includes an analysis of all the legal HLP objectives;
- in conjunction with branch and regional staff, work towards a new VRI prior to the next determination; and,
- resolve minor discrepancies in the TSA boundaries.



Jim Snetsinger, RPF
Chief Forester

July 22, 2009



Appendix 1: Section 8 of the *Forest Act*

Section 8 of the *Forest Act*, Revised Statutes of British Columbia 1996, c. 157 Consolidated to October 21, 2004, reads as follows:

Allowable annual cut

- 8** (1) The chief forester must determine an allowable annual cut at least once every 5 years after the date of the last determination, for
- (a) the Crown land in each timber supply area, excluding tree farm licence areas, community forest areas and 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 the 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 5 years after the order under paragraph (a) or the amendment or entering into under paragraph (b), and
 - (d) after the determination under paragraph (c), at least once every 5 years after the date of the last determination.
- (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 5 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 10 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 portions of the allowable annual cut attributable to
 - (a) different types of timber and terrain in different parts of Crown land within a timber supply area or tree farm licence area, and
 - (b) different types of timber and terrain in different parts of private land within a tree farm licence area,
 - (c) [Repealed 1999-10-1.]
- (6) The regional manager or district manager must determine an allowable annual cut for each woodlot licence area, according to the licence.
- (7) The regional manager or the regional manager's designate must determine a an allowable annual cut for each community forest agreement area, in accordance with
 - (a) the community forest agreement, and
 - (b) any directions of the chief forester.
- (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 [2003-31-02]
 - (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.

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

Section 4 of the *Ministry of Forests and Range Act* (consolidated to March 30, 2006) reads as follows:

Purposes and functions of ministry

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

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

Documents Attached

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

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



JUL 04 2006

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

Dear Jim:

Re: Economic and Social Objectives of the Crown

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

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

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

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Minister of
Forests and Range
and Minister Responsible
for Housing

Office of the
Minister

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Jim Snetsinger

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

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

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

Sincerely yours,

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

**Rich Coleman
Minister**