

**BRITISH COLUMBIA
MINISTRY OF FORESTS AND RANGE**

**North Coast
Timber Supply Area**

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

Effective November 6, 2007

**Jim Snetsinger
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 North Coast timber supply area (TSA). This document also identifies where new or better information is needed for incorporation in future determinations.

Description of the North Coast Timber Supply Area

Location: The North Coast TSA is located in northwest British Columbia, within the Coast Forest Region. The North Coast TSA is bordered to the west across Hecate Strait in the Pacific Ocean by the Queen Charlottes TSA; to the south by the Mid Coast TSA; to the southeast by Tree Farm Licence (TFL) 25, Block 5 (partly within the Northern Interior Forest Region); to the east by the Nisga'a Treaty Lands, as well as the Nass and Kalum TSAs and TFLs 1 & 41 (within the Northern Interior Forest Region).

The North Coast TSA covers 1 830 883 hectares, of which, approximately 8 per cent or 145 808 hectares is classified as the timber harvesting land base. The remainder of the land base is considered non-productive, inoperable, or unavailable for timber harvesting for various reasons.

There are a number of parks in and adjacent to the TSA, including Tweedsmuir Provincial Park to the south and Khutzeymateen Provincial Park northeast of Prince Rupert. In 2006, the BC Government supported the conservancies as determined through the North Coast and Central Coast Land and Resource Management Plan (LRMP) processes and government-to-government negotiations.

The North Coast TSA is administered from the Ministry of Forest and Range (MOFR), North Coast Forest District office located in the City of Prince Rupert. Other communities within the TSA include the District of Port Edward, Dodge Cove, Port Simpson, and the villages of Gingolix, Lakalzap, Metlakatla, Oona River, Kitkatla, Hartley Bay and Kitsault. Data from the 2004 Statistics Canada survey indicated the population in the North Coast TSA at 17 269 persons. Approximately 87 percent of the population is concentrated in the City of Prince Rupert.

First Nations: The majority of the North Coast TSA is within the traditional territories of the Tsimshian First Nations, of which, four of seven villages, the Kitkatla, Hartley Bay, Metlakatla, and Lax Kw'alaams First Nations are inside the district boundary. Of the other three villages, Klemtu is just south of the district boundary, and Kitsumkalum and Kitselas are up stream on the Skeena River. The Haisla First Nation also has traditional territory within the TSA. The Heiltsuk and Gitanyow have also claimed traditional interests within this TSA. With the implementation of the Nisga'a Final Agreement, Nisga'a Treaty Lands have been transferred out of the North Coast TSA.

The Kitkatla, Hartley Bay, Metlakatla, and Lax Kw'alaams First Nations have signed Forest and Range Agreements (FRAs). Metlakatla First Nation has a non-renewable

forest licence (NRFL) as terms of their FRA, and the other First Nations are to be awarded NRFLs in the near future, with associated volume for timber coming from the North Coast TSA.

Environment: I am familiar with the environment of the North Coast TSA through my previous role as Regional Manager of the former Prince Rupert Forest Region and through discussions with North Coast Forest District staff.

The North Coast TSA encompasses a diverse area, ranging from the Hecate lowlands to the Kitimat Ranges within the Coast Mountains. The TSA contains three biogeoclimatic zones. The majority of the land base lies in the lower elevation coastal western hemlock zone, and is characterized by high rainfall, cool summers and mild winters. The mountain hemlock zone occupies the mid- to upper-elevation forested areas. The alpine tundra zone lies at high elevations and is characterized by clumps of trees interspersed with alpine tundra.

The major tree species in the North Coast TSA are western hemlock, western redcedar, amabilis fir (balsam), sitka spruce and yellow cedar. Minor tree species include shore pine (a variant of lodgepole pine), red alder, black cottonwood, mountain hemlock and pacific yew.

The diverse forests provide habitat for many wildlife species, including grizzly and black bear, black-tailed deer, wolf, mountain goat, moose, wolverine, fisher, porcupine, and numerous species of birds. The ocean inlets provide a rich marine environment that includes habitat for whales and salmon species.

Socio-economics: I am familiar with the 2006 ‘Socio-Economic Assessment’ for the North Coast TSA as submitted by the North Coast Defined Forest Area Management (DFAM) Group. This report describes the socio-economic profile for the North Coast TSA. Briefly, the key sources of employment within the North Coast TSA include: the public sector (40 per cent); forestry (19 per cent); tourism (17 per cent); fishing / trapping (16 per cent); construction, agriculture / food and other sources (8 per cent). Forestry is still important to the current economy despite mill closures and associated population decreases.

History of the AAC

In 1981, the AAC for the North Coast TSA was determined at 600 000 cubic metres. To accommodate two temporary timber sale licences issued for harvest of lands previously considered inoperable, with the aim of testing the use of experimental ‘A’ frame and skyline harvesting systems, the harvest level was raised in 1987 to 700 000 cubic metres. When the first of the temporary licences expired, the AAC was subsequently reduced in 1989 to 650 000 cubic metres, and further reduced to 600 000 cubic metres in 1994 when the second licence expired. For the timber supply review completed in 1995, the AAC was determined at 600 000 cubic metres.

In 2000, approximately 55 400 hectares were removed from the gross land base of the North Coast TSA under the Nisga’a Final Agreement, resulting in an AAC reduction of 25 600 cubic metres. At this same time, the AAC was further reduced to 573 624 cubic metres to account for a 776 cubic metres woodlot licence. The October 12, 2000 AAC determination maintained the AAC at this level and included one partition of 154 000 cubic metres to and are comprising the portion of the TSA which lies north of the Nass River and that portion of the TSA which is considered highly visually sensitive. In 2006, I reduced the AAC by a total of 138 000 cubic metres under written orders as per Section 173 of the *Forest Act*, to 435 624 cubic metres to account for areas designated under Part 13 of the *Forest Act*.

The harvestable volume for the North Coast TSA, is currently apportioned by the Minister of Forests and Range as follows (note that these numbers do not yet reflect the 138 000 cubic metres reduction under Part 13 of the *Forest Act*):

Form of Agreement	cubic metres / year	Percent of AAC
Non Replaceable Forest Licences	190 985	33.4
Replaceable Forest Licences	246 724	43.0
BC Timber Sales	110 043	19.1
Community Forest Agreement	20 000	3.5
Woodlot Licences	3 000	0.5
Forest Service Reserve	2 872	0.5
Total	573 624	100.0

Apportionment of the Current AAC

New AAC Determination

Effective November 6, 2007, and before taking into account a reduction that will remain in effect for as long as part of the TSA is a “designated area” under Part 13 of the *Forest Act*, the new AAC for the North Coast TSA will be 494 000 cubic metres per year. This represents a reduction of 79 624 cubic metres or approximately 14 per cent from the current AAC. The AAC includes a partition of 48 000 cubic metres attributed to that portion of the TSA that is situated north of the Nass River.

By way of a separate Order issued under authority of Section 173 of the *Forest Act*, I have stipulated that the new AAC is reduced by 94 000 cubic metres beginning on November 6, 2007 and lasting for as long as those areas remain a “designated area” under Part 13 of the *Forest Act*.

This AAC will remain in effect until a new AAC is determined, which may take place within five years of this determination, unless that date is formally changed as per the provisions of Section 8 of the *Act*.

Information Sources used in the AAC Determination

Information considered in determining the AAC for the North Coast TSA includes the following:

- *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 Minister to the Chief Forester, Re: Economic and Social Objectives of the Crown, July 4, 2006.
- 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.
- Wildstone Resources, Riparian Impact Assessment, 1994. Unpublished report prepared for the Province of British Columbia.
- *Forest and Range Practices Act*, 2002 and amendments.
- *Forest and Range Practices Regulations*, 2004 and amendments.
- *Forest Practices Code of British Columbia, Guidebooks*, BCFS and MELP.
- *Ministry of Forests and Range Act*, (consolidated to March 30, 2006)
- *Forest Practices Code of British Columbia Act*, 1995, and amendments.
- *Forest Practices Code of British Columbia Act Regulations*, 1995, and amendments.
- *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.
- *North Coast TSA Inventory Audit*, BCFS Inventory Branch, November 1999.
- *Timber Supply Analysis Data Package North Coast Timber Supply Area Timber Supply Review 2006*. The North Coast DFAM Group in Partnership with Tsimshian Nations FIA Project NC 6466001, June 2006.
- *Timber Supply Analysis Report North Coast Timber Supply Area Timber Supply Review 2006*. The North Coast DFAM Group FIA Project NC 6466001, April 2006.
- *Reliability of SINMAP Terrain Stability in Five Watersheds in The North Coast Forest District*, International Forest Products FIA Project 5030002, 2003.
- *North Coast Land and Resource Management Plan: Final Recommendations*. BC Ministry of Sustainable Resource Management, February 2005.
- *Red Alder (Alnus rubra) Inventory Review for the North Coast TSA Northwestern British Columbia*. Boyle & Dean Logging Ltd. FIA Project 5041004, March 2003.
- *Social-Economic Assessment North Coast Timber Supply Area Timber Supply Review 2005*. The North Coast DFAM Group FIA Project NC6466001, June 2006.
- *Incorporating SIBEC Estimates into the North Coast TSA TSR Dataset*. J.S. Thrower & Associates, March 2004.

- *Chief Forester Order, Section 173 of the Forest Act, for the North Coast TSA portion of the area referred to as the Central Coast Designated Area No. 2 in B.C. Reg 82/2006.* September 28th, 2006.
- *Chief Forester Order, Section 173 of the Forest Act, for the North Coast TSA portion of the area referred to as the North Coast Designated Area No. 2 in B.C. Reg 81/2006.* September 28th, 2006.
- *Silvicultural System and Partial Cut Harvesting Issues in the Coast Forest Region.* Discussion Paper. Silviculture Systems Issues Working Group of the Coast Region Implementation Team. May 15, 2006.
- *North of the Nass Strategic Economic Operability Assessment.* Timberline Forest Inventory Consultants Ltd. March 2004.
- *Procedures for Factoring Visual Resources into Timber Supply Analyses,* Ministry of Forests, March 1998
- *Bulletin — Modeling visuals in TSR3.* BC MoF, Forest Practices Branch, December 2003. Victoria, B.C.;
- *North Coast TSA Rationale for AAC determination,* BCFS dated October 12, 2000.
- *Definition of “Full Implementation of Ecosystem Based Management (“EBM”) by March 31, 2009”,* Joint Land & Resource Forums, July 10, 2007.

Role and Limitations of the Technical Information Used

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

The analytical techniques used to assess timber supply are necessary simplifications of the real world. There is uncertainty about many of the factors used as inputs into timber supply analysis due in part to variations in physical, biological and social conditions. Although ongoing science-based improvements in the understanding of ecological dynamics help reduce some of these uncertainties, technical information and analytical methods alone cannot incorporate all the social, cultural and economic factors relevant to forest management decisions, and do not necessarily provide complete answers or solutions to the forest management problems addressed in AAC determinations. However, the technical information and analytical methods do provide valuable insight into potential outcomes of different resource-use assumptions and actions and these are important components of the information that must be considered in AAC determinations.

In determining the AAC for the North Coast 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 to manage uncertainty include:

- i. minimizing risk associated with making AAC determinations. To this end, 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. re-determining AACs frequently. This is particularly important in cases where projections of short-term timber supply are not stable, and to ensure AAC determinations incorporate current information and knowledge. Consequently, re-determining AACs at a minimum, every five years, is a legislated requirement as per Section 8 of the *Forest Act*. 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 of 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* (FRPA)).

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

As British Columbia progresses toward the completion of strategic land-use plans, in some cases the eventual timber supply impacts associated with land-use decisions resulting from various regional and sub-regional planning processes remain subject to some uncertainty before formal approval by government. It is my practice not to speculate on timber supply impacts that may eventually result from land-use decisions not yet finalized by government.

In some cases, even when government has made a formal land-use decision, it is not necessarily possible to analyze and account for the full timber supply impact in a current AAC determination. Many government land-use decisions must be followed by detailed implementation decisions requiring, for instance, the establishment of resource management zones and resource management objectives and strategies for those zones. Until such implementation decisions are made, it would be impossible to fully assess the overall impacts of the land-use decision. In such cases the legislated requirement for frequent AAC reviews will ensure that future determinations address ongoing plan implementation decisions. Wherever specific protected or conservation 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 as contributing any harvestable volume to the timber supply in AAC determinations. However, these areas may contribute indirectly by providing forest cover and other components to help attain other legislated resource management objectives such as those for biodiversity, wildlife, First Nation cultural resources, or those determined through government-to-government discussions such as ecosystem-based management objectives.

The North Coast TSA lies within the area covered by the North Coast Land and Resource Management Plan (LRMP) and a smaller portion (Princess Royal Island) in the south that is covered by the Central Coast LRMP. Key final recommendations of the LRMPS (February 2005) were to protect 35 per cent of the land base and to adopt elements of ecosystem-based management. Subsequent to the final recommendations, land use designations were finalized through government-to-government negotiations (February 2006). Forest development is required to be consistent with aspects of these plans as they represent government objectives under FRPA and those objectives negotiated during government-to-government discussions, and I refer to these plans where applicable in various components of this document.

In April 2006 the *Park Act* was changed to create a new designation of protected area called a 'conservancy'. Conservancies prohibit logging, mining, and hydro electric power generation, except for run-of-the-river projects, but differ from a Class A Parks in allowing for social, ceremonial and cultural uses by First Nations and for low impact compatible economic opportunities. In the two coastal LRMP areas, 24 conservancies were established in April 2006, and 41 conservancies were established in April 2007.

Draft Orders by the BC Minister of Agriculture and Lands, released in December 2006 and January 2007 for public review have proposed land use legal objectives for many specified resource values in the coastal planning areas. Currently, the Province, First Nations and stakeholders are engaged in implementing the Coast Land Use announcement through the establishment of Plan Implementation and Monitoring

committees, Land and Resource Forums, and an Ecosystem-Based Management Working Group. The BC government has committed to full implementation of ecosystem-based management by March 2009.

The implications of these planning processes for land use status, forest management and timber supply are considered in the ‘*ecosystem-based management*’ section of this rationale.

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

Some 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 re-determine 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 obligations 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 asserted rights and title in a manner proportional to the strength of their claimed interests and the degree to which the decision may impact these interests. In this regard, I will consider any information brought forward respecting First Nations’ aboriginal interests, including operational plans that describe forest practices to address First Nations’ interests. As I am able, within the scope of my authority under section 8 of the *Forest Act*, I will address those interests. When aboriginal interests are raised that are outside my jurisdiction, I will endeavour to forward these interests to other decision-makers for consideration.

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 North Coast 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 Practices Code and under the *Forest and Range Practices Act*.

Because the new regulations of the *Forest and Range Practices Act* are designed to maintain the integrity of British Columbia's forest stewardship under responsible forest practices, it is not expected that the implementation of the legislative changes will significantly affect current timber supply projections made using the Forest Practices Code as a basis for definition of current practice.

The role of the base case

In considering the factors required under Section 8 of the *Forest Act* to be addressed in AAC determinations, I am assisted by timber supply forecasts provided to me through the work of the Timber Supply Review program for TSAs and TFLs.

For most AAC determinations, a timber supply analysis is carried out using an information package including data and information from three categories—land base inventory, timber growth and yield, and management practices. Using this set of data and a computer simulation model, a series of timber supply forecasts can be produced, reflecting different decline rates, starting harvest levels, and potential trade-offs between short- and long-term harvest levels.

From a range of possible forecasts, one is normally 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.

Base Case for the North Coast TSA

In February 2007, in a letter to all licensees, I explained that after much consideration, a decision was made that Defined Forest Area Management (DFAM) would be concluded and references to DFAM in current legislation would be removed. Prior to this, DFAM groups in TSAs could voluntarily complete data packages and timber supply analysis reports and make this information available to the public and First Nations. Once completed, the reports and comments would be submitted to the chief forester in support of determining AACs for TSAs.

The holders of replaceable forest licences and BCTS within North Coast TSA, in partnership with the North Coast First Nations, elected to complete the timber supply analysis for the North Coast TSA.

The 2006 timber supply analysis for the North Coast TSA, was completed under the guidance of the DFAM group by Timberline Forest Inventory Consultants Ltd. (Timberline), using Timberline's proprietary simulation model CASH6 (Critical Analysis by Simulation of Harvesting), version 6.21, to develop a spatial harvest schedules for the North Coast TSA timber supply analysis. A more detailed explanation of this model is available in the April 2006 *Timber Supply Analysis Report for the North Coast TSA*.

The base case forecast in the 2006 timber supply analysis incorporates land base inventory, timber growth and yield and management practices as described in this analysis report and in the 2006 *Timber Supply Analysis Data Package for the North Coast TSA*. The base case projection was developed prior to the completion of the North Coast LRMP and therefore did not account for new conservancies or ecosystem-based management. However, the new conservancies and ecosystem-based management were modelled in a sensitivity analyses, which are discussed in the '*conservancies*' and '*ecosystem-based management*' sections below.

Both of the aforementioned reports were completed by Timberline for the NC DFAM group and made available for public and First Nations review. These reports were submitted to me to assist in my AAC decision-making process.

The base case projected that the current AAC of 573 625 cubic metres could be maintained for four decades before declining by approximately 10 per cent in three decadal steps to a long-term level of 430 000 cubic metres by decade seven. This long-term level is 19 per cent higher than the long-term harvest level projected in the previous timber supply analysis, primarily due to a re-inventory of roughly half of the TSA since the previous timber supply review and revisions to the operability classification that increased the total harvesting land base by 22 per cent.

This projection was developed under the following assumptions:

- for the first 20 years of the simulation, harvest would be directed to priority watersheds (areas currently being developed and/or have approved forest development plans in place);
- disturbance in VQO areas would be limited to approximately 80 000 cubic metres per year, which is believed to be the maximum operationally feasible; and
- unsalvaged losses were estimated to be 10 100 cubic metres per year.

In addition to the base case forecast, I was provided with a number of sensitivity analyses and projections of alternative harvest flows carried out using the base case as a reference (as per the April 2006 *Timber Supply Analysis Report for the North Coast TSA*). These analyses have been helpful in specific considerations and reasoning in my determination. I am satisfied that the base case, and the other analyses, represent the best information currently available to me respecting various aspects of the projection of the timber supply in the North Coast TSA. I therefore, accept the base case forecast as a suitable basis from which to assess timber supply for the purposes of this AAC determination.

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 timber harvest

- general comments

The overall area of the North Coast TSA, as estimated from inventory data reported in the 2006 timber supply analysis, is 1 830 883 hectares. This total includes forested and non-forested lands of various ownerships such as parks, federal, Indian and military reserves, woodlot licence area, and private and other lands. Also included in the total area are 55 389 hectares of land that were transferred out of the TSA under the Nisga'a Final Agreement in 2002. All of these land base definitions have been appropriately removed from the North Coast TSA for timber supply analysis purposes.

Some of these areas do not contribute to timber harvesting or to forest cover requirements for other resource objectives and are excluded from the timber supply analysis. Although areas associated with the woodlot licence contribute to timber supply, these areas are administered and considered separately from the AAC for the TSA.

The timber harvesting land base includes those areas within the TSA that are currently considered to be economically and environmentally suitable and available for timber harvesting. In deriving the area of the timber harvesting land base for any TSA, a series of deductions are made from the total TSA area in recognition of many factors that, for economic or ecological reasons, effectively reduce the extent of the productive forest area that is suitable and available for timber harvesting. Some areas that do not directly supply harvestable timber, such as parks, conservation areas, and riparian reserves, do provide habitats and forest cover that assist in meeting a variety of management objectives in the TSA, thereby contributing indirectly to the timber supply of the TSA. In the analysis for the North Coast TSA, some of the most significant deductions were for areas considered unsuitable for harvesting operations for economic or physical reasons. These deductions are detailed in the April 2006 *Timber Supply Analysis Report for the North Coast TSA*.

Areas of productive forest that contribute to forest cover requirements, whether or not they contribute directly to the timber supply, are known as the productive Crown forested land base. For the North Coast TSA, after excluding other ownerships, non-forested areas, non-productive forest areas, existing roads, trails and landings, non-commercial brush, and alpine areas, the total productive Crown forested land base is 875 902 hectares.

Of the productive Crown forested land base, a total of 730 095 hectares are considered unavailable for harvesting. The area of the current timber harvesting land base so derived is 145 808 hectares, which equates to approximately 17 percent of the productive Crown forested land base, and eight per cent of the total TSA area.

My considerations of the reasonableness of specific land base deductions as applied in the analysis are documented as follows.

- *economic and physical operability*

Operability is based on accessibility for the purpose of timber harvesting, and the economics of operating in certain terrain and timber types. Land classified as not meeting this definition was excluded from the timber harvesting land base. Operable areas comprise 22 per cent of the productive Crown forested land base. In total, 685 627 hectares were removed from the productive Crown forested land base in the determination of the timber harvesting land base because they were considered inoperable.

The DFAM Group used updated operability mapping for the timber supply analysis. This mapping was updated in October 2001 by staff from MOFR, Integrated Land Management Bureau (ILMB) and the forest industry.

From public input, a representative for several environmental groups suggested that the extent of the operable land base is exaggerated, particularly where economic factors were considered, and recommended that “The DFAM group revises the data package to include stand types on which there has been performance over the last five years. Analysis includes removal of areas on which there is no past performance.” I note that operability is affected by changing market conditions and this is particularly applicable in the North Coast TSA. I have been advised that the DFAM group reviewed past performance over 6 years and over 12 years when considering what stand types to include in the timber supply analysis. I note that reviewing performance over a longer period ensures capturing a wider range of market conditions. The DFAM group were mindful that swings in market prices create uncertainty about which stands to include in the economically operable land base. I acknowledge that some of the more remote areas within the TSA have seen little past performance (i.e., north of the Nass River), and note that two sensitivity analyses were completed to investigate the implications of this uncertainty.

One of the sensitivity analyses indicated that impacts to timber supply are proportional to the change in size of the land base, such that increasing or decreasing the timber harvesting land base by 10 per cent results in a corresponding change in timber availability. Increasing the timber harvesting land base by 10 per cent projects the initial harvest level for an additional five decades, and indicates that long-term timber supply will increase by 4 per cent over a 250-year time horizon. Decreasing the timber harvesting land base by 10 per cent indicates that the decline to the long-term harvest level is likely to begin two decades sooner than projected in the base case.

A sensitivity analysis that investigated the potential impact of excluding the area north of the Nass River indicated that if the non-performance trend continues there would be a significant downward pressure on timber supply in the mid- and long-term.

I acknowledge this high degree of uncertainty associated with the size of the operable land base and in determining which parts of the TSA are economical to operate in, and am aware that the economics of operating in the North Coast TSA is very susceptible to market prices (i.e., an increase in pulp prices, relates to an increase in economic operability), particularly as it relates to the area north of the Nass River.

I am aware that there is currently an operability project within the Coast Forest Region to review operability and its dependence on economic conditions. This project highlights the uncertainty around defining operability in Coastal timber supply areas like the North Coast TSA. Although results of this project are not currently available, it is my expectation that these results will provide further useful insight and will be incorporated into the next TSR determination for the North Coast TSA.

I recognize that the operable land base identified on the map used in the 2006 analysis differs from the area identified in the previous timber supply review in regard to species profile, volume and a significantly larger land base. However, having reviewed and discussed with the North Coast Forest District staff, for the purposes of this determination, I consider the updated operable land base used in the timber supply analysis to be the best available and a reasonable estimation of current harvest opportunity.

As noted in ‘Implementation,’ I request that district staff and licensees complete a review of the timber operability for North Coast TSA within the next 2 years. Any new information arising from this operability review will be incorporated into the next timber supply review.

- *low productivity sites*

Low timber productivity occurs on sites not fully occupied by commercial tree species, or when factors inherent in the growing site (such as a poor availability of nutrients, a disadvantageous exposure, or the presence of excessive moisture), prevent a merchantable stand from reproducing within a reasonable time. Therefore, low timber productivity sites are not considered to contribute to timber supply.

The assumptions applied in the DFAM group’s analysis are a refinement of those used in the previous timber supply analysis. In deriving the timber harvesting land base for the 2006 timber supply analysis, a total of 5 844 hectares were classified as having low productivity and therefore were removed from the productive Crown forested land base. The majority of low productivity sites are located outside the operable land base.

From public input, a representative for several environmental groups recommended that “until the regeneration of low volume yellow cedar sites is better demonstrated they should not be included in the base case.” I have been advised that yellow cedar-leading

stands comprise about 3.3 per cent of the forested area in the TSA. Over 90 per cent were excluded from the timber harvesting land base for a variety of reasons (e.g., inoperable, low productivity). In addition, sites known to have regeneration problems were excluded from the timber harvesting land base using environmentally sensitive area mapping.

District staff also advised that harvesting in yellow cedar stands is limited, and that die-back of yellow cedar may be because the species is in decline, or it could be a climate related issue. There is currently a review of yellow cedar decline being carried out by district and regional staff. In the North Coast TSA, a low productivity research project, known as the HyP³ project, has been ongoing for the past several years. A follow up project, carried out during this timber supply analysis, to study operability of low productivity stands, may assist in the next timber supply analysis in deciding which sites should be included.

I am aware that ongoing research suggests that some low productivity sites may contribute to timber supply at some point in the future. If and when this is demonstrated, these stands can be incorporated in future analyses. In summary, I conclude that the assumptions used in the analysis regarding low productivity sites reasonably reflect current practice and are therefore suitable for this determination. I encourage those working on the low productivity stands study in the North Coast TSA to complete these studies and prepare an assessment before the next timber supply determination.

- *environmentally sensitive areas*

For the North Coast TSA, environmentally sensitive areas (ESAs) were mapped during the original forest inventory in 1970 and have not been updated with any of the subsequent forest inventories.

In the 2006 timber supply analysis for the North Coast TSA, areas were classified as either very sensitive or moderately sensitive to disturbance, and were wholly or partially removed from the timber harvesting land base. In the determination of the timber harvesting land base, 20 345 hectares classified as environmentally sensitive were excluded from the timber harvesting land base. There were no reductions made for wildlife or recreation areas. Instead, wildlife habitat requirements were addressed in other reductions to the timber harvesting land base (e.g., riparian, wildlife), and visual landscape management requirements were applied to recreation areas. The majority of ESAs are located outside the timber operable land base.

From public input, a representative for several environmental groups recommended that “The DFAM group uses current SINMAP model, but incorporates current MoF ESA net-downs and undertake a sensitivity analysis to incorporate objectives agreed at the NC LRMP Table with regard to all ESA criteria”. In the 2001 rationale, the previous chief forester instructed to ‘improve the data for soils sensitivity and slope stability, including additional collection of terrain stability data.’ This instruction was completed with the development of SINMAP, a model used for predicting terrain sensitivity. This model was then compared with the terrain stability map. In an analysis conducted on

five study areas by Madrone Environmental Services Ltd., they concluded that the SINMAP product was not sufficiently accurate to warrant use in operational planning or timber supply analysis.

I accept that the ESA mapping is currently the best available information for this determination.

- *deciduous and other non-merchantable forest types*

In the North Coast TSA, two deciduous forest types of consequence are found in the forest inventory. These are red alder and cottonwood, and together comprise less than 2 per cent of the Crown productive forest.

For this timber supply analysis, poorer quality red alder and cottonwood stands (those classified as older than 60 years) and any other deciduous stands were assumed to be non-merchantable and were excluded from the timber harvesting land base. Other non-merchantable stands excluded from the timber harvesting land base included all leading pine stands and stands having stocking class 2, 3, 4, and residuals. In total, 1 161 hectares of non-merchantable stands were removed from the productive Crown forested land base. The majority of non-merchantable stands (equivalent to 17 per cent of the productive Crown forested land base) are found outside of the operable land base.

I note that there are limited data on the quality and merchantability of deciduous stands. *A Red Alder (Alnus rubra) Inventory Review for the North Coast TSA* completed in 2003 by Kim Haworth of Kingfisher Forest Sciences indicates that there are 6 437 hectares of red alder stands (those stands composed of more than 50 per cent red alder), most of which are on good sites. With this in mind, the DFAM Group departed from assumptions made in the previous timber supply analysis, and included red alder stands in the timber harvesting land base based on increased market demand for red alder and on a 2 year red alder study prepared by John Kendall (*Red Alder Feasibility Assessment for the North Coast, 1999*).

A sensitivity analysis indicated that excluding cottonwood, red alder and other non-merchantable stands would have a negligible effect on timber supply and would not affect the short-term harvest level projected in the base case.

I believe it is appropriate to include some cottonwood and red alder stands to make opportunities available; however, the district needs to monitor harvest level over the next 5-year period so we can determine whether or not to continue to include these stands in future timber supply analyses.

- *estimates of roads, trails and landings*

In the January 2001 rationale for AAC determination, the former chief forester set an expectation for district staff to ‘work with licensees to collect permanent site productivity loss estimates for future roads.’ In response, the DFAM Group field measured 120 cross sections on twelve roads built 12 to 15 years ago. The results

showed an average road width of 13.3 metres, versus the 13.5 metres assumed in the previous analysis. District staff also completed 63 cross sections on five typical forest roads. Their data supported the findings of the DFAM Group. I acknowledge the efforts of the district and DFAM Group for validating these numbers.

In this analysis, 1 591 hectares of existing roads, trails and landings were removed from the productive Crown forested land base. The amount of permanent road area identified reflects current conditions in the TSA. Also, 7 838 hectares of land were removed from the timber harvesting land base after conventional harvesting had occurred, to account for all future road, trail and landing development.

District staff advises that helicopter harvesting operations have increased over the past three years. Heli-logging requires far less road, trail and landing development than convention harvesting operations. However, without more data it is difficult to predict the amount of future timber harvesting land base that may be lost to roads, trails and landings due to increased heli-logging operations. For future timber supply reviews, as I have noted in '**Implementation**', I request that district staff monitor the amount of roads, trails and landings built in the district relative to the amount of heli-logging. The results of these assessments can be incorporated in the next determination.

- *timber licence reversions*

Timber licences (TLs) are old tenure arrangements that give a licensee exclusive rights to harvest merchantable timber within the TL area. Until harvested, the timber harvesting land base in TLs does not contribute to the available timber harvesting land base for the TSA. After harvesting is complete and the TL tenure is closed, the associated timber harvesting land base is added to the TSA.

In the North Coast TSA, there are four TLs, excluding those associated with TFL 25. Two of these are closed, meaning the licence term has expired, and two remain open although no further harvesting is expected in either. All four TLs were excluded from the timber harvesting land base in the 2006 timber supply analysis. The two closed TLs account for a 223 hectare underestimate of the timber harvesting land base and 1 117 cubic metres of underestimated volume. The two open TLs account for a further 213 hectares of underestimated timber harvesting land base and 1 064 cubic metres of underestimated volume.

I encourage district staff to work on a process to get the closed TLs reverted, and to close and revert the two open TLs back to MOFR jurisdiction prior to the next timber supply review.

- *woodlot licences*

The *Forest Act* specifies that AACs determined for TSAs are exclusive of the areas and timber volumes associated with woodlot licences.

In the analysis, the Schedule B lands associated with the one woodlot licence issued from the North Coast TSA was excluded from the productive Crown forested land base. It therefore made no contribution to the timber supply projected in the analysis. Any new woodlots issued in the future will be similarly accounted for in future timber supply reviews.

I am satisfied that the 2006 timber supply analysis accounts appropriately for the existing woodlot licence area.

- *conservancies*

The North Coast LRMP and that portion covering Princess Royal Island in the Central Coast LRMP are within the North Coast TSA boundary. The North and Central Coast LRMP table recommendations informed government-to-government discussions between the Province and First Nations with interests in the North and Central Coast. Those discussions resulted in the Provincial government and First Nations land use announcement ‘*A New Vision for Coastal BC*’ on February 7, 2006, followed by the signing of government-to-government agreements. The land use decisions provide final land use zoning for conservancies, mining and tourism areas and ecosystem-based management.

In April 2006, the *Park Act* was amended to create a new designation of protected area called a ‘conservancy’. Conservancies are set aside to protect and maintain their biological diversity and natural environments, to preserve and maintain social, ceremonial and cultural uses of First Nations, and to protect and maintain their recreational values. The *Park Act* also directs that conservancies are set aside to ensure that development or use of their natural resources occurs in a sustainable manner consistent with the three purposes identified above.

Specific prohibitions within conservancies include commercial logging, mining, hydro-power generation, other than local run-of-the-river projects, and petroleum and natural gas drilling that requires use or disturbance of conservancy land. Other uses may be permitted in a conservancy, provided that they do not restrict, prevent or inhibit the development, improvement or use of the conservancy for its intended purpose.

On September 28, 2006, I released two Chief Forester Orders under Section 173 of the *Forest Act* to reduce the North Coast AAC to account for the North Coast Designated Area (NCDA) No. 2 (*B.C. Reg. 81/2006*) and Central Coast Designated Area (CCDA) No. 2 (*B.C. Reg. 82/2006*). In total, under this Section 173 reduction, the AAC for the North Coast TSA was temporarily reduced by 138 000 cubic metres (24 per cent)—115 000 cubic metres to account for the NCDA and 23 000 cubic metres to account for the CCDA.

Since the release of the September 28, 2006 orders, 65 conservancies have been established by legislation within the two coastal LRMP areas. Twenty-four conservancies were established in April 2006, and 41 conservancies were established in April 2007. I note that since these orders were released in 2006, there have been some

minor adjustments to names and boundaries made to the areas denoted in the NCDA and CCDA as a result of subsequent government to government discussions. Of these areas within the North Coast TSA, the following conservancies have been established:

Legislated Conservancies (2006)	Total area protected (hectares (ha))	Estimated area in mature timber harvesting land base (ha)
Banks Nii Luutiksm Conservancy	19 132.0	94.6
Crab Lake Conservancy	12 798.5	0.0
Gitxaala Nii Luutiksm / Kitkatla Conservancy	28 099.5	580.4
Kitasoo Spirit Bear Conservancy	102 957.0	1 718.5
K'ootz / Khutze Conservancy	34,193.6	0.0
K'lgaan / Klekane Conservancy	18 383.4	0.0
K'mooda/Lowe-Gamble Conservancy	14 464.9	423.5
K'nabiyaaxl / Ashdown Conservancy	727.5	0.0
Ksi Xts'at'kw / Stagoo Conservancy	11 432.8	839.2
Kt'll / Racey Conservancy	1 261.5	71.2
Lax Ka'gaas / Campania Conservancy	20 520.2	139.6
Lax Kul Nii Luutiksm / Bonilla Conservancy	1 585.1	11.5
Lax Kwil Dziidz / Fin Island Conservancy	1 903.3	13.0
Moksgm'ol / Chapple-Cornwall Conservancy	29 139.3	3 406.9
Monckton Nii Luutiksm Conservancy	24 793.9	771.7
Q'altanaas / Aaltanhash Conservancy	18 784.3	0.0
TOTAL	339 176.8	8 070.1

Note: Q'altanaas/Aaltanhash Conservancy, K'ootz / Khutze Conservancy, K'lgaan / Klekane Conservancy and Crab Lake Conservancy are within TFL 25. Part of the Kitasoo Spirit Bear Conservancy is also within TFL 25.

Legislated Conservancies (2007)	Total area protected (hectares (ha))	Estimated area in mature timber harvesting land base (ha)
Alty Conservancy	8 428.0	100.2
Bishop Bay - Monkey Beach Conservancy	4 277.7	481.4
Bishop Bay - Monkey Corridor Conservancy	16.8	0.8
Ethelda Bay-Tennant Island Conservancy	61.0	0.0
Larcom Lagoon Conservancy	311.4	0.0
Ktisgaida / MacDonald Bay Conservancy	483.7	21.2
K'waal Conservancy	3 313.6	402.5
Shearwater Hotsprings Conservancy	33.9	0.0
Simpson Lake East Conservancy	53.6	0.0
Smithers Island Conservancy	127.1	0.0
Stair Creek Conservancy	861.0	78.9
Maxtaksim'aa / Union Passage Conservancy	1 826.5	171.9
K'Distsausk / Turtle Point Conservancy	147.5	24.6
TOTAL	19 941.8	1 281.5

Note: Shearwater Hotsprings Conservancy is within TFL 25.

TOTAL 2006 & 2007	359 118.6	9 351.6
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In the 2006 timber supply analysis, the DFAM Group recommended that the AAC could remain unchanged for one decade. However, the base case forecast did not account for conservancies created since the previous timber supply review. When compared with the base case, the forecast shown in the protected areas sensitivity analysis better reflects the current timber supply. Timber supply is significantly impacted in the mid- and long-terms when protected areas are accounted for in the forecast. Overall, this analysis shows there is a 24 per cent reduction in timber supply over the planning horizon as a result of the new conservancy areas.

As a result of these areas within the NCDA and CCDA being established as conservancies in 2006 and 2007, the mature timber harvesting land base assumed in the 2006 timber supply analysis is overestimated by 9 352 hectares. Further analysis by the MoFR Regional Timber Supply Forester, indicated that the volume associated with these established conservancies is approximately 44 000 cubic metres. To account for these areas in this determination, I am now removing these established conservancies from the North Coast TSA. The two September 28, 2006 Chief Forester Section 173 Orders that temporarily reduced the AAC by 138 000 cubic metres are now rescinded in full. As discussed below, and in the ‘**Determination**’ section, these orders will be replaced with a new order covering those designated areas that have not yet been established. All of the areas pending establishment are within the NCDA.

The following table identifies the remainder of the designated areas reduced in the September 2006 order. These areas are pending establishment as conservancies or are identified as no timber harvesting zones and announced as “mining and tourism areas”. It is expected that *Land Act* objectives establishing no harvesting in the “mining and tourism areas” will occur in the near future. I note that while called “mining and tourism areas” both mining and tourism may not necessarily be the focus in the specific areas. For instance, Alwyn Lake is principally set aside to protect Port Edwards watershed while Citeyats, Rachel and Kinahan Islands reflect cultural interests. The pending conservancies and “mining and tourism areas” combined represent a mature total harvesting land base area of approximately 20 126 hectares. Through further analysis, the total volume represented by these areas is 94 000 cubic metres.

Within this AAC determination, I am considering only those areas that have been established. If and when the pending conservancies and “mining and tourism areas” are formally established as conservancies, there will be an immediate impact on timber supply. To account for these pending areas, I am releasing a revised Order under authority of Section 173 of the *Forest Act*, stipulating that the new AAC will be reduced by 94 000 cubic metres effective November 6, 2007. I have discussed the established and pending conservancies in ‘**Reasons for Decision**’ below.

Pending	Total area protected (hectares (ha))	Estimated area in mature timber harvesting land base (ha)
Alwyn Lake Mining and Tourism Area	1 370.1	29.5
Banks / Principe Mining and Tourism Area	13 486.7	252.1
Citeyats Mining and Tourism Area	31.9	7.0
Dawson / Stagoo Mining and Tourism Area	31 878.8	1 094.5
Kinahan Islands Mining and Tourism Area	109.2	0.0
Kitsault Mining and Tourism Area	516.8	102.5
Kshwan	55 997.3	722.4
Porcher Mining and Tourism Area	18 279.3	410.7
Rachael Islands Mining and Tourism Area	49.7	14.1
Quaal Mining and Tourism Area	50 247.2	4 163.2
Dundas-Melville Conservancy	33 419.6	182.0
Ecstall Headwaters Conservancy	13 119.0	66.6
Ecstall-Sparkling Conservancy	39 798.4	1 936.4
Ecstall-Spoksuit Conservancy	10 415.9	34.7
Gunboat Harbour Conservancy	29.5	9.0
Kennedy Island Conservancy	5 261.0	776.6
Khtada Lake Conservancy	13 648.6	614.8
Khutzeymateen Inlet Conservancy	10 266.8	790.9
Khutzeymateen Inlet West	1 465.5	239.8
Khyex Watershed	41 460.4	2 073.4
Klewnugget Conservancy	6 789.5	126.2
Ksi X'anmas Conservancy	33 565.4	4 792.6
Lucy Islands Conservancy	205.6	0.0
Manzanita Cove	20.8	0.0
Pa_aat West Conservancy	4 812.0	611.4
Skeena Bank Conservancy	652.5	5.7
Stephens Island Group	14 272.8	14.5
Thulme Falls	64.4	2.4
Tuck-Woodworth Lake Conservancy	4 586.5	452.7
Union Lake Conservancy	6 342.1	584.3
Wales Harbour Conservancy	753.3	7.4
Winter Inlet Conservancy	30.3	2.1
Zumtela Bay	17.7	6.9
TOTAL	412 964.6	20 126.2

Note: Lucy Islands Conservancy has no productive Crown forested land in North Coast TSA.

Existing forest inventory

- forest inventory – general comments

The forest inventory for the North Coast TSA was completed between 1994 and 1996 to the old forest inventory planning (FIP) standard. The forest inventory was updated to 1999 for depletions, and in 2001, converted to the new vegetation resource inventory

(VRI) format. Major licensees harvesting and road construction data from 1999 to 2004 was used to update the forest cover information for the 2006 timber supply analysis dataset.

The 1999 inventory audit results for the North Coast TSA showed this forest inventory to be statistically acceptable at a TSA wide scale and the current inventory to be more accurate than the old inventory. When compared with the previous inventory, the current inventory shows more productive forest that may be the result of finer delineation of areas that were originally broadly classified as alpine forest. The audit also suggested that the mature volume component of the old inventory could be overestimated. Anecdotal evidence indicates that stand attribute errors such as in species composition, age, and height are considerable but these errors roughly balance out over the inventory. Licensees and district staff advise that this statistically acceptable inventory is not very reliable for operational planning, and I accept that due to the nature of deriving forest inventory on a land base the inventory will be unreliable for detailed operational planning purposes.

I am concerned about the uncertainty associated with the quality of the forest inventory and lack of continuous updates for forest cover delineation since the previous timber supply review, on timber supply. As noted below in **‘Implementation’**, as an instruction for next timber supply review, I request that branch, region, and district staff work together to develop an action plan within the next two years that will address forest inventory uncertainties. Any new information can be incorporated into the next timber supply analysis.

I acknowledge that the forest cover information used in this timber supply analysis is the best information available, is suitable for doing this type of timber supply analysis and forms a good basis on which to make my determination.

- *age class structure*

Age class structure data, extracted from the inventory file is used in timber supply analyses to project forest stand conditions over time. Age class assumptions can impact timber supply at any point in the analysis horizon since they form the basis against which minimum harvestable ages, green-up requirements and other forest cover constraints are applied, and yield is estimated.

The age class distribution for the North Coast TSA reflects a predominantly old forest with relatively little logging or disturbance history. Approximately 62 per cent of the area outside the timber harvesting land base and 72 per cent of the area within the timber harvesting land base is currently covered by stands older than 250 years.

A review of age class structure by the DFAM group revealed concerns about the accuracy of stand age in the inventory. Some recent field sampling showed stands classified as age class 7 and 8 are actually age class 9. However, these samples were not large enough to make any statistically valid adjustments to the current inventory.

Consequently, the DFAM Group recommended that the current inventory be used without any adjustment to stand ages.

A sensitivity analysis showed that reducing the minimum age for old growth from 250 years to 200 years had no impact on the base case harvest level. This suggests older forest requirements are not limiting due to the high proportion of older forests located outside of the timber harvesting land base. As a result, correcting some age class 7 and 8 stands to age class 9 would likely not impact the base case projection.

I concur with the DFAM Group's recommendation that the current inventory be used without any adjustment to stand ages, as the perceived inaccuracy in stand ages does not affect harvest level projected in the base case forecast. I am satisfied that the age class structure was appropriately reflected in the timber supply analysis.

- *species profile*

Within the North Coast TSA timber harvesting land base, the species profile greater than 120 years of age is predominantly hemlock (approximately 55 per cent) and cedar (approximately 30 per cent), while spruce and balsam stands comprise the remainder.

In the 2006 timber supply analysis, forest stands having similar species were grouped by inventory type group for the purpose of applying base case assumptions and tracking the projected harvest. There are a total of nineteen groupings that are similar to those used in the previous timber supply analysis.

In preparing for this timber supply analysis, the DFAM Group compared the inventory species profiles with the actual volume harvested by species. Although they observed a higher representation of cedar and spruce in the last six years of harvest, and that over the last twelve years of harvest history, the cedar and spruce profiles became more similar; they made no recommendations to address harvesting to the species profile. They further concluded that the harvested species profile roughly reflects the inventory species profile.

District staff advised me that the harvesting practices in the past 6 years in the North Coast TSA have predominantly been partial harvesting of western redcedar and yellow cedar. Although tied to species profile, I discuss the harvesting of western redcedar and yellow cedar further in the '*timber supply / harvest profile*' section below.

I accept that the species distribution adequately reflects the forest inventory of the North Coast TSA. As noted in '**Implementation**' below, I instruct licensees to monitor the harvest of the species profile within the North Coast TSA, and to report annually on their harvest performance.

- *volume estimates for existing natural stands*

Existing natural stands are those stands that have not been logged, or are not subject to forest management by planting or density control. In the North Coast TSA, these include those stands defined as untreated stands older than 24 years.

For the 2006 timber supply analysis, the Variable Density Yield Prediction (VDYP) model was used to estimate volumes for existing natural stands. The VDYP model used forest inventory zone (FIZ) A, and public sustained yield unit (PSYU) 173 references to assign decay, waste and breakage factors, and to obtain net volume per hectare. Existing natural stands were grouped by clearcut management and heli-log variable retention harvesting. These assumptions are described in the April 2006 *Timber Supply Analysis Report for the North Coast TSA*. The analysis yield tables indicated the projected short- and mid-term harvest levels are very sensitive to changes in volume estimates for existing stands. If volumes are over-estimated by 10 per cent the timber supply over the next 120 years would be 8 per cent less, however, as harvesting moves more into the second growth timber supply there is no long-term impact.

I am aware that the main issue in the North Coast TSA that exists today is the difficulty to find sawlog quality timber. Although volumes appear to exist, in a market driven industry the quality of the timber may not be what the market demands. Shifts in market demand could occur at anytime in the future, and if and when there is a market shift, so shall the availability of desired timber volume.

I have considered the information on existing stand yield estimates, and believe that there is still some uncertainty about the quality of the timber associated with the yields projected in the analysis. As mentioned earlier, branch, region and district staff need to work on a plan to address the uncertainties in the forest inventory. I will take into account the risk to timber supply and will discuss this further under '**Reasons for Decision**'.

Expected rate of growth

- *site productivity estimates*

In British Columbia the productive potential of a forest stand to grow timber is expressed by a measure known as the 'site index.' A site index is determined from the height and age of the largest trees in a stand, typically expressed as the height at age 50 years. Tree height is directly related to volume. This measure indicates that the taller the largest trees are at age 50 years, the better the site productivity of the site. Site productivity largely determines how quickly trees will grow; this in turn affects the time seedlings will take to reach green-up conditions, the volume of timber that can be produced, the age at which a stand will satisfy mature forest cover requirements, and the age at which it will reach a merchantable size.

The most accurate estimates of site productivity are typically derived from stands between 30 and 150 years of age. The growth history of stands younger than 30 years is often not long enough to give an accurate measurement of site productivity. Estimates derived from older stands tend to underestimate productivity, as these stands are often

well past the age of maximum growth in height, and in their advanced age have often been affected by disease, insects and top damage.

Numerous studies in British Columbia, such as the MOFR Old-Growth Site Index (OGSI) project, have confirmed that site indices for stands older than 140 years and for those younger than 30 years (with a site index determined from the previous stand) are typically underestimated; when old stands are harvested and regenerated, the actual productivity realized in the new stands is generally higher than predicted in the inventory-based site index estimates. Under estimates between 20 per cent and 30 per cent have been commonly seen in other areas of the province. To accurately predict growth and yield in managed stands in British Columbia, site indices are needed that reflect the true potential of growing sites.

In areas where local site-index studies have been carried out to obtain definitive data, timber supply can be projected from improved productivity figures. In his January 2001 North Coast AAC determination, the former chief forester requested that district staff obtain improved site productivity information for the managed stands in the TSA. A SIBEC analysis was completed and data inputs into the analysis included the North Coast Predictive Ecosystem Map (PEM) and the SIBEC field data.

The DFAM group recommended using SIBEC estimates for the 2006 timber supply base case. However, Research Branch specialists advised that the PEM was not sufficiently accurate for use in assigning site index in the base case. Therefore, SIBEC estimates were instead applied in two sensitivity analyses.

The first sensitivity analysis examined the impact of applying provincial SIBEC estimates, using the PEM mapping, for managed stands. Using the SIBEC estimates increased the average mean annual increment (MAI) (rate of growth) by approximately 105 per cent. I note that the effect of this increase on long-term timber supply is significant. The second sensitivity analysis examined the impact of applying 85 per cent of the SIBEC estimates for managed stands. This resulted in an increased MAI of 55 per cent as compared to the base case with an associated increase in timber supply.

I have reviewed the two sensitivity analyses and discussed the results with BCFS staff. Based on my experience in other units, I find it likely that the site indexes assumed in the base case are underestimated, but to a degree that is uncertain. I also note that given the increasing use of partial cutting and the application of EBM on the landscape, the timber supply effects of SIBEC-based estimates may not be fully realized operationally. Therefore, until the accuracy of the PEM is improved and EBM is further implemented, I have not accounted for the results of the sensitivity analyses in this determination.

From public input, a representative for several environmental groups recommended that “Any volume increases found through better estimates in site index be applied to maximize public good including reducing risk to non-timber values prior to allocation to increase the AAC.” As noted above, SIBEC-based site index values were not used in the base case because of concern over their accuracy. I note that the effect on yield of using accurate SIBEC-based estimates could work to reduce risk to non-timber values as well

as potentially increase timber supply. Nevertheless, as a matter of course I consider reducing risk to non-timber values before contemplating increases in AAC.

In conclusion, I am satisfied that the site index values used in the base case are adequate for use in this determination. Before the next timber supply review, I encourage the licensees to improve the PEM so that SIBEC estimates can be considered in the next determination, noting my concern about the applicability of these estimates in partially harvested stands. As noted in the **'Implementation'** section, I instruct district and region staff and local licensees, to work on completing the SIBEC studies within the next two years. Any new information can be incorporated in future determinations.

- *volume estimates for regenerating stands*

In the 2006 timber supply analysis, timber volumes for managed stands were estimated using the standard MOFR growth and yield model Table Interpolation Program for Stand Yields (TIPSY). This included stands less than 25 years of age, future managed stands, and those stands up to age 40 if they have been subject to forest management by planting and density control to the degree that they would exhibit different growth characteristics and attributes in comparison with existing, natural stands.

All TIPSY projections are initially based on ideal conditions, assuming full site occupancy and the absence of pests, diseases and significant brush competition. However, certain operational conditions, such as a less-than-ideal distribution of trees, the presence of small non-productive areas, endemic pests and diseases, or age-dependent factors such as decay, waste and breakage, may cause yields to be reduced over time.

In the North Coast 2006 analysis, the provincial standard operational adjustment factors (OAFs) of 15 percent for OAF 1 and 5 percent for OAF 2 were applied. These two OAFs were applied to yields generated using TIPSY, to account for losses of timber volume. OAF 1 is designed to account for factors such as small stand openings that affect the yield curve across all ages. OAF 2 accounts for factors such as pests, disease, decay, waste and breakage, whose impacts tend to increase over time. As discussed later in the 'riparian management' section, an additional reduction of approximately 4 per cent was applied to clearcut management yield tables to account for riparian management.

I am confident that volume estimates for managed stands are appropriate for the purposes of this determination.

- *minimum harvestable ages (MHAs)*

In timber supply analysis, minimum harvestable ages are estimated as a measure of the earliest age at which a forest stand will have grown to a harvestable condition. Minimum harvestable ages affect when second-growth stands will become available for harvest, which in turn affects how quickly existing stands may be harvested while maintaining a stable flow of harvestable timber.

In practice, economic considerations such as piece size (minimum diameter) and constraints on harvesting that arise from managing for such values as visual quality, wildlife and water quality may influence the actual minimum harvestable age. Minimum harvestable ages are no more than estimates of when immature or future managed stands will become available for harvest. It is expected that not all stands will be harvested at this age, but theoretically harvesting may occur at this age to meet a harvest target for a relatively short period of time or to avoid large and abrupt changes in harvest levels. In some areas, stands may not be harvested until they are much older than the minimum harvestable age, due to extended rotations for forest cover requirements such as old forest objectives for landscape biodiversity.

For the 2006 North Coast timber supply analysis, minimum harvestable ages were defined based on species groups, harvest method and a minimum range threshold. Natural stands in the North Coast TSA are very old and harvested well beyond the minimum ages used in the timber supply analysis.

A sensitivity analysis was conducted to show the impact on timber supply if the minimum harvestable ages were increased or decreased by ten years. The results showed that in the short-term, timber supply is not sensitive to moderate changes in MHA, whereas in the mid-term, moderate changes would slightly affect timber supply. There was no impact to the long-term timber supply.

I conclude that the minimum harvestable ages are reasonable and appropriately modeled in the timber supply analysis. I therefore find them suitable for use in this determination.

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

Expected time of re-establishment

- *regeneration delay*

Regeneration delay is the period between harvesting and the time at which an area becomes occupied by a specified minimum number of acceptable, well-spaced seedlings.

In the North Coast TSA, an analysis completed for previous timber supply analysis based on harvesting between 1990 and 1995 determined the regeneration delay was approximately 1.2 years. District staff advised me that the practice of prompt

regeneration has not changed since the last AAC determination in January 2001. Therefore, I am satisfied basic silvicultural obligations are being met in the TSA, and that the regeneration assumptions are suitably modeled in the base case analysis as representative of current practice.

- *not satisfactorily restocked areas*

Not-satisfactorily-restocked (NSR) areas are those where timber has been removed, either by harvesting or by natural causes, and a stand of suitable forest species and stocking has yet to be established. Areas where the standard regeneration delay has not yet elapsed since harvesting are considered ‘current’ NSR. This value fluctuates with the amount of disturbance, harvesting or fires that occurs. Since 1987 there has been a legal obligation to reforest harvested areas with appropriate commercial species. Where a site was harvested prior to 1987 and a suitable stand has not yet been regenerated, a classification of ‘backlog’ NSR is applied.

For the 2006 North Coast timber supply analysis, NSR land was included in the timber harvesting land base except where it would be excluded for other reasons such as those areas assessed as inoperable or as permanent NSR. A total of ninety-one hectares of NSR were identified as permanent NSR and were excluded from the timber harvesting land base. When considering the net down order in the timber supply analysis, this equates to the current estimate of 199 hectares of non-productive backlog NSR. Refer to the ‘rehabilitation programs’ section for further discussion.

From public input, a representative for several environmental groups recommended that, “The 4,591 hectares classified as backlog NSR and current NSR be removed from the timber harvesting land base to reflect their poor volume performance. They can be considered to contribute to the future TSR once they are classified as stocked based on regenerations surveys.” I note that land considered as permanent NSR was removed from the timber harvesting land base. The remaining areas are either stocked or will be within approximately 2 years, thereby meeting our current growth assumptions, or have attained free growing status. The data contained in VRI and RESULTS does not reflect current conditions. As mentioned earlier in the ‘*forest inventory- general comments*’ section, I am concerned about the lack of continuous updates for forest cover delineation since the previous timber supply review and this impact on analyzing timber supply. More regular updates incorporated into VRI and RESULTS would ameliorate misleading data. This further supports the instruction for MOFR staff to develop an action plan that would address forest inventory uncertainties before the next timber supply analysis.

I have reviewed the information and I am satisfied that the assumptions applied in the timber supply analysis regarding NSR areas were appropriate and reasonably reflect current conditions in the TSA. Therefore, I have made no adjustments to account for NSR areas.

(iii) silvicultural treatments to be applied to the area

Silviculture treatments

- *silvicultural systems*

Within the North Coast TSA, harvesting practices have changed significantly over the past 6 years. District staff informed me that approximately 80 per cent of the new blocks proposed in recent forest development plan amendments are scheduled for partial harvest primarily using a helicopter harvest method.

The previous timber supply analysis modeled 99 per cent clearcutting and 1 per cent partial harvesting. For the 2006 timber supply analysis, the DFAM group indicated that current practice was 50 per cent clearcutting and 50 per cent partial cutting, spread evenly between aggregate retention and dispersed retention, and recommended that the base case model this. The modeling assumptions used to address this recommendation included non-visually sensitive areas, approximately 20 per cent western redcedar, and helicopter attribute designations, resulting in approximately 7 per cent of the timber harvesting land base being assigned to variable retention analysis units.

In visually sensitive areas the modelling assumption used was clearcutting with added restrictions on the rate of harvest. Yields from regenerated stands in partial harvest regimes may be different than those in clearcutting regimes, adding to the uncertainty in this analysis.

A field review of the partial harvesting systems conducted by branch and district staff in 2005 indicated that partial harvesting practices are varied within the North Coast TSA. Some of the practices include single stem removal leaving dispersed retention, and group removal leaving aggregate retention; planting the harvest gaps with desired species to not planting the gaps and relying on natural regeneration; levels of retention varying from 30 to 80 per cent of poorer quality and poorer value trees; levels of residual hemlock dwarf mistletoe vary from none to significant; targeting predominantly larger western redcedar and yellow cedar for removal; post harvest residual western redcedar and yellow cedar levels are generally low but vary from none to small to moderate amounts.

I am aware of benefits of partial harvesting, specifically in areas where partial harvesting results in large gaps, to promote regeneration of economically viable species like western redcedar in the future. Partial harvesting can also be an effective tool to realizing other management objectives.

I am also aware of several major concerns that arise with current partial harvesting practices, such as small gaps will not regenerate back to cedar easily or will result in very slow growth of young growing stock, although larger patch cuts (0.3 to 1 hectare in size) can be successfully planted with cedar and growth rates would be expected to be good; many of the residual stands had significant hemlock mistletoe overstory, which occupies the growing sites but will never be desirable from a timber harvest perspective; the lack of roads and infrastructure generally may preclude economically viable future

stand entries and multiple cutting cycles associated with true uneven-aged management; partial cutting regimes result in increased edge/tree canopy effect, which theoretically reduces growth rates in the regeneration layer and is expected to significantly increase rotation length, especially in stands where minimal levels of the more valuable western redcedar and yellow cedar are retained; high retention partial cuts create a large footprint of forest harvesting activity relative to clearcut harvesting; some portions of the landscape may be economically locked up and unavailable for future harvest for many years due to the extraction of the high value component of the stands; and past partial harvest does not appear to be confined to physically constrained areas, a practice that has recently received increased scrutiny.

Out of these concerns associated with partial harvesting, I am concerned with the level of planning and design with respect to mid-term management and intervention of partial cut stands. In areas where high value species are removed, leaving low value future crops that minimize the potential for a second entry in the future, I have serious concerns about how these prescriptions will affect future timber harvesting opportunities.

As mentioned earlier, there is ongoing work on cedar management practices for the future. As noted in **‘Implementation’**, I request district staff to further quantify the scope and scale of the issues they see with the application of partial harvesting in the district. This would include, but not be limited to, stand level practices as well as monitoring timber harvesting relative to the species profile of the North Coast TSA.

In conclusion, I have reviewed the information regarding the base case for silvicultural practices and am aware that the base case assumptions underestimated the level of partial cutting in the district. I have considered this when making my determination as discussed under **‘Reasons for Decision’**.

- *incremental silviculture*

In general, incremental silviculture includes activities such as juvenile spacing, pruning and fertilization that are not part of the basic silviculture obligations required to establish a free-growing forest stand.

In the January 2001 AAC determination rationale, the former chief forester’s instructions were for the licensees to continue to evaluate the potential for an increased juvenile spacing program. To that end, a report entitled *‘Stand Density Control Overview Reconnaissance and Inventory for the NC TSA’* was completed. Based on a set of pre-determined criteria the report identified approximately 950 hectares of high priority, approximately 6 100 hectares of medium priority and approximately 2 600 hectares of low priority spacing opportunities. Any available funding will be concentrated on the high priority areas.

The 2006 timber supply analysis modeled 2 393 hectares on growth and yield curves appropriate for thinned stands, and no other incremental silvicultural activity such as pruning or fertilization, was assumed. MOFR district staff considered this to reasonably

reflect current practice in this TSA as in the past 5 years, approximately 22 hectares have been spaced; no pruning has taken place, and fertilization has only been used for site rehabilitation work. No operational fertilization has occurred to provide incremental growth. Research data in support of operational fertilization in the TSA is inconclusive.

I note that the level of incremental silviculture undertaken in a TSA is very dependent on funding and is difficult to project into the future. If the amount of incremental silviculture actually practiced differs significantly in future from that assumed in the analysis, this can be reflected in future determinations. For the purposes of this determination, I am satisfied that the assumption in the analysis reflects current practice.

- *rehabilitation programs*

In the North Coast TSA, no site rehabilitation or stand conversion projects are currently ongoing or planned. Opportunities are extremely limited and for the most part are considered uneconomic.

Future potential rehabilitation projects include:

- Backlog NSR – From the January 2001 AAC determination rationale, “1 942 ha of backlog NSR exists however most areas have a level of stocking that would hinder rehabilitation opportunities”. In 2004, seventy-two of these old cut-blocks were reviewed and it was determined that 1 312 hectares had sufficient stocking and 199 hectares were not productive, no rehabilitation opportunities were identified.
- Slides - Some slides within active harvesting areas are currently being rehabilitated, whereas the more isolated slides are not being treated.
- Alder conversion - there is limited opportunity to convert stands and there is increased interest in harvesting opportunities.

The 2006 analysis did not account or model for any site rehabilitation/stand conversion, however, if further opportunities are identified and treated, I note that there would be a slightly positive effect on timber harvesting land base. For the purposes of this determination, I am satisfied that the analysis assumptions are accurate. Any changes in operational practices that occur over time can be reflected in future analyses.

- *commercial thinning*

Commercial thinning is a partial cutting silvicultural system in which some volume is removed from an immature stand after components of the stand have reached a merchantable size. The volume removed during the commercial thinning is sold and therefore contributes to timber supply. Commercial thinning activity may not significantly affect overall timber supply but does offer increased flexibility with respect to timing and location of harvest.

No commercial thinning was considered during the 2006 timber supply analysis. Commercial thinning is not a current practice in the North Coast TSA, as there are not enough second-growth stands old enough to commercial thin, and steep, rugged terrain with expensive access costs renders commercial thinning uneconomical.

Changes in operational practices that may occur can be reflected in future analyses. I am therefore satisfied that the assumptions applied in the analysis appropriately reflect current practice in the TSA.

- (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

- *utilization standards and compliance*

Utilization standards define the species, dimensions and quality of trees that must be harvested and removed from an area during harvesting operations.

The North Coast TSA utilization standards specify a 15 centimetre minimum top diameter, inside bark, a 30 centimetre maximum stump height and a 17.5 centimetre minimum diameter-at-breast-height for existing stands older than 120 years. The 2006 timber supply analysis used the VDYP growth and yield model that calculates volumes based on a 10 centimetre top diameter for both existing and managed stands. District staff advised me that this is a higher utilization standard than the one used in practice.

I note that the utilization criteria used in the timber supply analysis differ with those used in actual practice. However, past work done by MOFR Research Branch demonstrates that volume estimates compiled using a 15 centimetre top versus a 10 centimetre top are minimal. I am satisfied that the utilization criteria assumed in the timber supply analysis reflect current practice and therefore suitable for this determination.

- *decay, waste and breakage*

As noted earlier in the '*volume estimates for existing natural stands*' section, the VDYP model used in the 2006 timber supply analysis to project volumes for existing unmanaged stands incorporated estimates of the volumes of wood lost to decay, waste and breakage. These estimates of losses have been developed for various areas of the province based on field samples.

For volume estimates in regenerated managed stands, as noted earlier in the '*volume estimates for regenerating stands*' section, operational adjustment factors (OAFs) were used with the TIPSYP program to account for decay, waste and breakage. The same OAFs that are applied to clearcut managed stand yield tables were applied to variable retention yield tables. I note that OAFs are likely higher for variable retention stands resulting in a potential overestimation of the current volume estimates from these stands.

Within the North Coast TSA, relatively low stumpage rates encourage waste left on site. I note that there is an unknown downward pressure on the timber supply that may result as higher amounts of waste and residue are left behind. Currently, there exists a waste benchmark, below which licensees are not assessed for the sawlog volume left on site, however, this volume is accounted for their cut control. I encourage district staff, before

the next timber supply review, to collect more data for decay, waste and breakage such that a comparison between VDYP decay, waste and breakage factors, with the actual or ocular estimate of waste and residue left on site, and with billed volume can be analyzed for improved utilization and to monitor how the new administration co-relates with volumes projected from the timber supply analysis.

I have reviewed the information regarding decay, waste and breakage estimates and am satisfied that appropriate procedures were followed in this analysis to account for decay, waste and breakage in managed and unmanaged stands, and that the base case projection incorporates the best available information for this determination.

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

Integrated resource management 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 Practices Code (Code)*, 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. Consequently, the extent that integrated resource management (IRM) objectives for various forest resources and values affect timber supply, must be considered in AAC determinations.

In the 2006 North Coast timber supply analysis, some IRM objectives including environmentally sensitive areas, riparian zones, areas of cultural significance, and wildlife tree patches, were addressed through reductions in the timber harvesting land base. I have accounted for the environmentally sensitive areas factor in the ‘land base contributing to timber harvesting’ section. In this section, I account for IRM objectives where the affected portions of the land base continue to contribute to timber supply but are subject to various management requirements with respect to forest cover and adjacency.

- *cutblock adjacency and green up*

Adjacency, green-up and forest cover objectives guide harvesting practices to provide for a distribution of harvested areas and retained forest cover in a variety of age classes across the landscape. To manage for all resources, operational practices limit the size and shape of cutblocks, and prescribe minimum ‘green-up’ heights required for regeneration on harvested areas before adjacent areas may be harvested. Green-up requirements help to achieve objectives for water quality, wildlife habitat, soil stability and aesthetics.

Cutblock adjacency is accounted for in modelling through disturbance category and is defined as the total area below a specified green up height or age. In the 2006 timber supply analysis, green-up height requirements for preservation, retention, and partial retention visual quality objective (VQO) zones were set at seven metres, while the modification VQO zones were set at four metres. In addition, green up heights for integrated resource management areas were set at three metres and five metres within Community watersheds.

Results of a sensitivity analysis indicated moderate sensitivity to either increasing or decreasing the green up height by one metre from the base case assumptions.

I have reviewed the information regarding cutblock adjacency and green-up and am satisfied that they appropriately reflect current practice. I accept the information for this determination and make no adjustment as there are no issues that would pose a risk to timber supply.

- *visual quality objectives*

The *Forest and Range Practices Act* enables scenic areas to be designated, and VQOs to be established, so that the visible evidence of forest harvesting may be kept within acceptable limits.

In the North Coast TSA, there are four established scenic areas: Inside Passage, Skeena River Corridor, Portland/Work Channel, and Douglas/Gribbell. In May 2006, VQOs were established within these scenic areas with an effective date of September 18, 2006. These recently established VQOs are similar to the 1997 recommended VQOs of preservation, retention and partial retention. They are considered highly visually sensitive and account for approximately 15 percent of the timber harvesting land base.

These 2006 VQOs were not established in time to use for the 2006 timber supply analysis therefore the 1997 recommended VQOs were factored into this analysis. Analysis modelling parameters for VQOs were based on provincial standards documented in “Procedures for Factoring Visual Resources into Timber Supply Analyses, Ministry of Forests, March 1998 and the subsequent Bulletin – Modelling Visuals in TSR III, December 2003. Maximum percent alteration by VQO zones was modelled as following: 1 per cent preservation, 5 per cent retention, 15 per cent partial retention, and 25 per cent modification.

For approximately 15 years prior to 2001, harvesting levels in these highly visually sensitive areas were low. Consequently, in the January 2001 AAC determination rationale, the former chief forester established a partition of 84 700 cubic metres within the visual sensitive areas. As well, in the 2001 rationale, the former chief forester recommended that district staff ‘monitor harvesting performance in the partition to highly visually sensitive areas’, noting ‘that if operational performance in these areas does not occur in the near future in a manner which respects the visual values’, then he ‘may consider excluding these areas and their contribution to timber supply in a future

determination.’ Exclusion of these areas would have significant implications on timber supply.

Since 2001, major licensees have been harvesting within the VQO polygons of these highly visually sensitive areas. Because harvesting performance within the scenic area timber harvesting land base has improved significantly, I see no need to continue with the partition within the highly visually sensitive areas.

In conclusion, I am satisfied that the 2006 timber supply analysis reflects current practices and note that harvest operations are taking place within highly visually sensitive areas. I therefore accept the assumptions as suitable for use in this determination. I encourage district staff to continue to monitor performance within these highly sensitive areas to ensure future harvest activities continue at an appropriate level.

- *riparian habitat*

Riparian habitats occur along streams and around lakes and wetlands. Both the Forest Practices Code and the *Forest and Range Practices Act* require the establishment of riparian *reserve* zones that *exclude* timber harvesting, and riparian *management* zones that *restrict* timber harvesting, in order to protect riparian and aquatic habitats.

In the January 2001 AAC determination rationale, the former chief forester encouraged MOFR and Ministry of Environment (MOE) staff, and licensees, to work together to ‘obtain local data to better reflect practices in riparian management zones’. In response, the ‘*North Coast Riparian Classification Inventory*’ was completed in September 2001. This inventory examined 11 representative watersheds in the North Coast TSA and included the amount of riparian reserve zone (RRZ) needed to meet guidelines set out in the Riparian Management Area Guidebook.

In the 2006 timber supply analysis, based on the results of the 2001 riparian classification inventory, the timber harvesting land base was reduced by 7.5 per cent to account for riparian reserves. To account for timber volume left in riparian management zones (RMZs), all clearcut management yield curves were reduced by approximately 4 per cent. This assumption is based on average stream density figures for the coast, as reported in a 1994 study by Wildstone Resources. In this study the maximum overall levels of basal area retention within the RMZ were assumed at 5 per cent of S6 streams and 50 per cent for all other stream classes.

Current clearcut silviculture system practices indicate that RMZs are reserved with the exceptions of road crossings. S6 streams have low levels of retention within the RMZ therefore, 5 per cent is a reasonable estimation of the retention. S2 to S5 streams have variable levels of retention in the RMZ which makes it seem like 50 per cent is an overestimation of the retention level. Current partial harvest system practices indicate that the RMZ retention levels are much higher, however, the retention is available for another entry, therefore, 50 per cent is a reasonable estimate of the retention on all other stream classes.

From public input, a representative for several environmental groups recommended that, “A sensitivity analysis be undertaken that reflects implementation of hydro-riparian management as set out in the ecosystem-based management planning handbook.” Currently, stream classification mapping and high value fish habitat mapping are unavailable for the North Coast TSA. Modelling assumptions for hydro-riparian included the application of two factors to reduce the productive Crown forestland base by approximately 12 per cent. Uncertainty related to hydro-riparian management is generally addressed in the timber supply analysis by the land base sensitivity analysis. In the near future, EBM objectives may be established for the North Coast TSA that may include objectives for riparian management.

I have reviewed the riparian habitat information and am satisfied that the assumptions used in the 2006 timber supply analysis are reasonable for the combined clearcut and partial harvesting management regimes. I make no further adjustment for riparian habitat in my determination.

- *identified wildlife*

The province’s Identified Wildlife Management Strategy (IWMS) addresses plant communities and species at risk, as well as regionally significant species. Identified wildlife are those wildlife species and plant communities that have been designated as requiring special management attention under the *Forest and Range Practices Act*. Identified wildlife may be protected through the establishment of wildlife habitat areas (WHAs) with objectives or by general wildlife measures. The objectives or general wildlife measures may either preclude or constrain timber harvesting activity in certain areas, depending on the requirements of individual identified wildlife species or communities.

Government policy direction limits the timber supply impact of the IWMS to one percent. Operational policy direction has been to initially allocate the one percent impact equally to each forest district, acknowledging that this approach may be refined if warranted. Impacts greater than one percent may still be addressed by government if required to protect species at risk, by the use of other tools such as land use decisions.

To date in the North Coast TSA, three WHAs, one for Northern Goshawk and two for Coastal Tailed Frog (blue listed), have been established. The total mature timber harvesting land base covered by these WHAs is approximately 147 hectares. In addition, approximately 40 marbled murrelet sites (red listed) have been identified and some may be established as WHAs in the near future.

When the data file for the 2006 timber supply analysis was assembled, the final boundaries of the WHAs were not available. In order to account for WHAs and other areas left unharvested for wildlife such as wildlife tree patches, a reduction factor of 1 per cent was applied to the timber harvesting land base, resulting in 1 492 hectares being removed from the timber harvesting land base.

From public input, a representative for several environmental groups recommended the DFAM group do a sensitivity analysis for no harvest in moderate and high-risk habitat areas for marbled murrelet as per General Management Directives within the NC LRMP. In response, this was not done for the 2006 analysis. Instead, identified marble murrelet habitat areas that may be established within current policy limits in the near future are accounted for in the base case assumptions and the potential timber supply impacts were addressed in sensitivity analyses.

This same representative for several environmental groups suggested two additional recommendations. The first is that the requirements and modelling assumptions that account for bull trout, grizzly bear, moose, deer and fisher species be documented in the data package and included in a sensitivity analysis; and the second is for the data package to include no harvest in 100 per cent of red-listed and 70 per cent of blue-listed plant communities consistent with agreement in the NC LRMP. In response, the data package was not specific about these species for a variety of reasons such as a lack of mapping. However, I note that these were accounted for in the 2006 analysis through assumptions such as the 1 per cent reduction factor for IWMS and through forest cover requirements and overlap with other reductions such as riparian. As more information becomes known for these species and becomes part of management practices, these will be incorporated into future timber supply analyses.

I also note that in the North Coast TSA, the conservancies from North Coast and Central Coast LRMPs, will provide significant land base to provide for the needs of wildlife. In addition, wildlife values will be further protected as ecosystem-based management is implemented in the future.

The reduction factor of 1 per cent accounts for measures taken to manage wildlife under current policy limits, while allowing for any other types of wildlife management net down such as wildlife tree patches or wildlife trees. However, district staff advised me that most wildlife trees and wildlife tree patches are located in riparian areas which are already accounted for. About 420 hectares removed from the timber harvesting land base are attributed to wildlife trees and wildlife tree patches. As a result, the timber harvesting land base may be underestimated by as much as 420 hectares.

I am satisfied that the reduction factor used in this timber supply analysis adequately accounts for wildlife management in the North Coast TSA and the impact is low, consequently I will not be making any further adjustment in my determination for identified wildlife.

- *ungulates*

Within the North Coast TSA, there are three species of ungulates namely mountain goat, coastal black-tailed deer and moose. To date, there are no legally established UWRs under the *Forest and Range Practices Act* for the North Coast TSA. MOE staff is in the process of identifying and formally designating ungulate winter ranges (UWRs) for mountain goat and moose, but currently there are no plans to establish UWRs for black-tailed deer.

In the 2006 timber supply analysis, the assumption remains that UWR will be managed in the non-contributing land base as defined in the previous timber supply review, which is consistent with government policy, resulting in a timber harvesting land base net down of zero hectares.

Section 7(2) notices under the *Forest Planning and Practices Regulation* (FPPR), that were drafted consistent with government's timber supply impact policy for UWR, state that the amount of UWR for the purposes of FPPR 7(1) for mountain goat is a maximum of 187 483 hectares, and for moose is a maximum of 36 445 hectares, both with no timber supply impact.

Timber supply review considerations for UWR are separate and distinct from the 1 per cent land accounted for IWMS. Currently, moose winter range does not require a net down to the productive Crown forest land base; however, this may mean applying forest cover constraints for moose winter range in the future to achieve the desired stand structure.

District staff advised me that confirmed and unconfirmed mountain goat winter ranges that in the 2001 timber supply analysis were within the non-contributing land base, now overlap with approximately 2 200 hectares of planned operational cutblocks. This is due to the significant changes to the operable land base and timber harvesting land base as mentioned earlier, and could lead to a potential downward pressure on the timber supply in the future. Any overlaps will need to be addressed in the next timber supply review.

I am concerned with the potential future downward impacts due to goat ungulate winter ranges. I believe that the way to mitigate this pressure is through continuous communication between MOE, MOFR & licensees. As noted in the **'Implementation'** section below, I instruct district staff to work closely with MOE, ILMB, licensees and First Nations to implement UWR, WHAs and ecosystem-based management components in a manner that utilizes the existing parks and conservancies to minimize further timber harvesting land base impacts. An analysis of this work is to be completed prior to next timber supply review.

For this determination I am satisfied that the assumptions around UWR as used in the base case are appropriate, however, as noted in the **'Reasons for Decision'**, there is a potential downward pressure on timber supply due to goat winter ranges and overlaps due to changes to timber harvesting land base.

- *community watersheds*

In the North Coast TSA, there are 5 community watersheds covering 8 780 hectares. These watersheds include Dodge Creek on Digby Island (17 hectares), Gabion River near Hartley Bay (1 846 hectares), Shawatlan is the Prince Rupert watershed and is within a designated area (4 637 hectares), Stuman Creek near Port Simpson (871 hectares) and Wolf Creek is the Port Edward watershed and is also within a designated area (1 409 hectares). In the 2001 timber supply analysis, there were 6 community watersheds totaling 9 937 hectares. One of these watersheds was within Nisga'a lands.

All of the community watersheds are considered sensitive with respect to water quality. For the 2006 timber supply analysis all were excluded from the timber harvesting land base. To date, operationally, no harvesting has occurred in any of the community watersheds.

For this analysis, I am satisfied that no forest cover constraints to address community watershed objectives were used, and the community watersheds were appropriately addressed.

- *recreation*

As of January 1, 2006, the new Ministry of Tourism, Sports and the Arts took over the responsibility of managing the two recreation sites and two recreation trails within the North Coast TSA. These sites and trails take up a very small amount of the operable land base and both sites are within proposed conservancies. Most of the recreational activities are marine-based activities such as fishing, boating and kayaking.

Areas designated in the ESA data as sensitive for recreation were not explicitly removed from the timber harvesting land base as it was assumed that the accounting in the analysis for visual sensitivity also provided accounting for management of these areas. Given the nature of the recreation activities in the North Coast TSA, the consideration of scenic values, as discussed in the '*visually sensitive areas*', provide significant accounting for recreational values.

I am satisfied that recreation was appropriately accounted for in the 2006 timber supply analysis, and I have made no further adjustment in my determination.

- *cultural resources*

As mentioned earlier, the North Coast TSA is situated within the traditional territories of five of the Tsimshian First Nations, the Haisla First Nation, the Heiltsuk First Nation and the Gitanyow First Nation. However the Gitanyow First Nation's traditional territory is outside the timber harvesting land base. The Nisga'a Nation have reached final agreement and their lands in the lower Nass River Valley are excluded from the North Coast TSA.

The Forest Practices and Planning Regulation defines cultural heritage resources as those resources that are the focus of a traditional use, by an aboriginal people, and that are of continuing importance to that people. Cultural heritage resources do not include archaeological sites, which are managed under the *Heritage Conservation Act*. A cultural heritage resource includes the site or the location of a traditional societal practice of historical, cultural or archaeological significance.

For First Nations, cedar maintains a high profile for traditional use, although other tree species are also utilized. As noted earlier, the newly established conservancies and those areas designated under Part 13 of the *Forest Act* do not preclude aboriginal uses, and are designated in part to afford areas for this purpose and to protect cultural resources. District staff informed me that many of the cultural resources in the district are located within riparian areas, wildlife tree patches, leave areas between blocks, and other retention areas. These areas did not contribute to the base case harvest forecast. In the near future wildlife habitat areas identified through the IWMS and practices associated with ecosystem-based management may afford further protection for those cultural resources currently outside of conservancies.

District staff also advised me that, in some instances, roads have been relocated and cutblocks redesigned to accommodate protection of a cultural resource. I am also aware that the BC Government has worked closely with the First Nations within the North Coast TSA to ensure cultural resources are adequately managed for through the signing of Strategic Land Use Planning Agreements (SLUPAs).

In the 2006 timber supply analysis base case, a 1 per cent reduction to the timber harvesting land base to account for practices undertaken to protect cultural heritage resources, as recommended by the DFAM Group, was used. I note that there was no consensus reached by the DFAM Group on the exact percent reduction. One First Nation requested that the Archaeological Overview Assessment (AOA) prepared in 1999 by the North Coast Forest District be incorporated into the data set in order to potentially run scenarios on various zoning categories to test alternate harvesting methods in the high, medium and low AOA classifications. I have reviewed the information regarding the AOA completed for the North Coast TSA and am aware of the limitations therein. No scenarios were run due to the limitations within the AOA data.

In the January 2001 AAC determination rationale, the former chief forester recommended that district staff ‘work to improve available data on the occurrence of and management practices for cultural heritage resources’. This work is in progress and the estimates used in the 2006 timber supply analysis are an improvement over those used in 2001 timber supply analysis. New information will be incorporated into future timber supply reviews.

I have reviewed the cultural heritage resources information and conclude that the best information available to account for forest practices with respect to cultural heritage resources was used in the analysis. I make no further adjustment for cultural heritage resources in my determination.

- *stand level biodiversity*

Wildlife tree patches (WTPs) and coarse woody debris are important to the conservation of biodiversity at the forest stand level. The Forest Practices Code and *Forest and Range Practices Act* both provide for the retention of wildlife trees in harvested areas.

In 1997, district staff reviewed a number of silviculture prescriptions within the North Coast TSA, to determine the amount of net operable area that was occupied by WTPs, and found this value to be negligible. Licensees advised that the current practice with regard to WTPs has not changed significantly since this review was completed. In the 2006 timber supply analysis, no specific reductions in the timber harvesting land base were made to account for WTPs.

In the North Coast TSA, WTPs are not required within cutblocks since the distance between adjacent suitable forested habitats does not typically exceed 500 metres. Adjacent suitable habitat can include riparian reserve zone, inoperable terrain (which accounts for 77 per cent of the productive Crown forested land base), or surrounding timber harvesting land base. The recent trend towards high retention partial cuts tends to preclude the need for additional WTP area set-asides.

A report completed in 2003 for the entire Coast Forest Region, entitled “Evaluation of Wildlife Tree Retention for Cutblocks Harvested Between 1996-2001 under the FPC” indicates that the average impact in the CWH zone is approximately 5 per cent of volume or 6 per cent of area.

I have reviewed the information for stand level biodiversity and believe the reductions of 1 492 ha for WHAs and IWMS is adequate to cover any additional WTP requirements. For this determination, I am satisfied that the analysis assumptions adequately account for stand level biodiversity and have made no further adjustments in my determination.

- *landscape-level biodiversity*

Conserving landscape-level biodiversity involves maintaining forests with a variety of patch sizes, seral stages, and forest-stand attributes and structures, across a variety of ecosystems and landscapes. Together with other forest management provisions that provide for a diversity of forest stand conditions, the retention of old forest is a key landscape-level consideration. Old forest retention can be achieved through the location of old growth management areas (OGMAs).

As per the *Landscape Unit Planning Guide*, Biodiversity Emphasis Options (BEOs) (i.e., lower, intermediate and higher) may be employed when establishing biodiversity management objectives for a landscape unit. It is generally considered that biodiversity can be adequately maintained in conjunction with the timber harvesting objectives when a reasonable distribution of options is maintained across the land base.

In the 2006 timber supply analysis, interim BEOs, as assigned to each recommended landscape unit through the regional landscape unit planning strategy were assumed for the base case. On June 30, 2004, the provincial old growth order establishing the BEOs and landscape unit boundaries for the North Coast TSA came into effect.

A sensitivity analysis showed no effect on the base case when modelling procedures for addressing old growth objectives change if these established BEOs and landscape units are assumed. A second sensitivity analysis showed that more stringent requirements such as full old seral targets now in low emphasis landscape units would also have no effect on the base case forecast.

These sensitivity analysis results are consistent with the high percentage of forest classified as non-timber harvesting land base. I note that most of the old seral forest requirement can be met outside of the timber harvesting land base, and most of these stands are well beyond the threshold age of 250 years.

Operationally, until the BEOs were established, low BEO was assumed for all landscape units. Plans for the establishing targets and spatial OGMAs for landscape units within North Coast TSA are delayed for at least another two years or until more is known about what the implementation of ecosystem-based management entails.

Now that government decisions have been made for the North Coast and Central Coast LRMPs, landscape biodiversity will be addressed primarily through the establishment of new conservancies and ecosystem-based management. A sensitivity analysis showed that the impact of assuming ecosystem-based management old seral (Range of Natural Variation (RONV)) requirements resulted in the AAC being achieved for 1 decade, long-term level is reduced by 5 per cent and overall timber supply is reduced by 8 per cent.

From these considerations and from my discussions with district staff, I accept that the assumptions around landscape biodiversity used in the base case for the North Coast TSA were appropriately modeled.

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

Other information

- *ecosystem-based management*

In the February 2006 Land Use announcement, government committed to a series of decisions in support of the North Coast and Central Coast LRMPs, including the creation of conservancies and biodiversity areas, and committing to move forward on ecosystem-based management (EBM). EBM is a new approach to planning and resource management and a key recommendation from the LRMP tables and government-to-government discussions. EBM is defined as “...an adaptive, systematic approach to managing human activities, guided by the Coast Information Team EBM Handbook, that seeks to ensure the co-existence of healthy, fully functioning ecosystems and human

communities". Full implementation of EBM includes the governance framework, human well-being, ecological integrity, adaptive management and flexibility. Key elements of EBM include maintaining or protecting traditional First Nation values, aquatic habitats and biodiversity.

In January 2007, the BC Minister of Agriculture and Lands released, for public review, draft orders proposing land use legal objectives for EBM relating to the North and Central Coast of BC. These objectives remain in draft form and have not been legally established at the time of this determination. The order proposing land use legal objectives for EBM released for public review in December 2006 for the South Central Coast of BC and to the KNT First Nations (members of the Kwakiutl District Council, Musgamagw Tsawataineuk Tribal Council and Tlowitsis Nation, now collectively known as the Nanwakolas Council), was approved on July 27, 2007. I note that no areas within the North Coast TSA were included in the order approved in July 2007. The BC government has committed to full implementation of EBM in the coastal planning area by March, 2009. Currently, most licensees and BC Timber Sales within the North Coast TSA are voluntarily implementing EBM. Clearly, the implementation of EBM in the coastal planning areas is underway.

The base case, completed prior to February 2006, does not address final recommendations of the plan or government's decisions on land use designations. Currently, the Province, First Nations and stakeholders are engaged in implementing the Coast Land Use announcement through the establishment of conservancies, Plan Implementation and Monitoring committees, Land and Resource Forums, and an EBM Working Group.

At the time of the 2006 timber supply analysis, it was recognized that due to the complexities involved, modelling all EBM objectives was not feasible. Consequently, three sensitivity analyses were completed modelling only one of the primary EBM objectives, that being site series representation (managing landscape-level biodiversity). Sensitivity analyses showed the timber supply impacts of applying specific constraints to model EBM, as specified in the 2006 North Coast Timber Supply Analysis Report, were significant. A sensitivity analysis that modelled EBM and removed the proposed conservancy and biodiversity areas from the THLB indicated that the timber supply forecast projected in the base case is likely overestimated by approximately 31 per cent in the long-term, with about 24 per cent attributed to the new conservancy and biodiversity areas alone.

I acknowledge that the sensitivity analyses explored the potential implications of only one objective of EBM and note that timber supply impacts associated with EBM could change considerably as EBM is fully implemented operationally and better data become available.

As the precise timber supply impact for all EBM objectives is currently unknown, as noted in the 'Implementation' section, I request that before the next timber supply review, the North Coast Plan Implementation and Monitoring Committee to provide clarity on how EBM objectives are being implemented.

From public input, a representative for several environmental groups recommended that, “The DFAM group coordinates the analysis so that the AAC determination incorporates the North Coast LRMP recommendation and commitments to ecosystem-based management, yet meets the Chief Forester’s legislated schedule for a new determination by January 1, 2006. Consequently the data package and the sensitivity analysis need to include information that fully reflects the table recommendations and ecosystem-based management (see Fall and Morgan, 2004)”, and that “Full use of the CIT analyses and the NC LRMP reports by the DFAM group is advocated to properly model the transition to ecosystem-based management in the data package”.

In response, I note that the release of the analysis report was delayed so that further analysis could be done on the ‘pending’ government decisions on land use zones and EBM. The DFAM Group completed three sensitivity analyses to show the timber supply impacts of the new land use zones and one EBM objective. The sensitivity analyses reflect many of the NC LRMP table recommendations and only one of the primary objectives of EBM, but used factors based on professional judgement to address aspects of EBM where actual data, usually map work, were unavailable. Various LRMP reports were used when defining these factors.

This same representative for several environmental groups also stated “The data package includes no harvest in 100 per cent of red-listed and 70 per cent of blue-listed plant communities consistent with agreement in LRMP plan.” In response, I am aware that mapped areas of red- and blue-listed ecosystems were not available for the analysis and no specific reductions were made for red- and blue-listed ecosystems. However, the timber harvesting land base was reduced by 1 492 hectares to account for various wildlife and ecosystem considerations.

I have considered the sensitivity analyses and the public comments regarding EBM. I note that as stated in my guiding principles, it is typically my practice not to speculate on timber supply impacts that may eventually result from land-use decisions not yet finalized by government. However as described earlier, with Government’s commitment to fully implement EBM, and licensees and BCTS currently implementing elements of EBM, and the significant risks to timber supply, I find it appropriate to account for some level of EBM in this determination. Drawing on the results of sensitivity analyses I have therefore considered a reduction of about six per cent or 35 000 cubic metres, to account for the uncertainty of the potential timber supply impacts and some of the immediate timber supply impacts of EBM. I have further discussed this in my **‘Reasons for Decision’** below.

As EBM objectives are established, as noted in the **‘Implementation’** section below, I request district staff to monitor the impact of each of the EBM elements/values on the timber supply before the next timber supply review.

- *re-apportionment and undercut*

Following each AAC determination made by the chief forester, the minister allocates volume to each major tenure holder, BCTS, woodlot, forest licence to cut, community forest agreement or forest service reserve categories within the specific timber supply area. At the end of each five-year cut control period, any volume under tenure remaining unharvested can be reallocated to other forms of tenure within that timber supply area.

In the North Coast TSA at the end of 2004, there was a total undercut of 397 263 cubic metres. Some of this undercut was reallocated to other forms of tenure. Since 2004, the level of undercut has increased due to a low level of harvest activity. The low harvest activity was complicated by the timber reallocation project and the inability to find current economically feasible operating areas as committed through the Forest and Range Agreements (FRAs) signed with the First Nations within the North Coast TSA.

The profile of the logging industry has changed as a result of the reallocation and signed FRAs. The First Nations within the North Coast TSA will become more active in the local forest industry. Being relatively new to the industry, the First Nations are building internal capacity, gaining necessary experience, and building partnerships, before fully utilizing their apportionment.

I note that the AAC for the North Coast TSA is not being fully utilized. I have considered current harvesting performance and the existing undercut in my determination.

- *timber supply profile / harvest profile*

In the 2006 timber supply analysis, an 'oldest first' harvest rule was used to sequence stands for harvesting in the base case forecast. This rule gives the highest priority for harvest to the oldest stands above their minimum harvestable age once other priorities and management constraints are considered. Additionally, two harvest profiling priorities were used that affected the sequencing of stands harvested. The first priority involved directing as much of the annual harvest into the 25 priority operating areas or watersheds within the North Coast TSA, during the first 20 years of modelling simulation, and only going outside these areas when forest cover requirements for non-timber resources suspend access to timber. The second priority limited the annual harvest in VQO areas to approximately 80 000 cubic metres.

Red alder was included in this analysis. District staff advised me that recently there has been some interest in harvesting red alder. Current regulations impede district staff's ability to make this an operational reality. Consequently, companies interested in deciduous volume need to buy the deciduous component from an existing forest licensee.

The southern part of the TSA has a higher proportion of cedar species within the main First Nation's traditional territories. First Nations in the North Coast TSA are requesting

access to cedar for their cultural use and protection of the species for availability to future generations.

In previous timber supply reviews for the North Coast TSA, harvesting the timber supply profile was reviewed. In the 1995 timber supply review, the concern around harvesting the profile centered on whether the harvested species were representative of the profile of species occurring on the land base. Comparing harvest billing reports and inventory data substantiated this concern. The forest cover data implied that the proportion of each tree species harvested since 1984 did not reflect the proportional volumes of species that occur on the operable land base. However, it was extremely difficult to make a meaningful comparison because harvest billing reports reflect actual volumes from each species harvested, whereas forest inventory data provides information only on leading species for each stand.

In the January 2001 timber supply analysis, there was no evidence to indicate that the profile of stands within the timber harvesting land base was not being harvested, both in terms of species composition and site productivity, therefore the former chief forester was satisfied there were no issues and made no adjustments for harvesting the profile in his determination. However, in the 2006 timber supply review, the main concern is centered on the timber profile and harvest performance for cedar species. There has been a 100 per cent increase within the last five years with harvesting cedar species.

For the 2006 timber supply analysis, the DFAM Group compared the inventory and harvest species profile, and although a higher representation of cedar and spruce was harvested in the last six years, no recommendation was put forward to address species profile in the analysis. When the DFAM Group looked at twelve years of harvest history the two profiles appeared similar, leading them to conclude that the harvest profile, historically, roughly reflects the inventory profile. It appears that over the last ten years, the volume of cedar harvested has exceeded that available according to the inventory profile. In assessing the harvest history of the timber profile, there is inconsistency between the data the DFAM group used compared with the results of the Harvest Billing System data.

I acknowledge that cedar harvesting is currently being addressed provincially. Within the Coast Forest Region, the Coast Region Implementation Team is working to develop objectives and strategies for the harvesting of cedar in coastal forests.

I am very cognisant of and concerned with the current trend within the North Coast TSA regarding the level of western redcedar and yellow cedar harvested. I would like to see the licensees bring this more into balance over the next 5 years. As noted in the **'Implementation'** section, I request that district staff provide an annual update of the status of the harvest profile. At the next TSR, I will review the level of cedar harvest and partial cutting to determine whether any action such as a cedar partition is required to manage cedar on a sustainable basis in the North Coast TSA. This is discussed as well in **'Reasons for Decision'** below.

- *north of the Nass partition*

In the January 2001 AAC determination rationale, the former chief forester was concerned about establishing a partition in the North Coast TSA, given the administrative difficulties associated with partitions, as well as the adjustment period required for both licensee staff (in terms of planning) and MOFR staff (in administering the partition). However, he was convinced that it was not responsible to continue to develop the land base at the current rate without confirmation that the land base was viable for operations. Therefore, he felt obliged to reflect this concern in his decision by establishing a partition.

This partition was applied to the highly visually sensitive areas, and to the portion of the land base north of the Nass River. The proportion of volume from the North approximated 45 percent or 69 300 cubic metres of the total volume of the partition. From the 2006 timber supply analysis, the total timber harvesting land base attributed to this area was estimated at 16 540 hectares.

An implementation instruction the former chief forester gave in his January 2001 AAC determination rationale, was for district staff to monitor harvesting performance in the partitioned stands in the northern portion of the TSA. This task was completed. Since 2001, there has been very little harvesting activity. This activity consisted of four small-scale salvage sales for a total volume of approximately 2 087 cubic metres.

Historically, the portion of the TSA north of the Nass River has been a less desirable location to conduct harvesting activities due to poor quality wood, small piece size, less desirable species profile and economic feasibility. BCTS staff identified four blocks totaling 310 hectares within the north of the Nass River area as category information blocks in one previous forest development plan submission. They have not harvested these blocks and did not carry the areas into their most recent forest stewardship plan (FSP); however, a portion of the Kitsault Landscape Unit has been identified as a forest development unit within their current FSP submission. Also, none of this area has been identified as a potential operating area for a Forest and Range Agreement.

The lack of harvest north of the Nass has resulted in increased pressure on the rest of the TSA, a concern that has been echoed by the First Nations.

In 2004 the DFAM group completed a strategic economic assessment for this area. This report made several recommendations and suggestions on ways to improve economics and better define the operable areas. One recommendation was to continue to include partitions of the area in future timber supply reviews.

In the 2006 timber supply analysis, a sensitivity analysis was conducted regarding removal of the area north of the Nass from the timber harvesting land base. As mentioned in the '*economic and physical operability*' section above, this sensitivity analysis indicated that if the non-performance trend continues there would be a significant downward pressure on timber supply in the mid- and long-term.

I am cognizant of the limited interest demonstrated for operating in the area north of the Nass River. I am also aware of the timber supply impacts of either leaving the area north of the Nass River as a partition and the difficulties with administering and apportioning the partition volume, or removing this area totally from the timber harvesting land base. I recognize that there is some potential interest in harvesting within some parts of the area north of the Nass River; however, no harvesting activity has been undertaken to date. This may be exacerbated by the low current market demand for pulpwood. I agree with the former chief forester that it would not be responsible to continue to develop the entire TSA land base without consideration of the uncertainty of the viability to operate in the area north of the Nass River. However, for this determination, I will continue to maintain a partition for north of the Nass River of approximately 12 percent or 48 000 cubic metres of the new AAC determination volume. This will provide time for MOFR staff to explore administrative mechanisms associated with partitions, and to continue to refine the operability of this area north of the Nass River.

An **‘Implementation’** instruction I am giving to district, region and branch staff, is to work together to conduct a feasibility study for operating in the area north of the Nass River and to examine administrative mechanisms applicable to a partition for the area north of the Nass River. Any new information arising from the feasibility study will be incorporated into the next timber supply review.

- (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.

The 2006 timber supply analysis base case forecast presents one strategy for managing the decline from the AAC to the long-term harvest level. It was defined based on stable long-term harvest level and total growing stock; no more than 10 per cent decline per decade; and maintain the current AAC for as long as possible without violating the above principles. The long-term level in the base case is 25 per cent below the current AAC.

There were two alternative harvest flows generated that apply different harvest targets in the short- and long-term periods. The first alternative assumed that the 2000-2004 undercut of 629 300 cubic metres is cut during the next 10 years in addition to the

current AAC. This alternative harvest flow had no impact on the base case harvest rate and demonstrated that there is some flexibility in the short-term harvest rate.

The second alternative assumed the maximum even flow rate for 250 years. This second alternative demonstrated a slight opportunity to increase the long-term harvest level by approximately 2 per cent, and the objective of sustaining the existing AAC for four decades has no significant long-term timber supply impact.

In reviewing these alternative harvest flows, I note that although there is flexibility to raise the starting harvest level without adversely affecting the long-term harvest level, these alternative harvest flows did not consider the immediate impacts on the timber supply from the new conservancies and implementation of EBM objectives. I have considered the alternate harvesting forecasts when making my determination.

Economic and employment implications

In June 2006, the DFAM Group produced a socio-economic assessment for the North Coast. Much of the information that follows is from that report.

- *population trends*

The largest city in the North Coast is Prince Rupert, with several outlying remote First Nations communities located throughout the North Coast TSA. The region has seen a 14 per cent decline in population between 1996 and 2004; however, some of the First Nations communities have seen a population increase. The current population of the City of Prince Rupert is estimated at approximately 13 000. The beginning of funding and construction of a major container port at the Port of Prince Rupert in 2006 has contributed to new jobs in the region, and a slight increase in population.

- *economic profile*

The North Coast TSA has a diverse economy and is one of the few regions of BC where the majority of economic activity is not forestry related. Forestry is currently at 19 per cent, down slightly from the 2001 timber supply review (21 per cent). A considerable setback to the regional economy took place in 2001 with the closure of the Skeena Cellulose Inc. pulp mill at Watson Island and associated sawmills and logging activities. As well since the previous timber supply review in 2001, the North Coast Timber Sawmill has closed. In 2006, with the beginning of construction at the Port of Prince Rupert container port project, jobs in construction, security, customs, transportation and other supporting roles have opened up.

The most significant employment sectors in the North Coast TSA are public sector, 40 percent; forest industry, 19 percent; tourism, 17 percent; and fishing/trapping 16 percent. From these figures, forestry is still important to the current economy despite the mill closures and population decreases. Other communities outside the North Coast TSA, including Kitimat, Terrace, and some on Vancouver Island and the lower mainland, receive economic benefit from timber harvesting in the North Coast TSA.

High production costs limit the amount of commercial forestry in the northern portion of the TSA. Many stands are over mature and have limited merchantability. In addition, the harsh terrain limits accessibility.

The region's after tax income in 2004 totalled approximately \$158 million (average of \$26,380 per person in the labour force). I note that there is considerable variation in the average income earned and that forestry employment has considerably higher annual income compared with other sectors.

I note that although the region is relatively well diversified, forestry continues to help maintain stability in the local economy and remains a significant employment sector in the region. In making my determination, I am aware that the entire AAC for the TSA has not been harvested for some time now, resulting in a significant undercut, such that the full extent of any harvest level reduction might not be felt immediately.

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

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

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

Minister's letter

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

The letter stresses the importance of a stable timber supply while being mindful of other forest values. The letter also highlights objectives in the BC's Mountain Pine Beetle Action Plan; however, this has no bearing within the North Coast TSA.

The most applicable points for the North Coast TSA for me to consider concern the considerable change and transition the coastal forest industry is currently experiencing. To that end, I will consider a timber supply that is sustainable for the coastal forest industry, while considering the land use decisions made and ensuring local social and economic objectives expressed by the public are consistent with government's broader objectives and relevant First Nations information. I believe that the timber supply review process undertaken within this TSA has aided my consideration of these points while I made this AAC determination.

Summary of Public Input/Local objectives

The Minister's letter of July 4, 2006, asks that I 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. There were no specific local objectives for land and resource use in the North Coast TSA expressed.

There were a number of comments received from one source during the public review period on the Data Package and Timber Supply Analysis Report. The majority have been mentioned above, with the exception of those outlined below.

A consultant submitted a report on behalf of Forest Ethics, Greenpeace Canada and Sierra Club of Canada, BC Chapter on the data package and made several additional recommendations that are addressed below.

The recommendations included a request that various elements of the ecosystem-based management handbook and the LRMP that are not part of current management be documented in the data package and examined in the timber supply analysis. In response, the DFAM Group focused on factors that affect current management and that I consider in my AAC determination. The LRMP technical team, in the course of completing the LRMP and government-to-government negotiations, completed most of the additional analysis suggested.

The consultant also suggested that poorly documented inputs and assumptions in the data package were made. The timber supply analysis team recognized the same weaknesses as indicated and subsequent releases of the data package and analysis report provided additional documentation.

Regarding the recommendation that the spatial timber supply model, SELES, be used for the timber supply review, I acknowledge that both SELES and CASH 6 have been used successfully on other timber supply analyses. The DFAM Group considered using a spatial timber supply model but chose CASH 6. This model is competitively priced and suitable for doing timber supply modelling. CASH 6 uses a geographic approach to land base and inventory definition and adheres as closely as possible to the intent of forest cover requirements on harvesting. This model can simulate the imposition of overlapping forest cover objectives on timber harvesting and resultant forest development.

The recommendation that the DFAM group adhere to government standards so that in the future members of the public are provided with a link to Forest Analysis and Inventory Branch website from the DFAM site to confirm deadlines, is a good one. Although the DFAM website in general provided useful information and the timber supply review documents, there were frequent timber supply review deadline changes to account for the North and Central Coast LRMPs and government's decision and announcement of them. When the DFAM web site was constructed it was believed the North Coast LRMPs was near completion and changes to the timber supply review schedule would not be necessary.

First Nation Consultation

The '*cultural resources*' section above discussed how First Nation's cultural resources were accounted for in this timber supply review. The history of consultation with and involvement of First Nations in the North Coast TSA in the matter of this determination is discussed below.

The data package for the 2006 timber supply analysis was prepared by the North Coast DFAM Group in partnership with the Tsimshian First Nations including Lax Kw'alaams, Metlakatla, Gitga'at and Kitkatla First Nations. Periodic DFAM meetings were held since January 2004 during the preparation of the data package. At these meetings, the DFAM Group discussed and made decisions on the inputs and assumptions related to the North Coast TSA timber supply review. I have reviewed the documentation on the DFAM meetings and note that local First Nations were active participants in this phase of the TSR and attended most of the meetings.

The North Coast TSA *Data Package* was provided to Hartley Bay Band Council, Kitkatla Band Council, Lax Kw'alaams Band Council, Metlakatla Band Council, Kitamaat Village Council, and Kitasoo Band Council at the stakeholder and First Nations meeting just prior to the commencement of the 60-day review period. At this same time, a copy of this TSA *Data Package* was mailed to the Allied Tsimshian Tribes Association and Nisga'a Lisims Government. The First Nations were encouraged to submit feedback or comments on the *Data Package* to the DFAM coordinator, through the DFAM website, or to any of the contacts listed on the website or in the advertisements in the Prince Rupert Daily News. No feedback on the data package was received.

In June 2006, copies of the *2006 Timber Supply Analysis Report* were mailed to the First Nations groups listed above, with a request for feedback on the analysis report. Two responses were received from First Nations during the second review period.

The response from the Kitamaat Village Council requested a meeting with the MOFR and consulting staff to discuss the *2006 Timber Supply Analysis Report*. This meeting took place on August 2, 2006 in Terrace, BC. Discussions at this meeting focused on the status of the AAC determination process; a presentation of analysis results; status of ecosystem-based management and whether additional analysis would be conducted to further explore the timber supply impacts of this management approach; and the operational interpretation of the analysis results.

A letter from the Tsimshian Stewardship Committee outlined their concerns about the timing of the Public and First Nations review process; the fact that the analysis did not include an assessment of timber supply from a First Nations territory perspective; poor communication from the DFAM Group with respect to the TSR process; and scheduling of meetings with First Nations.

Based on a request made in the Tsimshian Stewardship Committee letter, the review period was extended for another 30 days, and several attempts to arrange an additional meeting with First Nations were made. However, a suitable time could not be found for representatives of the MOFR and the Tsimshian Stewardship Committee to meet, and a meeting was not held.

The common comments expressed by the First Nations included: the documents are of a technical nature that is beyond the understanding of the general public; they expressed an interest in participating in the timber supply review process, but were not provided

adequate time to respond; they did not have sufficient resources or time needed to interpret the technical documents and provide comment; they would like to see results presented that related to individual First Nations territories; and they would like to be consulted on the AAC decision itself.

The Tsimshian First Nations including Lax Kw'alaams, Metlakatla, Gitga'at and Kitkatla First Nations worked with the DFAM Group in preparing the 2006 data package and timber supply analysis. They were in attendance at several meetings of the DFAM Group, including a meeting when the Group received agreement from these First Nations that timber supply results for each individual First Nation traditional territory would not be generated as part of the Timber Supply Review. I am satisfied that First Nations have been provided with reasonable opportunities to provide input on their aboriginal interests and how those interests may be affected by my AAC determination. While I acknowledge the desire for timber supply forecasts for individual traditional territories, my decision under Section 8 of the *Forest Act* applies to the North Coast TSA. I have no legal authority to make AAC determinations for traditional territories. Further, information on the timber supply contributions from the traditional territories of individual First Nations would not affect the timber supply projection. No information was brought forward that leads me to conclude that an adjustment relative to the base case timber supply forecast is required to account for First Nations interests at this time. MOFR staff will be available to meet with First Nations to discuss my determination and respond to any related questions.

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

Unsalvaged losses

Unsalvaged losses are timber volumes destroyed or damaged by agents such as fire or disease and not recovered through salvage operations. Estimates for unsalvaged losses account for epidemic (abnormal) infestations; as well as for factors that result in losses that are not recovered through salvage harvest programs and that are not recognized in yield estimates. Timber volume losses due to insects and diseases that normally affect stands (endemic losses) are accounted for in inventory sampling for existing timber yield estimation or through other methods. Endemic losses associated with second-growth stands are addressed by application of operational adjustment factors as noted under '*volume estimates for regenerating stands*'.

In the North Coast TSA, the average annual unsalvaged losses due to fire are estimated at 2 034 cubic metres. These losses are based on a 20-year average.

A report estimating blow-down losses was completed in 1998. This study estimates the annual unsalvaged losses to wind to be 13 417 cubic metres on the operable land base. MOFR staff reviewed this report, and adjusted the blow-down estimate to 8 050 cubic metres to reflect unsalvaged losses on the timber harvesting land base.

Losses from insects and other pests have been accounted for through operational adjustment factors, and decay, waste and breakage factors.

Within the January 2001 AAC determination rationale, the former chief forester recommended that district staff continue to monitor damage to second growth stands from porcupine feeding. Some forest health damage studies were completed, however, no definitive impact has been determined to date. While porcupine damage is evident in some second-growth stands, the long-term effect on timber production is not fully understood. Possible effects include lengthened regeneration delays, lower stocking, and lower volume yields. Unsalvaged losses due to porcupine damage have not been quantified, and as such, no unsalvaged losses were attributed to this pest in the analysis.

Recently a phenomenon called yellow cedar decline has been documented in this TSA. In many areas throughout the district yellow cedar appears moribund or dead. This has not been accounted for in the analysis. Documentation shows that dead yellow cedar still retains significant value as a standing dead tree up to 80 years post mortality.

The 2006 timber supply analysis adequately accounts for fire, blow-down, various minor pests and insect losses. I note the uncertainty around porcupine damage and yellow cedar decline and encourage MOFR staff to continue ongoing research on yellow cedar decline. Any new information can be incorporated in the next determination.

Reasons for Decision

In determining AACs, my considerations typically identify factors which, considered separately, indicate reasons why the timber supply may be either greater or less than the harvest levels projected for various periods in the base case. Some of these factors can be quantified and their implications assessed with reliability. Others may influence the assessment of the timber supply by introducing an element of risk or uncertainty, but cannot be quantified reliably at the time of the determination and must be accounted for in more general terms.

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

The 2006 North Coast TSA timber supply analysis was initiated prior to February 2006 and did not address the final recommendations of the North Coast and Central Coast LRMPs or government's decisions on land use designations. There is therefore some uncertainty as to how the conservancies from the North Coast and Central Coast Designated Areas and the implementation of EBM objectives will affect the overall timber supply projections.

On September 28, 2006, I made a Part 13 AAC temporary reduction of 24 percent to account for the North Coast Designated Area (NCDA) No. 2 (*B.C. Reg. 81/2006*) and Central Coast Designated Area (CCDA) No. 2 (*B.C. Reg. 82/2006*). This temporary reduction amounted to 138 000 cubic metres; 115 000 cubic metres for the North Coast Designated Area and 23 000 cubic metres for the Central Coast Designated

Area. This effectively reduced the AAC for the North Coast TSA to 435 624 cubic metres. As noted previously, since these orders were released, there have been some minor adjustments to names and boundaries made to the areas denoted in the NCDA and CCDA as a result of subsequent government to government discussions. These minor adjustments to the boundaries would not affect timber supply given the proportionately small area involved.

From the 2006 North Coast TSA timber supply analysis, the base case indicated that a harvest level of 573 700 cubic metres could be maintained over the next four decades. After the fourth decade, the harvest level would decrease in three decadal steps to maintain a long-term level of 430 000 cubic metres after the sixth decade. This analysis projects a long term harvest level that is 19 percent higher than that projected in the previous timber supply review. This is mainly attributable to a 22 per cent increase in the timber harvesting land base due to a re-inventory of approximately 50 per cent of the TSA and revisions to the operability classifications. However, sensitivity analyses indicated that impacts to timber supply are proportional to the change of size of the land base. A decrease in the size of the timber harvesting land base by 10 percent would mean that the long-term level would decline two decade sooner, whereas increasing the timber harvesting land base by 10 percent would extend the initial harvest level depicted in the base case for 5 more decades and increase the long-term level by 4 per cent over the 250-year time horizon.

I acknowledge that the economics of operating in the North Coast TSA is very susceptible to market prices such that an increase in pulp prices relates to an increase in economic operability. Because of the high degree of uncertainty around the size of the operable land base and in determining which parts of the TSA are economical to operate in, I am instructing region and district staff, and licensees to complete a review of the timber operability for North Coast TSA. The results of this review will be incorporated into the next timber supply review.

The area north of the Nass River has historically been less desirable to operate in due to poor timber quality and access issues. I note that there is some potential interest in harvesting within some parts of the area north of the Nass. However, the lack of activity in the north of the Nass River area puts additional pressure on the rest of the TSA.

In the January 2001 AAC determination rationale, the former chief forester was concerned with the administrative difficulties associated with partitions and the adjustment period required for both licensee and MOFR staff. He believed that it was not responsible to continue to develop the land base at the current rate without confirmation that the land base was viable for operations. Thus, he felt obliged to reflect this concern in his decision by establishing a partition. He instructed MOFR staff to monitor performance within the partition area, and if there was still no performance in that area north of the Nass River, he may consider removing the area from the contributing land base in a future determination.

This is now a subsequent timber supply review for the North Coast TSA. Other than a few minor licences awarded, there has been very little significant performance in that

area. Further, we are still experiencing the administrative difficulties of establishing partitions.

I am cognizant of the timber supply impacts of either leaving the area north of the Nass as a partition and the difficulties associated with administrating the partition, or removing this area totally from the timber harvesting land base.

I considered removing all or a portion of the area north of the Nass from the North Coast TSA timber harvesting land base. I have determined not to do so until a feasibility study of operating within that area is completed, as well as a report back to me on how to effectively implement any administrative mechanisms associated with partitions.

Therefore, for this determination, I am retaining a 12 percent partition over that area north of the Nass River, which equates to 48 000 cubic metres. Results and findings arising from the feasibility study can be incorporated into the next timber supply review.

In the North Coast TSA, there are four old timber licences, two of which are closed, meaning the licence term has expired, and two remain open although no further harvesting is expected in either. All four TLs were excluded from the timber harvesting land base in the 2006 timber supply analysis. Although a small impact, the old timber licences need to be closed and reverted back to the Crown so they can contribute to the timber harvesting land base in future analyses. I have instructed district staff to do this prior to the next timber supply review.

I have acknowledged that the forest cover information used in this timber supply analysis is the best information available, is quite suitable for large-scale analysis such as that over the timber supply area, and forms a good basis on which to make my determination. I am, however, concerned about the impacts on timber supply due to the quality of the forest inventory versus the quality of timber found on the ground, and lack of continuous updates for forest cover delineation. In a market driven industry the quality of the timber may differ significantly from market demands, even though the inventory indicates adequate volume is available. As market demand shifts, so could the availability of desired timber volume. When making this determination, I had to consider potential negative and positive short and long term impacts to the forest industry in North Coast TSA due to market demand shifts in the future, and how sustainable the timber supply is at the current market demand level. To address the forest inventory uncertainties around timber quantity and quality, and to ensure greater frequency in updating the forest inventory data base, I have instructed MOFR staff to develop, within the next two years, an action plan that will address these forest inventory uncertainties. This information is to be available for the next timber supply analysis.

Since the release of the September 28, 2006 Chief Forester Section 173 Order, twenty-four conservancies were established in April 2006, and forty-one conservancies were established in April 2007. Although the base case forecast in the timber supply analysis showed that the AAC could remain unchanged for one more decade, it did not account for the conservancies. However, they were accounted for in a sensitivity analysis, which

showed that timber supply is significantly impacted in the mid- and long-terms of approximately a 24 per cent.

These established conservancies overestimated the mature timber harvesting land base by 9 352 hectares or 44 000 cubic metres. To account for these areas, I am removing them from the North Coast TSA timber harvesting land base. I am also rescinding the two September 28, 2006 Chief Forester Section 173 Orders that temporarily reduced the AAC by 138 000 cubic metres.

There are a number of areas that are pending establishment as conservancies or are no timber harvesting zones and announced as “mining and tourism areas”. These areas combined represent a mature total harvesting land base area of approximately 20 126 hectares or approximately 94 000 cubic metres. There will be an immediate impact on timber supply if and when the pending conservancies and “mining and tourism areas” are formally established as conservancies. As all of the areas pending establishment are within the North Coast Designated Area, I will be releasing, effective November 6, 2007 a new Section 173 Chief Forester Order for 94 000 cubic metres, covering those proposed areas that have not yet been established.

Timber supply review considerations for ungulate winter ranges and wildlife habitat areas are to be managed in the non-contributing land base as modelled in this analysis so there will be zero impact on timber harvesting land base. In addition, since most wildlife tree patches and wildlife trees overlap with riparian areas, the total harvesting land base may be underestimated by 420 hectares. Although no ungulate winter ranges have been legally established to date, I am concerned with the potential impact of goat winter range. MOFR, MOE, ILMB staff, licensees and First Nations need to communicate closely to implement ungulate winter ranges, wildlife habitat areas, wildlife tree patches and wildlife trees and ecosystem-based management components in a manner that utilizes the existing parks and conservancies and other non contributing land. They will also need to monitor and report for the next timber supply review, these impacts on the timber harvesting land base.

Harvesting within the North Coast TSA has changed significantly over the past six years to varied partial harvesting silviculture system practices where predominantly cedar species are harvested. The 2006 timber supply analysis however, modelled 50 per cent clearcutting and 50 per cent partial cutting, spread evenly between aggregate retention and dispersed retention resulting in approximately 7 per cent of the timber harvesting land base being assigned to variable retention analysis units, thereby underestimating the level of partial cutting in the district. Adding to the uncertainty in this analysis, yields from regenerated stands in partial harvest regimes may be different than those in clearcutting regimes.

Although the DFAM Group concluded that historically, the species harvested roughly conforms to the inventory species profile, MOFR staff showed me scale reports that indicate a dramatically higher percentage of cedar being harvested over the past few years. Current trends suggest cedar harvesting will continue over the short term.

I am aware that currently, harvesting of cedar is being addressed provincially, as well, the Coast Region Implementation Team is developing objectives and strategies for the harvesting of cedar in coastal forests. I also understand that First Nations are looking to utilize cedar as part of their cultural use and protection of cedar for availability to future generations.

I acknowledge there are benefits of partial harvesting systems, however, I have noted several concerns with partial harvesting as outlined in the '*silviculture systems*' section above.

Over the next 5 years, licensees need to bring the harvest of cedar into balance, harvest the species profile, consider future opportunities when developing their forest stewardship plans, and implement future cedar objectives under FRPA. District staff will continue to monitor the scope and scale of the issues they see with the application of partial harvesting in the district. If there is no improvement in cedar management practices in the North Coast TSA, I may consider a cedar partition at the next timber supply review.

As a result of an implementation instruction by the former chief forester in the January 2001 determination, a Site Index by Biogeoclimatic zone (SIBEC) study for North Coast TSA was completed. As I noted previously under '*site productivity estimates*', the predictive ecosystem mapping (PEM) that was used as the basis for applying the SIBEC estimates was not sufficiently accurate. I acknowledged that the site productivity estimates assumed in the base case are likely underestimated and also noted that given the increasing use of partial cutting and the application of EBM on the landscape, the timber supply effects of SIBEC-based estimates may not be fully realized operationally. Until the accuracy of the PEM is improved and EBM is further implemented in the TSA, I have therefore not accounted for the results of the sensitivity analyses in this determination.

In addition to committing to the creation of conservancies and biodiversity areas, the BC government also committed to full implementation of ecosystem-based management in the coastal planning area by March, 2009. As mentioned earlier, full implementation of EBM includes the governance framework, human well-being, ecological integrity, adaptive management and flexibility. Although some EBM objectives were approved in July 2007, none are directly applicable to areas associated with North Coast TSA. Other objectives have been released for public review; however at the time of this determination, they remain in draft form and have not been legally established. Operationally, BC Timber Sales and most licensees in the North Coast TSA are voluntarily implementing EBM. Implementation of EBM is clearly underway in the North Coast TSA.

I acknowledge that that due to the complexities involved, modelling all EBM objectives was not feasible in the 2006 timber supply analysis. However, three sensitivity analyses were completed modelling only one of the primary EBM objectives, managing for landscape-level biodiversity. The sensitivity analyses showed the potential implications of only one objective of EBM as having a timber supply impact of approximately 6 per

cent. I note that as EBM is fully implemented operationally and better data become available, timber supply impacts associated with EBM could change considerably. For this reason, I am requesting that the North Coast Plan Implementation and Monitoring Committee provide clarity on how EBM objectives are being implemented.

As stated in my guiding principles, it is typically my practice not to speculate on timber supply impacts that may eventually result from land-use decisions not yet finalized by government. However, after considering the Government's commitment to fully implement EBM, licensees and BCTS currently voluntarily implementing elements of EBM, the significant risks to timber supply as demonstrated in the sensitivity analyses and public comments regarding EBM, I find it appropriate to account for EBM in this determination. I have drawn on the results of sensitivity analyses, and consider a reduction of approximately 6 per cent or 35 000 cubic metres, to account for the potential timber supply impacts associated with EBM. As EBM objectives are established, I request district staff to monitor the impact of each of the EBM elements/values on the timber supply before the next timber supply review.

Determination

I have considered and reviewed all 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 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, and that considers First Nations issues, can be best achieved in the TSA by establishing an AAC of 494 000 cubic meters per year before taking into account the temporary reduction mentioned below. The new AAC represents a decrease of 14 percent from the current AAC. This AAC includes a partition of 48 000 cubic metres attributed to that portion of the TSA that is situated north of the Nass River. The partition for the highly visually sensitive areas is removed.

I am rescinding the two September 28, 2006 Chief Forester Section 173 Orders for the North Coast Designated Area (NCDA) No. 2 (*B.C. Reg. 81/2006*) and Central Coast Designated Area (CCDA) No. 2 (*B.C. Reg. 82/2006*) that temporarily reduced the AAC by 138 000 cubic metres. Coincidentally, I am replacing these orders with a separate Order, temporarily reducing the AAC by 94 000 cubic metres to account for those areas within the TSA that currently remain as designated areas under Part 13 of the *Forest Act*.

This determination is effective November 6, 2007 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

In the period following this decision and leading to the subsequent determination, I request MOFR staff and licensees to undertake the tasks and studies noted below, which are also described in appropriate sections of this rationale document. I recognize that the

ability of staff and licensees to undertake these projects is dependent on available resources including funding. These projects are important to help reduce the risk and uncertainty associated with key factors that affect the timber supply in the North Coast TSA.

1. Request District staff and Licensees within the next two years to conduct a review of the timber operability for District.
2. Request District, Region, and Branch staff to conduct a feasibility study for operating in the area north of the Nass River and to examine administrative mechanisms associated with a partition for the area north of the Nass River.
3. Request licensees to harvest the species profile and report annually on performance.
4. Request District staff to further quantify the scope and scale of the issues they see with the application of partial harvesting in the district, and to provide annual updates. This would include, but not limited to, stand level practices as well as monitoring harvesting relative to species profile.
5. Request Region, District, and Branch staff to develop an action plan within the next two years to address the inventory uncertainties around wood quantity and quality.
6. Request District and Region staff to work with licensees to complete the SIBEC studies within the next two years.
7. Request District staff to work with MOE/ILMB, First Nations and others to implement UWR, WHAs and ecosystem-based management components in a manner that utilizes the existing parks and conservancies in order to minimize further timber harvesting land base impacts; work to be completed prior to next timber supply review.
8. Request MOFR staff to continue to study the yellow cedar decline phenomenon.
9. Request District staff to monitor the impact of each of the ecosystem-based management elements/values on the timber supply before the next timber supply review.
10. Request that the North Coast Plan Implementation and Monitoring Committee provide clarity on how EBM objectives are being implemented.



Jim Snetsinger
Chief Forester

November 6, 2007



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

Documents attached:

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

Appendix 4: List of Submissions Received

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



JUL 04 2006

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

Dear Jim:

Re: Economic and Social Objectives of the Crown

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

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

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

Page 1 of 2

Minister of
Forests and Range
and Minister Responsible
for Housing

Office of the
Minister

Mailing Address:
PO Box 9049 Stn Prov Govt
Victoria BC V8W 9E2
Telephone: 250 387-6240
Facsimile: 250 387-1040

Location:
Parliament Buildings
Victoria BC V8V 1X4
e-mail: FOR.Minister@gov.bc.ca



Jim Snetsinger

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

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

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

Sincerely yours,

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

Rich Coleman
Minister

Appendix 4: List of Submissions Received

Kitamaat Village Council

Tsimshian Stewardship Committee

Consultant representing Forest Ethics, Greenpeace Canada and Sierra Club of Canada,
BC Chapter