

**British Columbia
Ministry of Forests and Range**

**Rationale for Increase in
Allowable Annual Cut (AAC)**

Revised January 9, 2008

Innovative Forestry Practices Agreements

Issued to
ATCO Wood Products Ltd.
Bell Pole Canada Inc.
Kalesnikoff Lumber Co. Ltd.
Springer Creek Forest Products
Tolko Industries Ltd.

**Effective
January 1, 2008**

**T.P. (Phil) Zacharatos, R.P.F.
Regional Manager
Southern Interior Forest Region**

Introduction

Section 59.1 of the *Forest Act* enables the Ministry of Forests and Range (MFR) regional manager to increase the current allowable annual cut (AAC) associated with the licence of an innovative forestry practices agreement (IFPA) holder. An increase in AAC must be justified based on the IFPA-holder documenting their innovative forestry practices or activities in a Forestry Plan approved by the regional manager and demonstrating the impacts of the practices on timber supply by methodology approved by the chief forester.

On December 6, 2007 I determined an AAC increase of 30,000 cubic metres within the Arrow TSA attributable to the innovative forestry practices of the IFPA holders. My reasoning was documented in a rationale released on that date. Subsequently, I have realized an error in my reasons for decision. This document revises my reasons for decision and determination of the December 6, 2007 rationale.

Reason For Decision

The error that I wish to revise is in the accounting for the IFPA-holders not being able to access the identified increased timber supply. In my December 6, 2007 rationale, I accounted for a 36% deduction based upon the full 90,000 cubic metres of identified increased harvest flow. I now believe that this should have been applied to only 68,000 cubic metres that reflected the increased harvest flow available above the current AAC level of the TSA as determined by the chief forester. This suggests about a 43,000 cubic metres increase in harvest flow due to the innovative forestry practices.

In my December 6, 2007 determination I identify that there were other uncertainties that suggested to me that there may be further pressures on timber supply in the short to mid-term. I felt that an accounting in the range of 5,000 to 10,000 cubic metres was appropriate for these varied uncertainties.

Determination

In this rationale, I determine that it is reasonable for a 34 000 cubic metres increase in the allowable annual cut of the IFPA-holders' forest licences.

The 34 000 cubic metres awarded under Section 59.1 will be allocated as follows:

- A20191 – Tolko Industries Ltd. by 4 664 cubic metres per year
- A20192 – Springer Creek Forest Products by 9 802 cubic metres per year
- A20193 – ATCO Wood Products Ltd. by 14 862 cubic metres per year
- A20194 – Kalesnikoff Lumber Co. Ltd. by 3 401 cubic metres per year
- A20196 – Bell Pole Canada Inc. by 1 271 cubic metres per year

The determination is effective January 1, 2008 and will remain in effect until August 31, 2011 unless otherwise determined. This determination and rationale should be considered to append the December 6, 2007 determination rationale. Conditions identified within the December 6, 2007 document are applicable.

Yours Truly,

A handwritten signature in black ink, appearing to read "Phil Zacharatos". The signature is fluid and cursive, with a large initial "P" and "Z".

T.P. (Phil) Zacharatos, R.P.F.
Regional Manager
Southern Interior Forest Region

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Executive Summary

Section 59.1 of the *Forest Act* enables the Ministry of Forests and Range (MFR) regional manager to increase the current allowable annual cut (AAC) associated with the licence of an innovative forestry practices agreement (IFPA) holder. An increase in AAC must be justified based on the IFPA-holder documenting their innovative forestry practices or activities in a Forestry Plan approved by the regional manager and demonstrating the impacts of the practices on timber supply by methodology approved by the chief forester.

In the fall of 1998, the Minister of Forests signed innovative forestry practice agreements with 5 licensees in the Arrow TSA for a period of 10 years. The licensees work together as the Arrow Forest Licensee Group (AFLG).

In a letter dated December 29, 2006 AFLG requested that the regional manager consider an increase of 90 000 cubic metres per year to their licences under the IFPA. This is the first request for an allowable annual cut increase under this agreement. For this decision, I have reviewed the application, the associated information, and consulted with First Nations.

In this rationale, I determine that it is reasonable for a 30 000 cubic metres increase in the allowable annual cut of the IFPA-holders' forest licences.

The 30 000 cubic metres awarded under Section 59.1 will be allocated as follows:

- A20191 – Tolko Industries Ltd. by 4 116 cubic metres per year
- A20192 – Springer Creek Forest Products by 8 649 cubic metres per year
- A20193 – ATCO Wood Products Ltd. by 13 113 cubic metres per year
- A20194 – Kalesnikoff Lumber Co. Ltd. by 3 001 cubic metres per year
- A20196 – Bell Pole Canada Inc. by 1 121 cubic metres per year

The determination is effective January 1, 2008 and will remain in effect until August 31, 2011 unless otherwise determined.

Objective of this Document

This document is intended to provide an accounting of the factors that I, as regional manager of the Southern Interior Forest Region, have considered, and the rationale that I have used in making my determination, under Section 59.1 of the *Forest Act*, of a request to increase the current allowable annual cut of the replaceable forest licences under Innovative Forestry Practices Agreements. Specifically, on December 29, 2006 the Arrow Forest Licensee Group on behalf of the IFPA-holders made an application to increase the AAC of licences FL A20191, A20192, A20193, A20194 and A20196 that are under innovative forestry practices agreements. Collectively, these IFPAs are referred to as the Arrow IFPA and the licensees involved as IFPA-holders.

This document outlines the background of the Arrow IFPA, statutory framework, guiding principles for the determination, the role of timber supply analysis in the process, the consideration of factors influencing the timber supply analysis, impacts on other licensees, First Nations' considerations, reasons for decision, determination, conditions and recommendations. The appendices contain the IFPA legislation and memorandum from the chief forester on timber supply methodology. This rationale does not identify all the work completed by the IFPA-holders, but is intended to address the AAC increase application and resulting determination needs.

Innovative Forestry Practices Agreement

In the fall of 1998, the Minister of Forests signed innovative forestry practice agreements for a period of 10 years with 5 licensees in the Arrow TSA: Slocan Forest Products Ltd (now Springer Creek Forest Products), Atco Lumber Ltd. (now ATCO Wood Products Ltd), Kalesnikoff Lumber Co. Ltd., Bell Pole Company (now Bell Pole Canada Inc.) and Riverside Forest Products Ltd. (now Tolko Industries Ltd.). The licensees work together as the Arrow Forest Licensee Group (AFLG).

In January 2007 the Minister of Forests and Range enabled the extension of agreements to August 31, 2011.

Description of Innovative Forestry Practices Agreement Area

The Arrow IFPA covers the total 605 600 hectare area of the Arrow Timber Supply Area (TSA) which is administered by the Arrow Boundary Forest District. Nearly 44 000 people reside in or near the TSA with about 40 percent of the population living in Castlegar, Trail and Rossland. Other communities include Fruitvale, Montrose, Nakusp, New Denver, Salmo, Slocan, Silverton and Warfield.

The forest sector accounts for about 20 percent of total employment in the Arrow Boundary Forest District with other major sectors consisting of tourism and the public sector.

Natural resources in the TSA include timber, fish and wildlife, recreation and tourism, and water. The diversity of wildlife is impressive: most of the ungulate species present in BC are found in the TSA including bighorn sheep, caribou, elk, moose, mountain goats, mule and whitetail deer.

The TSA primarily consists of the Interior Cedar-Hemlock and Engelmann Spruce Subalpine Fir biogeoclimatic zones. Leading species include Douglas-fir, subalpine fir (also known as balsam), lodgepole pine, Engelmann spruce, western larch, western hemlock and western red cedar.

Statutory Framework

Section 59.1 of the *Forest Act* enables the regional manager to increase the current allowable annual cut associated with the licence of an innovative forestry practices agreement holder. Prior to such approval, the regional manager must have approved a Forestry Plan in which the innovative forestry practices or activities are identified.

Eligible categories of innovative forestry practices and activities are described in the Innovative Forestry Practices Regulation. These categories include improvements due to harvesting or silvicultural systems, silvicultural treatments, collection and analysis of new data on forest composition and expected growth, and management activities to enhance and protect other resource values. To be eligible, the practices and activities must be within the Forestry Plan approved by the regional manager. The collection and analysis of new data must be in accordance with the available specifications of the chief forester.

An increase in AAC must be justified based on timber supply analysis methodology approved by the chief forester. The chief forester has made known his approved timber supply analysis methodology in a memorandum dated April 6, 2001 to the regional managers. This memorandum provides the general principles of the timber supply analysis methodology that is required to justify an increase in allowable annual cut to the licence of an innovative forestry practices agreement holder.

Under section 59.1 of the *Forest Act*, the regional manager can limit an AAC increase to a period of time, area of land, type of timber or any other condition. The regional manager can also reduce or eliminate an increase at any future time given new information or for non-compliance with the Forestry Plan or the conditions set. Further, the regional manager is enabled to suspend or cancel an innovative forestry practices agreement if the holder is not complying with the agreement, Forestry Plan, conditions, *Forest Act*, or *Forest and Range Practices Act*.

Section 59.1 of the *Forest Act*, the Innovative Forestry Practices Regulation, and the memorandum on timber supply methodology from the chief forester, are reprinted in the appendices.

Guiding Principles

As a number of decisions with respect to innovative forestry practices agreements under section 59.1 of the *Forest Act* were expected to be made, I, as regional manager, outlined the following guiding principles for these decisions. These principles assist me in ensuring administrative fairness and consistency in how I approach my decisions.

- For an innovative forestry practice or activity to be considered in an AAC increase decision, the practice or activity must be either currently implemented or the plans for the practice must be clear, practical, and feasible. Given the nature of innovative

practices, I accept that some innovative activities presented may be at an initiation stage rather than a current practice stage.

- Innovative forestry practices or activities identified in the approved Forestry Plan, but which are not addressed in an AAC increase request, need to be considered in the AAC increase determination. It is my expectation that the IFPA-holder will work towards implementing the Forestry Plan as approved. My approval is based on the whole plan, not simply components that might result in increased timber supply. As such, I may weigh the risks of practices not yet carried out against identified increases presented to me.
- Any AAC increase decision should be made in the context of current government policy. While I may be aware of proposed policy changes that could impact an AAC increase decision, I must be mindful of the ever changing nature of proposed policy and not speculate on the acceptance of proposed policy. Similarly, it would be inappropriate for me to speculate on the impacts of strategic land-use or treaty processes before the decisions have been made by government and the appropriate implementation details have been determined.
- The most recent timber supply review for the management unit in which the IFPA is located provides the basis for describing current practice. This base may be updated with new information or management practices that are not innovative practices or activities. While I will not credit the IFPA-holder for increases in harvest flow associated with practices that are not defined as innovative in the Forestry Plan and regulation, I must consider impacts on the harvest flow of these updates in relation to the base allowable annual cut and to any benefits derived from innovative practices and activities.
- The right of the IFPA-holder's licence to access timber volume within the timber supply area is not affected by the IFPA unless otherwise agreed upon. I expect that any increase in AAC will be harvested from within the IFPA boundaries in accordance with the information and practices identified in the IFPA application and review.
- An AAC increase awarded under the IFPA must not cause a negative impact on non-IFPA licensees operating within the IFPA boundaries without the approval of the non-IFPA licensees. The non-IFPA licensees can agree to manage their operating areas within the IFPA area in accordance with the IFPA Forestry Plan but are not eligible for any AAC increase. However, any AAC increase associated with innovative practices carried out under the IFPA Forestry Plan within the IFPA area can be attributable to the IFPA-holder, even if the activities are undertaken by a non-IFPA licensee.
- IFPA practices and activities can be assumed to apply to areas that are temporarily excluded from the IFPA (e.g., timber licences, partitions outside of the IFPA-holder's licence) only after they have reverted to general timber supply area status. Any increases in harvest flow identified on these stands before they revert will not be eligible under the IFPA.
- Uncertainty exists in the data and management practices presented and modelled in a review of timber supply. In my decision, I must consider this uncertainty and associated risks and, where necessary, I can account for such.

- One method to reduce risk is to periodically review the determination. As such, I will specifically assign a time period for which an AAC increase is applicable. Nevertheless, if prior to this time period, new information or an assessment of the innovative practices indicates that the increment is not justified, or the licensee is not complying, I have the right to remove or decrease any AAC increase that I may have determined.
- A second method to reduce risk associated with an increased harvest flow is to award a lower AAC increase than the timber supply analysis suggests. The level of caution that I exercise will depend on the uncertainty of the timber supply increase being attributed to an innovative practice, which is normally related to the quality of the information on the practice, and to inherent uncertainties in ecological dynamics and biophysical factors.

With respect to First Nations' issues, I am aware of the Crown's legal obligations resulting from recent court decisions including those in the British Columbia Court of Appeal and the Supreme Court of Canada. The AAC increase that I may determine should not in any way be construed as limiting those obligations under these decisions.

In my decision, I have considered all information brought forward respecting First Nations' interests, including information from the chief forester resulting from his Section 8 determinations for the Arrow TSA. If, subsequent to my determination, I become aware of information respecting First Nations' interests that was not available to me at the time of this decision, and indications are that all or part of the allowable annual cut increase was not justified, I will re-visit my determination.

My acceptance of information on practices within this decision does not supersede or fetter other statutory decision-making authorities, and is not to be construed as approval required by any other authority or agency. My determination is also independent of any decision by the Minister of Forests and Range with respect to subsequent allocation of the wood supply.

In making my decision, I am aware of my obligations as a steward of the forests of British Columbia and of the mandate of the Ministry of Forests and Range as set out under the relevant legislation.

Information Sources

In making this decision, I have considered information from a variety of sources. Many of these sources were used to compile a technical summary of the application that was presented to me on October 3, 2007. This document was my primary source for reviewing the application; the document refers to other sources of information not listed below used to support my determination.

- Ministry of Forests and Range (unpublished). Technical Summary of the Arrow Forest Licensee Group Innovative Forestry Practices Agreement Request for an Allowable Annual Cut Increase. October 3, 2007. Kamloops, British Columbia

The allowable annual cut increase application and associated timber supply analysis documents submitted by the AFLG provide much of the input into the technical summary:

- Arrow Forest Licensee Group. 2006. Forestry Plan Amendment and Binder Containing Application for an Allowable Annual Cut Increase for the Arrow IFPAs.
- Timberline Forest Inventory Consultants Ltd. 2006. Timber Supply Analysis Report Arrow Innovative Forest Practices Agreement. Support and Analysis for Uplift Application. October 2006. (includes the “2006 analysis” or “2006 uplift scenario” referred to in my rationale).

I have also reviewed 2005 allowable annual cut determinations made by the chief forester and associated timber supply review information as the analysis used for the base case for the 2005 determination was also the base for the current application. This information includes:

- Nienaber, G. 2004. Arrow Timber Supply Area Analysis Report Timber Supply. Timberline Forest Inventory Consultants Ltd. June 2004. (includes the “2004 timber supply analysis base case” or “2004 base case” referred to in my rationale)
- Robinson Consulting and Associates Ltd. and Timberline Forest Inventory Consultants Ltd. 2004. Arrow Timber Supply Area Analysis Report, Socio-Economic Assessment. June 2004.
- Snetsinger, J. 2005. Arrow Timber Supply Area Rationale for Allowable Annual Cut (AAC) Determination. Effective July 1, 2005. (“2005 AAC Rationale” or “2005 determination” referred to in my rationale)

I have also considered other applicable information sources including:

- Walton A., Hughes J., Eng, M. Fall, A., Shore, T., Riel, B., and Hall, P. 2007. Provincial-Level Projection of the Current Mountain Pine Beetle Outbreak: Update of the infestation projection based on the 2006 Provincial Aerial Overview of Forest Health and revisions to the “Model” (BCMPB.v4). Ministry of Forests and Range, Research Branch, Victoria, BC.
- Coleman, R. Letter to IFPA-holders about agreement extensions. January 19, 2007
- Snetsinger, J. Guidance on landscape- and stand-level structural retention in large-scale Mountain pine beetle salvage operations. December 2005.
- Vadal, E.J., S.F. Wilson, and J. Stone. 2007. The BC Species at Risk Coordination Office’s draft Mountain caribou recovery strategy: Analysis of habitat options for forest industry stakeholders. Prepared for the BC Species at Risk Coordination Office. Feb. 11, 2007.

With respect to First Nations my staff prepared a summary of the consultation in which the correspondences received are noted. Additional information and sources of information considered are identified within the consultation summary.

- Black, L. 2007. Consultation Summary – Arrow Forest Licensee Group IFPA in the Arrow TSA. Memorandum to Phil Zacharatos, Regional Executive Director, Southern Interior Forest Region. June 29, 2007.

I have also received information through a technical review and evaluation of current and expected operating conditions through comprehensive discussions with BC Forest Service staff, including a meeting held in Kamloops on October 3, 2007.

At that meeting, government's intended decision regarding caribou recovery was discussed. Since the meeting, I reviewed the recently announced Mountain Caribou Recovery Implementation Plan which is summarized in:

- Province of BC. 2007. Backgrounder: Mountain Caribou Recovery Actions. Ministry of Agriculture and Lands. October 16, 2007.

Forestry Plan

Prior to awarding an AAC increase under Section 59.1, the regional manager must have approved a Forestry Plan in which the innovative forestry practices or activities are identified.

The Forestry Plan for this agreement was initially approved on June 11, 1999. This plan was subsequently extended to June 15, 2007.

AFLG in submitting an application on December 29, 2006 for an allowable annual cut increase also made an application to amend the Forestry Plan. As such, within my determination I will be considering first the approval of the application as a Forestry Plan amendment.

Public review and First Nations consultation of the amended forestry plan has been conducted in conjunction with this AAC increase application.

Allowable Annual Cut Increase Application

In a letter dated December 29, 2006 the AFLG applied to the regional manager for an increase in the allowable annual cut on behalf of the forest licences with innovative forestry practices agreements in the Arrow TSA. The application requested that the regional manager consider an increase of 90 000 cubic metres per year to their licences. This is the first request for an allowable annual cut increase under IFPAs in the Arrow TSA. The application identified the proposed innovative forestry practices, presented a supporting timber supply analysis for an allowable annual cut increase of 90 000 cubic metres, and identified that a public review and First Nations information sharing was to proceed over the next 60 days.

On March 31, 2007 the AFLG provided a letter summarizing their review process and the responses received. The review process included notification via newspaper advertisements and meetings on request and communications with First Nations. No comments were received from the general public or public agencies. Two First Nations provided comments in response to this review process (see "First Nations Consultation").

The Role of Timber Supply Analysis

Section 59.1(7) of the *Forest Act* identifies that an increase in allowable annual cut must be justified according to timber supply analysis methodology approved by the chief forester. The chief forester has made known this methodology in a memorandum dated April 6, 2001. The memorandum provides the general principles, not detailed procedures, of timber supply analysis required to assist my decision.

The timber supply analysis consists of two components. The first component is an information package that includes information from three categories: land base and inventory; timber growth and yield; and management practices. The second component is a suite of timber supply forecasts based on the information package that investigates different harvest flow options and data uncertainty.

To determine an increase in AAC requires that I have both knowledge of timber supply based on current practices and of the changes associated with the IFPA innovative practices and activities. As such, the timber supply analysis provides separate forecasts without and with the innovative forestry practices and activities.

For the current AAC increase application, I made use of timber supply analysis provided by AFLG within the application of December 29, 2006 and 2004 timber supply analysis provided for the chief forester's 2005 AAC determination in the Arrow TSA. This later analysis was provided to the chief forester by the licensees that comprise the AFLG.

The timber supply analysis with which I am provided is an integral component to my review of the AAC increase application. However, the determination itself is not a calculation but a synthesis of judgement and analysis in which numerous risks and uncertainties are weighed. Analytical methods such as forest estate models cannot incorporate all the social, cultural, and economic factors that are relevant when making forest management decisions. As such, depending upon the outcome of these considerations, the increase in AAC determined may or may not coincide with harvest flows identified in the timber supply analyses.

In this rationale, I will not discuss in detail many of the timber supply analysis assumptions or factors where I am satisfied that such is appropriately considered and is documented within the timber supply analysis reports.

Consideration of Factors

I have reviewed the IFPA-holder's application including the timber supply analysis for the proposed allowable annual cut increase. My decision process for an allowable annual cut increase consists of two steps. The first step is the confirmation that the proposed practices can be considered innovative forestry practices as defined by regulation. The second step is to determine, as justified by the timber supply analysis methodology, an increase in harvest flow attributable to the innovative forestry practices.

Below I follow the above 2 steps where I first discuss my interpretation of the innovative forestry practices proposed and then secondly I comment on the timber supply analysis and information that was used to assess increases in harvest flow. For the analysis assessment, I will only discuss factors that affect the decision or need elaboration due to concerns expressed.

Innovative Forestry Practices

The application identifies a variety of practices that IFPA-holders are or wish to undertake. I have discerned from the application and the supporting documentation 5 proposed practices that IFPA-holders are presenting as innovative forestry practices.

In the December 2006 AAC increase application, the AFLG identify 5 specific activities as being innovative forestry practices. These include the results of inventory projects:

- Vegetation Resource Inventory (VRI) Phase 2 plot establishment and inventory adjustments
- Net Volume Adjustment Factor (NVAF) sampling.

The application also presented the results of several analysis projects that looked at environmental and forest health issues:

- an impact assessment of the implementation of the spatial old growth management areas
- an assessment and sensitivity analysis of mountain pine beetle impacts
- an analysis of caribou habitat impacts.

My guiding principles infer that activities proposed as innovative forestry practices be identified within the approved Forestry Plan. These five practices are present within the December 2006 forestry plan amendment. While the Forestry Plan approved in 1999 does not specifically identify all of the above, most of the above do fall within the general practice areas identified within the plan or are a logical progression. As such, I am willing to accept that these practices have been included within the Forestry Plan.

I find that these 5 projects could be considered innovative forestry practices as defined under section 2(e) of the Innovative Forestry Practices Regulation. All these projects provide new information or analysis that will result in a more accurate representation of the forest composition. For the later projects they may also help to protect other resource values through their consideration.

I will further discuss these factors in the relevant sections below and discuss my decision on allowable annual cut increases attributable to these innovative forestry practices within my reasons for decision.

Timber Supply Analysis

To support the allowable annual cut increase application, the IFPA-holders undertook timber supply analysis that included the 2004 timber supply analysis base case and the 2006 uplift scenario that support the identified innovative forestry practices.

The timber supply analysis was completed using the CASH6 model of the Timberline Forest Inventory Consultants Ltd. The 2004 timber supply analysis base case was completed by Gordon Nienaber, FIT and the 2006 analysis that provided the uplift scenario by Kelly Sherman, RPF.

The base case indicated that an AAC of 550 000 cubic metres per year could be maintained for seven decades, followed by a substantial 25 percent increase in the eighth decade to a long-term maximum sustainable harvest flow of 690 000 cubic metres per year. The increase primarily reflects the use of improved site productivity estimates and genetic gains for managed stands that are projected to result in higher productivity than estimated for unmanaged stands that have not yet been harvested.

The uplift scenario employed the findings of VRI Phase 2 and NVAF sampling and subsequent adjustments to the Phase 1 inventory. The uplift scenario indicates that an initial harvest level of 640 000 cubic metres per year can be maintained for seven decades before a long-term harvest level of 690 000 cubic metres is attained in decade eight similar to the base case. The initial harvest levels are 90 000 cubic metres above the base case and this finding forms the basis for the AAC increase application submitted by IFPA-holders.

An alternative harvest flow was prepared by IFPA-holders that showed how high initial harvest levels could go in the TSA. This alternative indicated that an initial harvest level of 710 000 cubic metres could be supported provided that 10 percent per decade decreases in harvest levels immediately occur until a mid-term harvest level of 480 000 cubic metres is reached. After decade 7, managed stands provide enough volume to restore harvest levels to a long-term level of 705 000 cubic metres which is slightly higher than the base case.

The 2006 analysis also assessed the impacts of the other 3 innovative forestry practices which I will address in the applicable factors discussed below.

I am satisfied that the methodology used in the timber supply analysis that supported the application for an AAC increase sufficiently meets the needs identified in the chief forester's April 6, 2001 memo on timber supply analysis methodology related to innovative forestry practices agreements (see Appendix 3).

Decision Base

Under section 59.1 of the *Forest Act*, I am enabled to increase the allowable annual cut authorized in a licence whereas the chief forester's decision under Section 8 is to

determine the allowable annual cut of a management unit. While these decisions may use similar information, they are different decisions.

For this decision, which is an increase in the AAC of a licence, I need to identify a base to which to compare the impact of the innovative forestry practices. For this base case, the licensees have presented me with the same base case used by the chief forester to determine the current AAC for the Arrow TSA. I find that this is a reasonable base case for use in support of my decision. However, I also recognize that the chief forester identified uncertainties in the information that either positively or negatively impacted the base case harvest flow. For his decision coincidentally the short term harvest flow of the base case matched his decision. For my decision, I also must consider how information presented to me may affect the presented base case. I may not view the information similar to the chief forester or I may be presented with updated information that would influence my decision.

For my decision I also recognize that the timing of the chief forester's 2005 determination to be a logical time point from which to base my decision. After this time period the licensees completed the 5 innovative forestry practices presented in the application. Prior to this time period, the licensees had completed other projects that may have been considered innovative forestry practices but were presented as information to the chief forester and considered in his decision. In fact these practices likely enabled the chief forester to support the continuation of the current AAC level rather than a decrease, and thus enabled the maintenance of the AAC on the licences of the IFPA-holders.

Operable Land Base

The most recent operability mapping was completed in 1991 and updated in 1998 by the Arrow Forestry Association. The updated operability mapping was used in the 2004 base case. In the 2005 AAC Rationale, the chief forester agreed with British Columbia Forest Service (BCFS) district staff concern that operational practices are isolating some mature stands within areas mapped as operable which in effect slightly increases the inoperable area relative to that assumed in the base case. The chief forester concluded this may represent a 0.5 percent overestimation in the size of the timber harvesting land base.

I reviewed this concern with BCFS district staff and they confirmed that this assumed overestimation in short- and mid-term timber supply relative to the base case remains valid. I have therefore also taken this overestimation into account in my "Reasons for Decision".

Woodlot Licences

Woodlot licences are removed from Timber Supply Areas and their volumes are not to be considered in AAC determinations for TSAs including IFPA AAC increases. The 2004 base case included only woodlots licences that had been issued at that time. The 2005 AAC rationale noted that applications to increase woodlot licence areas had been

received but no decisions had been made at that time. Therefore no adjustments were made by the chief forester in his 2005 determination to account for this factor.

Since the 2005 AAC Rationale, 525 hectares have been added to existing woodlot licences. There are other additional proposals to increase the size of woodlots but no decisions have yet been made for these areas. In addition to the recent decisions that added 525 hectares of new woodlot licence area, the minister has apportioned 3000 cubic metres of the TSA's AAC to further woodlot expansions.

I employ similar guiding principles as does the chief forester by not speculating on allocation decisions that have not yet been made. Therefore for the purposes of this decision, I account for only the 525 hectares of woodlot license area that have been removed from the TSA since the 2004 base case. Based on current woodlots in the Arrow Boundary Forest District, the average mean annual increment is 2.3 cubic metres per hectare per year. Therefore the 525 hectares represents an annual volume of about 1200 cubic metres per year which I have accounted for as a downward pressure on short-term timber supply in my "Reasons for Decision" relative to the base case.

Community Forests

The 2005 base case and 2005 AAC Rationale did not account for community forests since none had been issued at that time. Since then, the minister has apportioned 40 000 cubic metres of the TSA's AAC to community forests, and the application process to issue the Nakusp and Slocan community forests within the TSA is well advanced. The timber harvesting land base of the two community forests is estimated to be 19 440 hectares with a total allowable annual cut of 40 000 cubic metres per year similar to the apportionment.

Although the final decisions regarding the community forests have not been made, given the advanced stage of the applications, it is highly likely that these community forests will be removed from the TSA land base accessible to IFPA-holders.

Consequently, I find it is appropriate to account for this in my "Reasons for Decision" as a 40 000 cubic metre portion of the TSA that will no longer be available to IFPA-holders for consideration in their uplift request. The community forests, when established, are no longer considered part of the TSA.

Protected Areas

In the 2005 AAC Rationale, the chief forester recognized as an upward pressure on timber supply 298 hectares (about 0.14 percent of the timber harvesting land base) of proposed Goal 2 protected areas that had been removed from the land base in the 2004 base case. The proposed Goal 2 protected areas were recommended in a 2001 process consistent with the direction provided from the Kootenay-Boundary Land Use Plan Implementation Strategy. Currently, however, there is no active process in place to advance these proposed areas for designation.

Since no decisions have been made for these areas since the 2005 AAC Rationale, I also find it appropriate to recognize the inclusion of these areas in the analysis as a small upward pressure on timber supply in my “Reasons for Decision.”

Forest Inventory

The Vegetation Resource Inventory (VRI) consists of two phases: Phase 1 based on photo-interpretation mapping, and Phase 2 consisting of field sampling. Both phases are now complete in the Arrow TSA. The 2004 base case incorporated the results of the then completed Phase 1 work. Since Phase 2 work, including Net Volume Adjustment Factor (NVAF) sampling, was not completed by IFPA-holders at the time of the 2005 AAC Rationale, the chief forester reviewed comparisons of pre-VRI forest cover inventory (FCI) audit sampling with the Phase 1 inventory. The chief forester acknowledged that the results of this comparison needed to be cautiously interpreted since the audit sampling was not designed to address the accuracy of post-audit VRI Phase 1 mapping. Nevertheless, in reviewing this information, the chief forester concluded that a significant unquantified upward pressure on short- and mid-term timber supply is expected due to strong indications that volume estimates for existing unmanaged stands assumed in the 2004 base case have been underestimated. A conservative estimate by the chief forester of the general magnitude of this underestimation was at least 10 percent.

Since the 2005 AAC Rationale, IFPA-holders have completed the Phase 2 and NVAF sampling, and have used these findings to adjust Phase 1 inventory attributes using standard procedures approved by Forest Analysis and Inventory Branch and regional inventory staff. As a result of the inventory adjustments, the estimated existing volumes are 16.4 percent higher than the unadjusted volumes using the Phase 1 estimates in the 2004 base case.

As discussed earlier, the increased volumes determined from the Phase 2 and NVAF sampling is the main basis for the uplift request by IFPA-holders. The uplift scenario using the adjusted inventory enables short-term annual harvest levels to increase by 90 000 cubic metres from 550 000 cubic metres in the 2004 base case to 640 000 cubic metres in the 2006 uplift scenario.

IFPA-holders investigated the sensitivity of timber supply to changes in the adjustment from several different perspectives around the observed variation.

IFPA-holders performed sensitivity analysis that illustrated a likely extreme case where adjustment ratios in species stratum were increased or decreased by the level of the sampling error (95 percent confidence level). At the upper confidence level, the short-term annual harvest levels could increase to 770 000 cubic metres, whereas at the lower confidence level, the short-term annual harvest level would decrease to 490 000 cubic metres.

IFPA-holders provided another sensitivity analysis that changed the inventory adjustments by the level of the overall sampling error of 11.6 percent (i.e., plus or minus 11.6 percent of the 16.4 percent estimated volume increase). Underestimating the existing volumes at this level resulted in a slight increase in annual short-term to 648 000 cubic metres, whereas an overestimate in volumes resulted in a decrease of annual short-term volumes to 628 000 cubic metres.

In reviewing the information for this important factor with inventory and district staff, I am confident that a 90 000 cubic metre short-term increase in harvest flow is available as identified by VRI Phase 2 and NVAF sampling. However, I also recognize that the chief forester accounted for an upward pressure due to expected higher existing volumes in his 2005 AAC Rationale when making his determination that maintained the AAC in order to offset downward pressures in timber supply. I have reflected on these considerations in my “Reasons for Decision.”

Site Productivity

The productivity of a site largely determines how quickly trees grow. This in turn affects the time seedlings will take to reach green-up conditions, the volume of timber that can be produced, and the ages at which a stand will satisfy mature forest cover requirements and reach merchantable size. Traditionally inventory data has been used to obtain an estimate of site productivity for each forest stand, expressed in terms of site index. The site index is based on the stand’s height as a function of age.

In British Columbia it has been found that estimates of site productivity derived from forest cover inventory on older unmanaged stands have often been found to underestimate site productivity. The older unmanaged stands are often well past the age of maximum height growth and have often been affected by pests and damage as they reach advanced age, thus their heights do not reflect the site productivity.

To address this issue, IFPA-holders derived site index estimates for managed stands based on Site Index – Biogeoclimatic Ecosystem Classification (SIBEC) estimates of site productivity in conjunction with a completed Predictive Ecosystem Mapping (PEM). Managed stands were defined in the analysis as existing Douglas-fir and spruce stands 25 years or younger, other stands 15 years or younger, and future managed stands following harvesting. Locally derived SIBEC sampling augmented the provincial SIBEC database maintained by the MFR Research Branch. Research Branch staff approved the PEM as reasonably accurate for timber supply review modelling with some qualifications.

For unmanaged stands, the IFPA-holders used inventory-derived site index estimates.

This abovementioned information was available to the chief forester for review and is reflected in his 2005 AAC Rationale. The chief forester accepted the site productivity estimates in the base case for both managed and unmanaged stands. He also recommended that managed stands in the TSA be monitored for growth in order to validate the site productivity estimates, and that the PEM be improved, for example

through the provision of additional plot data, to address the qualifications noted by Research Branch staff. These efforts can be used to refine site productivity estimates in support of future AAC determinations.

In reviewing this factor with BCFS staff, I accept that the site productivity estimates applied in the 2004 base case reflect best available information. I also concur, as reflected in “Recommendations” with the chief forester request that site productivity in managed stands be monitored and that additional efforts be made to improve the quality and reliability of PEM.

Root Rot

The 2004 base case applied provincial default Operational Adjustment Factors (OAFs) to adjust regenerated managed potential stand volumes when using the yield model Table Interpolation Program for Stand Yields (TIPSY version 3.0b). The OAFs account for differences in the projections of timber volume resulting from operational conditions such as pests and disease that are not otherwise modelled.

A study titled, “Demonstrating growth and yield adjustments (TIPSY OAFs) for Armillaria root disease in timber supply analysis”, was conducted for the Arrow TSA in 2004. In this study, OAFs were developed to reduce yield estimates in the TIPSY growth and yield model to reflect Armillaria (root rot) losses for Douglas-fir in the Interior Cedar-Hemlock zone.

In reviewing this study, the chief forester in his 2005 AAC rationale concluded that a conservative estimate of the timber supply impact of root rot, in addition to those assumed in default OAFs, was 7 to 8 percent in the mid- to long-term. A sensitivity analysis indicated that uncertainty in this factor was not likely to affect short-term timber supply.

In discussing this factor with BCFS staff, I concur that the default OAFs used in the 2004 base case likely underestimate the impact of root rot on mid- to long-term timber supply. Although my IFPA AAC increase determination is focused on the next 5 years, and uncertainty regarding root rot on managed stands does not appear to impact short-term timber supply, I also recognize that the chief forester considered that these downward pressures were offset in the mid-term by considering the upward pressures exerted by increased anticipated volumes for existing unmanaged stands (as discussed earlier) and the long-term by improved information on site productivity. I further reflect on this downward pressure on mid- to long-term timber supply in my “Reasons for Decision”.

Log Grades

Prior to April 1, 2006, a log was assessed in BC’s Interior according to whether the tree it came from was alive or dead at the time of harvest, and those derived from grades 3 and 5 dead trees were not charged to the AAC of a licensee nor were they considered in the AAC for a management unit.

The current AAC does not reflect logs derived from dead trees. However, transitional policy to the new log grade system enables logs derived from dead trees to not be charged to the AAC. Schedule A of the cut control regulation identifies a percentage of each species within a TSA that is considered to be non-billable until a new AAC determination is made that accounts for the new log grade system. In the Arrow TSA, this is 25.8 percent for lodgepole pine, 10.5 percent for balsam, 5.2 percent for Douglas-fir, and 3.7 percent for spruce.

District staff believe that the lodgepole pine percentage is high as the data source was likely collected during an atypical timber period with respect to utilization of grade 3 pine logs. If so, this means volume is being harvested that has not been charged to the AAC but is likely considered present within the modelled timber supply analysis (i.e., would mean if current AAC is being fully utilized that actual harvest flow is above AAC level).BCFS staff believe based on the pre-VRI inventory audit that the dead potential volume is about 5.3 percent of the 'green' volume (volume derived from live trees) on forest stands over 60 years of age.

In the AAC increase application, the timber supply analysis estimated existing stand volume in the 2004 base case based on the standard Variable Density Yield Prediction (VDYP) model. This growth and yield model does not report the volume of dead (but potentially useful) timber that exists in a stand at a given time. Further, the VRI Phase 2 sampling collects information on dead wood, but does not utilize this information in the inventory adjustment process. The current modelling tools available do not currently account adequately for this change in log grade and only rudimentary modelling considerations can be made.

As a consequence of the above the 2004 base case, the 2006 uplift scenario, and current AAC determination of the chief forester are seen not to account for April 1, 2006 change in log grade specifications.

In reviewing all of this information, I conclude that there is potential that the short-term harvest flow may exceed the AAC due to the transitional policies until an accounting for dead potential volumes is undertaken by the chief forester. I further note that the coarseness of current modelling is not able to identify small incremental differences due to innovative forestry practices that such a change in log grade might affect. As such, I find that for my decision that while these changes may affect overall harvest flow, the change would not likely impact the incremental increases upon which I base my IFPA AAC increase determination.

Visually Sensitive Areas

Scenic areas were designated in the Kootenay-Boundary Higher Level Plan Order in 2001. The district manager provided instructions under the Forest Practices Code to forest licensees to use the recommended visual quality classes in the visual landscape

inventory. These instructions were brought forward under FRPA and were modelled in the timber supply analysis supporting the 2004 base case. The chief forester indicated that he was satisfied with how visually sensitive areas were accounted for in the base case. The 2006 uplift scenario uses the same assumptions about visually sensitive areas as did the 2004 base case.

Subsequent to the 2005 AAC determination by the chief forester, visual quality objectives (VQOs) were established for scenic areas in the Arrow TSA through an order under FRPA's *Government Actions Regulation* on December 31, 2005. The rationale for the establishment decision noted that the VQOs used in the 2004 base case were very similar to those being established by the order, and therefore it was assumed that the decision would not unduly impact timber supply in the Arrow TSA.

I am satisfied that the base case appropriately accounted for this factor.

Ungulate Winter Range

The Kootenay-Boundary Land Use Plan – Implementation Strategy (KBLUP-IS) identified ungulate winter ranges in the Arrow TSA with corresponding green-up height and forest cover requirements. This direction is reflected in the 2004 base case where 21 443 hectares of winter range occur in the timber harvesting land base.

In December 2004, the legal objective for managing ungulate winter range under FRPA was established with a notice under section 4 of the *Forest Planning and Practices Regulation* reflecting the provisions of the KBLUP-IS. The notice was considered interim until ungulate winter ranges were established under the *Government Actions Regulation*. The Ministry of Environment (MOE) completed a “Supplemental Ungulate Winter Range Analysis” in January 2005 that indicated a small 5000 cubic metre upward pressure on timber supply would likely occur relative to the 2004 base case should the proposal be established by MOE. The small upward pressure is primarily due to an overall easing of management constraints in ungulate winter range.

The chief forester in his 2005 AAC Rationale noted a small upward pressure could occur due to this factor but did not account for it in his determination since the decision under the *Government Actions Regulation* had not been made.

In February 2007, MOE established the ungulate winter range and general wildlife measures under the *Government Actions Regulation* consistent with their 2005 proposal. I therefore conclude in my “Reasons for Decision” that it is reasonable to account for this small 5000 cubic metre upward pressure on timber supply in my determination.

Caribou

The 2004 base case reflects the direction provided by the Kootenay-Boundary Higher Level Plan on the management of caribou habitat. About 13 640 hectares of the timber

harvesting land base are recognized as caribou habitat areas with associated green-up and forest cover requirements provided.

A proposal to refine the higher level plan by a regional caribou committee was accepted by government in a March 2005 variance to the order. BCFS staff advised the chief forester that the variance was not expected to result in a net increase in timber supply impacts across the TSA. The chief forester therefore accepted the base case assumptions in his 2005 AAC Rationale as adequately accounting for caribou habitat in the base case.

Since 2005, the Species at Risk Coordination Office (SaRCO) has been coordinating accelerated recovery planning for mountain caribou in BC. In 2006, SaRCO published for discussion a proposed selected management strategy for all mountain caribou herds. In the AAC increase applications, the IFPA-holders provided a scenario that investigated the 2006 SaRCO suggested option for caribou habitat management in the Arrow TSA. Compared to the 2006 uplift scenario, that is based on VRI Phase 2 work, the ‘caribou scenario’ resulted in an insignificant change in annual short-term (about a 1000 cubic metre increase) and long-term (about a 2000 cubic metre decrease) in timber supply.

On October 16, 2007, government announced its endorsement of the Mountain Caribou Recovery Implementation Plan. Current government direction is that the plan could result in up to 3500 hectares being removed from the timber harvesting land base in the Arrow TSA (up to about 1.7 percent of the land base).

I am aware of my guiding principle around speculating on proposed government policy or decisions. I am also cognisant that government through their October 2007 announcement provided strong direction towards the protection of mountain caribou and that that while there is the objective of no short term mill viability impacts, there is direction to reduce the available timber harvesting land base by no more than 1.7 percent in the Arrow TSA. My accounting of this factor is discussed in my “Reasons for Decision”.

Other Wildlife Species

In addition to other factors such as ungulate winter ranges, caribou habitat, riparian reserves, biodiversity, etc, other wildlife species were also accounted for in the 2004 base case by a one-percent reduction in harvest yield to account for identified wildlife (e.g. species at risk or regionally significant species) such as grizzly bears. A no-harvest buffer was also established around known goshawk and great blue heron nesting sites that have protection under law. The one-percent yield reduction reflects FRPA guidance regarding the expected timber supply impacts associated with managing for identified wildlife at the district level. Identified wildlife are formally protected under FRPA through the designation of wildlife habitat areas (WHAs). Although no WHAs had been designated at the time, the chief forester considered the approach taken in the base case to be appropriate for the purposes of his 2005 AAC determination.

Since the 2005 AAC determination, some WHAs have now been established under the *Government Actions Regulation* of FRPA including 6 WHAs for grizzly bears representing a gross area of 1676 hectares. In addition, a proposed order is being prepared by MOE to address grizzly bear habitat for portions of the TSA. The proposed order is focussed on managing access and does not impact timber supply. The management for critical grizzly bear habitat in the TSA is being largely accommodated within: (1) the management considerations of other non-timber values, for example, in the deployment of mature and old growth forests needed to meet biodiversity objectives under the Kootenay-Boundary Higher Level Plan (e.g. by targeting retention of grizzly bear habitats adjacent to avalanche tracks); and in (2) the establishment of WHAs related to identified wildlife consistent with the one percent timber supply impact FRPA guidance that was reflected in the base case.

In reviewing this factor with BCFS staff, I am therefore satisfied that the 2004 base case has appropriately accounted for other wildlife species, including grizzly bears.

Wildlife Management Area

Administered under the *Wildlife Act*, the Hamling Lakes Wildlife Management Area (WMA) was established in 1998. The MOE regional manager has the authority to permit use of land or resources within the WMA which may include timber harvesting. A draft Operational Management Plan was completed in 2003 which emphasizes the protection of critical winter habitat for mountain caribou and high value foraging areas (avalanche tracks) for grizzly bears. The WMA contains 4700 hectares of timber harvesting land base of which 3250 hectares are not already constrained by other management objectives such as caribou management. The 3250-hectare unconstrained area represents about 1.5 percent of the entire timber harvest land base in the Arrow TSA.

Timber supply impacts associated with the WMA are managed through the Kootenay-Boundary Higher Level Plan and an approved variance. The direction in the variance is reflected in the 2004 base case. In reviewing this factor, the chief forester indicated in his 2005 AAC Rationale that he was satisfied that the base case appropriately accounted for the timber supply impacts associated with the WMA.

In reviewing this factor with ministry staff, it was pointed out that no timber harvesting has occurred recently within the WMA and that licensees appear to be avoiding the area due likely to the additional efforts required to obtain cutblock approval and the relative low proportion of timber harvesting land base in the WMA which can make operations difficult and expensive.

Due to avoidance of the area, I consider in my “Reasons for Decision” that there could be up to a 1.5 percent downward pressure on timber supply that is not reflected in the 2006 uplift scenario.

Riparian Habitat

IFPA-holders modelled default requirements under the Forest Practices Code, that continue to apply under FRPA, for riparian reserve zones (RRZs) and riparian management zones (RMZs) in the 2004 base case. Although there is no requirement to provide a RRZ along small streams that provide fish habitat or are located in community watersheds (“S4 streams”), district staff believe that a 4 metre average reserve width reflects current and expected practices on S4 streams. This constitutes about a 665-hectare (0.3 percent) area which the chief forester in his 2005 AAC Rationale concluded was a downward pressure on timber supply.

No information was provided to me to suggest that operational practices have changed in the TSA and therefore I have also recognized this downward pressure in my “Reasons for Decision.”

Community and Domestic Watersheds

A large proportion of the timber harvesting land base in the Arrow TSA – nearly one-half (47 percent) – are identified as community or domestic watersheds as part of the Kootenay-Boundary Land Use Plan. Equivalent clearcut area (ECA) guidelines, designed to protect water quality and quantity, define the maximum area that can be disturbed for community watersheds and for each class of domestic watersheds. Disturbed areas should reach a hydrologic green-up height of 6 metres before they are considered undisturbed. ECA guidelines are not generally considered to be hard rules, rather they are generally used as a ‘red flag’ to trigger further hydrologic study should disturbed areas approach the limits indicated.

The ECA guidelines were applied in the 2004 base case. In reviewing this information, the chief forester noted a potential small unquantified upward pressure since the analysis emulated ECA limits which in fact are not hard limits, but overall accepted the analysis as a reasonable accounting of community and domestic watersheds.

In reviewing this factor, BCFS district staff believe that licensees are able to exceed in some instances the ECA disturbance guidelines modelled in the base case. This further suggests that a small upward pressure may exist, however, my overall conclusion, similar to the chief forester, is that there is no reason to formally adjust the base case to account for this factor.

Stand Level Biodiversity

An important approach to managing for stand-level biodiversity is to retain wildlife tree patches (WTPs). WTPs were accounted for in the 2004 base case in two ways. The first approach removed currently mapped WTPs from the timber harvesting land base; this resulted in 792 hectares (0.3 percent) reduction to the land base. The second approach

evaluated the area of expected WTPs in future cutblocks; this estimated an additional 2.5 percent of the timber harvesting land base was required for future WTPs which was modelled in the timber supply analysis as a 2.5 percent reduction in the yield tables.

The district manager provided a letter to all licensees where it was indicated that 3.4 percent of the timber harvesting land base is expected to be retained for WTPs. District staff however have not determined if this suggested higher level of WTP reflects current practices. District staff therefore accepted the modelling approach that supported the 2004 base case.

The chief forester concurred with that view in his 2005 AAC Rationale but also requested that future WTPs be monitored so that their impact on timber supply can be better accounted for in future determinations.

Subsequent to the 2005 AAC determination, forest stewardship plans in the Arrow TSA commit to leaving 7 percent for WTP although it is not known how much of this area would otherwise be within or outside the timber harvesting land base. In discussing this factor with BCFS district staff, they raised concern that a larger area may be left for WTPs than assumed in the 2004 base case.

I accept the reductions made for WTPs in the 2004 base case as a reasonable accounting for this factor at this time, but under “Recommendations” request that licensees monitor WTP reductions and report their findings prior to the next timber supply review for the Arrow TSA.

Landscape Level Biodiversity

An important approach to conserving landscape-level biodiversity in forested landscapes is to retain a sufficient area of old growth forests for species that depend on that habitat. Non-spatial old and mature forest retention targets are provided for in the Kootenay-Boundary Higher Level Plan as amended in October 2002. Spatially located old growth management areas (OGMAs) can be approved by the Ministry of Agriculture and Lands to address the requirements in the Higher Level Plan.

In support of the 2004 base case, licensees used proposed spatially located OGMAs. The proposed OGMAs were based on areas identified by then Ministry of Sustainable Resource Management (MSRM) staff but revised by licensees. The revised areas had about 38 000 fewer hectares than the areas originally identified by MSRM staff. If the ratio of net reductions to total reductions (about 1:3) for the areas specified in the 2004 timber supply analysis applied to the 38 000-hectare area, this would represent about a 9500-hectare (about 5 percent) further reduction to the land base to reflect the OGMAs originally identified by MSRM.

At the time of the 2005 AAC Rationale, the OGMAs had not been established, so there remained uncertainty regarding their potential timber supply impacts. The chief forester concluded that the 2004 base case likely underestimated the impacts, and although

unquantified, the upper limit of the impact would be no more than 5 percent based on the estimated 9500-hectare disparity with areas identified by MSRM.

Subsequent to the 2005 AAC determination, it was discovered that an incorrect proposed OGMA coverage was used in support of the 2004 base case. Applying the revised proposed OGMA boundaries that reflect current practice to the timber supply analysis identifies a 1.8 percent reduction in harvest flow.

In the base case, the licensee modelled disturbance in the inoperable land base for only those areas that did not contribute to meeting forest objectives such as old growth retention. The chief forester concluded in his 2005 AAC Rationale that this is not realistic, as disturbances such as wildfire could occur in such areas, and recognized this as an unquantified downward pressure on timber supply.

In reviewing landscape level biodiversity and the modelling of proposed OGMAs, I recognize in my “Reasons for Decision” that there will likely be a downward pressure on timber supply due to the establishment of OGMAs relative to that assumed in the 2004 base case, but that, given the correction in proposed OGMA mapping, this pressure is now likely to be about 1.8 percent. I also recognize under “Reasons for Decision” an unquantified downward pressure on timber supply due to way in which disturbances were modelled in the base case for stands outside the timber harvesting land base.

Slocan Valley

There has been a history of forest operational planning delays and harvesting deferral in the Slocan Valley due to a variety of issues (e.g. water use, environmental concerns) and challenges continue to exist in some areas within the valley. There is concern that the actual volume contribution from areas with such challenges may not reflect what is assumed in timber supply analysis. If so, this could lead to an inadvertent over-harvesting of other areas within the TSA.

To address these concerns, two reviews were undertaken in the previous timber supply review. First, actual harvest levels in the 5 landscape units within the Slocan Valley were compared with their volume contribution overall to the TSA. In the last 5 years the harvest volume contribution from the 5 landscape units matched their relative AAC volume contribution in the TSA.

Second, eight more specific areas with operating challenges within the 5 landscape units were identified. These areas represent 9495 hectares (about 4.5 percent) of the timber harvesting land base in the TSA. Licensees undertook a sensitivity analysis to test an extreme situation where the entire 9495 hectare area was removed from the timber harvesting land base. In this sensitivity analysis, initial harvest levels can still be maintained for 3 decades but a 10 percent decrease would then occur from decade 4 to 8. If the harvest contribution from the eight areas are flowed over the entire harvest forecast, it contributes 25 000 cubic metres per year – representing about 4.5 percent of harvest levels in the short- and mid-term.

The chief forester expressed confidence in his 2005 AAC Rationale that significant harvest contributions can be made within the landscape units in the valley. Given the challenges that remain in the more specific eight areas identified by licensees, and the importance of avoiding a significant mid-term decrease in timber supply, he requested that the harvest level contribution in the eight areas be tracked.

Since the 2005 AAC determination, an offer for a community forest in the Slocan Valley has been made by the minister and once established will account for about 20 000 cubic metres. The proposed community forest, which is almost through all approval stages for a pilot area, includes about one-half of the eight areas with operating challenges. BCFS district staff believe this will help relieve some of operating challenges faced by IFPA-holders in the TSA in the Slocan Valley.

As noted earlier under “Community Forests”, I have concluded in my “Reasons for Decision” that the proposed community forests should no longer contribute to the IFPA AAC increase request since these areas, when established, will be removed from the TSA. The consequence of establishing the Slocan Valley Community Forest with respect to the eight areas noted above will be to reduce the corresponding operating challenges that had been faced by IFPA-holders; these challenges will be ones faced by the license holder for the community forest. As a consequence, I do not believe I need to account further for these challenges in the TSA particularly since recent data notes that the harvesting in the Slocan Valley has been proportionally similar to its harvest contribution to the AAC in the last 5 years.

Impact on Other Licensees

BC Timber Sales (BCTS) has 28.7 percent of the AAC in the Arrow TSA, and their chart areas comprise 24.7 percent of the TSA by area. BCFS staff note that licensee chart areas have traditionally been well respected in the Arrow Boundary District. BCTS is not one of the IFPA-holders and does not support the uplift application. BCTS is concerned that areas allocated to them could be impacted if an uplift were granted. For example, the 20-year spatial feasibility analysis (see below) shows that 35 percent of the cutblocks proposed by IFPA-holders over 20 years would be from BCTS chart areas. The analysis therefore suggests some portion of the 90 000 cubic metre uplift proposal would need to be harvested from BCTS chart areas, which could negatively impact BCTS and associated government objectives related to market pricing.

Section 81.1 of the *Forest Act* states: “If the minister determines that the issuance of a cutting permit or road permit would compromise government objectives as specified by regulation, the person who under this Act has the discretion to issue the permit must refuse the application for the permit.” Regulation around this section of the Act is still under development, but it is anticipated that one of the government objectives will address the need to preserve the integrity of market pricing by ensuring BCTS chart areas are reserved. If so, IFPA-holders may be denied access to BCTS chart areas.

It therefore appears likely that BCTS chart areas will not be available to IFPA-holders to capture corresponding AAC increases due to improved inventory information associated with VRI Phase 2 sampling. I therefore conclude in my “Reasons for Decision” that 28.7 percent of the uplift proposal associated with BCTS chart areas should be assumed to be unavailable to IFPA-holders.

Mountain Pine Beetle

The Arrow TSA compared to other TSAs in the southern interior has a relatively low component of pine with about 15 percent of the inventory in pine. Nevertheless, the TSA is vulnerable to mountain pine beetle (MPB) epidemic that is plaguing the province and dramatic increases in the infestation is expected in some parts of the TSA in the next few years. In the 2005 AAC Rationale, the chief forester recognized the potential impacts of the incidence of mountain pine beetle infestation in the Arrow TSA, and noted that licensees were proposing to alter their operational plans in order to salvage harvest damaged pine-leading stands. He further recognized an unquantified downward pressure due to bark beetle activity that will likely cause unsalvaged losses to timber supply in the mid-term that are not reflected in the 2004 base case; that is, pine losses associated with those stands that cannot be salvage harvested.

Recent projections of MPB-caused mortality based on a BCFS model (BCMPB v. 4) suggest the annual green attack volume in the TSA may increase from 0.5 million cubic metres in 2004 to a peak of 1.0 million cubic metres in 2008. The cumulative mortality of mature pine is projected to be 37 percent in 2006, 72 percent in 2010, and 83 percent in 2018.

The IFPA-holders provided a MPB scenario where they target stands that are considered severely impacted in 2010 as first priority for harvest for 10 years. In this scenario, minimum harvest age was reduced to 60 years of age and constraints related to VQOs and cutblock adjacency in integrated resource management and enhanced resource development zones were removed. The scenario was designed to better enable severely attacked stands to be salvaged before the end of their economic shelf life.

In the MPB scenario, attacked pine volumes not salvaged in the 10 year period were assumed lost and removed from the inventory. This approach helps address the higher non-recoverable losses expected in the TSA due to the MPB that were not assumed in the base case. In unharvested attacked stands, it was assumed that the residual surviving volumes and ensuing natural regeneration, following a 15 year regeneration delay, would grow at rates reflected in natural (unmanaged) stand yield tables (using VDYP). Pine stands that were salvaged were assumed to regenerate, like all other harvested stands, to managed stand yield curves. During the 10-year targeted salvage harvest in the MPB scenario, the assumed annual unsalvaged losses of 28 720 cubic metres in the base case were reduced by 10 000 cubic metres.

Several alternative harvest flows were investigated by IFPA-holders associated with the MPB scenario. In one alternative, the uplift harvest level of 640 000 is maintained for 5

years, with subsequent drop to 610 000 cubic metres which can be maintained for 7 decades before increasing to a long-term harvest level of 690 000 cubic metres by decade 8. In another scenario, the uplift harvest level of 640 000 cubic metres is maintained for 4 decades before declining in decade 6 and 7 to 570 000 cubic metres, and then increasing to a long-term harvest level of 690 000 cubic metres by decade 8.

In reviewing the MPB scenario and alternative harvest flows, I do not believe they exert either an immediate upward or downward pressure on timber supply in the short term relative to the 2006 uplift scenario. I recognize, however, that the alternative harvest flows do indicate that the uplift scenario level of 640 000 cubic metres can not be maintained and that some decrease in harvest levels will be required in the mid-term. I reflect on these conclusions in “Reasons for Decision”.

Share Agreement

IFPA-holders signed a share agreement in 2007 related to the Arrow TSA IFPA uplift request. IFPA-holders represent all of the replaceable forest licences in the TSA with an AAC of 346 882 cubic metres about 63 percent of total apportionment. The share agreement reflects the relative commitment of the existing AAC to the five IFPA-holder licensees as follows: ATCO Wood Products Ltd (43.7 percent), Springer Creek Forest Products (28.8 percent), Tolko Industries Ltd. (13.7 percent), Kalesnikoff Lumber Co. Ltd. (10.0 percent), and Bell Pole Canada Ltd. (3.7 percent).

Legislation requires me to award any IFPA AAC increase I may determine exclusively to IFPA-holders and I address this in my “Reasons for Decision”.

Spatial Feasibility of Harvest Level

IFPA-holders prepared a revised 20-year plan that attempted to reflect the 2006 uplift scenario and proposed management of mountain pine beetle that, for example, by removing constraints related to VQOs as well as those associated with cutblock adjacency in integrated resource management and enhanced resource development zones in order to better target severely impacted pine stands. The new 20-year plan was reviewed by district staff and they raised concerns as it appears that some forest management objectives are not being achieved and that cutblock adjacency constraints, such as achieving a 2.5 metre green-up before harvesting an adjacent cutblock, are not being met. This concern may extend beyond the intended initial 10-year salvage harvest focus of severely attacked pine stands in the MPB scenario.

The revised 20-year plan did not allay concerns that the proposed 90 000 cubic metre per year uplift scenario proposal could in fact be spatially achieved and I have noted this concern in my “Reasons for Decision”. Under “Recommendations”, I encourage IFPA-holders to update the plan in a manner that validates that cut levels can be spatially achieved consistent with forest management objectives.

First Nations Consultation

The following First Nations are considered to have potential interest in the Arrow TSA and were consulted: Lower Similkameen Indian Band, Osoyoos Indian Band, Okanagan Indian Band, Penticton Indian Band, Westbank First Nation, Splots'in First Nation, and Shuswap Indian Band. Consultation was also extended to the Ktunaxa Nation Council, Okanagan Nation Alliance, and Shuswap Nation Tribal Council

The consultation process consists of 2 components. In the first step, information is shared by IFPA-holders about their application. In the second step, the ministry consults with First Nations around the decision.

The AFLG was requested to share information and solicit input from First Nations. On March 31, 2007 the AFLG provided a letter summarizing their review process and the responses received. The 60 day review process included notification via newspaper advertisements and meetings on request and communications with First Nations.

Within the 60 day review period only the Westbank First Nation provided comment to AFLG. This letter raised concerns regarding the alienation and renewals of usages of lands and resources within the territory of the Okanagan Nation and suggested that consultation on land applications should be dealt with at its treaty table. It did not identify specific aboriginal interests that I judge would be impacted by the proposed extension of the IFPA, an increase in the licensees' AAC or amending the forestry plan.

The Ministry of Forests and Range initiated consultation with First Nations with interest in the Arrow TSA via a letter sent April 20, 2007. The consultation period was 60 days. My staff prepared a consultation summary (dated June 29, 2007) for me that looked at direct communication (only the Westbank First Nation had provided comment) around the decisions and a review of regional and district files.

Other concerns noted were from the Lower Kootenay Indian Band and the Ktunaxa Nation Council around expectations that under cut volumes in the Arrow TSA would be awarded to First Nations. I note that in 2006 it was reported that there was no undercut. Similarly the Splots'in First Nation have been unsuccessful to date at efforts to obtain timber volumes in the TSA under the Forest Revitalization Plan,

Subsequent to my viewing the consultation summary, Splots'in First Nation made a request dated July 6, 2007 of the AFLG for monies to enable them to review the information. I note that there are opportunities under Forest and Range Opportunities (FRO) to obtain funding to support First Nation's capacity to undergo reviews of this kind. The Splots'in First Nations have signed a FRO agreement with the BC Forest Service. All First Nations with asserted aboriginal interests in the Arrow TSA have been offered FROs.

I am satisfied that sufficient consultation has occurred to inform my decision around an allowable annual cut increase and that I have reflected this in my "Reasons for Decision."

In my decision under Section 59.1, I can only award an allowable annual cut increase on the licence of an IFPA-holder. I cannot award within this decision timber volume for

accommodation even if I reasoned it appropriate. However, my decision does enable me to consider First Nations interests and values, and their expressed interest in obtaining timber volumes in the TSA can influence my determination which I reflect in my “Reasons for Decision.”

Reasons for Decision

In reaching my decision on a request for an increase in allowable annual cut by the Arrow Forest Licensee Group on behalf of the IFPA-holders, I have considered all of the factors presented to me, and I have reasoned as follows.

In my considerations, I organize my thoughts around the timber supply analysis provided with the application. However as I had previously noted, I recognize that the determination is not a calculation but a synthesis of judgement and analysis in which risks and uncertainties are weighed. My review around the level of an available harvest flow increase involves the following steps:

1. Review land base, management, and modelling assumptions around harvest flow similar to the review described by the chief forester in his 2005 AAC Rationale
2. Assessment of innovative forestry practices
3. Identify issues that influence the ability of IFPA-holders to access uplift harvest flow
4. Other considerations.

1. Review land base, management, and modelling assumptions around harvest flow similar to the review described by the chief forester in his 2005 AAC Rationale.

In my review of factors I recognize upward and downward pressures on short term timber supply in the Arrow TSA. Some of these pressures were similarly recognized by the chief forester in his 2005 AAC rationale and others were recognized due to new information presented to me. Considerations of the proposed innovative forestry practices are assessed later below.

The upward pressures in the short- to-long-term are:

- *ungulate winter range*: a small 5000 cubic metre (less than 1 percent) upward pressure since current proposed management regime is less restrictive than assumed in the base.
- *protected areas*: a small 0.14 percent upward pressure on short-term timber supply since no decisions have as yet been made for the proposed Goal 2 protected areas that were excluded in the base case.

The downward pressures in the short- to long-term are:

- *old growth management areas*: based on information at the time, the chief forester concluded that there was a downward pressure of no more than 5 percent based on the OGMAs assumed by the licensees in the 2004 base case that differed from those proposed by government at that time. Applying the revised proposed OGMA boundaries reduces the upper end of the impacts from 5 percent identified by the chief forester to 1.8 percent.

- *disturbances*: a small unquantified downward pressure since it was assumed in the base case that stands outside the timber harvesting land base needed to meet forest cover requirements would not be disturbed yet natural disturbances like wildfire could disturb these stands.
- *inoperable areas*: a small 0.5 percent downward pressure to account for additional inoperable areas not assumed in the base case due to isolated stands.
- *riparian reserves*: a small 0.3 percent downward pressure due additional riparian reserves for small S4 streams not assumed in the base case.
- *woodlot licences*: a small 1200 cubic metre (about 0.2 percent) downward pressure to account for recently awarded 525 hectare woodlot area since the 2005 AAC determination that was not reflected in the base case.
- *caribou*: an up to 3500 hectare (up to 1.7 percent) downward pressure associated with government's recently announced endorsement of the Mountain Caribou Recovery Implementation Plan.

I need to be aware of harvest flow projections beyond the short-term, particularly the mid-term where short-term decisions on harvest flow can have significant impacts. For the mid-term I note several other uncertainties around the following issues:

- *root rot*: the chief forester noted in his 2005 AAC Rationale a downward pressure on mid- and long-term timber supply associated with root rot.
- *mountain pine beetle and unsalvaged losses*: in reviewing the MPB scenario and alternative harvest flows provided by IFPA-holders, I do not believe they exert either an upward or downward pressure on timber supply in the short term relative to the 2006 uplift scenario for my decision related to this AAC increase application but I do believe that they will exert a downward mid-term pressure. I also note that the analysis provided by IFPA-holders has directly accounted for unsalvaged losses due to the MPB. I discuss this further below.

The assessment of the upward and downward pressures on short term timber supply suggest a quantified downward pressure of about 4 percent which is slightly less than the quantified downward pressures documented by the chief forester in the 2005 AAC rationale that provided the reasoning for the current Arrow TSA AAC. In that determination the chief forester was comfortable with considering that the underestimation of the inventory of existing stands was at least comparable to a 10 percent harvest flow underestimation and that this would balance off the observed downward quantified pressures and unquantified pressures.

Within my decision, I consider how any increase in AAC awarded to an IFPA-holder influences the sustainability of harvest flow on the TSA. As such, as did the chief forester, I must recognize the need first to balance downward pressures on the current Arrow TSA AAC prior to any increases of IFPA-holder's AAC related to innovative forestry practices. Based on the information received I see a need to consider that any observed increases due to innovative forestry practices must address about 4 percent of the current AAC of 550 000 cubic metres to account for short-term quantified pressures. Although the estimated short-term downward pressures overall have eased, these have been offset somewhat by unquantified short-term pressures and additional mid-term pressures.

2. Assessment of innovative forestry practices

The AAC increase application is based upon 5 innovative factors. As noted previously 3 of the factors are simply additional analysis around the issues of old growth management areas, mountain pine beetle, and caribou management. These 3 factors had no direct positive contribution to an increase in harvest flow and have been incorporated as base information as discussed in the previous section.

The two innovative forestry practices around the Phase 2 vegetation inventory (ground plots and net volume adjustment factor sampling) increase harvest flow in the short-term by about 90 000 cubic metres. I find that the collection and analysis of this information has followed appropriate standards. As with any sampling there is uncertainty around the estimate. However, for inventory purposes and as used for all management units, the estimate of the mean obtained from these standard procedures is accepted as the inventory estimate. Nevertheless, in my decision, it is important that I also weigh the uncertainty around an estimate with any risks associated with the application of that estimate.

For this AAC increase decision, I am willing to recognize the 90 000 cubic metres per year increase in short-term harvest flow as a result of the inventory projects.

However, as noted above, I need to account for about 4 percent downward pressures in timber supply of the TSA in order balance upward and downward pressures relative to the base case. This 4% of 550 000 cubic metres translates into approximately 22 000 cubic metres of volume leaving 68 000 cubic metres available for consideration for uplift increase consideration.

3. Identify issues that influence the ability of IFPA-holders to access uplift harvest flow.

The IFPA uplift request assumes the entire TSA is available to IFPA-holders to apply the benefits of the VRI phase 2 project. However, I view that the IFPA-holders are unlikely to be able to or have the desire to access this inventory-based increase from a significant portion of the Arrow TSA. These areas that the IFPA-holders are unlikely to be harvesting within are as follows:

- *community forests*: about 7 percent of timber supply is expected to be removed from the TSA so that two community forests can be established; the application process has progressed to a stage where the community forests are likely to be approved. The IFPA-holders will not have access to the land area that supports the inventory-based increase.
- *BCTS area*: about 28 percent of timber supply within the TSA has been apportioned to BCTS and specific areas allocated. Based on current direction from government, it is unlikely that IFPA-holders will be able to access the areas allocated to BCTS that support this apportionment.
- *wildlife management area*: an up to 1.5 percent impact on timber supply associated with avoidance of harvesting activity in the Hamling Lakes Wildlife Management Area at least over the short term.

The above areas represent about 36 percent of the timber volume in the TSA. I feel it prudent to only apply any AAC increase given the IFPA-holders to that portion of TSA with which IFPA-holders can or are willing to harvest – the remaining 64 percent. The harvest flow increase identified by the IFPA-holder applied across the entire TSA; therefore I reason that only 64 percent of that increase should apply in my determination.

Removing 36 percent of the 90 000 cubic metres identified for improved inventory information across the TSA results in about 32 000 cubic metres less volume available for uplift consideration. Applying this reduction to the 68 000 cubic metres after considerations in (1) and (2) results in about 36 000 cubic metres of increased harvest flow available.

4. Other considerations

The information presented to me contains many uncertainties, which is normal given the complexities of forests and their management and modelling. There are a number of areas in particular that suggest to me that there may be further pressures on timber supply in the short to mid-term.

- *mountain pine beetle*: the MPB scenario and alternative harvest flows provided by IFPA-holders indicate that the uplift scenario level of 640 000 cubic metres can not be maintained and that some decrease in harvest levels will be required in the mid-term.
- *other tenures*: I am satisfied that sufficient consultation has occurred with First Nations to inform my decision around an allowable annual cut increase. BCFS staff have received requests from First Nations for non-replaceable forest licences that may exert further pressures on timber supply.
- *spatial allocation*: as part of the application the IFPA-holders provided a 20 year spatial allocation plan. Due to BCFS staff concerns about the reasonableness of the block locations, this plan was revised; however, the revisions have not allayed BCFS staff concerns that an AAC uplift is in fact spatially feasible. While I find that licensees will be able to obtain volumes from any increase I may determine over the 3.5 years to the IFPA expiry, I do recognize the increased uncertainty around accessing identified mid-term volumes that has been caused by the proposed plan.

These and other considerations suggest I should be conservative in responding to an AAC uplift request. I believe for the most part I have done that in only applying a portion of the VRI Phase 2 uplift that I feel is not needed to address downward pressures on timber supply, and in only applying the uplift request to the portion of the TSA that IFPA-holders are expected to access.

Nevertheless, I do not want to cause undue stress on the TSA's timber supply where an increase I might determine could cause a corresponding impact on mid-term timber supply. I have therefore determined that, in consideration of all of the above, that my determination should make some further accounting around the uncertainty. For this determination I feel that an accounting in the range of 5 000 to 10 000 cubic metres is appropriate for these varied uncertainties. This accounting would then result in an increase in short-term harvest in the range of 26 000 to 31 000 cubic metres per year.

In making allowable annual cut increase determinations, and particularly given the impacts on forest values that may result from the current mountain pine beetle infestation, 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 Act*, and of my responsibilities under the *Forest Practices Code Act of BC* and the *Forest and Range Practices Act*.

In summary, I am satisfied that the information provided with the application is sufficient upon which to base a decision about an allowable annual cut increase on the licences of the IFPA-holder.

Determination and Conditions

I have reviewed and considered all the factors and the associated uncertainties described in this document.

First, I approve the Forestry Plan as submitted December 29, 2006 with the recognition of the initial innovative forestry practices that have been completed and that the related background information contained within the June 3, 1999 forestry plan and appendices are still valid components of the forestry plan. My approval of the Forestry Plan expires August 31, 2011.

Second, I determine that innovative forestry practices or activities under the IFPAs provide 30 000 cubic metres per year from within the Arrow TSA and award such to the IFPA-holders.

The 30 000 cubic metres awarded under Section 59.1 will be allocated as follows:

- A20191 – Tolko Industries Ltd. by 4 116 cubic metres per year
- A20192 – Springer Creek Forest Products by 8 649 cubic metres per year
- A20193 – ATCO Wood Products Ltd. by 13 113 cubic metres per year
- A20194 – Kalesnikoff Lumber Co. Ltd. by 3 001 cubic metres per year
- A20196 – Bell Pole Canada Inc. by 1 121 cubic metres per year

The award on each licence is subject to the condition below:

- Submit an annual report by April 30th of each year that summarizes the activities completed by the IFPA-holder in the past year, the expected activities in the upcoming year, and how conditions of this award have been met.

This determination is effective January 1, 2008 and will remain in effect until August 31, 2011, the date at which the innovative forestry practices agreements expire. I note that I am prepared to reduce the allowable annual cut awarded if I find information or assumptions upon which this decision is based are not justified or that conditions of this decision have not been met.

Recommendations

The review of information in support of an allowable annual cut increase determination provides me with the opportunity to make recommendations on several issues. These recommendations are intended to reduce the uncertainty and risk associated with future determinations and to ensure the intent of the Forestry Plan is met. Below are specific recommendations that I have identified.

- *Site productivity estimates:* that site productivity in managed stands be monitored and that additional efforts be made to improve the quality and reliability of PEM consistent with similar request by the chief forester in his 2005 AAC Rationale.
- *Wildlife tree patches:* that WTP retention in the timber harvesting land base be monitored and reported so that the findings can be factored into the next timber supply review.
- *Twenty year plan:* to update the plan so that cut levels can be spatially validated before the next determination. The existing 20-year plan did not allay BCFS staff concerns in that regard.
- *Mountain pine beetle:* one of the innovative practices undertaken by IFPA-holders was an assessment and sensitivity analysis of mountain pine beetle impacts as reflected in the MPB scenario where the target potentially stands that are considered severely impacted in 2010 as first priority for harvest for 10 years. In my determination, I expect that licensees will use the uplift to address these stands and I ask that BCFS district staff monitor performance in that regard.

Yours Truly,



T.P. (Phil) Zacharatos, R.P.F.
Regional Manager
Southern Interior Forest Region

December 6, 2007

Appendix 1: Section 59.1 of Forest Act

Innovative forestry practices 59.1

- (1) For the purpose of improving the productivity of the forestry resource, the minister, at his or her discretion, may enter into an agreement with a person referred to in subsection (2) to allow that person to carry out, subject to subsection (5) and the *Forest and Range Practices Act*, one or more of the innovative forestry practices and other activities that are set out in a regulation made under subsection (4).
- (2) For the purposes of subsection (1), the minister may enter into an agreement with a person who (a) is the holder of a forest licence or other agreement that is entered into under section 12 and specified in a regulation made under subsection (4) of this section, and (b) presents a written proposal for an agreement to the minister.
- (3) An agreement under subsection (1) (a) must be for a term not exceeding 15 years, and (b) may include terms and conditions that (i) the minister considers are necessary to effectively carry out the purpose of the agreement and further the social and economic objectives of the government, and (ii) are consistent with this Act and the regulations and the *Forest and Range Practices Act*, and the regulations and standards made under that Act.
- (4) The Lieutenant Governor in Council may make regulations specifying (a) the innovative forestry practices and other activities that may be the subject of an agreement referred to in subsection (1), and (b) the agreements entered into under section 12, the holders of which may enter into an agreement with the minister under subsection (1) of this section.
- (5) A person may only carry out an innovative forestry practice or other activity referred to in subsection (1) if the person (a) has prepared and obtained the regional manager's approval of a Forestry Plan that meets the requirements of subsection (6), and (b) is carrying out the practice or activity in accordance with the plan.
- (6) A Forestry Plan (a) must contain a description of the management area where the innovative forestry practices or other activities will be carried out, (b) must specify the particulars of the innovative forestry practices or other activities, (c) must contain a description of how the innovative forestry practices or other activities will be carried out, (d) must contain a schedule of when the innovative forestry practices or other activities will be carried out, (e) must specify how the innovative forestry practices or other activities will contribute to improved productivity of the forestry resource, (f) must specify how the innovative forestry practices or other activities will justify an increase in the allowable annual cut of the participant's licence or agreement referred to in subsection (2) (a), and (g) may include other terms and conditions that (i) the regional manager believes are necessary to effectively carry out the agreement referred to in subsection (1), and (ii) are consistent with this Act and the regulations and the *Forest and Range Practices Act*, and the regulations and standards made under that Act.
- (7) After approving a person's Forestry Plan, the regional manager may increase the allowable annual cut authorized in the person's licence or agreement referred to in subsection (2) (a) by an amount that is justified according to timber supply analysis methodology approved by the chief forester or the chief forester's designate.
- (8) When the regional manager increases an allowable annual cut under subsection (7), the regional manager may limit the increase to a period of time, area of land and type of timber, and may make the increase subject to conditions.
- (9) If an assessment of (a) the innovative forestry practices or other activities being carried out under the Forestry Plan, or (b) information that was not available at the time the regional manager increased the

allowable annual cut under subsection (7) indicates that all or part of the allowable annual cut increase was not justified, the regional manager may reduce the allowable annual cut of the licence or agreement referred to in subsection (2) (a) by an amount not exceeding the increase granted under subsection (7).

- (10) If, with respect to an innovative forestry practice or other activity, a person is not complying with (a) the agreement referred to in subsection (1), (b) the Forestry Plan approved under subsection (5), (c) any limitation or conditions imposed under subsection (8), or (d) this Act and the regulations made under this Act, or the *Forest and Range Practices Act* and the regulations or standards made under that Act, the regional manager may do one or both of the following: (e) suspend or cancel the agreement referred to in subsection (1) and sections 76 and 77 apply with respect to that suspension or cancellation; (f) reduce the allowable annual cut of the person's licence or agreement referred to in subsection (2) (a) by an amount the regional manager determines is attributable to the default.
- (11) A reduction under subsection (9) or (10) may be apportioned over a period of up to 5 years.
- (12) If the forest licence, or other agreement referred to in subsection (2) (a), is suspended, the agreement under subsection (1) is suspended.
- (13) If the forest licence, or other agreement referred to in subsection (2) (a), is cancelled or surrendered, the agreement under subsection (1) is cancelled.
- (14) If the agreement referred to in subsection (1) is suspended or cancelled, the Forestry Plan is suspended or cancelled, as the case may be.

Appendix 2: Innovative forestry practices regulation

B.C. Reg. 197/97, O.C. 0694/97 - Deposited June 18, 1997
Consolidated to August 5, 2003

1. Definitions
2. Authorized innovative forestry practices and activities
3. Authorized forms of agreement

Definitions

1. In this regulation:

"**Act**" means the *Forest Act*;

"**Forestry Plan**" means a Forestry Plan required to be submitted for approval under section 59.1(5) of the Act;

"**forest practice**" has the same meaning as in the *Forest Practices Code of British Columbia Act*;

"**free-growing stand**" has the same meaning as in the *Forest Practices Code of British Columbia Act*;

"**holder**" means a person that presents a written proposal for an agreement under section 59.1(2)(b) of the Act;

"**permanent access structure**" has the same meaning as in the *Forest Practices Code of British Columbia Act*;

"**standard practices**" means the forest practices routinely applied by licensees in the timber supply area when the Forestry Plan is submitted or at any other time determined by the regional manager;

"**stocking requirements**" has the same meaning as in section 1 (1) of the Operational and Site Planning Regulation, B.C. Reg. 107/98.

Authorized innovative forestry practices and activities

2. The innovative forestry practices and other activities that may be the subject of an agreement under section 59.1(1) of the Act are the following:

- (a) the implementation of harvesting methods or silvicultural systems that may

(i) increase the total amount of timber available to harvest in the timber supply area over the amount available under standard practices, or

(ii) reduce the loss of productivity associated with permanent access structures from the loss of productivity under standard practices for similar terrain and timber types in the timber supply area;

(b) activities that result in the establishment of free-growing stands on

(i) previously unforested areas,

(ii) areas that are below stocking requirements and are not part of the holder's free-growing responsibilities under section 69.1 (3) and 70(3) of the *Forest Practices Code of British Columbia Act*, or

(iii) areas that

(A) have stands of timber with repressed growth or that contain brush or species that are not commercially valuable, and

(B) are not part of the holder's free-growing responsibilities under section 69.1 (3) and 70 (3) of the *Forest Practices Code of British Columbia Act*;

(c) silviculture treatments on free-growing stands;

(d) silviculture treatments on sites that are not free growing in order to produce stands that exceed current growth performance or standards achieved using standard practices for the timber supply area;

(e) the collection and analysis of new data, in accordance with the specifications of the chief forester, to provide a more accurate representation of the forest composition and its expected rate of growth compared to the rate existing when the forest plan is submitted or at any other time determined by the regional manager;

(f) activities that will enhance and protect other resource values, including, but not limited to, water, fisheries, wildlife, biological diversity, soil productivity and stability, forage production, grazing and recreation values.

Authorized forms of agreement

3. The holders of the following agreements under section 12 of the Act may enter into an agreement under section 59.1 of the Act:

(a) replaceable forest licences, and

(b) replaceable timber sale licences with an allowable annual cut greater than 10 000 cubic metres.

Appendix 3: Memorandum from chief forester on timber supply methodology



Ministry of
Forests

Chief Forester

MEMORANDUM

File: 19500-01/IFPA

April 6, 2001

To: Regional Managers

From: Larry Pedersen
Chief Forester

Re: Timber Supply Analysis Methodology Related to Innovative Forest Practices Agreements (IFPAs)

I am certain you are aware that the *Forest Act*, section 59.1, gives regional managers the responsibility for determining if increases in allowable annual cuts (AACs) for IFPA holders are justified. The *Act* requires regional managers to make their judgements according to a timber supply analysis methodology approved by the Chief Forester or the Chief Forester's designate. Attached to this memorandum is a timber supply analysis methodology to fulfill my responsibility under section 59.1 of the *Act*.



The methodology covers general analytical issues related to information needs, analysis outputs, links between AACs for IFPAs and TSAs, harvest flow, AAC increases, and legislation and policy. The method does not dictate the types of innovative practices that should or may be considered appropriate for approval as part of forestry plans, or for justifying AAC increases. Approval of forestry plans is clearly the regional managers' responsibility under the *Act*. Further, I believe that information and practices must be evaluated on their own merits within specific contexts; hence it would not be reasonable for me to prescribe evaluative criteria.

In the end, regional managers must make their own determinations based on analysis that provides insight on the full range of relevant factors, including the important risks and uncertainties. The analysis methodology is designed to assist in this undertaking.

Timber supply analysis methodology – IFPAs
Page 2

The methodology should be included as an appendix to the Forestry Plan Outline to ensure the approach is clear to all government staff and external stakeholders. Please contact Chris Fletcher of Timber Supply Branch (250-356-5959, Chris.Fletcher@gems8.gov.bc.ca) with comments or concerns.



Larry Pedersen
Chief Forester

Attachment: Timber Supply Analysis Considerations for Innovative Practices Agreements

cc: Gary Townsend, Director, Timber Supply Branch
Ralph Archibald, Director, Forest Practices Branch
Henry Benskin, Director, Research Branch
Dave Gilbert, Director, Resources Inventory Branch
Dale Draper, Director, Tree Improvement Branch
Jim Langridge, Director, Resource Tenures and Engineering Branch
Drew Brazier, Resource Tenures and Engineering Branch

Timber Supply Analysis Considerations for Innovative Forest Practices Agreements

Section 59.1 (7) of the *Forest Act* allows regional managers, after approving an IFPA Forestry Plan, to increase the allowable annual cut of the holder's forest licence by an amount that is justified according to a timber supply analysis method approved by the chief forester or the chief forester's designate. The following discussion outlines the timber supply analysis method and allowable annual cut decision principles used by the chief forester.

The focus is on components and principles of timber supply analysis that are crucial in gaining an understanding of factors that determine timber supply in an area. Because of the complexities involved in determining harvest levels, it is not possible to develop precise procedures or simple calculations for timber supply analysis. The process can be guided by general principles—which are outlined below—however, the detailed aspects must be developed using case specific professional judgement. In this light, the following ideas are provided as guidance, not as firm procedural requirements that must be followed in all cases. While the general ideas apply in almost all cases, each case must be viewed as unique: some cases may require additional analysis to that outlined, while others may be assessed satisfactorily with less detail than suggested here.

If a timber supply analysis incorporates the types of information noted below, and facilitates evaluation of the considerations discussed, it will have followed a timber supply analysis method supported by the chief forester.

The chief forester's task under the *Forest Act* is to provide an analysis method, not to evaluate, or provide a method for evaluating information quality. Hence, the discussion here does not address information quality but focuses on an analytical method. Nevertheless, the results of any analysis depend heavily on the quality of the information used in the analysis; that is, information about the forest land base, growth and yield, and management objectives. Evaluation of information quality must be done on a case-specific basis, which regional managers, in their evaluation of IFPA analyses, are best positioned to do.

Analysis should consist of clear descriptions of issues, information sources, assumptions, and any relevant data manipulations or adjustments related to the following three categories:

Land base:

- A tabular description of the categories of land and forest that are excluded from the timber harvesting land base, and the area excluded in each category. Such tabular descriptions are included in all timber supply analysis reports published for TSAs as part of the Timber Supply Review.
- A detailed description of the criteria employed in deriving the area included in the above table. This description should follow a format similar to the Information Package for Tree Farm Licence analyses.

- A description of the composition of the timber harvesting land base and the total forested land base in terms of species, site quality, stand age, and any other features relevant in the area.

Growth and yield:

- A description of the models and methods used in generating timber yield tables for existing and regenerated stands.
- The yield tables used for each species and site quality group and silvicultural regime.
- Detailed descriptions of methods and concepts underlying site productivity estimates and yield tables that reflect any planned innovative management.
- Notice of acceptance by appropriate BC Ministry of Forests staff of site productivity or yield estimates or adjustments corresponding to both baseline and innovative practices, and of any sampling or study methods related to deriving the estimates.
- MFR, Regional Growth and Yield Foresters will coordinate the growth and yield review process.

Management objectives:

- A description of the various management objectives that apply to the area and the methods used to represent actions used to achieve the objectives (e.g., silvicultural regimes, utilization levels, seral forest cover requirements, extended “rotations,” alternative harvesting systems). The description should specify the component of the land base to which the objective applies; for example, timber harvesting land base, or Crown forested area. The template for Information Packages for Tree Farm Licence analyses provides a framework for organizing relevant information.

Analysis is facilitated if communication between relevant ministry staff and the agreement holders regarding land base, growth and yield, and management inputs occurs as early as possible in the analysis process.

Other considerations include:

Model review and benchmarking. There are no specific requirements or limitations on which analysis models may be used. However, interpretation of results and confidence that timber supply effects can be attributed to innovative practices rather than model differences requires a detailed understanding of assumptions made in the model about relevant processes and features. The best method of gaining this understanding is to benchmark the model with FSSIM, or other models used and understood by Timber Supply Branch staff. This is not to imply that FSSIM is a better model, or produces more accurate results than other models. It is simply the case that Ministry of Forests staff understands how FSSIM works, and can therefore use it as a basis for understanding how other models work. If the model to be used has not been reviewed and benchmarked by Ministry of Forests staff, the agreement holder should develop a review process in cooperation with Timber Supply Branch or a regional timber supply analyst. If the model being benchmarked produces different results from FSSIM (or other models used and understood by Timber Supply Branch staff), the agreement holder or its representative should be responsible for explaining the differences in detail in a technical document.

Even with a benchmarked model, the potential to increase harvest levels should be evaluated using the same model for both current and innovative practices. For example, a timber supply forecast corresponding to an innovative management regime and generated with a model other than FSSIM should not be compared directly to a forecast derived using FSSIM and the current management regime. Using results generated with the same model will help ensure any timber supply increase is based on management not model differences.

Results and reporting. The analysis report and related appendices should include sufficient output information to allow understanding of the main factors determining timber supply, and if applicable, reasons behind timber supply changes due to proposed innovative practices. Management, land base and growth and yield assumptions are to be documented in an Information Package. The timber supply analysis should demonstrate how these assumptions affect timber supply. The outputs should allow for examination of all relevant forest management objectives; for example, areas in seral stages by landscape unit, or area achieving visually effective green-up in visual management zones. Outputs related to timber inventory levels, areas and average volumes harvested, average age of harvested stands, and age class distributions over time all assist in understanding timber supply dynamics and evaluating the feasibility and realism of analysis results.

Sensitivity analysis. The analysis report must include results of sensitivity analyses that examine a reasonable range of uncertainty around management, land base and growth and yield assumptions and proposed innovative practices. The implications of changes in available funding to undertake planned innovative practice may be an important consideration for sensitivity analysis.

Operational feasibility. The analysis should examine any issues that may affect the operational feasibility of harvesting at the levels indicated. The most common issue involves the ability to locate harvest opportunities spatially.

Interactions between IFPA area and the TSA. IFPA timber supply analysis should demonstrate that any harvest level increases related to IFPAs will not disadvantage timber supply at the TSA level, or timber supply available to other operators in the TSA. An IFPA area may not be representative of the forest and management conditions for the TSA, and hence analysis results for the IFPA area should not be extrapolated and assumed to apply to the whole TSA.

Administration of IFPAs is the purview of the regional manager, and it is the regional manager's prerogative to require or request any analysis that s/he believes will assist in clarifying matters regarding IFPA AACs. It may be appropriate to investigate, using timber supply analysis, the advantages and disadvantages of different approaches to administering timber supply in the IFPA in the context of the TSA. For example, benefits may be gained by administering timber supply flexibly at the TSA level (e.g., allowing for harvesting of an IFPA increase from throughout the TSA not only the IFPA area) rather than combining timber supplies that have been assessed separately for spatial sub-units of the TSA. Ultimately, the regional manager will decide on the administrative

approach, and the analysis must be consistent with that approach.

The intent here is to highlight that analysis must show that timber supply benefits for IFPAs will not come at the cost of supply at the TSA level or other operators in the area.

Harvest flow. Timber supply forecasts employing assumptions/estimates of both current and proposed innovative practices must follow reasonable flow patterns over time. In general, a reasonable flow pattern provides for a controlled and gradual transition from short-term to medium- and long-term harvests, and avoids large and abrupt disruptions in supply. Considerations include: rate of harvest level decline if any is necessary; the degree to which mid-term timber supply may appropriately drop below the long-term sustainable harvest level; and the timing of increase to the long-term sustainable timber supply if it is higher than mid-term levels.

A difference between mid-term and long-term levels may be justified because mid-term supply depends more on the existing stock of timber and the timing of availability of regenerated stands, while long-term timber supply is based on timber growth which is affected by site productivity and forest management practices. Maintaining mid-term levels above or equal to the long-term level could in some circumstances delay the achievement of, or lead to failure to achieve the maximum long-term level, or cause timber supply disruptions, because of limited supply of existing timber. Likewise, a decline in timber supply from a higher short-term supply to a lower mid-term may be appropriate if it can be shown that the associated harvests do not jeopardize or cause disruptions in long-term productivity.

The analysis should include different harvest flows that examine each of these considerations. A "base case" harvest flow for current practices must be chosen from the range of possibilities. The choice should be explained. In most cases this explanation can be brief, and consist primarily of reference to alternative harvest flow patterns. The IFPA base case harvest flow should reflect that used in the Timber Supply Review base case, if relevant. This will ensure that any change in short-term timber supply is due to changes in management, not harvest flow.

The analysis report should describe the criteria used to determine:

- the long-term harvest level and growing stock (criteria for sustainability);
- the harvest flow (e.g., maintain current harvest level for as long as possible, maximize volume harvested over a specified time frame, control the rate of decline);
- the minimum harvest level allowed in the medium term.

Allowable cut increases. Harvest forecasts for many management units in B.C. show declining timber supply over a period of decades. The general approach in cases of declining timber supply is that short-term allowable cuts are not usually increased unless there is a sound demonstrated forest management reason. This approach ensures that allowable cuts are not increased in the short term only to force reductions in the near future. There may be sound forest management reasons, such as existence of high risk of loss of stands to fire, insects or disease due to current or developing stand attributes (e.g., age or diameter distribution favourable to beetle attack, etc.).

An AAC increase in the short term should not decrease future timber supply below the

levels forecast without the increase, unless there is a documented and compelling reason to do so.

The general approach described above for TSA and TFL AAC determinations with respect to potential increases leads to some issues for IFPAs. One of the explicit aims of the IFPA initiative is to allow AAC increases for IFPA-holders. However, one stipulation of an increase is that other license holders will not be negatively affected by any AAC increases for the IFPA. In this context, important considerations in designing and interpreting an IFPA timber supply analysis would include:

- what are the forest management reasons that justify an AAC increase?
- what effects would an increase have on future timber supply?
- would a boost in AAC increase the sensitivity of future timber supply to uncertainties?
- if the forecast is for a temporary short-term increase (that is, timber supply is forecast to decline from the higher level) what actions will be taken to mitigate or avoid future socio-economic impacts? In other words: in the absence of a forest management objective for increasing the AAC, how will a temporary increase assist in strengthening the long-term role of timber harvesting and processing in the social and economic fabric of the area (capacity-building, diversification, etc.)?

Consistency with legislation and policy. The land base, growth and yield and management regime modeled in the analysis should be consistent with current legislation and policy. While the need for consistency with laws and policy is perhaps self-evident, it must be acknowledged that one of the goals of IFPAs is to move management in new directions. Therefore, it is imperative that modeling of proposed innovative management does not imply conflicts with legislation and policy. This analytical consideration differs from the approval of innovative management that is the regional manager's responsibility as part of Forestry Plan approval. The intent here is to highlight the need to evaluate analysis inputs and results to ensure that they do not create or imply conflicts. If a timber supply forecast is based on conflicts with designations or objectives that are the responsibility of other statutory decision makers under existing laws or policies, that forecast cannot reasonably be accepted as a basis for harvest level determination.

Relationship between chief forester (TSA) and regional manager (IFPA) determinations.

The concern has been raised that AAC determinations for TSAs under Section 8 of the *Forest Act* may conflict in some way with AAC determinations for IFPAs. Communication between the chief forester and regional manager will be necessary to avoid discrepancies or conflicts regarding AAC determinations. It is not possible to generalize about the relationship between TSA AAC determinations and related to IFPAs given the diversity of timber supply conditions across the province.

A guiding principle for TSA and TFL AACs is that the determination should reflect current or reasonably foreseeable practices. Use of the preceding method and considerations should ensure that practices approved under IFPAs will constitute current or reasonably foreseeable management, and will be considered as such in TSA AAC determinations.

Documentation of decisions. Documentation of reasons for decision is useful to ensure the basis for the decision is clear and understandable. Further, both the regional manager and the chief forester have AAC determination responsibilities under the *Forest Act*. Reasonably detailed decision documentation, referring to the technical considerations discussed in this methods document, would help ensure consistency between regional manager and chief forester determinations, particularly when the time period between the decisions is long.