

**British Columbia
Ministry of Forests**

Adams Lake Innovative Forest Practices Agreement

Issued to
International Forest Products Ltd. Adams Lake Lumber Division

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

**Effective
January 1, 2003**

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Objective of this document

This document is intended to provide an accounting of the factors that I, as regional manager of the Kamloops Forest Region, have considered and the rationale that I have used in making my determination, under Section 59.1 of the *Forest Act*, of the request for an increase in allowable annual cut (AAC) of the replaceable forest licence FL A18693 under the Adams Lake Innovative Forestry Practices Agreement (IFPA).

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. Additionally, the collection and analysis of new data must be in accordance with the 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 6 April 2001 to the regional managers. This memorandum provides the general principles of 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 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 also can 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 Practices Code of British Columbia Act*.

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

Description of IFPA

The Adams Lake IFPA was issued to International Forest Products Ltd. Adams Lake Lumber Division (IFPA holder) on 17 November 1997. A forestry plan was submitted 17 April 2000 and approved by the regional manager with conditions on 25 August 2000. On 25 June 2001, the IFPA holder applied to the regional manager for an allowable annual cut increase as allowed under section 59.1 of the *Forest Act*. During the review of the application, at the request of government staff, further background and analysis was provided by the IFPA holder.

The Adams Lake IFPA area comprises approximately 180 000 hectares in south central British Columbia. The IFPA area encompasses, for the most part, the watershed of Adams Lake extending to Running Bear Lake in the north and Little Shuswap Lake in the south. Climate for the area varies from the relatively dry south to an increasingly wetter north with elevation ranging from 350 m to 2130 m.

The IFPA area contains 11 biogeoclimatic variants that reflect the various combinations of climate, terrain, and soils. Extensive fluvioglacial deposits are present along the lower slopes bordering Adams Lake. The forests contain a mixture of species with primary species being Douglas-fir, Engelmann spruce, lodgepole pine and subalpine-fir. Other common species include western redcedar, western hemlock, hybrid white spruce, birch and trembling aspen.

Administratively, the IFPA area is located in the Clearwater and Kamloops forest districts within the Kamloops Forest Region. The community of Adams Lake lies within the IFPA. Nearby communities, outside of the IFPA area, include Chase to the south, Vavenby to the north, Barriere to the west and Scotch Creek to the east. Four first nation bands are located in the Adams Lake area: Adams Lake Indian Band, Neskonlith Indian Band, North Thompson Indian Band, and Little Shuswap Indian Band. Within the IFPA boundaries are the operating areas of Adams Lake Lumber (FL A18693), Gilbert Smith Forest Ltd. (FL A18692), the Clearwater and Kamloops Forest District small business forest enterprise programs, Timber Licence T0888 (held by Adams Lake Lumber), and operators in the old cedar- and hemlock-leading partition (NRFL A56291, A58853, and A58854).

Guiding principles

As I expect to have to make a number of decisions with respect to Innovative Forest Practice Agreements under section 59.1 of the Forest Act, I have outlined the following guiding principles. These principles will assist me in ensuring administrative fairness and consistency in how I approach my decisions.

- Increases in allowable annual cut must be justified by changes that have been identified due to an innovative practice or activity within the approved forestry plan. In my approval of the forestry plan, I may recognise that a practice or activity started

prior to the approval (but after the IFPA is signed) is acceptable. This acceptance is primarily to accommodate the non-synchronisation of field seasons, funding, and my approval. I also recognise that an innovative activity may include new analysis of existing data or build upon existing knowledge where the existing data or knowledge would not be considered an innovative activity (e.g., data collected prior to forestry plan approval)

- For an innovative 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. I also recognise that there is less risk on my decision of an AAC increase if a practice that is in an initiation stage reduces harvest flow.
- Innovative 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 current 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 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 licensee. 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 temporally excluded from the IFPA (e.g., timber licences, partitions outside of the IFPA holder's licence) only after they have reverted to timber supply area status. Any increases in harvest flow identified on these stands before they revert will not be eligible under the IFPA. However, I recognise that these areas when they revert to TSA status are subject to licensee negotiations and, while the IFPA holder does not have a specific right to harvest from such future stands, the IFPA holder is as likely as others to obtain such rights. As such, I will consider these stands to be within the IFPA area at the time they revert.
- 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, and in this respect it should be noted that my determination does not prescribe a particular plan of harvesting activity within the Adams Lake IFPA area. In my decision, I have considered all information brought forward respecting First Nations' interests. If, subsequent to this determination, I become aware of information respecting First Nation interests that was not available to me at the time of this decision and indicates that all or part of the allowable annual cut increase was not justified, I may 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 with respect to subsequent allocation of the wood supply.

In making my decision, I am aware of my obligations as a steward of the forest land of British Columbia, of the mandate of the Ministry of Forests as set out under the *Ministry of Forests Act*, of the *Forest Practices Code of British Columbia Act*, and of my responsibilities under section 59.1 of the *Forest Act*.

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 6 April 2001. The memorandum provides the general principles, not detailed procedures, of timber supply analysis that I have required be present in the AAC increase application and from which I have based my decision.

The timber supply analysis consists of 2 components. The first component is an information package that includes information from three categories – land base, 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 IFPA innovative practices and activities.

I assume that the information from the 2001 timber supply review of the Kamloops TSA as presented to me and the chief forester by MOF staff at a 3-5 December 2001 meeting represents the current status of the land base and management within the Kamloops TSA. I also accept that this current status can be updated by new or specific information about the IFPA area. I discuss adjustments in information under 'Consideration of factors influencing timber supply analysis'. Adjustments are made based on my informed judgement of the information that is currently available to me. This information includes changes since the original AAC increase request was presented on 25 June 2001.

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. Technical analytical methods such as computer 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 AAC determined may or may not coincide with the original IFPA review analysis.

In this rationale, I will discuss many of the timber supply analysis assumptions in the context of my considerations for this determination. However, I may not discuss my

considerations in detail about a factor where I am satisfied that the factor is appropriately modelled and described in the timber supply analysis report of the 25 June 2001 AAC increase application. Nevertheless, I may elaborate on appropriately modelled factors for reasons such as high level of public input or lack of clarity in the analysis report.

The base harvest flows

The 25 June 2001 application for an AAC increase included a report of a timber supply analysis that incorporated the most current information on the land base, timber yields, and forest management on the IFPA area. The report identified harvest flows that represent current management practice and harvest flows with the innovative practices and activities. Sensitivity analyses around several modelled variables were also presented. Upon review of the 25 June 2001 application, my staff requested further analysis to understand the harvest flow dynamics and to clarify the impacts of individual innovative practices and activities.

To determine a harvest flow increment requires comparing a base harvest flow to the base with the innovative practices included. In my considerations, I refer to the base without the innovative practices as the TSA-like analysis and the base with the innovative practices as the IFP-like analysis. I refer to the whole timber supply analysis for this application as the IFPA review analysis.

For the TSA-like analysis, I chose a harvest flow provided by the IFPA holder on 10 January 2002 that demonstrated a harvest level of 259 800 cubic metres per year is available through all time periods. I feel that this non-declining harvest flow is closer to the base case presented in the *July 2001 Kamloops Timber Supply Area Analysis Report* than would be the harvest flow presented in the original application that must decline to a mid-term level below the long-term harvest level. I also accept that the updated information included in the analysis about roads, operability, not satisfactorily restocked lands, old growth management areas, and forest development plan priorities as better information specific to the IFPA area. These factors are discussed below. I also recognise that this harvest flow did not include the deer winter range management constraints of the Kamloops LRMP and I discuss this factor below.

For the IFP-like analysis, I chose the harvest flow provided by the IFPA holder on 16 January 2002 that demonstrated a harvest level 285 300 cubic metres per year is available for the first 10 decades before stepping up to a long-term harvest level of 346 800 cubic metres per year. The assumptions of this harvest flow differed from the TSA-like analysis only in that 3 innovative practices and activities were included. The innovative practices and activities included in the IFPA analysis were (1) new site indices, (2) new deer winter range, and (3) an adjustment of existing stand volumes as determined by VRI phase 2 sampling. The IFP-like analysis identified a 25 500 cubic metres per year increment over the TSA-like analysis. I refer to this as the 'base AAC increase'.

Further, I agree with the use of spatially explicit forest cover constraints for the initial decades in both the TSA-like and IFP-like analysis, as discussed below in the sections 'The model' and 'Cutblock adjacency/green-up'. This similar use will ensure that any timber supply increase is based on an innovative practice or activity rather than a modelling difference.

I am satisfied that the above TSA-like and IFP-like base harvest flows provide a suitable basis from which to evaluate the assumptions regarding the land base, management practices, timber yields, and the impacts of the innovative practices for the Adams Lake IFPA area.

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General

- Technical information provided through correspondence and communication among staff from the Ministry of Forests (MOF), the Ministry of Sustainable Resource Management (MSRM), and the Ministry of Water, Land, and Air Protection (MWLAP).

Consideration of factors influencing timber supply analysis

The chief forester in his memorandum of 6 April 2001 identifies that information quality must be evaluated on a case by case basis. Below I identify specific areas that are of concern to me.

The model

The timber supply analysis for the Adams Lake IFPA was prepared by Timberline Forest Inventory Consultants (Timberline) under the direction of the IFPA holder staff. Timberline used its proprietary timber supply model Critical Analysis of Schedules for Harvesting (version 6) (CASH6). This model can be used to project spatially implicit or spatially explicit timber supply forecasts. Spatially explicit means that the model accounts for the spatial relationship between mapped cutblocks while spatially implicit means that the model does not track cutblocks. Thus, a spatially explicit model enables direct implementation of adjacency rules associated with 'green up' forest cover constraints whereas a spatially implicit model approximates adjacency by constraints such as maximum disturbance.

For this analysis, the licensee used CASH6 in both spatially explicit and spatially implicit modes. The spatially explicit cutblock adjacency rule was applied for the first 3 to 6 decades after which a spatially implicit forest cover requirement was applied. These methods are further discussed below under 'Cutblock adjacency/greenup'.

For the recent Kamloops TSA timber supply review the forest estate model FSSIM version 3.0 developed by the B.C. Forest Service was used in a spatially implicit mode. FSSIM was also used in the previous timber supply review that provided information for the 1996 AAC decision. As my decision must consider an increase in AAC above the decision made by the chief forester, I am mindful of differences in harvest flows that might be the result of different forest estate modelling methodology.

In the chief forester's 6 April 2001 memorandum, he identifies the importance of understanding the characteristics of the forest estate model and of benchmarking the model against FSSIM. The licensee did a benchmark comparison of FSSIM and CASH 6 using an Adams Lake IFPA data set (Timberline Forest Inventory Consultants 2000). This analysis suggested that application of spatially explicit constraints within CASH6 reduced harvest flow further than the spatially implicit method used in FSSIM. However, problems in the data set and model set up were identified. Timberline staff note that these problems have been addressed in the data and model set up used in the IFPA review analysis supporting Adams Lake IFPA AAC increase application. A new comparison with FSSIM was not provided.

Based upon my staff's experience in examining results from the CASH6 model, I am satisfied that the model is capable of providing adequate projections of timber supply for my decision on the incremental effects of the innovative practices and activities. In my consideration of other factors, described below, I am mindful of the potential differences in forecasts between models.

Land base

As part of the process used to define the timber harvesting land base in the timber supply analysis, a series of deductions are made from the productive forest land base. These deductions account for the factors that effectively reduce the suitability or availability of the productive forest area for harvest, for ecological, economic or social reasons. The deductions in the Adams Lake IFPA review analysis resulted in a current timber harvesting land base of 109 072 hectares.

I have considered all of the deductions applied in the derivation of the timber harvesting land base for the Adams Lake IFPA area. I am satisfied that the following were appropriately modelled and will not discuss them in detail: environmentally sensitive areas, woodlots, problem forest types and sites of low productivity

The factors discussed below are those for which I believe my consideration requires some documentation.

Economic and physical operability

Those portions of a forest management unit that are not physically accessible for harvesting, or that are not feasible to harvest economically, are categorised as inoperable and are excluded when deriving the timber harvesting land base.

The IFPA holder, in consultation with the Kamloops Forest District, delineated operability lines in 1999 based on information from aerial photography, terrain stability mapping, TRIM contour mapping, forest cover mapping, and operational experience. This delineation updated the 1991 operability lines used in the 2001 Kamloops TSA timber supply review and resulted in a decrease of 2 378 ha of the operable land base. The Clearwater Forest District have not officially approved these lines but indicated their support for use in the IFPA analysis.

Public input from The Shuswap Environmental Action Society (SEAS) expressed concern about the operability mapping. Proposed logging blocks fall within the inoperable area on a map provided to SEAS. The IFPA holder has since identified that this was a typing error and that the proposed blocks are within the operable land base.

Based on the advice of MOF district staff, I view the new operability lines as providing the best available information. As such, for this determination, I accept the assumptions about economic and physical operability as incorporated in the analysis.

Roads, trails, landings

Roads, trails, and landings were excluded from the productive land base in the timber supply analysis. In the Kamloops TSA timber supply review, average percent reductions, based on sampled data and expert opinion, were applied to the appropriate land base. In this IFPA review analysis, existing roads were removed directly from the timber harvesting land base in the GIS database. The road location was based on an updated road classification and mapping. The road width for each road class was estimated by the IFPA holder. This resulted in 1301 ha less area being deducted than based on the Kamloops TSA timber supply review analysis methodology.

For future roads and landings, the IFPA review analyses applied the 6.5% reduction used in the Kamloops TSA timber supply review. However, the IFPA holder believes that the actual average reduction might be in the range of 3 to 4%. This belief is supported based on a limited review of silvicultural prescriptions by the IFPA holder. Ministry staff feel that this limited review is insufficient to provide reliable information on future road and landing deductions.

Public input from the B.C. Wildlife Federation (BCWF) expressed concerns about the road reductions, particularly as related to rehabilitation and deactivation. I note that the reduced road deduction for existing roads is simply an improved accounting in the IFPA analysis over the Kamloops TSA analysis rather than a reflection of reduced roads.

Forest district staff advise me that the road, trails, and landing methodology used in the analysis provided the best available information. I concur with district staff. As such, for this determination, I accept the assumptions about existing and future roads, trails and landings as incorporated in the analysis but I am mindful of the IFPA holder's concern that future reductions may have been overestimated in the IFPA review analysis.

Not satisfactorily restocked areas

Not satisfactorily restocked (NSR) areas are those areas where timber has been removed, either by harvesting or by natural causes, and a stand of suitable forest species and stocking has yet to be established.

The IFPA holder reviewed and updated all silviculture records to 2000. Thus, most of the NSR stands identified in the IFPA review analysis were updated with current information rather than assumptions used in the Kamloops TSA timber supply review.

Given the use of updated records, I view the change as providing the best available current information. As such, for this determination, I accept the assumptions about NSR stands as incorporated in the analysis.

Deciduous-leading stands

Deciduous-leading stands have not traditionally been harvested within the IFPA area. In the TSA-like analysis all deciduous-leading stands were excluded from the timber harvesting land base. However, they may contribute to other forest objectives (e.g., green-up adjacency, old growth).

In the IFP-like analysis deciduous-leading stands were excluded from the timber harvesting land base except that recently harvested stands labelled as deciduous-leading were recognised as likely to become conifer-leading over time. To account for these stands, specific volume tables were generated based on successional assumptions. Given district staff opinion that these stands will likely become conifer-leading, I accept these assumptions for the analysis but I am mindful of the preliminary nature of these volume estimates.

Greater usage of deciduous species is occurring throughout British Columbia and it is likely that such demand will extend to the Kamloops TSA and the Adams Lake IFPA area. I note that Ainsworth Lumber Co. Ltd. has stated an interest in harvesting deciduous forest types that are older than 60 years of age and outside the PA 16 area of the TSA. In a proposal for the Kamloops TSA, Ainsworth identified approximately 22 000 hectares of deciduous-leading stands, of which half were assumed to be available considering constraints such as operability, merchantability, ESAs, and riparian areas. Within the Adams Lake IFPA Ainsworth identified 450 hectares of potential cutblocks from the total 8023 ha of deciduous forest types in the IFPA area.

Although I am mindful of Ainsworth's proposal, I am not aware of current harvesting or future harvesting as identified in forest development plans of these deciduous-leading stands. As such, I accept the assumption of exclusion for this analysis by the IFPA holder. If harvesting of deciduous forest types does occur, I expect the IFPA holder to identify the impact of such harvest so that I may re-visit this determination if necessary.

Timber licences

Timber licence T0888, held by Adams Lake Lumber, falls within the boundaries of the Adams Lake IFPA. A timber licence permits the licence holder to harvest the existing timber, and upon harvest the licence reverts back to timber supply area status. These reverted lands are subject to periodic operating area negotiations. In the Adams Lake IFPA review analysis and in the Kamloops TSA timber supply review analysis, the harvest of existing stands from timber licences is not included in the harvest flows. However, in both analyses timber licences contribute to future harvest flows after their projected reversion to the TSA. The methodology for reverted timber licence land base in the IFPA area follows the understanding outlined by my staff for the inclusion of timber licences in the IFPA area (letter from Frank Blom 16 October 1998).

While I am mindful that the IFPA holder does not have specific rights to the reverted timber licence areas, I accept that the IFPA holder may realise increment from these reverted lands as per my guiding principles.

Old cedar- and hemlock-leading stands

The 1996 AAC determination for the Kamloops TSA established a partition of 200 000 cubic metres per year for old cedar- and hemlock-leading stands. In support of this partition, the current forest licence of Adams Lake Lumber issued 15 November 1998 does not include age class 8 and 9 cedar- and hemlock-leading stands. Within the Adams Lake IFPA boundaries there are 7 243 ha of such stands.

In the IFPA review analysis, the IFPA holder included the old cedar- and hemlock-leading stands partition in the total harvest flow and provided a summary showing the harvest flow in 3 zones: old cedar- and hemlock-leading stands, the IFPA holder operating area, and other licensee operating area. Further to provide realistic harvest projections, the harvest in the partition was limited to 20 000 cubic metres per year throughout the model projection period.

The modelled harvest flow in the old cedar- and hemlock-leading partition was higher in the IFP-like analyses than the TSA-like analyses. The increase over the first 3 decades averaged about 2 600 cubic metres per year and over the 40 decade projection period averaged about 3 500 cubic metres per year. In the first decade, the increase was 900 cubic metres per year. In the long-term this increase is expected given the improved site productivity information. In the short-term, the TSA-like analysis did not access the maximum of 20 000 cubic metres per year, whereas the IFP-like analysis did access the maximum.

Public input from BCWF expressed concerns about the IFPA holder assuming harvest rights in cedar hemlock stands given current licences and interests of First Nations.

I am mindful that the IFPA holder does not have licence rights to the existing old cedar- and hemlock-leading stands or rights to these areas after harvest. Nevertheless, I accept that the IFPA holder may realise increment from the innovative practices and activities on these lands after they have reverted to TSA status as per my guiding principles. I do not accept that the IFPA holder is entitled to the short-term gains observed by increased harvest flow from the existing old cedar- and hemlock-leading partition given the IFPA holder's licence excludes these stand types. I will discuss my accounting for this factor under 'Reasons for decision'.

Growth and yield

The timber supply methods used in this analysis require that matrices of volume yield over time for specific stand and management regimes are developed. Growth and yield models were used to develop these yield tables. These models require specific information related to the existing forest inventory and management, and to the expected future productivity of forested sites.

I have considered the expert advice of my staff presented to me on inventory, management, and the expected rate of growth. I am satisfied that the analysis assumptions result in appropriate yield estimates except for the factors discussed below for which I believe my consideration requires some documentation.

Site productivity estimates

Inventory data includes estimates of site productivity for each forest stand. Site productivity is expressed in terms of a site index, which is based on the stand's height as a function of its age. The productivity of a site largely determines how quickly trees grow, which in turn affects the time seedlings will take to reach green-up conditions, the volume of timber that can be produced and the age at which a stand will reach a merchantable size.

In general, in British Columbia, site indices determined from younger stands (i.e., less than 31 years old) and older stands (i.e., over 140 years old) may not accurately reflect potential site productivity. In young stands, growth often depends as much on recent weather, stocking density and competition from other vegetation, as it does on site quality. In old stands, the trees used to measure site productivity may have grown under intense competition since they were not subject to management of stocking density, or may have been damaged, and therefore may not reflect the true growing potential of the site. This has been verified in several areas of the province where studies—such as the old-growth site index (OGSI) 'paired plot' project and the 'veteran' study, suggest that actual site indices may be higher than those indicated by data from existing old-growth forests. Site index estimates for site series within the Biogeoclimatic Ecosystem Classification System (SIBEC) also consistently indicate that site productivity has generally been underestimated and that managed forest stands tend to grow faster than suggested by inventory-based site index estimates.

Public input from SEAS expressed concern that potential growth is not real growth and should not be used to support increases in the logging of remaining stands. To forecast future stand growth, the Ministry of Forests have developed growth and yield models that use site index as an input of site productivity. The IFPA holder used these models in this analysis. These models were specifically developed to forecast potential growth and yield rather than an average so that they would have wider applicability. As such, potential yield must be adjusted downward through operational adjustment factors, as was done in

developing the yield tables for the timber supply analysis. Changes in site productivity estimates do not affect yield estimates of existing stands. However, changes in site productivity estimates can affect the availability of existing stands by enabling future stands to meet volume or other management objectives earlier (e.g., green up constraints).

Further, SEAS identified that the report *Potential Site Index for the Major Commercial Species in the Adams Lake IFPA* was not available. I note that this report has been submitted to me for use in this decision.

As an innovative practice, the IFPA holder generated new estimates of site productivity using a 'site index adjustment' project and, in the ESSF zone, an elevation modelling exercise.

The site index adjustment project involved 2 stages. The first stage was the prediction of potential site indices using expert knowledge based on reconnaissance-level terrestrial ecosystem mapping for forest polygons. The second stage was the adjustment of the potential site indices based on the results of a ground sample. These adjusted site indices were determined for all zones except the ESSF where few sampling opportunities existed in high elevations.

In the Adams Lake IFPA area, the reconnaissance-level terrestrial ecosystem mapping for forest polygons fails to meet the current specifications set up the chief forester. Under my guiding principles, I should not accept this information. However, I recognise that this mapping was initiated prior to standards being available and that MOF ecology staff accepted the ecosystem mapping for use. As such, I accept the use of the ecosystem mapping as the best available information but I will account for the increased uncertainty in the application of the site index adjustments under 'Reasons for decision'.

The ecosystem mapping is only one phase of the site index adjustment project. The second phase is a field sample of site indices. This statistical based sample is used to adjust the initial estimates of site index to observed values. In some cases the adjustment is upwards and in others the adjustment is downward. I accept that such adjustments are appropriate for the management unit level but due to the limited sample size uncertainty in specific ecosystems can exist.

In the ESSF zone, it has been recognised that site productivity decreases as elevation increases. The IFP-like analysis used a model based on Klinka et al. (1996) that reduces site productivity as a function of elevation. However, after completing the analysis the IFPA holder modified the model to include site index information from 8 new plots established in the IFPA area and 47 plots from outside of the IFPA area. This 'localised' model, that the IFPA holder considered more representative, identified that when evaluated against the model that included local information, the Klinka et al. model used in the IFPA review analysis may overestimate site indices by 3% in the ESSF zone. As the sensitivity of this change in site indices was not explored in the timber supply analysis, I crudely estimate that this translates to a 500 cubic metres volume reduction. This reduction assumes a proportionate reduction of the total impact of the site index

adjustment based on a decrease of 3% applied to the ESSF zone, which is 28% of the productive forest. The total impact of the site index adjustment (63 000 cubic metres per year) was determined as the difference of the TSA-like analysis and an analysis with only the site index adjustment added.

MOF and MSRM growth and yield staff have expressed strong concerns about the validation of the elevation model and the sufficiency of only 8 subjectively placed plots from within the Adams Lake IFPA used to calibrate the model. Further, staff have concerns about stands realising potential growth in the ESSF particularly at higher elevations and that operational adjustment factors have not simultaneously been examined. Public input from SEAS similarly expressed concerns about regeneration problems in high elevation stands. These are valid concerns that raise the uncertainty and risk in their use. I will discuss my accounting for this uncertainty under 'Reasons for decision'.

Minimum harvestable ages

A minimum harvestable age is an estimate of the earliest age at which a forest stand is expected to reach a harvestable condition and minimum merchantability criteria. The minimum harvestable age assumption largely affects when second growth stands will be available for harvest. In practice, many forest stands will be harvested at older ages than the minimum harvestable age, due to economic considerations and constraints on harvesting that arise from managing for other forest values such as visual quality, wildlife, and water quality.

In the IFPA review analysis, minimum harvestable age estimates in the TSA-like analysis followed the methodology used in the Kamloops TSA timber supply review analysis. For the IFP-like analysis, the minimum harvestable ages were defined as follows for: (1) existing natural stands - the age at which 150 m³/ha is reached; (2) existing managed stands - the age at which 90% of the maximum mean annual increment is reached; (3) future managed stands - the age at which the maximum mean annual increment is reached; and (4) all existing stands in cedar-hemlock leading stands - the age is set to 141 years. These changes were not considered to be innovative forestry practices or activities but to be changes in current information.

Upon review of the differences of minimum harvestable ages between the TSA-like and the IFP-like analysis, my staff indicate that (1) changes for existing natural stands would have minimum impact as most stands are already beyond the minimum harvestable age and (2) changes for future managed stands result in similar minimum harvestable ages in the IFP-like analysis and the TSA-like analysis due to the increased site productivity in the IFP-like analysis.

Public input from SEAS expressed concern that the proposed increase is based in part on decreasing rotation ages and value and product objectives have not been considered. As I have identified above, while the method of determining minimum harvestable ages has

changed the resultant ages in the TSA-like and the IFP-like analysis are similar. Further, as noted above, the minimum harvestable ages identifies the minimum acceptable harvest age and not necessarily the age of harvest.

I am mindful that the changes in minimum harvestable ages in the IFP-like analysis could impact volume availability and thus impact harvest flow. However, based on the above review, I do not believe any impacts occur and as such I accept the minimum harvestable age assumptions in the TSA-like and IFP-like analysis for use in this determination.

Volume estimates for existing stands

The current (1996) forest inventory of the Adams Lake IFPA area is based on 1995 aerial photography and updated for disturbance to 31 December 1999. Volume estimates for stands greater than 25 years were derived using BatchVDYP (version 6.4a). In the Kamloops TSA, separate audits of the Clearwater Forest District in 1997 and the Kamloops Forest District in 1995 suggested the overall mature inventory volumes of the inventory were reasonable for the TSA.

However to further confirm inventory volumes, the IFPA holder conducted a ground sample of 76 plots using vegetation resource inventory (VRI) phase 2 sampling methodology for timber emphasis. The inventory of mature net merchantable volume was found on average to be overestimated by 11% (95% confidence interval ranges from 0.776 to 1.007). Post-stratification of these plots, found that in the ESSF zone, which constitutes 28% of the IFPA productive forest, the inventory of mature net merchantable volume is overestimated by 30% (95% confidence interval ranges from 0.517 to 0.886). In the non-ESSF zones, the inventory of mature net merchantable volume is overestimated by 5% (95% confidence interval ranges from 0.808 to 1.083). Staff from the forest districts and Ministry of Sustainable Resource Management have reviewed this study and accept that the mature volumes in the ESSF are overestimated.

Public input from SEAS and BCWF expressed concerns that the results of the VRI Phase 2 sampling should not be ignored.

For the purposes of this determination, while I am mindful of the variation around the volume estimates of the ground sample, I consider adjusting existing stand volume tables based on the VRI Phase 2 sample to reflect the best available information. As such, I accept government staff opinion that a 30% volume reduction on existing stand analysis units in the ESSF zone and a 5% volume reduction on other existing stand analysis units is appropriate information to use. Further based on the approved Forestry Plan, I find that this updated inventory information to be an innovative activity that should be applied in the IFP-like analysis.

Timber Berth

In the south-western part of the Adams Lake IFPA is an area known as Timber Berth 233. This area, which covers 4 943 ha, has had a history of selective harvesting and silvicultural treatments that has left poorer quality stands. The IFPA holder indicates that they believe this area will require special attention to ensure the productivity of sites is captured. In the IFPA review analysis, the IFPA holder conducted a sensitivity analysis that showed that modifying existing inventory labels to reflect the rehabilitation of a portion of the Timber Berth would likely have a negligible impact on timber supply.

Ministry staff had concern about the current volume estimates within the Timber Berth. However, at this time the IFPA holder is unable to assess the reliability of the inventory in the Timber Berth.

The 29 June 2001 AAC application requested that a partition be made to address the need for silviculture treatments in the Timber Berth.

Given that the current forest inventory labels are the best available information, I have accepted the VDYP generated volume estimates based on current forest inventory labels and the adjustments noted under 'Volume estimates for existing stands' for the IFPA review analysis. Additionally, given the available information and that treatment in the timber berth has negligible impact on the analysis, I will not consider partitioning the Timber Berth.

Tree Improvement

The Forest Practices Code requires the use of improved (class A) seed from seed orchards for regeneration where available. Class A seed is the product of British Columbia's forest genetics program, which uses naturally occurring, well-performing trees and standard breeding techniques to produce trees with improved attributes, including enhanced growth.

No genetic gains were assumed in either the TSA-like or IFP-like analyses. However, improved seed is likely to be used in the Adams Lake IFPA. A sensitivity analysis that assumed 100% improved seed indicated no impact in the first 3 decades and a 4% long-term impact. However, Ministry staff indicate that it is unlikely that the Adams Lake IFPA would be able to obtain 100% class A seed for their needs.

As tree improvement is not recognised as an innovative forestry practice in the Forestry Plan, the upward pressure of improved seed applies both to the TSA-like and IFP-like analyses. The impact of such a change on the base AAC increase was not presented to me and I assume for the purpose of this determination that the upward pressure on both the TSA-like and IFP-like analyses would be equivalent.

As such, I accept the tree improvement assumptions used in these analyses but I am mindful of the potential improvements to harvest flow due to the use of improved seed.

Root disease

Root disease is of concern in the Adams Lake IFPA area. Volume tables account for historical endemic levels either directly in the empirical fitting of the growth and yield model VDYP or through standard operational adjustments with the model TIPSY. To account for the impact of root disease above these endemic levels requires additional adjustments to volume tables in the analysis.

The Adams Lake IFP-like analyses increased operational adjustment factors by 5 percentage points for root disease presence in Douglas-fir leading managed stands of the ICH and IDF zones. In the Okanagan TSA, located southeast of the Adams Lake IFPA area, the timber supply review analysis used larger adjustments than the IFP-like analysis. Both the Adams Lake IFP-like analysis and the Okanagan TSA analysis based the adjustments on a comparison between natural stand yield tables and managed stand yield tables. In the Kamloops TSA review analysis there was no accounting for root disease beyond standard operational adjustment factors.

The Ministry of Forests regional pathologist believes that the increases in operational adjustment factors used in the IFP-like analyses and the 2001 Kamloops TSA review analysis are low. However, I have insufficient information from within the Adams Lake IFPA area with which to develop estimates of likely root disease/damage beyond the level used in the IFP-like analysis.

Given the lack of localised data, I accept the operational adjustment assumptions used in this analysis to account for root diseases but I am mindful of the potential greater impacts suggested by my staff.

Non-recoverable losses

Non-recoverable losses are timber volumes destroyed or damaged by agents such as fire, wind, or disease that are not recovered through salvage operations. These losses are not recognised in yield estimates. Timber losses due to insects and diseases that normally affect individual trees in forest stands (endemic losses) are accounted for in the inventory sampling upon which existing stand yield estimates are based or standard operational adjustments for future managed stand yield estimates.

Non-recoverable losses in the IFPA review analysis were determined as an area-weighted proportion of the non-recoverable losses identified in the Kamloops TSA timber supply review. I accept this methodology for use in the analysis but I note that an error occurred in the calculation of such losses in the IFPA review analysis resulting in the non-recoverable loss being overestimated by 670 m³/year. As this error occurs in both the

TSA-like and the IFP-like analysis, it does not impact my AAC increase decision. Further, I believe that the IFPA holder could improve upon estimates of non-recoverable loss specific to the IFPA area.

Integrated resource management objectives

The Ministry of Forests is required under the *Ministry of Forests Act* to manage, protect and conserve the forest and range resources of the Crown and to plan the use of these resources so that the production of timber and forage, the harvesting of timber, the grazing of livestock and the realisation of fisheries, wildlife, water, outdoor recreation and other natural resource values are co-ordinated and integrated. Accordingly, the extent to which integrated resource management (IRM) objectives for various forest resources and values affect timber supply must be considered in AAC determinations.

To manage for resources such as water quality and aesthetics, current harvesting practices prescribe the size and shape of cutblocks, the amount of disturbance (areas covered by stands of less than a specified height), and minimum green-up heights for regenerated stands on harvested areas before adjacent areas may be harvested. Green-up requirements provide for a distribution of harvested areas and retention of forest cover in a variety of age classes across the landscape.

I have reviewed the information presented to me about recreation sites, range resources, moose range, and caribou winter range and I am satisfied that IFPA review analyses appropriately reflected current practices.

The factors discussed below are those for which I believe my consideration requires some documentation.

Cutblock adjacency/green-up

To manage for resources such as water-quality, soil stability, wildlife and aesthetics, and to avoid concentrating harvesting-related disturbance in particular areas, operational practices control the size, shape, and spatial relationships of cutblocks (i.e., setting of minimum green up height before allowing harvesting of adjacent blocks).

In CASH6 the time to green-up height was determined using site height curves from the growth and yield model TIPSU. Ministry of Forest growth and yield experts recognise that height/age models, as presented in the MOF SiteTools program, are generally a better choice for modelling green-up height. The IFPA holder indicates that on the average green-up height for analysis units in the IFP-like analysis would have been 1.5 years earlier if height/age models were used. In an IFP-like analysis that used a declining harvest flow, decreasing the green-up height by 1 m enabled maintaining the initial harvest one more decade. Nevertheless, both estimates are not based directly on data specific to the Adams Lake IFPA area.

While I am mindful of this increase due to ‘modelled’ height/age relationships, I will not account specifically for this factor in my decision as I was not provided an analysis that demonstrated the impact on both the TSA-like and IFP-like analyses with a non-declining harvest flow. As such, I cannot determine whether such a change negatively or positively influences the base AAC increase.

In the timber supply analysis, as discussed above, spatially explicit constraints were applied in the first several decades in the analysis. The impact of these constraints is dependent not only on the management objectives (e.g., height of stand before adjacent stand can be harvested) but also on the model delineation of the harvested stands. In regards to the latter, staff of Timberline indicated that they believe the blocking of harvested stands to be reasonable. Nevertheless, my staff were unable to explicitly determine, given available analysis results, why projected volumes available for harvest over the next two decades are so significantly lower than the total merchantable inventory.

For the both TSA-like and IFP-like analyses that I am using as my bases, spatially explicit constraints are applied for 3 decades. Other analysis shows that the use of spatially explicit constraints for 6 decades is more constraining in the mid-term. However, I recognise that the certainty of the model blocking routines decreases the farther forecasts are into the future.

In conclusion, I am concerned about the constrained harvest flow in the first few decades given the initial amount of mature inventory. An analysis that is more constrained than necessary could influence the impact of innovative practices. Nevertheless, I am reasonable confident, given that my staff is satisfied that CASH6 is capable of providing adequate projections and that both the TSA-like and the IFP-like analyses show similar characteristics, that my concern would have little impact on the base AAC increase.

Visually sensitive areas

Careful management of scenic areas along travel corridors and near recreational sites is an important IRM objective. The Forest Practices Code enables the management of visual resources by providing for scenic areas to be identified and made known by the district manager or through a higher level plan, and by providing for the establishment of visual quality objectives (VQOs).

In the Adams Lake IFPA the scenic areas were designated in the Kamloops LRMP. The district manager has established the VQOs in the Kamloops Forest District. The district manager in the Clearwater Forest District has not established the VQOs but the recommended VQOs are used in practice during operational plan approvals.

Provincial guidelines provide a range of values for maximum disturbance in each class of visually sensitive area. The applicable disturbance value within the range is dependent on the visual absorption capacity (VAC) of the area, which is a measure of an area's

physical capacity to absorb alterations while maintaining its visual integrity. An area with a low VAC can sustain relatively less disturbance than an area with a high VAC before the visual condition is compromised.

Visual forest management objectives were modelled in the IFPA review analysis as per provincial guidelines used in the Kamloops TSA timber supply review. However, the IFPA holder states that they believe their current harvesting and silvicultural practices enable a greater maximum disturbance while meeting the visual quality objectives. The IFPA holder demonstrated by a sensitivity analysis that such a practice enables a greater mid- and long-term harvest. However, the IFPA holder has not provided sufficient information to validate the disturbance level of current practices with regard to visual management objectives.

Public input from SEAS expressed concern that accessing more timber from scenic areas than previously anticipated was not innovative.

In accepting the Adams Lake IFPA forestry plan, I identified specifically that improvements in managing VQOs beyond current guidelines are not an innovative practice. Given such, I do not recognise any harvest flow gains to be eligible for an increase in AAC. However, I am mindful that such improvements might lead to an overall increase in harvest flow.

Deer winter range

The IFPA review analysis identifies a four-fold increase in the amount of deer winter range over the current deer winter range identified in the Kamloops LRMP. Deer winter range was identified for the IFPA holder by Keystone Wildlife Research based on ecosystem mapping complimented with ground sampling. This increased managed deer winter range is dispersed over both the timber harvesting land base and the non-timber harvesting land base in blocks of various sizes. Government staff indicated that this new deer winter range proposal meets the intent of the Kamloops LRMP and current deer winter range planning processes. While the proposal has not yet been officially endorsed by the Monitoring Table of the LRMP (or approved by government), I accept the modelled deer winter range to be an innovative practice that is reasonably foreseeable. Further, as seen below by the impact, the use of this innovative practice in this determination does not increase the harvest flow.

Timber supply analysis provided by the IFPA holder identifies a negative impact of 17 500 cubic metres per year due to the IFPA deer winter range (over the base where no deer winter range is present). However, since the TSA-like analysis does not incorporate the LRMP winter range, which I consider to represent current practice, I believe that the timber supply increment between the TSA-like and the IFP-like forecasts may be overstated on this account. The magnitude of the over-estimate however is uncertain. To determine the magnitude, one method would be to assume that the impact of including the LRMP winter range is proportionate based on area to the impact of the winter range

used in the IFP-like analysis (i.e., 5205 cubic metres per year). Another possible conclusion is that due to the contiguous nature of the LRMP winter range together with other management objectives for the area, the LRMP winter range in fact has no downward impact on timber supply. In this latter case, the difference between the TSA-like and the IFP-like forecast would provide a reasonable indication of the incremental impact of new deer winter ranges.

Further, I note that the planning cell methodology for deer winter range is the direction of future practice in this region. As such, the IFPA holder, by accelerating the use of planning cells, is absorbing some of the impact of future deer winter range planning that would have impacted all licensees in the IFPA area. Nevertheless, given the principle that an AAC increase should not cause negative impact on non-IFPA licensees, I accept that the impacts of deer winter range should be accounted within the IFPA AAC increase as an innovative practice.

Wildlife tree retention

Wildlife tree retention in association with cutblocks has been in place for some time in the Kamloops TSA. Wildlife tree retention was modelled by assuming a volume reduction to yield tables in the IFPA review analysis and the Kamloops TSA timber supply review. In the Kamloops TSA timber supply review, an estimate of 2.12% of cutblock volume was assumed for retaining single tree reserves and wildlife tree patches in cutblocks. This percentage was based on a review of silvicultural prescriptions in the Kamloops Forest District in 1996-1997 and professional judgement in the Clearwater Forest District.

The IFPA holder questioned the applicability of the TSA average to the IFPA area. Based on a spatial modelling exercise, they identified that this percentage might be reduced to as low as 0.59%. In a sensitivity analysis that replaced the 2.12% volume reduction with a 0.59% volume reduction, the IFPA holder, in a declining harvest flow scenario, was able to increase the mid to long term harvest levels by 2%. They did not attempt to raise the short-term level.

I recognise the limited nature of the data used for determining the impact of wildlife tree retention and that given differences in practices and land base a TSA average might not be applicable to the smaller IFPA land base. I also recognise that operationally the selection of wildlife tree patches is dependent on many factors of which the distance to other wildlife tree patches is just one factor and that the spatial modelling exercise may not capture these factors.

I will discuss my accounting for this factor under 'Reasons for decision'.

Riparian

Riparian areas are those areas along streams and around lakes and wetlands. To protect riparian and aquatic habitats, the Forest Practices Code requires the establishment of riparian reserve zones where timber harvesting is excluded and riparian management zones where harvesting may be limited. While all streams, lakes, and wetlands have not yet been classified in the Kamloops TSA, for the IFPA review analysis government staff provided appropriate classes based on existing information or reasoned defaults. Riparian reserve and management zones as per the 'best management practices' of Forest Practice Code guidelines were modelled in both the TSA-like and IFP-like analyses. In the analysis process, riparian reserve zones are considered removed from the timber harvesting land base. For riparian management zones an area equivalent was calculated based on the required width and retention level and removed from the timber harvesting land base.

Public input from SEAS expressed concerns that better riparian protection should be implemented and that leaving more trees along S4 and S6 streams would create a downward pressure on timber supply.

In the Kamloops TSA timber supply review best management practices were not modelled. However, forest district staff indicate that in the Kamloops TSA and the Adams Lake IFPA area the current practice is best management practice. As such I accept the use of best management practice within the TSA-like and IFP-like analyses. However, I note that in these analyses no riparian management zone buffer was assumed for S6 class streams. For best management practices, a reduction equivalent to a 1 metre buffer should have been assumed. I will discuss my accounting for this factor under 'Reasons for decision'.

Identified Wildlife Management Strategy

Wildlife potentially occurring within or adjacent to the Adams Lake IFPA area include *identified wildlife* species. *Identified wildlife* refer to species at risk (red- and blue-listed) as well as regionally significant species that are potentially affected by forest management activities and which have not been adequately accounted for through existing management strategies. While the biodiversity and riparian provisions of the Forest Practices Code are intended to provide for the needs of most wildlife species, some species that are considered to be 'at risk' require special management practices. The Province's Identified Wildlife Management Strategy (IWMS)—released in February 1999—provides mechanisms for managing critical habitat for identified wildlife species including Wildlife Habitat Areas, General Wildlife Measures, and higher level plan recommendations.

For this determination, no information is available to specify the exact location or precise amount of wildlife habitat areas that will be required within the timber harvesting land base to implement the IWMS. However, I note that the chief forester in recent AAC

determinations has accounted for up to a 1% impact based on the Province's commitment to implementing the IWMS and on associated current policies. I also note the higher level of management objectives (e.g., deer winter range, visuals) on the IFPA area and speculate that the IWMS would have a lower impact on the IFPA area than in the TSA as a whole. For this decision, I conclude that the IWMS has a small but not fully quantified impact on the base AAC increase. I will discuss my accounting for this factor under 'Reasons for decision'.

Landscape level biodiversity

The *Biodiversity Guidebook* and the *Landscape Unit Planning Guide* describe current guidelines on planning for and managing biodiversity at the landscape level. Landscape-level biodiversity management focuses on ensuring old forest is retained in each forest ecosystem variant in each landscape unit. In the Kamloops TSA, the Kamloops LRMP assigned a preliminary biodiversity emphasis option for each landscape unit. Within the Adams Lake IFPA boundaries there are 6 landscape units, some which extend outside of the IFPA boundaries.

The TSA-like and IFP-like analyses for the Adams Lake IFPA addressed landscape-level biodiversity management by identifying old growth management areas (OGMAs) that are excluded from the timber harvesting land base. These OGMAs were initially identified based on a modelled rating process conducted by the IFPA holder and then revised by both government staff and the IFPA holder. The OGMAs have not yet been finalised by MSRM staff or the LRMP Monitoring Table. The draft of OGMAs currently agreed upon by government staff and the IFPA holder consists of 850 more hectares of timber harvesting land base than the draft used in the TSA-like and IFP-like analyses. Nevertheless, government staff indicate that the area of OGMAs used in the TSA-like and IFP-like analysis exceed the retention requirements as used in the Kamloops TSA timber supply review by 1300-1400 hectares.

In the Kamloops TSA timber supply review, landscape-level biodiversity management is modelled based on retention percentages for old forest within forest ecosystem units of landscape units rather than on OGMA delineation. In practice, the retention of old-seral forest to meet landscape-level biodiversity objectives involves establishing OGMAs. For the Adams Lake IFPA, the forest district managers indicate that the draft plan is consistent with the requirements to manage old seral stages.

Public input from SEAS and BCWF expressed concern about the IFPA holder being involved in the OGMA selection process and that stands younger than what might currently be considered old growth could be included as an OGMA. While the IFPA holder has provided information and suggested OGMAs, the Ministry of Sustainable Resource Management (MSRM) is ultimately responsible for Landscape Unit Planning (i.e., OGMAs). In some cases, it could be reasonable to include stands that have not yet reached old growth within an OGMA. Again, the decision on the stands included within OGMAs lies with MSRM.

Based on input from government staff, I accept the use of OGMAs in the IFPA review analysis as the appropriate management and modelling methodology. However, I need to consider differences between the modelled and currently proposed OGMAs. I will discuss my accounting for this factor under 'Reasons for decision'.

Cultural heritage resources

Under the *Forest Act*, a cultural heritage resource means 'an object, a site or the location of a traditional societal practice that is of historical, cultural or archaeological significance to British Columbia, a community or an aboriginal community.' Archaeological sites contain physical evidence of past human activity, whereas traditional use sites may not necessarily contain historical physical evidence but may indicate current use by First Nations. Archaeological sites that predate 1846 are protected under the *Heritage Conservation Act*. The nature and extent of required protection of archaeological sites are detailed under this legislation.

The Kamloops LRMP directs that archaeological assessments be completed in zones identified as medium and high within the current Archaeology Overview Assessment. To date within the Adams Lake IFPA area 49 archaeological sites have been mapped. These sites were not excluded from the timber harvesting land base in the IFPA review analyses. However, the IFPA holder indicates that all these sites are found within parks or on lakeshores and would not be operationally affected by timber harvest.

I am mindful of the licensee's commitment to work with First Nations operationally to ensure that cultural heritage resources are properly managed. Should any sites be identified in the future, they should be brought to my attention and accounted for in future determinations. For this determination, I am satisfied that the analysis assumptions were based on the best available information for cultural heritage resources and make no adjustments on this account.

Harvest flow

Large timber volumes in older forests often enable a variety of short-term harvesting levels without jeopardising the long-term sustainable timber supply. These alternative harvest flows may have a decline to a long-term level, an even flow or step up to a long-term level or even a decline to a level below the long-term before stepping up to the long-term level.

For the IFPA review analysis, I requested several alternative harvest flows to aid in understanding the dynamics of the timber supply. These included non-declining and declining harvest flows.

The chief forester in his memo on timber supply analysis methodology suggested selecting, if relevant, a 'base case' harvest flow that reflects the harvest flow used in the Timber Supply Review base case. In the recent Kamloops TSA timber supply review, the timber supply analysis base case for conventional harvest showed a harvest flow with only a 5% decline between the short-term and the long-term.

Consistent with advice in the chief forester's memo on timber supply analysis methodology, I will use non-declining harvest flows for assessing the timber supply impact of innovative practices. I make this choice because the Kamloops TSA timber supply review base case closely approximates an even-flow forecast. Further, I feel that a comparison of this non-declining harvest flow with the non-declining harvest flow that includes the innovative practices reduces the risks to long-term sustainability because the risk of an over-estimate of a short-term AAC increase, that might result solely from the manipulation of harvest flow in later periods, is reduced.

Nevertheless, I recognise that a harvest flow at the TSA-level cannot always be mimicked at a sub-unit level. There may be trade-offs at different time periods between sub-units that enable a greater harvest flow at the TSA-level. For the IFPA area, given that the negotiation of operating areas did not use timber supply analysis methodologies, it would be unlikely that the harvest flow would match exactly the TSA harvest flow. I will discuss this factor further under 'Impacts on other licensees'.

Impacts on other licensees

Under my guiding principles, I identify that an AAC increase decision should have minimal impact on non-IFPA holder's rights. If impacts exist, the IFPA holder may negotiate agreements with other licensees to mitigate such impacts. The IFPA holder has obtained letters of support and agreement with 5 other licensees currently operating within the Adams Lake IFPA boundaries with respect to management and any increase in allowable annual cut:

Gilbert Smith Forest Products Ltd. (FL A18692, NRFL A56291) in a 29 June 1998 letter and Meeker Log and Timber, Kamloops Ltd (NRFL A58853) in a 25 January 2000 letter agreed to work with the IFPA holder to plan management activities that may become eligible through the implementation of the IFPA. They also agreed that the benefit of an increase should accrue to the IFPA holder.

SIMPCW Development Corp. Ltd. (NRFL A58854) in a 4 February 2000 letter agreed that increases in allowable annual cut that are the direct result of innovative forestry practices and actions would accrue to the IFPA holder.

Kamloops Forest District Small Business Program in a 10 February 2000 and the Clearwater Forest District Small Business Program in a 28 February 2001 letter agreed to work with the IFPA holder to plan management activities that may become eligible through the implementation of the IFPA.

It is my expectation, that as per the letters of agreement, the above non-IFPA licensees will co-operate in the management outlined within the Forestry Plan and identified in the IFPA review analysis, and that such agreement satisfies my principle of minimal impacts on other licensees.

The IFPA holder, in consultation with the Ministry of Forests, estimated prior to the IFPA review analysis that for operating areas in the IFPA area the current AAC allocation is 310 000 m³/year. This included approximately 250 000 m³/year for FL A18693, 40 000 m³/year for Gilbert Smith Forest Ltd (FL A18692) and Ministry of Forest's small business forest enterprise program, and 20 000 m³/year for operators in the old cedar- and hemlock-leading partition. These harvest levels expected from the operating areas of the above non-IFPA licensees were not based on timber supply analysis methodologies and therefore do not necessarily represent sustainable levels. Rather these levels were derived based on the total volume allocation in licences (which are based on sustainable harvest flow at the TSA-level).

The IFPA review analysis (i.e., the TSA-like analysis provided on 10 January 2002) found that the above estimated level of harvest is not obtainable in the short-term from the IFPA area using a sustainable harvest flow. The TSA-like analysis with an even-flow indicated that in the first decade about 211 000 m³/year is available from the operating area of the IFPA holder, 29 000 m³/year from the combined Gilbert Smith Forest Ltd. and the small business forest enterprise program, and 19 000 m³/year from the old cedar- and hemlock-leading partition. Thus, the analysis suggests that IFPA holder, whose current operating area is completely within the IFPA boundaries, does not have sufficient operating area for its full current AAC allocation on a sustainable basis.

The TSA-like analysis in conjunction with the basecase of the 2001 Kamloops TSA timber supply review suggests that at some future time, Adams Lake Lumber (FL A18693) would need to re-negotiate their operating area in order to meet their current volume allocation. This need is identified without considering the impacts of any innovative practices. As such in my IFPA AAC decision, I do not consider this need as impacting other licensees given that the innovative practices did not exacerbate the need.

In my considerations under the Section 59.1 of the Forest Act I am not responsible for determining the total allowable annual cut for an IFPA area nor assigning operating areas of individual licensees. My responsibility relates solely to determining an allowable annual cut increase resulting from innovative forestry practices or activities. As such my reasons for decision will focus on an allowable annual cut increase.

First Nation Considerations

With respect to First Nations issues in the Adams Lake IFPA area in addition to cultural heritage resources discussed above, I am aware of the following:

- Four First Nations Bands reside in or near the Adams Lake area. These include the Adams Lake Indian Band, the Neskonlith Indian Band, North Thompson Indian Band, and the Little Shuswap Indian Band.
- The IFPA holder indicated that all four Bands were forwarded copies of the Forestry Plan and the AAC Increase application during the public review processes and were asked to review the documents and provide comments. Neither the IFPA holder nor I received written comments directly from the Bands. However, I met with representatives of the Adams Lake Indian Band to discuss issues about the IFPA on 2 separate occasions (22 November 2001, and 24 June 2002)
- The IFPA holder and the Adams Lake Indian Band have discussed economic opportunities related to an AAC increase, wood supply for the Adams Lake Indian Band's sawmill, co-management, and evolving protocols to work together.
- My staff have been invited to various meetings and field tours with the IFPA holder and First Nations and have informed me of First Nation's interests. My staff have discussed with the IFPA holder the need to consider First Nations issues.
- The Shuswap Nation Tribal Council (SNTC) expressed concerns in a 1 December 1998 letter to Kamloops Forest District Manager in regards to Timber Supply Review of the Kamloops TSA about the lack of use of resource inventory and traditional use data from the SNTC and its member communities, the large-scale timber extraction focus of the analysis, and the timber supply review process not involving proper consultation and informed consent.
- A letter from the Secwepemc Watershed Committee to the IFPA holder identifying concerns about the impact on environmental health, cultural use, and unsettled land claims.
- In my 5 July 2002 letter to the IFPA holder regarding amendments to the Forestry Plan, I have stated my expectation that the IFPA holder would commit in the forestry plan to consultation with First Nations, and commit to be consistent with the ministry's *Aboriginal Rights and Title Policy*. I am also aware of proposed changes to this policy in light of recent court decisions.
- I am aware that there is no current involvement of First Nations in the Adams Lake area under the British Columbia Treaty Commission (BCTC) Treaty Process. However, I am aware of the assertion of title, rights, and interests expressed by the Shuswap Nation Tribal Council and individual Indian Bands in various written communications to the Ministry of Forests.
- I am aware of the 'Protocol respecting the management of forests within the Little Shuswap Indian Band Aboriginal Interest Area between the Little Shuswap Indian Band and the British Columbia Ministry of Forests' dated 1 April 2001.

Considering the above information I have concluded the following:

- I am satisfied that reasonable opportunity have been made available to the 4 First Nations Bands to make direct presentation about the IFPA Forestry Plan and the AAC increase application and that the IFPA holder has been made aware of the need to consider First Nation interests.

- I recognise the interest of the Adams Lake Indian Band in obtaining a wood supply for its mill. However, my determination is independent of any decision by the Minister of Forests with respect to the allocation of wood supply.
- The potential rights and title of First Nations in the Adams Lake IFPA area introduces uncertainty into my determination. However, the nature, scope, and geographical location of the potential rights and title and how they would impact my determination of an AAC increase are not known to me. As such, I make no adjustments related to this uncertainty.
- I will inform the IFPA holder of any approved changes to the Ministry of Forest's *Aboriginal Rights and Title Policy* and I will expect that the IFPA holder to be consistent with any new policy.

If information becomes available during the term of this AAC increase that concerns potential rights and title of First Nations in the Adams Lake IFPA area, I may re-visit this determination.

I also reiterate that the AAC increase that I may determine should not in any way be construed as limiting obligations under recent British Columbia Court of Appeal or the Supreme Court of Canada, and in this respect it should be noted that my determination does not prescribe a particular plan of harvesting activity within the Adams Lake IFPA area. Further my decision does not affect obligations with respect to referrals on harvest operations.

Reasons for decision

In reaching my decision on a request for an increase in allowable annual cut to Forest Licence A18693, I have considered all of the factors presented to me, and I have reasoned as follows.

An increase in allowable annual cut is based upon the increment in short-term harvest flow attributable to the innovative forestry practices and activities. These innovative forestry practices and activities are identified in the Forestry Plan, that I have previously approved, and have been or are being carried out by the IFPA holder in accordance with the Forestry Plan.

The original 25 June 2001 application for an AAC increase implied that the improved site index information was the sole innovative practice considered for the AAC increase application. However, upon review of the application and associated timber supply analysis I consider the new deer winter range and VRI phase 2 sampling to be identified innovative practices and activities under the Forestry Plan. I have discussed previously my reasons for including the effects of these innovative activities in my AAC increase determination.

Section 59.1 of the *Forest Act* requires that I justify an increase in allowable annual cut based on timber supply analysis methodology approved by the chief forester. The chief forester in his timber supply analysis considerations for IFPAs identifies the types of

information that should be included in an analysis. I have reviewed factors related to the land base, growth and yield, and management objectives and I am satisfied that the majority of the assumptions appropriately reflect the best available information and current practices. However, I have identified a number of forest management or data issues that either cause uncertainty or lead to changes in analysis assumptions relative to the TSA-like analysis or IFP-like analysis. Some of these factors can be quantified and their impacts assessed with dependability. Other factors may influence the timber supply by adding an element of risk or uncertainty to the decision but cannot be reliably quantified at the time of this determination.

Following is a summary of the factors that my considerations indicate require an adjustment to the base AAC increase of 25 500 cubic metres per year identified as the difference between the TSA-like analysis and the IFP-like analysis. Factors with uncertainty that were discussed previously in my consideration but do not influence the base AAC increase are not discussed below.

Factors whose impacts can be assessed have their impacts expressed in terms of the base AAC increase. In many of the below factors, the initial adjustments are in terms of overall harvest flow volume. The impact in terms of base AAC increase is therefore only a proportion of these initial adjustments. As such to determine the impacts in terms of the base AAC increase, I have assumed that the proportion of these initial adjustments is equal to proportion of the base AAC increase to the overall harvest flow. This is about 10 percent.

- *Increases to base AAC increase*

(1) *Deer winter range:* Management of deer winter range as identified in Kamloops LRMP was not included in the TSA-like analysis. Based on the opinion of my staff, I believe that the impact of the deer winter range management under the Kamloops LRMP to be proportionately less constraining than the impact under the more dispersed deer winter range management regime of the IFPA. However, I do not know if the LRMP deer winter range in fact has no downward pressure on the overall timber supply. As I feel that the LRMP deer winter range is more likely to be less constraining, I will assume that the omission of the deer winter range in the TSA-like analysis results in slightly less than the half the proportional estimate. This correction does not apply to the IFP-like analysis that contains the IFPA deer winter range. As such, I will apply a 2 000 cubic metres per year upward pressure on the base AAC increase.

(2) *Wildlife Trees:* I accept the IFPA holder's premise, as demonstrated by their spatial modelling exercise for wildlife tree patch placement, that the volume reduction applied in both the TSA-like analysis and the IFP-like analysis likely overestimates the reductions required operationally. However, I believe that the spatial exercise provides an optimistic lower bound that is likely not achieved in practice. I believe that the appropriate volume reduction lies between the assumption modelled in a sensitivity analysis (0.59%) and the estimate used in the Kamloops TSA timber

supply review and the IFPA review analyses (2.12%). Based on the sensitivity analysis provided, I estimate that there might be a 0 to 1% increase in short term harvest flow which would exert a 0 to 270 cubic metres upward pressure on the base AAC increase. Since I accept the IFPA holder's evidence that the wildlife tree reduction was most likely overestimated on the IFPA area, but to a somewhat uncertain magnitude, I will assume that this volume increase will result in a 125 cubic metres per year upward pressure on the base AAC increase throughout all time periods.

- *Reduction to base AAC increase*

- (1) *Site productivity estimates:* As discussed above under my detailed considerations of site productivity estimates, I agree with the 3% overestimation of site indices identified by the IFPA holder caused by using the non-localised elevation model in the IFP-like analysis rather than the localized model. As such, I will reduce the base AAC increase by 500 cubic metres per year. I also recognise the uncertainty and risk associated with both the Klinka et al. and the localised elevation model as expressed by the strong concerns of government staff. The small number of samples and the inherent biased nature of these samples do not reduce my uncertainty about the estimates of productivity in the high elevation ESSF zone. The robustness of the existing Klinka et al. model has also not been adequately demonstrated for the IFPA area. As such, I am not willing to fully credit the IFPA holder for this model use as an innovative activity. Similarly, staff and public concerns about the high elevation stands not reaching their potential due to regeneration and other difficulties and the lack of current data to counter these concerns do not reduce my uncertainty. As such, I will reduce the base AAC increase 8 000 cubic metres per year. Further, the quality of the ecosystem mapping for the site index adjustment project causes some uncertainty in the assignment of site indices in the non-ESSF zones. I reduce the base AAC increase 3 000 cubic metres per year to account for this uncertainty. Therefore, I conclude that an 11 500 cubic metres per year downward pressure on the base AAC increase is justified related to site productivity estimates.
- (2) *Riparian:* I conclude that a 1 metre buffer requirement should have been considered as best management practice for S6 class streams in the TSA-like and the IFPA analysis. MOF staff indicate a deduction 130 ha of timber harvesting land base is required based on the mapped length of S6 streams and best management practice. For this omission, based on proportionate assumptions, I will reduce the base AAC increase by 30 cubic metres per year.
- (3) *Identified Wildlife Management Strategy:* I believe that Identified Wildlife Management Strategy will have less than a 1% impact within the IFPA area due to the large areas found in deer winter range and visuals. I am uncertain of the magnitude of this reduction but I will assume that the impact is midway between the current area in wildlife habitat areas (i.e., zero) and the provincial policy of 1%. As such, I reduce the base AAC increase by 125 cubic metres per year. If the Identify

Wildlife Management Strategy impact goes above 0.5% within the term of this AAC increase, I may re-visit the determination.

- (4) *Landscape level biodiversity*: In the TSA-like analysis and IFP-like analyses, the currently proposed OGMA's are 850 hectares more than the modelled OGMA's. If these additional OGMA's had been included there likely is a downward pressure on the total harvest flow in both the TSA-like analysis and the IFP-like analyses. If the impact of this missed OGMA area is assumed to impact proportionately to its size, then there is about a 0.75% downward pressure (i.e., 2025 cubic metres) on the total harvest flows. For this decision I conclude that the base AAC increase, which is about 10% of the total harvest flow, is overestimated by 200 cubic metres per year.
- (5) *Old cedar- and hemlock- leading stands*: I conclude that the IFPA holder does not have harvest rights to existing stands in the old cedar- and hemlock-leading partition as such any short-term increase in the harvest flow in the partition cannot be credited to the IFPA holder's licence. Therefore, I conclude that the base AAC increase is overestimated in the first decade by 900 cubic metres per year.

There are factors that cause uncertainty in the analysis (e.g., spatially explicit adjacency) for which I do not have quantified information to estimate the impact on the base AAC increase. Some of these factors may favour an AAC increase while others may not. I am mindful of the constrained nature of the analysis in the short-term and the implications of an AAC increase. Similarly, I am mindful of the large inventory that is present in the short-term, the nature of volume-based tenures, and the economic and social objectives of the crown as expressed to the chief forester. For this decision, I am assuming that these non-quantified factors balance.

In summary, I am satisfied that the information provided with the application is sufficient for me upon which to base a decision about an AAC increase.

Determination

I have reviewed and considered all the factors and the associated uncertainties described in this document. I determine that innovative practices or activities under the IFPA provide 14 870 cubic metres per year from within the Adams Lake IFPA boundaries that would not have been known or made available within the current allowable annual cut for the Kamloops TSA.

I increase the allowable annual cut assigned to Forest Licence A18693 by 14 870 cubic metres per year subject to:

- (1) the IFPA holder providing an annual summary (1 January to 31 December) of harvest in IFPA area. This summary should identify harvest by the operating areas noted in the IFPA review analysis and separate conifer- and deciduous-leading stands as identified by forest cover inventory labels.

- (2) other licensees within the IFPA boundaries confirming their commitments as identified in their letters of agreement and that the other licensees will provide a summary of their annual harvest in the IFPA area to the IFPA holder;
- (3) the IFPA holder making known to other major forest licence holders in the Kamloops TSA the insustainability of the current allowable annual cut of Forest Licence A18693 within the IFPA holder's current operating area as identified in the TSA-like analysis; and
- (4) the IFPA holder presenting their deer winter range plan to the monitoring table of the Kamloops LRMP for consideration.

This determination is effective 1 January 2003. Due to the uncertainties and risks as previously discussed, this AAC increase will remain in effect for 5 years from the date of this determination at which time I expect the decision to be reviewed. Nevertheless if prior to the expiry date, the IFPA holder presents significant new information within an amended forestry plan, or if I find any information or condition upon which this decision is based, is not justified I am prepared to re-visit this decision.

Recommendations

The review of information in support of an AAC 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. I recommend that the IFPA holder:

- clarify the timber harvest that can be sustained from operating areas within the IFPA area and work with other TSA licensees towards rationalising operating areas for the next operating area negotiations. This should include:
 - conducting a further review of management and modelling assumptions associated with adjacency in order to validate modelled harvest flows within the IFPA boundaries, and
 - investigating the implications of TSA-level timber supply over time on the harvest flow available from individual operating areas;
- follow up on all innovative forestry practices and activities identified within the forestry plan to ensure that the original intent of the forestry plan is met;
- continue to improve forest inventory and site productivity information, particularly in zones such as the ESSF and timber berth;
- improve upon growth and yield forecasts for forest stands and conditions (e.g., root disease impacts, conifer succession in deciduous leading stands) that are not currently well modelled;
- improve the mapping of ecosystem units within the IFPA to the standards established by the chief forester;

- clarify and document the achievement of objectives for visual resources and wildlife tree retention and determine appropriate modelling parameters.
- obtain local unsalvaged loss estimates; and
- continue to work with First Nations in the IFPA area in order to develop opportunities for increased First Nation's involvement in the forest sector.

A handwritten signature in black ink, appearing to read "Fred Baxter". The signature is written in a cursive, flowing style with a long horizontal stroke at the end.

Fred Baxter
Regional Manager
Kamloops Forest Region

31 July 2002

Appendix 1: Section 59.1 of Forest Act

Innovative forestry practices

- 59.1** (1) For the purpose of improving the productivity of the forest 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 Practices Code of British Columbia 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 purpose 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 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 Practices Code of British Columbia 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 forest resource,

AAC Increase Rationale for Adams Lake IFPA, July 2003

- (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 Practices Code of British Columbia 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 Practices Code of British Columbia 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.

1996-11-9.

Appendix 2: Innovative forestry practices regulation

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 39 (1) of the Operational Planning Regulation, B.C. Reg. 174/95.

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 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 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

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.

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, rather it 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.
- MoF, 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 understand 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.