

<b>Title:</b>	<b>Impacts of Wildfire-Burned Areas on Annual Allowable Cuts</b>
<b>Policy Number:</b>	<b>AF-FDP-2021-03</b>
<b>Effective Date:</b>	<b>October 25, 2021</b>
<b>Revision History:</b>	<b>New Directive</b>

## Purpose

Wildfires can affect an annual allowable cut (AAC) at two possible points in the forest management planning cycle:

1. During the Forest Management Plan (FMP) implementation phase, where wildfires may trigger the requirement for an AAC impact assessment<sup>1</sup>; and/or
2. During FMP development, where recently burned areas have historically been excluded from the contributing landbase for purposes of AAC determination.

This Directive provides updates to Alberta Forest Management Planning Standard (AFMPS) requirements for incorporating wildfire impacts into AAC determination, including:

- Requirements for AAC impact assessments following wildfire, including a choice of two discretionary methods that may be used as an alternate to the default method;
- FMP development requirements that apply when including wildfire-burned areas in the contributing landbase for purposes of AAC determination; and
- The approaches that an organization may use to include wildfire-burned areas in the contributing landbase, either as part of an AAC impact assessment or during FMP development.

## Policy Context

This Directive is enabled by Section 14(2) of the *Forests Act*.

The Directive replaces those portions of AFMPS Annex 1, Appendix B not already superseded by Directives 2007-01 and 2014-01. The Directive also provides updates to AFMPS Annex 1, Section 5.9.6.ii and Appendix A, Section 1.0.

## Procedures

### 1. Overview

**Context:** The AAC for a Forest Management Unit (FMU), determined through the forest management planning process, is calculated based on harvest levels that do not directly account for stochastic natural events such as wildfire. If natural disturbance events occur during the FMP implementation phase, AACs must be adjusted to ensure that sustainable harvest levels are maintained. When an organization subsequently commences development of a new FMP, those

---

<sup>1</sup> An AAC impact assessment is required when the cumulative impact of wildfire on the contributing landbase exceeds 2.5 per cent; see Section 1 for additional details.

disturbances must be correctly represented in timber supply analysis (TSA) in order to set a new sustainable AAC for that FMU.

The general process for incorporating wildfire impacts on AACs is as follows:

- 1.1. When wildfires occur during the FMP implementation phase and the cumulative area impacted by wildfire exceeds 2.5 per cent of the contributing landbase for that FMU, an assessment to determine the impact on the AAC is required ("AAC impact assessment"). If the impact is assessed to be greater than 2.5 per cent of the current approved AAC, the AAC must be adjusted for that FMU according to the rules outlined AFMPS Annex 1, Appendix A<sup>2</sup>.
- 1.2. The default ("baseline") method for AAC impact assessment is an area-based method in which the per cent AAC impact is equal to the per cent of the contributing landbase that is burned, i.e., the entire burned area is deleted from the contributing landbase. Organizations may request to use one of two discretionary methods in order to mitigate AAC impacts. These are:
  - i. Adjusted area-based method: Allows an organization to return some of the burned area to the contributing landbase in order to reduce the total area deleted and reduce the corresponding AAC impact.
  - ii. TSA-based method: Allows an organization to return additional burned areas to the contributing landbase in a more sophisticated manner, allowing for the AAC impact assessment to recognize the contribution of post-wildfire regeneration and growth.
- 1.3. During FMP development, wildfire-burned areas may be returned to the contributing landbase using the same suite of options available for TSA-based AAC impact assessments, until such time as an approved forest inventory<sup>3</sup> shows the area as reforested.

The processes are described in detail in the following sections.

## 2. Annual Allowable Cut Impact Assessments

**Context:** An AAC impact assessment is intended solely to determine the impact of wildfires on the AAC when wildfires occur during the implementation phase of an FMP. As such, the assessment is constrained to wildfires that have occurred since the last FMP<sup>4</sup> and associated events that have occurred within those wildfire boundaries since the wildfire event (e.g. salvage harvest and/or changes to reforestation obligations within burned areas).

The process for impact assessments is as follows:

- 2.1. Alberta will undertake photo interpretation of wildfire boundaries and classification of delineated polygons into burn classes. Upon completion, Alberta will calculate a preliminary AAC impact using the baseline area-based adjustment method to determine the per cent impact on the AAC. The per cent impact of wildfire will be calculated to two decimal places using the following equation:

$$\% \text{ Impact} = \frac{\text{Contributing Landbase Area After Wildfire} - \text{FMP Contributing Landbase Area}}{\text{FMP Contributing Landbase Area}} * 100$$

In cases where the approved AAC established in the FMP approval decision has already been adjusted (e.g. to account for landbase removals), the FMP contributing landbase area

---

<sup>2</sup> Plus additional clarification as provided in Section 2.4 of this Directive.

<sup>3</sup> Approved by the Executive Director, Forest Stewardship and Trade Branch under Directive 97-12 and Alberta Vegetation Inventory Standards Version 2.1.1.

<sup>4</sup> Wildfires that have occurred since the date of the input layer used in the approved FMP's classified landbase.

used in the calculation will be the approved contributing landbase area minus the area of previous removals.

- 2.2. If the cumulative per cent area impacted by wildfire<sup>5</sup> has exceeded the 2.5 per cent threshold, Alberta will notify the organization of the preliminary AAC impact assessment calculation. Depending on fire size, a preliminary notification to the organization may occur prior to finalizing photo interpretation of wildfire boundaries.
- 2.3. Organizations may subsequently request to use one of two discretionary (optional) methods as listed in Sections 2.3.i or 2.3.ii. In order to do so, the organization must submit a written request for approval via email to the Director, Forest Resource Management Section. Requests must specify the discretionary method to be used and the proposed date for submission of additional information. Discretionary methods are as follows:
  - i. Adjusted area-based method: The organization will provide Alberta with supplemental spatial information that will be used to reduce the area deleted from the contributing landbase under the baseline method. Previously harvested openings with reforestation obligations that meet the requirements outlined in Appendix 1 are eligible under this approach<sup>6,7</sup>. Alberta will then update the per cent impact calculation as described in Section 2.2.
  - ii. Timber supply analysis-based method: The organization will undertake a forecasting-based analysis to determine the per cent impact, subject to additional approval and technical requirements listed in Appendix 2. Appendix 1 specifies the conditions under which additional wildfire-burned areas may be returned to the contributing landbase. The organization will submit the results of analysis to Alberta for review and approval according to the submission requirements specified in the Appendix 2.
  - iii. If the organization does not request to use an alternate method, fails to submit the information required under Section 2.3.i or 2.3.ii by the agreed-upon date, or approval is not granted under Section 2.3.b, the method specified under Section 2.1 will apply.
- 2.4. Alberta will then determine whether an AAC adjustment (“AAC update”) for the FMU is required. If the impact is greater than 2.5 per cent of the current approved AAC, the AAC must be updated for each FMU according to the methods outlined in AFMPS Annex 1, Appendix A, with the following additional clarifications:
  - i. The updated AAC will be effective May 1 of the timber year of the wildfire in which the 2.5 per cent threshold was exceeded.
  - ii. The per cent adjustment will be applied to the currently approved AAC(s), regardless of whether they are based on even flow or accelerated harvest assumptions, or whether they have previously been adjusted (e.g. to account for landbase removals).
  - iii. Secondary volumes will be adjusted by the per cent difference applied to the corresponding primary AAC, i.e. the secondary coniferous AAC will be adjusted by the per cent impact calculated based on the primary deciduous volume and the secondary

---

<sup>5</sup> Defined as the total area of the contributing landbase burned by wildfire since the date of the wildfire input layer used in the approved FMP’s classified landbase.

<sup>6</sup> Area-based methods are a relatively simple method for assessing the impacts of wildfire. While the methods are accurate at predicting the impact of landbase *deletions* on the AAC, they are unable to reflect the AAC impacts due to landbase *changes* i.e. from standing timber to a young regenerating stand condition. If an organization wishes to recognize the contribution to the AAC from reforestation after wildfire, use of the TSA-based AAC impact assessment approach is recommended.

<sup>7</sup> Spatial boundaries for all supplemental datasets must meet the spatial requirements of the AFMPS and be clipped to the wildfire boundaries. Attributes must include, at a minimum, ARIS opening number, fire number, fire year, and burn class.

deciduous AAC will be adjusted by the per cent difference for primary coniferous volume.

- 2.5. No modifications to the spatial harvest sequence (SHS) are required as part of the AAC impact assessment process. However, depending on the magnitude of wildfire impacts on the current SHS or other non-timber values, a wildfire event may trigger other policy instruments (e.g., compartment assessment).

### 3. Forest Management Plan Development

**Context:** This Directive replaces the current direction for treatment of wildfire-burned areas during FMP development under the AFMPS. Section 4 and Appendix 1 of this Directive provide updated direction on which areas may be included in the contributing landbase. This section outlines requirements that will apply during FMP development and are considered supplemental to the AFMPS.

An organization must:

- 3.1. Include burned areas in the contributing landbase according to the criteria outlined under Appendix 1 and order for inclusion in Appendix 1, Figure 1. Certain approaches listed in this Appendix are optional.
- 3.2. Meet any applicable approval requirements specified in Appendix 1, Section A1.5. (Additional Requirements for Return to Contributing Landbase) prior to development of the classified landbase.
- 3.3. Where post-wildfire transition assumptions are employed:
  - i. Undertake a sensitivity analysis as per AFMPS Annex 1, Section 5.6.iii: Sensitivity of Long-Term Forecasts to Yield Projections in order to quantify the risk associated with including these areas in the contributing landbase. The sensitivity analysis must compare the harvest levels with and without the post-wildfire transition areas in the contributing landbase.
- 3.4. Where any of the optional methods are employed (lightly burned areas, post-wildfire surveys or post-harvest transition assumptions):
  - i. The FMP landbase submission must include relevant pre-wildfire AVI and/or ARIS attributes (e.g. for AVI, those listed in Annex 1, s. 3.9.2) and must also include derived landbase attributes assigned based on pre-wildfire attributes, including at a minimum, in/out of the contributing landbase, stand type (e.g., natural/managed), pre-wildfire yield stratum and pre-wildfire stand age, as per AFMPS Annex 1, s. 3.10.x.

### 4. Returning Wildfire-Burned Areas to the Contributing Landbase

**Context:** Wildfire-burned areas are considered non-forested until shown to be in an acceptable reforested condition in a subsequent FMP through an approved post-wildfire inventory. This section outlines the exceptions under which non-forested, wildfire-burned areas may be included in the contributing landbase prior to showing as reforested in an approved inventory as part of either an AAC impact assessment or during FMP development.

The following areas may be returned to the contributing landbase depending on the approach being employed. Further details on the approaches for return to the contributing landbase, including associated requirements and restrictions on use, are described in Appendix 1.

- 4.1. Previously harvested openings: Openings or portions of openings for which reforestation obligations have been retained or assumed after wildfire according to the rules in Directive 2014-01. Managed stand yields apply. Examples are areas where:

- i. Reforestation activities were not yet complete at the time of wildfire;
  - ii. A post-wildfire assessment has deemed the area “capable of meeting its regenerated yield and stand structure projection”; and/or
  - iii. Reforestation obligations have or will be assumed, e.g. via the Wildfire Reclamation Program (WRP).
- 4.2. Salvage harvest with reforestation obligations: Areas that have been salvage harvested after wildfire or are scheduled for salvage harvest as part of an approved salvage plan<sup>8</sup>. Managed stand yields apply.
- 4.3. Lightly burned natural stands: Areas with a burn class of 1 (1-25 per cent fire killed) that were of natural origin prior to wildfire<sup>9</sup>. Natural stand yields apply, with a reduction of 25 per cent to account for wildfire losses<sup>10</sup>.
- 4.4. Post-wildfire surveys: Areas that show an acceptable reforested condition based on a survey acceptable to Alberta. Two approaches are recommended<sup>11</sup>:
- i. Photo-based Surveys: Protocols derived from the Reforestation Standard of Alberta (RSA) aerial stratification standards, with photo capture and interpretation as per RSA performance survey specifications and revised rulesets to facilitate delineation of new linework. Natural stand yields apply.
  - ii. Reconnaissance Surveys: Protocols derived from RSA establishment survey protocols, retaining pre-fire polygons to facilitate surveys, and recording total per cent poorly stocked area for each polygon in order to adjust to yield estimates. Natural stand yields apply, adjusted to account for average per cent poorly stocked area by FMP yield stratum.
- 4.5. Post-wildfire transition assumptions: Areas assumed to regenerate naturally after fire using transition assumptions and a conservative approach to mitigate risk; further details are provided in Section A1.5.3. Reduced natural stand yields apply.

An order of inclusion applies as described in Appendix 1, Figure 1. This order of inclusion ensures appropriate constraints on use of approaches (e.g., that areas with planned salvage cannot be retained as lightly burned areas, or that areas with a reforestation obligation cannot be included as part of a post-wildfire survey).

<sup>8</sup> Approved as part of an Annual Operating Plan under Section 3.6 of the Operating Ground Rules.

<sup>9</sup> Applies to natural stands only; the assessment of lightly burned managed stands and determination of their eligibility for inclusion in the contributing landbase is addressed under Directive 2014-01.

<sup>10</sup> Organizations may propose an alternate estimate of yield impacts based on information collected from burned stands; see Section A1.5.1.

<sup>11</sup> Organizations may propose alternate survey methods; see Section A1.5.2.

## Definitions

**Annual Allowable Cut:** The total volume of timber that may be harvested in one year or the total amount of forested land on which the timber may be harvested in one year.

**Annual Allowable Cut Impact Assessment:** An analysis undertaken during the FMP implementation phase in order to determine the impact of wildfires on the annual allowable cut.

**Annual Allowable Cut Update:** Implementation of a revised annual allowable cut according to the protocols outlined in Annex 1, Appendix A of the Alberta Forest Management Planning Standard.

**Classified Landbase:** The product of the landbase classification process. It defines the contributing and non-contributing landbases, as well as contains other required attributes.

**Contributing Landbase:** The area available for timber harvesting activities. In the forecasting model, it is the area available for timber harvest action(s). Also referred to as the net landbase, active landbase, productive landbase, timber harvesting landbase, or operable area.

**FMP Implementation Phase:** The period between the effective date and the end date of the current FMP as defined in the applicable FMP approval decision.

**FMP Yield Strata:** FMP-specific classification of tree species compositions of forested stands, stand type (natural, managed), yield estimate type (basic, enhanced) and any other criteria used by the Organization (e.g., crown closure class, timber productivity rating) to group similar stands together for the purposes of developing statistically-valid and accurate yield estimates.

**Forest Management Unit:** An area of forest land established by the director as a forest management unit under section 14(1) of the *Forests Act*.

**Harvest Level:** A volume or area of timber determined through timber supply analysis available for harvest on an annual sustainable basis within a forest management unit. A harvest level is not an AAC unless approved by the Executive Director.

**Merchantability Deletions:** Stands removed from the contributing landbase because they will never become merchantable. They are generally defined by a ruleset comprised of some combination of tree species composition, crown closure class, height, age, site productivity and/or volume. Also referred to as subjective deletions.

**Managed Stand Yield:** Estimates of yield for a given FMP yield stratum, to be applied to managed (post-harvest) stands. Natural stand yield estimates may be used as a proxy for managed stands but would still be referred to as managed stand yields.

**Natural Stand Yield:** Estimates of yield for a given FMP yield stratum, to be applied to natural (fire origin) stands.

**Non-Contributing Landbase:** The portion of the classified landbase that is not available for timber harvesting activities.

**Organization:** The industrial proponent charged with developing an FMP.

**Provincial Base 10 Strata:** An Alberta-wide standardized classification of forested stands with ten categories based on tree species composition. Also referred to as minimum strata. Assignment rules provided in the Yield Projection Interpretive Bulletin of the Alberta Forest Management Planning Standard.

**Reforestation Obligation:** Obligation to meet the mandated reforestation requirements, approvals and time frames set out under Part 6 of the Timber Management Regulation.

**Regeneration Lag:** The length of time (number of growing seasons, expressed in years) between a stand replacing disturbance and the initiation of a new forested stand.

**Timber Year:** The period from May 1<sup>st</sup> to April 30<sup>th</sup>. Although the Timber Management Regulations defines the period from May 1st to April 30th as "year", "timber year" is generally used for clarity.

**Yield Estimate:** Estimate of yield (generally volume as a function of age) applicable to a specific FMP yield stratum.

## Contact Information

Director, Forest Resource Management Section  
Forest Stewardship and Trade Branch  
Main Office (780) 427-6807

## Authorities

*Forests Act* 14(2)

Forest Management Agreement 12(1), 12(2)(a)

Alberta Forest Management Planning Standard Version 4.1, Annex 1

## Related Policy

Alberta Timber Harvesting Planning and Operating Ground Rules Framework for Renewal

Alberta Vegetation Inventory Interpretation Standards Version 2.1.1

Directive 97-12 Verification of Disposition Holder Forest Inventories

Directive 2007-01 Fire Salvage Planning and Operations

Directive 2014-01 Assessing Damage from Disturbance to Regenerating Forest Stands in Cutblock Openings and Recovering Productivity

Forest Resources Improvement Association of Alberta Wildfire Reclamation Program Grant Agreement

Reforestation Standard of Alberta

Timber Management Regulation

## Approved

Original signed by

October 25, 2021

\_\_\_\_\_  
Daniel Lux  
Executive Director  
Forest Stewardship and Trade Branch  
Alberta Agriculture and Forestry

\_\_\_\_\_  
Date

## Appendix 1. Approaches for Return to the Contributing Landbase

The following approaches may be used by organizations in order to expedite the return of wildfire-burned areas to the contributing landbase, as described in Section 4 of this Directive.

### A1.1. Eligibility for Return to the Contributing Landbase

The organization must demonstrate that areas meet all of the criteria below in order to be eligible for return to the contributing landbase:

A1.1.1. The wildfire occurred within the applicable eligibility window:

- i. For FMP development, wildfires occurred no more than 30 years prior to the effective date of the landbase.
- ii. For AAC impact assessments, wildfires occurred after the date of the input layer used in the current FMP's classified landbase<sup>12</sup>.

A1.1.2. Areas are located within an official wildfire boundary (burn class 1-5) as determined by Alberta<sup>13</sup>.

A1.1.3. Areas would have been eligible to be part of the contributing landbase when classified based on pre-fire information, i.e.:

- i. For FMP development, the area would be part of the contributing landbase if the current landbase classification procedures were applied to the pre-wildfire inventory or pre-wildfire ARIS information;
- ii. For AAC impact assessments, the area was part of the contributing landbase prior to wildfire based on the current FMP's approved classified landbase.

A1.1.4. Areas meet any additional eligibility criteria or requirements for use as described in Appendix 1, Sections A1.2 through A1.5.

### A1.2. Eligibility for Use in Analysis

The eligibility to use a specific approach for return to the classified landbase depends on the type of analysis being undertaken as summarized in Table 1. Specifically:

A1.2.1. For baseline area-based impact assessments, all recently burned areas are deleted, therefore no approaches for return to the contributing landbase apply.

A1.2.2. For adjusted area-based impact assessments, only previously harvested openings may be included in analysis. If this method is selected, inclusion of these openings is required.

A1.2.3. For TSA-based impact assessments and FMP development, both of which employ TSA for purposes of AAC determination, the full suite of approaches for return to the classified landbase are available.

- i. Inclusion of areas with reforestation obligations (previously harvested openings, salvage harvest) is required.
- ii. The remaining approaches (lightly burned areas, post-wildfire surveys and post-wildfire transition assumptions) are discretionary. Organizations may elect to include one or more of these options in order to meet FMU-specific needs.

---

<sup>12</sup> Focus is on the impact of wildfires that have occurred since the development of the current approved FMP.

<sup>13</sup> This may require intersecting the wildfire boundary and including only those portions of polygons or openings that fall within the spatial extent of the wildfire boundary.



**Table 1. Eligibility for inclusion in the contributing landbase by information type and type of analysis.**

Approach	AAC Impact Assessment			FMP
	Baseline	Adjusted	TSA-Based	Development
Previously Harvested Openings	-	Required	Required	Required
Salvage Harvest (Actual/Planned)	-	-	Required	Required
Lightly Burned Areas	-	-	Optional	Optional
Post-Wildfire Survey	-	-	Optional	Optional
Post-Wildfire Transitions	-	-	Optional	Optional

While inclusion of survey-based and post-wildfire transition approaches is permitted for TSA-based AAC impact assessments, data collection must not delay the TSA analysis past the agreed-upon date for submission. This may affect the eligibility of these approaches for use.

### A1.3. Characterizing Post-Wildfire Areas Included in the Contributing Landbase

Each polygon or opening, or portion thereof, that is returned to the contributing landbase under one of the approaches listed here must be assigned an FMP yield stratum and stand age and put onto the appropriate yield trajectory. Table 2 outlines the rules for characterizing these areas depending on the approach used for return to the classified landbase.

**Table 2. Rules for characterizing stands (polygons or openings) by approach used for return to the contributing landbase.**

Information Type	FMP Yield Stratum Assignment	Stand Age	Yield Estimate <sup>1</sup>
Previously Harvested Openings	Current declaration <sup>2</sup>	Fire date <sup>4,5</sup>	Managed stand
Salvage Harvest (Actual/Planned)	Current declaration <sup>2</sup>	Fire date <sup>4,5</sup>	Managed stand
Lightly Burned Areas	Pre-wildfire FMP yield stratum <sup>3</sup>	Pre-wildfire stand age <sup>3</sup>	Adjusted natural stand
Post-Wildfire Survey	Survey results	Salvage date <sup>5</sup>	Natural stand (photo-based) or adjusted natural stand (reconnaissance)
Post-Wildfire Transitions	Pre-fire stratum <sup>3</sup> + post-fire transitions	Fire date <sup>4,5</sup>	Adjusted natural stand

<sup>1</sup>As described in Section 4.

<sup>2</sup>Current declaration plus FMP yield stratum assignment rules as per the applicable FMP. Where no declaration is available (e.g., planned salvage), use the pre-fire yield stratum.

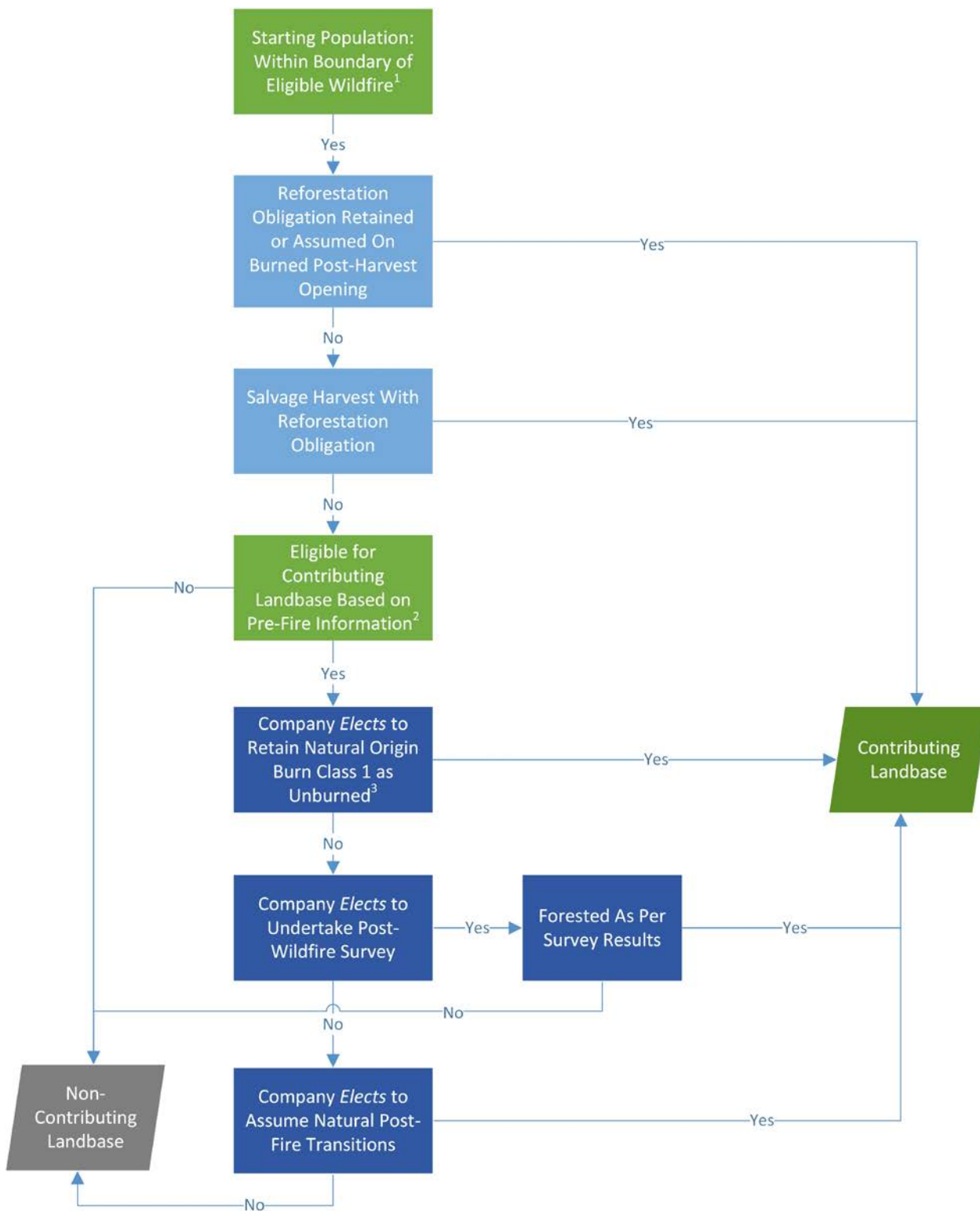
<sup>3</sup>For TSA-based AAC impact assessments, obtain from the approved contributing landbase; for FMP development, assign by applying the new FMP classification rules to the pre-fire forest inventory.

<sup>4</sup>Extinguish date of the wildfire or, if the wildfire has not yet been extinguished, then April 30 of the end of the timber year in which the wildfire started.

<sup>5</sup>For TSA-based AAC impact assessments, reset (override) stand age to 0 at the beginning of the planning horizon in order to facilitate analysis (see Appendix 2).

### A1.4. Order of Inclusion for Return to the Contributing Landbase

The flow chart in Figure 1 describes the order in which wildfire-burned areas must be returned to the contributing landbase as well as decision rules for assigning areas to the non-contributing landbase. Note that if an organization elects to include an area in a post-wildfire survey and is shown to be non-forested, it may not be included in a post-wildfire transition assumption.



<sup>1</sup>In the case of FMPs, wildfires that occurred no more than 30 years prior to the effective date of the landbase; in the case of AAC impact assessments, fires that occurred after the date of the fire input layer used in the current approved FMP.

<sup>2</sup>In the case of FMPs, would be part of the contributing landbase if current (new) landbase classification procedures were applied to pre-fire AVI or ARIS information; in the case of AAC impact assessments, was part of the contributing landbase prior to wildfire based on the current FMP's approved classified landbase.

<sup>3</sup>Election may only be made if the salvage activities for that wildfire have been completed.

**Figure 1. Order for inclusion of wildfire-burned areas in the contributing landbase.**

## **A1.5. Additional Requirements for Return to Contributing Landbase**

### **A1.5.1. Retention of Lightly Burned Areas**

A1.5.1.1. Lightly burned areas within a wildfire may not be retained in the contributing landbase if the salvage activities for that wildfire have not yet been completed, in order to mitigate issues related to assignment of AAC chargeability.

A1.5.1.2. The following additional requirements apply during FMP development:

- i. Organizations are responsible for evaluating stands to determine whether they would now fall into categories that would normally be considered merchantability deletions.
- ii. When assigning yield strata based on pre-fire inventory attributes, exclude understory attributes where appropriate due to an increased likelihood of fire kill. At a minimum, exclude spruce and fir-leading understories with an equivalent height to live crown of under 2 m.

A1.5.1.3. An organization may propose an alternate method for estimating the impacts of fire kill on yield estimates. The organization must obtain written approval to undertake an assessment from the Director, Reforestation, Inventory and Biometrics Section, prior to commencing analysis. The request for approval must include the following:

- i. Description of the sampling population, assessment methods and compilation procedures.
- ii. Proposed deliverables. Note that survey data must be retained and made available to Alberta upon request.
- iii. Timelines for data collection and compilation of results.

### **A1.5.2. Post-Wildfire Surveys**

A1.5.2.1. The organization must obtain written approval to utilize this approach from the Director, Reforestation, Inventory and Biometrics Section, prior to commencing data collection. The request for approval must include the following:

- i. Description of the sampling frame, survey methods, stocking and/or density minima and compilation procedures.
  - Data collected must be suitable for the assignment of both Provincial base 10 and FMP yield stratum to each surveyed polygon.
  - Proposed minimum stocking and/or minimum densities, depending on the approach employed, must be linked to FMP yield assumptions.
- ii. Proposed deliverables which must include, at a minimum, a file geodatabase with the information needed to support inclusion in the contributing landbase, e.g. unique polygon identifier, fire name, fire date, Provincial base 10 stratum, FMP yield stratum and per cent poorly stocked area if applicable. Note that survey data must be retained and made available to Alberta upon request.

- iii. Timelines for data collection and compilation of results. Due to the dynamic nature of young stands, surveys must not be completed sooner than 5 years prior to the applicable effective date<sup>14</sup>.

### **A1.5.3. Post-Wildfire Transition Approach**

A1.5.3.1. The organization must obtain written approval to utilize this approach from the Director, Reforestation, Inventory and Biometrics Section, prior to commencing analysis. The request for approval must include the following:

- i. Description of expected transitions in species composition after wildfire as well as proposed methods to adjust natural stand yields to account for regeneration lag, potential for regeneration failures and/or potential post-wildfire productivity issues. A conservative approach to these assumptions is required in order to mitigate risk. Alternatively, an organization may use the generic post-wildfire transition assumption matrix provided in Table 3 as an interim solution until improved information is available (see next).
- ii. Plan for monitoring of assumptions in order to improve the understanding of key characteristics needed to support transition and yield assumptions<sup>15</sup>. The monitoring plan must address the following:
  - Collection of data necessary to evaluate post-wildfire assumptions at a minimum by region (Boreal vs. Foothills), Provincial base 10 stratum, pre-fire stand origin (natural vs. managed) and pre-fire silviculture methods (e.g., herbicided vs. not).
  - Data must be sufficient to assess regeneration lag, species composition transitions after wildfire, occurrence of regeneration failures and/or areas with productivity issues.

It is recommended best practice to commit to reporting of outcomes of monitoring via Stewardship Reporting.

- iii. Timelines for completion of monitoring activities and compilation of results.

---

<sup>14</sup> In the case of FMPs, prior to the effective date of the landbase; in the case of AAC impact assessment, prior to the effective date of an AAC update, i.e. May 1 of the timber year in which the 2.5% threshold was exceeded.

<sup>15</sup> Initial monitoring could be fulfilled by a one-time retrospective study, with continued monitoring achieved through assessments of subsequent forest inventories. Given the nature of the monitoring requirements, an aerial-based approach (photography, drones, etc.) would be satisfactory to fulfill these requirements. Monitoring requirements do not require detailed ground measurements such as the establishment of a permanent sample plot program.

**Table 3. Generic post-wildfire transition assumptions and yield adjustments based on pre-fire Provincial base 10 strata.**

Pre-Fire Stratum	Regen Lag	Natural Stand Prior to Wildfire		Managed Stand Prior to Wildfire					
				≤ 10 Years Old <sup>2</sup>				>10 Years Old <sup>3</sup>	
				Not Herbicided		Herbicided			
Transition	Yield <sup>1</sup>	Transition	Yield <sup>1</sup>	Transition	Yield <sup>1</sup>	Transition	Yield <sup>1</sup>		
Hw	3	Hw	-15%	Hw	-15%	-	-	Hw	-15%
HwSx	3	Hw	-15%	Hw	-15%	Low Density SwHw or Failure	-50%	Hw	-15%
SbHw	3	HwSx	-15%	HwSx (50%) Hw (50%)	-15%	Low Density SbHw or Failure	-50%	HwSx	-15%
SwHw	3	HwSx	-15%	HwSx (50%) Hw (50%)	-15%	Low Density SwHw or Failure	-50%	HwSx	-15%
Sb	3	Low Density Sb or Sb	-35%	Low Density Sb or Failure	-50%	Low Density Sb or Failure	-50%	Low Density Sb or Sb	-35%
Sw	3	SwHw (50%) HwSx (50%)	-15%	HwSx	-15%	Low Density Sw or Failure	-50%	SwHw (50%) HwSx (50%)	-15%
HwPI	3	HwPI	-15%	Hw	-15%	Low Density PIHw	-35%	HwPI	-15%
PIHw	3	PIHw	-15%	HwPI	-15%	Low Density PI	-35%	PIHw	-15%
PI	3	PI	-15%	Low Density PI	-35%	Low Density PI	-35%	PI	-15%

<sup>1</sup> Natural stand yield estimate appropriate to the specified post-wildfire FMP yield stratum, adjusted by reducing both the deciduous and coniferous yields downwards by the percent specified here.

<sup>2</sup> Opening age at year of wildfire; assumes no to very few cones available for coniferous replacement.

<sup>3</sup> Opening age at year of wildfire; assumes some cones available for coniferous replacement.

## Appendix 2. Requirements for Timber Supply Analysis-Based Annual Allowable Cut Impact Assessments

**Context:** A TSA-based AAC impact assessment is a comparative analysis that uses a forecasting scenario from the current FMP as a baseline and compares it to a new scenario that reflects the impact of wildfire on the harvest level(s). Organizations should consider the choice of options being used for TSA-based impact assessments and the implications to subsequent FMPs. It is strongly recommended that any optional approaches used in a TSA-based impact assessment also be incorporated into future FMPs in order to minimize disruptions to the AAC over time.

The following process and requirements apply to organizations wishing to undertake TSA-based impact assessments:

A2.1. Obtain written approval to undertake a TSA-based AAC impact assessment from the Director, Forest Resource Management Section, prior to commencing analysis (as per Section 2.3 of this Directive). In the case of a TSA-based impact assessment, the request for approval must also include the following:

A2.1.1. Describe the FMP scenario to be employed as the baseline for analysis:

- i. The baseline scenario must be the 200-year even flow scenario presented in the FMP that is closest to the preferred forest management scenario (PFMS)<sup>16</sup> even if the approved PFMS includes an uneven flow assumption.
- ii. To facilitate analysis, the baseline scenario may be aspatial.

A2.1.2. List the optional approaches to be used in analysis, if any, and describe how any additional monitoring and/or approval requirements listed in Appendix 1 will be met.

A2.2. Undertake analysis following the technical requirements and processes as follows:

A2.2.1. Obtain the pre-fire harvest levels from the baseline scenario<sup>17</sup>.

A2.2.2. Create a comparison scenario as follows:

A2.2.2.1. Update the landbase from the baseline scenario to account for revised post-wildfire conditions<sup>18</sup>.

- i. Include all wildfires not already identified in the landbase (i.e. all wildfires that occurred between the date of the wildfire input layer for the landbase used in the baseline scenario and the end of the wildfire season in which the 2.5 per cent threshold was exceeded). Attributes must include, at a minimum, fire number, fire year, and burn class.
- ii. Return wildfire-burned areas to the contributing landbase according to the criteria outlined under Appendix 1 and order for inclusion in Appendix 1, Figure 1.
  - Areas with reforestation obligations (required) – i.e. previously harvested openings and salvage harvest (actual or planned).

---

<sup>16</sup> If an appropriate baseline scenario does not exist, the organization cannot pursue the TSA-based AAC update approach.

<sup>17</sup> The baseline harvest level does not have to match the approved AAC in cases where the PFMS is not used as the baseline scenario.

<sup>18</sup> Spatial boundaries for all datasets must be cut into (i.e. a geometric union or intersection with) the landbase unless they are already present in the baseline landbase (e.g., burned openings).

Attributes must include, at a minimum, ARIS opening number and post-wildfire stratum declaration<sup>19</sup>.

- Areas that an organization has elected to include (i.e., lightly burned areas, post-wildfire surveys, post-wildfire transitions). Attributes must include, as a minimum, polygon number, Provincial base 10 stratum and post-wildfire FMP yield stratum.
- iii. Sliver cleanup is recommended.
- iv. Do not include any other activities (e.g. harvesting outside of wildfire boundaries or new dispositions).

A2.2.2.2. Update the forecasting model from the baseline scenario to account for revised post-wildfire modelling assumptions.

- i. Do not change the modelling system, model start date, number of periods or planning horizon length from the baseline scenario.
- ii. For lightly burned stands that are retained as green standing timber, allow the models to treat these areas as eligible standing timber and schedule them for harvest.
  - Harvest volumes from these stands contribute to the even flow harvest level calculation and are not considered salvage volume.
- iii. For all other burned stands, update the forecasting model in a manner that sets the burned polygons, openings and/or salvaged stands to their post-wildfire, post-treatment or post-salvage condition as if the wildfires occurred at the beginning of the planning horizon (i.e. model start date), regardless of when activities actually occurred<sup>20</sup>. In particular, ensure that stand age is reset to 0 at the model start date.
  - Exclude all standing timber present after wildfire from the even flow harvest level calculation.
- iv. Do not change the model objectives, constraints, goals and/or targets between the baseline and comparison scenarios. If necessary, constraints may be relaxed, but not removed, in order to prevent an infeasible solution.

A2.2.3. Calculate the average even flow harvest levels from the results of each of the baseline and comparison scenarios<sup>21</sup> for each of the following volumes depending on the landbase type identified in the current FMP:

- Single combined landbase: total coniferous and total deciduous volume.
- Separate distinct landbase: primary coniferous and primary deciduous volume.
- Separate black spruce landbase: additional primary coniferous volume.

---

<sup>19</sup> Assign FMP yield strata during analysis using the post-wildfire stratum declaration and the ruleset from the approved FMP. If information sufficient to assign a stratum declaration is not available (e.g. planned salvage), use the pre-fire FMP yield stratum.

<sup>20</sup> While listed as under the forecasting model, these updates may be incorporated into the landbase, yield estimates or the forecasting assumptions depending on preference.

<sup>21</sup> Refer to the "How to Calculate the Proposed Harvest Level" guide for a description of methods for calculating the average harvest levels (available from the Forest Resource Management Section).

A2.2.4. Calculate the per cent difference between the two average even flow harvest levels to two decimal places using the following equation:

$$\% \text{ Impact} = \frac{\text{Comparison Scenario Average Harvest Level} - \text{Baseline Scenario Average Harvest Level}}{\text{Baseline Scenario Average Harvest Level}} * 100$$

For efficiency, the calculation of per cent impact under this approach is the same regardless of whether the approved AAC established in the FMP approval decision has already been adjusted for landbase removals. The wildfire impact will be determined based on the pre-removal (unadjusted) condition and will be applied to the current (adjusted) AAC.

A2.2.5. Submit the results of analysis to the Director, Forest Resource Management Section, in digital format. All submissions must:

- i. Be validated by a Registered Forestry Professional;
- ii. Describe the process used to modify the baseline scenario in order to create the comparison scenario;
- iii. Describe any changes made to model constraints in order to prevent an infeasible model solution; and
- iv. Document results of analysis (e.g., scenario results from A2.2.3 and the calculated per cent impact from A2.2.4).

Alberta will review submissions for their compliance with the technical requirements as listed in this Appendix as well as compliance with the written approval.