



# Post Wildfire Assessment & Survey Standard 2017

**FINAL May 31, 2017**

These standards apply, in addition to the [General Standards for Ministry Funded Programs \(FS 1001\)](#), to all survey activities funded under FFT Program.

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## ARTICLE 1: GENERAL STANDARDS

**NOTE** (The following variation features of this document require the direction of the **Ministry Designated Representative**):

1. (optional) - are specific underlined clauses available for optional selection (**underlined blue** are hyperlinks and are not optional clauses)
2. (insertion ~ ) –are where specific underlined values are required to be entered (suggested values maybe listed)
3. Direction required by Ministry Designated Representative highlighted in **yellow**

### Definitions

1.1 In this document the following words shall have the following meanings.

- (a) **“Accredited Silviculture Surveyor”** means a person who is registered with the Resource Practices Branch of the Ministry of Forests, Lands and Natural Resource Operations (MoFLNRO) as an Accredited Silviculture Surveyor.
- (b) **“Approved Surveys Quality Inspection System”** or **“Approved SQI System”** means the inspection system contained in this Document **or** another similar system approved in writing by the, **Ministry Designated Representative** prior to the commencement of Work.
- (c) **“Crew”** means one person, or a group of persons working together in the same Opening.
- (d) **“Inspector”** means any person who performs a review of a survey or treatment prescription - this includes a Recipient (reviewing Contractor work) for the Ministry Designated Representative or the Ministry Designated Representative themselves;
- (e) **“Ministry Designated Representative”** means the MoFLNRO staff person(s) or Ministry Designated Administrator/Authority, identified at the project pre-work and documented in Article 8 of this document, who is responsible for the outcomes of the surveys performed under this standard, and will be empowered to give approval and/or direction to specific article content in this standard that references this title.
- (f) **“Opening”** means an area identified on a vegetation resources inventory map by an opening number.
- (g) **“Overstorey Conifer”** means layer 1 and/or 2 stand structure coniferous trees as described in the [Silviculture Survey Procedures Manual](#).
- (h) **“Reconnaissance Survey or Recce”** means a form of screening walk-through survey that can be systematic or non-systematic in nature, and involves physically walking through a stand to visually note and record characteristics found in the stand and results in a next action recommendation.
- (i) **“Seed-in Potential”**- means the estimated potential for a Stratum to seed-in naturally after a wildfire disturbance and the process of determining Seed-in potential will result in a ranking based on professional consideration of critical site factors such as those listed in Article 3.11.
- (j) **“Seed Tree”** – means a mature ecologically suitable species tree of good form and vigour, capable of producing viable seed and is of sufficient height to provide dispersal of seed.
- (k) **“Standards Unit”** means one or more areas of an Opening for which there is only one of each of the following: Stocking Standard and soil disturbance limit standard.
- (l) **“Stocking Standards”** means the stocking requirements applicable to an Opening that are stated in the [FFT Stocking Standards](#) link and/or in Article 3 of this schedule.

- (m) **“Stratification Criteria”** means the criteria a contractor will use to stratify an opening for survey sampling and reporting purposes, as set out in these standards.
- (n) **“Stratum”** or **“Strata”** means, respectively, a Survey area or areas for which the boundaries are determined by the Stratification Criteria for the type of Survey referenced.
- (o) **“Survey”** means, as the context requires, a reconnaissance, a stocking, plantability, or free-growing survey as set out in the [Silviculture Survey Procedures Manual](#) and includes the collection and analysis of field data, and all forms, maps, reports, photographs, Survey Summary and Treatment Prescription required by the Ministry and FFT standards.
- (p) **“Survey Map”** means a map produced according to the specifications in Article 3.
- (q) **“Survey Summary”** means a short (no more than one page) summary report from a Survey (signed by the Accredited Silviculture Surveyor), composed of the outcomes of the data compilation (minimum inventory and silviculture label, and any brush competition data/issues) and an abbreviated Treatment Prescription (if a treatment is prescribed).
- (r) **“Treatment Map”** means a map produced according to the specifications in Article 3.
- (s) **“Treatment Prescription”** means a logical, biologically-sound, cost-effective recommendation, based on survey results and anticipated stand development, which specifies any future Surveys and/or silviculture treatments that are required for a Stratum, which will lead to a free growing stand and which also specifies the year and season during which any such Survey or treatment should take place.
- (t) **“Understorey conifer”** means layer 3 and 4 stand structure coniferous trees as described in the [Silviculture Survey Procedures Manual](#)
- (u) **“Vegetation Resources Inventory Map”** means a Vegetation Resources Inventory Map maintained by the Ministry of Forests and Range or by a holder of a Tree Farm Licence or Community Forest Agreement.
- (v) **“Wildfire Surveys”** means all Surveys performed on post wildfire disturbed stands that have no licensee obligation to reforest and are solely the responsibility of the crown to regenerate.

### **Information and Materials Furnished by the MoFLNRO**

- 1.2 At the request of the Contractor, the Ministry Designated Representative will provide or facilitate access to :
- (a) any Treatment Prescription or Work Plans applicable to the Openings, when they exist;
  - (b) copies of the Vegetation Resources Inventory Maps applicable to the Openings to be surveyed;
  - (c) applicable aerial photographs or access to ortho photos, subject to any conditions of use that may be attached; and
  - (d) all other available information considered by the Ministry Designated Representative to be pertinent to the Work.

## **ARTICLE 2: PERSONNEL**

### **Crew Qualifications**

- 2.1 Each Survey Crew must include at least one Accredited Silviculture Surveyor on the ground who has been to every Opening being surveyed greater than 5 ha. All personnel performing the Work must be familiar with the Treatment Prescription options that are appropriate and generally considered acceptable for the area.

**Inspector’s Qualifications**

- 2.2 All Work must be internally inspected by a person who did not undertake the survey and is one of the following:
- (a) a Registered Professional Forester (RPF), or operates under the direction of a RPF;
  - (b) an accredited silviculture surveyor, experienced and competent in conducting Surveys;
  - (c) familiar with appropriate Treatment Prescription options

**ARTICLE 3: STANDARDS APPLICABLE TO ALL SURVEYS**

**Post Wildfire Assessment and Survey Procedural Chart**

3.1 The following chart outlines the steps in the process of assessing and surveying a Wildfire. **Steps 1 to 3** reflect the steps outlined in the **Provincial Wildfire Reforestation Planning Strategy for FFT (link posted April 2012)** and are the responsibility of the Ministry Designated Representative to perform or ensure the procedures have been completed, **prior** to the next steps being completed. Steps 4 to 7 are incorporated within this Standard and are referenced by the corresponding Standard Article numbers.

**STEP 1**

**Identification of the Wildfire Areas within the District (Potential Wildfire Population)**

1. Generation of a Digital Area List (Name, Disturbance Year, Area) and Spatial map of Wildfire Areas (potentially from various Sources):
  - a. Provincial Wildfire Mapping Update Project (from Resource Practices Branch) Data; or
  - b. Wildfire Branch Data source; or
  - c. Local District Mapping/Opening.
2. Ministry Designated Representative to identify the targeted Population of Wildfires for the annual assessment project.
3. Areas of wildfires NOT within the identified TSR THLB will be excluded and screened from assessment.



**STEP 2**

**Delineation of Shell Openings into RESULTS (to be clarified by RPB)**

1. Each Wildfire identified for the assessment year will be entered as a Shell Opening into RESULTS via the direction of the Ministry Designated Representative.



**STEP 3**

**Overview Reconnaissance**

1. All Wildfire Shell Openings identified for the assessment year will be **aerially** overview assessed (as directed or contracted by the Ministry Designated Representative, considering the procedures and criteria outlined in the **Provincial Wildfire Reforestation Planning Strategy for FFT**) to

determine and prescribe into RESULTS:

- a. The next Survey timing to be completed – this year or up to 4 years – based on assessed estimate natural regeneration establishment and the need for artificial regeneration relative to the site factors of the Wildfire Opening;
- b. The Wildfire Opening size, shape and any obvious non-productive/non-THLB areas (i.e. wetlands, rock outcrops and/or non-commercial brush) will be confirmed and updated into RESULTS relative to the results from this assessment.



#### STEP 4 – ARTICLE 4

##### Recce Ground Survey

1. Resultant annually Openings scheduled for a Post Wildfire Survey for this year will be pre-stratified prior to commencing a Recce.
2. Non-productive strata will be separated from the Survey area and will be identified with unique polygons and entered into RESULTS.
3. A Recce will be performed along transects in each Opening – using a combination of recce notes only or recce notes and a minor number of formal sample plots.
4. One next course of action recommendation will be made for each Stratum, from the following options:
  - a. **Reassess; Leave as is or Develop a Treatment Prescription**  
– Move to **STEP 6 and STEP 7;**
  - b. **Conduct a full Survey**  
– Move to **STEP 5**



#### STEP 5 – ARTICLE 5

##### Plot Survey Standards

1. The sampling design and intensity will be driven by the degree of variability and complexity found in the Stratum during the Recce.
2. Established plots per Stratum will tally TT, TC, WS and FG trees relative to layers and management regime; brush levels; seed-in potential; plantability if applicable; site index; and inventory labels. Comments on dead tree assessments, access notes, treatment recommendations and photographs will be taken during the survey where required.



#### STEP 6 – ARTICLE 6

##### Reports, Treatment Prescriptions, and Deliverables

1. Strata identified for treatment that are greater than 10 hectares will have a LBIS Treatment Template with a Treatment Prescription completed and the ROI Analysis completed.
2. For all openings that a Survey is performed, the following products will be delivered to the Ministry Designated Representative:



Original field data and summary forms; Survey Map and Survey Summary; LBIS Template and Treatment Map where applicable; ROI printout and photographs



## STEP 7 – ARTICLE 7

### Submission into RESULTS

1. For all openings that a Survey is performed, the following products will be submitted into RESULTS following the RISS specification for Government Funded projects:

The LBIS Survey Template, including prescribed planning activities (where applicable), forest cover polygon data, inventory label data, and silviculture label data; attachments for listed deliverables; and digital spatial information.

### General

- 3.2 All Treatment Prescriptions must be signed and sealed by an RPF.
- 3.3 All contents and sections of this document pertaining to specific FFT Survey Standards, will supersede any similar content and section procedures stated in the [Silviculture Survey Procedures Manual](#).
- 3.4 Any survey procedures not specifically referenced in this FFT Survey Standard document, will default to the [Silviculture Survey Procedures Manual](#), as referenced in the text of this document.

### Format of Documentation

- 3.5 Surveys must collect the information necessary to complete the required forms for each survey type. Where survey data or results are summarized or represented using computerized or other electronic means, the display, content and format of the information must substantially duplicate the corresponding MoFLNRO forms – specifically the FS 657, 658 and 659 and its respective procedural requirements. Survey compilation software, including SNAP Survey Wizard, uses a slightly different method to calculate preferred well-spaced and preferred free growing densities when compared to the FS659 method. Both methods are acceptable. It is advisable that the Ministry Designated Representative and the survey contractor agree to the chosen method prior to commencement of the contract

### Stocking Standards and Damage Criteria

- 3.6 All Surveys will use the Stocking Standards applicable for each Opening by following the standards protocol outlined on the FFT website at the following link: [FFT Stocking Standards](#) (SS). Free Growing Damage Criteria for all Surveys will be applied as per the [Silviculture Survey Procedures Manual](#).

(Note: DDM approved local TSA or district damage criteria for specific pests, will be included in a TSA variance in Article 8 and will supersede any replaced criteria referenced in this document).

### Survey Stratification Criteria

- 3.7 Unless otherwise specified in this Standard, Work Area(s) will be stratified as set out in the [Silviculture Survey Procedures Manual](#) - Section 3.2: Preliminary Stratification and Section 3.8.1: Field Stratification.

**Survey Lines and Plots (where applicable)**

- 3.8 Survey lines and plots will be established using either Global Positioning System (GPS) units (preferred), or by manual chaining methods. Survey lines and plots must be identified as follows:
- (a) For both GPS and manual chaining methods:
    - i) point of commencement (P.O.C.) must be marked with flagging tape showing the Opening number in waterproof ink;
    - ii) flagging tape must be affixed at a height of approximately 1.3 meters above each plot centre, showing in waterproof ink the plot number, (optional) date of survey, surveyors initials (if not included with the plot number);
    - iii) flagging tape must be affixed to the ground at all plot centers;
  - (b) If a GPS is being used, plot centre UTM Coordinates must be provided;
  - (c) If a manual chaining method is being used:
    - i) survey baseline (if established) and all strip lines must marked with flagging tape showing the baseline and strip line number in waterproof ink;
    - ii) all plot centre flagging tape affixed at 1.3 meters must have the bearing and distance to the next plot written in waterproof ink.

**Minimum Height Criteria Total Tree (TT) and Total Conifer (TC) Count**

- 3.9 All trees (conifer and deciduous) will be tallied that are greater than (insertion ~ 10) cm in height at the time of survey in the TT count, including germinants if applicable to the defined height criteria. This count can be an estimate, if initial tally exceeds 35 per 3.99 meter radius plot.

TC count will be tallied for all conifers that are greater than the height criteria defined above for the TT count, including germinants if applicable to the defined height criteria.

**Minimum Height Criteria WS Count:**

- 3.10 All WS crop trees of preferred and acceptable species will be tallied that are greater than (insertion ~ 30) cm in height.

**Potential Seed-in Assessment Ranking:**

3.11 For each Stratum in every Survey, Seed-in Potential must be assessed using either the following codes and criteria **or** an alternative professional assessment based on these criteria along with other local criteria, supported by a stated professional rationale:

**HIGH to MODERATE**

1. High levels of seed source(  $\geq$  25 Seed Trees aligned with the prevailing winds and within 500 m of NAR) **AND**;
2. High to moderate amounts of exposed mineral soil ( High for  $>$  50% and Moderate for 50% to 15% of surface NAR) **AND**;
3. Predominately mesic or submesic site series ( $>$ 50% NAR) **AND**;
4. Original mature stand comprised of ecologically suitable species for the site **AND/OR**;
  - a. Mostly ground fire in original mature stand.

**LOW**

1. Low levels of seed source (  $<$  25 Seed Trees within 500 m of the NAR) **AND**;
2. Low amounts of exposed mineral soil ( $<$  15% of surface NAR) **AND**;
3. Original mature stand comprised of  $<$  50% ecologically suitable species for the site **AND/OR**
  - a. Mix of ground and crown fire in the original mature stand.

**NIL**

1. No seed source ( no Seed Trees within 500 m of the NAR) **AND**;
2. Mostly crown fire in original mature stand **AND/OR**
  - a. Thick organic humus layer  $>$  10 cm. **AND/OR**;
  - b. Predominately drier than submesic or wetter than mesic sites (xeric, subhygric, hygric or subhydryc  $>$  50% NAR) **AND/OR**;
  - c. High levels and/or high potential for brush competition **AND/OR**;
  - d. Original mature stand comprised of  $<$ 10% ecologically suitable species for the site.

**Free From Brush Criteria**

3.12 Within all Surveys the preferred and acceptable well-spaced trees in a plot must be assessed for free growing in accordance with Appendix 13 of the [Silviculture Survey Procedures Manual](#).

**Brush Assessment**

3.13 For each Stratum in every Survey, brush hazard must be assessed using the following codes:

- HIGH - brush has encroached on some of the crop trees (control will be necessary);
- MED - brush will encroach on some of the crop trees (control may be necessary in the future);
- LOW - some brush present but no anticipated problem; or
- NIL - no brush hazard present.



### **Requirement for a Plantability Assessment**

- 3.14 If a Survey indicates that a Stratum is not satisfactorily restocked (NSR and below the required WS stems per ha), a plantability assessment must also be conducted on the Stratum while performing the survey. Assess plantability at (insertion ~ [Density Target](#)) targeted plantable and /or preparable spots per ha (defining the planting target inter-tree distance), in order to determine the amount of seedlings required.

Assess plantable and / or preparable spots **utilizing** the minimum inter tree distance (from the Stocking Standards for the Stratum) **up to** the target inter-tree planting density.

### **Site Index (SI) Methodology**

- 3.15 Site index must be collected following the procedural guidelines outlined in *Land Management Handbook 12 - Selecting a Method to Estimate Site Index 2006*: [Selecting a Method to Estimate Site Index, 2006](#).
- 3.16 The following is a summary of a combination of the site index hierarchy process presented above in Article 3.15 and FFT specific guidelines, relative to different FFT objectives and Stratum conditions relative to wildfire disturbance:

#### **a) SI for Inventory Labels – RESULTS**

1. The first choice is via Site Index by BEC (SIBEC) **second** approximation data for the appropriate species (usually denoted by a sample size, standard error and decimal site index in the SIBEC table); or
2. The second choice would be via SIBEC **first** approximation data for the appropriate species (usually denoted by no sample size, no standard error and whole number site index in the SIBEC table). SIBEC tables for all BEC subzones/site series by species, by old Forest Service Regions, are available at [SIBEC link](#).

### **Dead Tree Count**

- 3.17 Estimates will be made for the total number of stable and total number of unstable dead trees greater than 5 m. in height, in the plot. This estimate will be used in NSR strata to determine if a Danger Tree Assessment by a qualified assessor is required, prior to treatment.

### **Additional Field Notes - Access and ROI**

- 3.18 **Access:** Current access and required access improvement contained in inter-plot or recce notes, must be collected during all Surveys and documented/summarized with the Treatment Prescription.

**ROI:** To assist with estimating the total trees/ha and well-spaced trees/ha for the return on investment (ROI) process, interplot or recce notes may be collected during all Surveys specifying the percentage of the total trees that are unlikely to develop into merchantable timber (e.g. 90% of the layer 2 and 3 PL are suppressed and/or infected with dwarf mistletoe).

### **Forest Cover Inventory Label and Silviculture Label**

- 3.19 Surveys must produce a complete forest cover inventory label and silviculture label (use WS per ha in silviculture label) for each Stratum, as specified in the [Silviculture Survey Procedures Manual](#) and the [RESULTS Information Submission Specification - Government Funded](#).

Labels for inventory and silviculture for Strata and WTPs (where appropriate), should only contain live species in the species components.

### **Recommendations**

- 3.20 Subject to the outcome of a Survey, Treatment Prescriptions must be developed in accordance with:

- a) the procedures in the [Silviculture Survey Procedures Manual](#); and
- b) any previous Treatment Prescriptions for the Opening, if one exists.

### **Survey and Treatment Maps**

3.21 Survey and Treatment Maps must:

- a) be submitted in accordance with the [RESULTS Information Submission Specification - Government Funded](#) in Chapter 6 for use in RESULTS submissions; and
- b) the two maps can be combined into one Survey and Treatment map if directed by the Ministry Designated Representative.

### **Survey Maps - Additional Requirements**

3.22 In addition to the requirements of Article 3.21, Survey Maps must also show:

- a) the type of Survey;
- b) biogeoclimatic (BEC) classification from the subzone to the site series level;
- c) Opening and Strata area;
- d) inventory and silviculture label (including either well-spaced [WS] or free growing [FG] per Stratum);
- e) points of commencement of the survey;
- f) plot centers numbered at least every fifth plot; and
- g) (optional) survey lines and direction travelled.

### **Treatment Maps - Additional Requirements**

3.23 Treatment Maps must show:

- a) biogeoclimatic (BEC) classification from the subzone to the site series level;
- b) Opening and Strata area;
- c) inventory and silviculture label (including either well-spaced [WS] or free growing [FG] per Stratum);
- d) treatment unit boundaries (treatable areas) and identifiers;
- e) abbreviated Treatment Prescription Recommendations;
- f) the direction and distance to nearest town; and
- g) gross and net treatment area.

## **ARTICLE 4: WILDFIRE RECONNAISSANCE (RECCE) GROUND SURVEY STANDARDS**

### **General**

- 4.1 An initial reconnaissance (Recce) of a Stratum is a form of screening walk-through survey. The Recce will be either systematic or non-systematic in nature, and will involve physically walking through a Stratum to visually record information as defined in this standard. A small number of sample plots may be established if necessary (Article 4.5 and 4.6), but specified information (Article 4.4) must be collected to further define the characteristics of the Stratum and recommend the next course of action.

### **Recce Procedures**

- 4.2 It is recommended that the Recce be performed on a transect basis so that the whole Stratum is covered. The transect can be established either on a predetermined basis or via a random walkthrough. The resultant Recce transect location will be rough mapped or GPSed.
- 4.3 Pre-stratification is recommended prior to performing the Recce in order to identify homogeneous Strata for sampling and to delineate non-productive areas not to be sampled (i.e. wetlands, rock outcrops and/or non-commercial brush). Use of photos, images, maps, and / or use of the aerial overview stratification and delineations maps of non-productive areas (from Step 3 above) are recommended in this pre-stratification procedure. Stratification criteria must follow the procedures included in Article 3.8.
- 4.4 Non-productive areas identified not to be surveyed (either at this pre-stratification stage or during Step 3 above) shall be given separate polygon status and appropriately updated as such into RESULTS as directed or contracted by the Ministry Designated Representative.

### **Non-Plot Recce Information**

- 4.5 Non-plot measurements/observations collected during the Recce and in-between plots (if established) include:
  - a) BEC classification from the subzone to the site series level;
  - b) forest health factors/damage agents (where applicable);
  - c) an estimate of dead tree total tallies/ha, and if a Danger Tree Assessment is required (where applicable);
  - d) Overstorey stems per hectare (live and dead/dying) and live Overstorey stocking (well-spaced and free growing as applicable);
  - e) Understorey conifers – species % and density, distribution, stocking (well-spaced, and free growing as applicable), age and height;
  - f) germinant tally and likelihood of survival.
  - g) assessment of Seed-in Potential rating for each stratum as per Article 3.11;
  - h) competing (or potentially competing) vegetation and distribution;
  - i) site index via the hierarchy methods and protocol as outlined in Article 3.15;
  - j) delineation of stratum boundaries.
  - k) **\*NEW\*** basal area (m<sup>2</sup>) estimates for total live Layer 1 stems (≥12.5 cm DBH) and total live Layer 2 stems (≥7.5 cm DBH and <12.5 cm DBH) using a prism with a Basal Area Factor (BAF) that will effectively tally at least 4 stems per sample location
  - l) (optional) photographs representing the stand/stratum;

### **Recce Sample Plot Procedure and Information (if required)**

- 4.6 Plots should be established “representatively” as per the representative sampling methodology outlined in the [Silviculture Survey Procedures Manual](#).
- 4.7 Number of plots required are:
  - a) a minimum of (insertion ~ 1) plot(s) should be established for every (insertion ~ 20) hectare – or portion thereof, with a minimum of (insertion ~ 3) plots in total.

- b) a minimum of 5 plots should be established in any Stratum which is recommended for a Treatment Prescription, and any Stratum where a change to the inventory label is being recommended.
- 4.8 The following data shall be recorded at each Recce sample plot in addition to the data requirements of Article 3 and 5 of this standard (except for Article 5.2 & 5.3 - Sampling Intensity):
- a) (optional) tally the number of Overstorey trees (Layer 1 and 2) by species in a 3.99m plot or 5.64 m plot (at the surveyor's discretion);
  - b) (optional) tally the number of Understorey (Layer 3 and 4) trees by species. Comment on their acceptability and height and age (average and range);
  - c) **\*NEW\*** at the sample plot location complete a prism 'sweep' to collect basal area ( $m^2$ ) estimates for total live Layer 1 stems ( $\geq 12.5$  cm DBH) and total live Layer 2 stems ( $\geq 7.5$  cm DBH and  $< 12.5$  cm DBH) using a Basal Area Factor (BAF) that will effectively tally at least 4 stems per sample plot. Record the BAF used and number of 'in' trees per plot
  - d) (optional) take (insertion ~ 2) photograph(s) per stratum representing the stratum.

#### **Next Course of Action Recommendation**

- 4.9 Upon completion of the Recce and/or Recce sample plot establishment, and the compilation of the data collected, there will be a recommended next course of action included in the Survey Summary. The categories are either:
- a) **Re-assess** - Do another Recce in the future and recommend a date of reassessment (For example after an initial overview recce, schedule a full survey for specific strata in 2 years after germinants appear);
  - b) **Leave as is** – No treatment or further assessment required (For example in wildfire unburned island Strata, which have an abundance of healthy acceptable understorey conifers which are maintaining the Strata stocked);
  - c) **Conduct a full survey** - Recommend a full survey and plot intensity. (For example for Strata which have a great deal of variability in levels and distribution of regeneration and are therefore very difficult to accurately describe with a walk-through and limited plot establishment); **or**
  - d) **Develop a Treatment Prescription** - Includes planting, or a combination of site preparation and planting. (For example in Strata that have very low current stocking and an assessed low probability of receiving further seed-in of acceptable germinates. Therefore, it would be redundant to do a full survey, as Recce observations and possible Recce plots have provided enough information. Collection of current access and required access improvements are required, as outlined in Article 3.18).

## **ARTICLE 5: WILDFIRE PLOT SURVEY STANDARDS**

### **General**

- 5.1 The standards contained in this Article apply to Wildfire Surveys in addition to the standards specified in Article 3.

### **Full Silviculture Survey Sampling Plot Intensity**

- 5.2 The sampling design and intensity will be driven by the degree of variability and complexity found in the Stratum during the Recce. Increased Stratum variability and complexity typically will require more sampling. Plot intensity will range from 1 plot/ha to 1 plot/5 ha. A minimum of 5 plots/Stratum is required. Regardless of the plot intensity, the surveyor must ensure that their plot locations provide uniform coverage of the Stratum. This process will help ensure the plot data is representative of the whole Stratum.
- 5.3 (optional) Where the Recced stocking levels are between (insertion ~) and (insertion ~) WS or FG sph, then (insertion ~.) plots per ha will be established.

### **Tally of TT, TC, WS and FG Trees**

- 5.4 The following defines the procedure for tallying TT, TC, WS and FG trees relative to layers and management regimes:
- Single Layered stand structure: These Strata will be surveyed tallying all TT, TC, WS and FG stems as one layer and will follow the standard base survey procedures as outlined in [Silviculture Survey Procedures Manual](#)
  - Layered Even-aged stand structure: These Strata will be surveyed by tallying TT, TC, WS and FG stems by all 4 layers and will be totaled by adding all layers (without nesting) to compare estimates of the mean stocking values to the minimum Stocking Standards. Layers are defined by the following criteria for these surveys:
    - Layer 1  $\geq 12.5$  cm dbh;
    - Layer 2  $\geq 7.5$  cm dbh and  $<12.5$  cm dbh;
    - Layer 3  $>1.3$  m ht and  $<7.5$  cm dbh;
    - Layer 4  $\leq 1.3$  m ht and  $\geq$  the specified height in Article 3.10 and 3.11.

This procedure is outlined as well in the [Silviculture Survey Procedures Manual](#). A commonly used terminology is to group Layer 1 and 2 into the term “Overstorey” and Layer 3 and 4 into the term “Understorey”. These terms are applicable for reference purposes only, but the layer designation should be used when entering the inventory and silviculture label data into RESULTS.

### **\*NEW\* Mandatory Basal Area (BA) Prism ‘Sweeps’**

- 5.5 Basal Area prism ‘sweeps’ will be completed on all Strata (for all trees dead and live - immature and mature PI) and at all plots for total Layer 1 stems ( $\geq 12.5$  cm DBH) and total Layer 2 stems ( $\geq 7.5$  cm DBH and  $\leq 12.49$  cm DBH). Select the lowest BAF prism that will provide an effective estimate of the residual basal area (i.e. targeting a minimum of 4 trees in each sweep as a guide for selection). All live trees in L1 and L2 must be tallied by species (i.e. L1: 2 Pli, L2: 1 Sx).

### **Brush Assessment**

- 5.6 In addition to the requirements of Article 3.13, for all HIGH and MED brush hazard Strata, the species, percent cover and height of competing vegetation must be recorded at every plot.
- 5.7 In addition to the requirements of Article 3.13, for all LOW and NIL brush hazard Strata, the species, percent cover and height of competing vegetation need only be recorded at the first and every fourth sample plot thereafter.

**Required Photography**

- 5.8 Stratum - One colour photograph must be taken, showing a representative view of each Stratum. Opening - Total number of photographs for an Opening must be labeled and attached to the hard copy of the Treatment Prescription and attached into the RESULTS opening file as a PDF file.

**ARTICLE 6: REQUIRED SURVEY REPORT TEMPLATE, TREATMENT PRESCRIPTION, EVALUATIONS (Inc-IRR), LAYOUT & DELIVERABLES (APPLICABLE TO ALL SURVEYS)**

**General**

- 6.1 MoFLNRO representatives may at any time request the Contractor to provide any information related to the Work, and the Contractor shall supply the information within a reasonable time period.

**LBIS Survey Report Template**

- 6.2 For each Opening that a Survey is performed, the Contractor will complete the [LBIS Survey Report Template](#) that will contain all of the Survey compilation data elements.

**Return On Investment (ROI) Analysis**

- 6.3 For all Stratum with proposed treatments (treatment areas), a financial analysis must be carried out to determine if the proposed treatments will meet the FFT required return on investment (ROI) criteria. The [Incremental Internal Rate of Return \(Inc-IRR\)](#) will be calculated using methods provided by the Ministry. All resource tools, procedures and steps are provided at the following link on the FFT website under [Return On Investment](#).

Individual **Ministry Designated Representative** will determine if the Survey Contractors will be required to complete Inc-IRR analysis on potentially treatable units within their respective TSAs. Key personnel who will be completing the financial analysis will be required to take a 2 to 3 hour training course on line, accessed at the same Inc-IRR web link above.

**Treatment Prescriptions**

- 6.4 The minimum treatment unit size is ten (10) hectares.
- 6.5 For all Strata with proposed treatments (treatment areas), a complete Treatment Prescription will be produced by the Contractor, comprised of 4 components:
1. Completed [LBIS Survey Report Template](#) –manually completed and/or digitally uploaded, including the following elements in the Recommendations Section of the Template:
    - a. a schedule of treatments including options/alternatives, preference rationale, and follow-up surveys;
    - b. anticipated natural regeneration from seed-in or germinants present on site and Seed-in Potential rating;
    - c. total hectares of the prescribed treatment unit (optional) as determined by a GPS traverse;
    - d. site preparation prescription if applicable, with the planned year and season;
    - e. danger tree assessment recommendation where applicable;

- f. numbers of seedlings to be planted by species, including recommended stock type, planting year and season;
  - g. a statement addressing the use of genetically improved seedlings and greater species diversity (see FFT Policy on [Management of Tree Species Composition](#));
  - h. proposed brush control treatments with the planned year and season where applicable; and
  - i. access notes including information on accessibility and any required access improvements (e.g. 4WD, quad access only).
2. Additional digital attachments relative to the [LBIS Survey Template](#) such as:
    - a. Inc-IRR calculation sheet from the [Return On Investment](#) website link;
    - b. Colour photograph for each Stratum.
  3. a Treatment Map;
  4. a Survey Summary

**(optional) Traversing and Layout of Treatment Units (treatable areas)**

- 6.6 The Contractor will only layout and traverse those areas approved by the **Ministry Designated Representative**.
- 6.7 Traversing of treatment units, roads and spur roads will be done using GPS technology only and to the General Mapping Standards found in Section 6.1 of the [RESULTS Information Submission Specifications -Licensee Submissions](#).
- 6.8 All non-GPS traverses (not preferred and only permitted if GPS failure) must be aerial-photo tied and ground-tied to a mappable unit.
- 6.9 All treatment unit boundaries will be flagged using winter weight ribbon of the colour and format as defined by the **Ministry Designated Representative** and TSA standard. All flagging shall be inter-visible at a glance (i.e. two consecutive ribbons are visible in one direction). and attached as high as possible, to residual stems.

**Reports and Deliverables**

- 6.10 For each Opening that a Survey is performed, the Contractor will ensure the provision of the following products to the **Ministry Designated Representative** and deliverables 2 to 5 in the following table will be included as attachments in the RESULTS submission.

<b>Recce, Stocking, Free Growing, and Plantability Survey List of Deliverables</b>	<b># of Original s</b>	<b>Digital Deliverable Format</b>
1. All original field data and summary forms.	1	Not applicable
2. Survey Map and Survey Summary.	1	.pdf
3. LBIS Survey Report Template (signed by an RPF) and Treatment Map, where future treatments are recommended.	1	.pdf
4. ROI printout where applicable	1	.pdf
5. Colour photograph for each Stratum	<u>1</u>	.jpg

## ARTICLE 7: SUBMISSION INTO RESULTS

### General

- 7.1 For each Opening that a Survey is performed, the Contractor must submit into RESULTS:
1. Completed Survey data digitally via the LBIS Survey Report Template, including prescribed planning activities (where applicable), forest cover polygon data, inventory label data, and silviculture label data;
  2. Attachments to the Opening file such as listed above in Article 6.10 for deliverables 2 to 5;
  3. Digital spatial information for strata and treatment areas using recommended Electronic Submission Framework (EZLink or CENGEA) or online submission (whichever is applicable).

### Data Entry Standards

- 7.2 All data must be entered into RESULTS in accordance with the [RESULTS Information Submissions Specifications - Government Funded](#). This standard describes the process of creating new Openings (as required with some Recce MPB and wildfire situations) and provides a link to the Provincial Standard for RESULTS submissions - "RESULTS Information Submission Specifications for Government Funded Silviculture Activities" and "Silviculture Information Submission Guidebook".

### RESULTS Quality Management

- 7.3 For the purposes of quality management, the Contractor must submit tabular and spatial data for 5 (five) Openings into RESULTS by a deadline specified by the **Ministry Designated Representative**. Following this initial submission, the Contractor will periodically provide to the Ministry Designated Representative, a list of Openings that have been successfully submitted into RESULTS.

## ARTICLE 8: ADDITIONAL TSA STANDARDS

- 8.1 Additional standards to all of the base standards above may be requested by specific TSA. **Ministry Designated Representative** These additional standards must be attached to this document.
- 8.2 These additional standards will be clear as to the Articles of this base standard that are being added to and/or superseded and will contain specific rationale for a variance to this base standard.

## ARTICLE 9: INSPECTION

### Quality Inspection - General

- 9.1 The Inspector must inspect the Work in accordance with an Approved Surveys Quality Inspection System in a timely manner to ensure the results of the Work conform to the Standards.
- 9.2 Unless otherwise specified by a Ministry Designated Representative, the methodology given in this Article shall form the basis for the Approved Surveys Quality Inspection System.



**Method of Inspection**

- 9.3 If the Deliverables contain all of the required elements and are deemed satisfactory, the Inspector shall conduct a reconnaissance of the Payment Area to carry out a preliminary assessment of the quality of the Work.
- 9.4 If, after any reconnaissance, the Inspector and / or Ministry Designated Representative decide, in their discretion, to conduct field inspections of the corresponding Payment Area, they shall inspect 10% or more of the Payment Area to determine compliance with the terms and conditions of this Agreement.
- 9.5 The Ministry Designated Representative will provide the Contractor with a copy of the inspection of the Deliverables and the preliminary assessment, and/or field inspection within 10 working days of the date of the inspection so that the Contractor is notified in a timely manner as to:
- (a) whether to proceed to the next activity or phase of Work; and/or
  - (b) any deficiencies or non-compliance with the Agreement.

**Field Inspection**

- 9.6 The Inspector shall conduct field inspections by checking, at their discretion, the results of all plots and lines established by the Contractor on a portion of the Payment Area or by establishing an independent survey of some of the Strata within the Payment Area.
- 9.7 Where the Inspector checks the results of actual plots established by the Contractor in an Opening, they shall inspect the greater of ten (10) plots established or 10% of plots established, and the shall assess and compare the data it obtains with that collected by the Contractor for the same plots.

**Provision of Field Maps**

- 9.8 The Ministry Designated Representative may request that the Contractor provide them with copies of Survey cards and field maps for any Stratum surveyed, and the Contractor shall supply the copies within a reasonable time period as agreed to by the Ministry Designated Representative.

**Satisfactory Work Quality Defined**

- 9.9 The Inspector must examine the data to the extent necessary to determine that the Survey has been undertaken and reported in accordance with this Standard, and specifically may determine a Survey to be **satisfactory** when:
- a. an Opening is correctly stratified according to the Stratification Criteria;
  - b. the Survey correctly identifies for a Stratum:
    - i. the Biogeoclimatic zone, sub-zone, and site series,
    - ii. the stocking status (e.g., satisfactorily restocked [SR] vs. not satisfactorily restocked [NSR]); and
    - iii. the order of the leading and secondary species in the inventory label,
  - c. the Survey correctly reports:
    - i. a brush hazard, and
    - ii. any pest, pest damage, disease, disease damage or other physical damage;
  - d. a field check finds a difference of no more than 10% between the Survey and the Inspector's tally in any data collected in Article 3, 4 and 5 – except for no more than 20% for total trees;
  - e. field cards, reports, maps or summaries are legible, and are completed in accordance with this Standard, and;
  - f. the Deliverables are complete and contain no errors, omissions or false statements.

**Approval of Payment from Inspection**

- 9.10 The Ministry Designated Representative shall approve payment for any Payment Area where the Contractor has, in the sole opinion of the Ministry Designated Representative and as recommended by the Inspector, satisfactorily completed and submitted all Deliverables required for the Payment Area to the Standards of this document. The Ministry Designated Representative may approve partial payment for achievement of specified milestones as set out in the Work Progress Plan.
- 9.11 The Ministry Designated Representative will recommend the following action on a per Opening basis, for Work pertaining to all Surveys that are determined unsatisfactory due to non-compliance of the criteria identified in Article 9.9:
- a. the Ministry Designated Representative shall promptly notify the Contractor, and
  - b. the notice shall:
    - i. specify the fault, give the Contractor a deadline for compliance, and specify if the Ministry Designated Representative wishes to exercise their option to require the Contractor to rework the unsatisfactory Work; or,
    - ii. specify the fault, indicate that the Ministry Designated Representative will exercise the option to correct the unsatisfactory Work, and deduct from payment all direct and indirect costs incurred for correcting the unsatisfactory Work.

If the Contractor fails to comply by the specified deadline for compliance, or if any inspection of further Work indicates that Work is again unsatisfactory, the Ministry Designated Representative will recommend no payment per Opening basis, for Work pertaining to all Surveys.