



ROCKY MOUNTAIN FOREST DISTRICT
STANDARD OPERATING PROCEDURES

NUMBER 8

SUBJECT

NDT4 Restoration Post
Treatment Assessments
File: 18940-00

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INTENT:

To supplement existing *Silviculture Survey Guidebook* standards and procedures when complying with Section 86 of the *Forest Planning and Practices Regulation* or Sections 45-47 of the *Timber Harvesting and Silviculture Practices Regulation* – reporting requirements.

This replaces SOP #8 dated April 28, 2006, and is an interim district policy subject to revision if clarification is received from a Branch or Regional level and will be reviewed within 3 years.

PURPOSE:

To provide survey standards for post treatment assessments in the NDT4 Open Range/Open Forest management units to:

- Evaluate post treatment stand structure and species composition,
- Determine if prescribed cutting and residual stand structure objectives have been met,
- Produce an updated map label and forest cover description,
- Flag layers or stands that may require secondary treatment under a Ministry SMP,
- Provide recommendations for secondary treatment based on the management objectives set out in a silviculture prescription, and
- Assess the incidence of damage to trees from forest health factors.

SCOPE:

This policy applies to all NDT4 restoration post treatment and stocking or free growing assessments.

REQUIREMENTS:

Prescription holders are required to provide an update of the forest cover inventory prior to milestone deadlines as per regulation. Surveys must be completed to prescription or FSP standards.

Timing

‘Open range’ units may be declared ‘free growing’ immediately following successful completion of a harvest or stand management treatment. On units where the estimated post treatment residual density of layers 1&2 is less than 100 sph, a formal survey is not necessary. The inventory update (for example FS708C or its equivalent) can be based on information gathered during a walk-through inspection to check that all prescribed objectives have been met.

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‘Open range’ stands where the residual density of layer 1&2 stems exceeds 100 sph can be declared ‘free growing’ immediately following a formal post treatment survey as for ‘open forest’ stands.

A post treatment assessment survey is required on all ‘open forest’ stands. The early free growing date will normally be two years. This period is to allow time to determine if the stand has been negatively impacted by such factors as snow or blow-down, sunscald, forest health factors or other causes. This date can be moved forward when a supplemental treatment under the ecosystem restoration program is scheduled sooner.

The final or free growing assessment can consist of a walk through where a formal post treatment assessment has been completed earlier. If the stand appears unchanged from the original assessment, the data may be used to describe the stand and assign new forest cover labels. If the stocking appears to have changed or the stand has been treated since the last assessment, a new survey is required.

Stratification

As the intent of the NDT4 standards is to establish fire maintained ‘management units’, stocking status for Open Range/Open Forest Standards Units (SU) can be assessed by the *average* stocking on a SU basis, further stratification is not required. Regardless, when mappable units exist, stratification can be applied where this reduces the sampling intensity required to derive an appropriate label.

Sampling intensity

Sample the SU to the intensity required to obtain a representative label using professional discretion. Key considerations in determining appropriate sampling intensity are SU size and variability. As a minimum, a sample design of one plot per 10 ha with a minimum of five plots per Standards Unit is required. Plots are to be “pre-located” using a method that ensures a non-biased selection of sampling. For example, the area could be covered with a grid such that plots are uniformly and systematically distributed over the unit.

In the rare event that the surveyor finds that plots continually fell in either the most open or in heavily treed clumps, and does not represent the area, plots should NOT be dropped. Rather, to ensure non-biased sampling, additional plots (5 plots recommended) are to be added and these should be pre-located in a non-biased manner.

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Plot Measurements

Layer 1 and 2 stocking is to be combined and captured using appropriate BAF prism (typically BAF 2 to ensure an adequate number of sample trees). The prism used should be recorded (for example, on the FS657 'Front Card' or equivalent); use the same BAF for the entire unit. Layer 1&2 trees will be tallied by 5 or 10 cm diameter class. Density of layer 1&2 stems can then be determined by summing the calculation of average BA of diameter class/BA of mean tree of diameter class as per Table 1 or 2 (Excel versions of these Tables are available). Both average BA and density estimates are to be entered into the RESULTS system (could enter as 'Inventory' and no layer).

Diameters for the layer 1&2 stems can be estimated but some measurements should be taken to calibrate one's eye. The height and age of one 'modal' (representative) layer 1 or 2 tree per plot should be measured so that there are at least 5 samples of the first and second leading species per SU; more are to be taken if the variability is high. (when the number of plots per SU exceeds five, measurements do not need to be taken on every plot...).

Species composition for the combined layer 1&2 can be based on ocular estimates (especially when stocking is relatively low) or may be based upon actual plot data (when densities are relatively high); use professional discretion.

Layers 3 and 4 stems can be grouped and densities estimated within a 5.64 m or a 3.99 m fixed radius sub-plot. Typically all stems are to be included in 'estimates' and 1 m would be used as 'countable' height when determining max density. Species composition can be based upon ocular estimates or plot estimates, height and age estimates are to be provided for representative trees. The combination of these two layers can be entered into RESULTS as the 'Silviculture' label with no layer specified.

When the sampling is occurring after a slashing/burning treatment, actual measurements of layer 3 and 4 is recommended.

Reference of Layers

Layer names and descriptions are defined as follows (similar to the *Operational Planning Regulation*):

1. Mature pole: ≥ 12.5 cm dbh
2. Pole layer: 7.5 cm to 12.4 cm dbh

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3. Sapling layer: 1.3m in height to 7.4 cm dbh
4. Regeneration layer: < 1.3 m in height

Note, when a silviculture prescription sets out suggested stocking by DBH classes or species composition objectives for the layer 1 stems, compliance with the prescription would need to be presented for verification so the combination of layers as described in the preceding would not be appropriate.

Minimum inter-tree spacing

All layer 1 stems regardless of spacing will be tallied as well spaced provided they meet the free growing damage criteria. The minimum inter-tree spacing for layer 2, 3, and 4 stems will default to 2 m unless stated otherwise in the prescription.

M value

There will no 'M' value or limit on the number of well spaced stems allowed in a layer or plot. All well spaced preferred and acceptable trees will be tallied.

Reserve Patches

Identified 'no work' reserve patches will not count towards well-spaced or total stocking densities.

Veterans

Veterans will not be tallied as a separate layer. All veterans should be included in Layer 1.

Forest Health considerations

Except as noted below or otherwise specified in the prescription. The 'Free Growing Damage Criteria' will apply to all tree layers.

Damage Criteria

Residual layer 1 stems with excessive logging damage:

- Scar or wound > 30 cm² or
- Is more than 3 cm deep or
- The wood has been splintered,
- Or as per the prescription

will not be considered well spaced but will contribute towards total stand density.

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Data analysis

Stocking will be determined on a SU basis (or polygon, if the SU was stratified). As per other multi-layered surveys, statistical analysis is not required. Stocking status will be determined by comparing the average number of well spaced stems per hectare from the survey to the minimum-stocking standard for the SU stated in the prescription.

For Silviculture Prescriptions, compliance with stand structure, basal area retention and species composition objectives will be based on layer 1 stems only. Compliance with Stand management Prescription objectives will be based on all layers.

Maximum density

Maximum density standards for Open Range and Open Forest stands are set out in the KBLUP Implementation Strategy. Stands that exceed these standards but have less than 10000 countable sph (or 20000 countable if PI dominated stand) should be flagged as needing treatment under the Ministry ecosystem restoration program.

Survey reports

The Free Growing survey report must meet the content requirements specified under the relevant legislation that pertains to the specific block.

REFERENCE:

- *Forest Planning and Practices Regulation* Section 86 – Annual reports
- *Forest Practices Code Act of British Columbia* Sec. 70 - Silviculture prescriptions
- *Operational Planning Regulation* Section 39 - Content of prescriptions
- *Silviculture Practices Regulation* Section 23 - Surveys required
- *Silviculture Practices Regulation* Section 24 and 25 - Survey requirements
- *Silviculture Practices Regulation* Section 28 - Reporting requirements
- *Establishment to Free Growing Guidebook* - Nelson Forest Region
- *Silviculture Surveys Guidebook*
- *1998 Draft Stocking and Free Growing Surveys*
- FRPA Practice Requirements, Professional Reliance
- Kootenay-Boundary Land Use Plan Implementation Strategy - *Management Guidelines for Fire Maintained (NDT4) Ecosystem Restoration*

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Table 1.

BAF:	BAF value				
DBH class (midpoint)	Species	BA/tree	Tally	BA/ha (m2/ha)	Density (sph) "=e5/c5"
10		0.0079		d5*B1	"
15		0.0177			
20		0.0314			
25		0.0491			
30		0.0707			
35		0.0962			
40		0.1257			
45		0.1590			
50		0.1964			
55		0.2376			
60		0.2827			
70		0.3848			
75		0.4418			
80		0.5027			
85		0.5675			

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Table 2.

BAF:	BAF value				
DBH class (midpoint)	Species	BA/tree	Tally	BA/ha (m2/ha)	Density (sph) "=e5/c5"
11.25		0.0099		d5*B1	"
20		0.0314			
30		0.0707			
40		0.1257			
50		0.1963			
60		0.2827			
70		0.3848			
80		0.5027			
90		0.6362			

Note: dbh class ranges for the above are :
7.5-15.0
15.1-25
25.1-35
Etc.

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