DRAFT - Blending Stand Attributes for FRI Two-Tiered Canopy Conditions

The following guidelines and set of criteria were developed to assist with Forest Resource Inventory (FRI) canopy blending for forest polygons or stands with a two-tiered vertical structure attribute (VERT). This document is intended to complement the information and guidelines presented in version 2.1 'Blended Canopy Species Composition for the Two-Tiered Condition of the White Pine Forest Unit'; however, the canopy blending approach discussed here is intended for all two-tiered forest polygons and is not specific to white pine forest polygons.

A canopy blending approach for these two-tiered polygons to derive a single species composition and associated set of attributes must be considered by all forest management planning teams at the onset of forest management plan development. A detailed analysis of the FRI should be carried out to assess the following:

- Strategic level implications of implementing (or not implementing) a canopy blending approach (i.e., assessment of scale – a tally of the total amount of area where canopy blending may be necessary).
- Level of similarity/dissimilarity between overstory and understory species composition, crown closure, age, and height.
- Implications at the forest unit (FU) level (e.g., the amount of shift in forest units as a result of canopy blending.
- Unmanaged stands vs. stands that have received harvest treatments.
- Stage of development (i.e., DEVSTAGE); it is important to note that stage of development included by the interpreters is not always accurate. As such, the stage of development based on annual report data supersedes interpreters' calls.

To clarify direction outlined in version 2.1, canopy blending in relation to actively managed white pine shelterwood polygons; blending is only intended for unmanaged shelterwood forest polygons, not for polygons that have started along the shelterwood management continuum. Forest polygons currently being actively managed under the shelterwood management system should use the overstory layer FRI description (i.e., TO or MO). As indicated in version 2.1, an exception to this may occur where shelterwood is indicated on the FRI but the historical management records for follow-up harvest or subsequent treatments have been lost.

The following criteria are intended to serve as filters to narrow down where blending may be necessary when vertical structure indicates a two-tiered condition (i.e., TO, MO, TU and MU).

Blend vertical structure codes TO or MO with the understory when:

- The overstory crown closure is <= 30%, AND/OR
- The understory is of merchantable ht. (e.g., >= 10 m), AND
- The understory crown closure >= 40%

Note: 10 m is a guideline for average merchantable height, however, this increment can be determined using input from operations foresters on the management unit.

Blend vertical structure codes TU or MU with the overstory when*:*

- The overstory crown closure >= 40%, OR
- The overstory year of origin is the same or within 10 years of the understory year of origin and the height difference between understory and overstory is <5 m difference, OR
- The overstory contains white pine

Blending Methodology

Species composition

As per canopy blending technical note, version 2.1, to blend the species composition, the crown closure of each of the overstory and understory is used to proportionally represent each species correctly in the blended species composition. The blended species composition will equal the weighted sum by species to the nearest 1% by crown closure for the overstory and understory respectively.

The procedure for developing a blended species composition from the overstory and understory involves parsing each individual species contribution in the species composition string and multiplying by the respective percentage crown closure. The resulting blended species composition string is derived from all weighted species from both the overstory and understory.

$$SPCOMPi = \left(OSPPi \times \frac{OCCLO}{(OCCLO + UCCLO)} \right) + \left(USPPi \times \frac{UCCLO}{(OCCLO + UCCLO)} \right)$$

Where:

$SPCOMPi$:   Overstory/understory blended species composition for species I expressed as a percentage.

$OSPPi$:   Individual species proportion contributing to the FRI overstory species composition string.

$OCCLO$:   Overstory crown closure expressed as a percentage.

$USPPi$:   Individual species proportion contributing to the FRI understory species composition.

$UCCLO$:   Understory crown closure expressed as a percentage.

Height

Use the height of the leading species; if the leading species is found in both the overstory and understory use the height of the vertical structure originally assigned.

Age

Use the age of the vertical structure that was used to define height.

Year of Origin

Use the year of origin of the vertical structure that was used to define height.

Crown Closure

Average the overstory crown closure and understory crown closure. If this is a unit of measure that will be used during operational planning, it is suggested that the original crown closures assigned for each vertical structure be used as a reference.

Stocking

The overstory STKG + understory STKG, weighted average by crown closure

Site Class

Use the leading species of the overstory and then convert to the site class of the lead species of the blended canopy using the look-up tables of Mauer (1993). As per tech note version 2.1, the use of height over age to determine site class and site index is based on open grown trees associated with the overstory; understory trees are likely suppressed to some degree so may not express the height potential for the site.