

STAND GROWTH ASSESSMENT TOOL

OWEN BURNEY AND DOUG ROBIN



INTRODUCTION

Douglas-fir stands infected with Swiss Needle Cast (SNC) have shown conflicting growth responses in which some stands grow extremely well while others put on little volume. This has important implications for forest managers who must decide how to manage infected stands. The current convention directs foresters to clear cut stands if they have needle retention levels below a minimum threshold. However, using SNC severity alone, as estimated by needle retention, to prioritize harvest plans does not directly consider growth as a factor. As a result, there is a need for a method to determine treatment priorities that is based on expected stand growth results.

In response to this need, Doug Mainwaring (OSU) and Nate Coleman developed the Swiss Needle Cast Stand Evaluation Software (SNCSES) program “which allows the user to examine how a particular stand is growing in relation to growth model estimates of how it would be growing in the absence of Swiss needle cast. By doing so, stands may be ranked by their current performance relative to expectations, allowing informed decisions on the value of holding, thinning, or clearcutting them.” (Doug Mainwaring unpublished information)

OBJECTIVE

The primary function of this assessment tool is to assist forest managers in making definitive decisions on harvest prescriptions for a stand using a combination of real and modeled quantitative growth values.

SITE SELECTION

Define stands by harvest areas within a sale (Ex. Zig Zag Area 1). If sale area is not established, define area by any combination of LEI, SLI, stand type, and any other area of interest.

METHODS

SAMPLE PLOT

The number of sample plots should be based on the total acres associated with the harvest

The number of sample plots should be based on the total acres associated with the harvest area as described in Table 1. The layout of the sample plots will be based on the forester's discretion. Grid plots provide the best representation but may be inefficient. The next best option would be multiple transect lines.

MEASUREMENTS

Variable radius plots will be used to collect data. The basal area factor (BAF) will be determined at the first plot and must be consistent for the entire stand. Choose a BAF that selects an average of 6-8 sample trees per plot. The parameters measured are described below:

Full sample (all live trees 5.5" dbh and larger are measured within variable radius plot):

- Species—"df" (Douglas-fir) or "o" (all other hardwoods or conifers)
- DBH—All species (nearest 0.1 inch)
- Height/HCB¹ or CR²—ORGANON estimates require that each sample tree has a crown ratio. The program allows data to be entered either as a full or partial sample of heights and height to crown bases, or an ocular estimate of CR.
- Radial Growth—Radial growth for previous 5 years, Douglas-fir only (nearest 0.05 inches) (Figure 1)
- Sapwood width—Douglas-fir only (nearest 0.05 inches)

Height/HCB¹—All trees may be measured for height/HCB, or a subsample of 30 trees within the stand. If heights/HCB are subsampled, the 30 trees should be chosen to cover the full range of the diameter distribution (for 10 plots within a stand, three trees per plot can be measured, that with the largest dbh, the smallest dbh, and an intermediate dbh).

Crown ratio²—Crown ratio can be estimated visually or based on height/hcb measurements. Crown base may be based on height to lowest live branch (lowest live whorl of contiguous crown, excluding epicormic branches), or a compacted (reconstructed) crown base. Whichever convention is chosen should be applied consistently throughout a stand, and the appropriate option should be chosen on the data entry form.

Sub-sample (Site trees—most dominant within plot, 1 per plot)

- Age—Douglas-fir only (years at breast height)
- Height—Total height for site trees

Measuring Damaged, Deformed, or Forked Trees:

• Tree forking above DBH are considered as one tree. Tree forking below DBH are

- Trees topping above DBH are considered as one tree. Trees topping below DBH are considered as two trees.
- Measure trees with bole irregularities as close to breast height as possible, but above or below the deformity.
- Measure damaged trees, and note type of damage in the comments, e.g., broken top at 40 feet.

RADIAL GROWTH

When measuring radial growth do not include the bark, Phloem (current years spring wood), or the current years summer wood. Measure both 5-year and 10-year period beginning at the end of the 2nd years' spring wood and stopping at the beginning of the 5th years' and 10th years' fall wood.

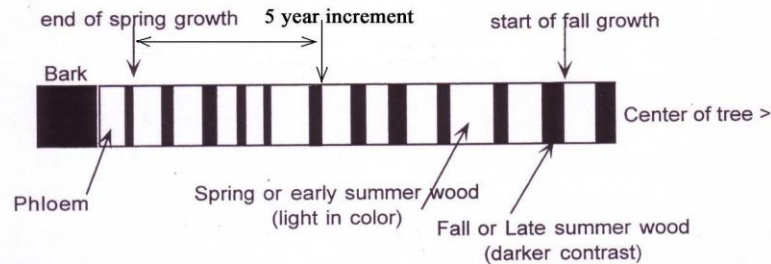


Figure 16: Measuring radial growth

Figure 1. This diagram is from: ODF Field Guide, Current Vegetation Survey Permanent Plot inventory. The 5 year incremental growth is measured to the nearest 0.05", e.g., 0.75"

Tip: Measure from the "end" on the latest springwood band to the beginning of the fifth summerwood band.

SITE INDEX

Site index can be determined through two methods. The first is calculating the site index for the stand based on measured tree heights discussed in the measurements section. The second method defines site index from stand maps. Using a GIS program (ArcView 3.X or ArcGIS 9.X), create a shapefile of the harvest area. This may be done at an early step to define sample plot locations. Once the harvest area shapefile is created overlay the district soil layer containing site indices. Define the site index for the harvest area using this method. If more than one site index exists for the harvest area, average them together. If no site index exists, define the site index by a similar stand adjacent to harvest area of interest. If the measured site index is higher than the site index shown on the soil layer, use the highest one.

SNC ASSESSMENT TOOL

Use the SNC Growth Assessment Tool Excel program to define the stands growth value in the form of MBAG (measured basal area growth), ORGBAG (Organon predicted basal

area growth), and the **RATIO** (ratio of **MBAG** / **ORGBAG**). The program reports the growth values at the stand level and at the plot level.

INTERPRETATION OF RESULTS

The values for **ORGBAG** and **RATIO** are intended to be interpreted on a relative scale by comparing stand to stand. The only true value is **MBAG** which can stand alone in interpretations. The **ORGBAG** and **RATIO** values can aid in deciding the management plan for particular stands. Certain values may be clear on the decision while others may be extremely muddy as Figure 2 describes. Results from this tool should be used in combination with all other available stand evaluation resources to make good management decisions.

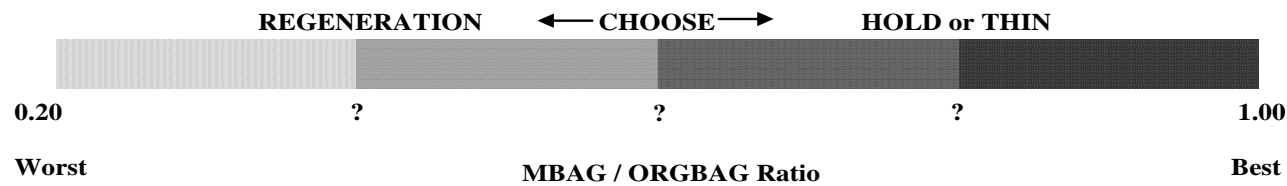


Figure 2. Graphical interpretation of the decision process based on **RATIO** growth values.

