Sampling Intensity for Stand-Level Biodiversity Surveys

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Resource stewardship monitoring for stand-level biodiversity uses a sampling methodology that incorporates timber cruising techniques for standing trees and a line-transect survey for coarse woody debris (CWD). Overall biodiversity attributes (e.g., evidence of wildlife use, presence of ecological anchors) are also assessed through an overview of the cutblock or a stratum within the cutblock. Tree and CWD data are collected from plots or transects randomly located on the cutblock. Indicators, such as density of large trees and volume of CWD, are estimated from this plot data and compared against baseline values to assess the state of biodiversity in a group of cutblocks. For tree indicators, baseline values are obtained from timber cruise data for comparative cutblocks in the same ecosystem. Indicators for CWD from harvest areas are compared against indicators found in unharvested patch areas of the same ecosystem.

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In a cutblock's Net Area to be Reforested (NAR), the recommended plot sampling intensity is three plots. The recommended plot sampling intensity for patch retention is one plot per hectare of each patch, to a maximum of five plots per patch. The sampling intensity exercise documented in the Forest and Range Evaluation Report #15, *Sampling Intensity for Stand-level Biodiversity Surveys* (2008), had two objectives:

1. To assess the change in bias (mean) and precision (standard error around the mean) of tree and CWD indicators as sample intensity increases, and
2. To determine the impact on assessment of biodiversity values for a cutblock.

"DO THE BIAS AND PRECISION OF TREE AND COURSE WOODY DEBRIS INDICATORS CHANGE AS SAMPLE INTENSITY INCREASES?"

In order to assess the validity of the recommended plot sample intensity, two harvested cutblocks were randomly selected and sampled using the Forest and Range Evaluation Program sampling methodology for stand-level biodiversity monitoring. The number of plots established was more than double the recommended plot sample intensity as described in the Protocol for Stand-level Biodiversity Monitoring (Province of British Columbia, 2007). Tree and coarse woody debris indicators were estimated based on varying numbers of the established plots. No bias was found in the estimation of the indicators for large trees, large snags, CWD volume or density of long pieces of CWD. The means of these indicators were relatively stable at all sampling intensities. However, the precision of the mean (standard error) for the large snags density indicator was low at the recommended sampling density. The mean of number of species sampled does have an inherent bias influenced by sampling intensity. The number of species found tends to increase with increased number of sample plots. Therefore, care must be taken to ensure that comparisons with baseline indicators are limited to datasets that represent similar sampling intensity or are based on suitable estimates of the total number of species (i.e., found plus missed).

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