Assignment 1 – Movement Ratios

Introduction

For short-term projections, stand table projection using movement ratios may be a very effective approach. This is because projection uses increment data from the same stand for which predictions are required. In other words, the data used to develop the prediction are very local to the stand. Also, these data can be collected quickly and at low cost.

Instructions

This assignment has three parts. You will work in groups to complete the first part. First, we will establish temporary sample plots in a pine stand near Atlantic Mine. Second, you will enter the data you collect into spreadsheets and send them to Robert Froese, who will compile data for the entire stand. Third, you will summarize the data to generate stand tables and use the “movement ratio” method to project your stand table 15 years into the future, in three 5-year time steps. The fundamental question to be addressed in this assignment is whether the stand should be harvested soon, or whether harvest should be delayed for another 5, 10 or 15 years.

Some basic assumptions are needed: (1) we will group trees into 2" DBH classes; (2) field data collection will involve 1/24 acre fixed-radius plots; and, (3) the basic time-step for your projection will be 5 years.

Field Procedure

Each team of three students will be responsible for collecting data on ten plots in the stand. You have about 15 minutes to complete data collection on each plot. Please keep track of your time and be efficient!

[1] Head to the field, navigate to your plot center, and mark the center on the ground.

[2] Starting from due north, work around the plot in a clockwise direction identifying each “in” tree and recording the tree’s species and DBH. Measure DBH to the nearest 1/10th inch. Make sure you correct for slope when evaluating borderline trees.

[3] Select one tree from each 2” diameter class for increment sampling. For each tree, extract a single increment core at DBH, drilling just far enough into the tree so that the last 5 years of increment can be measured. Extract the core, identify the last 5 years of growth inside bark by counting rings, and measure increment as precisely as possible, using a ruler. Record the increment and discard the core.

[4] Measure the height and live crown height of (a) the largest tree by DBH and (b) one other tree selected arbitrarily. On subsequent plots, the second tree should come from a different DBH class.
Office Procedure

Enter all of your field data into a spreadsheet using the column names from your field data sheet. Calculate total height and live crown ratio for each tree from the angle measurements you made in the field. Send your field data sheet to Robert Froese as soon as you have entered the data.

Data Analysis

Generate the summary data necessary to complete a stand table projection, using movement ratios. Then, following the example on the class web page, project the stand table for 15 years in three 5-year increments.

Then, calculate (1) present and (2) future volume by diameter class. First, fit a regression model to estimate height from tree DBH, and use the equation to generate a predicted height for each 2” diameter class. Then, using the individual-tree volume equations from the Manager’s Handbook for Red Pine (Gilmore and Palik 2005) estimate total cubic foot volume in each class. Finally, calculate the volume increment at the stand level 5, 10 and 15 years into the future.

Due Date

Summarize the objectives, methods and results in a brief memo. Discuss your findings, briefly. Based on the volume increment you forecast for the stand when do you think the final harvest should be? What is the economic benefit of time? Discuss.

The professionalism of your submission will be a critical factor in your grade on this assignment. Your memo will be shared with Plum Creek Timber Company, with your name on it!

Your memo is due in class on Friday 01 February 2013.