Ex 1.

This exercise introduces you to the 3-PG model, run at a single site with stable climatic conditions for 160 consecutive years. It requires that you change two variables in the model to match data published in a forestry yield table. In this exercise the model predicts the growth and changes in stocking for a Douglas-fir stand with a productivity site class of III (43 m height @ 100 years).

To run the model, open the spreadsheet and click on the tab: "Douglas fir Yield Table Ex 1". You will see three colored boxes: one (light green) contains information required to describe the initial conditions and set limits on how many years the model should run; a second (yellow) contains various parameters that we might wish to change; a third (blue) presents average climatic data, and a forth (gray) observations from the forestry yield tables.

It is assumed that the soils are deep and hold 300 mm of available soil water at full capacity. Your task is to assess the soil fertility, which corresponds to a value between 0 to 1 for "fertility ranking" (1st box) and for the "weight of stems" (kg x 1000) (yellow box) that will cause the number of trees to decrease, at similar rates to those recorded in the yield table as the size of individual trees increases (self-thinning graph). Values of wood volume and cross-sectional area of stems (basal area) must also come close to matching values given in the yield table.

To start the model, enable the spreadsheet, and click on "add-ins" located at the top of the page, then click on "run". Answers are provided on another sheet “Douglas fir Yield Table Ex 1 ANS”. Annual output of the model appears below on the spreadsheet with the definitions and units explained on the tab “3PGpjs_Outputs”. Note that the maximum leaf area index (LAI), which represents the projected layers of leaves per m^2 of ground, is directly correlated with productivity. The highest value obtained by any forests is ~ 12.0 m^2/m^2. For more details on this simulation, see Pub. No.88.