

Ex 3

“Douglas-fir thinning Ex 3a”

When foresters establish a plantation, they often plant more seedling than necessary to assure that some trees growth to reach an adequate size, and that natural pruning of limbs will occur. Once trees reach a size that is merchantable, the stands are often thinned to harvest trees that might otherwise die as competition among individual increases. In part A of this exercise “”, you are asked to evaluate the implications of thinning a stand of Douglas-fir just before natural mortality would begin at age 20 when the diameter of an average tree reached a merchantable size, specified here at 20 cm at breast height. When you run the model (see Ex 1) to age 40, and thin or defoliate the stand as indicated, you will find differences in the amount of stemwood volume harvested. You will also see a change in leaf area index and growth efficiency (Mg (dry mass of stems)/ha/yr divided by LAI). The units for other variables are given on the spreadsheet “3-PGpjs_Outputs”. Compare model runs with and without thinning/defoliation and answer the questions. The answers are provided on the adjacent spreadsheet.

“Ponderosa pine Ex 3b”

As a stand grows, trees become more crowded, and their growth efficiencies drop precipitously, even with to the death of smaller individuals. Although this is a natural process, there are times, particularly during a drought when it is dangerous to maintain fully stocked stands. This is because low values of growth efficiency indicate that trees will be unable to shift resources that would normally go into growing wood to producing resin to pitch out bark beetles and prevent the infection of the sapwood by lethal blue-stain fungi (Pub. No. [41,87,106](#)). Your challenge in this exercise is to select the age when thinning to a specified stocking level with maintain stand growth efficiency above a relatively safe level (70 grams of wood produced annually per unit of leaf area).