Forestry 466W – Forest Resource Management
Practice Problem Set 3
Land Expectation Value

1. You are in charge of the Transcontinental Paper Company's spruce genetics program in Maine. You have obtained the following yield data from some trials of a new, genetically improved variety of red spruce.

Age	Yield (cords/ac)	MAI	LEV
45	41		
50	56		
55	68		
60	77		

   a. Calculate the mean annual increment (MAI) for ages 45, 50, 55, and 60 and fill in the third column in the table. (Don't worry about the LEV column for now.)

   b. What is the average annual compound rate of growth between ages 45 and 55?

2. 2. Using the yield data in problem 1 and the cost data below, calculate the LEV for plantations of the new spruce variety for each rotation (45, 50, 55 and 60 years). Assume all prices and costs will increase at about the same rate as inflation).

   • Seeding cost: $145/ac   • Spruce pulpwood price: $35/cd
   • Release cost at age 3: $45/ac   • Real interest rate: 4%
   • Annual taxes: $2/ac·yr

3. The net sawtimber (board feet/acre) yield for a medium-site northern hardwood stand in the Deep Valleys ecoregion of northwestern Pennsylvania can be estimated with the following function:

$$Y_a = e^{(10.593 - 89.9/a)}$$

where a is the age of the stand. The yield from the above equation can be broken down by species group using the proportions shown in the table below. The table also shows the price per thousand board feet for each species group in northwest Pennsylvania as of the third quarter of 2011.

	Red Oaks	Red Maple	Hard Maple	Black Cherry	Other Hardwood	Softwoods
Price ($/mbf)	328	161	258	796	52	24
Proportion (%)	3.5	35.7	10.2	34.6	13.3	2.7

Assume that stand establishment costs are $240 per acre and that annual property taxes and management expenses are $6 per acre per year. Also assume that it costs $200 per acre to conduct a timber sale and maintain oversight on the harvesting operation. Calculate the LEV for this timber stand for rotations of 40, 50, 60 and 70 years using real discount rates of 3, 4, and 5 percent. Assume that all costs and prices will increase at the same rate as inflation.

4. Do the same analysis you did in question 3 for a good site. The net sawtimber yield equation for a good site is:

$$Y_a = e^{(10.905 - 89.9/a)}$$

The species group yield proportions for a good site are:

	Red Oaks	Red Maple	Hard Maples	Black Cherry	Other Hardwood	Softwoods
Proportion	10.2	25.1	21.7	33.3	6.5	3.2

Use the costs and prices given in question 3.