Name: _____ Section: Mon / Wed

FOR 373: Assignment 7 – Review of Sampling Designs [60 points]

Notes: 2-pages of notes can be attached to this assignment and you are encouraged to use your calculator or Excel where necessary. You must show your work to receive any credit (e.g., the equation you use and any assumptions you make). Doing so also indicates whether you understand the method and help you receive partial credit, even if your final answer is incorrect.

1. What is the most commonly used sampling design in forest management?

2. What is the difference between R and r^2 and when do you use each?

3. Assuming we hold our plot size constant, what does increasing our sampling intensity due to the output of our confidence interval? Use some of the terminology we have discussed in class.

4. You are given the following stand information and told to allocate 180, 1/10 acre plots. Calculate how many plots you would allocate to each strata using equal, proportional, and Neyman allocation methods. What is the benefit of Neyman allocation over the other two?

5. Using the provided cruise data of cu ft volume in 1/10 acre plots, calculate the combined mean per acre.

6. If you decided to sell only strata D in question #5 for $330/MBF, what is your maximum and minimum profit with 90% certainty?

7. Estimate the total cubic-foot volume and its associated variance from the 3P cruise data given in the Excel spreadsheet.

8. A nursery manager wants to estimate the average height of seedlings in the nursery beds. Because the beds were sowed at uniform spacing and because the germination percentage of seeds was high, it is possible to divide the beds into 5,000 equal-sized clusters of 50 seedlings each, with 5 equal segments of 10 seedlings. From these 5,000 clusters, 40 are selected at random, and the average height is measured (inches) for each segment. Calculate the average height, standard error of height and a 95% confidence interval. The data is given in the Excel spreadsheet.

9. You are assigned to cruise a 70 acre stand, your boss wants you to use a 5% sampling intensity. Calculate how many plots you would need and what the square spacing in chains would be between plots for ¼, 1/10, 1/100 acre plots.

Given the following preliminary stand information complete questions 10 & 11:
Ave Vol/plot = 1800 cu ft Variance = 20000 cu ft 1/10th acre plots n = 3

10. Calculate how many plots you would need in order to estimate the mean volume per plot within the stand to within 3%. Assume the stand is infinitely large and use a 95% confidence level.

11. Calculate how many plots you would need in order to estimate the mean volume per plot within the stand to within 40 cu ft. The stand is 80 acres; use a 95% confidence level.

Extra Credit: Given the following stand information calculate the maximum profit you would expect:
1,600 cu ft per acre standard error 110 cu ft per acre 120 acres 95% CI
Stand composition: 40% ABGR 30% PSME 20% THPL 10% TSHE
Species value: ABGR $170/MBF PSME $290/MBF THPL $350/MBF TSHE $310/MBF
The cedar is hauled to a mill that takes 75 minutes each direction while the fir species and hemlock is hauled to mill that takes 45 minutes each direction. The logger has told you that it is $75 per hour for the trucks to haul to the mill but that there is usually a 30 minute wait for off-load. The trucks can haul 5,000 bf in each load. (Make sure to calculate how many loads will be needed to go to each mill and you cannot make a partial load.) [10 points]