

## Study Questions—Week 2 Making Sense of Forest Data

Forests Through Time and Space      Fall/ Winter, 2004/05

**Due on Monday, Oct.11<sup>th</sup>.**

For each of the three forest types, fill out the Forest Summary sheets that were part of the *Peninsula Forests* handout. Additional copies of the handout can be downloaded from the FTTS website. For each forest site that you sampled, complete the following calculations. You will summarize your data in tables as outlined below and then answer the questions listed. **Put all your summary data tables on one page per forest.** You may work with your field group or on your own.

1. Organize the fixed-plot data for the overstory tree species into a table.
2. Calculate the basal area (BA) for each tree. Use the formula for the area of a circle ( $\pi \times r^2$ ). In order to convert basal area to square feet, divide your answer by 144  $\text{in}^2/\text{ft}^2$ .

$$\text{Thus } BA = \frac{\left[ \frac{DBH}{2} \right]^2 \pi}{144 \text{ in}^2} \text{ ft}^2$$

Record your answers with three

decimal places.

**Overstory Trees**

Species	DBH (in)
Douglas fir	26.5
Douglas fir	30.1
Douglas fir	20.6
Douglas fir	18.4
Douglas fir	24.5
Western Hemlock	20.3
Western Hemlock	27.7
Western Hemlock	25.1

**Example of data table with calculations.** Numbers & arrows refer to the calculation steps.

Overstory Trees		3	4	5	6	7	8	
Species	DBH (in)	Basal Area (ft <sup>2</sup> )	Total BA/Species (ft <sup>2</sup> ) in plot	% BA/species	BA/acre by species	Avg DBH by species	Std Dev DBH by species	# trees/acre
Douglas fir	26.5	3.830	16.207	62.2%	174.65	24.02	4.65	50
Douglas fir	30.1	4.942						
Douglas fir	20.6	2.315						
Douglas fir	18.4	1.847						
Douglas fir	24.5	3.274						
Western Hemlock	20.3	2.248	9.869	37.8%	106.35	24.37	3.75	30
Western Hemlock	27.7	4.185						
Western Hemlock	25.1	3.436						
<b>Total BA</b>		<b>26.075</b>						<b>80</b>

3. Sum the basal area for all the trees in your plot and multiply by 1/(area sampled) to get BA/acre for the forest sampled. E.g. If these data are from a 0.1 acre plot, then the total BA per acre is 26.08/0.1 or **260.8 ft<sup>2</sup>/acre**. This is another estimate of the BA/acre.
4. Sum the individual BAs for each tree species to get the Total BA/species in the plot.
5. Divide the total BA/acre for each species by the total BA/acre for the entire plot to get the % BA per species.
6. Use these percentages and the estimate of BA/acre from the variable plot data to calculate the BA/acre for each tree species.

Variable plot data	BAF=20										Average	BA/Acre
Plot number	1	2	3	4	5	6	7	8	9	10		
Tree counts	11	14.5	17	12	13	12	12	18	16.5	15	<b>14.050</b>	<b>281.00</b>

7. Calculate the average and standard deviation for DBH for each tree species.
8. Calculate the number of trees per acre.
9. Prepare a summary table for the overstory trees. See example below.

Summary Table for Imaginary forest located in Paul's head					
<b>Overstory Tree Species</b>	<b>Avg DBH</b>	<b>Std Dev DBH</b>	<b>BA/acre</b>	<b>% canopy cover</b>	95.4%
Douglas fir	24.02	4.65	174.65	<b>Avg Tree height (ft)</b>	126.6
W Hemlock	24.37	3.75	106.35	<b>Trees /acres</b>	80
<b>Total BA</b>			<b>281.00</b>		

10. Prepare a summary table for the understory layers. See example below

Summary Table for Imaginary forest located in Paul's head				
	Sapling/ tall shrub	Shrub	Herbaceous	Moss
<b>Dominant species</b>				
<b>Abundant species</b>				
<b>Common species</b>				
<b>Occasional species</b>				
<b>Rare species</b>				

11. On your summary page for each forest, please also include a written description of the forest.

**Study questions**

1. Carefully compare the summary numbers for trees and the vegetation patterns for the understory by examining the three sets of summary tables you've created. What patterns do you see? Similarities and differences?
2. You have come up with two different estimates of BA/acre for each forest you visited. Which one do you think has more validity? Why?
3. What is the relationship between your written descriptions and the data recorded in your tables? What can you see in the data that could allow you to visualize the forest you described?
4. What potential sources of error do you think are in your data? List all the possibilities and then list ways you might improve the field techniques to minimize each potential source of error. Identify which sources of error you think are most likely.