

Guiding questions for Lab Project 2

A) At the local scale of your team's particular study plots:

1. How does the vascular species composition compare among the three time periods (1985-2007-2014)?
2. How has the forest structure (density and basal area of trees) changed over the study period?
3. What patterns do bryophytes show within plots?
4. What factors (temporal, spatial, environmental) appear to be the main causes of the patterns observed in 1 - 3 (above)?

B) At the larger scale of the combined plot data from all teams:

1. How do the changes in understory vegetation (vascular plants and bryophytes) and forest structure compare among the different vegetation associations?
2. How do the causal factors for explaining vegetation dynamics (temporal, spatial, environmental) differ between the local scale of your team's study and the larger scale of all combined plots?

Sampling methods

To ensure that your data are compatible with the two earlier studies (1985 & 2007) we will use the same sampling design for plot layout and vegetation measurement as described in the Thompson report (see Lab Projects folder on CONNECT). Following is a brief description of the main features of the sampling method:

1. Each team will be required to set-up and sample two 20 x 20 m plots within a 30-50 m radius of one of Thompson's plots. Directions to plot locations will be given in class.
2. Team members from Biology 406 and 321 will collaborate to arrange a time and location to meet for the purpose of sampling the vegetation and forest structure of their assigned plots.
3. Three types of data will be collected for each plot:

Vegetation cover data - you will be provided with field data forms (including a species list) to assist with this part of the sampling. Vascular plant species cover will be recorded by Biol 406 students as visual estimates to the nearest 1% cover within the 20 x 20 m study plots (note: species not rooted within the plot but with over-hanging branches should also be recorded).

Bryophyte species cover - data will be collected by Biol 321 students using the field forms provided.

Forest structure data (Biol 406 students) - this will comprise a list of the tree species along with corresponding dbh measurements for all trees that occur within the plot (note: use the 50% in/out rule for trees on the plot boundary). Trees should be recorded as living or dead. Only stems with dbh ≥ 10 cm need to be recorded. For trees with multiple stems, separate measurements should be recorded for each stem. To avoid measuring the same tree twice it is recommended that you subdivide the main plot into four sectors (each approx. 5 x 20 m) and systematically record the trees within each sector before moving to the next sector.

Once the DBH data for trees have been obtained you will be required to convert the values to basal areas (BA, in units of cm^2). Note that the conversions from DBH to BA must be done separately for each tree before summing to obtain the total basal area (TBA) values for each species per plot.

4. After checking for accuracy, teams will send all their plot data to the Biol 406 TA for entry into combined spreadsheets with the 1985 and 2007 datasets which will then be made available for analysis.

Field equipment

The following items of field equipment will be available for sign-out: plot sampling sheets, clipboards, pencils (make sure you have 3-4 extras), compasses, 30 m and 100 m tapes, DBH tapes, poly bags (for collecting leaves etc., for plant id). Appropriate field clothing (warm,

Biology 406 Field Lab - Forest Vegetation dynamics in Pacific Spirit Park

rugged, rain-proof) is strongly recommended. At least one team member should carry a cell phone/camera (photos of study plots and team members will be useful later on for class presentations!).

Data analysis

Try to design your data analysis around the key ecological questions you are asking (see Guiding questions, above). Data analysis should be viewed as a tool to help you gain a deeper ecological understanding of the vegetation patterns and processes that you are investigating. Several methods for analyzing vegetation data will be outlined during lectures that you will find useful in your project.

Evaluation

For Biology 406 students this project will count 20% toward your final mark in the course. Class presentations will be made during the week of February 11-14, 2014. Teams will jointly present their results, but team members are required to prepare and hand-in their own written report (15-20 pages including summary tables & figures [not required to include lengthy computer output]).

Due date for Project 2 written reports is February 28, 2014.