

Purpose: The discussion questions give you an opportunity to think about processes shaping forest communities. Your discussion paper must **carefully** explain your logic. **Support** your ideas with **specific** citations from the readings and lectures or with data from the field trip. Address **all** parts of the assigned question. The written assignment should be individual work.

Due: October 12, midnight, in **MS Word format**, mailed to cfr501@u.washington.edu

Style Tips: Take advantage of the style tips listed at:
http://courses.washington.edu/cfr501/index_files/Assignments.htm

Be sure your species naming conventions follow:
http://courses.washington.edu/cfr501/Using_Species_Codes.pdf

Page Limit: Two pages maximum, 1" margins all around, 12 point font, double spaced. Put your name in the document's header and embed your name in the file name (e.g. Clements_Frederick_DQ1.doc). Tables, figures and references do not count to the page limit.

References: Photos for all six sites and combined species lists for all transects are posted on the web in case you want to refresh your memory of each site.

Some of these references are rather general. Some of the references are very specific. It would be hard to imagine that a cogent argument could be made without using a combination of general and specific citations. Cite **only** course material.

Lectures

The stops on the field trip

Data collected on the field trip

Franklin, J.F. and C.T. Dyrness. 1973/1988. Natural vegetation of Oregon and Washington.

Hessburg, P. F., J. K. Agee, and J. F. Franklin. 2005. Dry forests and wildland fires of the inland Northwest USA: contrasting the landscape ecology of the pre-settlement and modern eras. *Forest Ecology and Management* 211:117-139.

Harrod, R. J., B. H. McRae, and W. E. Hartl. 1999. Historical stand reconstruction in ponderosa pine forests to guide silvicultural prescriptions. *Forest Ecology and Management* 114, 433-446.

Waring, R.H. and J.F. Franklin. 1979. Evergreen coniferous forests of the Pacific Northwest. *Science* 204: 1380-1386.

Lassoie, J.P., T.M. Hinckley, and C.G. Grier. 1985. Coniferous forests of the Pacific Northwest. *In:* B.F. Chabot, and H.A. Mooney (eds.) *Physiological Ecology of North American Plant Communities* pp. 127-161.

McDowell, N., J.R. Brooks, S.A. Fitzgerald, & B.J. Bond, 2003. Carbon isotope discrimination and growth responses of old *Pinus ponderosa* trees to stand density reductions.

McKenzie, D., D. W. Peterson, D. L. Peterson, P. E. Thornton. 2003. Climatic and biophysical controls on conifer species distributions in mountain forests of Washington State. USA. *Journal of Biogeography*, 30:1093-1108.

Species response curves generated by Jeremy Littell (2003).

Peterson, D. W. and D. L. Peterson. 2001. Mountain hemlock growth responds to climatic variability at annual and decadal time scales. *Ecology* 82:3330-3345.

Brooks J.R., F.C. Meinzer, R. Coulombe, and J. Gregg. 2002. Hydraulic redistribution of soil water during summer drought in two contrasting Pacific Northwest coniferous forests. *Tree Physiology* 22, 1107-1117

The Question

Both the Peterson and Peterson 2001 and the McKenzie *et al.* 2003 papers discuss the importance of top-down influences of climate on the growth rate and presence of trees. Furthermore, both papers justify the importance of their findings in terms of predicting the consequences of future climate change.

Consider the Wenatchee field trip site BS **OR** CN. Assume:

- 1) an immediate 1°C increase in summer temperature and an immediate 3°C increase in winter temperature;
- 2) no change in the amount of annual or seasonal precipitation;
- 3) no change in the existing range of climate variability;
- 4) fire, beetles and other disturbances continue to be successfully excluded from the sites; and
- 5) the current western spruce budworm outbreak ends with no tree mortality

Hypothesize how the influence of the assumed temperature changes (and associated changes in biophysical parameters) is likely to affect plant establishment, performance and community composition during the next 50 years. What trends would you expect to see in **community composition** at your chosen site over the next 50 years? Choose one or two **ecophysiological measurements** ($\delta^{13}\text{C}$, photosynthetic ability, WUE, etc.). How will these parameters change over time within the community if your hypotheses are correct? Support your inferences with specific examples and data.