

Report for 2005MT67B: STUDENT FELLOWSHIP: Clonal recruitment of *Populus angustifolia* along the Yellowstone River: extent and requirements

Publications

- Dissertations:
 - Polzin, Mary Louise, 2006, Ph.D. dissertation, "Temporal and Spatial Patterns of *P. angustifolia* along the Upper Yellowstone River and Clonal Recruitment: Extent and Requirements," College of Forestry and Conservation, Montana State University, Missoula, Montana.

Report Follows

Polzin December 12, 2006 mid-report:

Dear Susan Higgins:

I have been busy since the fellowship started with writing up the results of my research for my thesis. Presently I have just completed my thesis and will send it out to all of my committee members by Monday Dec. 19 at the latest. I have had two review processes of all of the chapters by Dr. Merigliano (chapters 1 and 2) and Dr. Fishman (chapters 3 and 4) with the last chapter (4) coming today (Dec. 16). Once all the committee has had a chance to read my thesis I will find out if it is ready to defend or if I need to work on some areas first.

If it is ready to defend, I will set this up for some time in January after the 9th as expressed by one of my committee member. I then plan on working on a paper on the clonal process of *P. angustifolia* along the upper Yellowstone River with publication in 2006.

My discovery of the clonality of the upper Yellowstone River is the backbone of the organization of the thesis. My initial work was for the Governor's Task Force, which wanted to know what was happening along the flood plains of the river. My part was looking at and collecting data on the cottonwood trees and assessing the flood plain turnover period. During observation while collecting data and analysis of the data there was strong indications that root-suckering was making up a large portion of the mature stands. Because of this, I pursued the investigation in identifying clones by the use of DNA microsatellite analysis. Once I identified clones, I would apply the information gain from my initial study to see if any of the variables I measured affected the amount of clonality occurring.

Chapter 1 is an introduction with some of the background on cottonwood trees and a literature review of what is known so far.

Chapter 2 is the results from the cottonwood study, with flood plain turnover period, hydrological associations, and stand characteristics. The results suggested that clonal recruitment is occurring but it was only speculation at this point.

The population genetics and how well the selected microsatellite markers worked, was covered by chapter 3. It was found that the study reach was one population at the genetic level and that the markers were highly polymorphic with a high degree of confidence for identification of ramets that occurred within the fixed plots used.

The final chapter combines the results from chapter 2 and clone identification. Clonality plays a major role with 71% of the trees in mature stands originating from root suckering, branch fragment sprouting and or burial of flood-trained saplings. The amount of clonality increases following a 10-year or greater flood frequency event and the range in age within fixed plots was the result of multiple clonal recruitment events. Many of the recruitment events were correlated to very small frequent flood events indicating that while scour increases the amount of root suckering, any inundation will promote suckering even without any physical damage. Many of the variables measured did not have a significant affect on clonality but help to point at other areas to study and possibly set up some experiments in the field to see what variables do contribute to higher levels of clonality. As with most research, you are left with some questions answered and a completely new group of

questions to ask now that it is known that clonal recruitment is an important part of the reproduction ecology of *P. angustifolia* along the upper Yellowstone River.

Polzin Final Report 3/20/2006

During my award year I was able to complete my dissertation and defend it successfully on January 27. The fellowship allowed me time to give my writing and searching for papers my full attention. Without this funding I would have had to find a job which would have restricted my time considerably so that I would not have been finished in January. I was also able to spend time in Missoula every month to consult with my genetic advisor Dr. Lila Fishman and Dr. Fred Allendorf for consultation on the population genetics portion of my research. Being able to go to Missoula when ever I needed personal help was essential and would not have been possible if I had a job that would have time demands attached to it. I found it very important to spend time every month at the University as it helped in the critical thinking aspect of the writing. Being able to bounce ideas off other colleagues would result in many problems being resolved that I did not come up with the solution being at home writing. Even though I came up with the solutions myself having other colleagues to discuss things with seem to firm up ideas when spoken out loud. A couple of questions some one may ask that is not as familiar with the work as myself helped me to see what areas needed more explanation as I thought it was self explanatory but it was not. The fellowship was a very important aspect in helping me complete my dissertation and thus my PhD.