

Fire History in the Palouse Region of Latah County, Idaho

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Fire plays an important disturbance role in many forest and grassland ecosystems by influencing nutrient dynamics and vegetation structure. Historically, fire was an important ecological process in the Blue Mountains of Oregon and Washington (Heyerdahl et al. 2002), and in the northern Rocky Mountains of Idaho and Montana (Barrett and Arno 1982, Baker 2002). The historical role of fire in northern Idaho's Palouse Prairie and adjacent low elevation ponderosa pine forests is not well understood. Fire was likely to have been a key disturbance force in Latah County's Palouse region and adjacent forests; however, since Euro-American settlement of the region in the late 1800s fire has been mostly suppressed or excluded. Physical evidence of fire exists in the ponderosa pine forests adjacent to Idaho's Palouse, and can lend insight into the role of fire along the ecotone between the region's forests and grasslands.

Fire history in forests can be studied through the examination of fire scars, which occur when a non-lethal fire kills a portion of a tree's cambium. The cambium at the edge of the scar continues to grow, and over time (and successive fires) leaves a physical record of fires and their dates. Cross-dating can be used to date tree rings by comparing incremental ring growth with established and consistent regional growth patterns (Kipfmüller and Swetnam 2001). Cross-dating is done using a partial cross section of a tree. The wood is sanded to a very smooth surface with successively finer grades of sandpaper. Incremental growth is then measured and correlated with known growth patterns to obtain an inner ring date. Missing and false rings must be accounted for, and a growth chronology can be built with which fire scars can be dated to the year and season (Agee 1993). Season of fire is determined by recording where within an annual growth ring the fire scar is found.

This internship has three objectives: 1) learn fire history sampling, sample preparation, and cross-dating techniques; 2) describe fire the fire regime and seasonality for the low elevation ponderosa pine forests adjacent to northern Latah County's Palouse region; and 3) examine temporal and spatial trends in fire intervals.

We sampled fire scarred ponderosa pine stumps from three sites along the Palouse-forest ecotone (Pine Creek, Crane Creek, and Wietz Property). Only sites with existing scarred stumps were selected, and only stumps with large numbers of visible scars were sampled. Sampling was conducted in January and February when shrub and forb cover was minimal making the detection of scared stumps easier. In March samples were taken to the USFS Fire Sciences Laboratory in Missoula, Montana to learn sample preparation and crossdating. A total of 14 samples were prepared and crossdated between March and August. Data from samples taken at two other sites (Flanigan Creek and Basalt Hill) were also obtained from other research projects for a total of 21 samples from five sites (Pine Creek – 4, Crane Creek – 3, Wietz Property – 6, Flanigan Creek 5, and Basalt Hill – 3). The 5 sites are located along a gradient of distance from the edge of the Palouse; two sites are directly at the edge of the Palouse (Pine Creek and the Weitz Property), two sites are in an intermediate zone where forest and grasslands mix (Crane Creek and Flanigan Creek), and one site is located in a forested zone that is relatively remote from the Palouse (Basalt Hill).

Results are preliminary, and a fire history expert will check the cross-dating results in mid-September (Emily Heyerdahl, US Forest Service Fire Sciences Laboratory, personal communication, August 7, 2006). Preliminary data reveals a record that spans more than 500 years from 1485 to 2005 (one sample collected for another research project was from a live tree). A total of 259 fire scars and injuries were recorded in all 21 samples. Ninety-two scars and injuries were recorded on the Flanigan Creek samples, 52 on Pine Creek, 50 on the Weitz property, 29 on Basalt Hill, and 20 on Crane Creek. These results suggest that fires at these sites were frequent, but exact dates for each indication of fire are too preliminary to calculate fire intervals. A burn season was attributed to 166 (70%) fire scars. Season was categorized as dormant period, early earlywood, middle earlywood, late earlywood, and latewood. The majority of all scars (91%) occurred while the tree was putting on latewood or during the dormant period (along the latewood boundary) consistent with late summer and fall fires.

To conclude the internship, we will characterize fire frequency (Weibull median fire-free interval) and seasonality, evaluate differences in fire intervals between sites adjacent to what was historically Palouse prairie and sites that are more distant, and examine temporal trends in fire intervals. Of particular interest is how fire frequency changed with human history, including whether fires were more frequent once the Nez Perce brought horses onto the landscape and how much less frequent fires are now relative to the past. This internship will be concluded during the fall of 2006.

References

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