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Water Resources and Policy Initiatives

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Historical Vegetation of the "First 48" Fuels Brake Project

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Executive Summary

In 1854 Euro-Americans arrived in South Fork Mountain for the first time and extirpated the Native Americans who had inhabited the area for centuries, within just a decade after Euro-American arrival. This has brought forth cascading consequences to the land due to the drastic changes in land management. Prior, the Natives depended and lived off the land directly, thus had systematic ways of management. Frequent prescribed fires were useful in maximizing a multitude of resources and in turn created a landscape which evolved with anthropogenic influence and fire. Wildfire created by frequent lightning strikes offers further evidence that the landscape evolved with regular fire intervals. The frequency of fires practiced by Natives served to sweeps the ground of small trees and litter which facilitate hunting and gathering, but also preventing the buildup of excess fuels. Furthermore, the management practices of the Natives allowed for richly diverse habitats for numerous species. Over 100 years of fire suppression fire on the Mad River Ranger District (MRRD), located in the southern range of Six Rivers National Forest (SRNF), has adversely affected the land by resulting in a buildup of excess fuels, high risks for large and high severity wildfires. The lack of fire has resulted in the exponential growth of Douglas-fir, *Pseudotsuga menziesii* and White-fir, *Abies concolor* which have had significant adverse effects particularly on California black oak, *Quercus kelloggii* and Oregon white oak, *Quercus garryana.* Oak woodlands are adversely affected by the dense encroachment and competition brought forth by fir trees. The data collected in this project will offer us insight to the historical vegetation types that existed when low to moderate severity fires were still common. This knowledge will be used to guide future fuel break and restoration projects underway.

Project Objectives

As part of meeting the USDA Career Identification requirement, I have considered Soil Conservation as a potential USDA career path. My experiential learning in forestry has further strengthened my intention to continue working outdoors, and has also sparked a new interest in managing larger landscapes. I am passionate about small-scale farming and therefore have a deep appreciation for healthy soil and an interest in learning to help improve it. As described in the job description, I could work with farmers, ranchers, and other groups, in developing conservation plans and, gather data for planning alternative management practices to individual landowners, groups of landowners, or companies. Some alternative management practices I would be interested include increasing diversity of microorganisms and managing pests and nutrients efficiently without harsh pesticides.

The goal of this project was to gain an in-depth understanding of what the South Fork Mountain on the Mad River Ranger District looked like pre Euro-American settlement. Understanding the historical vegetation of this area will provide a basis for a fuel break project aimed at reducing risk of a major fire and to try and promote the growth of oak trees. Oak woodlands have reduced greatly with the suppression of fire, while fir trees have grown exponentially. In combination with the suppression of fire, firs were heavily planted 70 years ago because of the profit in logging, which in time became the region's economic standing. Since the extirpation of Native inhabitants, the land has lost the controlled management system in which it evolved with. Without fire to clear the grounds of young trees, firs have been allow to grow in an overcrowding fashion forming a forest of thin deprived fir trees. The fast growing firs outcompete oak trees by piercing the canopy and encroaching the oak trees to death. Furthermore, this has too caused disruption in the ability for ground water to recharge and runoff into the water systems (streams,

creeks, and rivers). Our goal is to gather evidence to show the remnants of oak woodlands and showcase the important role of fire in South Fork Mountain.

Project Approach

Under the guidance of Forester Rayma Cooley and alongside my colleague Vannia Pena, we conducted *n*=31 observational plot, that were systematically stratified in a grid system with 1/3 mile spacing between each plot. (Figure 1) The point system was created in ArcGIS by Cooley, and served as our guided in the field along with a Global Positioning System (GPS) which allowed us to hike out to each point.

The field work consisted of first localizing the pre-set points on a GPS and identifying which roads would have best access to each given point. Hikes ranged from 0.1-0.5 miles from the road. A plot was established by identifying plot center and north, south, east and west, which were marked 30 feet from plot center in the four directions. Photos were taken in each cardinal direction and site conditions were determined by recording elevation, slope percent, aspect and topographic context. We recorded ground cover composition by estimating the total percentage of bare ground, rock, water, litter, moss/lichen and basal vegetation cover per plot. We estimated the canopy composition, by conducting standardized center prism sweeps from north, clockwise. Trees were counted as "in" by a 20 factor prism and borderline trees alternated between in and out. Trees "in" were identified by species and as dead or alive, classified by crown class and decay class, measured at diameter breast height (DBH), height and for some age. Initially we set out to age the north most tree as well as the largest tree per species. The strenuous physical challenge associated with manually boring trees led to numerous problematic incidents such as samples stuck in the core, increment bits warping and a muscle injury in my colleague. In some instances we were also limited by the size of the borers which were short of reaching tress center.

Due to these challenges we seized the collection of tree core samples for aging midway through. This was unfortunate because the respective tree ages would be very useful in providing evidence showing understory Oak trees to be older than Douglas Firs whom though younger, pierce the canopy. Additionally, we recorded emerging small trees and seedlings to gain an understanding of the projected composition and lastly, to take into consideration the historic composition of the site, we recorded any course woody debris with diameters greater than 10 inches.

Project Outcomes

Statistical analysis of data was outside the scope this internship and remains pending.

Conclusions

Though statistical evidence is not yet available, I've taken in with careful observation the different environments throughout the plots of South Fork Mountain. Insights through conducting this observation study seem to clearly correlate the sudden growth in presence of fir trees with the harsh reduction of quality of forest, for various reasons. Far often we observed the same pattern thought areas of the forest where fir trees would be dense, out shading and piercing the canopy, meanwhile oak trees dwindled in the understory. Frequently thought the understory oaks trees grow at an angle, towards the down slope, to maximize light intake it is seems. Over time this compromise in growth leads oaks to fall in deprivation. Old groves with strong and big healthy trees risk being phased out if fire suppression continues because the overcrowding of new growing trees will outcompete each other into deprivation without any single trees thriving.

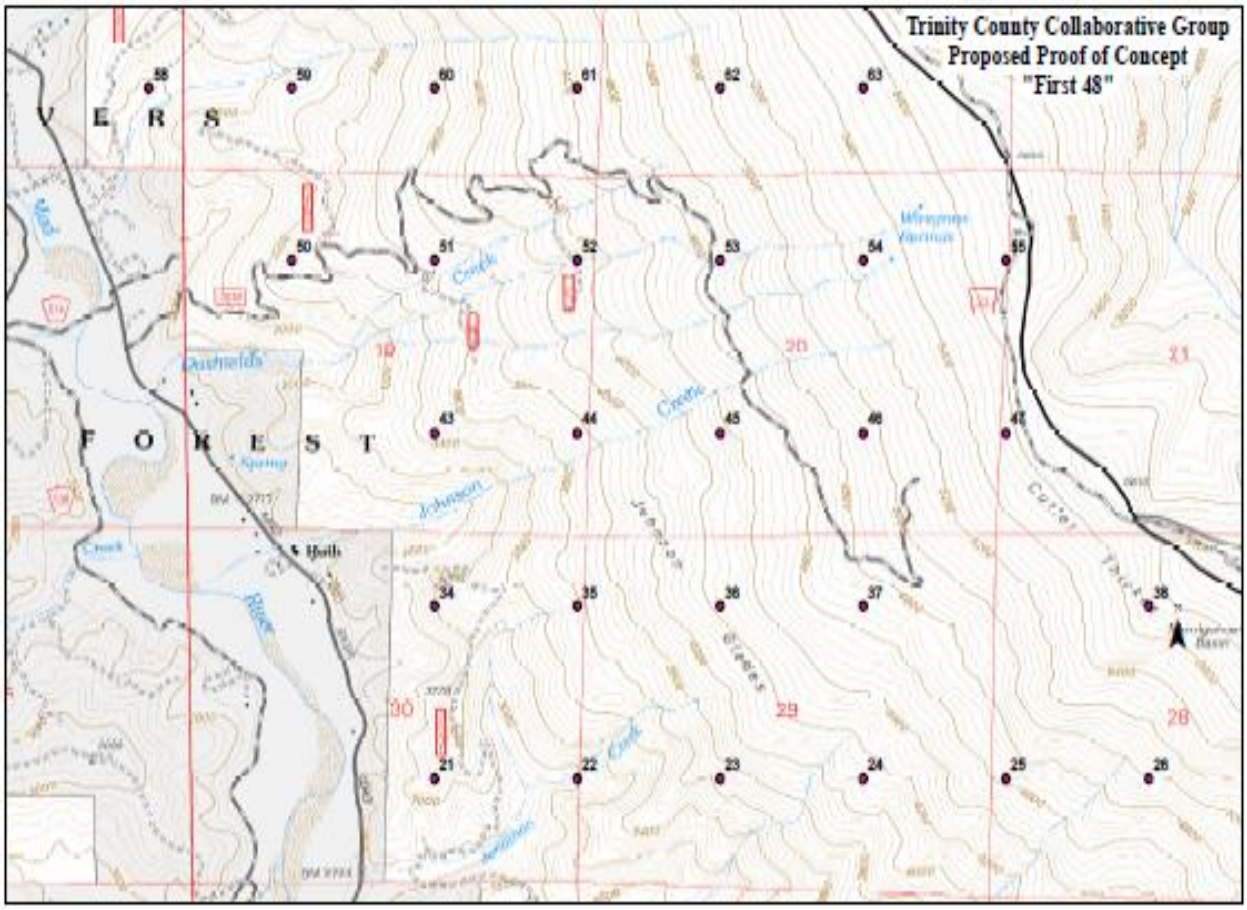

Figure 1: Map filed site and plots of the Historical Vegetation of the “First 48” Fuels Brake Project