Estancia Basin Watershed Health Restoration Monitoring Study
SWCA Progress Report for mid-fall 2008, October 16 – November 14, 2008

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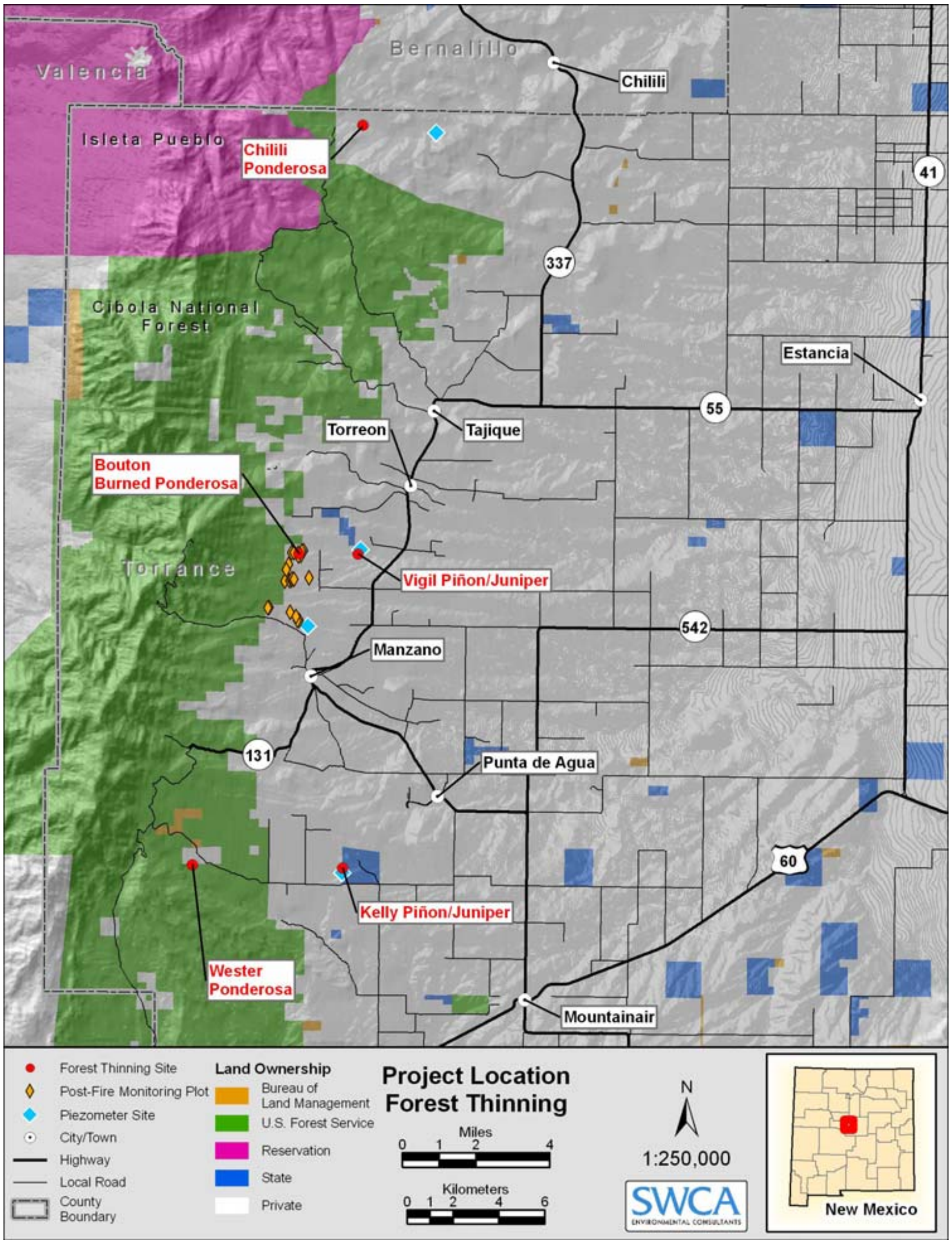
Submitted to the Estancia Basin Watershed Health, Restoration, and Monitoring Steering Committee

November 14, 2008

The following tasks were completed by SWCA personnel for the mid-fall period of 2008, year 2 of the project.

- SWCA personnel (Williams, Thompson) conducted tree measurements on all forest thinning monitoring sites (Nov. 10-13). Trees in tree monitoring subplots were also tagged for future measurements.
- SWCA personnel entered and error checked data from field monitoring work in September and October 2008, in preparation for data analysis and annual report preparation.
- SWCA personnel (Pease) investigated existing ground water well availability for monitoring relative to the forest thinning and Trigo fire site. To date, no existing wells have been found in appropriate areas. Sandia National Laboratories is beginning a well monitoring study, but all of their wells are on the east side of the Estancia Basin. USGS monitoring wells are located far down-slope from forest monitoring sites. We will continue to search for monitoring wells.
- SWCA produced an outline for the year one annual report and submitted it to Dee Tarr and Ken Smith for approval.
- Below is a summary of some of our findings to date. These and more will be submitted for our year 1 annual report in December 2008.

This brief report provides a summary of some of the activities and preliminary data Claunch Pinto Soil and Water Conservation District along with SWCA Environmental Consultants are using to evaluate and monitor watershed health within the Estancia Basin. This long-term monitoring project is designed to provide information about vegetation, water resources, soil composition, and wildlife. The monitoring initiatives have four foci; Tree-Thinning Monitoring, Water Resource Monitoring, South Mountain Weather Station, and Post-Fire Monitoring.

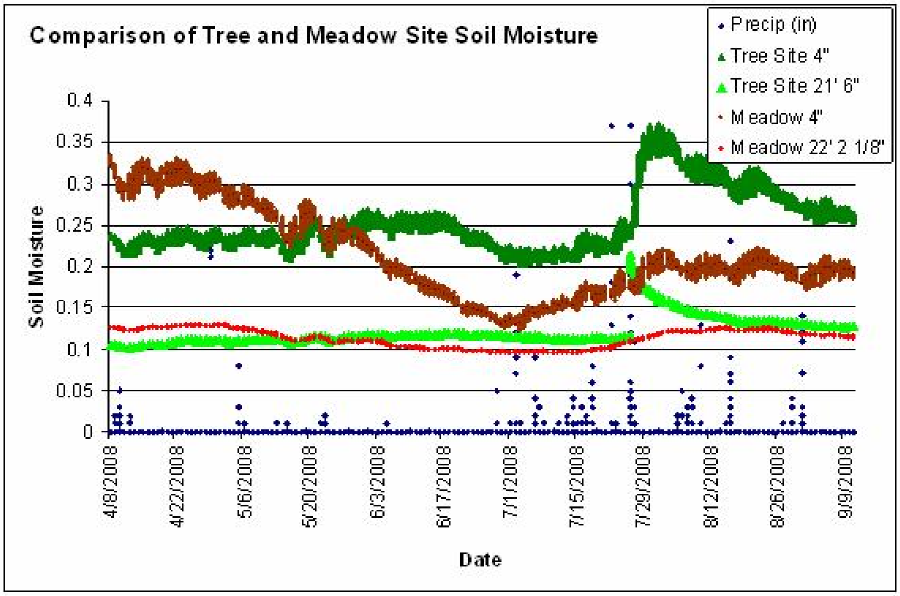


Forest Thinning, Post-Fire Monitoring and Water Resource Monitoring Project Sites

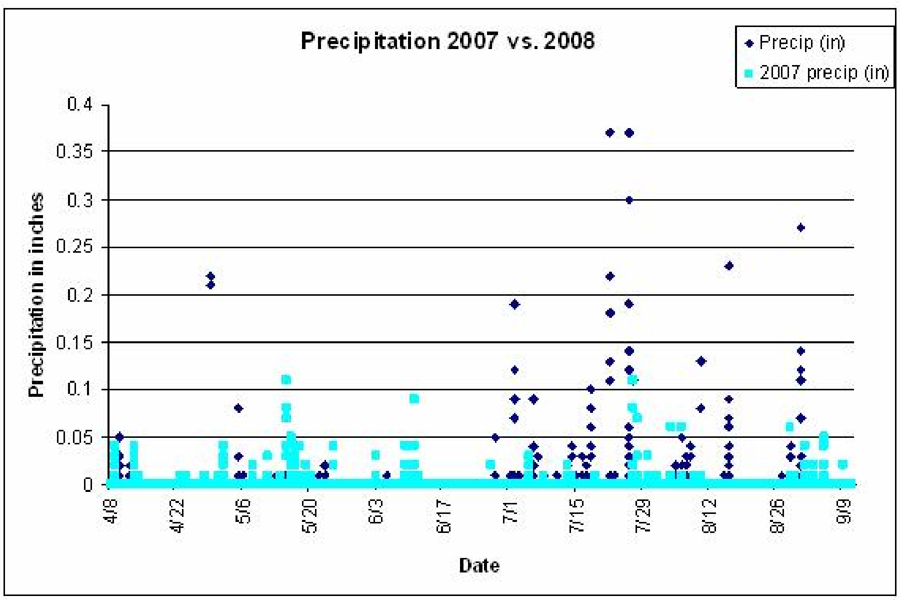
South Mountain Weather Station

The South Mountain Weather Station was installed near Edgewood, New Mexico to provide meteorological and soil moisture and temperature data as part of a watershed health and restoration program overseen by the Estancia Basin Watershed Health, Restoration and Monitoring Steering Committee.

Soil moisture is continually being measured at a variety of depths in both a meadow and in a forested area. We can monitor the soil moisture variations after a rainfall event at both sites.



It is now possible to compare atmospheric readings between years, for example, the difference between precipitation in 2007 and 2008. This comparison will be more valuable as multiple years of data are collected.



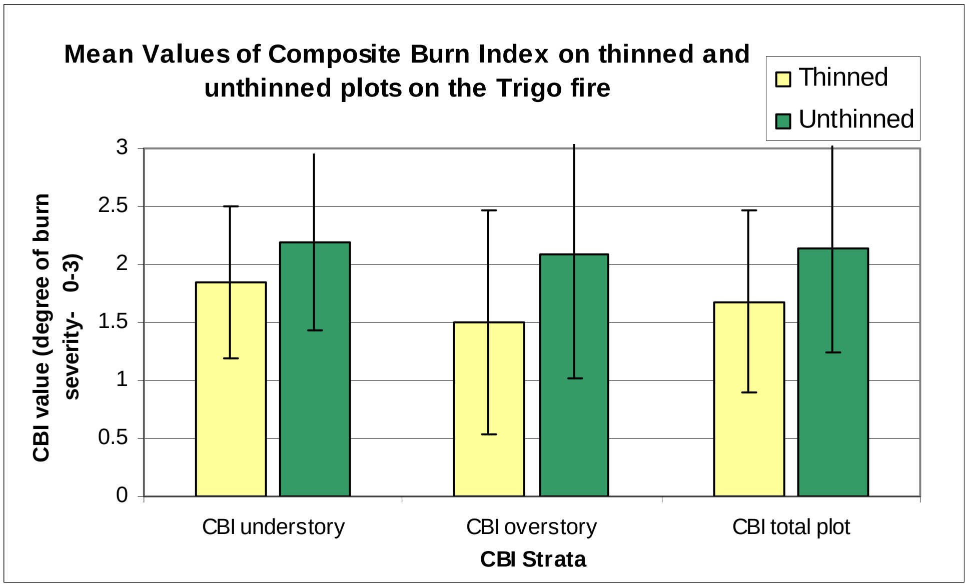
Post-Fire Monitoring

As part of the Fire monitoring project we carried out an assessment of burn severity on plots selected within the Trigo Fire perimeter. Plots were randomly selected and stratified by thinned and un-thinned area. We measured 68 plots in total, all in ponderosa pine and all on private land at the eastern edge of the fire perimeter. We chose to use the Composite Burn Index (CBI) methodology (Key and Benson 1999) to classify severity because it allowed quick and accurate measurement of burn severity across a large area. The CBI method measures burn severity of a plot on a scale of 0-3:

- CBI: 0-0.5 = unburned
- CBI: 0-5-1.5= low severity
- CBI: 1.5-2.5= moderate severity
- CBI: 2.5-3.0= high severity

CBI plots are circular nested plots with a 20ft radius plot nested inside a 25ft radius plot. The smaller plot is used to measure fire effects to the understory strata which include parameters- soil, litter, duff, herbaceous vegetation and shrubs (understory). The larger outer plot is used to measure fire effects to the sub-canopy and dominant canopy strata, which include trees greater than 16 ft (5 meters) (overstory). All measurements are ocular estimates of fire damage to parameters across the plot and measurements are made by the same person in order to limit error through subjectivity. CBI values are calculated for the understory and overstory strata and then a total plot CBI average is calculated from these two values. An example of the CBI data form is included in Appendix A.

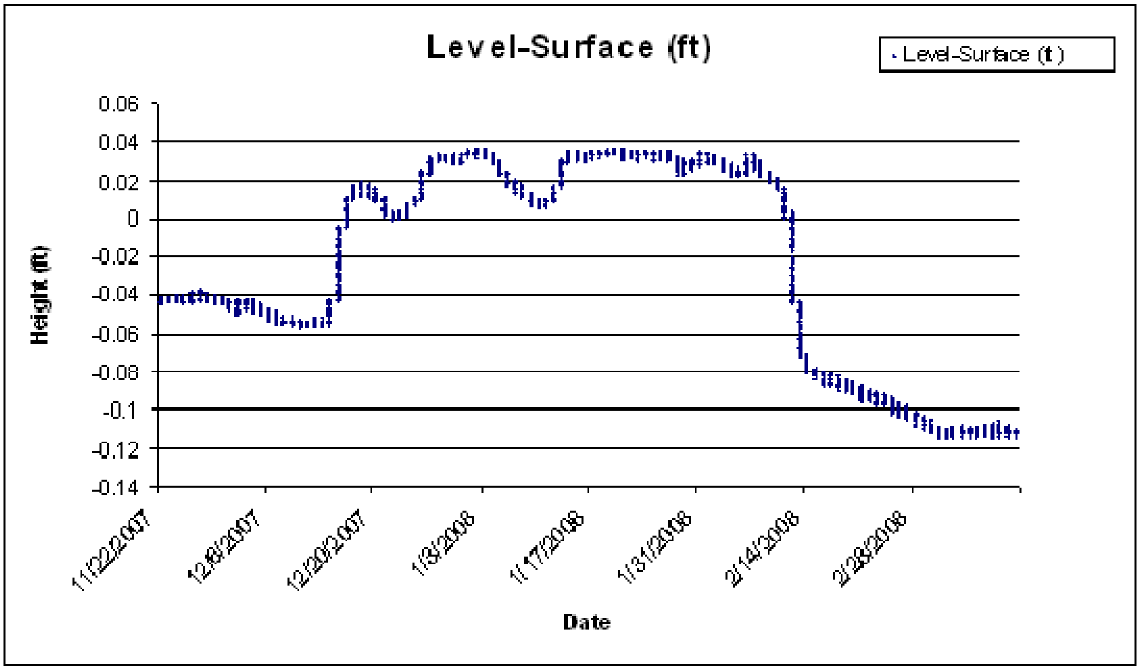
The following chart shows the average CBI values across all plots for understory, overstory and total plot. The data is split into those plots that had been thinned prior to the fire and those that were un-thinned.



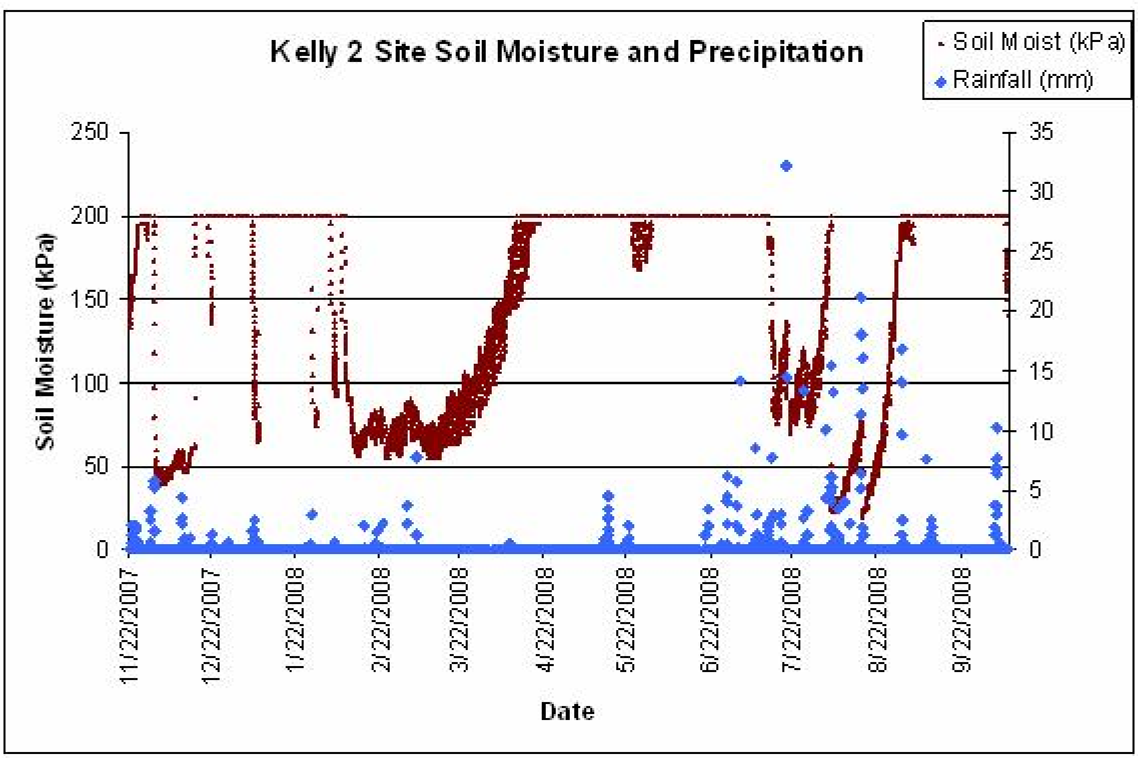
It is clear from the chart that plots that were burned in thinned areas had lower CBI values (lower burn severity) than plots in un-thinned areas for both the understory and overstory strata as well as total plot average. On average, plots in thinned areas experienced at most a moderate severity burn (1.5-2.5 CBI), with most overstory strata experiencing only a low severity impact (0.5-1.5) from the fire. Un-thinned plots experienced on average moderate severity (1.5-2.5) burn across all strata based on the strata means. It should be emphasized however that there was significant range in values for all data sets analyzed, as reflected by the standard deviation bars; un-thinned plots extended into the high severity burn class (2.5-3.0) while thinned plots remained within the moderate severity range (1.5-2.5).

When comparing strata amongst thinned areas the charts show that the burn severity was higher for understory parameters than overstory parameters, suggesting the fire remained predominantly on the surface in thinned areas with limited transmission and spread through the canopy due possibly to a lack of ladder fuels and greater crown spacing. Damage to the understory and overstory was relatively uniform in the un-thinned plots showing that the fire transmitted through active crown fire engaging both surface and canopy fuels.

Water Resources Monitoring



This graph shows changes in height in the Kelly 2 flume. 0 feet is the baseline within the flume, and heights above it indicate flow through the flume.



At each thinning site, Watchdog weather stations have been installed allowing monitoring of how soil moisture changes after rainfall events.