Measuring the effects of slash pile burning and how fire effects change as piles age

Why do we care about the ecological effects of burning piles?

Thousands of piles are burned each year in the West to dispose of thinning and harvesting slash and reduce the risk of severe wildfires. Burning piles is safer than broadcast burning and causes less damage to the environment than a severe wildfire, but we still need to know more about burning piles to protect our forests.

What is the purpose of the study?

The purpose of the proposed research is to examine how piles change with age and how those changes affect the amount of biomass consumed, the rate of pile combustion, carbon dynamics, soil characteristics, and vegetation response under different seasonal burning conditions.

How will this study help?

This study will provide the Okanogan-Wenatchee NF and the Santa Clara Pueblo with new information about the effects of pile burning so that managers can make good decisions about where, when, and under what conditions slash piles should be burned.

How is the experiment set up?

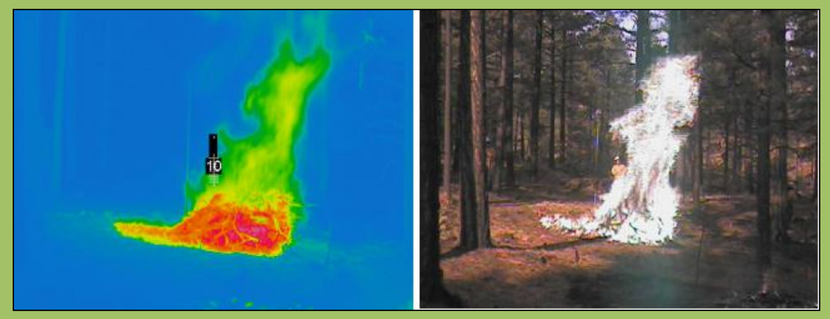
The experiment involves 55 slash piles each near Naches, WA on the Okanogan-Wenatchee NF and on the north side of Santa Clara Canyon on the Santa Clara Pueblo north of Santa Fe, NM.

Thirty piles were built in the fall of 2011 and 25 more will be built in the spring of 2012 at each site. Ten piles will be burned each spring and fall in 2012 and 2013. Each pile is 1.2 m tall and 2.4 m in diameter and weighs approximately 200 kg (WA site) or 85 kg (NM site). Piles were constructed of slash from thinning operations conducted in the spring of 2011.

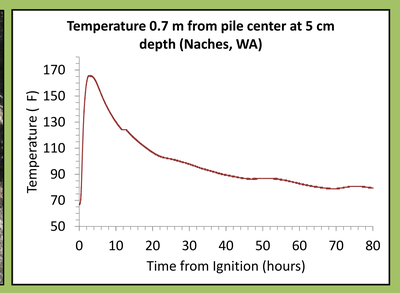
What are we measuring?

To understand how pile burning affects the forest we are measuring fuels, soils, and vegetation both before and after the fire. We measured the size and moisture content of each pile and will monitor how they change after 1, 2, and 3 years.

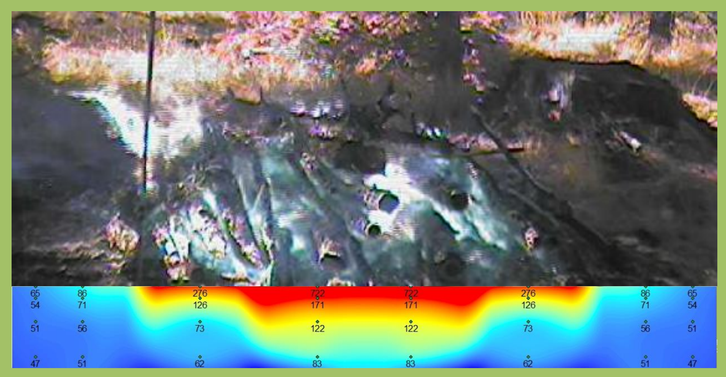
Ground vegetation is measured in small plots and will be monitored for changes in species composition and abundance. We are also measuring fuel consumption and charcoal formation during the fire, and soil nutrients before and after the fire.



In addition, we measured aboveground heat flux with an infrared camera (shown above) and buried thermocouples (shown below, left) that measure the temperature and duration of heating of the fire below ground during the burn (shown below, right).



Initial data show that temperatures were over 700°F under the center of the pile, but only in the 80's at the edges.



We time the burns and record flame height. In the fall of 2011 flaming combustion was over in about 30 minutes, but piles continued to smolder for more than 12 hours. Once the ash is cool, we collect unburned material and charcoal to see how much biomass is consumed, and how much charcoal is produced.

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