# 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 amount and duration of soil heating, 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?

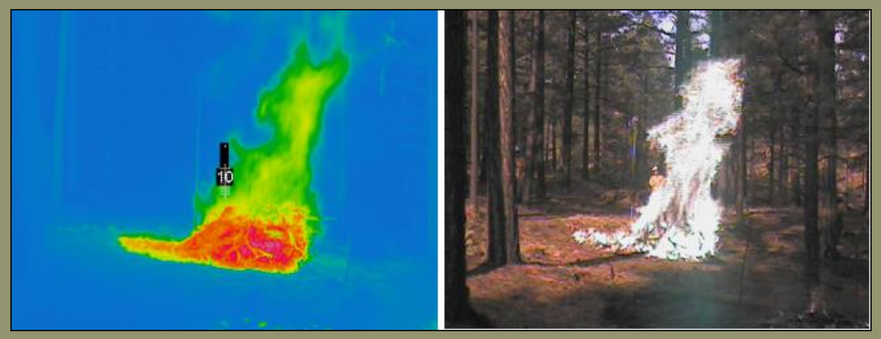
The experiment involves 55 slash piles each near Naches, WA on the Okanogan-Wenatchee NF and on the north side of Santa Clara Canyon on the Santa Clara Pueblo north of Santa Fe, NM.

Thirty piles were built in the fall of 2011 and 25 more were built in the spring of 2012 at each site. Five replicate (pile age x season of burning) piles will be burned in the fall and spring from the fall of 2011 to the spring of 2014. 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.

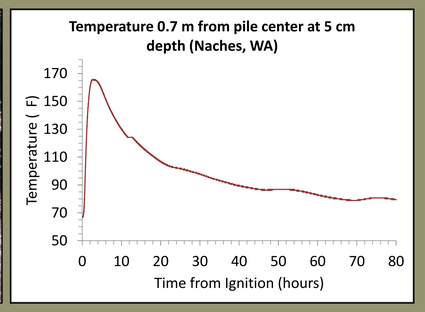
## What are we measuring?

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

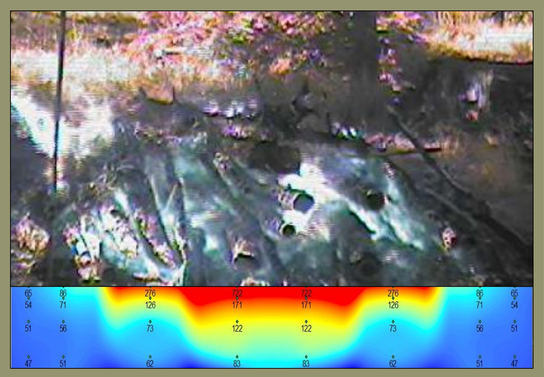
Ground vegetation is measured in small plots and will be monitored for changes in species composition and abundance. We are measuring fuel consumption and charcoal formation during the fire, and soil nutrients and organic matter before and after the fire.

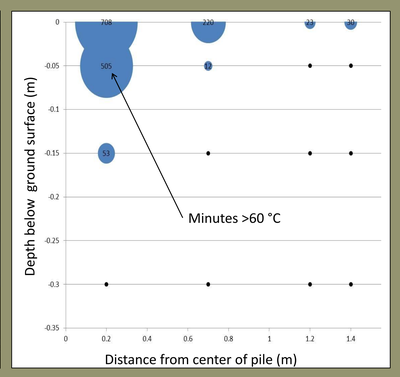


We are measuring aboveground heat flux with an infrared camera (above) and buried thermocouples (below, left) that measure below-ground temperature and duration of heating during the burn (below, right).




Initial data show that surface temperatures were over 700°F under the center of the pile, but only ~80°F at the edges (below, left). Only a small amount of the soil under the center of the pile was heated to 60°C, the lethal temperature for plant parts (below, right).






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.


## Funding

This project is funded by the Joint Fire Science Program under project number 11-1-8-4.



## Researchers

- Clint Wright, USFS Pacific Wildland Fire Sciences Lab
- Zander Evans, Forest Guild
- Karen Haubensak, Northern Arizona University