Science at Santa Clara : 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 Southwest to reduce the risk of severe wildfires. Burning piles is much safer 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 Santa Clara?

This study will provide Santa Clara 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. This experiment also gives the community a chance to interact with scientists and learn about the scientific process.

How is the experiment set up?

The experiment involves 55 slash piles in the Turkey Flats area on the north side of Santa Clara Canyon and another set of 55 slash piles on the Okanogan-Wenatchee National Forest in Washington.

Pile building at Turkey Flats, Santa Clara

Thirty piles were built in the fall of 2011 and 25 more will be built in the spring of 2012. Ten piles will be burned each spring and fall in 2012 and 2013. Each pile is 4 tall and 8 feet in diameter. On average each pile weighs about 193 pounds.

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 two foot squares. Below are some of the most common plants we found.

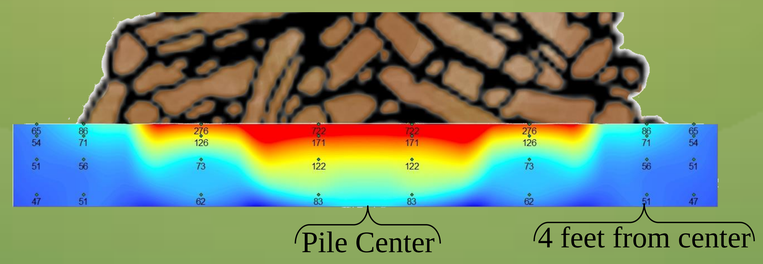
Goosefoot
Chenopodium graveolens

Pussytoes
Antennaria parvifolia

Bitterweed
Hymenoxys richardsonii

We are taking soil samples before and after the fire that will be analyzed to find out how pile burning affects nutrients in the soil. As shown below, we also buried thermocouples that measure the heat of the fire below ground during the burn.

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



We timed the burns and recorded flame heights. The piles burned in about 30 minutes, but continued to smolder for almost 12 hours. The next day, once the ash was cool, we collected unburned material and charcoal to see how much biomass was consumed.

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