CALIFORNIA STATE SCIENCE FAIR
2004 PROJECT SUMMARY

Name(s)
Joshua J. Compton

Project Number
J0805

Project Title
The Effectiveness of Ridgetop Fuelbreaks in Modifying Wildfire Behavior on Moderate and Steep Forested Slopes

Abstract

Objectives/Goals
The objective is to determine the effects of ridgetop fuelbreaks (created by altering vegetation on the ridgetop) on the spread of wildfires, in a forested stand, on moderate (35%) and steep (65%) slopes.

Methods/Materials
Two models (1/150th scale) were constructed using soil mounds with 35% slopes. Wire mesh was placed on the slope to establish a fixed grid pattern. Pine branches, alder twigs, chemise brush, pine shavings, and moss were placed on the mounds in a predetermined pattern. Vegetation was altered on the ridgetop fuelbreak model. A space heater was used to simulate fire weather. The vegetation was ignited and results mapped out corresponding to trees, snags, brush, and surface fuels consumed, partially consumed, and not consumed. This experiment was repeated three times. Two models (1/150th scale) were also constructed using soil mounds with 65% slopes, and the experiments repeated three times.

Results
Complete consumption of trees, snags, brush, and surface fuels was greatest in the control stands, ranging from 50.6% to 63.9%. The ridgetop fuelbreaks on the steep slopes were more effective than on moderate slopes, with complete consumption of trees, snags, brush, and surface fuels ranging from 43.9% to 49.2%.

Conclusions/Discussion
Ridgetop fuelbreaks on moderate and steep slopes were effective in suppressing the wildfires. However, the ridgetop fuelbreaks on the steep slopes were more effective than on moderate slopes which is contrary to background research conducted. The consumption of vegetation was significantly reduced when the wildfires reached the ridgetop fuelbreaks. Ridgetop fuelbreaks can be an effective tool in fire management. The use of ridgetop fuelbreaks in high fire risk areas can reduce the consumption of fuels, thereby suppressing wildfires and allowing firefighters to take control.

Summary Statement
My project is about evaluating the effectiveness of ridgetop fuelbreaks on wildfire behavior, on moderate and steep slopes, using a model forested landscape.

Help Received
Father helped construct soil mounds, gather and place vegetation. Mother helped organize log book and display board.