



**CALIFORNIA STATE SCIENCE FAIR  
2004 PROJECT SUMMARY**

<b>Name(s)</b> <b>Angeline R. Wolski</b>	<b>Project Number</b> <b>S0612</b>
<b>Project Title</b> <b>Burning Desire: The Effect of Prescribed Grassland Fire on Soil Nutrients</b>	
<p style="text-align: center;"><b>Abstract</b></p> <p><b>Objectives/Goals</b> The objective of my project was to determine if prescribed grassland fires affect soil nutrients and are therefore beneficial or harmful to the environment. I also wanted to assess how deep the soil is affected by fire, and see if the changes are confined to the top layer or reach into the lower layer, and measure how long the changes persist.</p> <p><b>Methods/Materials</b> I used a space-for-time substitution to test different ages of fire. I visited four sites in Redwood National Park, a burn from one month, one year, and five years ago, and one site that was not burned for more than 15 years (the control). I took soil samples from three random places at each site in the top (0-6cm deep) and bottom (6-12cm deep) layers of soil. Then I tested every sample for its pH, nitrogen, organic carbon, and potassium content.</p> <p><b>Results</b> Overall, the most recent burn had the highest amounts of potassium and carbon and the most basic pH. Nitrogen, however, was highest in the five-year-old burn. The one-year-old burn had lower nutrient levels than the other sites. At all four sites, the top and bottom layers differed in nutrient content and the top layers showed the largest increase in nutrients following a fire.</p> <p><b>Conclusions/Discussion</b> The nutrient increase was only in the top layer of soil because the fires were not intense enough to reach the bottom layer. In the one-month-old burn, the ash created by the fire increased carbon, nitrogen and potassium and turned the soil more basic. The one-year-old burn site had a lower nutrient content; this may be because the ash was weathered away and there wasn't enough regrowth and build-up of vegetation to compensate for the loss of ash. The five-year-old burn had higher carbon content because of the fast regrowth of vegetation adding to the organic matter. The five-year-old burn had significantly more nutrients than the control, which shows the beneficial effects of fires last at least five years. Overall, the effects of the fires were positive because of the nutrient increase. This counteracts the popular view in today's society that all fires are detrimental.</p>	
<b>Summary Statement</b> I tested the effects of prescribed grassland fires on soil nutrient levels, pH, and depth of change at four sites with different ages of fires.	
<b>Help Received</b> Mother was chauffeur; Humboldt State University provided muffle furnace for carbon testing; Redwood National Park provided background information on burn history.	