



**CALIFORNIA STATE SCIENCE FAIR
2006 PROJECT SUMMARY**

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| Name(s) David M. Cohn, III | Project Number J0907 |
| Project Title From Ashes to Life: Burned Region Plant Regeneration/ Soil Transformation | |
| <p style="text-align: center;">Abstract</p> <p>Objectives/Goals The San Diego County Cedar Fire of October 2003 was the largest fire in California's history. After the fire, driving through my hometown of Poway, I saw black and white ash as far as the eye could see. I wondered how the plants would ever recover. How long would it take and would the same species return? I hypothesized that a wildland fire would cause invasive species to flourish during the first few years after the fire due to the lack of competition and an abundance of nutrients, though over time the burned areas would return to their original state, with native plants taking over and replacing non-natives. I also hypothesized that many nutrients would be abundant in the burned soil, gradually decreasing in concentration over time, and that soil chemistry changes due to a natural fire could be replicated by burning soil in a kiln.</p> <p>Methods/Materials I selected a burned area in a nearby preserve and staked out several 1m² observation plots. Every three weeks for 30 months from November 2003 to April 2006, I measured the soil moisture and temperature and documented the type, number, and description of each plant that germinated in the plots. I also recorded general plant growth observations for the entire hillside. I analyzed soil samples every three months using a Rapidtest soil test kit at my home and fired unburned soil in a Beilman gas kiln at 538°C, 816°C, and 1093°C to assess the fire impacts.</p> <p>Results Over the 30 months, a total of 1,348 native plants versus only 32 non-native plants germinated in the observation plots. To my surprise, the nitrate level remained normal for chaparral soil. Potassium remained above normal probably due to ash in the soil. Phosphorus stayed below normal throughout the entire 30 months. The pH was initially slightly acidic, then remained relatively neutral. Soil analysis of the kiln-burned soil revealed a decrease in potassium at 538°C, then increases at 816°C and 1093°C. Phosphorus increased at 538°C and 816°C, then declined at 1093°C. Nitrogen was depleted at all burn temperatures, and the pH rose as heat was applied.</p> <p>Conclusions/Discussion The native plants regenerated at significantly higher rates than the non-native plants. Native fire-followers, such as (Cryptantha micromeres), Minute popcorn flower and (Phacelia parryi), Parry phacelia, were predominant in the first 18 months. Native grasses thrived in all plots, far outnumbering any invasive grass species.</p> | |
| Summary Statement This project examines the regeneration of native and non-native plants and the transformation of soil in a chaparral region affected by a wildfire. | |
| Help Received My science teacher assisted me with plant identification, editing and organization. | |