



**CALIFORNIA STATE SCIENCE FAIR
2004 PROJECT SUMMARY**

Name(s) Evelyn K. Chan	Project Number S1302
Project Title The Effects of Ash from Local Wildfires on Phytoplankton Growth	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals My objective was to see if natural sources of iron: surface soil or ash, could be a significant source of iron and be beneficial to phytoplankton growth. Iron is a limiting trace metal nutrient necessary to phytoplankton for photosynthesis and growth.</p> <p>Methods/Materials Sterilized flasks, with the same constants such as temperature, light received, added nutrients (without iron) and EDTA were given 42 mg of surface soil to one flask, 42 mg of ash to another flask, and 84 mg of ash to another flask. Each flask had a double, or a second trial, and a control was also included in the experiment. Varying factors of nutrients and ash were also conducted in a different experiment to see the different extents of nutrients that ash could supply to phytoplankton. The effects of natural ligands vs. EDTA added to cultures was also tested. The addition of EDTA was left off in the flasks with natural ligands. All of the flasks were inoculated with one mL of phytoplankton <i>Thalassiosira weissflogii</i>, and the phytoplankton cells were counted daily using a hemacytometer and compound microscope.</p> <p>Results Cultures grown with different added combinations of ash, iron, nitrogen and phosphorous showed that phytoplankton were able to obtain significant amounts of iron from the ash, but not a significant amount of nitrogen and/or phosphorus. Ash was also found to be a more effective source of iron for the phytoplankton than surface soil collected from the San Diego area. Natural ligands found in seawater are much less effective chelators than EDTA, a chelator added to laboratory cultures. Chelators are necessary for the binding of iron, which is important because it keeps much of the iron available to phytoplankton.</p> <p>Conclusions/Discussion My experimental results suggest that ash supplied by the recent San Diego wildfires may have introduced a significant supply of iron to phytoplankton of the southern California coast. Although this type of iron input may be rare or occur occasionally, the regeneration or reuse of iron by phytoplankton may have influences beyond an immediate growth response. This type of nutrient input over a global scale or over long time periods may have an important effect on the marine and global carbon cycles.</p>	
Summary Statement Iron, a scarce limiting nutrient necessary for phytoplankton growth and photosynthesis, is found in ash particles, and greatly increased phytoplankton growth.	
Help Received Used lab materials, compound microscope and hemacytometer at Scripps Institution of Oceanography; Received references from Dr. Kathy Barbeau and Andrew King, who also answered some of my questions; Mom helped to glue board	