



**CALIFORNIA STATE SCIENCE FAIR
2017 PROJECT SUMMARY**

Name(s) Daniel Feng	Project Number J1208
Project Title Are Southern Californian Waters in Danger of Algae Blooms?	
Abstract Objectives/Goals Algae blooms are becoming increasingly common worldwide and are environmentally and financially damaging. In this project, I wanted to find if Southern Californian waters are in imminent danger of an algae bloom. In particular, I asked, "Can the presence of small amounts of fertilizer set off an algae bloom?" and "How does the amount of fertilizer affect the growth of algae blooms?" Methods/Materials I tested 3 local water sources in Orange County. To measure and observe algae growth from these sources, I used Miracle Gro fertilizer, glass vials, a spectrophotometer, a 96-well plate, a microscope, a micropipettor, and cover slides. I divided the water from my sources into many samples and changed the amount of added Miracle Gro fertilizer and the water source (independent variables) to see how they affected algae growth, measured by light absorbance with a wavelength of 750 nm (dependent variable). I had five trials for each sample type, and over three 1-month periods, I took more than 650 measurements. Results I found that it is possible to obtain algae blooms in all 3 of my Southern Californian water sources using very small amounts added fertilizer. The amount of fertilizer in those samples had a fertilizer-to-sample ratio of 1:2000. All of the water sources contained different types of algae as well. I also found that too much fertilizer can stunt algae growth, showing that there is an optimal amount of fertilizer for algae growth. Conclusions/Discussion Very small amounts of fertilizer can cause an algae bloom easily in every water source tested. Southern California is, therefore, in danger of algae blooms. My experiment shows that people should be very wary of fertilizer runoff into their water sources because small fertilizer amounts lead to very noticeable results. These results are important to everyone because water is a precious resource and is used by everybody in many ways.	
Summary Statement I found that Southern California is in danger of algae blooms because a very small amount of fertilizer runoff can result in algae blooms in many water sources.	
Help Received I designed and carried out the experiments myself. Graduate student Medea Neek (UC Irvine) taught me how to use lab equipment and helped me set spectrophotometer conditions. Dr. Huber (Algae Research Supply) gave me helpful information over the phone about algae and sold me algae materials.	