



**CALIFORNIA STATE SCIENCE FAIR
2006 PROJECT SUMMARY**

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| Name(s) Melissa E. Weyant | Project Number J0930 |
| Project Title Modeling the Effects of Storm Drain Pollutants on San Fransquito Creek using Water Quality Studies and Toxicity Testing | |
| <p style="text-align: center;">Abstract</p> <p>Objectives/Goals My objective is to determine how storm drain pollutants affect creek health.</p> <p>Methods/Materials I simulated trace contamination and chemical spill of storm drain pollutants on creek health. In one experiment, I studied three different chemicals, each one at eight different levels of concentration in one gallon tubs of creek water. I monitored all mixtures over three days and repeated the entire experiment three times. All tubs were in a darkened garage, with temperature, light exposure, and air exposure being controlled. I varied levels of chemicals. I used a multi-meter to conduct water quality testing and performed toxicity studies on all tubs using ghost shrimp. After I determined toxicity values for each chemical, I subjected a smaller number of tubs to light/stagnant, dark/aeration, and light/aeration. I also conducted ammonia, nitrate, nitrite, and phosphate testing. I am now conducting LC50 toxicity testing and applying what I have learned to San Fransquito Creek.</p> <p>Results Almost all of the chemical and creek water mixtures that were toxic to ghost shrimp were safe according to water quality measurements. In my stagnant water simulation, a car wash product was toxic at the level of 1 teaspoon to 1/2 tablespoon per gallon of creek water, depending on the size of the ghost shrimp. A deck wash was toxic at 1/4 to 1/2 teaspoon per gallon of creek water. A fertilizer was not toxic by itself. However, at the chemical concentrations that were toxic to ghost shrimp, creek water quality values were almost entirely within normal ranges. Furthermore, subjecting select mixtures to light/stagnant, dark/aeration, and light/aeration did not affect toxicity levels. In my testing for ammonia, I found that the car wash had high levels of ammonia. However, the manufacturer reports that no ammonia is in the product. The high ammonia may be caused by a chemical reaction of the preservative or may be a non-active chemical in the product which the company is not required to report.</p> <p>Conclusions/Discussion My conclusions are important. Stream Keepers who use water quality testing to assess if a creek is healthy may overlook toxic events that will definitely harm creek health. In addition, we need to be careful about chemical labeling and be sure to report potential chemical interactions that may involve a preservative or harmful reactions associated with non-active ingredients.</p> | |
| Summary Statement I performed detailed water quality studies and toxicity testing to evaluate the effects of storm drain pollutants on creek health. | |
| Help Received My parents helped me collect water and supervised my use of chemicals. The Environmental Compliance Group in Palo Alto mentored me, especially Karin North and Brad Eggleston. They let me borrow their multi-meter and pipettes. Stream Keepers Mr. Jackson, Ms. Elliot, and Mr. Frost helped answer questions. | |