



**CALIFORNIA STATE SCIENCE FAIR
2004 PROJECT SUMMARY**

Name(s) David I. Marash-Whitman	Project Number J0917
Project Title Ecotoxicology of Stormwater Pollution in Our Aquatic Communities	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals Chemical pollutants that flow into the storm drain go directly into creeks and the Bay without treatment, making stormwater pollution a threat to aquatic communities. Residential activities (yard, pool, auto, and home maintenance) contribute to stormwater pollution. I wanted to (a)determine the impact of residential stormwater pollutants on organism growth; and (b)compare growth in environmental stormwater runoff samples with growth in 'clean water'</p> <p>Methods/Materials I designed dose/response experiments using a lettuce seed bioassay protocol to look at the effect of pollutant dose on growth. For each of 9 residential pollutants, I exposed 3 replicates with 6 seeds each to 11 serial dilutions of the pollutant(100%>>>0.01%) and a control(0%),incubating them for 5 days. I measured # seeds sprouted and root lengths. I also ran bioassays on environmental stormwater samples to compare growth with controls over a 5 day period.</p> <p>Results Growth (# seeds sprouted/18, average root length) responded to pollutant dose inversely -no growth at high doses and 'normal' growth at very low doses. The dose that caused a 50% drop in growth (TC50) varied greatly - Copper Algaecide(7.4% Cu) had the most impact, with TC50 < 0.01%; Clorox, the herbicide, pesticides, and brake fluid had less impact, with 0.1% < TC50< 1%; and paint and coolant had the least impact, with TC50>1%. Exposure to the pollutants had greater effect on root length than on germination. For environmental samples, stormwater from near a gas station had 3/8 the growth, from near a remodel had 7/8 the growth, and other samples had slightly better growth than the control with 'clean' water over the 5 day period.</p> <p>Conclusions/Discussion All the pollutants proved toxic enough that we should take precautions to avoid contaminating stormwater with them. The fact that Copper Algaecide(7.4% Cu) had significant impact at even very low concentration of copper(7.4 ppm), and similarly that one pesticide (0.24% pyrethins) had significant impact at very low concentration of pyrethins (9.6 ppm), is consistent with community concern and effort to specifically reduce stormwater pollution by these 2 chemicals. Greater impact on root elongation than germination, emphasizes that we should consider multiple effects when studying the ecotoxicology of aquatic systems. Less impact than expected for environmental samples, was probably due to dilution of pollutants with heavy rains.</p>	
Summary Statement This project determined the potential impact of stormwater pollution due to residential activities on aquatic organism growth and identified which of 9 representative pollutants had the greatest toxic impact.	
Help Received My mother helped glue the board, helped get materials for the experiments, drove me to get environmental samples, and helped me wash petri dishes. My little brother Adam helped me label the >350 petri dishes that I used!	