



**CALIFORNIA STATE SCIENCE FAIR  
2009 PROJECT SUMMARY**

<b>Name(s)</b> <b>Elizabeth C. Brajevich</b>	<b>Project Number</b> <b>S0805</b>
<b>Project Title</b> <b>Just Ducky? The Harsh Effects of Torrance Runoff on Madrona Marsh</b>	
<b>Objectives/Goals</b> To use various forms of science including biochemistry and microbiology to preserve Madrona Marsh a vernal marsh in Torrance, California from harsh contaminants in local runoff.	
<b>Abstract</b> <b>Methods/Materials</b> Mock Marshes, Zinc Chloride, Lead Nitrate, Chromium sulfate, Ammonia, Gasoline, Compound light microscope, Balance, GC/MS, seperatory funnel, dichloromethane, NaCL Aqueous solution, Ethanol, Sodium sulfate, safety equipment, droppers, Madrona marsh water, Torrance street runoff, 300 ml distilled water. I obtained permission to use the UCLA GC/MS facility and Madrona Marsh water. I collected marsh and runoff water. Then with the assistance of Dr. Jane Strouse and co-workers, I prepared and analyzed samples of marsh water and runoff using a Gas Chromatography Mass Spectrometer to look for similarities in the marsh and runoff to prove runoff contaminants were entering the vernal marsh when it rained. I researched and chose chose 5 prominent toxins to test on protozoa. I used the protists as an indicator species I set them up in six mock marshes and tested each toxin in the miniature marsh. I counted the amount of protozoa living after 2 weeks and established lead nitrate as the most lethal toxin. I found a filtration system to remove all five toxins from the marsh, a salmon saver Enviro-drain.	
<b>Results</b> Lead Nitrate had the most lethal effect on the protozoa. In a miniature pond previously containing 525 protozoa viewable (100x magnification, 5 minutes), it had only 60 protozoa viewable. An Enviro Drain system can restore the marsh, the top tray filters particles and a natural cellulose fiber absorbs oil and gasoline substances, the bottom tray, filled with activated carbon, neutralizes pesticides and removes lead nitrate as well as the other prominent toxins. My chi-square results prove there is a significant difference between each set of data.	
<b>Conclusions/Discussion</b> My hypothesis was valid because lead nitrate was the most lethal of the five toxins (lead nitrate, zinc chloride, chromium sulfate, ammonia, and gasoline). This means that by removing Lead Nitrate alone, 88.5% more protozoa would survive. When adding each toxin to the mock marshes I used the PPM by mass ratio that each toxin is present in the marsh. I counted protozoa accurately, counting how many I could view in 5 minutes on 100x magnification. I counted Six times, per container and averaged those numbers.	
<b>Summary Statement</b> I detetmined the five most prominint toxins in Madrona Marsh then tested them on protozoa determining Lead Nitrate as the most lethal and found a filter that efficiently removes these polutants fron Madrona Marsh in Torrance California.	
<b>Help Received</b> Due to age restricitons in UCLA sample preperatory labs, Dr. Yves Rubin directed assistants to prepare samples for the GC/MS using a method we had agreed on. Dr. Jane Strouse helped, running the GC/MS machinery, asisiting me most in finding the data on the correct software so that i could analyze the	