



**CALIFORNIA SCIENCE & ENGINEERING FAIR  
2018 PROJECT SUMMARY**

<b>Name(s)</b> <b>Zoe A. Macknicki</b>	<b>Project Number</b> <b>J2211</b>
<b>Project Title</b> <b>Effects of Parking Lot Run-off on Mortality Rates of Freshwater Daphnia and Cyclops</b>	
<b>Objectives/Goals</b> The project studies the effects of parking lot run-off on the mortality rates of freshwater Daphnia and Cyclops at the Arcata Marsh.	
<b>Abstract</b> <b>Methods/Materials</b> Log Pond marsh water, parking lot sediment, dissecting scope, glassware, boiling water, coffee filters. Using boiling water to extract the chemical pollutants from parking lot sediment, and adding additional measured sediment to the cooled soaking sediment sample to incorporate any bacteria, use a coffee filter to strain out sediment solids. Use a needless syringe to add filtered sediment run-off to samples of Log Pond water in a range of concentrations: 15mL/100mL, 20mL/100mL, and 40mL/100mL. Measure and observe 20 mL of each treated sample within each concentration to count Daphnia and Cyclops through a dissecting microscope. Observe daily for two weeks.	
<b>Results</b> In lower concentrations, the number of Daphnia and Cyclops decreased only slightly from the numbers in the control. In higher concentrations, Daphnia and Cyclops numbers decreased measurably and Daphnia was able to recover to nearly those of the control, while Cyclops numbers remained low.	
<b>Conclusions/Discussion</b> In times of drought or dry summers, carbon dioxide and chemical pollutants can be deposited in parking lots and, without rains to wash it away, can be flushed into the nearby freshwater ponds in high concentrations when storms do arrive. This study shows that Cyclops is sensitive to pollutants that run into the freshwater watershed by nearby parking lots. Daphnia is less sensitive to increased pollutants, but mortality rates in both Daphnia and Cyclops do increase as the concentration of pollutants increases. Because these organisms are producers, entire food webs can be affected by the decline of their populations. With a decline in Cyclops and Daphnia populations, the entire ecology of the Arcata Marsh (part of the nation's only ecologically responsible water treatment facility that uses microorganisms to clean the city's waste water) will be affected.	
<b>Summary Statement</b> As the concentration of parking lot run-off increases in freshwater ponds, the mortality rates of Cyclops increase significantly while mortality rates of Daphnia increase at a much lower rate.	
<b>Help Received</b> My science teacher taught me about calculating concentrations and how to use the dissecting scope.	