



**CALIFORNIA SCIENCE & ENGINEERING FAIR
2019 PROJECT SUMMARY**

Name(s) Caley Miller	Project Number J2113
Project Title Salinity Tolerance of Freshwater Green Algae at the Arcata Marsh	
Abstract	
Objectives I added measured sea salt to samples of Arcata Marsh water to create differentiated salinity concentrations and determine the salinity tolerance of freshwater green algae.	
Methods Arcata Marsh water was collected from the Log Pond. 100mL of Arcata Marsh water was measured with a beaker and added to 18 sterile jars. Using a triple-beam-balance, I measured sea salt and added it to jars of Arcata Marsh water to create five salinity concentrations of 1%, 2%, 3.5%, 4% and 4.5%. Three groups were made for each salinity concentration, and three were untreated as a control. I confirmed the salinity using a refractometer. I took readings by placing 1 mL of sample water on a slide and counting the green algal cells seen in each observation in each sample using a compound microscope.	
Results In all concentrations of increased salinity, the green algae mortality rates increased to complete eradication within one week. In salinity concentrations above 2%, all green algae died off completely within the first 24 hours. In concentrations of 2% and 1%, the green algae completely died off after four days.	
Conclusions Freshwater green algae is not tolerant of increased salinity. As ocean levels rise, pushing freshwater watersheds inland, the freshwater ecosystems are at risk. The results of this experiment support that green algae will die off if ocean waters enter the freshwater systems, or if drought increases evaporation and allows soil salts and minerals to increase salinity levels in freshwater. If green algae fail to thrive, organisms that rely on green algae as a food source or to keep oxygen levels stable in water environments will also be affected. The producers help to maintain the equilibrium of whole ecosystems, and this experiment supports the importance of preserving freshwater watersheds to maintain the sustainability of the planet.	
Summary Statement Through establishing controlled, artificial environments of increased salinities from 1% to 4.5%, this project supports that freshwater green algae cannot tolerate increased salinities which can lead to ecosystem instability..	
Help Received Greta Turney provided supervision and instruction on how to use a refractometer and triple beam balance. Greta Turney also assisted in collecting the Arcata Marsh sample and sea salt that I used for this project.	