



**CALIFORNIA STATE SCIENCE FAIR
2007 PROJECT SUMMARY**

Name(s) Katherine W. Glockner	Project Number J1017
Project Title Dinoflagellate Detectives: Bioluminescence as a Measure of Water Quality	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals The purpose of this project was to determine if the water quality in a San Diego County lagoon, San Elijo Lagoon, varied according to high or low tide or location. Dinoflagellate mortality rate is an indicator for water toxicity in several realms, including bacterial contamination, pesticides, and water chemical imbalances. I hypothesized the dinoflagellates would show that lagoon water quality varies between different locations and tides.</p> <p>Methods/Materials I performed a total of 140 tests in this experiment. Two harmless dinoflagellate species, <i>Pyrocystis fusiformis</i> and <i>Pyrocystis lunula</i> were used. I collected water samples from four different sites in the lagoon (mouth, west body, east body, and headwaters) at high and low tides. I obtained samples of <i>P. fusiformis</i> and, to establish a baseline luminescence for each sample, I agitated them and took a picture with a digital camera each night for three days. I then added lagoon water samples to the dinoflagellates and agitated them each night for three days, taking pictures of each result. To analyze the luminosity readings for all the tests, I downloaded the images into Adobe Photoshop and used a histogram to discern the luminosity of each sample. I expressed the results as a percent of the baseline luminosity. I repeated this testing process, with a few minor changes, with <i>P. lunula</i> dinoflagellates. I also tested the samples at a Carlsbad company named Assure Controls using the Qwiklite, a machine that measures the number of photons produced by dinoflagellate bioluminescence.</p> <p>Results The results showed that water quality varied significantly in the lagoon. The dinoflagellate samples with water from the west body site in the lagoon at high tide had the least amount of dinoflagellate mortality, and the highest mortality occurred in water samples from the east body site at low tide.</p> <p>Conclusions/Discussion Based on the results of this experiment, the higher levels of contamination in the lagoon water samples appeared to be near the more urban areas. This implies that urban runoff may be a significant contributor to water contamination in the San Elijo Lagoon.</p>	
Summary Statement In this experiment, the water quality in several regions of a lagoon was evaluated by measuring the luminosity of two dinoflagellate species, <i>Pyrocystis lunula</i> and <i>Pyrocystis fusiformis</i> .	
Help Received Father helped take pictures; Used lab equipment at Assure Controls under the supervision of Mr. Bryan Bjorndal; Mother drove me to different sites; Mrs. Hunker helped decide what to research	