



# CALIFORNIA STATE SCIENCE FAIR 2017 PROJECT SUMMARY

<b>Name(s)</b> Corey D. Telfer	<b>Project Number</b> <b>J1214</b>
<b>Project Title</b> Investigating Water Quality at Cardiff Beach	
<p style="text-align: center;"><b>Abstract</b></p> <p><b>Objectives/Goals</b> I have noticed the difference in the water quality of the San Elijo Lagoon effluent which feeds into the ocean. I hypothesized that nutrients such as phosphates, and nitrates, and bacteria from the San Elijo lagoon effluent will flow directly into the ocean water designated for swimming and surfing which can affect the water quality and may cause algal blooms in the vicinity.</p> <p><b>Methods/Materials</b> For my experiment, I went to Cardiff Beach to take water samples for testing of the chemicals and bacteria. I then went to the science lab at my school, and I tested for phosphates, nitrates, nitrites, ammonia, and pH. I also tested for bacteria levels and plated my water samples into Coliscan Easygel. I inoculated 25 plates with my six different water samples. I included plates containing 0.1 dilution in each sample, and a sterile sample containing only distilled water and the media. 24 hours later, I returned to the lab to read the plates for bacteria and mold colonies. I recorded my results into a field log and on my lab pages.</p> <p><b>Results</b> No ammonia or nitrites were found in any of the water samples I tested. The phosphate measurements were an average of 5 ppm, 50 times greater than the recommended 0.1 ppm. Nitrates were an average of 2.6 ppm, 30% greater than the recommended 2 ppm. The highest concentration of nitrates was found in the lagoon effluent at 3 ppm. The greatest measure of coliform colonies was too numerous to count with colonies all around the plates. E. coli colonies were a maximum of 250 colony forming units per 100 ml. Noncoliform colonies were at most 600 colony forming units per 100 ml. Only three plates contained traces of mold colonies. The bacteria levels were all within the recommended safe ranges with the exception of excessive coliforms found in the effluent water samples. Ocean water samples from the surfing area all contained acceptably low levels of bacteria.</p> <p><b>Conclusions/Discussion</b> In my project, I discovered high levels of phosphates, nitrates, and bacteria in the San Elijo Lagoon effluent and at Cardiff State Beach water. These may contribute to harmful impacts on the ecosystem. Phosphates were the greatest offenders and were at levels of 50 times the recommended ppm for San Diego ocean water. Nitrates exceeded the recommended quantity by 30%. These nutrients may cause algal blooms in the ocean and lead to eutrophication in the lagoon.</p>	
<b>Summary Statement</b> In my project, I tested the impacts of certain chemicals and bacteria flowing out of the San Elijo Lagoon on the water quality of the ocean water.	
<b>Help Received</b> Throughout my project, I required minimal assistance. Throughout my testing, my science teacher, Mrs. Roxanne Hunker supervised my testing in order to test safely and accurately. I also received help from my mother who measured my distance from the shoreline when taking samples of the ocean water.	