



**CALIFORNIA STATE SCIENCE FAIR
2016 PROJECT SUMMARY**

Name(s) Annabelle Fowler	Project Number 36815
Project Title The Effect of Storm Drain Runoff on the Concentration of Chloride Ions and Dissolved Oxygen in Newport Harbor's Back Bay	
Objectives/Goals The objective of this study is to determine the impact of storm drain runoff on concentrations of chloride ions and dissolved oxygen in an estuary. Methods/Materials I collected samples from Back Bay at high tide each day for a period of ten days, recording weather conditions and air and water temperatures, and measuring the dissolved oxygen concentration of the water using a dissolved oxygen probe. I performed three titrations on each sample using silver nitrate and potassium chromate to determine the concentration of chloride ions present. Results The amount of dissolved oxygen present at the storm drain was consistently lower than at the two other locations, on average by 0.94 milligrams per liter, despite the fact that the water was colder near the storm drain. During the first three days of my experiment, the chloride ion concentration was almost ten times lower at the storm drain than at the other two locations, whose concentrations were about the same. However from November 23 to the end of my experiment, the chloride ion concentrations differed by less than 4.1×10^{-5} moles per gram at all three locations. Conclusions/Discussion The low levels of dissolved oxygen near the storm drain have led me to conclude that my hypothesis was correct. The algae and decomposing materials carried into the bay by the storm drain were most likely the cause of the lowered oxygen levels. The days when there was very little difference in chloride ion concentration between my sample sites coincide with the time period when my collection sites were experiencing a king tide. During this period, all three sites were completely submerged at high tide when I did my collecting. The amount of freshwater deposited by the storm drain was not enough to dilute all the extra bay water, so the amount of chloride ions was not lowered significantly. From the data I collected during normal tide patterns, I have come to the conclusion that my hypothesis was correct; storm drain runoff lowers the concentration of chloride ions. However, if I had had more time, I would have taken more samples on days with regular tide patterns to see if the effect I observed was consistent.	
Summary Statement My analysis shows that effluent water released to an estuary causes a decrease in levels of both chloride ions and dissolved oxygen, chemicals that are essential to the survival of the Bay ecosystem.	
Help Received I designed and performed the experiment myself. My parents helped me acquire and dispose of the materials for this project. Robin Madrid, of the California Department of Fish and Wildlife, provided articles for background research, and Stephanie Tartakoff taught me how to do titrations.	