



**CALIFORNIA STATE SCIENCE FAIR
2009 PROJECT SUMMARY**

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Project Title Bioremediation Impacts on Water Quality: Effects on Urban Runoff	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals Over the summer, while at a park near a beach, I noticed a sign that intrigued me. The park contained a small riparian habitat and the sign mentioned a process called "bioremediation". The purpose of my project was to determine if there were significant differences in water quality before and after a creek flowed through a dedicated bioremediation riparian habitat. I hypothesized that, due to the process of bioremediation, the levels of phosphate, ammonia, nitrite, nitrate, and metals would be lower at the downstream test location of Cottonwood Creek Park than at the outflow at the upstream testing location.</p> <p>Methods/Materials I tested in two locations: where the stream enters the park (upstream) and where the creek flows out of the riparian habitat (downstream). I tested for ammonia, pH, nitrates, nitrites, chloride, chlorine, phosphates, iron, copper, chromium, lead and turbidity. I performed 518 tests.</p> <p>Results On average, ammonia, phosphates, and iron levels were all significantly lower in the downstream test site than the upstream site. Ammonia, when present, was reduced, on average, by 0.23ppm. Phosphate was reduced on average by 6.1ppm. In the upstream testing location, iron was sometimes in excess of the iron level normally allowed in recreational waters. Bioremediation, however, lowered iron to 2.8ppm which is within the acceptable range.</p> <p>Conclusions/Discussion The improvements observed in the water quality are especially important since the creek flows almost immediately from the park into the oceans. The reductions in nutrients might help prevent algal blooms. The riparian habitat in Cottonwood Creek Park appeared to have a significant, positive impact on water quality. In addition to being aesthetically pleasing, the riparian habitat provided a valuable environmental benefit: helping to remove excessive nutrients as well as harmful metals. I recommend further study of the effectiveness of bioremediation by riparian habitats as well as more widespread use of these habitats.</p>	
Summary Statement The purpose of my project was to determine if there were significant differences in water quality before and after a creek flowed through a dedicated bioremediation riparian habitat.	
Help Received Thanks to my parents who drove me to my test sites. Thanks to my science teacher who provided me with testing supplies and equipment. Thanks to Schmidt Design Group, a small architectural firm, for providing me with a map of the park I tested.	