



# CALIFORNIA SCIENCE & ENGINEERING FAIR 2019 PROJECT SUMMARY

<b>Name(s)</b> <b>Caroline Worman</b>	<b>Project Number</b> <b>J1134</b>
<b>Project Title</b> <b>Eco-Friendly Filters: Effects on the Escondido Creek Water Quality</b>	
<p style="text-align: center;"><b>Abstract</b></p> <p><b>Objectives</b> Last year I tested the Escondido Creek water quality at different locations attempting to find the source of problems that the Escondido Creek is notorious for. I wondered if there was a way to filter the creek water with eco-friendly materials. The objective of this project was to evaluate the water quality of the Escondido Creek and compare the it before and after natural filtration using peat moss and manganese sand.</p> <p><b>Methods</b> I used a dipper to collect the water samples and recorded environmental observations around the test sites. I ran the sample water through six different variations of manganese sand and peat moss filters and varying number of holes in the bins. I performed 106 tests, 77 chemical tests and 29 plates. I used LaMotte and Hach kits and Coliscan Easygel to grow the bacteria.</p> <p><b>Results</b> Overall, the sample water which filtered slower contained fewer harmful chemicals and bacteria. When filtered through the peat moss filter, copper was entirely eliminated from the water and slightly reduced in all other samples. Unfortunately, the samples filtered through manganese sand contained excessive amounts of nitrate and those filtered without the manganese sand contained less than 2 ppm nitrates. Hardness was decreased in slower filtering tests. Iron was eliminated entirely from each manganese sand filtered sample. Many of the bacteria plates had excessive amounts of non-coliform colonies and were even TNTC. The samples treated with peat moss contained significantly fewer E. coli and mold colonies compared to the samples filtered with manganese sand or peat moss.</p> <p><b>Conclusions</b> From my results I concluded that peat moss and manganese sand filtration may be effective in reducing harmful chemicals and bacteria in polluted water sources, like the Escondido Creek. There were some negative effects on the water quality such as higher levels of nitrates with the manganese sand filtration method. A continuation of this testing and possible chemical modifications to the manganese sand might help to improve the water quality of Escondido Creek and many watersheds like it.</p>	
<b>Summary Statement</b> After filtering the Escondido Creek water, I found that natural filters using peat moss and manganese sand may be effective in reducing harmful chemicals and bacteria.	
<b>Help Received</b> I received help from my parents, my nanny, and my science teacher, Mrs. Hunker, who provided me with the equipment and lab to perform my tests.	