



**CALIFORNIA SCIENCE & ENGINEERING FAIR  
2018 PROJECT SUMMARY**

<b>Name(s)</b> <b>Olivia M. Hansen</b>	<b>Project Number</b> <b>J1206</b>
<b>Project Title</b> <b>Urban Runoff: Is 72 Hours Enough?</b>	
<p style="text-align: center;"><b>Abstract</b></p> <p><b>Objectives/Goals</b> The Department of Environmental Health recommends waiting 72 hours before entering the water at our local beaches after a significant storm event. The purpose of my project was to perform water quality tests on the Cottonwood Creek outlet at Moonlight Beach (a storm drain water runoff area) to discover the impact of urban runoff to this waterway both 24 hours and 72 hours after a heavy rainfall and to confirm if 72 hours is an adequate amount of time for the water quality to return to safe levels. My hypothesis states that although this runoff is UV treated before entering the ocean, I believe there will be a decrease in water quality, including a large increase in bacteria levels immediately following significant rainfall.</p> <p><b>Methods/Materials</b> I collected two water samples from the Cottonwood Creek outlet during a dry period without any rainfall. I tested the following water quality indicators - temperature, pH, salinity, turbidity, nitrates, phosphate and dissolved oxygen. I also tested for total bacteria and fecal bacteria (E.coli) using Coliscan Easygel. Within 24 hours following 1.88 inches of measured rainfall, I collected two water samples from the same location and repeated the same tests. Then I collected two more water samples 72 hours after the rain stopped and repeated all the same tests.</p> <p><b>Results</b> My results showed that urban runoff immediately following a large storm has a negative impact on water quality in this area. Phosphate and turbidity levels increased. Dissolved oxygen decreased. E.coli levels showed a 225% to 400% increase from levels before the rainfall. Nitrate levels did not increase as expected however. 72 hours after the rainfall stopped, the water quality levels returned close to their original values. One interesting result I observed was that E.coli levels do not necessarily return to an EPA acceptable level after 72 hours.</p> <p><b>Conclusions/Discussion</b> Urban runoff after storm events causes water quality issues at the Cottonwood Creek outlet at Moonlight Beach, particularly during the first 24 hours. Although most water quality indicators return to initial levels after 72 hours, E.coli levels that exceed EPA standards are still present in the water that enters our oceans.</p>	
<b>Summary Statement</b> At the Cottonwood Creek outlet at Moonlight Beach, the urban runoff created after a significant amount of rain has a negative impact on water quality and creates an unsafe level of E.coli bacteria to enter the ocean even after the 72 hour r	
<b>Help Received</b> My parents purchased the materials and helped me safely collect the water samples. They provided guidance on how to avoid contact with the bacteria. The Coliscan Easygel kits were purchased from Micrology Labs. They also provided information on sample handling and safe disposal of the bacteria.	