



**CALIFORNIA STATE SCIENCE FAIR
2013 PROJECT SUMMARY**

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Project Title Findings from the Field Yr2: Cont. Study of Pervious Materials in LID Project at Riv.Co. Flood Control/H2O Conserv. Dist	
<p align="center">Abstract</p> <p>Objectives/Goals Year 1 I designed an experiment to determine if oil inhibits water flow through porous materials by studying the infiltration rates of H(2)O with soybean oil (nontoxic proxy for motor oil). Year 2 of this project continues my research of porous materials & low impact development to determine the conditions of permeable surfaces (asphalt, concrete) tested in Year 1 to ascertain if oil has had negative effects on infiltration rates of previously tested locations by retesting these locations with water only & by comparing infiltration rates of water on new locations. I further test my findings using porous concrete core samples in a home lab to compile data to compare with my field findings.</p> <p>Methods/Materials Field: Make infiltration rings with section of air conditioning duct & plumber's putty & mark measurements. Test H(2)O infiltration on Year 1 locations & additional Year 2 locations on three days per location (concrete/asphalt). Calculate results using Akers formula. Lab: Cut porous concrete cores into 30mm sections, find density & make proxy infiltration rings. Divide into H(2)O/sediment, H(2)O/oil/sediment, & H(2)O control. Time infiltration, weigh H(2)O & sample, test H(2)O turbidity with multi-parameter tester.</p> <p>Results The Year 1 porous concrete(PC) test site was totally impermeable. I then tested new PC locations whose rates were quicker than Year 1 sites. The H(2)O infiltration rates of porous asphalt (PA) water/oil locations when tested with H(2)O (no oil) 1 year later were indeed slower than the H(2)O-only control from Year 1 & new H(2)O-only locations. The new PA locations had infiltration rates consistent with the PA Control. When testing PC core samples in a home lab, I observed that oil caused infiltration to be slower than H(2)O alone & that sediment slowed down infiltration immensely for all samples (H(2)O-only control not included.)</p> <p>Conclusions/Discussion Locations on the PA which had oil introduced in Year 1 had much slower H(2)O rates than H(2)O-only control & than last year's oil/H(2)O rates. I believe that sediment has attached to the oil over the year. I found the Year 1 PC test site was completely impervious due to lack of maintenance. The new well-maintained PC test site had even quicker rates than the original Year 1 site. My lab results support my field study. Oil does slow down H(2)O infiltration & appears to trap sediment causing a lack of effectiveness of porous materials.</p>	
<p>Summary Statement This project determines conditions of permeable surfaces tested at RCFC&WCD 1 year later to find if oil has ill effects on infiltration rates of these surfaces by retesting with H(2)O only & comparing rates on new locations & core samples.</p>	
<p>Help Received Robert Cullen allowed my research to take place at RCFC&WCD & provided core samples & information. Wes Blasjo & Fred Pontius at CBU supervised my use of a masonry saw, loaned caliper & multi-parameter tester. Mother & sister took pictures, helped carry & pour water. Father helped research.</p>	