



**CALIFORNIA STATE SCIENCE FAIR  
2012 PROJECT SUMMARY**

<b>Name(s)</b> <b>Hannah J. Washburn</b>	<b>Project Number</b> <b>S0807</b>
<b>Project Title</b> <b>Will the Addition of an Alkaline or Acidic Solution to Hydrophobic Soil Affect Its Ability to Allow Water Percolation?</b>	
<b>Abstract</b> <b>Objectives/Goals</b> The purpose of my project was to determine if saturating hydrophobic soil with an alkaline or acidic solution will help with water percolation. My goal is to find a way to rehabilitate the soil by reducing its hydrophobicity. This is important because hydrophobic soil causes greater water runoff which contributes erosion to precious top soil and post fire mud slides. <b>Methods/Materials</b> I collected coarse, upland soil and covered it with dried leaves and wood. With supervision, I burned the organic material for 8 hours and then let it cool. I then did a WDPT test to determine hydrophobicity. I had 4 test soils: untreated soil, hydrophobic soil, hydrophobic soil saturated with alkaline solution, hydrophobic soil saturated with acidic solution. I saturated 12 cups of hydrophobic soil with alkaline solution(water & salt mix pH of 9)then allowed to dry for 5 days. Did the same with an acidic solution(water & vinegar mix pH of 5). 1 cup of test soil is placed in a clear tube suspended over a measuring cup by wire mesh. I had 147ml of water rain into clear tube and measured amount of water to percolate in 15 minutes. I repeated test for a total of 10 trials per test soil. <b>Results</b> Untreated soil had an average percolation of 84.2ml of water in 15 minutes. Hydrophobic soil had an average percolation of 2.51ml of water in 15 minutes. Hydrophobic soil saturated with an alkaline solution had an average percolation of 20.45ml of water in 15 minutes. Hydrophobic soil saturated with an acidic solution had an average percolation 10.57ml of water in 15 minutes. <b>Conclusions/Discussion</b> Hydrophobic soil saturated with an alkaline solution showed the greatest amount of soil rehabilitation in regards to water percolation. All 10 tests allowed a measurable amount of water percolation averaging 17.94ml more than the hydrophobic soil alone. This is important because if the addition of an alkaline solution speeds up the rehabilitation process of hydrophobic soil we may be closer to finding a solution to the problem of erosion due to hydrophobicity. I believe further testing is needed to determine if the addition of the alkaline solution adversely affects plant life or is a danger to aquatic life and if so could an alkaline loving plant leach enough harmful alkaline to offset this.	
<b>Summary Statement</b> The purpose of my project is to determine if the addition of an alkaline or acidic solution to hydrophobic soil will increase water percolation thereby helping rehabilitate post fire hydrophobic soil.	
<b>Help Received</b> Dad supervised the creating of hydrophobic soil; Mom photographed the testing process	