



**CALIFORNIA STATE SCIENCE FAIR
2008 PROJECT SUMMARY**

Name(s) Quinn Y. Stewart	Project Number S0710
Project Title The Effect of Perennial Ryegrass (<i>Lolium perenne</i>) Presence and Growth Stage on the Erodibility of a Sandy Clay Soil	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals The purpose of this investigation was to evaluate the extent to which the presence and growth stage of perennial ryegrass (<i>Lolium perenne</i>) would affect the erodibility of a sandy clay soil.</p> <p>Methods/Materials The experiment called for 12 plastic rectangular soil pans (10 cm by 18 cm), 12 circular soil collection pans (diameter of 20 cm), 1 water-flow apparatus (previously constructed using a 1000-ml measuring cup, a valve, and a sprinkler fitting), 13 kg of sandy clay soil, 180 g of topsoil, 150 g of ryegrass seed, 1 electronic precision scale, 1 cylindrical lead weight, and 1 large oven.</p> <p>Experimentation involved three test groups of four samples each: a control group, a group with ryegrass planted fourteen days prior to testing, and a group with ryegrass planted twenty-one days prior to testing. To evaluate the effect of the manipulated variable (that is, the presence and growth stage of ryegrass), samples were tested for the responding variable (erodibility) using a water-flow apparatus. The apparatus maintained a consistent intensity, angle, and duration of water flow onto the soil samples in order to maximize the reliability of the testing. Eroded matter was collected in pans and massed to quantify the amount of erosion that had occurred.</p> <p>Results The average eroded masses for the control samples, 14-day samples, and 21-day samples were 40.27 g, 2.32 g, and 0.72 g, respectively. Qualitative observations of soil behavior during erosion testing supported quantitative measurements. The standard deviation ranged from 24% to 29% among the three sample groups, but the small size of sample groups limited the robustness of deviation figures. A t-test analysis proved differences between sample group means to be statistically significant.</p> <p>Conclusions/Discussion Statistically distinct data collected from each sample group, in addition to qualitative observations, supported the hypothesis that the presence of vegetation would reduce erodibility. Further, it was supported that more advanced growth stages of vegetation were more effective in preventing erosion than earlier growth stages. The findings of this experiment suggest that re-seeding may be effective in reducing erosion after wildfires. Further investigation would be needed to evaluate and compare the benefits and drawbacks of re-seeding and natural re-vegetation.</p>	
Summary Statement This project examines the role of vegetation in determining soil erodibility.	
Help Received Geomatrix Consultants donated soil samples and ran gradation tests to ensure soil consistency.	