



**CALIFORNIA STATE SCIENCE FAIR
2004 PROJECT SUMMARY**

Name(s) Alan M. Joyce	Project Number J0913
Project Title The Effect of Runoff on Bacteria Levels in Escondido Creek	
Abstract Objectives/Goals This study sought to compare bacteria levels before and after rain along the Escondido Creek to determine whether runoff from a horse farm would affect bacteria levels in the Creek. Methods/Materials Water samples were collected several times at each of four locations along the Escondido Creek: two immediately upstream and two immediately downstream from a horse farm. Samples were taken both before and twelve hours after a rain. In the first tests, samples were run through a 0.22 micron filter to collect bacterial impurities. The filters were swabbed, and then bacteria were cultured in soy trypticase agar, which was incubated for 24 hours at 24 °C. After the incubation period, a digital picture was taken of each dish against a light box. The pictures were uploaded to a computer. They were analyzed using Adobe Photoshop to desaturate the images, and Kodak 1D, to determine the total number of pixels representing bacteria on each dish. For each sample the pixel counts representing bacteria were compared. In the second phase of this study, I used the multiple tube fermentation technique to confirm the results of the first experiment by testing samples collected from locations upstream and downstream from a horse farm, again before and after rainfall. Results After the rain, the downstream samples had much higher bacteria counts than the upstream samples. In the first tests, the average number of pixels representing bacteria in samples taken after the rain was 11 million, and only 4.8 million for #before rain# samples. In the second set of experiments on average there were much higher bacteria levels after the rain. The downstream samples averaged 20 times as much total coliform bacteria (MPN 1,400,000) and almost twice as much fecal coliform bacteria (MPN 30,000) as the upstream samples. Conclusions/Discussion From the results, runoff from a horse farm appeared to significantly impact bacterial levels in the creek.	
Summary Statement This study compared bacteria levels before and after rain along the Escondido Creek to determine whether runoff from a horse farm affected bacteria levels in the Creek.	
Help Received Dr. Gerald Joyce allowed me to use his lab equipment; Suzanne Mandel Mosko allowed me to use her lab and equipment; Mother helped with display creation; Science teacher provided advice throughout project	