CALIFORNIA STATE SCIENCE FAIR
2009 PROJECT SUMMARY

Name(s)
Connor J. Rutten

Project Number
S1715

Project Title
Escherichia coli Bacterial Pollution in the Santa Rosa Watershed

Abstract

Objectives/Goals
The purpose of this experiment is to test the level of Escherichia coli (E. coli) in the local creeks of Santa Rosa and determine if the levels change according to where the samples were taken in relation to the center of town. The objective is to determine whether levels of E.Coli in the creeks are a factor of human influence and what hazard it may pose.

Methods/Materials
Establish appropriate sample sites to test for E. coli inputs. Observe any variables e.g. human activity, temperature, and creek flow. Make sterile collections and label. Mix one Coliscan Easygel with 5mL of sample, label and fill Petri dishes. Culture samples for 48 hours; count the number of purple/blue colonies in each Petri dish. Report results in number of E. coli colonies per 100mL of water; 100mL/5mL=20mL x # of E. coli colonies = # of E. coli colonies per 100mL of water. Compare and evaluate results from each sample and to see if the level of E. coli and its location correlates to the observed human activity.

Coliscan Water Quality Kit (30 each Easygel test bottles, Petri dishes, sterile collection bottles, and sterile 3ml droppers. rubber gloves, a black marker, map, bleach, and cooler samples.

Results
The data collected showed that rain was causing dispersion of E. coli bacteria. At first, E. coli concentration was high in just two locations within the watershed, but after the first rainfall it had dispersed throughout the creeks/sample sites. The data also showed a spike in the level of E. coli in Spring Creek, a creek next to a local ranch, suggesting that fecal matter had been washed into the creek by the rain. As Spring Creek intersects the mainstem of Santa Rosa Creek and progresses further into town, Santa Rosa Creek is collecting increasing levels of fecal mattern and therefore E. coli.

Conclusions/Discussion
The results conclude that the presence of E. coli is related to human influence and activites; E. coli concentration is influenced by stream flow. The spike in E. coli levels in Spring Creek was defining proof that human activity, in this case a ranch, largely contributed to the levels of E. coli present. E. coli concentration is affected by stream flow; E. coli dispersed during rain events, and was concentrated in the downstream samples of Santa Rosa Creek. Concentrations exceeded State drinking water standards and were high enough to be considered a heal hazard for body contact and definitely human consumption.

Summary Statement
My project tested for the presence of a hazardous bacterium, Escherichia coli (E. coli) in the Santa Rosa watershed and if this bacterium correlated to human activity and impacted water quality.

Help Received
My dad helped me to order the necessary supplies, and he also drove me around town so I could collect my my water samples.