CALIFORNIA STATE SCIENCE FAIR
2015 PROJECT SUMMARY

Name(s)
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Project Number
S1104

Project Title
What's in Your Water? How Urbanization Impacts Water Quality

Abstract

Objectives/Goals
This study seeks to determine a possible relationship between urbanized land and water quality in three streams in Santa Cruz County. Studies have shown that there is a strong correlation between the proportion of urbanized land in a watershed and the quality of the stream.

Methods/Materials
Branciforte Creek, Arana Gulch Creek, and the San Lorenzo River, each in Santa Cruz County, were sampled. Each watershed was divided into an upper, middle, and lower section based on the surface water drainage area for that sample site. Proportion of urbanized land was calculated on ArcGIS using a Land Cover raster and evaluating classes 21-24 (Booth, Mitchell, & Redlands, 2001). Water temperature, turbidity, conductivity, pH, dissolved oxygen, and air temperature were examined at each site every other month from August 2013 to August 2014.

Results
Correlation tests revealed that dissolved oxygen, water temperature, and conductivity had the highest relationship with proportion of urbanized land. Each variable had an r-value above 0.44. T-tests showed that the results were not statistically significant. The standard deviation of the residuals was found for each variable and showed that pH and dissolved oxygen resulted in the most accurate line of regression, each prediction being within at least 0.49% of the actual value.

Conclusions/Discussion
Healthy water is the source of life. It is necessary to sustain aquatic, human, and environmental existence. However, today, according to the USEPA (2000), "over 13,000 km of streams and rivers in the United States are impaired by urbanization" (As cited by Paul & Meyer, 2002). This study supports this effect in the streams in Santa Cruz County. Future areas to study include additional variables such as examining effect of rainfall, salinity, nitrogen, and phosphorus levels, analyzing fecal coliforms and macroinvertebrates, testing for correlations between variables used, additional streams and sample sites, and sampling for a longer period of time.

Summary Statement
This study seeks to determine a possible relationship between the proportion of urbanized land and water quality in three different streams in Santa Cruz County.

Help Received
Chloe Gordon: driver, Debie Chirco-Macdonald: Coastal Watershed Council connection, John Laird: interview, Jasper Billings: advisor, Jen Slaughter: understanding water quality using SCEHS materials, John Binnert: statistics assistance, Jonathan Felis: assistance on ArcGIS.