



CALIFORNIA STATE SCIENCE FAIR 2014 PROJECT SUMMARY

Name(s) Elizabeth J. Vojvoda	Project Number 34417
Project Title Suburban Nitrogen Runoff's Effects on Aqueous Ecosystems of Contra Costa County	
Objectives/Goals Nitrogen (N) compounds are carried into bodies of water as nitrogen runoff (NR). While NR may have higher relevance in farming areas, NR from commercial products can be significant in suburban communities and affect the aqueous ecosystems of areas such as Contra Costa County (CCC). The goal of this experiment was to analyze the effects of NR on various bodies of water in CCC and to determine how levels of NR would affect the aqueous ecosystems and the safety of human interaction with those bodies of water. The study was subdivided into three parts. The first part of the study looked at N levels in water from multiple sources with connections to storm drains and suburban NR. The second portion explored the communities of bodies of water with various levels of N. The third portion looked at the effect of varying concentrations of ammonia on microorganisms from sample waters. Abstract Nitrogen (N) compounds are carried into bodies of water as nitrogen runoff (NR). While NR may have higher relevance in farming areas, NR from commercial products can be significant in suburban communities and affect the aqueous ecosystems of areas such as Contra Costa County (CCC). The goal of this experiment was to analyze the effects of NR on various bodies of water in CCC and to determine how levels of NR would affect the aqueous ecosystems and the safety of human interaction with those bodies of water. The study was subdivided into three parts. The first part of the study looked at N levels in water from multiple sources with connections to storm drains and suburban NR. The second portion explored the communities of bodies of water with various levels of N. The third portion looked at the effect of varying concentrations of ammonia on microorganisms from sample waters. Methods/Materials Samples from four different CCC bodies of water and tap faucets (control), were tested for levels of N using test strips on three consecutive weeks. The populations within the water samples were studied on a standard light microscope. The amounts and diversities of identifiable organisms were determined. Results The data revealed an isolated body of water (Tao Pond-TP) has higher amounts of N, greater population size and diversity than creeks with storm drain connections (Low and San Ramon Creeks). San Ramon Creek (SRC) and Remington Creek (RC) had similar amounts of N and populations. In February 2014, the amount of N compounds in SRC was highest (1.65 ppm) and the population in SRC was largest (346 organisms). The data showed a connection between N levels and population characteristics. Microbes from samples collected were grown with varying amounts of ammonia. TP had the highest circular colony growth rate (109.97 colony/day) when enhanced continuously with ammonia (control trial: 67.264 c/d). SRC showed similar results for the circular colony growth. Cow Creek and RC#s control trial had the greatest logarithmic graph values and the variable trials showed inhibited growth. Conclusions/Discussion In all bodies of water, the overabundance of N compounds can cause eutrophication, toxicity, and other health concerns. NR has varying effects on different water bodies which should analyzed in all areas to find the dangers of human interactions. NR should be limited to reduce health risks.	
Summary Statement The goal of this project was to analyze the current effects of nitrogen runoff on various bodies of water in CCC and to determine how increased nitrogen runoff would affect the aqueous ecosystems and their safety for human interaction.	
Help Received Mother and Father edited written report, assisted in water collections, and helped organize poster; Mrs. Groch provided lab equipment and agar plates; peers edited written report	