CALIFORNIA STATE SCIENCE FAIR
2004 PROJECT SUMMARY

Name(s)
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Project Number
S0801

Project Title
What's in That Water? A Study of Water Filtration in a Wetland Ecosystem

Abstract

Objectives/Goals
The purpose of this experiment was to determine whether the natural purification action of a wetlands ecosystem causes a measurable improvement in the water quality. Water quality was defined in terms of copper, nitrate, dissolved oxygen (DO), total dissolved solids (TDS), and pH.

Methods/Materials
Tests were performed at two housing areas to establish a baseline for pH and chlorine and to familiarize the scientists with the equipment. Field tests were also conducted for pH and chlorine to insure relative pH stability between when the samples were taken and when they were measured in the lab and to check for chlorine as chlorine assists in water purification. A minimum of five samples from sites at Piute Pond were then taken on four consecutive weeks. The sites were selected based on three factors; they were in different portions of the ecosystem, restrictions on water surface travel and, the recommendations of the Edwards AFB Environmental Engineer. Lab analyses for DO, TDS, pH, nitrates, and copper were performed on all field samples. A control sample was taken during week one and tested with samples obtained during each of the three subsequent weeks.

Results
Water quality measured between inlet and outlet did not improve in relation to tests that were performed. The DO level decreased by 15%, TDS decreased less than 3%, and pH levels remained constant. There was less than 1.3% difference in nitrate levels and a 2.5% difference in copper levels between sample locations. Two probable reasons for this exist. One, the vegetation that serves as the water filtration device is located near the inlet and not evenly spread throughout the ecosystem. This does not allow the vegetation to completely perform its filtration. Second, research indicates that the depth of the pond is a factor in filtration capability due to the differing types of vegetation that exist at deeper levels. Piute Pond is very shallow throughout inhibiting filtration capacity. However, in the vegetated areas of the wetland, copper levels decreased 60% and nitrate levels decreased 70%.

Conclusions/Discussion
The data indicated that the hypothesis was correct. In evaluating the data it was found that water quality did not improve significantly from the inlet to the outlet. In conclusion, Piute Ponds is not efficient in improving the water quality of the water from the water treatment plant.

Summary Statement
The purpose of this experiment was to determine whether the natural purification action of a wetlands ecosystem causes a measurable improvement in the water quality.

Help Received
Used bioenvironmental laboratory at Edwards AFB under supervision of Mr. Lynn Coffey. Father helped type report.