CALIFORNIA STATE SCIENCE FAIR
2005 PROJECT SUMMARY

Name(s)
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Project Number
J0632

Project Title
The Water Quality of Two Bayland Ponds

Abstract

Objectives/Goals
My objective was to compare the water quality of two bayland ponds and a nearby creek. I asked several questions. How does the water quality of the ponds and nearby creek change over a day? How does wind increase dissolved oxygen? How well do surface measurements at the pond edge reflect water quality? How do bayland pond and creek habitats compare? What is the source of water for the bayland ponds?

Methods/Materials
At first I used a multi-meter to test seven sites at my ponds and nearby creek once a week. I wanted more data so I conducted multi-meter testing at the seven locations three times a day for four days. Now I am continuing my multi-meter testing at eight sites, including a bay site, three times a day, once a week, for eight weeks. The multi-meter measures several values including dissolved oxygen, temperature, salinity, and pH. I also monitor wind speed, air temperature, turbidity, and rainfall. At home I test water samples for ammonia, nitrate, and nitrite. A pipe is used to extend the measurement site away from the pond edge and to allow measurements at different depths. I mark water level using wooden poles. I use an excel spreadsheet to organize my data and collect digital photographs.

Results
Wind increases dissolved oxygen in pond water. In a day, dissolved oxygen starts low, goes up high, and then slightly decreases. Surface measurements from the edge are comparable to measurements away from the edge and below the surface. Dissolved oxygen is higher and more consistent in creek water than pond water. The salinity in the creek was much lower than the salinity in the ponds, including the pond with the fish kill. The results of the ammonia, nitrate, and nitrite testing are so far negative.

Conclusions/Discussion
Wind increases dissolved oxygen in ponds by increasing water surface area. The changing of dissolved oxygen in a day is due to the effects of wind and photosynthesis. Surface measurements from the pond edge adequately reflect pond water quality because of convection currents. The ponds receive water mostly from groundwater linked to the bay and not from the nearby creek. Creek habitats are healthier than bayland pond habitats because of faster flowing, new water, more water surface area, and less build-up of debris. It was not possible to show if the fish kill was caused by storm drainage or a waste problem; this emphasizes the need for continuous testing.

Summary Statement
This project shows how the water quality of two bayland ponds and a nearby creek change over time.

Help Received
The Environmental Compliance Group in the City of Palo Alto let me borrow their multi-meter and gave me good advice. My mother drove me to my testing sites.