CALIFORNIA STATE SCIENCE FAIR
2008 PROJECT SUMMARY

Name(s)
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Project Number
J1001

Project Title
Measuring Seawater Mixing in Pillar Point Harbor, Half Moon Bay

Abstract

Objectives/Goals
To determine if Pillar Point Harbors man-made breakwaters allow the wind, tide and surf action to mix the water in the harbor.

Methods/Materials
I tested four different spots in Pillar Point Harbor and one control spot at Surfers Beach for dissolved oxygen, pH, temperature, salinity and conductivity. I had 87 pieces of data from five sampling trips. In order to test for conductivity I built a probe that attaches to a voltmeter that measures resistance which I converted to conductivity. Salinity tests, done at the San Francisco Water Department, were compared with my conductivity measurements to see if the voltmeter probe worked.

Results
In all the tests the numbers I got did not vary very much and I found almost no difference between the inner and outer harbors and my control site at Surfers Beach. The conductivity probe was not sensitive enough to pick up differences in our salinity range. When I graphed the data against the salinity measurements I got a scatter plot that showed no trend.

Conclusions/Discussion
A comparison of the averages for sites in the harbor versus the control site showed very little variation. My results suggest the harbor waters are well mixed with no sign of stagnation. The results of my voltmeter data compared to the salinity data showed that the probe I built was not sensitive enough to show differences in conductivity in the concentration range for our seawater.

Summary Statement
My project explored whether the seawater in Pillar Point Harbor is well-mixed by wind, tide and surf action.

Help Received
Father helped build probe. Mother helped figure out which tests to use and taught me Chart Wizard on Excel. Both parents drove to sampling sites. Salinity tests, used as a check on conductivity readings, were performed by the San Francisco Water Department.