CALIFORNIA STATE SCIENCE FAIR
2008 PROJECT SUMMARY

Name(s)
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Project Number
J1017

Project Title
Sandy Beaches: Pleasure or Pollutant? An Analysis of Sand Bacteria as a Possible Source of Ocean Contamination, Year 2

Abstract

Objectives/Goals
We tested as a continuation of previous years in which we found that beach sand could be a possible contaminant of oceanwater and groundwater. We tested to see if sand could be a filter for Escherichia coli (E.coli) and coliform bacteria. We used local beaches as our case studies. We tested for E.coli and coliform bacteria before and after filtering oceanwater and groundwater through the sand. Our null hypothesis stated that there would be no significant difference between the amount of E.coli and coliform bacteria filtered by the sand; and the amount of E.coli and coliform bacteria added by the sand when oceanwater and groundwater are run through sand cores. Our alternative hypothesis stated that when the oceanwater and groundwater run through the sand, the sand will filter out the E.coli and coliform bacteria. When the clean water runs through the sand, the water will not pick up any bacteria.

Methods/Materials
We collected sand cores from three different beaches at three spots each at the high tide line. Then groundwater and oceanwater were run through the sand cores. After the filtered water was collected, it was tested for E.coli and coliform bacteria, in regulation of the state standards. Then the water was put in an incubator for 18-22 hours and read for bacteria counts. Sand at 6 inches in the beach was collected and tested to find out the original bacteria counts for the sand. The sand was collected at 6 inches because previous tests indicated that there was the most bacteria at 6 inches in the sand.

Results
Capitola Beach oceanwater E.coli filtration overall acted as a filter. Capitola Beach groundwater E.coli and coliform for oceanwater and groundwater filtration the sand did not act as a filter. For Cowell's Beach and Rio Del Mar Beach oceanwater and groundwater E.coli and coliform filtration the sand did not act as a filter.

Conclusions/Discussion
Overall, the sand did not act as a filter. Our null hypothesis was rejected, as was our alternative hypothesis because there was a significant difference between ocean water and groundwater filtration. The sand did not filter bacteria and the groundwater became unclean.
In the future we would test more beaches, at different seasons and make sure to be very exact with our measurements.
People could use this information to educate the public about safety of their local beaches. Also, this could be reason why oceans are so contaminated.

Summary Statement
The purpose of our project is to see if beach sand can act as a natural filter for Escherichia coli (E.coli) and coliform bacterias in the oceanwater and groundwater.

Help Received
Our parents for driving us to each beach, buying our supplies, and being our mentors. Adina Paytan of UCSC for helping us design our tests and helping us analyze our data. Eric Russell and Sarah Mansergh, of the Surfrider Foundation, for donating bacteria testing supplies. Whitney LeConte, of the Iddex Water