CALIFORNIA STATE SCIENCE FAIR
2005 PROJECT SUMMARY

Name(s)
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Project Number
S0613

Project Title
Ripped Away: How Does Dredging Affect Rip Currents?

Abstract

Objectives/Goals
Each year, people drown by getting caught in rip currents along coastal areas. Often this happens in places where sand dredged from the ocean has been added to the beach. My experiment tests to see if extending the beach by adding sand to it affects rip currents. I hypothesize that if a beach is built out, then the frequency and speed of rip currents will increase.

Methods/Materials
I built a model beach using a plastic tank and a tray of sand. Waves were created in the tank using a wave-maker built from a Lego set. I used plaster-of-paris molds to shape the sand into beaches with sandbars at different distances.
I measured rip currents by turning on the wave-maker and videotaping Styrofoam pieces as they were pulled into the currents near the beach. A total of 54 trials were run using three different sandbar depths (0, 0.5, 1cm) and three different distances between the beach and the sandbar (4, 6, 8cm). The video was analyzed on a computer to calculate the frequency and speed of rip currents.

Results
The data showed that rip currents occurred in 16 out of 18 trials with the most built out beach, but in only 11 of 18 trials with the least built out beach. However, I did not find a statistically significant difference in the speeds of the rip currents when the beach was built out.

Conclusions/Discussion
My hypothesis was partially correct. When the beach was built out, the number of rip currents increased by 45%. Although there were small changes in the speed of the rip currrents when the beach was built out, they were not statistically significant.
This experiment shows that changing a beach can have an impact on the behavior of the ocean. By understanding this impact, we can try to change our beaches in ways that will affect the currents less.

Summary Statement
My experiment tests to see if building a beach out towards the ocean increases the frequency and speed of rip currents.

Help Received
My dad offered suggestions for building my apparatus and downloaded the video into the computer for me. He showed me statistical tests I could do in Microsoft Excel.