



**CALIFORNIA STATE SCIENCE FAIR
2003 PROJECT SUMMARY**

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| Name(s) Eric W. Leidersdorf | Project Number J0613 |
| Project Title Use Your Head(land)! An Experiment in Shore Protection | |
| <p style="text-align: center;">Abstract</p> <p>Objectives/Goals The objective of this project was to determine whether a man-made headland could rival the effectiveness of a groin in protecting the shoreline, but maintain a more natural setting.</p> <p>Methods/Materials The experiment was conducted in a 1.2 m x 2.4 m rectangular wave basin. Three tests were run: an unprotected beach, a beach with a conventional groin, and a beach with an experimental, triangular headland. The horizontal scale was 1:400 and the vertical scale was 1:80 (5:1 distorted scale). Each test consisted of 6,000 waves run in sets of 60 to prevent recirculation. The wave height was 3 cm and the period was 0.42 seconds. The water depth was 7.6 cm. The slope of the beach was 1 on 6, which equals a 1 on 30 prototype slope. To measure changes in the beach, eleven profiles were surveyed before and after each test from the back of the beach to the toe.</p> <p>Results The test results indicated that the groin trapped the most sand. Not many sand grains were able to pass around the end, and a large bar formed on its updrift side. However, since the groin trapped so much sand, it starved the downdrift beach. The headland did a better job of regulating sediment movement. It did not starve the downdrift beach, because it did not block as much sediment. It caused a large, symmetrical bar to develop on its updrift and downdrift sides.</p> <p>Conclusions/Discussion The experiment demonstrated that a man-made headland can rival the effectiveness of a groin in protecting the shoreline. Although a groin protects the beach on the updrift side, it causes erosion on the downdrift side. A headland is not as effective on the updrift side, but provides more equal protection for the entire beach.</p> | |
| Summary Statement This project compares the effectiveness of different methods of protecting the shoreline. | |
| Help Received Prof. R. Wiegel (U.C. Berkeley) and Prof. W. McDougal (Univ. of Fla.) offered suggestions for literature, preliminary tests, and design of the wave basin. Mr. G.E. Hearon answered questions about the results, and provided guidance on graphing beach profiles. My father assisted in constructing the wave basin. | |