

## **A STUDY OF WATER CIRCULATION AND WATER QUALITY IN HILO BAY, HAWAII**

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Hilo Bay, located on the windward side of the Big Island of Hawaii, appears degraded to an undefined degree and does not provide a suitable environment for recreation and aesthetic enjoyment of the area. Canoe paddling, surfing, fishing and other water sports are popular recreational uses of the bay. The focus of a study completed by the US Army Corps of Engineers, Honolulu District was to identify and evaluate alternatives to modify the existing breakwater at Hilo Bay to increase water circulation and provide corresponding water quality improvements through the application of numerical models. The resulting changes to wave energy within the harbor were also investigated to relatively quantify the effects that breakwater modification may have on navigation.

The criteria for assessing alternative plans in this study were determined by examining changes in waves, current circulation, water quality, and residence time, as well as by determining areas subject to stagnant or weak circulation or focused wave energy resulting from proposed alternatives. The initial numerical modeling efforts concentrated on quantifying change in circulation and wave patterns with and without the alternatives in place for a range of forcing conditions. Model results and predictions for up to five alternative breakwater plans will be presented.

This study highlights the changing coastal environment and the continuing challenge of balancing the importance of navigation and industry with recreation and environmental health.

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