

**Effect of bed shear stress forces on coral distribution in
Kailua Bay, Oahu**

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Abstract

Water energy has long been recognized as one of the most important factors controlling coral growth and reef development. I investigated the effect of bed shear stress forces on coral distribution in Kailua Bay, Oahu. As part of this study, a computer model was developed and utilized to map the sum of wave-, tide-, and current-induced hydrodynamic forces in Kailua Bay. The model output was then compared with data on coral cover and coral species distribution at four sites throughout the bay. High stress environments were observed to have lower diversity and lower coral coverage than low stress environments. In addition, high stress environments exhibited significantly higher coralline algae cover and uninhabited substrate than low stress environments, although species equitability of cover was comparable. Results from the modeling and sample data suggest that wave-, tide-, and current-induced forces are an important control on the amount of living coral, and on the distribution of other benthic species and uninhabited substrate in a coral reef ecosystem.