

EFFECTS OF CLIMATE CHANGE, OCEAN ACIDIFICATION, AND NUTRIENT  
ENRICHMENT ON CORAL-ALGAL COMPETITION

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By  
NATASHA GRISWOLD

Thesis Advisors

ROB TOONEN  
CHRIS JURY

## Abstract

Although research has been performed on the effects of climate change, nutrient enrichment, and ocean acidification on corals, little is known about these effects on coral-algal competition. This study was conducted from June 23, 2015 to August 5, 2015 at the Hawaii Institute of Marine Biology on Coconut Island in Kaneohe Bay, Hawaii using organisms collected from Kaneohe Bay: *Gracilaria*, *Kappaphycus*, and *Porites Compressa*. The study design consisted of exposing corals and coral-algal pairs to one of two levels each of temperature (ambient or elevated), CO<sub>2</sub> (ambient or elevated), and nutrients (ambient or elevated) in a fully factorial design, resulting in eight environmental treatments total. Results show high temperature levels (~31-30 °C) have the most significant effect on reducing coral growth by nearly 50%. Coral competition with macroalgae also had a clear negative impact on coral growth, reducing growth by nearly 30%. Nutrient enrichment and elevated levels of CO<sub>2</sub> did not impact coral growth under any of the test conditions. Without mitigating either climate change, or local impacts (nutrient enrichment and presence of algae), coral growth could decrease by ~80% in the next 50-100 years.