

Crumbling Coral: Investigating How Changes in Structural Complexity Impact Cryptofauna Communities

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Coral reefs are undergoing rapid change in the Anthropocene due to global climate change, disease outbreaks, and other factors. These impacts have been especially felt in the Florida Keys where the loss of live corals have caused a scale-shift in habitat complexity. What were once highly rugose, three-dimensional reef environments have since shifted into flattened rubble beds, which offer highly complex microhabitat for small organisms. This research aims to explore how the transition from large-scale reef complexity to interstitial microhabitat complexity impacts marine cryptofauna: the most diverse metazoan community of organisms on coral reefs. This was done through a series of field experiments across sites in the middle Florida Keys. The influence of reef-wide habitat complexity on cryptofauna communities and recruitment were assessed with Autonomous Reef Monitoring Systems (ARMS) and Structure-from-Motion photogrammetry. Additionally, field manipulations were used to simulate varying degrees of three-dimensional complexity around coral rubble habitats and assess its influence on motile cryptofauna community composition. Preliminary results found that cryptofauna vary by region and respond to changes in structural complexity across multiple scales. Structurally complex environments immediately around coral rubble had a positive effect on cryptofauna biodiversity, while microhabitat metrics such as the quantity and shape of rubble pieces influenced the abundance and species richness of these communities. These results provide a much-needed perspective on how changes in habitat complexity across multiple scales impact an integral community in the Florida Reef Tract.