

MS Thesis Defense

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Title: Associations Between the Diversity and Density of Herbivorous Functional Groups and Ecosystem Functioning in the Caribbean

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ABSTRACT

With an increase in the rate of biodiversity loss, much research has been focused on understanding the relationship between biodiversity and ecosystem functioning. A functional group perspective has emerged. Past research has shown that both the diversity and density of functional groups is positively related to ecosystem functions. This thesis explores the relationship between the variation in macroalgal cover and five herbivorous fish functional groups on 51 reefs in the Caribbean. The main aims are to determine which functional groups significantly affect macroalgal cover and to understand the relative importance of functional group diversity and density. Linear mixed effect models are used to determine the relationships. This study shows that large parrotfish and territorial damselfish (to a lesser extent) are significantly associated with macroalgal cover and that reefs with a high density of large parrotfish and territorial damselfish have low cover of macroalgae. The absence of two species-*Sparisoma radians* and *Archosargus rhomboidalis*, both of which comprise the browser functional group, is an important finding since these fish are the only two species in the Caribbean that preferentially feed on macroalgae. All together, these findings shed light on the shifted baseline in the Caribbean, emphasize the importance of certain herbivorous functional groups in exerting a top-down control on macroalgae and suggest that conserving large parrotfish and territorial damselfish can increase the resilience of reefs against macroalgal phase shifts.