

Title: Students from the University of the Virgin Islands investigate the role of herbivore biomass in coral reef recovery using data available through MBON

The 2020 cohort at the University of the Virgin Islands in the Master of Marine and Environmental Science program, researched the role of herbivory on coral reef recovery in the Caribbean for their capstone project. Long-term data from the Territorial Coral Reef Monitoring Program (TCRMP) in the U.S. Virgin Islands (USVI) and the Puerto Rico Coral Reef Monitoring Program (PRCRMP) that classify reef composition and herbivore biomass was used. These monitoring programs annually or semi-annually collect data on coral cover and composition, and fish density, diversity, and size composition using diver surveys and analysis of photos taken of the benthos. The PRCRMP dataset is available in the MBON Data Portal developed by NOAA-IOOS, while the TCRMP dataset is being translated following the Darwin Core standard to be added to the portal as well. Coral Reef Specialist with CARICOOS, Miguel Figuerola Hernández, provided insight to the students on the MBON portal and the PRCRMP dataset and walked students through translating the raw data from the monitoring programs into the necessary portal format. This insight facilitated a better understanding of the importance of MBON, as well as a better understanding of the data we were working with.

The project hypothesis [to be tested with these datasets] was that sites with higher herbivore biomass showed positive changes in coral cover. Changes in coral cover as a metric of reef resilience were analyzed between the years 2007 to 2017, which represented a period of very little disturbance between a major thermal stress-induced coral mortality event occurring in 2005-06 and the passage of two catastrophic category 5 hurricanes (Irma and Maria) in 2017. Herbivore biomass was used as a proxy for grazing intensity and parrotfish were found to comprise a majority of biomass for both TCRMP and PRCRMP sites. A weak, but significant positive relationship was found between total parrotfish biomass and positive change of coral cover for sites less than 30 meters with the TCRMP data. However, this relationship was not found for sites greater than 30 meters in USVI, neither for the PRCRMP data. When parrotfish species composition was investigated in relation to positive coral cover change in the USVI, rare species, including the rainbow (*Scarus guacamaia*) and blue parrotfish (*Scarus coeruleus*), were found to have more powerful impacts on reef recovery when compared to the more common, but smaller sized, striped parrotfish (*Scarus iseri*). Future work should consider the functional diversity of parrotfish and the effects of coral species composition. As these preliminary results suggest that larger-sized parrotfish that have been over-harvested within the U.S. Caribbean are playing a positive role in reef recovery, management should consider targeted protections for these species.

A webinar on this project was presented and is available temporarily at the following link:

https://zoom.us/rec/play/m6YJkTKjecgNDftN6BRG-gVTaRyaWRrWtWR_o-jhaoBqqAbDcZiP8nzcKkDdkt5uzbNdmbA61YOiSRUi.L_atvj4errxpvjHh?autoplay=true