Status of Parrotfish Populations on Coral Reefs around New Providence & Rose Island, Bahamas

Condicíon de las Poblaciones de Peces Loro en los Arrecifes de Coral de New Providence y Rose Island, Las Bahamas

Estat des Populations de Poissons Perroquets Sur les Récifs Autor New Providence et Rose Island, Bahamas

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EXTENDED ABSTRACT

It is widely recognized that herbivorous parrotfish play critical ecological functions in sustaining healthy coral reefs. A more thorough understanding of the ecological processes that contribute to reef resilience — especially in the face of a rapidly evolving climate is urgently needed for informed conservation management. We conducted fine-scale spatial and temporal analysis using an *in situ* data set spanning 9 years to assess the status of parrotfish populations across 26 reefs representing around New Providence and Rose Island, Bahamas. Ordination analysis through non-metric multidimensional scaling revealed two distinct parrotfish assemblages around New Providence temporally, differing between 2019 and earlier surveys, and spatially between fore- and patch-reef zones (Fig. 1; Sherman et al. 2022). Parrotfish densities declined by 59% across sites (Fig. 2; Sherman et al. 2022) and significant decreases occurred in three species: striped parrotfish (*Scarus iseri)*, redband parrotfish (*Sparisoma aurofrenatum*) and greenblotch parrotfish (*Sp. atomarium*).

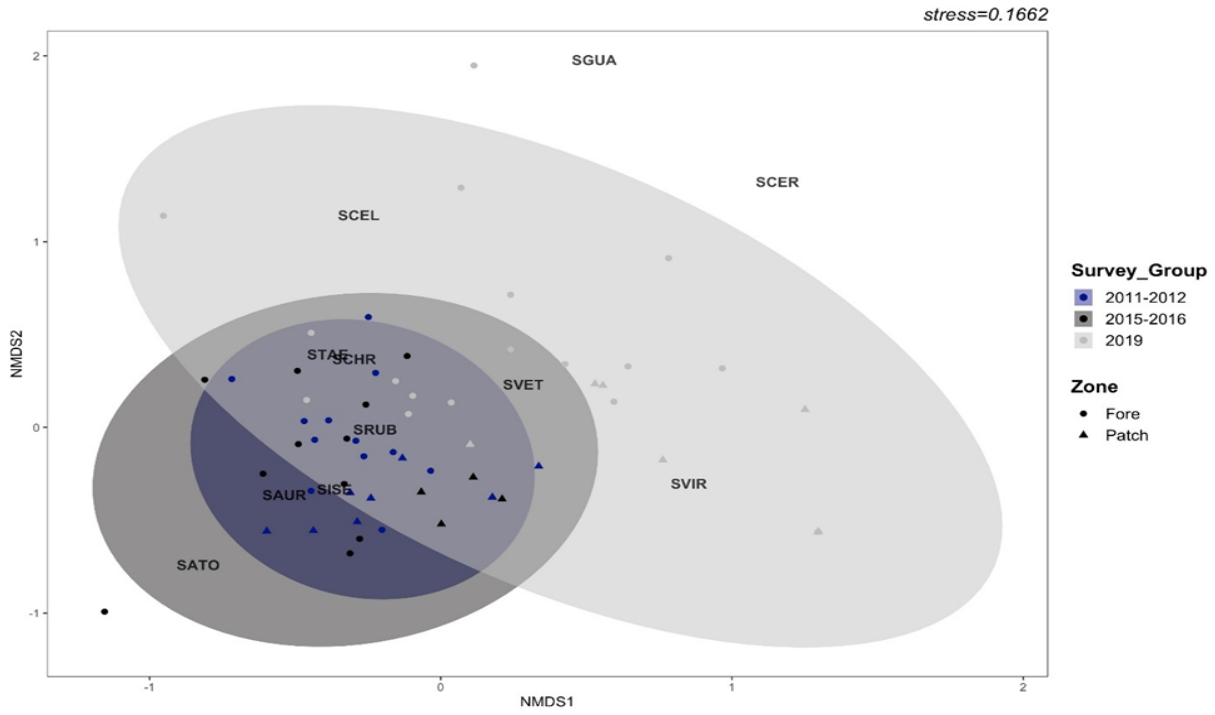

Figure 1. Non-metric multidimensional scaling (NMDS) plots describing assemblage-level variation of mean densities of parrotfish species from New Providence by survey period and zone. Points indicate parrotfish assemblages at individual sites, with species densities averaged for all transects from each survey group. Sites are labelled by zone and coloured by survey group. Ellipses represent 95% confidence intervals for parrotfish assemblages associated with each survey group and the stress values indicate a measure of distortion due to the representation of ordinations in two-dimensional space of the assemblages. Species abbreviations are as follows: SCHR = Sp. chrysopterum, SGUA = Sc. guacamaia, SCEL = Sc. coelestinus, SRUB = Sp. rubripinne, STAE = Scarus taeniopterus, SVET = Sc. vetula, SAUR = Sp. aurofrenatum, SISE = Sc. iseri, SVIR = Sp. viride, SATO = Sp. atomarium and SCER = Sc. coeruleus.

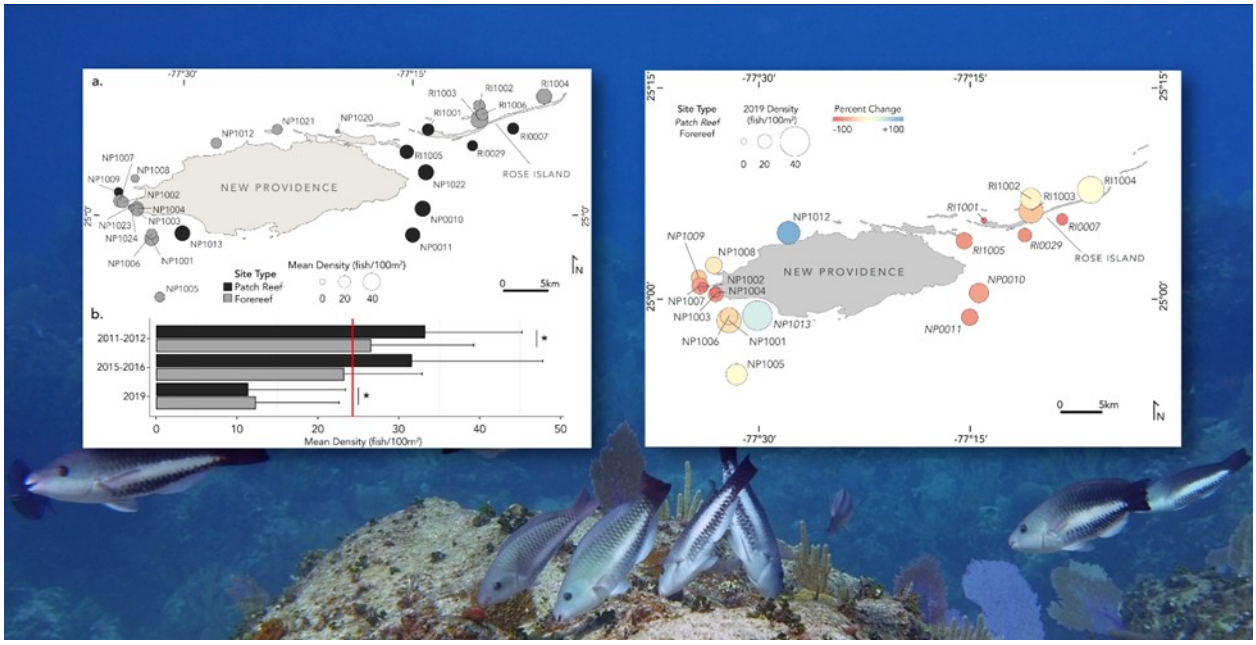

Figure 2. Graphical abstract featuring figures from Sherman et al. 2022, which show changes in parrotfish populations around New Providence and Rose Island, The Bahamas.

Changes in the size composition of parrotfish over time were also found – showing a shift to smaller size fish 11-20 cm and loss of adults across reef sites (Sherman et al. 2022). There were significant interactions between size structure and reef zone for parrotfish overall and for stoplight parrotfish (*Sp. viride)* — a species common across all sites (Sherman et al. 2022). The observed patterns appear to be related to the growing parrotfish fishery in The Bahamas. Our results emphasize the urgency of implementing science-based management strategies to protect these ecologically essential herbivores, which are vital components of coral reefs. Findings from this study are relevant to conservation management of herbivorous fish species and also have important implications for coral reef ecology more generally.

KEYWORDS: density, diversity, herbivores, size composition, fishing

LITERATURE CITED

Sherman, K.D.; Gomez, M.I.; Kemenes, T.; Dahlgren, C.P. Spatial and Temporal Variability in Parrotfish Assemblages on Bahamian Coral Reefs. *Diversity* **2022**, *14*, 625. https://doi.org/10.3390/d14080625

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