

Submission theme: Coastal and marine technologies supporting management

## **Determining the Effectiveness of Curieuse Marine National Park, Seychelles, in Safeguarding Target Species using BRUVS**

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Curieuse Island is a small granitic island (2.86km<sup>2</sup>) in the Republic of Seychelles, approximately 1km north of the Praslin Island. Curieuse Marine National Park (CMNP) was established in 1979, and covers an area of 14.7km<sup>2</sup>. Since establishment, there has been limited fish monitoring within the park, and therefore effectiveness of the park in restoring and restocking species of interest is unknown.

This study provides baseline data on target predatory and scavenger species abundance and diversity along the north shore of Curieuse Island, and over time aims to track changes in their populations. Horizontal BRUV (H-BRUV) Stereo Camera Frames (SeaGIS) modified to be mounted with a single wide-angle video camera were used for this study. Upon retrieval of the units 60 minutes of recording time was analysed. Substrate was categorized as either: sand, rock, rubble, or sand/rock and depth was categorized as shallow ( $\leq 10\text{m}$ ) or deep ( $\geq 15\text{m}$ ). Relative abundance estimates were made by recording (MaxN) and species diversity at each site was calculated using the Shannon-Weiner Diversity Index.

A total of 103 target species were determined for monitoring and 72 were positively identified. Shallow sites had significantly higher average species diversity than deep sites ( $p\text{-value} \leq .05$ ); however, substrate type was not normally distributed and rock and sand/rock were only found at shallow sites. Rock substrate had the highest species diversity ( $H=2.7$ ), followed by sand/rock ( $H=2.2$ ), rubble ( $H=1.5$ ) and sand substrate had the lowest ( $H=.82$ ). Based on MaxN values of species pooled over 22 categories and across all sites, results indicate that Lethrinidae was the most commonly observed family; with the redfin emperor (*Monotaxis heterodon*) seen the most. Snapper species followed in relative abundance, with the red snapper (*Lutjanus bohar*) observed most commonly. Shark sucker, rabbitfish and grouper followed as 3<sup>rd</sup>, 4<sup>th</sup> and 5<sup>th</sup> highest in relative abundance. Emperor, snapper, grouper and rabbitfish species all compose a consistent and significant proportion of landings by artisanal fishermen in Seychelles (Daw et al. 2011 and Seychelles fishing authority 2014); in combination with observing these species in elevated abundance in this study, it can be suggested that CMNP helps promote species population health and sustainable fisheries outside of CMNP. However, the lack of elasmobranchs is cause for concern as only 2 species were recorded at .125 sharks/hr at CMNP. In comparison, 5 species were recorded at .5 sharks/hr at North Island (Green Island Foundation 2015) and 6 species were found at 6.73 sharks/hr at Aldabra (Clarke et al. 2012). This indicates elevated fishing pressures within Seychelles' inner islands. Therefore, continued monitoring of these species, and other target species, in the context of adaptive management is critical in ensuring that the closure of

fisheries within CMNP effectively serves the purpose of preserving source populations for both larval and adult fish spill-over outside of the MPA.