# Changes in Coral Cover and Fish Population Density in the Fishing Reserve of Grand Port, Republic of Mauritius.

**Chumun, P.; V. Seetapah; H. Jhumun; S. Perrine**

Coastal ecosystems, including lagoons are at the front line of climatic change effects and are suffering from a global decline. In Mauritius, main threats to our lagoon ecosystem are development, overfishing, and climate change induced weather anomalies. In 2012, massive coral bleaching events were perceived globally as well as in Mauritius inducing the decline of many species. Understanding the behaviour, and trends of coral cover and their possible recovery is essential input to administer management actions to protect these particularly sensitive ecosystems. In this context, Eco-Sud Lagon Bleu initiated a lagoon monitoring based on Line Intercept Transect (LIT) and visual identification to determine trends amongst coral cover change and abundance and biodiversity of fish species. The monitoring was implemented at five sites within the lagoon of Grand Port, chosen based to show information representative of the lagoon. Site 2 and 3 were adjacent to the coast, whilst site 4 and 5 was adjacent to the reef. Site 1, a degraded area, was chosen as a control and as a means to demonstrate capacity for recovery. The date accumulated since 2016 infers to a gradual increase in live coral cover in the lagoon of Grand port. Fish abundance also fluctuated with sites, reflecting seasonal spawning and life cycles of some fish species. Data collected from the lagoon monitoring of Grand Port fishing reserve could be further used to determine the trends of coral cover and compared with other lagoons of Mauritius, and moreover to understand the effectiveness of Marine Protected Areas in protecting sensitive areas.

## Introduction

The coral reef ecosystem is among the most diverse ecosystem and provides important goods and services to the coastal communities in Mauritius. The coral reef ecosystem in the South East of Mauritius is quite distinct compared to other parts of the Island and has an important socio-economically contribution to the people living in that area. The lagoon in that region is large and relatively shallow and harbours a high percentage of coral cover. The Lagon bleu team of the Ngo Eco-sud has been carrying out visual surveys to estimate the percentage of living coral cover and fish abundance in the Fishing reserve of Grand Port.

## Aims and Objectives

To evaluate the change in coral cover and fish abundance in the lagoon and its impact on the diversity of the reef.

## Methodology


Fig 1: Survey sites in the Lagoon of Grand Port

The survey was carried out using the Line intercept transect (LIT) technique with 3 transect of 20 m each separate by 10 m. Each site was survey on a quarterly basis.

Five sites were selected based on the level of anthropogenic pressure. Site 1 is found outside the fishing reserve. Site 2 & 3 are situated outside the boat traffic lanes. Site 4 & 5 are near the coast and impacted by human activities

## Results & Discussions

**Percentage living coral cover 2015-2019**

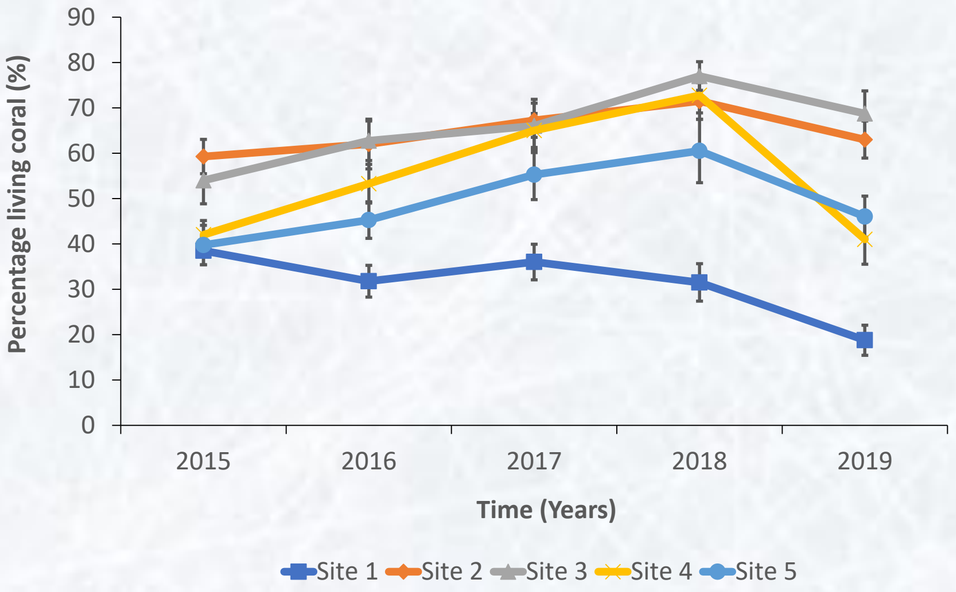


Fig 2: Percentage living coral cover from 2015 to 2019 in 5 different sites around the lagoon of Grand Port.

**Coral diversity index**

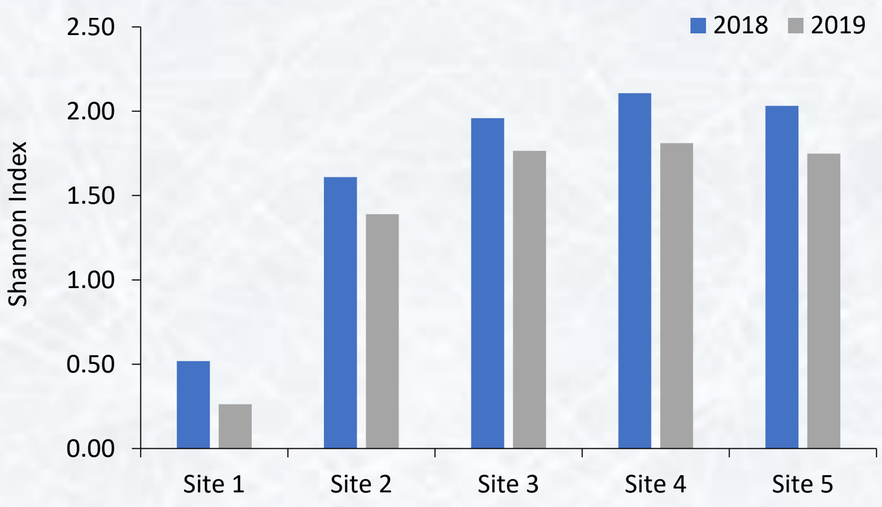


Fig 4: Shannon Diversity Index for coral species from 2018 and 2019.

From 2015 to 2018, the percentage coral cover in site 2, 3, 4 & 5 showed in increase in living coral cover compared to site 1.

A decrease of about 50% was noted in site 1 in the past 5 years.

Living coral cover decreased in all site in the beginning of 2019 due a bleaching event that affected the branching and tabular Acropora species in the survey sites.

The fish abundance in all sites except site 1 showed and average increase of about 25 % in the last five years which could be due to the increase in living coral cover in sites 2, 3, 4 & 5.

The Shannon diversity index indicated an overall decrease in diversity for fish and coral due to the 2019 bleaching event.

**Fish abundance 2015-2019**

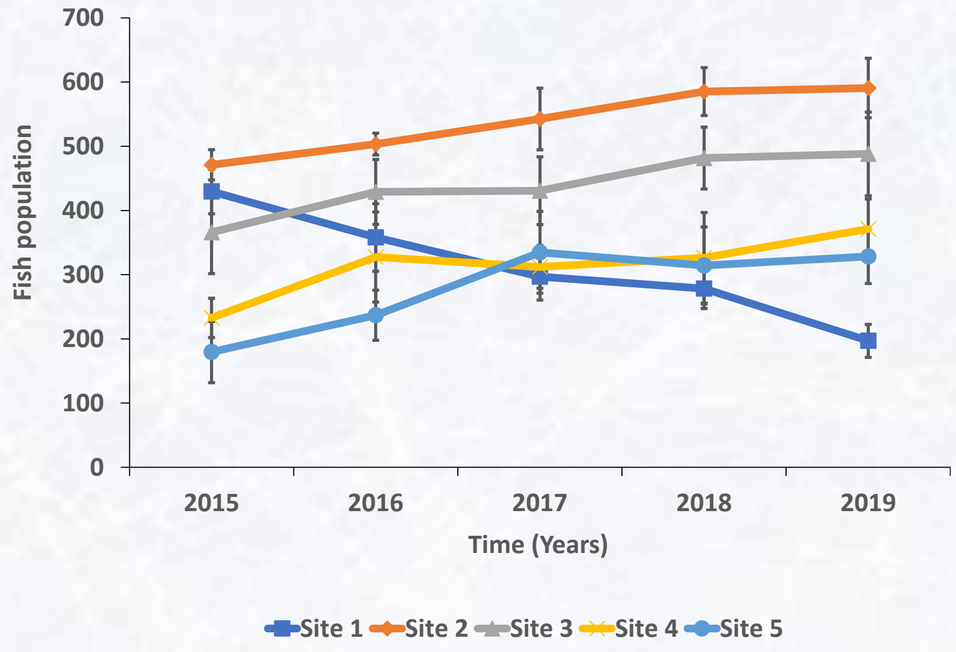


Fig 3: Fish population abundance from 2015 to 2019 in 5 different sites around the lagoon of Grand Port.

**Fish diversity index**

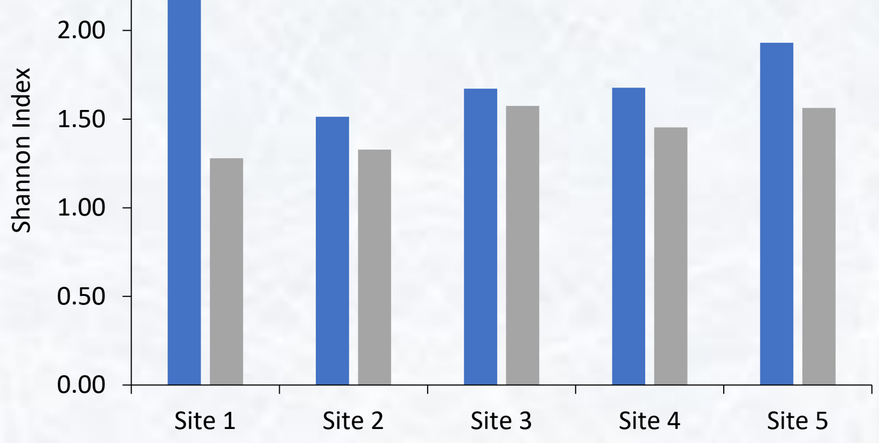


Fig 5: Shannon Diversity Index for fish species from 2018 and 2019.

## Conclusion

The percentage living coral and fish abundance in the Fishing reserve has increased in the past 5 years but a loss in coral cover, fish abundance and diversity has been observed in the beginning of 2019. The bleaching event has affected the reef in the Grand Port region but the ecosystem has shown to be quite resilient to the environmental change. However, a similar event in the near future could be catastrophic to the coral reef ecosystem and could possibly have adverse effect on diversity of the lagoon

**Acknowledgment** The authors would like to acknowledge the staff and volunteers of Eco-sud for their help in data collection.

LAGON BLEU
Protégeons nos lagons !

Eco-sud