

MPA NEWS



Published on MPA News (<https://mpanews.openchannels.org>)

Perspective: First reports from comprehensive, in-depth study of a large remote MPA

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By Rachel Jones

On 11 September 2018 the [Bertarelli Foundation](#) hosted its first Marine Science Symposium, at the Royal Geographical Society in London. The event was a showcase for the first full year of activities in the Bertarelli Programme in Marine Science – a program that focuses entirely on the 644,000-km² British Indian Ocean Territory (BIOT) marine protected area, which includes the Chagos Archipelago.

From 2017 to 2021, the first phase of the program, scientists are applying an unprecedented level of private funding for research in a single MPA – US \$12 million – to determine to what extent this large, remote site is delivering species protection and resilience.

The research program involves more than 60 marine scientists and conservationists. This brief essay gives a synopsis of the main findings from the London symposium.

Sentinel species

BIOT is a regionally important hotspot for highly mobile 'sentinel' species such as pelagic sharks, tuna, seabirds, and turtles. The presence, abundance, and behavior of these species can help indicate an ecosystem's general health and function.

So far 413 tags have been attached to animals from ten species of pelagic predators including grey reef sharks *Carcharhinus amblyrhynchos* and silvertip sharks (*Carcharhinus albimarginatus*). Their tracks are revealing how they use this large MPA and the regional seas beyond its boundaries¹ (presented by Prof [Barbara Block, Stanford University](#)). Results from 256 tagged red-footed and brown boobies are showing foraging trips of hundreds of kilometers that are still contained within the MPA boundary (presented by [Hannah Wood, ZSL](#)). Tagged nesting green turtles (*Chelonia mydas*) return to their foraging grounds on seagrass beds across the region as far north as Somalia² and can be used to identify previously unidentified habitats³ (presented by Dr [Nicole Esteban, Swansea University](#)). Network studies of reef shark behavior based on data from an acoustic array are revealing detailed patterns of their distribution and their subsequent vulnerability to illegal, unreported, and unregulated (IUU) fishing⁴ (presented by Dr [David Jacoby, Zoological Society of London](#)).

Coral reef recovery

BIOT represents some of the last oceanic wilderness left in the Indian Ocean⁵. However, despite its remote location and low level of proximate anthropogenic influences, it still faces pressure from widespread coral bleaching and subsequent changes to reef structure and species composition as a result of climate forcing. Decades-long data sets tracking the changes in the reefs of BIOT have shown good recovery from previous bleaching events. The next four years will provide an opportunity to track the latest response in more detail than has previously been possible (presented by Prof [John Turner, Bangor University](#)). This work will contribute to a better understanding of the mechanisms for recovery in what is effectively a baseline environment relative to other reefs in the region.

Science for management

The aim of the program is to create a substantial body of scientific research that can be used to inform and support management efforts in this MPA and others regionally. Research presented by Prof [Mick Graham \(Lancaster University\)](#) showed that pelagic sources of nutrients brought to the islands by nesting seabirds contribute to increased growth rates of species far out on the reefs around the atolls, particularly compared to those around islands with invasive rats.⁶ This elegant study from BIOT gives a powerful example of how practical field ecology can be used to support and inform conservation management activities such as rat eradication. It also provides evidence for how an MPA of this size can protect an entire ecosystem and maintain the functional links between habitats from the open ocean, through the islands to the reefs.

The program feeds back regularly to the BIOT Administration on management of the MPA, in multiple ways:

- We interpret all published science to draw out management-relevant findings;
- We summarize all main findings from each research expedition;
- We contribute science expertise directly to the BIOT management planning process, and to regional programmes such as [FAD Watch](#) (addressing issues with regard to fish aggregating devices) and the [Indian Ocean Tuna Commission \(IOTC\)](#);
- We will produce a managers summary report at the end of our first full year of science (2018) and annually thereafter. The reports will pull together highlights from each year's science into a series of actionable points that can be used to plan management activities such as prioritizing islands for de-ratting.

Sharing MPA experiences

A series of workshops after the symposium included a half-day session with a team from the 1315-km² Turneffe Atoll Marine Reserve in Belize (also supported by the Bertarelli Foundation). Despite differences between the MPAs – including in size, proximity to human populations, and types of fishing pressure – the two teams were able to find shared areas of experience. In particular the challenges of making scientific research accessible and relevant to MPA managers were reviewed and the MPAs' respective approaches compared.

All presentations from the symposium can be found online [here](#).

Follow the work of the program at [@BIOTscience](#) and [Fondation Bertarelli](#). The next phase of the program will start in mid-2019, building on recent successes while also adding new ideas and projects.

The research program is actively seeking collaborative partnerships, particularly with researchers and MPA practitioners in the wider Western Indian Ocean region. Interested parties should contact BIOTscience@zsl.org, from where they can be put in touch with the most relevant members of the team for further discussions.

For more information:

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