

# CABO VERDE EXPEDITION

25 September - 1 October 2017  
Boavista, Cabo Verde and João Valente reef

MarAlliance Team

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## INTRODUCTION

Under the auspices of the Monaco Explorations, The MarAlliance Team completed the expedition in search of marine megafauna to the SW sector of Boavista and the remote reef of João Valente. Our ongoing research into elasmobranch fauna in eastern Cabo Verde has highlighted several critical areas for marine megafauna. Of these, we proposed two sites to be incorporated into the Yersin's itinerary to complement our existing monitoring throughout this region and support the development of current research. The two sites are specifically reputed to harbour the world's largest ray (*Manta* spp.) and the world's largest shark/fish, the whale shark (*Rhincodon typus*), along with large sharks include tiger, hammerhead, blacktip and mako.

The exploration took place at a critical time as globally, 24% of species of elasmobranchs are classified as 'Threatened' to extinction (Threatened, Endangered, Critically Endangered) by the IUCN [1]. In Cabo Verde a shortage of scientific information exists on elasmobranch diversity, abundance and distribution [2], and yet the Eastern Central Atlantic (ECA), is considered to have one of the highest rates of illegal unreported and unregulated fisheries (IUU) [3]. Such threats pose a significant threat to elasmobranch populations and highlight the need for basic scientific research to establish and monitoring of populations and habitat use of species.

## METHODS

We use a range of methods in order to generate data on 1). relative abundance and distribution of existing populations through deployment of BRUVs (Baited Remote Underwater Video) and scientific longline, and 2). the deployment of SPOT 6 satellite tags (Smart Position Only Tracking) in towed torpedo or fin mounted format in order to provide information on utilization of space and establish potential connectivity between populations of large migratory species such as whale sharks (*Rhincodon typus*), oceanic manta rays (*Manta birostris*) and tiger sharks (*Galeocerdo cuvier*).

### 2.1 BRUVs

Sampling using demersal BRUV systems took place during two days at João Valente bank. Our BRUV system is standardised as per Graham et. 2012 (4), and replicates bait species (*Auxis thazard*) and soak time (>65 minutes) consistent with our existing monitoring in Boavista, Maio and Sal. A total of 15 stations (n=15) were sampled on the 28<sup>th</sup> and 29<sup>th</sup> of September 2017. Stations encompassed both the windward and leeward side of the reef, and a variety of depths between 8m and 40m.

### 2.2 Scientific Longlines

A standardized surface-set scientific longline containing between 20-25 hooks (size 16/0 Mustad circle hooks) was deployed in 4 locations. This generated a total of 285 hooks / across 12:23 hours. All hooks were baited with a chunk of skip jack tuna (*Katsuwonus pelamis*) and left to soak for 50 minutes before being checked again. By reducing the time between checks, known as the 'soak time', we were able to minimise stress and damage to any sharks caught, allowing us to collect genetic and biometric data, deploy tags and release all sharks in optimum condition.

### 2.3 Mega-planktivore surveying

At both sites boat-based visual census' were conducted in order to find mega-planktivores. When these species were identified size estimations, sex and photo identification were made and SPOT 6 towed tags were fitted by way of an in-water snorkeler (ZS and RTG).

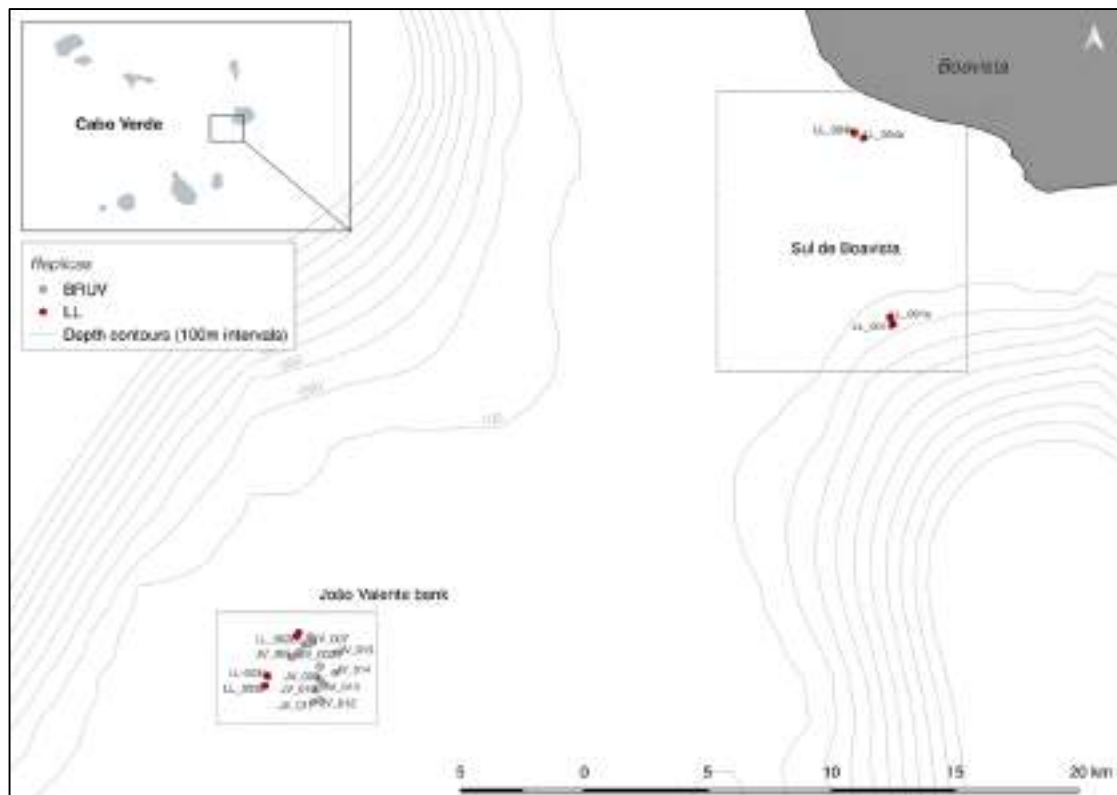


Fig. 1 – Map illustrating BRUV and longline replicas conducted during the Cabo Verde with a pole spear.

## RESULTS

### 3.1 BRUVs

Initial results from video analysis indicated nurse sharks (*Ginglymostoma cirratum*) to be the most abundant elasmobranch species present in João Valente. The round sting ray (*Taeniuria grabata*) was the 2<sup>nd</sup> most abundant elasmobranch species and was observed frequently with preliminary CPUE > 1.0. No other species of sharks have been identified from video recordings.

When compared to other sites in Cabo Verde monitored using BRUVs that yield far higher abundances of top predatory species of sharks, results from Joao Valente suggest a loss of top predatory sharks from the site. Anecdotally, fishers we work with have indicated that the remote reef is increasingly targeted by fishers from the country's largest island of Santiago. However, 2 oceanic manta rays (*Manta birostris*) were also observed, though these were considered coincidental observations.

Teleost fish biomass was noticeably greater at Joao Valente than that found in the coastal zone of the eastern islands and predatory species such as greater amberjack (*Seriola dumerili*) and *Caranx* spp. were significantly more abundant though most individuals were not considered fully mature.

### 3.2 Scientific longline

Only two sharks were caught during eight longline sets with a total of 235 hooks, and on the same set in João Valente West. These were a big nose shark (*Carcharhinus altimus*) and tiger shark (*Galeocerdo cuvier*), both sharks were

mature females and measured 203.5cm and 355cm respectively. Swabs were taken of the dorsal fins to collect bacteria for the MARBEC Team investigating bacterial microbiomes hosted by shark skins and a small fin clip stored in ethanol will help the MarAlliance team in future population studies and the MARBEC team ground truth their eDNA studies when these are undertaken. The tiger shark was fitted with a small orange numbered rototag and a fin-mounted satellite tag (SPOT6) with battery longevity of at least 5 years.

### 3.3 Elasmobranch tracking

Over the course of the expedition seven oceanic manta rays (*Manta birostris*) and two whale sharks (*Rhincodon typus*) were observed either directly or through BRUVs and associate tenders. We successfully in-water tagged the two mantas and one whale shark encountered with SPOT6 torpedo towed tags (Wildlife Computers, Redmond WA). These tags are currently transmitting. Unfortunately, the free site that we used previously to provide daily tracking of the tags no longer functions and there is no alternative. Several of the tracks to date are included as maps below to 19 November 2017. These suggest that within the first month of tagging the animals are resident to Cabo Verde and are mostly site faithful to tagging areas.

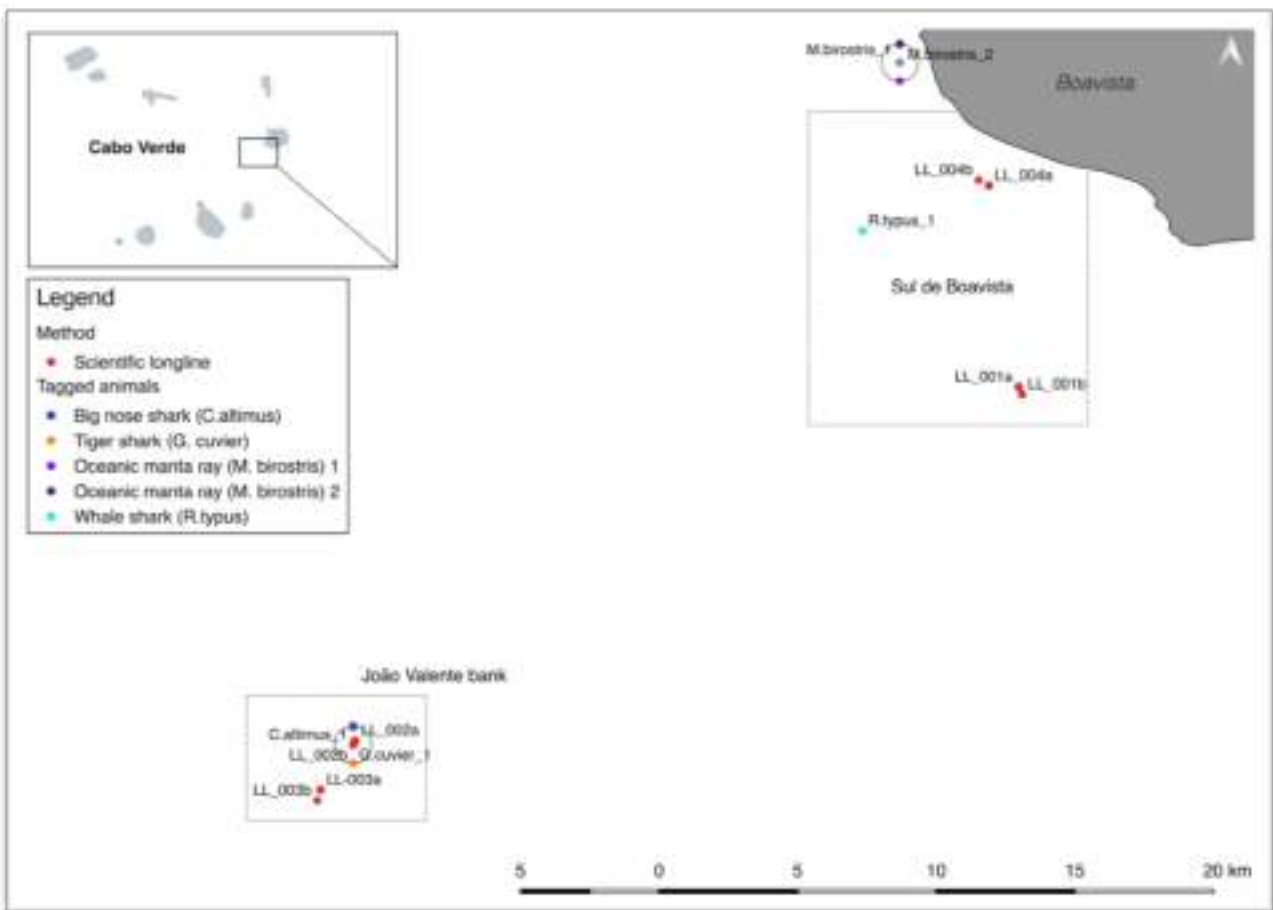


Fig. 2 – Map illustrating species and location of conventionally and satellite-tagged animals in Cabo Verde.

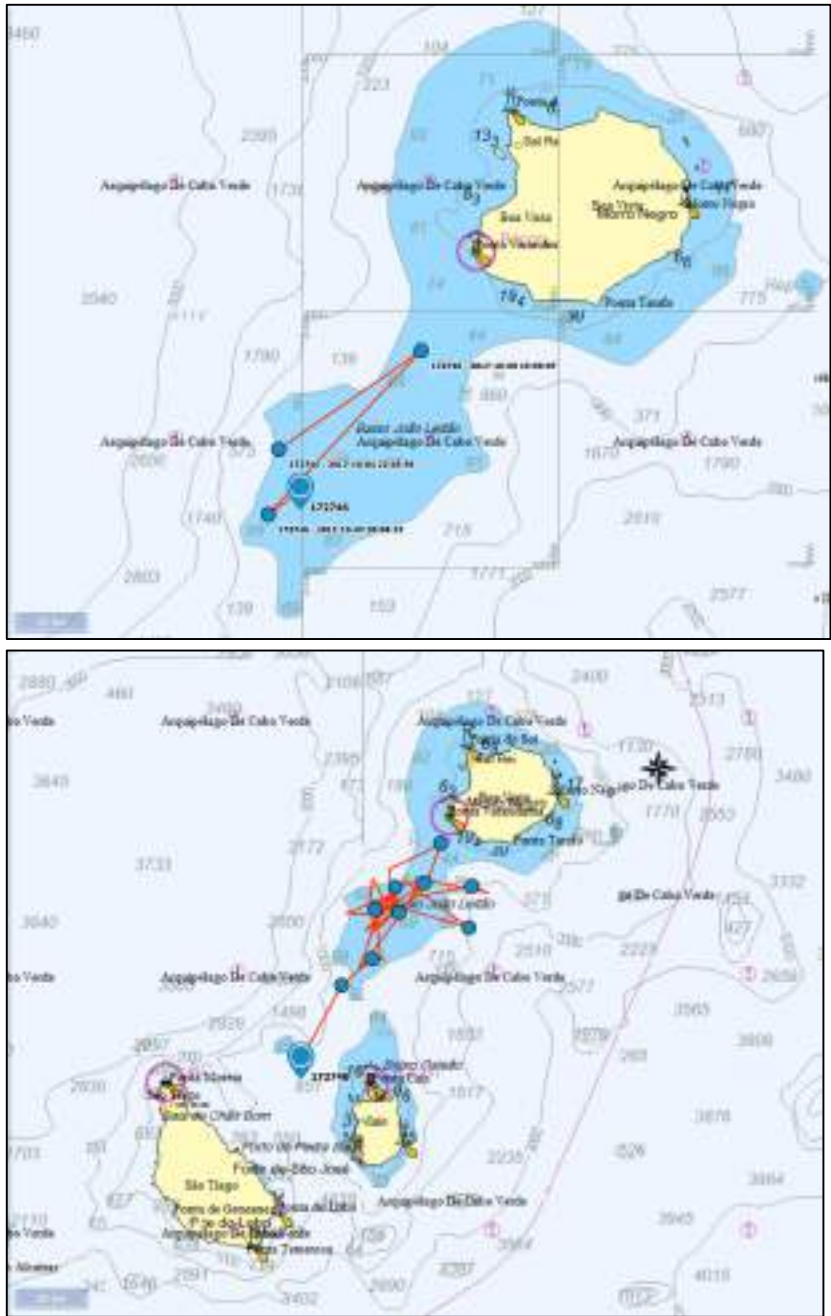


Fig. 3 a,b – a) 5-day track of satellite-tagged tiger shark at Joao Valente with Argos location quality 1-3 used; b - tracks to 19 November 2017.





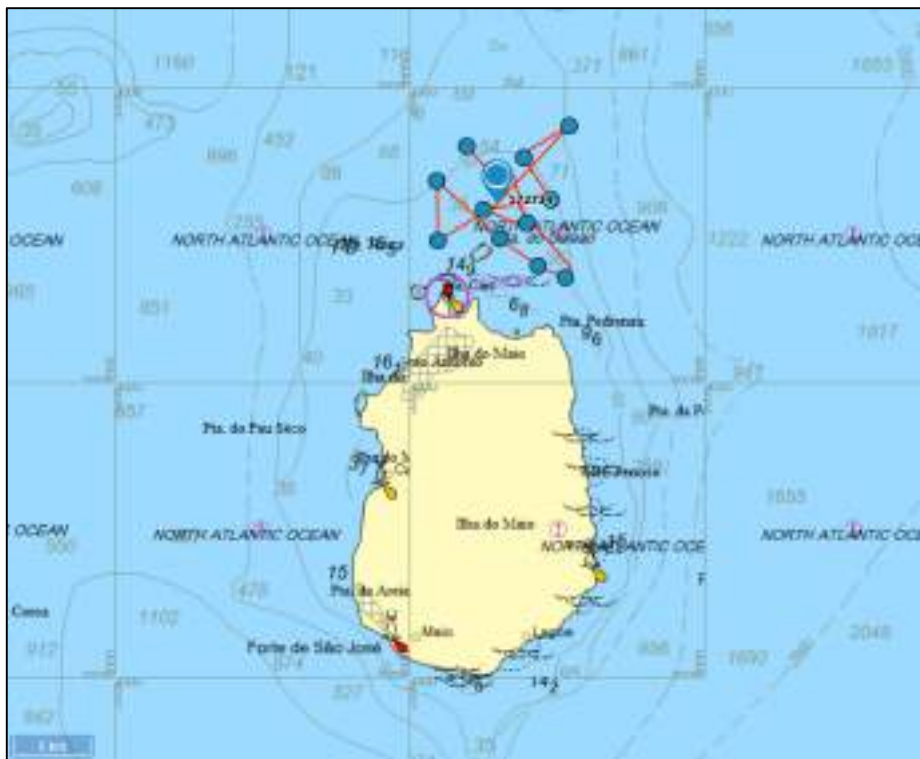


Fig. 5 a,b – a - 15-day Spot-6 track of *Manta birostris* 1 around Boavista with Argos location quality A,B, 1-3 used; b - tracks to 19 November 2017.



Fig. 6 a,b– a-15-day Spot-6 track of *Manta birostris* 2 around Boavista with Argos location quality A, B, 1-3 used; b-tracks to 19 November 2017.

## DISCUSSION and CONCLUSIONS

The remote bank of João Valente has been widely touted amongst Cabo Verde’s artisanal fishers for its abundance and diversity of sharks. Despite João Valente’s distance from the coast, the area appears to have experienced heavy fishing pressure due to its centralized position on the route travelled by fishers between the islands of Santiago and Boavista / Sal. The relative absence of many species on BRUVs recordings, including all higher trophic level Carcharhinidae, suggests intensive fishing pressure focused on top predators has occurred in the recent past. This is further supported by the comparative relative abundance of demersal meso-predatory species such as *G. cirratum* and *T. grabata*. Their abundance may indicate the use of surface / mid-water longlines over bottom-deployed fishing gear, a technique commonly used in industrial tuna and swordfish fisheries and widely acknowledged to have a high impact on mid-water shark populations. Results from scientific longlines provide further limited evidence of top predator presence with CPUE substantially reduced in João Valente (2 animals captured) and 0 caught in South-



western Boavista, indicating sharks are being severely impacted by fisheries and the perception of abundance in these island's coastal waters highlights the putative scarcity in other islands. Further study is required in order to ascertain whether key pelagic species (such as *P. glauca*, *I. oxyrinchus* and *C. falciformis*) are still present in both sites and establish site importance for large-bodied migratory species such as *Galeocerdo cuvier*.

The scarcity of mega-planktivores also encountered during the study was more readily explained by both the timing of the field work and the sea conditions. Rougher seas made finding these animals more difficult, particularly as the BRUV data indicate that *Manta birostris* were present at both sites during the survey. Nonetheless, their relative scarcity supports fisher assertions of seasonality with considerably fewer observations of mega-planktivores recorded outside of the recently identified peak season of late July through early September.

Continued efforts will be made to tag a total of 6 mantas, 6 whale sharks and 10 tiger sharks that form the basis of our satellite telemetry project for these species in 2017 and early 2018. Towed SPOT tags and smaller fin mounted SPOT tags are expected to provide from weeks to 6 months' maximum of movement information if the tags are not predated on (this does occur). The larger fin mounted tags can provide up to 5 years if the animals are not captured. We hope to capture the maximum amount of information on these threatened species over the next 6-12 months to best identify and support the protection of hotspots that may further function as critical habitat in the species life-cycle. Results will be shared with the Government of Cabo Verde, integrated where possible into management plans and used to raise awareness for the need to manage and protect highly migratory species. These data are notable in light of the new provisions of the Convention on Migratory Species that support stronger cross boundary cooperation for species such as the whale shark, manta rays and large bodied hammerheads.

Throughout this process we will keep the Monaco Explorations apprised of the results and their positive impact on species science and conservation in Cabo Verde.

## ACKNOWLEDGEMENTS

We gratefully acknowledge the support of Monaco Explorations, the scientific exploration vessel, the Yersin, and her crew, in making this study possible. We are grateful to the Government of Cabo Verde for extending the necessary research permit and accompanying us in the field work. We gratefully acknowledge and thank the Monaco Foundation, Kris Norvig, The Mitchell Petersen Foundation, and The Prince Bernhard Nature Fund for the critical financial support that enabled this field work to take place as well as supporting our continued work with sharks, fisher capacity-building and public education on critical marine topics in Cabo Verde.

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