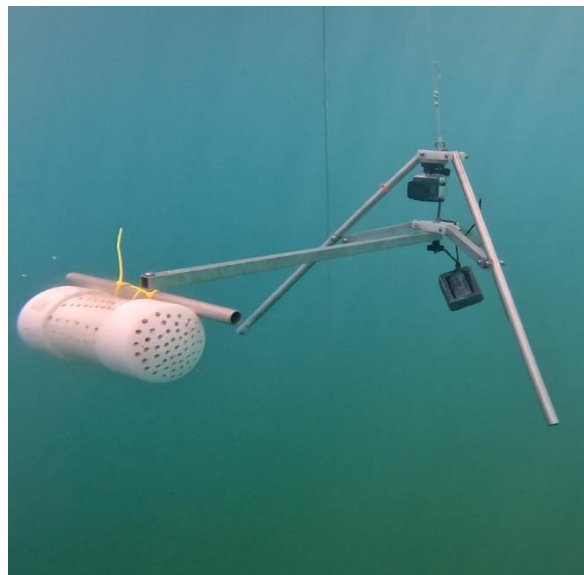
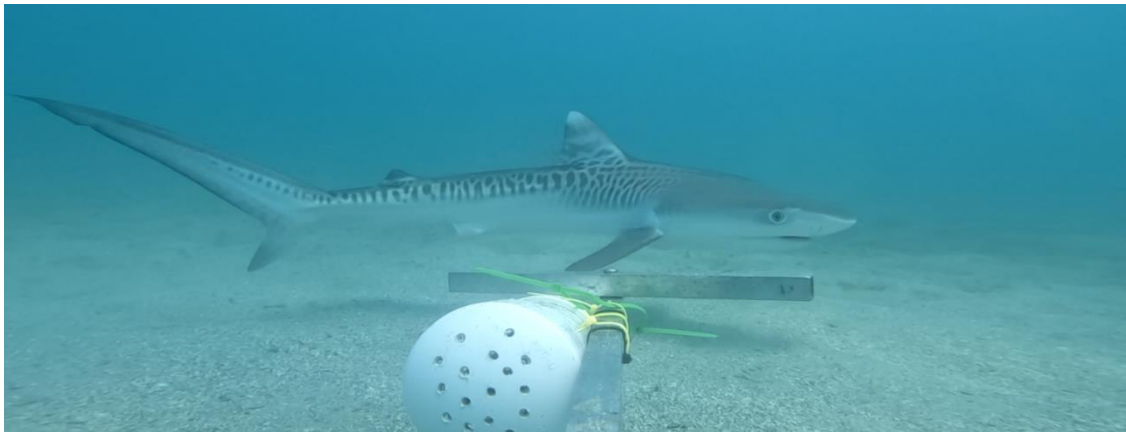




Progress Notification

Enabling the conservation of threatened elasmobranchs with dependent communities
in a Key Biodiversity Hotspot of the Eastern Tropical Pacific, Las Perlas Archipelago
(42529-1)



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1. Project summary

Las Perlas Archipelago, in the Gulf of Panama, is a globally-recognized biodiversity hotspot, drawing interest both for conservation and socioeconomic reasons. Current knowledge indicates the presence of threatened mobile sharks and rays in the area feeding and/or nursing, including the critically endangered scalloped hammerhead and large migratory species such as the whale shark. Nonetheless, active threats to this group persist, and there is a lack of essential insight for effective management. This project seeks to enable meaningful conservation actions by providing the first characterization of the chondrichthyan population's ecology using non-invasive, accessible methods, and by integrating local stakeholders in the project with the goal of elevating local capacities and stewardship for the marine environment

2. Objectives:

- a. To generate at least 80 hours of permanent video records of marine fauna in Las Perlas Archipelago recorded by accessible, robust, and non-invasive baited remote underwater videos.
- b. To provide the first characterization of the abundance, diversity, distribution, and habitat associations of endangered chondrichthyans in Las Perlas Archipelago.
- c. To interpret, consolidate, and deliver the findings to relevant conservation planners and management authorities, including Panama's ministry of environment, and Panama's fisheries authority in the form of technical reports.
- d. To elevate local capacities and engagement in marine research and conservation by actively training and integrating local fisher folk in the development of the project.

3. Developments and activities

a. Preparation of field equipment:

Starting on 05/10/2024, we initiated logistics and preparations for the start of field work. This included the assemblage of 6 BRUVs units by collaborator Sam Owen, alongside the acquisition of associated kits, such as buoys, weights, cabling and underwater cameras (GoPros).

d. Student recruitment:

Through MarAlliance's network of collaborators, two students were recruited from the University of Panama, Ana Sofia Santos and Jocsan Barria, as well as student from the University of Exeter, Sam Whiting, who will execute their thesis within the project's framework. Respective focuses are: a. an evaluation of the spatiotemporal abundance of biodiversity in the archipelago, b. the use of statistical models for predicting abundance and/or diversity, and c. the use of INLA methods for generating species distribution models incorporating data from different sources.

b. Establishment of a local collaborator network:

In between 05/10/2024 and 18/10/2024, a series of visits were made to Las Perlas Archipelago to establish initial contact with local fisher folk and other relevant stakeholders. Several interested collaborators were identified from fishermen from Saboga (Second most densely populated Island after San Miguel) and were invited for further talks about the possibility of joining the project. From the expressions of interest, three enthusiastic, young fishermen followed up with establishing partnerships and providing support for project execution

c. Training in scientific monitoring:

A first training session was held on the 19/10/2024 in Contadora Island directed towards fisher associates, which consisted of a half-day training practice on the assemblage and deployment of BRUVs units. Following on, a second training workshop was held in Contadora Island for students from the University of Panama as well as for MAR collaborators Josue Collins and Daneira Brown, following the same protocol as with the first training session.

e. Data collection:

Between the 20th and 21st of October 2024, one first field outing was carried out to initiate data collection with fisher collaborator, Anthony Murillo. A total of 7 deployments were made in between Contadora, Pacheca, and Bartolome Islands. Following on, a second field outing was executed in between the 10th and 17th of February 2025, carried out by fisher collaborators, students from the University of Panama, local MAR collaborators, as well as the new Research Officer for MarAlliance, Andres Frauca. A total of 35 deployments were executed across the archipelago (see Figure 1.)

f. Preliminary results:

Whilst videos are just starting to be processed in a standardized manner, quick visual overviews have elucidated the local biological assemblage of Las Perlas Archipelago. During the first outing, where sampling was concentrated towards the northern extent of the archipelago, a high abundance of large predatory fish (*Carangidae*, *Haemulidae*, *Muraenidae*, amongst others) and threatened ray *Dasyatis longa* were primarily observed. During the second outing in the month of February, where sampling took place more extensively across the archipelago, it was observed more generally, a lesser abundance of large predatory fish, though with a similar abundance of threatened rays in comparison the first outing. Elasmobranch species identified include Pacific Nurse sharks (*Ginglymostoma umami*) in three videos, as well as a registry of the elusive guitarfish (*Rhinobatidae* spp.). In addition, a high frequency of tiger sharks (*Galeocerdo cuvier*) (present in ~40% of videos), of small size classes (85-130 cm), indicating a strong presence of juveniles in the archipelago (Images 1-4). Given the large number of small-sized individuals for an elusive species as is the tiger shark, and the approximate 250 cm maturity size, current results suggest the notion that Las Perlas may be the first tiger shark nursery identified for Pacific Panama, and the second for the Eastern Tropical Pacific. Worryingly, one individual was observed with a partially broken jaw (Images 5-6), elucidating on the likely negative interactions occurring with fishing fleets in the area.

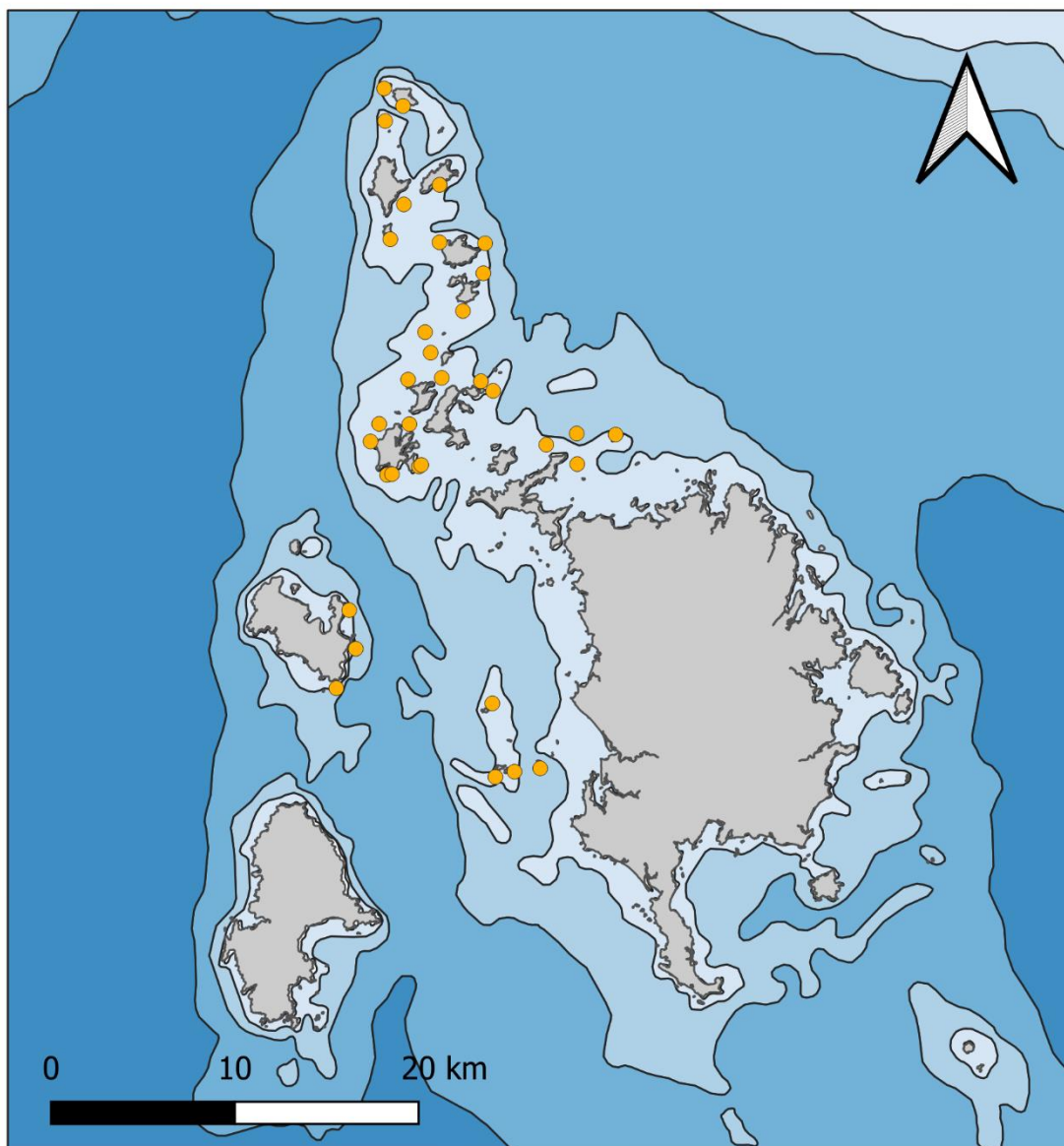
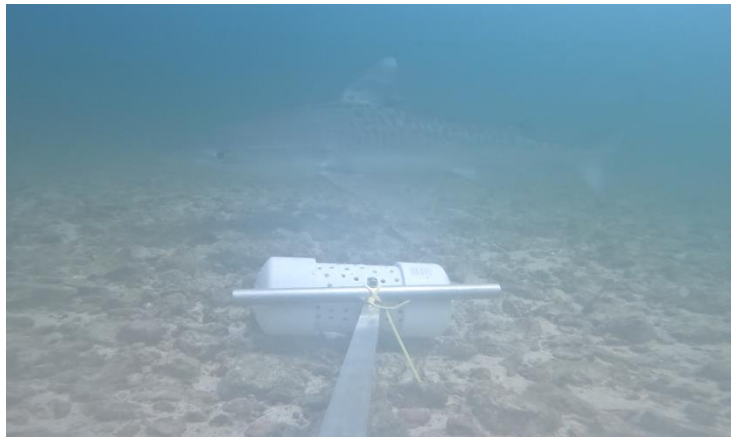
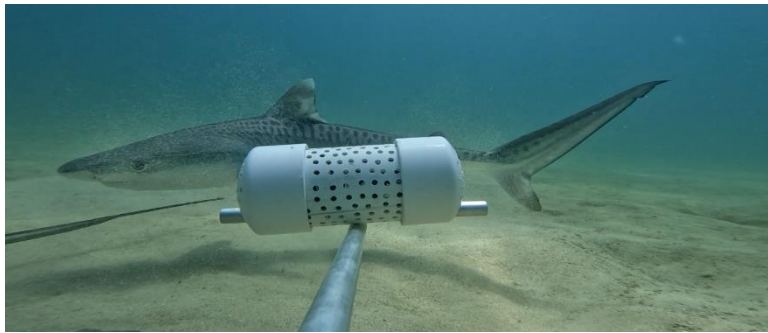
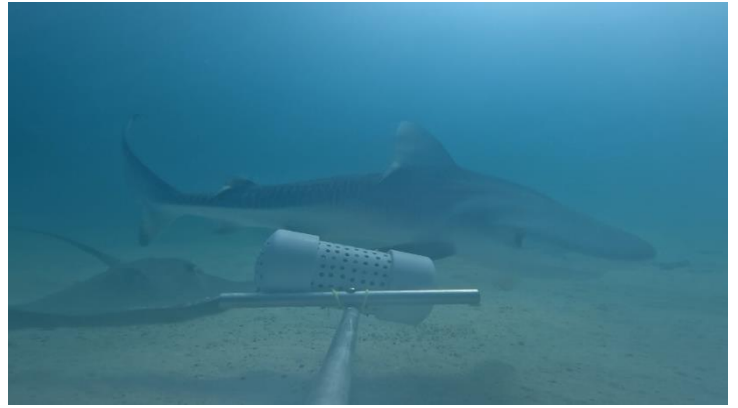
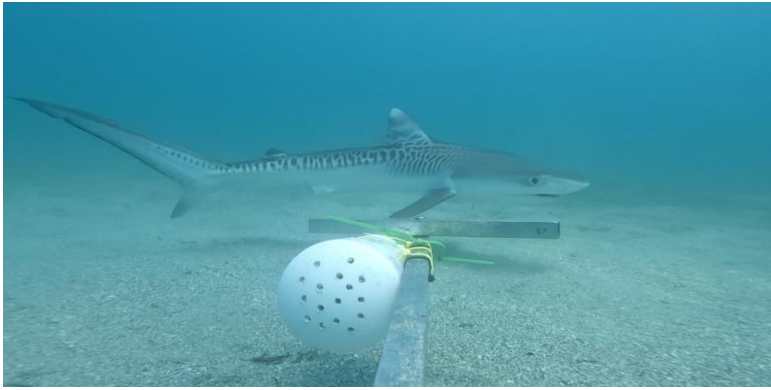
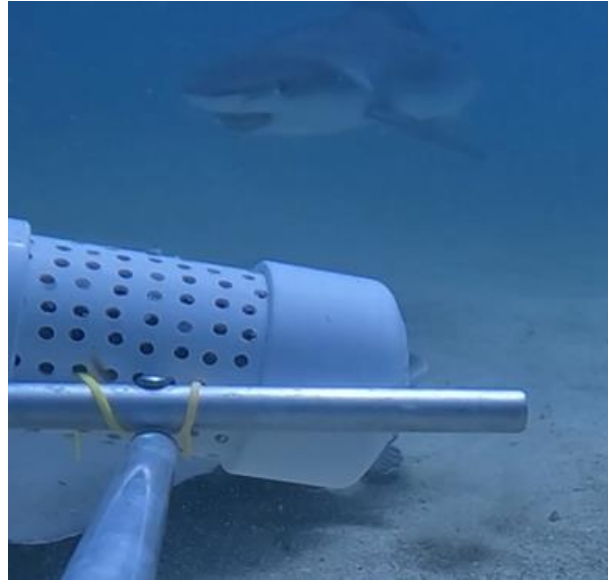
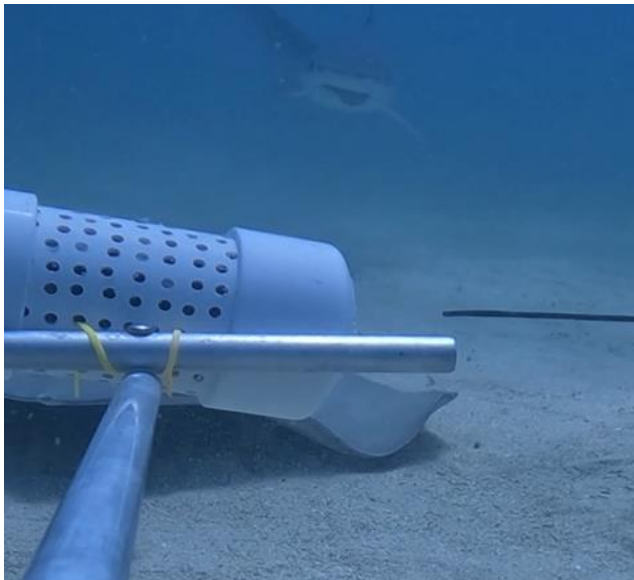


Figure 1. Sampling sites in Las Perlas Archipelago across field outings (December 2024, February 2025).



Images 1 - 4. Example tiger shark juveniles observed during the field outing of February 2024.



Images 5 - 6. Registry of juvenile tiger shark with a broken jaw.