

Identification and characterization of a Potential Shark Nursery area on the island of Sint Maarten (Dutch side)

Identificación y caracterización de un área de Criadero Potencial para Tiburones en la isla de Sint Maarten (lado neerlandés)

Identification et caractérisation d'une zone de Nurserie Potentielle pour les Requins sur l'île de Sint Maarten (côté néerlandais)

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EXTENDED ABSTRACT

This study investigates the role of St. Maarten waters as a multi-species shark nursery area, particularly for Caribbean Reef Sharks (*Carcharhinus perezi*) and Tiger Sharks (*Galeocerdo cuvier*). The research combines three types of data including citizen science, satellite telemetry, and anecdotal data to provide a comprehensive approach to fulfilling the six different shark nursery criteria determined through an extensive literature review; Size segregation, Higher number of juveniles present in the area, Site fidelity for extended periods, Skewed sex ration with higher number of adult females, Area is repeatedly used across years, Evidence of parturition (Gruber et al., 2001; Heithaus, 2007; Heupel et al., 2007; Knip et al., 2010; Werry et al., 2014)

The citizen science dataset comprised 245 shark observations across 14 locations, gathered from 134 dives conducted between February and April 2024. The sampling effort varied greatly across dive sites, with the highest efforts coinciding with the marine park locations. Statistical analysis was performed to account for effort, resulting into to determining dive as an effort unit. Citizen science results revealed a significant higher abundance in sightings of Caribbean Reef Sharks over Nurse Sharks. Ultimately, we refrained from investigating the role of this area as a habitat for nurse sharks, given the constraints imposed by the limited dataset. Moreover, significant differences in the abundance across life stages were found for every location with sufficient data, with a significantly higher amount of juveniles. However, Sex ratio results of Caribbean Reef Sharks suggested scuba divers observation might not be a suitable methodology for recording sex data. Satellite telemetry data from eight Tiger Sharks provided insights into their spatial distribution, showing the first indications of the tiger shark migration pattern in the Eastern Caribbean following the Aves Ridge. Moreover, a pregnant tiger shark exhibited high site fidelity, indicating the area's potential role as a parturition site, resulting in most shark detections occurring in the EEZ of Saint Martin. This study also integrated recorded and non-recorded anecdotal data to evaluate if the aforementioned criteria were being met. Recorded anecdotal data, comprised documented information observed in previous studies and expeditions conducted in the area , providing valuable historical context. Non-recorded anecdotal data, included interviews conducted to shark research and divers of the region.

The three types of data confirmed the following nursery criteria for Tiger Sharks and Caribbean Reef Sharks, though not every criterion was met by both species: size segregation, site fidelity, skewed sex ratio, a higher number of juveniles present, and evidence of parturition. The only criterion not being met was due to a lack of robust acoustic telemetry data in the area.

These findings, highlight the crucial role this island plays as a critical habitat for shark conservation on a regional basis. Future research is needed to address the knowledge gaps identified in this study, such as the absence of baseline shark abundance data, and a lack of long-term data. Nonetheless, these findings emphasize the necessity of legislative actions to address the gaps in protection and implement effective conservation measures to grant this area a level of protection aligned with its ecological significance, such as an Important Shark and Ray Area.

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