

Blue lines indicate the area meeting the ISRA Criteria; dashed lines indicate the suggested buffer for use in the development of appropriate place-based conservation measures

VAIARE ISRA

New Zealand & Pacific Islands Region

SUMMARY

Vaiare is situated on the southeast side of Moorea Island in the Society Archipelago of French Polynesia. The area encompasses a fringing reef bordering a lagoon connected to the open ocean. Vaiare is characterised by a homogenous mix of corals, muddy and sandy substrates, and is influenced by low tidal variation. This area overlaps with the Lagon de Moorea Ramsar site and the Tetiaroa, Moorea et Tahiti marine Key Biodiversity Area. Within this area there are: **threatened species** and **reproductive areas** (Blacktip Reef Shark *Carcharhinus melanopterus*).

CRITERIA

Criterion A - Vulnerability; Sub-criterion C1 - Reproductive Areas

FRENCH
 POLYNESIA

0-10 metres

0.23 km²





DESCRIPTION OF HABITAT

Vaiare is situated on the southeast side of Moorea Island in the Society Archipelago of French Polynesia. The area is located within Moorea's narrow lagoon system and encompasses a fringing reef forming a plateau, bordering a deep lagoon (46 m depth) connected with the open ocean. Vaiare is characterised by a homogenous mix of corals, muddy and sandy substrates at depths <2 m within 50 m of the shore (Bouyoucos et al. 2023; Eustache et al. 2024). The area is influenced by low tidal variation (~20–30 cm) (Bouyoucos et al. 2023) and currents generally oriented from the reef crest towards the channel, largely induced by waves (Ramsar Convention 2008; Berthe et al. 2018).

This area overlaps with the Lagon de Moorea site (Ramsar Convention 2008) and the Tetiaroa, Moorea et Tahiti marine Key Biodiversity Area (KBA 2024).

This Important Shark and Ray Area is benthopelagic and is delineated from inshore and surface waters (0 m) to 10 m based on the bathymetry of the area.

ISRA CRITERIA

CRITERION A – VULNERABILITY

One Qualifying Species considered threatened with extinction according to the IUCN Red List of Threatened Species regularly occurs in the area. This is the Vulnerable Blacktip Reef Shark (Simpfendorfer et al. 2020).

SUB-CRITERION C₁ – REPRODUCTIVE AREAS

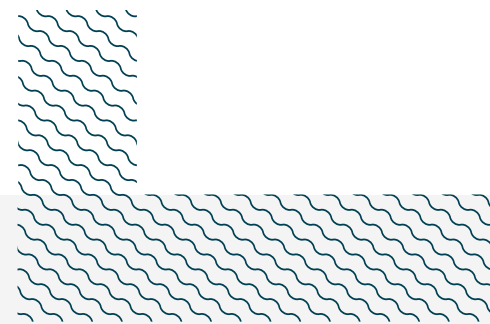
Vaiare is an important reproductive area for one shark species.

Between 2013–2022, a fisheries-independent program was conducted at ten sites around Moorea, including the area (Bouyoucos et al. 2023; Eustache et al. 2024). The area was sampled twice per month, between October and February, (coinciding with the parturition season of the species [Mourier & Planes 2013]) using a monofilament gillnet (50 m x 1.5 m, with a 5 cm mesh size) set perpendicular to the shore for approximately three hours in the evening. Captured animals were fin-clipped, sexed, measured, weighed, and had their umbilical scars photographed with a size reference. The sharks sampled were identified as neonates or young-of-the-year (YOY) based on the healing stage of the umbilical scar and length size (Bouyoucos et al. 2023; Eustache et al. 2024). Size-at-birth for this species is 30–52 cm TL (Ebert et al. 2021). Fishing survey data were used to quantify catch-per-unit-effort (CPUE, sharks h⁻¹) per gillnet set per site and per survey year (Bouyoucos et al. 2023; Eustache et al. 2024).

Between 2013–2022, ~237 neonates and YOY Blacktip Reef Shark were captured in the area (Physioshark Lab unpubl. data 2024). The seasonal pattern for parturition occurs annually from October to February when neonates and YOY are captured (Mourier & Planes 2013). Vaiare presented a significantly higher catch-per-unit-effort (CPUE) of neonates and YOY relative to the other nine sites across 2013–2022. This area has the second highest average CPUE (0.0361 ± 0.0458 [mean ± SD]), only being surpassed by another reproductive area for this species (Haapiti) (Eustache et al. 2023). Recaptures were recorded in 2015 (n = 1), 2016 (n = 2), 2017 (n = 3), 2018 (n = 4), and 2019 (n = 3) (Bouyoucos et al. 2023).

Individuals captured across the 10 sites in Moorea (n = 1,607) included 52.2% neonates (n = 839), which were 35 days old or younger, and 46.7% YOY (n = 751), which were older than 36 days (Physioshark Lab unpubl. data 2024). Adults of Blacktip Reef Shark accounted for only 1.1% (n = 17) of the total captures around Moorea (Physioshark Lab unpubl. data 2024).

Vaiare is one of the several areas of importance for neonates and YOY Blacktip Reef Sharks that have been identified around Moorea (Mourier & Planes 2013; Bouyoucos et al. 2023; Eustache et al. 2024). The existence of several of these areas dispersed around the island is attributed to the small home ranges of neonatal Blacktip Reef Sharks in Moorea. Research using mark-recapture and acoustic telemetry has shown that these home ranges are the smallest documented for the species, likely due to the deep channels within Moorea's lagoon and the fragmented habitat (Bouyoucos et al. 2020). Additionally, pregnant female Blacktip Reef Sharks exhibit philopatry, returning to the same nursery for each birthing event (Mourier & Planes 2013). These factors together explain the presence of multiple nursery areas or areas that are crucial for neonate and YOY Blacktip Reef Sharks in Moorea.



Acknowledgments

Jodie Rummer (Physioshark Lab; James Cook University), Johann Mourier (Université de Montpellier - MARBEC), Kori Burkhardt (Ma'o Mana Foundation with Direction de l'Environnement Polynésie Française), and Marta D Palacios (IUCN SSC Shark Specialist Group - ISRA Project) contributed and consolidated information included in this factsheet. We thank all participants of the 2024 ISRA Region 10 - New Zealand and Pacific Islands workshop for their contributions to this process.

This factsheet has undergone review by the ISRA Independent Review Panel prior to its publication.

This project was funded by the Shark Conservation Fund, a philanthropic collaborative pooling expertise and resources to meet the threats facing the world's sharks and rays. The Shark Conservation Fund is a project of Rockefeller Philanthropy Advisors.

Suggested citation

IUCN SSC Shark Specialist Group. 2024. Vaiare ISRA Factsheet. Dubai: IUCN SSC Shark Specialist Group.

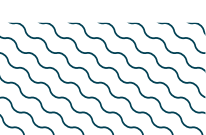
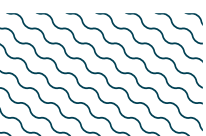
QUALIFYING SPECIES

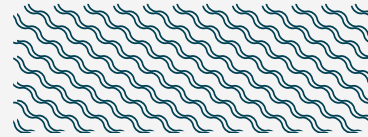
Scientific Name	Common Name	IUCN Red List Category	Global Depth Range (m)	ISRA Criteria/Sub-criteria Met									
				A	B	C1	C2	C3	C4	C5	D1	D2	
SHARKS													
<i>Carcharhinus melanopterus</i>	Blacktip Reef Shark	VU	0-100	X		X							

SUPPORTING SPECIES

Scientific Name	Common Name	IUCN Red List Category
SHARKS		
<i>Negaprion acutidens</i>	Sharptooth Lemon Shark	EN

IUCN Red List of Threatened Species Categories are available by searching species names at www.iucnredlist.org Abbreviations refer to: CR, Critically Endangered; EN, Endangered; VU, Vulnerable; NT, Near Threatened; LC, Least Concern; DD, Data Deficient.





REFERENCES

Berthe C, Waqalevu VP, Latry L, Besson M, Lerouvreur F, Siu G, Lecellier G, Rummer JL, Bertucci F, Iglésias S, et al. 2018. Distribution patterns of ocellated eagle rays, *Aetobatus ocellatus*, along two sites in Moorea Island, French Polynesia. *Cybium* 42(4): 313–320. <https://doi.org/10.26028/CYBIUM/2018-424-002>

Bouyoucos IA, Romain M, Azoulay L, Eustache K, Mourier J, Rummer JL, Planes S. 2020. Home range of newborn blacktip reef sharks (*Carcharhinus melanopterus*), as estimated using mark-recapture and acoustic telemetry. *Coral Reefs* 39: 1209–1214. <https://doi.org/10.1007/s00338-020-01965-z>

Bouyoucos IA, Simpfendorfer CA, Planes S, Schwieterman GD, Weideli OC, Rummer JL. 2022. Thermally insensitive physiological performance allows neonatal sharks to use coastal habitats as nursery areas. *Marine Ecology Progress Series* 682: 137–152. <https://doi.org/10.3354/meps13941>

Ebert DA, Dando M, Fowler S. 2021. *Sharks of the world: A complete guide*. Princeton: Princeton University Press.

Eustache KB, van Loon E, Rummer JL, Planes S, Smallegange I. 2024. Spatial and temporal analysis of juvenile blacktip reef shark (*Carcharhinus melanopterus*) demographics identifies critical habitats. *Journal of Fish Biology* 104(1): 92–103. <https://doi.org/10.1111/jfb.15569>

Key Biodiversity Areas (KBA). 2024. Key Biodiversity Areas factsheet: Tetiaroa, Moorea et Tahiti Marine. Available at: <https://www.keybiodiversityareas.org/site/factsheet/31035> Accessed June 2024.

Mourier J, Planes S. 2013. Direct genetic evidence for reproductive philopatry and associated fine-scale migrations in female blacktip reef sharks (*Carcharhinus melanopterus*) in French Polynesia. *Molecular Ecology* 22(1): 201–214. <https://doi.org/10.1111/mec.12103>

Ramsar Convention. 2008. Ramsar site Factsheet Lagon de Moorea, French Polynesia. Available at: <https://rsis.ramsar.org/ris/1834> Accessed June 2024.

Simpfendorfer C, Yuneni RR, Tanay D, Seyha L, Haque AB, Fahmi, Bin Ali A, Dharmadi, Bineesh KK, Gautama DA, et al. 2020. *Carcharhinus melanopterus*. *The IUCN Red List of Threatened Species 2020*: e.T39375A58303674. <https://dx.doi.org/10.2305/IUCN.UK.2020-3.RLTS.T39375A58303674.en>