

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

MUNYAFUSHI KANDU ISRA

Western Indian Ocean Region

SUMMARY

Munyafushi Kandu is located in northwestern Laamu Atoll in the southern Maldives. This area is a channel which connects the open ocean to the atoll lagoon. The area is subject to high current flow. Within this area there are: **threatened species** (e.g., Whitetip Reef Shark *Triaenodon obesus*); and **undefined aggregations** (e.g., Grey Reef Shark *Carcharhinus amblyrhynchos*).

CRITERIA

Criterion A - Vulnerability; Sub-criterion C5- Undefined Aggregations

MALDIVES

0-50 metres

1.89 km²





DESCRIPTION OF HABITAT

Munyafushi Kandu is located in the southern Maldives archipelago which sits centrally on the Chagos-Laccadive Ridge (Stevens & Froman 2019). This area (also known as Munyafushi Channel) is a channel in the northwestern side of Laamu Atoll. Channels, locally known as *kandu*, are reef passes that connect the open ocean to the atoll lagoon. These channels are known for their high current flow (Stevens & Froman 2019).

The weather in the Maldives is strongly influenced by the South Asian monsoon, especially the northern and central atolls as these are closer to the Indian subcontinent (Anderson et al. 2011). Therefore, two monsoons occur annually in Maldives. The southwest monsoon (locally known as Hulhan'gu), from May to November, and the northeast monsoon (locally known as Iruvai), from January to March, with transitional periods in December and April (Shankar et al. 2002; Anderson et al. 2011). The southwest monsoon increases average rainfall, and wind speeds, causing rougher seas and reduced visibility; in contrast, the northeast monsoon usually brings clear waters (Stevens & Froman 2019).

The Maldives archipelago disrupts the flow of the monsoon-driven North Equatorial Current as it crosses the Indian Ocean (Schott & McCreary 2001) which creates a current flow through the Maldives' channels (Sasamal 2006). The strongest lunar currents can overcome the prevailing monsoonal currents through the tidal suction mechanism along the channel's outer edges (Stevens 2016).

This Important Shark and Ray Area is benthopelagic and is delineated from 0 to 50 m based on the depth range of Qualifying Species in this area.

ISRA CRITERIA

CRITERION A – VULNERABILITY

Two Qualifying Species considered threatened with extinction according to the IUCN Red List of Threatened Species™ regularly occur in the area. These are the Endangered Grey Reef Shark (Simpfendorfer et al. 2020a) and the Vulnerable Whitetip Reef Shark (Simpfendorfer et al. 2020b).

SUB-CRITERION C5 – UNDEFINED AGGREGATIONS

This area is important for undefined aggregations of two shark species.

Data were collected from a citizen-science program known as the Sharkwatch project which was a government-led initiative run between 2009–2019 (Maldives Marine Research Institute [MMRI], unpubl. data 2023). Data were reported by experienced dive guides using the roving diver technique where surveyors can swim in any direction and count the number of individuals encountered by species during one-hour dive surveys. From the ~1,110 sites surveyed in the Maldives, this area has been identified as one of the most important aggregations for Whitetip Reef Shark and Grey Reef Shark (MMRI unpubl. data 2023). Sharkwatch surveys were conducted over five years (2013–2017; n = 33) in this area.

Sharkwatch surveys estimated a mean encounter rate of nine Whitetip Reef Sharks/hour (MMRI unpubl. data 2023). On six surveys in 2017, aggregations of >15 Whitetip Reef Sharks/hour were

recorded, in which five surveys conducted during the southwest monsoon recorded >20 Whitetip Reef Sharks/hour (MMRI unpubl. data 2023).

Sharkwatch surveys estimated a mean encounter rate of 11 Grey Reef Sharks/hour (MMRI unpubl. data 2023). In 2013 and 2017, aggregations of >30 Grey Reef Sharks/hour were recorded in four surveys, where during two surveys in 2017, >60 Grey Reef Sharks/hour were recorded. Grey Reef Sharks are observed in both monsoon seasons. For example, for both monsoon seasons in 2017, encounter rates of >20 Grey Reef Sharks/hour were observed during multiple surveys (MMRI unpubl. data 2023). This area might be used as a resting ground for the Grey Reef Shark. In channels with strong currents in French Polynesia, Grey Reef Sharks use current-induced updraft zones to reduce energy expenditure, since these are negatively buoyant fishes and obligate swimmers (Papastamatiou et al. 2021). Further information is required to determine the nature and function of these aggregations.

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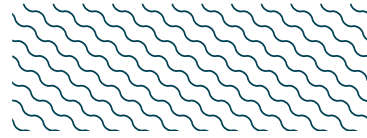
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QUALIFYING SPECIES

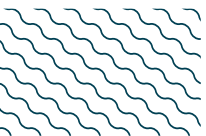
Scientific Name	Common Name	IUCN Red List Category	Global Depth Range (m)	ISRA Criteria/Sub-criteria Met								
				A	B	C1	C2	C3	C4	C5	D1	D2
SHARKS												
<i>Carcharhinus amblyrhynchos</i>	Grey Reef Shark	EN	0-280	X						X		
<i>Triaenodon obesus</i>	Whitetip Reef Shark	VU	0-330	X						X		

SUPPORTING SPECIES



Scientific Name	Common Name	IUCN Red List Category
SHARKS		
<i>Carcharhinus melanopterus</i>	Blacktip Reef Shark	VU

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

- Anderson RC, Adam MS, Goes JI. 2011.** From monsoons to mantas: seasonal distribution of *Manta alfredi* in the Maldives. *Fisheries Oceanography* 20(2): 104-113. <https://doi.org/10.1111/j.1365-2419.2011.00571.x>
- Maldives Marine Research Institute (MMRI). 2023.** Maldives Sharkwatch Data 2009-2019 [Unpublished summarised data]. Malé: Maldives Marine Research Institute.
- Papastamatiou YP, Iosilevskii G, Di Santo V, Huveneers C, Hattab T, Planes S, Ballesta L, Mourier J. 2021.** Sharks surf the slope: Current updrafts reduce energy expenditure for aggregating marine predators. *Journal of Animal Ecology* 90(10): 2302-2314. <https://doi.org/10.1111/1365-2656.13536>
- Sasamal SK. 2006.** Island mass effect around the Maldives during the winter months of 2003 and 2004. *International Journal of Remote Sensing* 27(22): 5087-5093. <https://doi.org/10.1080/01431160500177562>
- Schott FA, McCreary JP. 2001.** The monsoon circulation of the Indian Ocean. *Progress in Oceanography* 51(1): 1-123. [https://doi.org/10.1016/S0079-6611\(01\)00083-0](https://doi.org/10.1016/S0079-6611(01)00083-0)
- Shankar D, Vinayachandran PN, Unnikrishnan AS. 2002.** The monsoon currents in the north Indian Ocean. *Progress in Oceanography* 52(1): 63-120. [https://doi.org/10.1016/S0079-6611\(02\)00024-1](https://doi.org/10.1016/S0079-6611(02)00024-1)
- Simpfendorfer C, Fahmi, Bin Ali AD, Utzurum JAT, Seyha L, Maung A, Bineesh KK, Yuneni RR, Sianipar A, Haque AB, et al. 2020a.** *Carcharhinus amblyrhynchos*. *The IUCN Red List of Threatened Species* 2020: e.T39365A173433550. <https://dx.doi.org/10.2305/IUCN.UK.2020-3.RLTS.T39365A173433550.en>
- Simpfendorfer C, Yuneni RR, Tanay D, Seyha L, Haque AB, Bineesh KKD, Bin Ali A, Gautama DA, Maung A., Sianipar A, et al. 2020b.** *Triaenodon obesus*. *The IUCN Red List of Threatened Species* 2020: e.T39384A173436715. <https://dx.doi.org/10.2305/IUCN.UK.2020-3.RLTS.T39384A173436715.en>
- Stevens GM. 2016.** Conservation and population ecology of manta rays in the Maldives. Unpublished PhD Thesis, University of York, York.
- Stevens GM, Froman N. 2019.** The Maldives Archipelago. In: Sheppard C, ed. *World seas: An environmental evaluation*, second edition. London: Academic Press, 211-236. <https://doi.org/10.1016/B978-0-08-100853-9.00010-5>