

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

KUREDHU, HURAVALHI & KOMANDOO ISRA

Western Indian Ocean Region

SUMMARY

Kuredhu, Huravalhi & Komandoo is located in the northwest of Faadhippolhu Atoll (also known as Lhaviyani Atoll) in the Maldives. It is characterised by a diversity of coastal and benthic habitats including coral reefs, sandy lagoons, seagrass lagoons, and channels. This area overlaps with the Kuredhu Kandoolhi (Kuredhu Express) marine protected area. Within this area there are: **threatened species** (e.g., Ornate Eagle Ray *Aetomylaeus vespertilio*); **reproductive areas** (Blacktip Reef Shark *Carcharhinus melanopterus*); **feeding areas** (e.g., Reef Manta Ray *Mobula alfredi*); and **undefined aggregations** (e.g., Silvertip Shark *Carcharhinus albimarginatus*).

CRITERIA

Criterion A - Vulnerability; Sub-criterion C1 - Reproductive Areas; Sub-criterion C2 - Feeding Areas; Sub-criterion C5 - Undefined Aggregations

MALDIVES

0-50 metres

19.27 km²





DESCRIPTION OF HABITAT

Kuredhu, Huravalhi & Komandoo is located in the northern Maldives archipelago, which sits centrally on the Chagos-Laccadive Ridge (Stevens & Froman 2019). It is a benthopelagic area in the northwest of Faadhippolhu Atoll (also known as Lhaviyani Atoll). Within this area sits Huravalhi Kandu (otherwise known as Huravalhi channel), characterised by a high current flow (Stevens & Froman 2019). Kalifushifaru Corner (known as KFFC) and The Peak are situated in the outer entrance of this channel. Kalifushifaru Corner is a reef edge subject to strong incoming and outgoing currents with several terraces and overhangs. The Peak is a tongue shaped reef. Both, KFFC and The Peak, have a similar depth profile in which the top reef is at 5 m and descends gradually to 30 m at the bottom of the channel. Overall, the area has a diversity of coastal and benthic habitats including coral reefs, sandy lagoons, seagrass lagoons, and channels (Perry et al. 2017).

The climate in the Maldives is monsoon-dominated, with a wet boreal summer monsoon (April to November) due to winds blowing to the northeast, and a dry winter monsoon (December to March) with winds blowing westward (Su et al. 2021). 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 area overlaps with the Kuredhu Kanduolhi (Kuredhu Express) marine protected area, which covers an area of 3.9 km².

This Important Shark and Ray Area is benthopelagic and is delineated from inshore and surface waters (0 m) to 50 m based on the bathymetry of the area.

ISRA CRITERIA

CRITERION A – VULNERABILITY

Seven Qualifying Species considered threatened with extinction according to the IUCN Red List of Threatened Species™ regularly occur in the area. Threatened sharks comprise one Endangered species and two Vulnerable species; threatened rays comprise two Endangered and two Vulnerable species (IUCN 2023).

SUB-CRITERION C1 – REPRODUCTIVE AREAS

Kuredhu, Huravalhi & Komandoo is an important reproductive area for one shark species.

Young-of-the-year (YOY) Blacktip Reef Sharks are regularly and predictably encountered in shallow island lagoons within the area. Sightings have been recorded year-round between 2017 and 2023, with photo and video evidence available for 12 neonate/YOY sightings between January 2021 and October 2023. For example, in May and June 2023, early life-stage Blacktip Reef Sharks, as small as 38.1 cm total length (TL), were observed at Hurawalhi (Waters 2023). The size-at-birth of the species is 30–52 cm TL (Ebert et al. 2021). From a total of 44 sightings during eight aerial surveys, the average size of Blacktip Reef Sharks found in the shallow waters around Huravalhi island was estimated at 57 cm TL (range 38.1–114.4 cm TL), this included 30 individuals measuring 38–60 cm TL. Pregnant Blacktip Reef Sharks have also regularly been observed in the area and mating was captured on video at Komandoo in February 2023 (F Budd pers. obs. 2023).

SUB-CRITERION C2 – FEEDING AREAS

Kuredhu, Huravalhi & Komandoo is an important feeding area for two ray species.

Ornate Eagle Rays have been recorded regularly and predictably within this area on 42 occasions between 2015 and 2023 (T Bond unpubl. data 2023). Sightings have been documented year-round each month, with no evidence of seasonality. Photo-identification has confirmed the presence of at least six individuals recorded within this timeframe; three individuals have been resighted in the area, one of which has been sighted 10 times between 2015 and 2021. Aggregations of multiple individuals have been reported by dive professionals in the area on three occasions (two reports of two individuals and one report of three individuals; T Bond unpubl. data 2023). Ornate Eagle Rays have been recorded feeding within this area on eight occasions between 2018 and 2023 (19% of sightings), with Huravalhi Faru (the reef area surrounding Huravalhi island) accounting for the majority of records (n = 5; T Bond unpubl. data 2023). Given the rarity of sightings in general for this species worldwide, the regularity of feeding observations in this area is of considerable importance.

Reef Manta Rays regularly aggregate in the area, and predictably feed on the high concentrations of zooplankton that get trapped within the area, with sightings peaking during the northeast monsoon season (January–March; Maldivian Manta Ray Project 2020). Since 2010, there has been 575 sightings of Reef Manta Rays foraging in the area, comprising 160 individuals identified via photo-identification (IDtheManta unpubl. data 2022). One lagoon within the area in particular, Veligadu Falhu (between Huravalhi and Kuredhu islands), has been identified as one of four key aggregation areas within the Lhaviyani Atoll, and 136 different individuals have been sighted feeding in this lagoon (29% of the total Lhaviyani population [n = 465]; IDtheManta unpubl. data 2022).

SUB-CRITERION C5 – UNDEFINED AGGREGATIONS

Kuredhu, Huravalhi & Komandoo is an important area for undefined aggregations of two shark and two ray species.

For the shark species, data were collected from a citizen-science program known as the Sharkwatch project which was a government-led initiative between 2009–2019 (Maldives Marine Research Institute [MMRI], unpubl. data 2023). Data were collected 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 1-hour dive surveys. From the ~1,110 sites surveyed in the Maldives, this area represents the first and second highest mean encounter rates of aggregations of Silvertip Shark and Grey Reef Shark, respectively, in the Maldives (MMRI unpubl. data 2023).

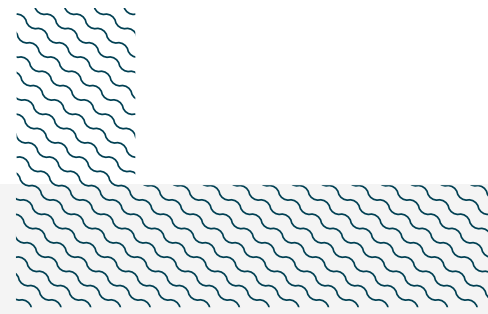
Sharkwatch surveys at Kalifushifaru Corner indicate that Silvertip Sharks are observed in both monsoon seasons with encounter rates of >50 Silvertip Sharks/hour recorded in both seasons in Kalifushifaru Corner in 2017 (MMRI unpubl. data 2023). In 2011 and 2017, six surveys crossing Huravalhi Kandu (from Kalifushifaru Corner to The Peak) were conducted which showed a mean encounter rate of 16 Silvertip Sharks/hour (MMRI unpubl. data 2023). In 2017, from the four surveys conducted during the southwest monsoon, one survey recorded 50 Silvertip Sharks/hour. In addition, aggregations of Silvertip Sharks are sighted cleaning in Huravalhi Kandu and sighted year-round in the channels found within the area (Prodivers Dive Centre unpubl. data 2023). During 519 dives conducted by Prodivers Dive Centre in the channels within the area in 2022, Silvertip Sharks were observed during 173 dives (33%). Larger aggregations of 10 or more individuals were observed on 92 dives (18%), and of 20 or more individuals on 57 dives (11%). The largest aggregations of between 50–80 individuals occurred between August and November in 2022.

Sharkwatch surveys conducted over four years (2009–2018; n = 33) at Kalifushifaru Corner estimated a mean encounter rate of 31 Grey Reef Sharks/hour (MMRI unpubl. data 2023). In 2017, the year with the highest survey effort (n = 23), four aggregations of >75 Grey Reef Sharks/hour were recorded during the southwest monsoon, and three aggregations of >50 Grey Reef Sharks/hour during the northeast monsoon. In 2011 and 2017, six surveys crossing Huravalhi Kandu (from Kalifushifaru Corner to The Peak) were conducted which showed a mean encounter rate of 55 Grey Reef Sharks/hour (MMRI unpubl. data 2023). Of these, five surveys were conducted in 2017, in which >150 and >75 Grey Reef Sharks per hour were recorded in the southwest and northeast monsoon season, respectively. Thus, Grey Reef Sharks are observed in both monsoon seasons. This area might be used as a resting ground for Grey Reef Sharks. 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). In Kandooma Thila, divers report a mix of both juvenile and adult Grey Reef Sharks and also report that this area could be both an important reproductive area and a cleaning station for Grey Reef Sharks (M Ushan pers. comm. 2023). In addition, Grey Reef Sharks are regularly sighted cleaning within two channels in the area (Huravalhi Kandu and Kuredu Express dive sites). During 340 dives conducted by Prodivers Dive Centre to these sites in 2022, Grey Reef Sharks were observed during 329 dives (97%). Larger aggregations of 40 or more individuals were observed on 140 dives (41%), and aggregations of 60 or more individuals on 74 dives (22%). The largest aggregations of between 90–120 individuals were observed on 15 dives in 2022, mostly between June and November (Prodivers Dive Centre unpubl. data 2023).

Spotted Eagle Rays aggregate year-round in the channels within the area (Prodivers Dive Centre unpubl. data 2023). Between 2019–2023, 6,354 Spotted Eagle Rays were recorded during 1,876 of 4,130 dive surveys (45% of all dive surveys, with a yearly average of seven individuals per dive). In 2022, Spotted Eagle Rays were observed on 434 of 519 channel dives (84%) by Prodivers Dive Centre. The average aggregation size was 10 individuals per dive, with larger aggregations of 20 or more individuals observed during 116 dives (22%), with the largest aggregations of 40–45 individuals observed on 23 dives (4%), throughout the year.

Blotched Fantail Rays are regularly sighted in the area with individuals observed cleaning together in the channels (Prodivers Dive Centre unpubl. data 2023). Between 2019 and 2023, 542 rays were recorded during 406 of 4,130 dive surveys (10% of all dive surveys, with a yearly average of three individuals per dive). The maximum number of Blotched Fantail Rays sighted per dive was 12 in 2023. In 2022, Blotched Fantail Rays were seen on 108 of 519 channel dives (21%) by Prodivers Dive Centre (average of 1–2 individuals, maximum n = 4).

More information is required to confirm the nature and function of the aggregation of these species in this area.



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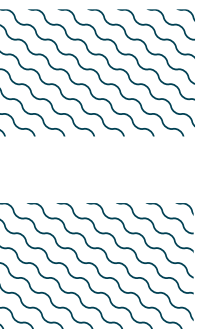
QUALIFYING SPECIES

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 albimarginatus</i>	Silvertip Shark	VU	0-800	X						X		
<i>Carcharhinus amblyrhynchos</i>	Grey Reef Shark	EN	0-280	X						X		
<i>Carcharhinus melanopterus</i>	Blacktip Reef Shark	VU	0-75	X		X						
RAYS												
<i>Aetobatus ocellatus</i>	Spotted Eagle Ray	EN	0-40	X						X		
<i>Aetomylaeus vespertilio</i>	Ornate Eagle Ray	EN	0-110	X			X					
<i>Mobula alfredi</i>	Reef Manta Ray	VU	0-711	X			X					
<i>Taeniurops meyeri</i>	Blotched Fantail Ray	VU	0-439	X						X		

SUPPORTING SPECIES

Scientific Name	Common Name	IUCN Red List Category
SHARKS		
<i>Galeocerdo cuvier</i>	Tiger Shark	NT
<i>Nebrius ferrugineus</i>	Tawny Nurse Shark	VU
<i>Negaprion acutidens</i>	Sharptooth Lemon Shark	EN
<i>Sphyrna lewini</i>	Scalloped Hammerhead	CR
<i>Sphyrna mokarran</i>	Great Hammerhead	CR
<i>Triaenodon obesus</i>	Whitetip Reef Shark	VU
RAYS		
<i>Megatrygon microps</i>	Smalleye Stingray	DD
<i>Mobula birostris</i>	Oceanic Manta Ray	EN
<i>Mobula kuhlii</i>	Shorthorned Pygmy Devil Ray	EN
<i>Pateobatis fai</i>	Pink Whipray	VU
<i>Pastinachus sephen</i>	Cowtail Ray	NT
<i>Urogymnus asperrimus</i>	Porcupine Ray	EN
<i>Urogymnus granulatus</i>	Mangrove Whipray	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.





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