

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

## EASTERN RASDHOO ATOLL ISRA

### Western Indian Ocean Region

#### SUMMARY

Eastern Rasdhoo Atoll is located in the central Maldives, along the outer reef at the south and east of Rasdho Atoll. The area is characterised by fringing reefs that descend abruptly to depths of ~100 m. Three channels connect the inner lagoon with the open sea. The area overlaps with Rasdhoo Atoll Reef Ecologically or Biologically Significant Marine Area, and it includes Rasdhoo Madivaru Marine Protected Area. Within this area there are: **threatened species** (e.g., Grey Reef Shark *Carcharhinus amblyrhynchos*); **range-restricted species** (Cowtail Stingray *Pastinachus sephen*); **resting areas** (Whitetip Reef Shark *Triaenodon obesus*); and **undefined aggregations** (e.g., Reef Manta Ray *Mobula alfredi*).

#### CRITERIA

**Criterion A - Vulnerability; Criterion B - Range Restricted; Sub-criterion C3 - Resting Area; Sub-criterion C5 - Undefined Aggregations**

—	—
<b>MALDIVES</b>	
—	—
<b>0-100 metres</b>	
—	—
<b>22.96 km<sup>2</sup></b>	
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## DESCRIPTION OF HABITAT

Eastern Rasdhoo Atoll is located in the central Maldives, along the outer reef at the south and east of Rasdhoo Atoll, one of the few micro atolls in the Maldives. The area is characterised by fringing reefs, channels, and shallow lagoons. The fringing reefs are situated opposite the four islands of the atoll (Kuramathi, Rasdhoo, Madivaru, and Veligandhu) and have a forereef platform of ~5 m deep that descends abruptly to deeper areas. Three channels break the fringing reef connecting the inner atoll lagoon to the open waters of the Indian Ocean. The reef channels are Rasdhoo Channel (between Kuramathi and Rasdhoo islands), Madivaru Channel (between Rasdhoo and Madivaru islands), and Veligandhu Kandu (north of Veligandhu island). They are characterised by sandy substrates ~30 m deep with chains of large coral blocks along the channels, and a steep almost vertical descent to deeper areas on the seaward side (Godfrey 2023).

The tides in the Maldives are characterised by a semidiurnal microtidal regime with a tidal range of ~1 m (Caldwell et al. 2015; Rasheed et al. 2021). Combined tidal and wind driven currents can exceed speeds of 2 m/s, and be very variable in speed and direction, especially through the channels between atolls, atoll rims, and channel gaps in the atoll rims (Ciarapica & Passeri 1993; Kuitert & Godfrey 2019; Rasheed et al. 2021). These currents can be intense in this area, particularly in the atoll channels, where incoming currents striking slopes in bottom topography can generate orographic updrafts (Papastamatiou et al. 2021) at the seaward side of the channel.

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). Two monsoons occur annually with 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 (Anderson et al. 2011; Shankar et al. 2002). 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 area overlaps with Rasdhoo Atoll Reef Ecologically or Biologically Significant Marine Area (EBSA; CBD 2023) and includes Rasdhoo Madivaru Marine Protected Area.

This Important Shark and Ray Area is benthopelagic and is delineated from inshore and surface waters (0 m) to 100 m based on the bathymetry of the area.

## ISRA CRITERIA

### CRITERION A - VULNERABILITY

Five 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 one Endangered species and one Vulnerable species (IUCN 2023).

### CRITERION B - RANGE RESTRICTED

This area holds the regular presence of the Cowtail Ray as a resident range-restricted species. This species occurs year-round in the area and is regularly encountered resting in sandy substrates along the channels (at 15–30 m), and in shallow lagoons near the shore (A Kalid, I Said, A Waseem, A Batlle-

Morera pers. obs. 2010–2023). Aggregations of 7–9 individuals have also been observed several times in the channel areas (A Kalid, I Said, A Waseem pers. obs. 2010–2023). This species primarily occurs in the Arabian Sea Large Marine Ecosystem (LME), Red Sea LME, and the Maldives.

### SUB-CRITERION C<sub>3</sub> – RESTING AREAS

Eastern Rasdhoo Atoll is an important resting area for one shark species.

Whitetip Reef Sharks are abundant in the area (encounter rate: 7 sharks/hour, range 7–23 sharks/hour; MMRI unpubl. data 2023). Animals can be observed regularly and predictably cruising in groups of three to four individuals along all reefs in Rasdhoo Atoll. However, they are most abundant in the channels where they can be regularly observed resting on sandy substrates sheltered from the current (A Kalid, I Said, A Waseem, A Batlle-Morera pers. obs. 2010–2023).

### SUB-CRITERION C<sub>5</sub> – UNDEFINED AGGREGATIONS

Eastern Rasdhoo Atoll is important for undefined aggregations of two shark and two ray species. More evidence is needed to confirm the nature of these aggregations.

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 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 1-hour dive survey.

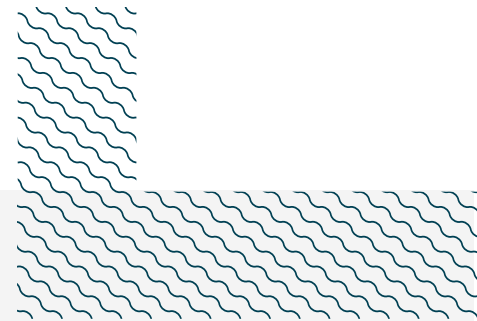
Silvertip Sharks aggregate in the seaward side of Rasdhoo Channel particularly during mild to strong incoming currents when groups of ~5 individuals are common (A Kalid, I Said, A Waseem, A Batlle-Morera pers. obs. 2010–2023). Surveys conducted between 2009–2018 (n = 83) in Rasdhoo Channel shows a mean encounter rate of four Silvertip Sharks/hour (MMRI unpubl. data 2023). On dives, aggregations of >10 Silvertip Sharks/hour were observed in three years (2015, 2016, and 2017). In 2016 and 2017, six dives showed >20 Silvertip Sharks/hour, of which two dives in 2017 showed aggregations of >30 Silvertip Sharks in one hour of diving (MMRI unpubl. data 2023).

Grey Reef Sharks aggregate in the seaward side of Rasdhoo and Madivaru Channels, particularly during mild to strong incoming currents when groups of ~15 individuals are common (A Kalid, I Said, A Waseem, A Batlle-Morera pers. obs. 2010–2023). Surveys conducted between 2009–2018 in Rasdhoo Channel (n = 83) show a mean encounter rate of 12 sharks/hour. Grey Reef Shark encounter rates of >20 sharks/hour were observed in three years in Rasdhoo Channel (2015, 2016, and 2017). Dive surveys with aggregations of >30 Grey Reef Sharks/hour were reported in Rasdhoo Channel for both seasons (MMRI unpubl. data 2023). In Madivaru (total surveys, n = 1,093), a mean encounter rate of three Grey Reef Sharks/hour was observed with 31 dives recording aggregations of >20 individuals/hour for 2015–2018. Aggregations of >30 Grey Reef Sharks/hour were recorded on seven dives in 2017 and 2018. In 2017, aggregations of >30 Grey Reef Sharks/hour were observed in both seasons with one dive recording an aggregation of 42 Grey Reef Sharks/hour (MMRI unpubl. data 2023).

Aggregations of Spotted Eagle Rays are common in the area and can be regularly observed by divers. Aggregations occur year-round and can be observed especially in Madivaru Channel, where animals aggregate in groups of 5–30 individuals in the channel corner in front of Madivaru island or hovering above the Grey Reef Shark aggregations in the middle of the channel (A Kalid, I Said, A Waseem, A

Batlle-Morera pers. obs. 2010–2023). Mild to strong incoming currents are usually associated with the presence of these aggregations. It is possible that the animals use the updraft generated at the channel entrance during the incoming current to rest compensating their slightly negative buoyancy (Papastamatiou et al. 2021), although the scientific literature on this topic is scarce (Lauder & Di Santo 2015).

Veligandu Kandu is a known seasonal aggregation site for Reef Manta Rays during the northeast monsoon between November and April. Surveys conducted during recreational diving and snorkelling trips (n = 275) with photo-identification in the area between the years 2009 and 2022 recorded a total of 714 sightings of 174 individuals, and 46 aggregations of an average of seven individuals (SD = 2.3, minimum = 5, maximum = 14). The main behaviour displayed by the animals during these sightings was cleaning (n = 673, 95% of sightings) in one of several well-known cleaning stations around Veligandu Kandu (IDtheManta unpubl. data 2022).



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## Suggested citation

**IUCN SSC Shark Specialist Group. 2023.** Eastern Rasdhoo Atoll ISRA Factsheet. Dubai: IUCN SSC Shark Specialist Group.

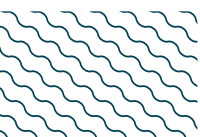
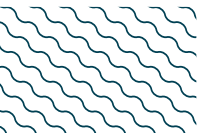
## QUALIFYING SPECIES

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	
<b>SHARKS</b>													
<i>Carcharhinus albimarginatus</i>	Silvertip Shark	VU	0-800	X							X		
<i>Carcharhinus amblyrhynchos</i>	Grey Reef Shark	EN	0-280	X							X		
<i>Triaenodon obesus</i>	Whitetip Reef Shark	VU	0-330	X				X					
<b>RAYS</b>													
<i>Aetobatus ocellatus</i>	Spotted Eagle Ray	EN	0-60	X							X		
<i>Mobula alfredi</i>	Reef Manta Ray	VU	0-711	X							X		
<i>Pastinachus sephen</i>	Cowtail Ray	NT	0-60		X								

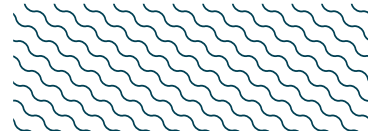
## SUPPORTING SPECIES

Scientific Name	Common Name	IUCN Red List Category
<b>SHARKS</b>		
<i>Carcharhinus falciformis</i>	Silky Shark	VU
<i>Carcharhinus melanopterus</i>	Blacktip Reef Shark	VU
<i>Sphyrna lewini</i>	Scalloped Hammerhead	CR
<i>Stegostoma tigrinum</i>	Indo-Pacific Leopard Shark	EN
<b>RAYS</b>		
<i>Aetomylaeus vespertilio</i>	Ornate Eagle Ray	CR
<i>Rhina ancylostomus</i>	Bowmouth Guitarfish	CR
<i>Taeniurops meyeri</i>	Blotched Fantail Ray	VU
<i>Torpedo fuscomaculata</i>	Blackspotted Torpedo	DD
<i>Urogymnus asperrimus</i>	Porcupine Ray	EN

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



## SUPPORTING INFORMATION



There are additional indications that Eastern Rasdhoo Atoll is an important area for two shark species.

Blacktip Reef Sharks can be observed year-round in the shallow reefs of Rasdhoo Atoll. Adults, juveniles, and neonates are abundant and aggregate around schools of fish of the family Atherinidae in sandy areas <1 m deep where feeding activity can be regularly observed. Further information is required to determine the importance of the area for reproduction, feeding, or undefined aggregations.

The area off the reef of Madivaru is a known location for Scalloped Hammerhead aggregations. The area was described as a location where an almost permanent aggregation of Scalloped Hammerheads of dozens, or even hundreds of individuals could be seen early morning (Anderson & Ahmed 1993; CBD 2023). Over the last decade, sightings have been drastically reduced, and observations of aggregations or single individuals have become rare (MMRI unpubl. data 2023). Additional contemporary evidence of Scalloped Hammerhead aggregations is required to determine if this area remains important for this species.



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