

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

WADGE BANK ISRA

Western Indian Ocean Region

SUMMARY

Wadge Bank is a large area of the continental shelf at the southern tip of India off the coast of Kerala and Tamil Nadu. It is generally flat with a variable benthos of sand, mud, and rock. Currents and eddies support vertical mixing and upwelling resulting in high biological productivity during the boreal summer monsoon. The area overlaps with Suchindram Therur, Vembanoor Key Biodiversity Area. Within this area there are: **threatened species** (e.g., Grey Bambooshark *Chiloscyllium griseum*); **range-restricted species** (e.g., Indian Swellshark *Cephaloscyllium silasi*); **reproductive areas** (e.g., Indian Ring Skate *Orbiraja powelli*); and the area sustains a **high diversity of sharks** (23 species).

CRITERIA

Criterion A - Vulnerability; Criterion B - Range Restricted;
Sub-criterion C1 - Reproductive Areas; Sub-criterion D2 - Diversity

INDIA

0-150 metres

6,608.53 km²





DESCRIPTION OF HABITAT

Wadge Bank is situated at the southern tip of India off the coast of Kerala and Tamil Nadu. The bank is a prominent seafloor feature representing a wide area of the continental shelf. The eastern part of the area is generally flatter and shallower than the western part (Sivalingam & Medcof 1957).

The benthos of the area is variable between sandy, muddy, and rocky substrates, although mud patches are more limited (Sivalingam & Medcof 1957; Mitra 1987). Rocky areas include patches of pinnacle rocks in both shallow and deeper water (Sivalingam & Medcof 1957; Mitra 1987). Sponge and sea fan beds were prominent in some parts of the bank but have been heavily impacted by repeated trawling (Mitra 1987).

The area falls well within southern part of the coastal upwelling system of the Southeastern Arabian Sea and is a physically active area with strong southeast currents (40–60 cm/s) and offshore Ekman mass transport (maximum of 8,000 kg/m/s in August) (Smitha et al. 2008; Sree Renjima et al. 2017). Cold core eddies present during the summer monsoon (Shafeeque et al. 2021) supports vertical mixing along with upwelling, resulting in high biological productivity.

The area overlaps with Suchindram Therur, Vembanoor Key Biodiversity Area (KBA) (KBA 2023).

This Important Shark and Ray Area is benthopelagic and is delineated from inshore and surface waters (0 m) to 150 m based on the bathymetry of the area.

ISRA CRITERIA

CRITERION A – VULNERABILITY

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

CRITERION B – RANGE RESTRICTED

Wadge Bank holds the regular presence of Indian Swellshark, Stripenose Guitarfish, and Indian Ring Skate as resident range-restricted species. These species occur year-round in the area and are commonly caught as bycatch in benthic trawls and gillnets of local fisheries which operate on Wadge Bank (e.g., Akhilesh et al. 2014; Karuppasamy et al. 2020; Wilson et al. 2020; Bhagyalekshmi & Kumar 2021; Bineesh et al. 2023).

Wadge Bank along with Kollam Slope are the primary areas where Indian Swellshark are regularly encountered in India (Akhilesh et al. 2014; Bineesh KK unpubl. data 2023). Stripenose Guitarfish and Indian Ring Skate are only encountered with any regularity in western India at Wadge Bank despite extensive fisheries along the whole west coast of India (Chembian 2010; Bhagyalekshmi & Kumar 2021).

These species are restricted to the Arabian Sea Large Marine Ecosystem (LME) and the Bay of Bengal LME.

SUB-CRITERION C₁ – REPRODUCTIVE AREAS

Wadge Bank is an important reproductive area for one shark and three ray species. The primary data comes from the monitoring of the major catch landing sites where fisheries operating in Wadge Bank land their catch with dissections providing information on reproductive biology (e.g., Bhagyalekshmi & Kumar 2021; Bineesh KK unpubl. data 2019–2022).

Grey Bambooshark are a regular bycatch of benthic trawls, beach seines, and hook-and-line operating in the area. During monitoring of landing sites across 2017–2019, a total of 896 individuals of both sexes were recorded with 3.5% of individuals classified as neonates (<12 cm total length [TL]) which is the size-at-birth as reported by Ebert et al. (2021) and 6.9% were pregnant females with egg cases containing fully formed embryos (Bineesh KK unpubl. data 2019). Wadge Bank is the area off southwestern India where larger numbers of neonates and pregnant females have been observed suggesting that the area serves as a pupping ground.

Stripenose Guitarfish are regularly caught as bycatch in the area (Bineesh et al. 2023). During monitoring of landing sites across 2021–2022, a total of 367 individuals of both sexes were recorded with 22.2% being pregnant females mostly at late pregnancy stages (size range: 58–75 cm TL) suggesting this area serves as a pupping ground (Bineesh KK unpubl. data 2022). The species has been recorded year-round but peak numbers are observed from September to January. An additional single pregnant female was reported from longline bycatch in the area in November 2019 at a depth of 110–130 m (Wilson et al. 2020). Wadge Bank is the area off southern India where larger numbers of pregnant females have been observed.

Indian Ring Skate are a regular bycatch of benthic trawls for shrimps and bony fishes in the area. An exploratory survey documented an egg-laying area in Wadge Bank (species misidentified as *Raja miraletus* at the time; Chembian 2010). Egg cases (n = 119) were recorded on three of 15 survey stations, clustered in the southwest of the area and egg cases were not recorded in other sites, for example, deeper surveys sites off the edge of the area (Chembian 2010). During monitoring of landing sites across 2017–2019, a total of 562 individuals of both sexes were recorded including 12 females containing egg cases with fully developed embryos (Bineesh KK unpubl. data 2019). Sampled skates ranged in size 7–52 cm TL and smaller individuals represented neonates and young-of-the-year (Bineesh KK unpubl. data 2019).

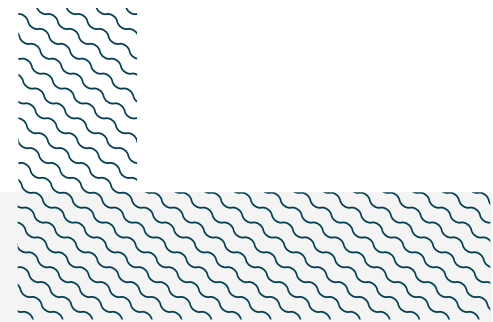
Bengal Guitarfish is one of the most common rays on the bank (e.g., the most common landed batoid observed at Colachel and the second most common batoid at Muttom; Bhagyalekshmi & Kumar 2021). This species is a regular bycatch of benthic trawls for shrimps and bony fishes in the area. During monitoring of landing sites across 2017–2019, a total of 1,482 individuals of both sexes (size range: 58–96 cm TL) were recorded (Bineesh KK unpubl. data 2019). Given a size-at-maturity of 61 and 63 cm TL for females and males, respectively (Purushottama et al. 2020), most sampled animals were adult with 11.2% (n = 166) being pregnant females (Bineesh KK unpubl. data 2019).

SUB-CRITERION D₂ – DIVERSITY

Wadge Bank sustains a high diversity of Qualifying species (23 species). This exceeds the regional diversity threshold (22 species) for the Western Indian Ocean Region.

Wadge Bank area is one of the most important fishing grounds of southern India with a long history of various fisheries operating in the area (Mendis 1965; Mitra 1987; Karupphasamy et al. 2020; Bhagyalekshmi & Kumar 2021). Monitoring of landing sites and exploratory surveys by Fishery Survey of India and CIFNET (Central institute for fisheries Nautical and Engineering Training) provide information on the regular occurrence of the Qualifying Species in the area. The major landing sites

are Chinnamuttom (Tamil Nadu), Muttom (Tamil Nadu), Colachel (Tamil Nadu), Thengapattanam (Tamil Nadu), and Vizhinjam (Kerala). Sharks and rays are a regular bycatch of trawl, gillnet, line, and seine fisheries operating on Wadge Bank and landed in these centres and the Qualifying Species represent the most regularly encountered species (Karuppasamy et al. 2020; Bhagyalekshmi & Kumar 2021; Bineesh KK unpubl. data 2023). Whale Shark bycatch has occurred historically on Wadge Bank (Lazarus et al. 1988) and continues with contemporary reports of Whale Sharks being released from fishing gear often appearing in the media.



Acknowledgments

Bineesh KK (Zoological Survey India), Hashim M (Centre for Marine Living Resources & Ecology), Akhilesh KV (Central Marine Fisheries Research Institute), and Peter M Kyne (IUCN SSC Shark Specialist Group – ISRA Project) contributed and consolidated information included in this factsheet. We thank all participants of the 2023 ISRA Region 7 – Western Indian Ocean 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. 2023. Wadge Bank 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 brevipinna</i>	Spinner Shark	VU	0-200	X								X
<i>Carcharhinus leucas</i>	Bull Shark	VU	0-256	X								
<i>Carcharhinus limbatus</i>	Blacktip Shark	VU	0-140	X								
<i>Carcharhinus longimanus</i>	Oceanic Whitetip Shark	CR	0-1,082	X								
<i>Cephaloscyllium silasi</i>	Indian Swellshark	CR	100-500	X	X							
<i>Chiloscyllium griseum</i>	Grey Bambooshark	VU	5-100	X		X						
<i>Rhincodon typus</i>	Whale Shark	EN	0-1,928	X								
<i>Rhizoprionodon acutus</i>	Milk Shark	VU	1-200	X								
<i>Sphyrna lewini</i>	Scalloped Hammerhead	CR	0-1,043	X								
RAYS												
<i>Acroteriobatus variegatus</i>	Stripenose Guitarfish	CR	0-366	X	X	X						
<i>Brevitrygon imbricata</i>	Bengal Whipray	VU	3-55	X								
<i>Glaucostegus obtusus</i>	Widenose Guitarfish	CR	0-60	X								
<i>Himantura leoparda</i>	Leopard Whipray	EN	1-70	X								

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
<i>Himantura leoparda</i>	Leopard Whipray	EN	1-70	X								
<i>Himantura uarnak</i>	Coach Whipray	EN	0-50	X								
<i>Maculabatis gerrardi</i>	Whitespotted Whipray	EN	0-60	X								
<i>Mobula birostris</i>	Oceanic Manta Ray	EN	0-1,000	X								
<i>Narcine timlei</i>	Brown Numbfish	VU	5-50	X								
<i>Orbiraja powelli</i>	Indian Ring Skate	NT	17-462		X	X						
<i>Pastinachus ater</i>	Broad Cowtail Ray	VU	0-60	X								
<i>Pateobatis fai</i>	Pink Whipray	VU	0-200	X								
<i>Rhina ancylostomus</i>	Bowmouth Guitarfish	CR	0-70	X								
<i>Rhinobatos annandalei</i>	Bengal Guitarfish	CR	5-73	X		X						
<i>Rhinoptera jayakari</i>	Oman Cownose Ray	EN	0-50	X								

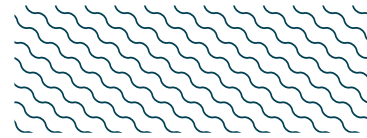
SUPPORTING SPECIES

Scientific Name	Common Name	IUCN Red List Category
SHARKS		
<i>Bythaelurus hispidus</i>	Bristly Catshark	NT
<i>Carcharhinus albimarginatus</i>	Silvertip Shark	VU
<i>Carcharhinus altimus</i>	Bignose Shark	NT
<i>Carcharhinus amboinensis</i>	Pigeeye Shark	VU
<i>Carcharhinus sorrah</i>	Spottail Shark	NT
<i>Eridacnis radcliffei</i>	Pygmy Ribbontail Catshark	LC
<i>Galeocerdo cuvier</i>	Tiger Shark	NT
<i>Halaelurus quagga</i>	Quagga Catshark	DD
<i>Hemipristis elongata</i>	Snaggletooth Shark	EN
<i>Sphyrna zygaena</i>	Smooth Hammerhead	VU
<i>Triaenodon obesus</i>	Whitetip Reef Shark	VU
RAYS		
<i>Gymnura poecilura</i>	Longtail Butterfly Ray	VU
<i>Mobula thurstoni</i>	Bentfin Devil Ray	EN
<i>Neotrygon caeruleopunctata</i>	Bluespotted Maskray	LC
<i>Pastinachus sephen</i>	Cowtail Ray	NT
<i>Pateobatis jenkinsii</i>	Jenkins' Whipray	EN
<i>Pteroplatytrygon violacea</i>	Pelagic Stingray	LC
<i>Taeniurops meyeri</i>	Blotched Fantail Ray	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.

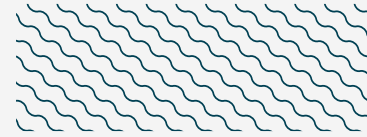


SUPPORTING INFORMATION



There are additional indications that Wadge Bank could potentially be an important reproductive area for one other ray species.

Widenose Guitarfish are a regular bycatch of benthic trawls, beach seines, and hook-and-line operating in the area. During monitoring of landing sites across 2017-2019, a total of 256 individuals of both sexes were recorded with 4.6% being pregnant females (size range: 67.6-78.7 cm TL) with fully developed embryos (Bineesh KK unpubl. data 2019). Further information is required on the importance of the area for reproduction.



REFERENCES

- Akhilesh KV, Bineesh KK, Mishra SS, Ganga U, Pillai NGK. 2014.** Notes on the Indian swellshark, *Cephaloscyllium silasi* (Scyliorhinidae: Carcharhiniformes) from deep waters off the west coast of India. *Marine Biodiversity Records* 7: e25. <https://doi.org/10.1017/S1755267214000141>
- Bhagyalekshmi V, Kumar AB 2021.** Bycatch of non-commercial batoids in the trawl fishery of south India: Status and conservation prerequisites. *Regional Studies in Marine Science* 44: 101738. <https://doi.org/10.1016/j.rsma.2021.101738>
- Bineesh KK, Ida EG, Nashad M, Kumar R, Rajan R, Mohapatra A. 2023.** An updated checklist of Indian batoids with new distributional records and conservation status. *Records of Zoological Survey of India* 123: 1–15.
- Chembian JA. 2010.** Description of spawning ground and egg capsules of the batoid *Raja miraletus* Linnaeus, 1758 in the Wadge Bank, along the south-west coast of India. *Indian Journal of Fisheries* 57: 13–16.
- Ebert DA, Dando M, Fowler S. 2021.** *Sharks of the world. A complete guide.* Princeton: Princeton University Press.
- IUCN. 2023.** The IUCN Red List of Threatened Species. Version 2022-2. Available at: <https://www.iucnredlist.org> Accessed October 2023.
- Karuppasamy K, Jawahar P, Kingston SD, Venkataramani VK, Vidhya V. 2020.** Elasmobranch diversity, conservation and management along Wadge Bank, South India. *Indian Journal of Animal Research* 54: 367–372. <https://doi.org/10.18805/ijar.B-3778>
- Key Biodiversity Areas (KBA). 2023.** Key Biodiversity Area factsheet: Suchindram Therur, Vembanoor. Available at: <https://www.keybiodiversityareas.org/site/factsheet/18403> Accessed October 2023.
- Lazarus S, Joel JJ, Philipose KK, Vincent SG. 1988.** On five whale sharks landed along the Trivandrum-Kanyakumari coast. *Marine Fisheries Information Service, Technical and Extension Series* 88: 19–20.
- Mendis AS. 1965.** Resources of the Wadge Bank and Pedro Bank. *Bulletin of the Fisheries Research Station Ceylon* 18(2): 48–51.
- Mitra GN. 1987.** Catch rates and catch composition of fish in the wadge bank in commercial fishing. Paper 34. In: National symposium on research and development in marine fisheries, mandapam camp, 16–18 September 1987, 284–287.
- Purushottama GB, Ramasubramanian V, Akhilesh KV, Raje SG, Thakurdas, Kizhakudan SJ, Zacharia PU. 2020.** Biological observations on the Bengal guitarfish *Rhinobatos annandalei* Norman, 1926 from the eastern Arabian Sea, India. *Indian Journal of Fisheries* 67(2): 23–34.
- Shafeeque M, Balchand AN, Shah P, George G, Smitha BR, Varghese E, Joseph AK, Sathyendranath S, Platt T. 2021.** Spatio-temporal variability of chlorophyll-a in response to coastal upwelling and mesoscale eddies in the South Eastern Arabian Sea. *International Journal of Remote Sensing* 42(13): 4840–4867. <https://doi.org/10.1080/01431161.2021.1899329>
- Sivalingam S, Medcof JC. 1957.** General features and productivity of the wadge bank trawl fishery. Bulletin No. 6. Ceylon: Fisheries Research Station, Department of Fisheries.
- Smitha BR, Sanjeevan VN, Vimalkumar KG, Revichandran C. 2008.** On the upwelling off the southern tip and along the west coast of India. *Journal of Coastal Research* 24(4C, Supp.): 95–102. <https://www.jstor.org/stable/40065075>
- Sree Renjima G, Sanjeevan VN, Smitha BR, Lalithambika Devi CB, Sudhakar M. 2017.** Early developmental stages of the Indian mackerel *Rastrelliger kanagurta* (Cuvier) along the Kerala - Mangalore coast of South Eastern Arabian Sea. *Journal of the Marine Biological Association of India* 58(2): 68–80.
- Wilson L, Zacharia PU, Kizhakudan SJ, Najmudeen TM, Santhosh B, Ambarish, Gop P, Radhakrishnan M, Sunil KTS, Pakkri Muthu S. 2020.** Report on the landing of the critically endangered rhinobatid *Acroteriobatus variegatus* (Nair & Lal Mohan, 1973) with some insights into its reproductive biology. *Journal of the Marine Biological Association of India* 62(1): 60–64.