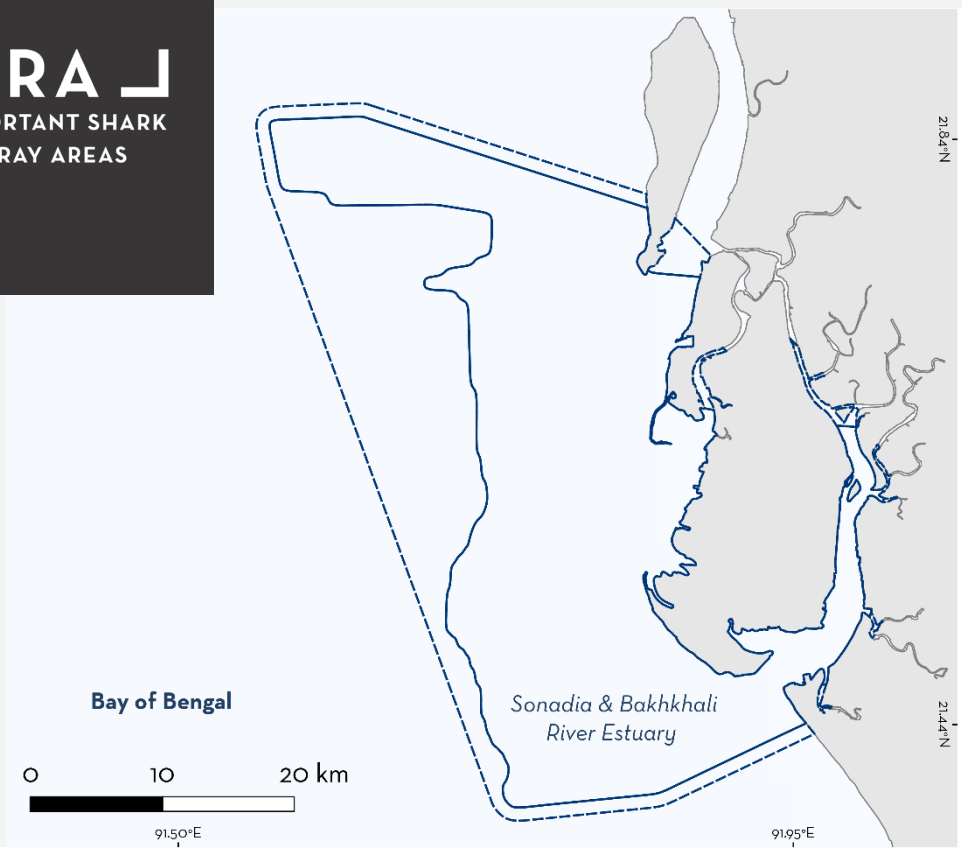
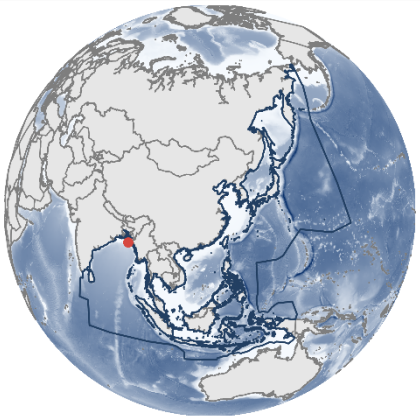
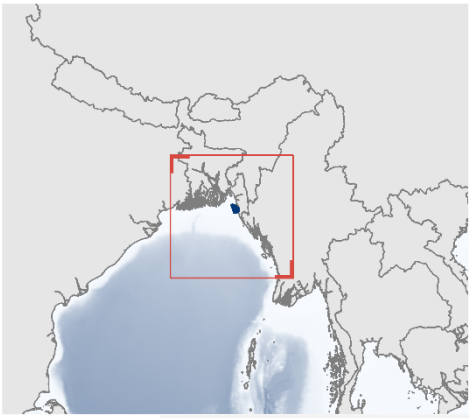
ISRA
IMPORTANT SHARK AND RAY AREAS







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

SONADIA & BAKHKHALI RIVER ESTUARY ISRA

Asia Region

BANGLADESH

0–15 metres

918.59 km²

SUMMARY

Sonadia & Bakhkhali River Estuary is located on the southeast coast of Bangladesh. It extends from the upper part of Cox's Bazar to the southern tip of the Kutubdia channel, including a portion of the Bakhkhali River. The area is bordered by the Bakhkhali River and Kutubdia Channel, and the coastal environment consists of other smaller river mouths (e.g., Kohelia River), sandy beaches, mudflats, nearshore sandbars, high dunes, and mangrove forests. The area overlaps with Sonadia Island Key Biodiversity Area. Within this area there are: **threatened species** and **undefined aggregations** (Widenose Guitarfish *Glaucostegus obtusus*).

CRITERIA

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

DESCRIPTION OF HABITAT

Sonadia & Bakhkhali River Estuary is on the southeast coast of Bangladesh in the northeastern Bay of Bengal. It extends from the upper part of Cox's Bazar to the southern tip of the Kutubdia Channel, including a portion of the Bakhkhali River and is bordered by them. The area is characterised by a shallow continental shelf and the coastal environment consists of other smaller river mouths (e.g., Kohelia River) and a variety of habitats, including sandy beaches, mudflats, sandbars close to the shore, high dunes, and mangrove forests (Khadiza et al. 2023).

The Maheshkhali and Kutubdia Channels (within and surrounding this area) separate the Moheshkhali and Kutubdia Islands from the mainland. Sonadia Island, located on the eastern cliff coast of Bangladesh, is a unique geological formation that does not fit into traditional categories as a deltaic or estuarine mouth bar. Situated on the shallow and vast inner shelf of the Bay of Bengal, its distinctive location leads to periodic alterations in the nearby coastline's geomorphology (Bhuiyan 2021). Due to its geographical position in multiple river estuaries and channel mouths, this region exhibits great productivity in terms of nutrients and primary productivity. The bathymetry in the vicinity of Kutubdia-Sonadia island is characterised by a layer of loose sediment that has been deposited by the major rivers (Hoque et al. 2023). Sonadia Island features a variety of ecosystems, including mudflats, dunes, mangroves, lagoons, saltpans, and beaches (Harun-ur-Rashid et al. 2017).

The oceanography of the area is influenced by the seasonal variations in climate, particularly related to the monsoon, and by freshwater influx. Water stratification occurs during the monsoon (July–September) due to intense rainfall and freshwater influx. This region experiences a biannual seasonal reversal of currents. The East Indian Coastal Current (EICC) moves in a northeasterly direction from February–September, reaching its highest point in March–April (Mukherjee et al. 2014; Paul et al. 2021). During this time, the current transports significant nutrients from the western side. The presence of strong currents interacting with Rossby waves, changes in wind stress curl, and associated Ekman pumping results in the formation of several cold core eddies in this location (Jain et al. 2021). These eddies carry nutrients from the subsurface to the surface, making it a highly productive area.

The area overlaps with Sonadia Island Key Biodiversity Area (KBA 2024).

This Important Shark and Ray Area is benthic and is delineated from inshore and surface waters (0 m) to 15 m based on the bathymetry of the area.

ISRA CRITERIA

CRITERION A – VULNERABILITY

One Qualifying Species within the area is considered threatened with extinction according to the IUCN Red List of Threatened Species. The Widenose Guitarfish is assessed as Critically Endangered (Kyne & Jabado 2021).

SUB-CRITERION C5 – UNDEFINED AGGREGATIONS

Sonadia & Bakhkhali River Estuary is important for undefined aggregations of one ray species.

Widenose Guitarfish are regularly targeted and incidentally captured in the area (Haque et al. 2021a). This species is landed in considerable numbers at Cox's Bazar (at the southern end of Sonadia & Bakhkhali River Estuary) with the southeastern region of Bangladesh, including the area, representing

the highest catches of Widenose Guitarfish in the country (Haque & Spaet 2021; Haque et al. 2021a, 2021b). Informal interviews with fishers and landing site workers corroborated that the species is regularly caught in the area when fixed benthic fishing gear (set bag nets and set nets) are deployed at times when guitarfish are forming aggregations (boreal winter months of December–February) (Haque et al. unpubl. data 2022–2024).

There is evidence to support these seasonal aggregations being related to reproductive activities (Haque et al. unpubl. data 2022–2024). During monitoring of landings at Cox's Bazar in 2022, a subset of 177 Widenose Guitarfish were isolated as having been caught in Sonadia & Bakhkhali River Estuary through informal discussions with fishers. The subsample represents individuals with spatially verified catch locations within the area. Furthermore, fishers report that specimens were caught in large groups in single net hauls supporting the fact that these are aggregations considering that this fishing gear is fixed in one location. Single hauls that could be counted and verified consisted of 44 individuals and 69 individuals. Of the 177 examined specimens, 74% (n = 131) were caught using set bag nets, and 26% (n = 46) were caught in benthic set nets deployed during low tide. The majority of the specimens were male (55%; n = 97), whereas 45% (n = 80) were female. The size range spanned 25–110.5 cm total length (TL) (mean = 64.2 cm TL). The specimens included 26 young-of-the-year individuals (14.8%) with healed but visible umbilical scars, ranging in size 29.4–50.2 cm TL (mean = 36.7 cm TL, SD ± 4.11 cm TL). Specimens with umbilical scars comprised 42.3% (n = 11) females and 57.7% (n = 15) males. Upon dissection, 27 adult female specimens (representing 51% of the adult females sampled; n = 53) were recorded with multiple ova in the ovaries, although embryos were not observed which may reflect seasonality of the reproductive cycle (dissected individuals were only from the 3-month period of October–December). Preliminary catch data from early 2024 suggests the similar presence of young-of-the-year, highlighting the regular occurrence of early life-stages in the area (Haque et al. unpubl. data 2022–2024). However, further information is required to understand the nature and function of the aggregations.

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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
RAYS												
Glaucostegus obtusus	Widenose Guitarfish	CR	0–60	X						X		

SUPPORTING SPECIES

Scientific Name	Common Name	IUCN Red List Category
SHARKS		
Carcharhinus sorrah	Spottail Shark	NT
Scoliodon laticaudus	Spadenose Shark	NT
RAYS		
Gymnura poecilura	Longtail Butterfly Ray	VU
Rhinobatos lionotus	Smoothback Guitarfish	CR

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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