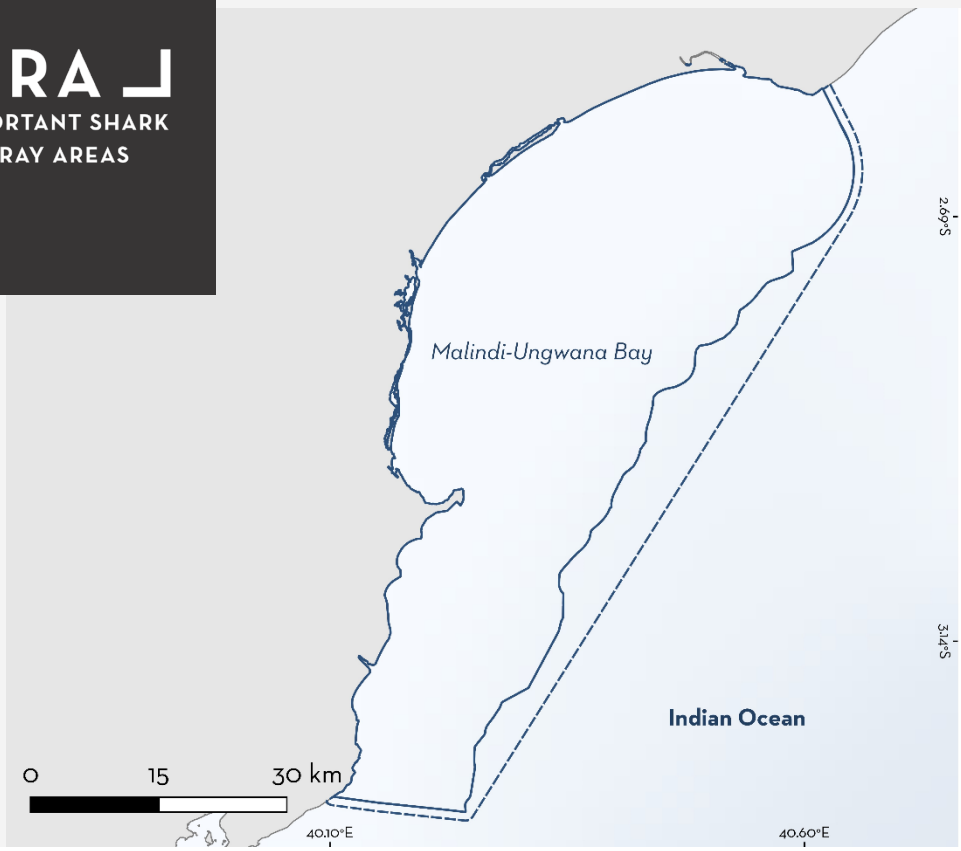
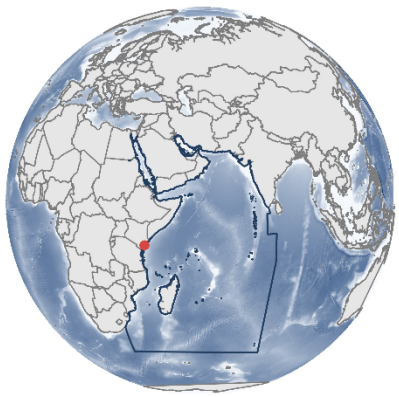
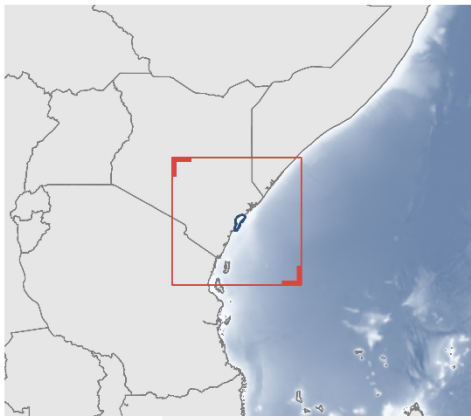
ISRA
IMPORTANT SHARK AND RAY AREAS







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

MALINDI-UNGWANA BAY ISRA

Western Indian Ocean Region

KENYA

0–210 metres

2,413.78 km²

SUMMARY

Malindi-Ungwana Bay is located on the northern coast of Kenya in eastern Africa. The area is characterised by muddy and sandy substrates, with mangroves, seagrass beds, and rocky areas. It has freshwater input from two rivers, Sabaki and Tana, which form an estuary and a delta, respectively. This area overlaps with two protected areas, the Tana River Delta Ramsar Site, the Tana River Delta Key Biodiversity Area, and the Lamu-Kiunga Area Ecologically or Biologically Significant Marine Area. Within the area there are: **threatened species** (e.g., Whitespotted Wedgefish *Rhynchobatus djiddensis*); **range-restricted species** (e.g., Speckled Catshark *Halaelurus boesemani*); and **reproductive areas** (e.g., Scalloped Hammerhead *Sphyrna lewini*).

CRITERIA

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

DESCRIPTION OF HABITAT

Malindi-Ungawana Bay is located on the north coast of Kenya in the Kilifi and Tana River counties. The area is characterised by muddy and sandy substrates, with patches of seagrass and seaweed, and some rocky areas (Fulanda 2003; Fondo et al. 2022). This bay is one of the most productive marine areas in Kenya as a result of the mangrove forests surrounding the bay and freshwater input from two rivers, Sabaki and Tana, that drain from a large part of the central and eastern regions of Kenya. The Tana River forms a delta while the Sabaki River forms an estuary. This area has a narrow continental shelf in the south (~15 km) but a wider shelf in the north around Kipini (~60 km).

The bay is influenced by the northeast (November–March) and southeast (April–October) monsoon winds that causes changes in water movements, salinity, and productivity (Ndoro et al. 2015).

The area overlaps with the Tana River Delta Ramsar Site (Ramsar 2023) which is also a Key Biodiversity Area (KBA 2023) and with the Lamu-Kiunga Area Ecologically or Biologically Significant Marine Area (EBSA; CBD 2023). In addition, it overlaps with Kiunga Marine National Reserve in the north and Malindi Marine National Park in the south.

This Important Shark and Ray Area is benthopelagic and is delineated from inshore and surface waters (0 m) to 210 m based on the bathymetry of the area.

ISRA CRITERIA

CRITERION A – VULNERABILITY

Three Qualifying Species considered threatened with extinction according to the IUCN Red List of Threatened Species™ regularly occur in the area. These are the Critically Endangered Scalloped Hammerhead (Rigby et al. 2019) and Whitespotted Wedgefish (Kyne et al. 2019), and the Vulnerable Speckled Catshark (Kyne et al. 2017).

CRITERION B – RANGE RESTRICTED

This area holds the regular presence of three shark and one ray species as range-restricted species. Speckled Catshark, Grinning Izak Catshark, African Angelshark, and Elaine's Skate occur year-round in the bay and are regularly caught and landed as bycatch of the prawn trawlers operating in the bay (Kaunda-Arara 2022; L Menya pers. comm. 2023). Observer data show that the species have been caught consistently by prawn trawlers in variable numbers since 2002.

Speckled Catsharks represented ~45% (n = 1,555) of the shark bycatch in the area between 2019–2021 making it the most caught bycatch species (Kiilu et al. 2019; Kaunda-Arara 2022; L Menya pers. comm. 2023). Some unconfirmed records previously reported its occurrence in Kenya (Compagno 1988). These reports were confirmed by observations from the Kenyan trawl catches (Kiilu et al. 2019; Kaunda-Arara 2022; L Menya pers. comm. 2023). This species is restricted to the Somali Coastal Current Large Marine Ecosystem (LME).

Grinning Izak Catsharks represented ~5% (n = 58) of the 2019–2021 shark bycatch in the area (Kaunda-Arara 2022; L Menya pers. comm. 2023). The species is restricted to the Somali Coastal Current and the Agulhas Current LMEs.

African Angelsharks represented 10% of shark bycatch in the area (n = 347) and is caught year-round (L Menya pers. comm. 2023). Between 2012–2013, four individuals were also caught on demersal

research trawls in the area (Kiilu 2016; Kiilu et al. 2019). This species occurs in the Somali Coastal Current and the Agulhas Current LMEs.

Elaine's Skate is currently caught year-round as bycatch in trawlers operating in the area with 49 individuals recorded between 2019–2020 at depths between 187–208 m (L Menya pers. comm. 2023). This species is endemic to Kenya (Ebert & Leslie 2019) and occurs exclusively within the Somali Coastal Current LME.

SUB-CRITERION C1 – REPRODUCTIVE AREAS

Malindi-Ungwana Bay is an important reproductive area for one shark and one ray species.

Scalloped Hammerhead are the most caught shark species in semi-industrial prawn trawls and artisanal fisheries operating in the area (Kiilu 2016; Oddenyo 2017; Kiilu et al. 2019) and are caught year-round in the Ungwana part of the bay. Individuals between 28–63 cm total length (TL) are commonly caught in the area (Kaunda-Arara 2016; Kiilu 2016; Oddenyo 2017; Kiilu et al. 2019; CORDIO unpubl. data 2023; B Kaunda-Arara unpubl. data 2023). These individuals are neonates (also supported by the presence of umbilical scars at different stages of healing) and young-of-the-year (YOY) since reported size-at-birth for the species is 31–57 cm TL (Ebert et al. 2021). Between 2012–2013, 78 individuals (46–63 cm TL) were recorded in the area and landed in Kipini, while between 2014–2015, 397 individuals (28–54 cm TL) were recorded (Kiilu 2016; Oddenyo 2017; Kiilu et al. 2019). Between May to December 2018, individuals between 35–98 cm TL (mean = 54.7 cm, n = 153) were recorded in the area (CORDIO unpubl. data 2023). Between 2019–2020, 181 individuals were caught by prawn trawlers. In addition, these sharks are commonly caught in longlines and gillnets in lagoon seagrass habitats at depths <10 m. Neonates and YOY are caught during the southeast monsoon season from April to October (Kaunda-Arara 2016; Wambiji et al. 2022; B Kaunda-Arara unpubl. data 2023). This species occurs in other parts of Kenya (Kiilu et al. 2019), however, Malindi-Ungwana Bay is the area where most neonates and YOY are captured.

Whitespotted Wedgefish are commonly caught as bycatch in prawn trawlers, with individuals caught measuring 23–210 cm TL (Kaunda-Arara 2022; L Menya unpubl. data 2023). Between 2019–2021, 24 individuals between 23–60 cm TL were recorded caught in the area and these individuals were considered neonates based on the reported size-at-birth for the species (~60 cm TL; Last et al. 2016). The high productivity of the bay facilitated by soft substrates caused mostly by river terrigenous inputs provide a suitable habitat for these life stages. Neonate Whitespotted Wedgefish have not been reported in any other sites on the Kenyan coast (B Kaunda-Arara pers. comm. 2023).

Acknowledgments

Boaz Kaunda-Arara (University of Eldoret), Melita Samoilys (CORDIO-EA), Nina Wambiji (Kenya Marine and Fisheries Research Institute), Benedict Kiilu (Kenya Fisheries Service), Remy M. Oddenyo (Wildlife Conservation Society), Mohammed Omar (Kenya Wildlife Training Institute), Joshua Rambahiniarison (CORDIO-EA), and Emiliano García-Rodríguez (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. Malindi-Ungwana Bay 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												
Halaelurus boesemani	Speckled Catshark	VU	29–91	X	X							
Holohalaelurus grennian	Grinning Izak Catshark	DD	238–353		X							
Sphyrna lewini	Scalloped Hammerhead	CR	0–1,043	X		X						
Squatina africana	African Angelshark	NT	1–494		X							
RAYS												
Leucoraja elaineae	Elaine's Skate	DD	187–484		X							
Rhynchobatus djiddensis	Whitespotted Wedgefish	CR	0–70	X		X						

SUPPORTING SPECIES

Scientific Name	Common Name	IUCN Red List Category
SHARKS		
Alopias pelagicus	Pelagic Thresher	EN
Carcharhinus amboinensis	Pigeye Shark	VU
Carcharhinus leucas	Bull Shark	VU
Carcharhinus limbatus	Blacktip Shark	VU
Carcharhinus macloti	Hardnose Shark	NT
Centrophorus granulosus	Gulper Shark	EN
Heterodontus ramalheira	Whitespotted Bullhead Shark	DD
Loxodon macrorhinus	Sliteye Shark	NT
Mustelus mosis	Arabian Smoothhound	NT
Rhincodon typus	Whale Shark	EN
Stegostoma tigrinum	Indo-Pacific Leopard Shark	EN
RAYS		
Aetobatus ocellatus	Spotted Eagle Ray	EN
Maculabatis ambigua	Baraka's Whipray	NT
Myliobatis aquila	Common Eagle Ray	CR
Neotrygon caeruleopunctata	Bluespotted Maskray	LC
Pristiophorus nancyae	African Dwarf Sawshark	LC
Rhinoptera jayakari	Oman Cownose Ray	EN
Rhina ancylostomus	Bowmouth Guitarfish	CR
Rhinobatos holcorhynchus	Slender Guitarfish	DD
Torpedo sinuspersici	Gulf Torpedo	DD

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 is additional information indicating that Malindi-Ungwana Bay may be an important reproductive area for three shark species.

Bull Sharks ranging in size 53–118 cm TL (mean = 81 cm, n = 74) were caught in June 2018 by artisanal fisheries within the area (CORDIO unpubl. data 2023). Based on reported size-at-birth of 50–80 cm TL (Ebert et al. 2021) this area host neonates and young-of-the-year Bull Sharks, as previously reported (Oddenyo 2017).

Three Silky Sharks ranging in size 47–101 cm TL (mean = 75 cm, n = 149) were recorded in nets from May to October (CORDIO unpubl. data 2023). Reported size-at-birth for the species is 60–75 cm TL (Joung et al. 2008; Galván-Tirado 2015), confirming that these were neonates/young-of-the-year.

A landings survey of artisanal fisheries conducted from May to December 2018 found four Whale Shark measuring 51–53 cm total length (TL) that were caught in artisanal fisheries using gillnets in Kipini between July–August (CORDIO unpubl. data 2023). Reported size-at-birth for this species is 55–64 cm TL (Ebert et al. 2021) confirming that these individuals were neonates. Very few neonates have been recorded worldwide (Pierce et al. 2022) highlighting the potential global importance of this area for the species. More information is needed to confirm the regular presence of these life-stages and the reproductive importance of the area for these species.

REFERENCES

Compagno LJ, ed. 1988. *Sharks of the order Carcharhiniformes*. New Jersey: Princeton University Press.

Convention on Biological Diversity (CBD). 2023. Lamu-Kiunga Area. Ecologically or Biologically Significant Areas (EBSAs). Available at: https://chm.cbd.int/database/record?documentID=204006 Accessed May 2023.

Ebert DA, Leslie RW. 2019. *Leucoraja elaineae* sp. nov., a new rough skate (Rajiformes: Rajidae) from the Western Indian Ocean. *Zootaxa* 4691(3): 225–234. https://doi.org/10.11646/zootaxa.4691.3.3

Ebert DA, Dando M, Fowler S. 2021. *Sharks of the world. A complete guide. Second edition.* Princeton: Princeton University Press.

Fondo EN, Omukoto JO, Wambiji N, Okemwa GM, Thoya P, Maina GW, Kimani EN. 2022. Diversity of shallow-water species in prawn trawling: a case study of Malindi–Ungwana Bay, Kenya. *Diversity* 14(3): 199. https://doi.org/10.3390/d14030199

Fulanda B. 2003. Shrimp trawling in Ungwana Bay: a threat to fishery resources. In: Hoorweg J, Muthiga N, eds. *Recent advances in coastal ecology: studies from Kenya*. Enschede: African Studies Centre; Print Partners Ipskamp BV, 233–242.

Galván-Tirado C, Galvan-Magaña F, Ochoa-Báez RI. 2015. Reproductive biology of the silky shark *Carcharhinus falciformis* in the southern Mexican Pacific. *Journal of the Marine Biological Association of the United Kingdom* 95: 561–567. https://doi.org/10.1017/S0025315414001970

Joung SJ, Chen CT, Lee HH, Liu KM. 2008. Age, growth, and reproduction of silky sharks, *Carcharhinus falciformis*, in northeastern Taiwan waters. *Fisheries Research* 90: 78–85. https://doi.org/10.1016/j.fishres.2007.09.025

Kaunda-Arara B. 2016. Ecology and fishery of hammerhead sharks (*Sphyrna lewini*) on the north coast of Kenya. US Fish and Wildlife Service, Endangered Species Programme.

Kaunda-Arara B. 2022. Impacts of prawn trawling on species of hammerhead sharks, sawfishes, wedgefishes, and guitarfishes in coastal Kenya: with additional information on other elasmobranch bycatch species. A Technical Report prepared for the National Geographic Society Explorer Programme. Eldoret: University of Eldoret/National Geographic Society.

Key Biodiversity Areas (KBA). 2023. Key Biodiversity Areas factsheet: Tana River Delta. Available at: https://www.keybiodiversityareas.org/site/factsheet/6412 Accessed September 2023.

Kiilu BK. 2016. Distribution, abundance and some growth aspects of shark species (Pisces: Chondrichthyes) on the Kenyan coast. Unpublished Masters Thesis, University of Eldoret, Eldoret.

Kiilu BK, Kaunda-Arara B, Oddenyo RM, Thoya P, Njiru JM. 2019. Spatial distribution, seasonal abundance and exploitation status of shark species in Kenyan coastal waters. *African Journal of Marine Science* 41: 191–201. https://doi.org/10.2989/1814232X.2019.1624614

Kyne PM, Ebert DA, Akhilesh KV, Tesfamichael D, Valinassab T. 2017. *Halaelurus boesemani. The IUCN Red List of Threatened Species* 2017: e.T161488A109905403. https://dx.doi.org/10.2305/IUCN.UK.2017-2.RLTS.T161488A109905403.en

Kyne PM, Gledhill K, Jabado RW. 2019. *Rhynchobatus djiddensis. The IUCN Red List of Threatened Species* 2019: e.T39394A121035795. https://dx.doi.org/10.2305/IUCN.UK.2019-2.RLTS.T39394A121035795.en

Last PR, White WT, de Carvalho MR, Séret B, Stehmann MFW, Naylor GJP. 2016. *Rays of the world.* Clayton South: CSIRO Publishing.

Ndoro CK, Kaunda-Arara B, Munga CN, Ruwa R. 2015. Influence of seasonality and bathymetry on decapod crustacean community structure in Malindi-Ungwana Bay, Kenya. *Western Indian Ocean Journal of Marine Science* 13: 31–46.

Oddenyo RM. 2017. Trophic ecology and exploitation status of shark species (Pisces: Elasmobranchii) in the north coast of Kenya. Unpublished Masters Thesis, University of Eldoret, Eldoret.

Ramsar. 2023. Tana River Delta Ramsar Site. Ramsar Sites Information Service. Available at: https://rsis.ramsar.org/ris/2082 Accessed September 2023.

Rigby CL, Dulvy NK, Barreto R, Carlson J, Fernando D, Fordham S, Francis MP, Herman K, Jabado RW, Liu KM, et al. 2019. *Sphyrna lewini. The IUCN Red List of Threatened Species* 2019: e.T39385A26.

Wambiji N, Kadagi NI, Everett BI, Temple AJ, Kiszka JJ, Kimani E, Berggren P. 2022. Integrating long-term citizen science data and contemporary artisanal fishery survey data to investigate recreational and small-scale shark fisheries in Kenya. *Aquatic Conservation: Marine and Freshwater Ecosystems* 32: 1306–1322. https://doi.org/10.1002/aqc.3829