

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

GULF OF TADJOURA ISRA

Western Indian Ocean Region

SUMMARY

Gulf of Tadjoura is located within the Gulf of Aden, Djibouti. It is characterised by extensive coastal coral reefs, seagrass beds, salt pans, and mangroves. Within this area there are: **threatened species** (e.g., Bowmouth Guitarfish *Rhina ancylostomus*); **reproductive areas** (Scalloped Hammerhead *Sphyrna lewini*); **feeding areas** (Whale Shark *Rhincodon typus*); and **undefined aggregations** (Bowmouth Guitarfish).

CRITERIA

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

DJIBOUTI

0-400 metres

197.05 km²





DESCRIPTION OF HABITAT

Gulf of Tadjoura is located within the Gulf of Aden and has a maximum width of ~15 km and a length of ~45 km. The area is bounded by Djibouti except for a small border on the southern side with Somalia. It is characterised by marine habitats including extensive coastal coral reefs, seagrass beds, salt pans, and mangroves. The depth drops rapidly near the coast to a maximum of 400 m. This steep decline is thought to cause upwellings resulting in highly productive coastal waters (Boldrocchi et al. 2020; D Rowat unpubl. data 2023).

This Important Shark and Ray Area is benthopelagic and is delineated from surface and inshore waters (0 m) to a maximum depth of 400 m based on the bathymetry of the area and the depth of the Qualifying Species.

ISRA CRITERIA

CRITERION A – VULNERABILITY

Three Qualifying Species considered threatened with extinction according to the IUCN Red List of Threatened Species™ are known to occur in the area. These are the Critically Endangered Scalloped Hammerhead (Rigby et al. 2019) and Bowmouth Guitarfish (Kyne et al. 2019), and the Endangered Whale Shark (Pierce & Norman 2016).

SUB-CRITERION C1 – REPRODUCTIVE AREAS

Gulf of Tadjoura is an important reproductive area for one shark species.

Scalloped Hammerheads have historically been among the most dominant species in Red Sea and Gulf of Aden shark fisheries (Bonfil 2003). These fisheries catch large amounts of juvenile sharks of many species, including young-of-the-year (YOY) Scalloped Hammerheads which are often landed in Djibouti city by gillnet fishers targeting mackerel (Bonfil 2003). Neonate and YOY individuals continue to be predictably found in this area. Scalloped Hammerheads are regularly recorded during fish market surveys or observed while fishers are using handlines or nets (Boldrocchi et al. 2019, 2021). Based on historical and contemporary data collected during Djibouti fish market surveys, the majority of Scalloped Hammerheads fished in waters within this area measured 50–60 cm TL (Bonfil 2003; Boldrocchi et al. 2019, 2021; Boldrocchi pers comms. 2023). The size-at-birth of this species is 31–57 cm total length (TL) (Ebert et al. 2021). Neonate and YOY Scalloped Hammerheads (50–75 cm TL) were observed in almost every survey (carried out twice per week for 2–3 months per year) between 2016–2023 (Boldrocchi pers. obs. 2023). From November to February each year, on multiple occasions, at least 30 individuals have been observed landed at the Djibouti fish market on the same day (Boldrocchi pers. comm. 2023). Landings are from small-scale fishers that operate within a short distance from the landing site.

SUB-CRITERION C2 – FEEDING AREAS

Gulf of Tadjoura is an important feeding area for one shark species.

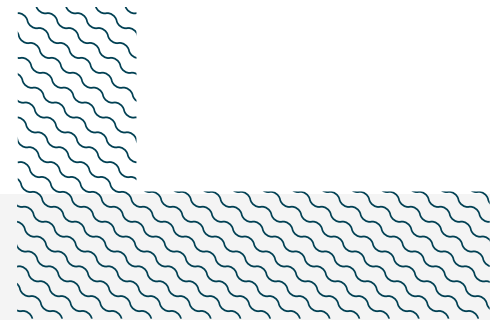
Aggregations of Whale Sharks surface feed on dense patches of zooplankton (Rowat et al. 2006; Boldrocchi et al. 2020) and baitfish (Boldrocchi & Bettinetti 2019). Whale Sharks aggregate in

localised coastal areas of the Gulf of Tadjoura, including the Bay of Goubet and between Ras Eiro and La Faille, to feed on dense patches of zooplankton thought to be present due to high productivity caused by upwellings that occur close to the coast. These seasonal feeding aggregations take place predictably between November and February. Annual counts of Whale Sharks since 2003 indicate up to 181 individuals per season. Whale Sharks present in these aggregations are mostly juvenile males (84.6%) (Boldrocchi et al. 2020; J Schmidt unpubl. data 2023). They also represent the smallest cohort in terms of body size of any recorded aggregation around the world, with a body size range of 1.8–7 m TL, a mean of 3.9 m TL, and a median of 3.7 m TL (Rowat et al. 2013, 2016; Leblond & Rowat 2016; Rowat & Robinson 2019).

SUB-CRITERION C5 - UNDEFINED AGGREGATIONS

Gulf of Tadjoura is an important area for undefined aggregations of one ray species.

Bowmouth Guitarfish aggregate in groups of at least seven individuals each year (Caprodossi pers. comm. 2023) from November-February. These observations are regularly made at Ras Korali and Ras Eiro within the area. There are no data available for March-October. Most records of this species from around the world have been opportunistic encounters of single individuals. The Gulf of Tadjoura is therefore particularly significant as it is one of the only location where these aggregations have been recorded. These aggregations have been reported each year since monitoring began from 2015 to 2022, with the exception of 2020 when monitoring was affected by travel restrictions (Boldrocchi et al. 2023). Additional information is required on the nature and function of these aggregations.



Acknowledgments

David P Robinson (Sundive Research), Ginevra Boldrocchi (University of Insubria), Jennifer Schmidt (Shark Research Institute), David Rowat (Marine Conservation Society Seychelles), Moussa Omar Youssouf (Centre d'Etude et de Recherche de Djibouti), and Ryan Charles (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. Gulf of Tadjoura ISRA Factsheet. Dubai: IUCN SSC Shark Specialist Group.

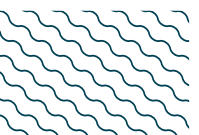
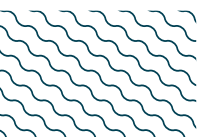
QUALIFYING SPECIES

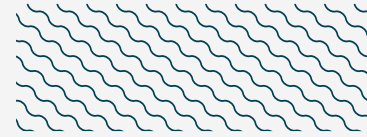
Scientific Name	Common Name	IUCN Red List Category	Global Depth Range (m)	ISRA Criteria/Sub-criteria Met									
				A	B	C1	C2	C3	C4	C5	D1	D2	
SHARKS													
<i>Rhincodon typus</i>	Whale Shark	EN	0-1,928	X			X						
<i>Sphyrna lewini</i>	Scalloped Hammerhead	CR	0-1,043	X		X							
RAYs													
<i>Rhina ancylostomus</i>	Bowmouth Guitarfish	CR	0-70	X							X		

SUPPORTING SPECIES

Scientific Name	Common Name	IUCN Red List Category
SHARKS		
<i>Carcharhinus falciformis</i>	Silky Shark	VU
<i>Carcharhinus limbatus</i>	Blacktip Shark	NT
<i>Carcharhinus macroti</i>	Hardnose Shark	NT
<i>Carcharhinus melanopterus</i>	Blacktip Reef Shark	VU
<i>Carcharhinus sorrah</i>	Spottail Shark	NT
<i>Centrophorus granulosus</i>	Gulper Shark	EN
<i>Glaucostegus halavi</i>	Halavi Guitarfish	CR
<i>Hemigaleus microstoma</i>	Sicklefin Weasel Shark	VU
<i>Hemipristis elongata</i>	Snaggletooth Shark	VU
<i>Mustelus mosis</i>	Arabian Smoothhound	NT
<i>Rhizoprionodon acutus</i>	Milk Shark	VU
<i>Stegostoma tigrinum</i>	Indo-Pacific Leopard Shark	EN
RAYS		
<i>Himantura uarnak</i>	Coach Whipray	EN
<i>Mobula alfredi</i>	Reef Manta Ray	VN
<i>Mobula thurstoni</i>	Bentfin Devil Ray	EN
<i>Taeniura lymma</i>	Bluespotted Lagoon Ray	LC

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.





REFERENCES

- Boldrocchi G, Bettinetti R. 2019.** Whale shark foraging on baitfish off Djibouti. *Marine Biodiversity* 49(4): 2013-2016. <https://doi.org/10.1007/s12526-018-00934-8>
- Boldrocchi G, Omar YM, Rowat D, Bettinetti R. 2018.** First results on zooplankton community composition and contamination by some persistent organic pollutants in the Gulf of Tadjoura (Djibouti). *Science of the Total Environment* 627: 812-821. <https://doi.org/10.1016/j.scitotenv.2018.01.286>
- Boldrocchi G, Monticelli D, Omar YM, Bettinetti R. 2019.** Trace elements and POPs in two commercial shark species from Djibouti: Implications for human exposure. *Science of the Total Environment* 669: 637-648. <https://doi.org/10.1016/j.scitotenv.2019.03.122>
- Boldrocchi G, Omar M, Azzola A, Bettinetti R, 2020.** The ecology of the whale shark in Djibouti. *Aquatic Ecology* 54(2): 535-551. <https://doi.org/10.1007/s10452-020-09758-w>
- Boldrocchi G, Spanu D, Mazzoni M, Omar M, Baneschi I, Boschi C, Zinzula L, Bettinetti R, Monticelli D. 2021.** Bioaccumulation and biomagnification in elasmobranchs: A concurrent assessment of trophic transfer of trace elements in 12 species from the Indian Ocean. *Marine Pollution Bulletin* 172: 112853. <https://doi.org/10.1016/j.marpolbul.2021.112853>
- Boldrocchi G, Robinson D, Caprodossi S, Mancuso E, Omar M, Schmidt JV. 2023.** Annual recurrence of the Critically Endangered Bowmouth Guitarfish (*Rhina ancylostomus*) in Djibouti waters. *Biology* 12(10): 1302. <https://doi.org/10.3390/biology12101302>
- Bonfil R. 2003.** Consultancy on elasmobranch identification and stock assessment in the Red Sea and Gulf of Aden. Regional Organization for the Conservation of the Environment of the Red Sea and Gulf of Aden.
- Leblond S, Rowat D. 2016.** Studying spatial distribution of the whale shark in the Gulf of Tadjora, Djibouti. QScience Proceedings, The 4th International Whale Shark Conference, May 2016, Doha, Qatar. Volume 2016: 29. <https://doi.org/10.5339/qproc.2016.iwsc4.29>
- Rowat D, Robinson D. 2019.** Are whale sharks social animals? A perspective from the Djibouti aggregation. 5th International Whale Shark Conference, May 2019. Exmouth, Western Australia.
- Rowat D, Meekan MG, Engelhardt U, Pardigon B, Vely M. 2006.** Aggregations of juvenile whale sharks (*Rhincodon typus*) in the Gulf of Tadjoura, Djibouti. *Environmental Biology of Fishes* 80: 465-472. <https://doi.org/10.1007/s10641-006-9148-7>
- Rowat D, Brooks K, March A, McCarten C, Jouannet D, Riley L, Jeffreys G, Perri M, Vely M, Pardigon B. 2011.** Long-term membership of whale sharks (*Rhincodon typus*) in coastal aggregations in Seychelles and Djibouti. *Marine and Freshwater Research* 62: 621-627. <https://doi.org/10.1071/MF10135>
- Rowat D, Bluemel J, March A, French G. 2013.** Whale shark population demographics and distribution off Djibouti. 3rd International Whale Shark Conference, October. Atlanta, Georgia, USA.
- Rowat D, Leblond S, Pardigon B, Vely M, Jouannet D, Webster I. 2016.** Djibouti - a kindergarten for whale sharks? QScience Proceedings, The 4th International Whale Shark Conference, May 2016, Doha, Qatar. Volume 2016: 54. <https://doi.org/10.5339/qproc.2016.iwsc4.54>
- Womersley F, Leblond S, Rowat D. 2016.** Scarring instance and healing capabilities of whale sharks and possible implications. QScience Proceedings, The 4th International Whale Shark Conference, May 2016, Doha, Qatar Volume 2016: 67. <https://doi.org/10.5339/qproc.2016.iwsc4.67>