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Rhizoprionodon acutus, Milk Shark

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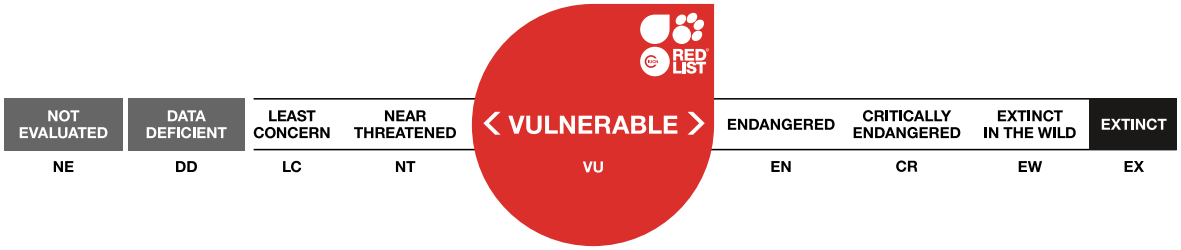

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Taxonomy

Kingdom	Phylum	Class	Order	Family
Animalia	Chordata	Chondrichthyes	Carcharhiniformes	Carcharhinidae

Scientific Name: *Rhizoprionodon acutus* (Rüppell, 1837)

Synonym(s):

- *Carcharhinus acutus* (Rüppell, 1837)
- *Carcharias sorrahkowa* Bleeker, 1853
- *Carcharias walbeehmi* Bleeker, 1856
- *Carcharias acutus* Rüppell, 1837
- *Cynocephalus acutus* (Rüppell, 1837)
- *Hypoprion acutus* (Rüppell, 1837)
- *Scoliodon acutus* (Rüppell, 1837)
- *Scoliodon walbeehmi* (Bleeker, 1856)

Common Name(s):

- English: Milk Shark, Fish-shark, Longman's Dogshark, White-eyed Shark
- Arabic: Gaîndé goundaw, Taess

Taxonomic Source(s):

Fricke, R., W.N. Eschmeyer and R. Van der Laan (eds.). 2020. Eschmeyer's catalog of fishes: Genera, species, references. Available at: http://researcharchive.calacademy.org/research/ichthyology/catalog/fishcatmain.asp. (Accessed: March 2020).

Taxonomic Notes:

Molecular evidence supports the idea that *Rhizoprionodon acutus* is a complex of (at least) four species that needs further taxonomic investigation (Naylor *et al.* 2012).

Assessment Information

Red List Category & Criteria: Vulnerable A2bd ver 3.1

Year Published: 2020

Date Assessed: February 4, 2020

Justification:

The Milk Shark (*Rhizoprionodon acutus)* is a small (usually to 110 cm total length) shark that occurs in tropical and sub-tropical waters across the Indo-Pacific and in the Eastern Atlantic Oceans. It inhabits continental shelves from inshore to a depth of 200 m and is a highly productive species that breeds annually and matures early. The species is taken as target and bycatch by industrial and small-scale fisheries with multiple gears including trawl, gillnet, and longline and is retained for the meat and fins; it is one of the most commonly consumed tropical and sub-tropical coastal sharks globally. The population is reported to have increased in northwest Australia over three generation lengths (15 years), and to be both stable over two years and have declined by 99% over the past three generation lengths (15–22

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years) in two areas of India, respectively. It is inferred to have declined by 67–80% in Sri Lanka over the past three generation lengths and inferred to have declined in Southeast Asia. In some other parts of its range, the Milk Shark is reported to have undergone a population increase, possibly due to meso-predator release. The species' productivity likely provides some resilience to fishing pressure, however, the lower productivity where it is heavily exploited in West Africa is of concern. It is heavily fished throughout its range (except in Australia) in mostly unregulated fisheries, and steep declines over the past three generation lengths have been reported. It is suspected that the Milk Shark has undergone a population reduction of 30–49% over the past three generation lengths (15–22 years) due to levels of exploitation, and it is assessed as Vulnerable A2bd.

Previously Published Red List Assessments

2003 – Least Concern (LC)
https://dx.doi.org/10.2305/IUCN.UK.2003.RLTS.T41850A10579779.en

Geographic Range

Range Description:

The Milk Shark occurs across the Indo-Pacific from South Africa to Australia, and in the Eastern Atlantic from Madeira and Mauritania to Angola; there are two records of this species in the Mediterranean Sea (Ebert *et al.* 2013, Amor *et al.* 2016).

Country Occurrence:

Native, Extant (resident): Angola; Australia; Bahrain; Bangladesh; Benin; Brunei Darussalam; Cabo Verde; Cambodia; Cameroon; China; Congo; Congo, The Democratic Republic of the; Côte d'Ivoire; Djibouti; Egypt; Equatorial Guinea; Eritrea; Gabon; Gambia; Ghana; Guinea; Guinea-Bissau; India; Indonesia; Iran, Islamic Republic of; Iraq; Japan; Kenya; Kuwait; Liberia; Madagascar; Malaysia; Mauritania; Mozambique; Myanmar; Nigeria; Oman; Pakistan; Papua New Guinea; Philippines; Portugal (Madeira); Qatar; Sao Tome and Principe; Saudi Arabia; Senegal; Sierra Leone; Singapore; Somalia; South Africa; Sri Lanka; Sudan; Taiwan, Province of China; Tanzania, United Republic of; Thailand; Togo; United Arab Emirates; Viet Nam; Yemen

Extant & Origin Uncertain: Italy; Tunisia

FAO Marine Fishing Areas:

Origin uncertain: Mediterranean and Black Sea

Native: Indian Ocean - eastern

Native: Indian Ocean - western

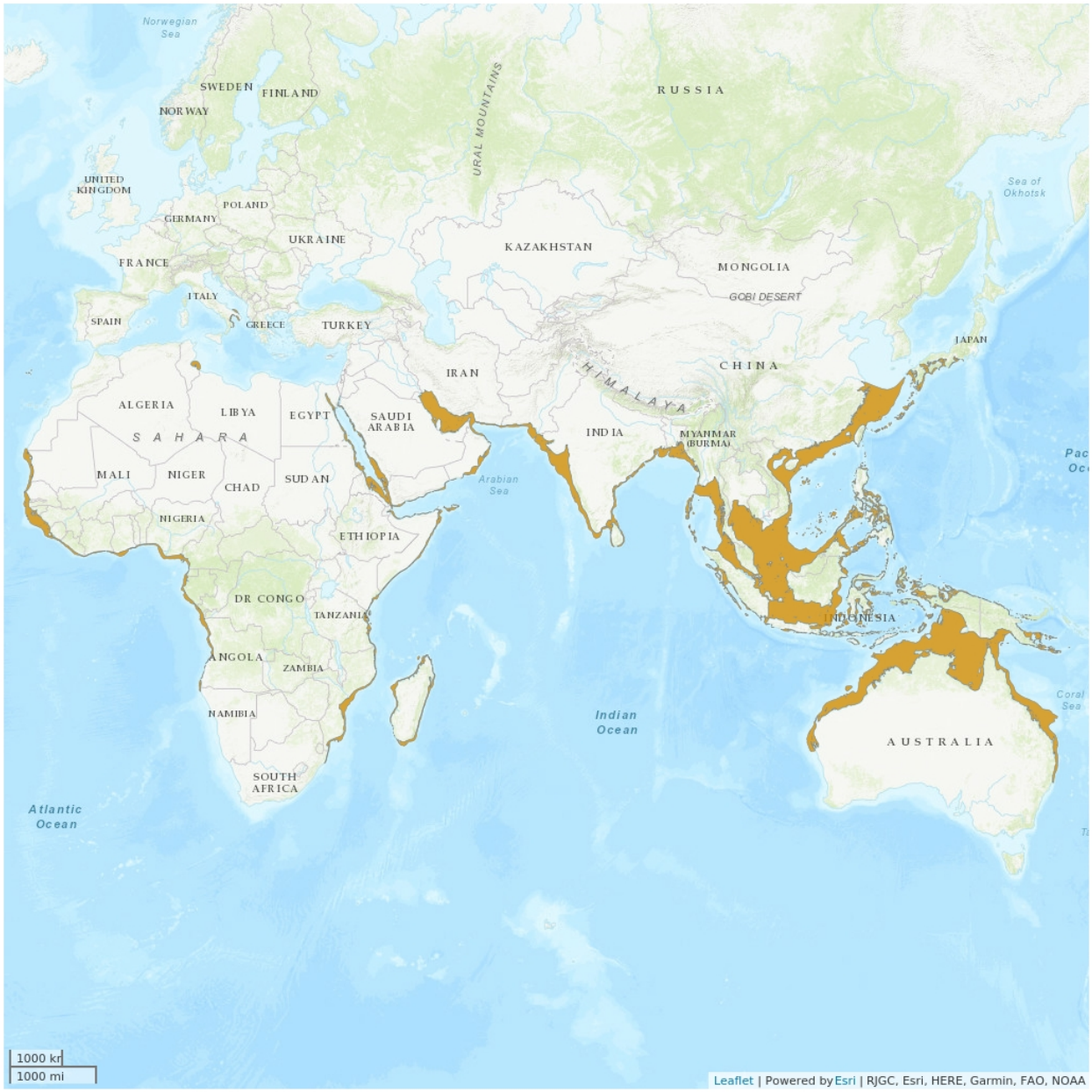
Native: Atlantic - eastern central

Native: Pacific - northwest

Native: Pacific - western central

Native: Atlantic - southeast

Distribution Map



Legend

EXTANT (RESIDENT)

Compiled by:

IUCN SSC Shark Specialist Group 2020

The boundaries and names shown and the designations used on this map do not imply any official endorsement, acceptance or opinion by IUCN.

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Population

Genetic data suggest that the Milk Shark is a complex of four species that require further taxonomic investigation (Naylor *et al.* 2012). Species-specific population trend data of standardized catch-per-unit-effort (CPUE) was available from northwest Australia (Braccini *et al.* 2019). The fishery-independent survey with droplines and longlines from 2002 to 2017 found the CPUE to be fluctuating but stable. The area of the surveys was closed to commercial fishing from 1993 to 2005 onwards and the stable pattern is suggested to reflect either no major detrimental fishing effects on the population even prior to the closures or naturally low abundance that precludes detecting abundance patterns (Braccini *et al.* 2019). The CPUE was analysed over three generation lengths (15 years) using a Bayesian state-space framework (Winker *et al.* 2020). This analysis yielded a 3.8% annual rate of increase, consistent with an estimated median increase of 69.3% over three generation lengths (15 years), and the highest probability of an increase over three generation lengths (see the Supplementary Information).

A stock assessment of this species based on landings during 2012–2014 in Gujarat, India showed that the fisheries exploitation level between 2012–2014 reduced stock biomass and spawning stock biomass to 55% and 34% of unexploited levels, respectively (Sen *et al.* 2017). The catch-per-unit-effort from 2012 to 2014 was stable and the assessment considered the population to be underexploited (Sen *et al.* 2017). This assessment should be regarded with caution due to limited time-frame of sampling and some simplistic assumptions. Market surveys from the same region indicate that all life stages of Milk Shark are vulnerable to capture by fisheries (Barnes *et al*. 2018).

Elsewhere in India, data from Mumbai indicate declines in landings of this species from 92.9 t in 2000 to 18.5 t in 2005 (Raje *et al.* 2016). Although landings data are not a direct measure of abundance, these can be used to infer population reduction where landings have decreased while fishing effort has remained stable or increased. In India, there is evidence of increasing fishing effort and decreasing catch-per-unit-effort of sharks in general (K. V. Akhilesh pers. comm. 09/02/2017). When this decline is scaled to three generation lengths (15–22 years) it represents a decline of 99%. In Sri Lanka, shark catches have decreased by 30% between 1994 and 1999 from 13,000 t to 9,000 t and have been steadily declining since 2001 despite increasing fishing effort (Dissanayake 2005). This represents a decline of 67–80% when scaled to three generation lengths of the Milk Shark (15–22 years). In Kuwait, this species represented 12.2% of elasmobranch landings by number in 2008 but this declined to 2.6% in 2011 (Moore *et al.* 2012). In the Iranian waters of the Arabian/Persian Gulf and Oman Sea, the Milk Shark has declined in abundance by more than 85% over the past 10–20 years; some of this decline may be due to an increase in illegal fishing despite a ban on target shark fisheries in Iran introduced ~15 years ago (T. Valinassab pers. comm. 03/06/2020). In Pakistan, landings of the Milk Shark have declined by 75–80% over the past 20 years due to overfishing (M. Khan pers. comm. 03/06/2020).

In Southeast Asia, catches of sharks and rays are very high but are declining and fishers are travelling much further from port in order to increase catches (Chen 1996). Net and trawl fisheries in Indonesia (especially the Java Sea) and elsewhere are very extensive and as a result, many shark and ray species are highly exploited and stocks of most species have declined by at least an order of magnitude (Blaber *et al.* 2009). Trawl and gill net fisheries are also moving further afield. For example, in Jakarta the gillnet fishery at Muara Baru travels to waters around Kalimantan due to the decline in local populations (W.T. White pers comm. 22/05/2007). While species-specific data on long-term declines in elasmobranchs in the Southeast Asian region are lacking, declines of the Milk Shark in Southeast Asia and elsewhere in

the Indo-West Pacific are inferred given the widespread historical and continuing declines of demersal fisheries in this region (Stobutzki *et al.* 2006).

Across its range, the population was reported to be increasing in northwest Australia over three generation lengths (15 years), stable over two years in Gujarat, India and to have declined by 99% across three generation lengths (15–22 years) in Mumbai, India. It is inferred to have declined by 67–80% in Sri Lanka and inferred to have declined in Southeast Asia. In some other parts of its range, increases in abundance of the Milk Shark have been reported, possibly due to meso-predator release. The Milk Shark is a productive species which likely increases its resilience to fishing pressure, although the lower productivity in West Africa is of concern as it is heavily exploited in that region. With the exception of Australia, the Milk Shark is exposed to increasing and intense fishing pressure across its range, with steep declines reported in some areas. Overall, it is suspected that the species has undergone a population reduction of 30–49% over the last three generation lengths (15–22 years).

For further information about this species, see Supplementary Material.

Current Population Trend: Decreasing

Habitat and Ecology (see Appendix for additional information)

The Milk Shark occurs on the continental shelf in tropical and sub-tropical waters from close inshore to depths of 200 m (Weigmann 2016). It is found throughout the water column but is mainly near the sea floor and is often occurs off sandy beaches and sometimes in estuaries (White *et al.* 2006, Ebert *et al.* 2013). The species is usually <110 cm total length (TL), although one specimen of 178 cm TL was recorded off Africa (Last and Stevens 2009, Ebert *et al.* 2013, Weigmann 2016). Life history traits vary regionally with males mature at 54–82 cm TL and females mature at 62–92 cm (Harry *et al.* 2010, Moore *et al.* 2012, Ba *et al.* 2013, Ebert *et al.* 2013). Reproduction is placental viviparous with litter sizes of 1–8, an annual reproductive cycle and size-at-birth of 25–45 cm TL (Harry *et al.* 2010, Ebert *et al.* 2013, Shaaban *et al.* 2018). In northeast Australia, female age-at-maturity is two years and maximum age is eight years, resulting in a generation length of five years (Harry *et al.* 2010). In Senegal, female age-at-maturity is 5.8 years and maximum age is nine years, resulting in a generation length of 7.4 years (Ba *et al.* 2015).

Systems: Marine

Use and Trade

The Milk Shark is one of the most consumed sharks in tropical and subtropical coastal waters globally. The flesh is consumed fresh or dried, salted, and smoked and used as fishmeal (Last and Stevens 2009, Roy 2010). Fins are of limited value due to their small size although trade in small, low-value fins has increased in Southeast Asia in recent years (Cardeñosa *et al.* 2019). Milk Shark fins comprised 1.4% of the fins sampled in Hong Kong in 2015 yet were the most common of the small-sized shark fins sampled in Hong Kong in 2019 (Fields *et al.* 2018, Cardeñosa *et al.* 2019).

Threats (see Appendix for additional information)

The Milk Shark is caught globally as target and bycatch in industrial, small-scale, and recreational fisheries by multiple fishing gears including trawl, gillnet, trawl, hook and line, and longline. The species

is generally retained for the meat and fins (Last and Stevens 2009, Fields *et al.* 2018). Commercial at-vessel-mortality (AVM) has only been reported for this species in trawl fisheries where it is highly variable ranging from 29–82% in the Indian Ocean and North Australia, respectively (Ellis *et al.* 2017).

In the Eastern Atlantic, this species is heavily fished throughout its range and frequently caught in Cape Verde, Mauritania, Senegal, Gambia, Guinea Bissau, and Guinea (Diop and Dossa 2011). It is the most commonly caught shark landed at fishing sites along the Senegalese coast (Capape *et al.* 2006, Ba *et al.* 2015). The predominance of juvenile Milk Shark in landings during all seasons could be an indication that the species is overexploited in Senegalese waters (Ba *et al.* 2013). It is among the most commonly caught shark by artisanal fisheries in the waters of Mauritania (Valadou *et al.* 2006). In the Banc d'Arguin National Park (Mauritania) 70–85% of individuals caught from April to June are females, more than half of which are pregnant with fully-developed embryos (Diop and Dossa 2011); this suggests that fishers target a pupping aggregation in this region. Declines in coastal shark assemblages have been reported throughout the eastern Atlantic region, although recreational fishers in the Bijagos Archipelago (Guinea-Bissau) have noticed an increased abundance of Milk Shark that has been attributed to declines in the numbers of large, predatory sharks (Diop and Dossa 2011).

In South African waters, the Milk Shark is caught incidentally by prawn trawl fisheries. The estimated annual catch of the Milk Shark in trawl fisheries of South Africa was <1 tonne for 2010–2012 (da Silva *et al.* 2015). The species is also important to recreational fisheries and was the second most commonly caught shark (18% of total catch) in the Kwa-Zulu Natal competitive shore fishery from 1977 to 2000 (Pradervand 2007). Van der Elst (1979) hypothesized that an increase in abundance of small sharks, including the Milk Shark, in the Kwa-Zulu Natal recreational fishery was due to the removal of large, predatory sharks by the Natal Sharks Board protective gillnet program. Extensive artisanal fisheries operate in coastal waters of the southwestern Indian Ocean (Le Manach *et al.* 2012, Benkenstein 2013, Cripps *et al.* 2015). It is an important component of commercial and artisanal shark fisheries in mainland Tanzania and Zanzibar where it has been recorded as the most abundant in market surveys (Fowler *et al.* 2002, Schaeffer 2004). The species is also an important component of artisanal shark fisheries in Madagascar waters (Robinson and Sauer 2013).

In the Arabian Seas region, surveys of fish markets and landings sites have revealed this species to be a major part of elasmobranch landings, often as bycatch in gillnet fisheries (Henderson *et al.* 2007, Moore *et al.* 2012, Moore and Peirce 2013, Jabado *et al.* 2015, Spaet and Berumen 2015). The high level of exploitation on its habitat in the region is of concern. For example, in Eritrea catch and effort data showed that total fishing effort as well as total annual catch increased more than two-fold from 1996 to 2002 (Tsehaye *et al.* 2007). While no accurate numbers are available, there has been an uncontrolled expansion of industrial trawling in the Red Sea through licenses issued to foreign industrial trawlers (particularly off Yemen) which has resulted in the depletion of marine resources (PERSGA 2002). In Somalia, illegal and unregulated fishing by foreign trawlers and longliners is widespread and impacting shark populations (Glaser *et al.* 2015). In Iran, there is increasing fishing effort with the number of fishermen almost doubling from 70,729 in 1993 to 109,601 in 2002 (Valinassab *et al.* 2006). In some areas (e.g. Pakistan, India) fishing effort on this species has been increasing in recent years. In Pakistan waters, about 2,000 trawlers operate in shelf waters, targeting shrimp in shallow waters and fish in

outer shelf waters (M. Khan pers. comm. 06/02/2017). CMFRI (2010) reports that 5,767 trawlers operate in Tamil Nadu waters, and fishing pressure is intense with severe declines in fish stocks, including elasmobranchs (Mohanraj *et al.* 2009, Karnad *et al.* 2014). Trawling is also intense in Kerala where CMFRI (2010) reported 3,678 trawlers. There were about 6,600 trawlers operating in the Indian state of Gujarat in the early 2000s (Zynudheen *et al.* 2004). This number increased to 11,582 trawlers in 2010 (CMFRI 2010). In India, there are over 13,400 gill netters operating along the west coast, with many other types of net gear also deployed in coastal areas (CMFRI 2010).

In Southeast Asia, the Milk Shark is one of the most commonly caught sharks in trawl fisheries of peninsular Malaysia and is commonly caught in gillnet fisheries of Indonesia (Department of Fisheries Malaysia 2006, White *et al.* 2006). The extensive loss and degradation of habitats such as coastal mangroves are also a threat to coastal and inshore species; Southeast Asia has seen an estimated 30% reduction in mangrove area since 1980 (FAO 2007, Polidoro *et al.* 2010).

In Australia, the Milk Shark is a bycatch in gillnet and prawn trawl fisheries with low to moderate fishing pressure in managed fisheries. It is usually not retained but post-release mortality is likely high (Stobutzki *et al.* 2002, Tobin *et al.* 2010). Northwest Australia was closed to commercial fishing of sharks and rays from 1993 to 2005 onwards to protect breeding stocks of Dusky Shark (*Carcharhinus obscurus*) and Sandbar Shark (*C. plumbeus*) (Braccini *et al.* 2019). Ecological risk assessments of the Milk Shark have considered it to be at low to moderate risk from fishing in Australia (Stobutzki *et al.* 2002, Zhou and Griffiths 2008, Tobin *et al.* 2010).

Conservation Actions **(see Appendix for additional information)**

There are few species-specific regulations for the Milk Shark. In South Africa, for small-scale fishing there is a bag limit of one individual Milk Shark for consumption only (DAFF 2016). In Iran, a ban on target shark fisheries introduced ~15 years ago (T. Valinassab pers. comm. 03/06/2020) may benefit the Milk Shark. The introduction of bycatch reduction devices in Australian trawl fisheries is likely to have benefited this species (Griffiths *et al.* 2006), as would have Australia's extensive network of Marine Protected Areas. Research is needed on the species' taxonomy and population size and trends, and catch rates should be monitored.

Credits

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Authority/Authorities: IUCN SSC Shark Specialist Group (sharks and rays)

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Bibliography

Amor, M.M.B., Diatta, Y., Diop, M. Salem, M.B. and Capapé, C. 2016. Confirmed occurrence in the Mediterranean Sea of milk shark *Rhizoprionodon acutus* (Chondrichthyes: Carcharhinidae) and first record off the Tunisian coast. *Cahiers de Biologie Marine* 57: 145–149.

Ba, A., Ba, C.T., Diouf, K., Ndiaye, P. I. and Panfili, J. 2013. Reproductive biology of the milk shark *Rhizoprionodon acutus* (Carcharhinidae) off the coast of Senegal. *African Journal of Marine Science* 35(2): 223–232.

Ba, A., Diouf, K., Guilhaumon, F. and Panfili, J. 2015. Slow growth of the overexploited milk shark *Rhizoprionodon acutus* affects its sustainability in West Africa. *Journal of Fish Biology* 87(4): 912–929.

Barnes, A., Sutaria, D., Harry, A.V. and Jabado, R.W. 2018. Demographics and length and weight relationships of commercially important sharks along the north-western coast of India. *Aquatic Conservation: Marine and Freshwater Ecosystems* 28(6): 1374–1383.

Benkenstein, A. 2013. Small-scale fisheries in Mozambique. Policy Briefing 72. Governance of Africa's Resources Programme. The South African Institute of Internal Affairs.

Blaber, S., Dichmont, C.M., White, W.T., Buckworth, R.C., Sadiyah, L., Iskandar, B., Nurhakim, S., Pillans, R.D., Andamari, R., Dharmadi and Fahmi. 2009. Elasmobranchs in southern Indonesian fisheries: the fisheries, the status of the stocks and management options. *Reviews in Fish Biology and Fisheries* 19: 367–391.

Braccini, M., Molony, B. and Blay, N. 2019. Patterns in abundance and size of sharks in northwestern Australia: cause for optimism. *ICES Journal of Marine Science 7* 77(1): 72–82.

Capapé, C., Diatta, Y., Diop, M., Guelorget, O., Vergne, Y., and Quignard, J. 2006. Reproduction in the milk shark, *Rhizoprionodon acutus* (Ruppell, 1837) (Chondrichthyes: Carcharhinidae), from the coast of Senegal (eastern tropical Atlantic). *Acta Adriatica* 47(2): 111–126.

Cardeñosa, D., Shea, K.H., Zhang, H., Feldheim, K., Fischer, G.A. and Chapman, D.D. 2020. Small fins, large trade: a snapshot of the species composition of low-value shark fins in the Hong Kong markets. *Animal Conservation* 23: 203–211.

Chen, H.K. (ed.) 1996. An overview of shark trade in selected countries of Southeast Asia. TRAFFIC Southeast Asia, Petaling Jaya.

CMFRI. 2010. Marine Fisheries Census (2010), Part 1. India, Govt. of India, Ministry of Agriculture, Dept. of Animal Husbandry, Dairying & Fisheries and Central Marine Fisheries Research Institute, Indian Council of Agricultural Research. New Dehli.

Cripps, G., Harris, A., Humber, F., Harding, S. and Thomas, T. 2015. A preliminary value chain analysis of shark fisheries in Madagascar. Indian Ocean Tuna Commission Working Party on Ecosystems and Bycatch, report no. IOTC-2015-WPEB11-17. SF/2015/34, Mauritius.

da Silva, C., Booth, A.J., Dudley, S.F.J., Kerwath, S.E., Lamberth, S.J., Leslie, R.W., McCord, M.E., Sauer, W.H.H. and Zweig, T. 2015. The current status and management of South Africa's chondrichthyan fisheries. *African Journal of Marine Science* 37(2): 233-248.

Department of Agriculture, Forestry and Fisheries (DAFF). 2016. Marine Living Resources Act, 1988 (Act No. 18 of 1998). Regulations relating to small-scale fishing. Government Notices. Department of Agriculture, Forestry and Fisheries.

Department of Fisheries Malaysia. 2006. Malaysia National Plan of Action for the Conservation and

Management of Shark. Ministry of Agriculture and Agro-based Industry, Putrajaya.

Diop, M. and Dossa, J. 2011. *30 Years of Shark Fishing in West Africa*. FIBA.

Dissanayake, D.C.T. 2005. Monitoring and assessment of the offshore fishery in Sri Lanka. The United Nations University, Reykjavik, Iceland.

Ebert, D.A., Fowler, S. and Compagno, L. 2013. *Sharks of the World. A Fully Illustrated Guide*. Wild Nature Press, Plymouth, United Kingdom.

Ellis, J.R., McCully Philips, S.R. and Poisson, F. 2017. A review of capture and post-release mortality of elasmobranchs. *Journal of Fish Biology* 90(3): 653–722.

FAO. 2007. The World's Mangroves 1980-2005, FAO Forestry Paper 153. In: FAO (ed.). Rome.

Fields, A.T., Fischer, G.A., Shea, S.K., Zhang, H., Abercrombie, D.L., Feldheim, K.A., Babcock, E.A. and Chapman, D.D. 2018. Species composition of the international shark fin trade assessed through a retail-market survey in Hong Kong. *Conservation Biology* 32(2): 376–389.

Fowler, S.L., Reed, T.M. and Dipper, F.A. (eds). 2002. Elasmobranch biodiversity, conservation and management: proceedings of the international seminar and workshop, Sabah, Malaysia, July 1997. IUCN SSC Shark Specialist Group. IUCN, Gland, Switzerland and Cambridge, UK

Glaser, S.M., Roberts, P.M., Mazurek, R.H., Hurlburt, K.J., Kane-Hartne, L. 2015. Securing Somali Fisheries. One Earth Future Foundation, Denver, CO.

Griffiths, S. P., Brewer, D. T., Heales, D. S., Milton, D. A. and Stobutzki, I. C. 2006. Validating ecological risk assessments for fisheries: assessing the impacts of turtle excluder devices on elasmobranch bycatch populations in an Australian trawl fishery. *Marine and Freshwater Research* 57: 395-401.

Harry, A. V., Simpfendorfer, C. A., & Tobin, A. J. 2010. Improving age, growth, and maturity estimates for aseasonally reproducing chondrichthyans. *Fisheries Research* 106(3): 393–403.

Henderson, A.C., McIlwain, J.L., Al-Oufi, H.S. and Al-Sheili, S. 2007. The Sultanate of Oman shark fishery: Species composition, seasonality and diversity. *Fisheries Research* 86: 159-168.

IUCN. 2020. The IUCN Red List of Threatened Species. Version 2020-3. Available at: www.iucnredlist.org. (Accessed: 10 December 2020).

Jabado, R.W., Al Ghais, S.M., Hamza, W., Henderson, A.C., Spaet, J.L.Y., Shivji, M.S. and Hanner, R.H. 2015. The trade in sharks and their products in the United Arab Emirates. *Biological Conservation* 181: 190-198.

Karnad, D., Gangal, M. and Karanth, K.K. 2014. Perceptions matter: how fisherman's perceptions affect trends of sustainability in Indian fisheries. *Oryx* 48(2): 218-227.

Last, P.R. and Stevens, J.D. 2009. *Sharks and Rays of Australia. Second Edition*. CSIRO Publishing, Collingwood, Australia.

Le Manach, F., Gough, C., Harris, A., Humber, F., Harper, S. and Zeller, D. 2012. Unreported fishing, hungry people and political turmoil: the recipe for a food security crisis in Madagascar? *Marine Policy* 36(1): 218-225.

Mohanraj, G., Rajapackiam, S., Mohan, S., Batcha, H. and Gomathy, S. 2009. Status of elasmobranchs fishery in Chennai, India. *Asian Fisheries Science,* 22(2): 607-615.

Moore, A.B.M. and Peirce, R. 2013. Composition of elasmobranch landings in Bahrain. *African Journal of*

Marine Science 35: 593-596.

Moore, A.B.M., McCarthy, I.D., Carvalho, G.R. and Peirce, R. 2012. Species, sex, size and male maturity composition of previously unreported elasmobranch landings in Kuwait, Qatar and Abu Dhabi Emirate. *Journal of Fish Biology* 80: 1619-1642.

Naylor, G.J., Caira, J.N., Jensen, K., Rosana, K.A.M., White, W.T. and Last, P.R. 2012. A DNA sequence-based approach to the identification of shark and ray species and its implications for global elasmobranch diversity and parasitology. *Bulletin of the American Museum of Natural History*: 1-262.

PERSGA. 2002. Status of the Living Marine Resources in the Red Sea and Gulf of Aden and Their Management. Strategic Action Programme for the Red Sea and Gulf of Aden. Regional Organization for the Conservation of the Environment of the Red Sea and Gulf of Aden, Jeddah.

Polidoro, B.A., Carpenter, K.E., Collins, L., Duke, N.C., Ellison, A.M., Ellison, J.C., Farnsworth, E.J., Fernando, E.S., Kathiresan, K., Koedam, N.E., Livingstone, S.R., Miyago, T., Moore, G.E., Ngoc Nam, V., Eong Ong, J., Primavera, J.H., Salmo, S.G., Sanciangco, J.C., Sukardjo, S., Wang, Y. and Hong Yong, J.W. 2010. The Loss of Species: Mangrove Extinction Risk and Geographic Areas of Global Concern. *Public Library of Science One* 5(4): 10.

Pradervand, P. 2007. Long-term trends in the shore fishery of the Transkei coast, South Africa. *African Zoology* 39(2): 247-261.

Raje, S.G., Sivakami, S., Mohanraj, G., Manojkumar, P.P., Raju, A. and Joshi, K.K. 2007. An atlas on the Elasmobranch fishery resources of India. CMFRI Special Publication, 95. 1-253.

Robinson, L. and Sauer, W.H.H. 2013. A first description of the artisanal shark fishery in northern Madagascar: implications for management. *African Journal of Marine Science* 35: 9-15.

Roy, B.J. 2010. Catch monitoring and assessment of shark and allied fisheries in the Bay of Bengal. pp. 33-42. In: Hoq, M. E., Yousuf Haroon, A. K. and Hussain, M. G. (eds.). 2011. Shark fisheries in the Bay of Bengal, Bangladesh: Status and potentialities. Support to Sustainable Management of the BOBLME Project, Bangladesh Fisheries Research Institute (BFRI), Bangladesh. 76 p.

Schaeffer, D. 2004. Assessment of the Artisanal Shark Fishery and Local Shark Fin Trade on Unguja Island, Zanzibar. *Independent Study Project (ISP) Collection. Paper 536*.

Sen, S., Chakraborty, S.K., Vivekanandan, E., Zacharia, P.U., Kizhakudan, S.J., Jaiswar, A.K., Dash, G. and Jayshree, G. 2017. Population dynamics and stock assessment of milk shark, *Rhizoprionodon acutus* (Ruppell, 1837) along Gujarat coast of India. *Indian Journal of Geo Marine Sciences* 46(5): 936–946.

Shaaban, A.M., Sabrah, M.M., Marie, M.-A.S. and Dakrory, A.I. 2018. Reproductive biology of the milk shark *Rhizoprionodon acutus* (Rüppell, 1837) from the Gulf of Suez, Red Sea, Egypt. *The Egyptian Journal of Aquatic Research* 44: 37-43.

Spaet, J.L.Y. and Berumen, M.L. 2015. Fish market surveys indicate unsustainable elasmobranch fisheries in the Saudi Arabian Red Sea. *Fisheries Research* 161: 356-364.

Stobutzki, I.C., Miller, M.J., Heales, D.S. and Brewer, D.T. 2002. Sustainability of elasmobranches caught as bycatch in a tropical prawn (shrimp) trawl fishery. *Fishery Bulletin* 100: 800-821.

Stobutzki, I.C., Silvestre, G.T., Abu Talib, A., Krongprom, A., Supongpan, M., Khemakorn, P., Armada, N., and Garces, L.R. 2006. Decline of demersal coastal fisheries resources in three developing Asian countries. *Fisheries Research* 78: 130-142.

Tobin, A.J., Simpfendorfer, C.A., Mapleston A., Currey, L., Harry, A.J., Welch, D.J., Ballagh, A.C., Chin, A., Szczenski, N., Schlaff, A. and White, J. 2010. A quantitative ecological risk assessment of sharks and

finfish of Great Barrier Reef World Heritage Area inshore waters: A tool for fisheries and marine park managers: identifying species at risk and potential mitigation strategies. In: Marine and Tropical Sciences Research Facility (eds). Cairns.

Tsehaye, I., Machiels, M.A.M. and Nagelkerke, L.A.J. 2007. Rapid shifts in catch composition in the artisanal Red Sea reef fisheries of Eritrea. *Fisheries Research* 86: 58–68.

Valadou, B., Brethes, J.C. and Inejih, C.A.O. 2006. Observations biologiques sur cinq espéces d'Élasmobranches du Parc National du Banc d'Arguin (Mauritanie). *Cybium* 30(4): 313-322.

Valinassab, T., Daryanabard, R., Dehghani, R. and Pierce, G.J. 2006. Abundance of demersal fish resources in the Persian Gulf and Oman Sea. *Journal of the Marine Biological Association of the United Kingdom* 86: 1455-1462.

Van Der Elst, R.P. 1979. A proliferation of small sharks in the shore-based Natal sport fishery. *Environmental Biology of Fishes* 29: 349-362.

Weigmann, S. 2016. Annotated checklist of the living sharks, batoids and chimaeras (Chondrichthyes) of the world, with a focus on biogeographical diversity. *Journal of Fish Biology* 88(3): 837-1037.

White, W.T., Last, P.R., Stevens, J.D., Yearsley, G.K., Fahmi and Dharmadi. 2006. *Economically Important Sharks and Rays of Indonesia*. ACIAR Publishing, Canberra, Australia.

Winker, H, Pacoureau, N. and Sherley, R.B. 2020. JARA: 'Just Another Red List Assessment'. *BioR□iv Preprint*: http://dx.doi.org/10.1101/672899.

Zhou, S. and Griffiths, S.P. 2008. Sustainability Assessment for Fishing Effects (SAFE): a new quantitative ecological risk assessment method and its application to elasmobranch bycatch in an Australian trawl fishery. *Fisheries Research* 91: 56–68.

Zynudheen, A.A., Ninan, G., Sen, A. and Badonia, R. 2004. Utilization of trawl bycatch in Gujarat (India). *27* NAGA Worldfish Center Quarterly((3&4)): 20-23.

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Disclaimer

External Resources

For Supplementary Material, and for Images and External Links to Additional Information, please see the Red List website.

Appendix

Habitats

(http://www.iucnredlist.org/technical-documents/classification-schemes)

Habitat	Season	Suitability	Major Importance?
9. Marine Neritic -> 9.1. Marine Neritic - Pelagic	Resident	Suitable	Yes
9. Marine Neritic -> 9.4. Marine Neritic - Subtidal Sandy	Resident	Suitable	Yes
9. Marine Neritic -> 9.9. Marine Neritic - Seagrass (Submerged)	Resident	Suitable	Yes
9. Marine Neritic -> 9.10. Marine Neritic - Estuaries	Resident	Suitable	Yes

Use and Trade

(http://www.iucnredlist.org/technical-documents/classification-schemes)

End Use	Local	National	International
Food - animal	No	Yes	Yes
Food - human	Yes	Yes	Yes

Threats

(http://www.iucnredlist.org/technical-documents/classification-schemes)

Threat	Timing	Scope	Severity	Impact Score
1. Residential & commercial development -> 1.1. Housing & urban areas	Ongoing	Minority (50%)	Slow, significant declines	Low impact: 5
	Stresses:	2. Species Stresses -> 2.2. Species disturbance		
1. Residential & commercial development -> 1.2. Commercial & industrial areas	Ongoing	Minority (50%)	Slow, significant declines	Low impact: 5
	Stresses:	2. Species Stresses -> 2.2. Species disturbance		
5. Biological resource use -> 5.4. Fishing & harvesting aquatic resources -> 5.4.1. Intentional use: (subsistence/small scale) [harvest]	Ongoing	Majority (50-90%)	Slow, significant declines	Medium impact: 6
	Stresses:	2. Species Stresses -> 2.1. Species mortality		
5. Biological resource use -> 5.4. Fishing & harvesting aquatic resources -> 5.4.2. Intentional use: (large scale) [harvest]	Ongoing	Majority (50-90%)	Slow, significant declines	Medium impact: 6
	Stresses:	2. Species Stresses -> 2.1. Species mortality		
5. Biological resource use -> 5.4. Fishing & harvesting aquatic resources -> 5.4.3. Unintentional effects: (subsistence/small scale) [harvest]	Ongoing	Majority (50-90%)	Slow, significant declines	Medium impact: 6
	Stresses:	2. Species Stresses -> 2.1. Species mortality		

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5. Biological resource use -> 5.4. Fishing & harvesting aquatic resources -> 5.4.4. Unintentional effects: (large scale) [harvest]	Ongoing	Majority (50-90%)	Slow, significant declines	Medium impact: 6
	Stresses:	2. Species Stresses -> 2.1. Species mortality		

Conservation Actions in Place

(http://www.iucnredlist.org/technical-documents/classification-schemes)

Conservation Action in Place
In-place research and monitoring
Action Recovery Plan: No
Systematic monitoring scheme: No
In-place land/water protection
Conservation sites identified: No
Area based regional management plan: No
Occurs in at least one protected area: Yes
Invasive species control or prevention: Not Applicable
In-place species management
Harvest management plan: No
Successfully reintroduced or introduced benignly: No
Subject to ex-situ conservation: No
In-place education
Subject to recent education and awareness programmes: No
Included in international legislation: No
Subject to any international management / trade controls: No

Conservation Actions Needed

(http://www.iucnredlist.org/technical-documents/classification-schemes)

Conservation Action Needed
1. Land/water protection -> 1.1. Site/area protection
3. Species management -> 3.1. Species management -> 3.1.1. Harvest management
3. Species management -> 3.1. Species management -> 3.1.2. Trade management
3. Species management -> 3.2. Species recovery
5. Law & policy -> 5.4. Compliance and enforcement -> 5.4.2. National level

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Research Needed

(http://www.iucnredlist.org/technical-documents/classification-schemes)

Research Needed
1. Research -> 1.1. Taxonomy
1. Research -> 1.2. Population size, distribution & trends
1. Research -> 1.3. Life history & ecology
2. Conservation Planning -> 2.1. Species Action/Recovery Plan
3. Monitoring -> 3.1. Population trends
3. Monitoring -> 3.2. Harvest level trends

Additional Data Fields

Distribution
Lower depth limit (m): 200
Upper depth limit (m): 1
Habitats and Ecology
Generation Length (years): 5-7.4

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The IUCN Red List Partnership

The IUCN Red List of Threatened Species™ is produced and managed by the IUCN Global Species Programme, the IUCN Species Survival Commission (SSC) and The IUCN Red List Partnership.

The IUCN Red List Partners are: Arizona State University; BirdLife International; Botanic Gardens Conservation International; Conservation International; NatureServe; Royal Botanic Gardens, Kew; Sapienza University of Rome; Texas A&M University; and Zoological Society of London.