

**Status of sharks in India's artisanal fisheries with a focus on shark conservation in
India**

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Abstract

India's marine artisanal fisheries involve diverse fleets, fishing crafts (<24 m OAL), area of operation and species. Sharks are an economically important group in artisanal fisheries, as sharks are retained fully, traded and consumed in various forms, and are also part of local culture. Sharks are mainly landed as bycatch in the artisanal fisheries of the country, including the tuna fisheries as there is very limited and localized targeted fishing of the group. Though more than 80 species of sharks are reported in Indian fisheries, only a few species form regular component in the country's artisanal fisheries. In this working paper, we highlight the status of sharks with a focus on the sharks which are presently the current priority for the WPEB of the IOTC. Of the shark species focused by the WPEB, this work highlights the fishery status including contribution to landings, major landing sites and size composition of the scalloped hammerhead shark *Sphyrna lewini*, the silky shark *Carcharhinus falciformis*, two species of thresher sharks *Alopias* spp. and two species of the mako sharks *Isurus* spp. in India's artisanal fisheries. We also highlight the conservation measures India has adopted to protect shark species and to ensure sustainability of threatened marine fauna, including NPOA Sharks and NDFs.

Keywords: elasmobranchs, management, sustainability, Arabian Sea, Bay of Bengal

Introduction

India has a vibrant marine fisheries sector which contributes significantly to economic and nutritional security of the country. The country has a diverse artisanal fleet comprised of fishing crafts (<24 m OAL) which fish in both territorial waters as well as the EEZ. India has an estimated Potential Yield of 5.3 million t (DADF, 2018) and in 2024 the country reported marine landings of 3.45 million t (FRAEED CMFRI, 2025). The major resources landed in India in 2024 were Indian mackerel, Indian oil sardine, ribbonfish, cephalopods and non-penaeid shrimps (FRAEED, CMFRI, 2025a).

Elasmobranchs are an economically important group of marine resource mainly landed as bycatch in India. Of this group sharks are the most commercially important group, which are retained fully, traded and consumed in various forms, and are also part of local culture. India prohibits the export of shark fins and hence no sharks in the country are finned onboard (Akhilesh et al., 2024). In 2024, India recorded 0.39 lakh t of elasmobranchs of which 60% were comprised of sharks (ICAR-CMFRI, 2025). Among sharks, the main species landed were *Scoliodon* sp. (33.05%), *Carcharhinus* spp. (33.25%), *Alopias* spp. (19.23%), *Chiloscyllium* spp. (4.47%), *Rhizoprionodon* spp. (2.64%), *Sphyrna* spp. (1.51%) and *Galeocerdo cuvier* (1.06%) (ICAR-CMFRI, 2025).

The WPEB of the IOTC focuses on the study of shark species caught as bycatch of IOTC tuna fisheries (hereafter termed as WPEB sharks), namely, *Prionace glauca*, *Carcharhinus longimanus*, *C. falciformis*, *Alopias superciliosus*, *A. pelagicus*, *Isurus oxyrinchus* and *Sphyrna lewini* (<https://iotc.org/node/3384>). In this paper, we present the status of the WPEB sharks in Indian waters in terms of landings, contribution to fisheries, major landing sites and size distribution. We also highlight the conservation measures that India has in place for conservation of sharks.

Material and methods

Landings data on sharks was accessed from the National Marine Fishery Resources Data Centre (NMFDC) of ICAR-CMFRI (ICAR-CMFRI, 2025b). Landings data is collected using a stratified multistage random sampling design which is based on a space-time stratification to estimate landings (Mini et al., 2023). Consequently the database contains species-wise, gear-wise, month-wise and region-wise landings of the artisanal fleet of India (Mini et al., 2023). The landings data on the WPEB sharks in the database was analyzed for the period from 2015-2024. Region-wise analysis was done for four regions namely, Northwest, Southwest,

Southeast and Northeast (CMFRI, 2023). Basic descriptive statistics were used to analyze the landings data. Size measurements are reported from primary field collection at various fish landing centres of the country.

Results

Landings of WPEB sharks

During 2015-2024, WPEB sharks formed an annual average of 0.07% of India's total marine landings the contribution ranging from 0.02-0.27% (Fig. 1). The WPEB sharks formed 12.2% of the sharks landed in the country, with the contribution ranging from 2.77-40.39% (Fig. 2). Of the WPEB sharks, the highest contribution to landings was from *Carcharhinus falciformis* (34.1%), followed by *Alopias superciliosus* (21.8%) and *Sphyrna lewini* (16.4%) during 2015-2024 (Table 1, Fig. 3).

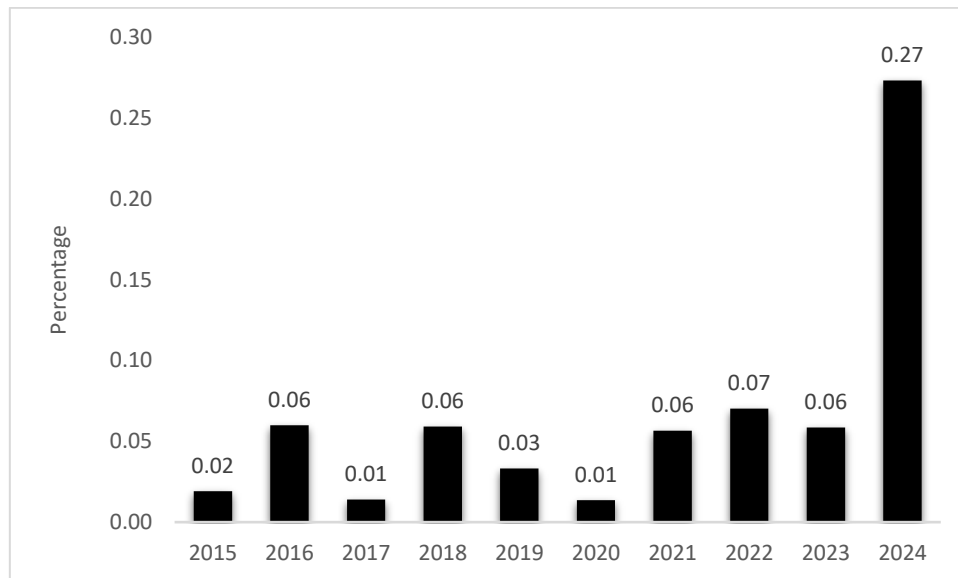


Fig. 1: Percentage composition of WPEB sharks to India's total marine landings (2015-2024)

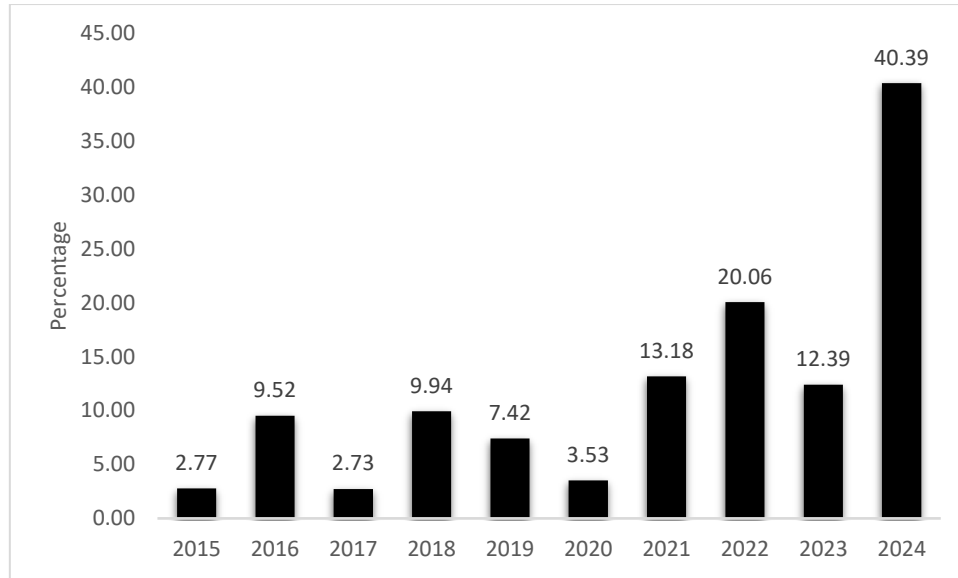


Fig. 2: Percentage composition of WPEB sharks to India's shark landings (2015-2024)

Table 1: Landings of WPEB sharks in India during 2015-2024 (year in parenthesis)

Species	Lowest landing (t)	Highest landing (t)	Average annual landing (t)
<i>Alopias pelagicus</i>	1.4 (2015)	561.168 (2024)	137.01
<i>Alopias spp.</i>	0.23 (2023)	133.55 (2015)	75.43
<i>Alopias superciliosus</i>	9.8 (2020)	3867.1 (2024)	548.4
<i>Alopias vulpinus</i>	31.3 (2020)	1053.4 (2018)	232.1
<i>Carcharhinus falciformis</i>	26.1 (2020)	4209.8 (2024)	773.2
<i>Carcharhinus longimanus</i>	1.25 (2020)	396.9 (2024)	119.2
<i>Isurus oxyrinchus</i>	1.64 (2018)	160.0 (2024)	40.9
<i>Isurus spp.</i>	1.0 (2020)	60.4 (2016)	17.1
<i>Prionace glauca</i>	0.22 (2024)	29.3 (2016)	10.7
<i>Sphyrna lewini</i>	94.2 (2017)	1072.5 (2021)	371.8

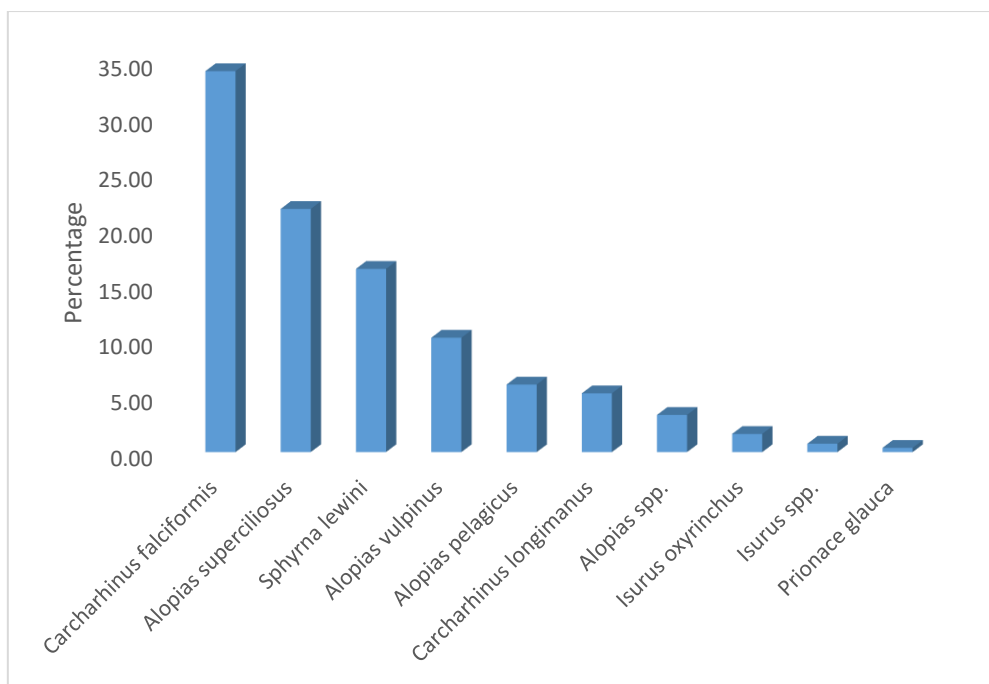


Fig. 3: Species-wise contribution to WPEB sharks in artisanal fisheries of India (2015-2024)

Among the four regions, the highest landings of WPEB sharks was from the SE region (48.9%) followed by the SW region (41.5%) (Fig. 4). Among the coastal states, Tamil Nadu contributed the highest to WPEB shark landings (48.7%), followed by Kerala (40.1%) (Fig. 5).

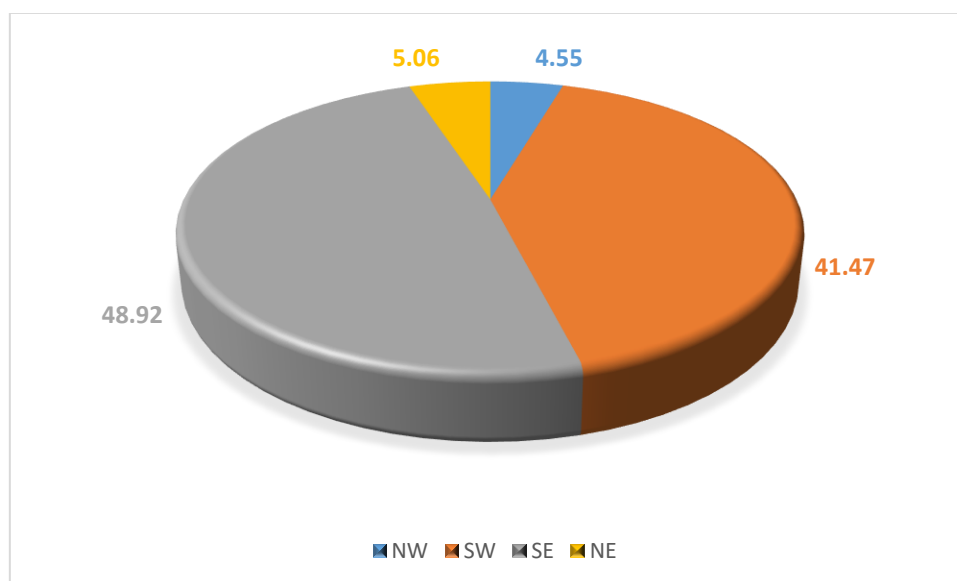


Fig. 4: Region-wise percentage composition of WPEB sharks landings in India (2015-2024)

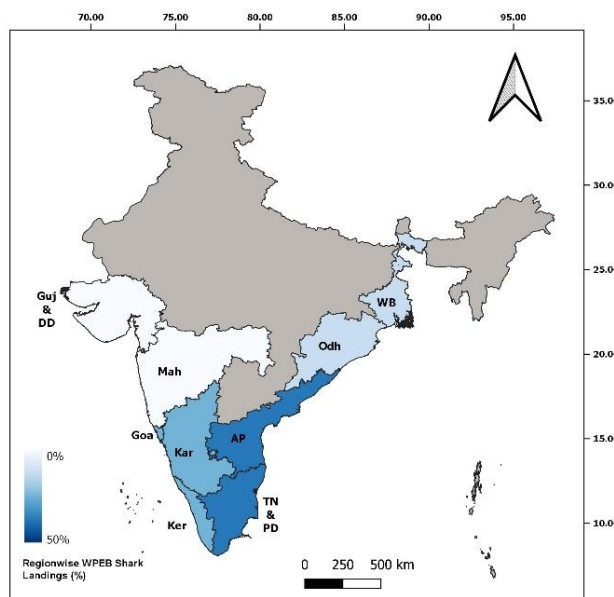


Fig. 5: State-wise contribution to WPEB shark landings (2015-2024) (Gu&DD – Gujarat and Daman & Diu, Mah- Maharashtra, Goa, Kar-Karnataka, Ker-Kerala, TN&PO – Tamil Nadu and Puducherry, AP – Andhra Pradesh, Odh – Odisha, WB – West Bengal)

Among various fishing gears, the mechanized hooks and lines contributed to 40.2% of WPEB shark landings, followed by mechanized other gears (combination gears) at 39.1% (Fig. 6). Mechanized hooks and lines and, mechanized gillnets are the two fishing gears which land the highest quantities of tuna in Indian waters.

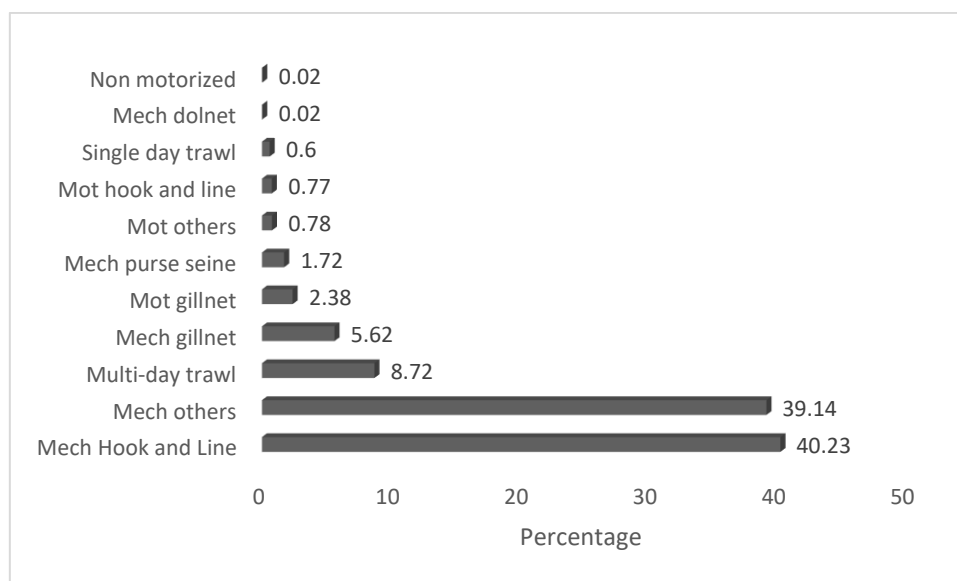


Fig. 6: Gear-wise contribution to WPEB shark landings in India (2015-2024)

Size distribution

Table 2: Size distribution of WPEB sharks in India's artisanal fisheries during 2015-2024 (zones in parenthesis)

Species	Minimum TL (cm)	Maximum TL (cm)	Average TL (cm)
<i>Alopias pelagicus</i>	145 (NE) 81.5 (NW) 150 (SE) 205 (SW)	167 (NE) 284 (NW) 220 (SE) 315 (SW)	144.25 (NE) 183.5(SE) 256 (SW)
<i>Alopias superciliosus</i>	112 (SW) 134 (SE)	310 (SW) 280 (SE)	238.2 (SW) 185.4(SE)
<i>Alopias vulpinus</i>	110 (SW)	410 (SW)	310 (SW)
<i>Carcharhinus falciformis</i>	124 (NE) 66.5 (NW) 140 (SE) 75 (SW)	182 (NE) 247 (NW) 217 (SE) 265 (SW)	153(NE) 173.6(SE) 148.5 (SW)
<i>Carcharhinus longimanus</i>	94 (NW) 200 (SE) 72 (SW)	251 (NW) 210 (SE) 192 (SW)	 205.3(SE) 135.6 (SW)
<i>Isurus oxyrinchus</i>	66 (NW)	280 (NW)	
<i>Prionace glauca</i>	195 (SW)	295 (SW)	
<i>Sphyrna lewini</i>	35 (NE) 46.5 (NW) 62 (SE) 45 (SW)	118.2(NE) 304.4 (NW) 235 (SE) 290 (SW)	83 (NE) 185 (SE)

Utilization

In India, all sharks landed are utilized completely and, there is no “finning” or “livering” as the entire shark has economic value in terms of meat (fresh, dried, salted), jaws, skin, oil and cartilage (Kizhakudan et al., 2015, Muktha et al., 2024).

Shark conservation in India

India has several legal measures and management measures in place for conservation of sharks (Akhilesh et al., 2023), listed below:

1. India released its National Plan of Action on Sharks (NPOA-Sharks) on 20 November 2024 coinciding with World Fisheries Day. The NPOA-Sharks suggests several measures to improve management and conservation including informed data collection of sharks caught in marine fisheries.
2. Prohibition on shark finning - In August 2013, the Ministry of Environment, Forests & Climate Change (Wildlife Division), Govt. of India, adopted a policy advisory on shark finning (vide F. No4-36/2013WL, 21 August 2013), prohibiting the removal of shark fins from live sharks in the sea and advocated landing of the whole shark with fins intact in the body.
3. Ban on export of fins - On 6 February 2015, the Department of Commerce, Ministry of Commerce and Industry, Govt. of India, through Notification No. 110/ (RE-2013)/2009–2014 prohibited the export of fins of all species of sharks, and further through Notification No. 111/ (RE-2013)/2009–2014 prohibited the import of fins of all shark species.
4. The Wildlife (Protection) Act 1972 and The Wildlife (Protection) Amendment Act, 2022 (WPA) – The WPA is the major national legislation that directly addresses the conservation of flora and fauna in India, under the Ministry of Environment, Forests & Climate Change, Govt. of India, to identify and categorize high-risk species/ groups or regions that have rich biodiversity or habitats of threatened fauna that require prioritization for conservation and protection. On 5 December 2001 the WPA was modified to include ten species of elasmobranchs, including the whale shark (Table 3). Subsequently amendments to the Act have been proposed through the recent Wildlife (Protection) Amendment Bill, 2022 (Bill No. 159 C of 2021). In 2022, the Amendment of WPA included CITES-listed species, providing legal support in the conservation of these species also.
5. Non-Detrimental Findings (NDFs) – India has brought forth NDFs for all CITES Appendix II listed elasmobranch species. Negative NDFs, which does not support international trade in the species listed under Appendix II of the CITES was suggested for bowmouth guitarfish *Rhina ancylostoma* (Kizhakudan et al., 2022a), mako sharks (*Isurus oxyrinchus* and *Isurus paucus*) (Thomas et al., 2022a), devil rays (*Mobula*

spp.) (Thomas et al., 2022), silky shark *Carcharhinus falciformis* (Kizhakudan et al., 2019a), oceanic whitetip shark *Carcharhinus longimanus* (Zacharia et al., 2017), hammerhead sharks (*Sphyrna mokarran*, *Sphyrna zygaena*, *Sphyrna lewini*) (Zacharia et al., 2017), thresher sharks (*Alopias* spp.) (Kizhakudan et al., 2019b) and wedgefishes (*Rhynchobatus* spp.) (Kizhakudan et al., 2022b).

6. Minimum Legal Size (MLS) - Minimum Legal Size has been proposed as an output control measure for managing major marine resources of India. Among WPEB sharks species, the MLS has been estimated for the scalloped hammerhead shark, *Sphyrna lewini* from a combination of fishery, size and reproductive potential indices, in the absence of regular and continuous data on the species in Indian waters. The species is currently subject to juvenile fishing pressure in India, which threatens the sustainability of the stock. A conservative MLS of 220 mm TL has been suggested (Thomas et al., 2021).

Table 3: Elasmobranch species protected in India by the WPA 1972 and WPA Amendment Act 2022

S. No.	Species name	WPA protection effect from 2001	The Wild Life (Protection) Amendment Act, 2022, effective from April 2023
1	Largetooth Sawfish , <i>Pristis pristis</i>	Yes	
2	Dwarf Sawfish <i>Pristis clavata</i>		Yes
3	Green Sawfish <i>Pristis zijsron</i>	Yes	
4	Narrow Sawfish <i>Anoxypristis cuspidata</i>	Yes	
5	Pondicherry shark <i>Carcharhinus hemiodon</i>	Yes	
6	Gange shark <i>Glyphis gangeticus</i>	Yes	
7	Speartooth shark <i>Glyphis glyphis</i>	Yes	Not included
8	Whale shark <i>Rhincodon typus</i>	Yes	
9	Oceanic whitetip shark <i>Carcharhinus longimanus</i>		Yes
10	Great hammerhead shark <i>Sphyrna mokarran</i>		Yes
11	Smooth hammerhead <i>S. zygaena</i>		Yes

12	Winghead shark, <i>Eusphyra blochii</i>		Yes
13	Giant guitarfish, <i>Rhynchobatus djiddensis</i>		Yes
14	Smoothnose wedgefish, <i>R. laevis</i>		Yes
15	Bottlenose wedgefish, <i>R. australiae</i>		Yes
16	Bowmouth guitarfish, <i>Rhina ancylostoma</i>		Yes
17	Widenose guitarfish, <i>Glaucostegus obtusus</i>		Yes
18	Clubnose guitarfish, <i>G. thouin</i>		Yes
19	Porcupine ray, <i>Urogymnus asperrimus</i>		Yes
20	Ganges sting ray, <i>Himantura fluviatilis</i>		Yes
21	Reef manta ray, <i>Mobula alfredi</i>		Yes
22	Giant manta ray, <i>Mobula birostris</i>		Yes
23	Giant freshwater whiplay, <i>U. polylepis</i>		Yes
24	Chilean devil ray, <i>Mobula tarapacana</i>		Yes
25	Mottled eagle ray, <i>Aetomylaeus maculatus</i>		Yes
26	Ocellate eagle ray, <i>A. milvus</i>		Yes
27	Banded eagle ray, <i>A. vespertilio</i>		Yes

Generic fisheries management measures are also in place for management of all marine fauna (Akhilesh et al., 2023) as listed below:

1. Management of fisheries in coastal waters within 12 nm
2. Closed season in territorial waters
3. Fisheries spatial zones for artisanal fisheries in territorial waters
4. Fishing efforts in Exclusive Economic Zone (EEZ)/fishing boat license and registration

5. Closed season in EEZ beyond 12 nm
6. Mesh size regulation
7. Marine protected areas
8. Conservation incentives for release of marine WPA species

Stock assessments of elasmobranchs are also conducted periodically in the country, though mostly for coastal species (see Muktha et al., 2024). Researchers from India are also part of collaborative research on elasmobranchs with both national and international agencies. A study on non-fin commodities from sharks and rays was conducted in the country with funding from FAO (Kizhakudan et al., 2024). Researchers also contributed information to the global status of sharks, rays and chimaeras (Jabado et al., 2024) as well as the Important Shark and Ray Areas (Hyde et al., 2022) global atlas (<https://sharkrayareas.org/>). Extension activities to inform stakeholders and to develop research networks are also conducted periodically (Akhilesh et al., 2023).

To conclude, this study indicated that WPEB sharks contributed a small percentage to national estimates of shark landings. WPEB sharks are not landed uniformly all across the Indian coastline, instead they are mainly landed along the southern peninsula of the country. Almost all size classes of WPEB sharks are landed in the country. India has strong conservation measures in place and is improving its shark management efforts.

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