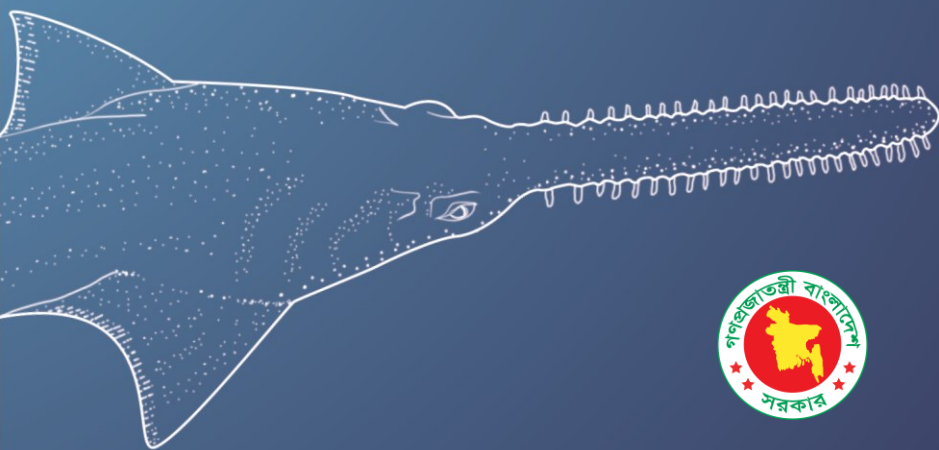




NATIONAL CONSERVATION STRATEGY AND PLAN OF ACTION FOR SHARKS AND RAYS IN BANGLADESH 2023 – 2033



Ministry of Environment, Forest and Climate Change
Government of the People's Republic of Bangladesh



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2023

Ministry of Environment, Forest and Climate Change
Government of the People's Republic of Bangladesh



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Md. Shahab Uddin MP
Minister

Ministry of Environment, Forest and Climate Change
Government of the People's Republic of Bangladesh



MESSAGE

We have a constitutional obligation to safeguard our ecosystems, wildlife, biodiversity, and other natural resources on land and in water for the present and future generations.

Sharks and Rays are marine wildlife almost unknown to us. Although someone might have seen some Sharks or Rays in an aquarium or in movies, but it true that in Bangladesh, unfortunately, it is most likely seen as their bodies or parts at fish landing sites and markets. I would like to thank to the researchers whose discoveries deepen our understanding about Sharks and Rays, we know more about these cartilaginous fishes that take a long time to become mature and often have very few young. I am deeply concerned about the threats they are facing from overfishing and international trade demand for their parts.

Coastal and marine ecosystem services mainly provide food security, jobs, and economic growth. We anticipate for a healthy ocean that produces significant amount of oxygen for our breathing, regulates our climate, and connects us with other ocean-oriented nations. Sharks and Rays are existing in critical conditions for the health of our coastal and marine ecosystems. We must act now onwards to reverse declines in threatened species and reduce the overexploitation and catch or bycatch of Sharks and Rays.

The conservation management of Sharks and Rays in Bangladesh is a shared responsibility. Sharks and Rays are fish as well as wildlife. The Forest Department under the Ministry of Environment, Forest and Climate Change is responsible for conserving these species as wildlife. Shark and Ray species are threatened with extinction are protected under the Wildlife (Conservation and Security) Act, 2012. All law enforcement agencies should be mandated to enforce their protection and stop illegal wildlife trade.

The significance of the *National Conservation Strategy and Plan of Action for Sharks and Rays in Bangladesh* is the strategic guidance on priority conservation interventions for addressing wildlife conservation challenges and ensuring long-term institutional capacity to implement them, as well as the exemplary development process. It was developed through an inclusive and transparent process. It is envisioned as guidance for government agencies, local communities, NGOs, research institutions, and private enterprises in Bangladesh to strategically prioritize their engagement in protecting the most endangered Sharks and Rays from extinction and ensuring sustainable, productive fishery livelihoods in coastal communities.

I would like to thank everyone who has contributed to the development of this *National Conservation Strategy and Plan of Action for Sharks and Rays in Bangladesh*.

Joy Bangla, Joy Bangabandhu

May Bangladesh Live forever

(Md. Shahab Uddin M.P.)



Habibun Nahar MP
Deputy Minister
Ministry of Environment, Forest and Climate Change
Government of the People's Republic of Bangladesh



MESSAGE

Sharks and rays are vital for a healthy and productive ocean that provides food and livelihoods for millions of coastal communities in Bangladesh. As top predators, sharks and rays are the indicators of a healthy ocean. We need to conserve them for the greater interest of the nation. Unregulated trade with shark and ray parts is a major driver for the global declines in shark and ray populations. The high market value and demand for shark and ray fins and ray gill plates is an incentive for fishers to target and retain sharks and rays. It has also created a growing domestic market for their meat. We need to improve proper monitoring of this trade to stop any illegalities.

I commend the Forest Department for their initiative to develop this *National Conservation Strategy and Plan of Action for Sharks and Rays in Bangladesh* under their Sustainable Forests and Livelihood Project (SUFAL) in line with their effort to strengthen Government capacity for compliance with international wildlife trade commitments. The document was developed in consultation with other government agencies, including the Department of Fisheries, research institutes, academics, NGOs, local fishery stakeholders, and law enforcement agencies. Under the SUFAL project, technical trainings were conducted to enable government officers to effectively monitor and enforce protection and trade regulations for sharks and rays, and thereby support the implementation of the *National Conservation Strategy and Plan of Action for Sharks and Rays in Bangladesh*.

There has also been a good amount of mass awareness campaigning at major shark and ray landing sites by the SUFAL Project. This is important and must be continued, so that everyone knows which wildlife species are protected and why they are worth way more alive in the wild than dead. Preparation of NDFs for Shark and Ray enable us for enforcing trade regulations on sharks and rays. We are also in better position to monitor shark and ray landings to establish trade traceability, and more effectively combat illegal wildlife trade.

I strongly believe that the *National Conservation Strategy and Plan of Action for Sharks and Rays in Bangladesh* enables us to overcome the challenges and ensure long-term institutional capacity and public engagement for effectively combatting illegal wildlife trade, particularly in sharks and rays.

Habibun Nahar

(Habibun Nahar M.P.)



Dr. Farhina Ahmed

Secretary

Ministry of Environment, Forest and Climate Change
Government of the People's Republic of Bangladesh



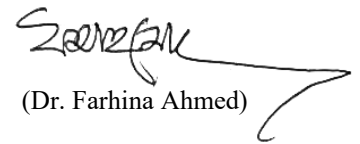
MESSAGE

It is our immense pleasure to note that the extraordinary oceanographic conditions make our coastal and marine waters a global hotspot for supporting a large portion of the world's most threatened marine megafauna, including sharks and rays. But, about two-thirds of the more than one hundred shark and ray species known or suspected to occur in Bangladesh are threatened with extinction primarily from overfishing and unregulated trade. The loss of these ecologically vulnerable top predators could potentially cause a trophic cascade. This may result in dramatic changes in our coastal and marine ecosystems and negatively impact fisheries livelihoods, national food security, and our blue economy.

Good news is that we are making a mentionable progress on strengthening national compliance with international agreements and improving national protection for the most threatened species. This *National Conservation Strategy and Plan of Action for Sharks and Rays in Bangladesh* is based on updated baseline information on the status, threats, and governance, and identifies conservation needs and priority actions to improve the conservation management of sharks and rays in Bangladesh.

Just like the sharks and rays move across boundaries, we also need to work across institutional and organizational mandates as well as engage in international platforms. The Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) regulates international trade and mandates the adoption of national legislation to improve the management of threatened wildlife, including sharks and rays. Bangladesh co-sponsored successful proposals to list sharks and rays that are globally threatened by international trade demands in CITES Appendix II. In September 2021, the list of sharks and rays protected under the Bangladesh Wildlife (Conservation and Security) Act, 2012, was amended to reflect recent status assessments in the IUCN Global Red List, CITES requirements, as well as resolutions of our regional fisheries management organization, the Indian Ocean Tuna Commission.

Bangladesh today is considered a 'bright spot' by the international community due to the strong progress made with CITES implementation. We are the first country in the world to grant full legal protection to all guitarfishes and wedgefishes – among the most threatened group of rays. The MoEFCC is committed to interagency and inter-ministerial collaboration for protecting our marine wildlife populations and preserving marine ecosystems and their services for ensuring a healthy ocean for healthy people. We believe that the *National Conservation Strategy and Plan of Action for Sharks and Rays in Bangladesh* will guide us for sharks and rays conservation management at all level.


(Dr. Farhina Ahmed)



Dr. Nahid Rashid
Secretary
Ministry of Fisheries and Livestock
Government of the People's Republic of Bangladesh



MESSAGE

Protecting sharks and rays from overexploitation and trade demand is a national responsibility and international commitment. The Convention of International Trade in Endangered Species of Wild Fauna and Flora (CITES), the Convention on Migratory Species (CMS), the Food and Agriculture Organization of the United Nations (FAO), and the Indian Ocean Tuna Commission (IOTC) encourage countries to develop a National Plan of Action for shark and ray conservation management and to improve monitoring and reporting of take and trade.

The collaborative process through which the *National Conservation Strategy and Plan of Action for Sharks and Rays in Bangladesh* (NCS/NPOA-Sharks & Rays) has been developed is exemplary and highly laudable. I applaud the active participation of local fishery stakeholders and experts from government institutions, including the Department of Fisheries, Forest Department, Bangladesh Fisheries Research Institute, Customs and other law enforcement agencies, universities, as well as NGOs, in identifying and prioritizing strategic actions needed for safeguarding threatened shark and ray populations and their priority habitats in our territorial waters. I am particularly grateful to members of NPOA working group appointed by the Ministry of Fisheries and Livestock for providing expertise and guidance throughout the development process.

The joint endorsement by the Ministry of Fisheries and Livestock and the Ministry of Environment, Forests and Climate Change underscores our strong commitment to concerted implementation efforts. The NCS/NPOA-Sharks & Rays provides science-based, locally informed guidance for improving the long-term survival of threatened sharks and rays in Bangladesh and ensuring the sustainability of fisheries vital to the food security and livelihoods of more than 3.5 million people in coastal communities.

By working together, we can sustain our coastal and marine fisheries and effectively protect marine biodiversity. I firmly believe that this NCS/NPOA-Sharks & Rays shows us how.

(Dr. Nahid Rashid)



Md. Amir Hosain Chowdhury
Chief Conservator of Forests
Forest Department
Government of the People's Republic of Bangladesh



PREFACE

Bangladesh is a global hotspot for sharks and rays supporting more than 100 species occurring in numbers generally much greater compared to other countries in the Bay of Bengal. However, about 80% of the species confirmed as occurring in our waters are considered threatened in the global IUCN Red List. The primary threats to sharks and rays in Bangladesh are overexploitation, including both targeted and non-targeted catches, and demand for international and national trade. The Forest Department (FD) is committed to protecting sharks and rays as part of our rich biodiversity heritage.

On an international level, the FD has cosponsored proposals to the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) for strengthening international trade protections for silky and thresher sharks and mobula rays at the 17th Conference of Parties and for mako sharks, guitarfish, and wedgetfish at the 18th Conference of Parties. On a national level, the FD has developed CITES non-detriment findings for silky sharks, hammerhead sharks, mobula rays, and rhino rays. These findings describe suggested conditions for trade, including management measures to mitigate conservation concerns. To protect sharks, rays, and other marine biodiversity, the FD has also established marine protected areas in the Swatch-of-No-Ground submarine canyon and around Saint Martin's Island. The *National Conservation Strategy and Plan of Action for Sharks and Rays in Bangladesh* is another major step forward in protecting these marine wildlife species that play a strong role in maintaining a healthy ocean ecosystem.

The *National Conservation Strategy and Plan of Action for Sharks and Rays in Bangladesh* was developed under the Sustainable Forests and Livelihood (SUFAL) project of the FD with technical assistance from the Wildlife Conservation Society (WCS) and in consultation with the Department of Fisheries, Bangladesh Fisheries Research Institute, Bangladesh Fisheries Development Corporation, Customs, law enforcement agencies, local shark and ray fishery stakeholders, as well as national and international experts. This is science based and identifies conservation needs and priority actions to improve the conservation management of sharks and rays in Bangladesh.

The FD looks forward to joining hands with relevant government agencies, national and international NGOs, and coastal fishing communities to implement the *National Conservation Strategy and Plan of Action for Sharks and Rays in Bangladesh* as part of our ongoing commitment to protect Bangladesh's rich biodiversity and contribute towards blue economy.

(Md. Amir Hosain Chowdhury)



Project Director
Sustainable Forests and Livelihoods (SUFAL) Project
Forest Department
Government of the People's Republic of Bangladesh



ACKNOWLEDGEMENT

The *National Conservation Strategy and Plan of Action for Sharks and Rays in Bangladesh 2023-2033* has been developed by Forest Department (FD) under Sustainable Forests and Livelihoods (SUFAL) Project (Procurement Package no. SD-39) with financial support from the World Bank and technical assistance from the Wildlife Conservation Society (WCS). WCS deserves gratitude for their professional input, sharing their research findings, partaking in non-detriment finding assessments, providing helpful reviews and technical contributions for preparing the *National Conservation Strategy and Plan of Action for Sharks and Rays in Bangladesh 2023-2033*.

Sincere thanks are due to the Additional Secretary Mr. Iqbal Abdullah Harun and Mr. Md. Mizanul Hoque Chowdhury, Joint Secretary Ms. Zakia Afroz and Deputy Secretary Mr. Md. Abu Nasar Uddin from the Ministry of Environment, Forest and Climate Change for their kind participation as well as for technical guidance, professional input and administrative support in facilitating cooperation among relevant ministries and agencies. Special acknowledgement is also due for the Conservator of Forests, Wildlife and Nature Conservation Circle, Dhaka for his continuous support to the preparation of the *National Conservation Strategy and Plan of Action for Sharks and Rays in Bangladesh 2023-2033*.

Sincere appreciations for the senior representatives from the Ministry of Fisheries and Livestock, Ministry of Commerce, National Board of Revenue, Bangladesh Coast Guard, Bangladesh Navy, Bangladesh Police, Department of Fisheries (DoF), Bangladesh Fisheries Research Institute (BFRI), Bangladesh Fisheries Development Corporation (BFDC), the University of Dhaka, University of Chattogram, Sher-e-Bangla Agricultural University for their valuable recommendation. Credits also shared with the consulted fishers, fishing vessel owners, and traders engaged in shark and ray fisheries and trade for their valuable recommendations. Special thanks are due to the members of the SUFAL Project Management Unit, BFD Officials, World Bank personnel for wholehearted support and input. Also thanks to the Chairman of the Deliverable Review and Comments Giving Committee and Deputy Project Director Mr. Md. Abdullah Abraham Hossain and his committee members for their critical review and comments. Finally acknowledged the support from the national working group established by the Ministry of Fisheries and Livestock, in particular Dr. Sharif Uddin, Director of the DoF Marine Fisheries Wing, Dr. Muhammad Tanvir Hossain Chowdhury, Deputy Chief (Marine), and Shoukot Kabir Chowdhury, Assistant Director (Marine).

(Gobinda Roy)

EXECUTIVE SUMMARY

Sharks and rays are among the world's most threatened species groups. Two-thirds of the over one hundred species of sharks and rays that occur in Bangladesh are threatened with extinction. The ecological vulnerability of sharks and rays, due to their slow growth and reproduction rates, makes them particularly susceptible to overfishing. Unsustainable catches in small-scale and industrial fisheries, unregulated trade in their products, increasing local consumption of their meat, and to a lesser degree habitat degradation and loss of habitat due to climate change are the primary threats to sharks and rays. Without conservation management, shark and ray diversity and abundance in Bangladesh will decline with harmful impacts on economically valuable fish stocks, fishery livelihoods, food security and the national economy.

The conservation management of sharks and rays is a shared responsibility of natural resource and law enforcement agencies of the Government of Bangladesh and local fishing communities. The *National Conservation Strategy and Plan of Action for Sharks and Rays in Bangladesh* (NCS/NPOA-Sharks & Rays) was prepared under the *Sustainable Forests and Livelihoods* (SUFAL) Project of the Forest Department under the Ministry of Environment, Forest and Climate Change (MoEFCC) in broad consultation with the Department of Fisheries, government and non-government stakeholders, and with technical support from the Wildlife Conservation Society (WCS) to reflect the best available science, international commitments, and locally feasible solutions for their management and conservation. The collective vision is for sharks and rays to be effectively protected and sustainably managed, delivering ecological and socio-economic benefits to people and ecosystems. The NCS/NPOA-Sharks & Rays provides strategic guidance on priority conservation and management actions needed to protect threatened for shark and ray species and populations from extinction and manage the sustainable use of non-threatened species for a healthy ocean and healthy coastal people.

Key recommendations include (i) reducing mortalities of threatened shark and ray species through gear restrictions, time and area closures, and live-release requirements, (ii) protecting priority habitat by incorporating sharks and rays into marine spatial plans, marine protected area management and other effective area-based conservation measures, (iii) strengthening legal protection and enforcement through amending laws and rules and enabling joint law enforcement operations, (iv) engaging fishing communities by empowering community-based monitoring of protected species and areas, promoting value-enhanced products from sustainably caught non-threatened species, and reducing demand for protected species, (v) improving reporting to international conventions on shark and ray catches and trade by systematically monitoring catches and landings from small-scale and industrial fisheries, and (vi) strengthening governance and coordination by clarifying mandates and responsibilities, developing sustainable finance mechanisms, and engaging with regional and international bodies.

The NCS/NPOA-Sharks & Rays serves as a blueprint for government agencies, local communities, NGOs, research institutions, and private enterprises in Bangladesh to engage in protecting the most endangered sharks and rays from extinction and ensuring sustainable, productive fishery livelihoods in coastal communities.



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ACRONYMS AND ABBREVIATIONS

BFD	Bangladesh Forest Department	MoDMR	Ministry of Disaster Management and Relief
BFDC	Bangladesh Fisheries Development Corporation	MoEFCC	Ministry of Environment, Forest, and Climate Change
BFRI	Bangladesh Fisheries Research Institute	MoF	Ministry of Finance
BGB	Border Guard Bangladesh	MoFL	Ministry of Fisheries and Livestock
BOBLME	Bay of Bengal Large Marine Ecosystem	MoHA	Ministry of Home Affairs
BOBP	Bay of Bengal Programme	MoPA	Ministry of Public Administration
CBD	Convention on Biodiversity	MoU	Memorandum of Understanding
CC	City Corporation/City Council	MPA	Marine Protected Area
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora	MSP	Marine Spatial Planning/Plan
CMS	Convention on the Conservation of Migratory Species of Wild Animals	MSY	Maximum Sustainable Yield
COFI	Committee on Fisheries	NBR	National Board of Revenue
CR	Critically Endangered	NCS	National Conservation Strategy
DD	Data Deficient	NDF	Non-Detriment Finding
DoE	Department of Environment	NGO	Non-Governmental Organization
DoF	Department of Fisheries	NPOA	National Plan of Action
EEZ	Exclusive Economic Zone	NL	Not Listed
EN	Endangered	NT	Near Threatened
FAO	Food and Agriculture Organization	OECM	Other Effective Area-based Conservation Measures
FIQC	Fish Inspection and Quality Control	SAARC	South Asian Association for Regional Cooperation
FRSS	Fisheries Resources Survey System	SAR	Shark Assessment Report
GoB	Government of Bangladesh	SMART	Spatial Monitoring and Reporting Tool
HS	Harmonized System	SoNG	Swatch-of-No-Ground
IORA	Indian Ocean Rim Association	SOP	Standard Operating Procedure
IOTC	Indian Ocean Tuna Commission	SUFAL	Sustainable Forests & Livelihoods Project
IPOA	International Plan of Action	SSF	Small-Scale Fishers/Associations
IUCN	International Union for Conservation of Nature	UNCLOS	United Nations Convention on the Law of the Sea
LC	Least Concerned	Uni	University
LE	Law Enforcement	VU	Vulnerable
LG	Local Government	WCCU	Wildlife Crime Control Unit
MFSMU	Marine Fisheries Survey Management Unit	WCO	World Customs Organisation
MoC	Ministry of Commerce	WCS	Wildlife Conservation Society
MoD	Ministry of Defense		

PART A – BACKGROUND

1. Development process of the National Conservation Strategy and Plan of Action for Sharks and Rays in Bangladesh

The *International Plan of Action for the Conservation and Management of Shark Resources* (IPOA-Sharks) was adopted by the United Nations Food and Agriculture Organization (FAO) Committee on Fisheries (COFI) in 1999 under provisions of the *FAO Code of Conduct for Responsible Fisheries*. The IPOA-Sharks requires that FAO member countries, including Bangladesh, assess their shark fisheries and prepare a National Plan of Action for Sharks and Rays (NPOA-Sharks & Rays).

With financial and technical assistance from the *Bay of Bengal Large Marine Ecosystem* (BOBLME) project and the FAO, the Bangladesh Fisheries Research Institute (BFRI) conducted a survey of shark fisheries, prepared an initial *Shark Assessment Report* (SAR) as per FAO guidelines, and drafted the first NPOA-Sharks for Bangladesh in 2014 (BOBLME 2014). The draft was based on outcomes from a national consultation workshop (Hoq et al. 2011) and three stakeholder consultations at major shark and ray landing centers in Patharghata, Chittagong, and Cox's Bazar conducted under BOBLME in 2013 with representatives from the Ministry of Fisheries and Livestock (MoFL), Department of Fisheries (DoF), Bangladesh Fisheries Development Corporation (BFDC), BFRI, Department of Environment (DoE), Bangladesh Forest Department (BFD), Faculty of Marine Sciences and Fisheries of Chittagong University, Department of Zoology of Dhaka University, Shark Fishery Traders Welfare Association Cox's Bazar, IUCN-Bangladesh, and WorldFish-Bangladesh. The draft was validated in a workshop convened by the DoF two months before the BOBLME project ended in June 2014.

Recognizing the need to improve protection of threatened sharks and rays in Bangladesh, with funding from the World Bank under the *Sustainable Forests and Livelihoods* (SUFAL) project, in 2021, the BFD initiated and assigned the *Shark and Ray and Associated Species Conservation Strategy Development and Non-Detriment Findings* project to the Wildlife Conservation Society (WCS). Since the first SAR and NPOA for sharks and rays in Bangladesh was drafted in 2014, substantial new information has become available. In 2021, a new SAR (BFD 2021a) was prepared under the SUFAL assignment, providing baseline information on the status, threats, and governance of sharks and rays in Bangladesh. This report was based on the results of scientific investigations, stakeholder consultations, published reports and scientific papers. The report was presented and discussed in a two-day consultation workshop convened in May 2021 with over 50 national experts from government agencies and institutions, universities, and NGOs (BFD 2021b). Recommendations on practical approaches to reduce mortalities and trade of threatened species and ensure the sustainable exploitation of species not in immediate danger of extinction were refined through a second consultation, organized under the SUFAL assignment in November 2021, with fishers, fishing vessel owners, and traders engaged in shark and ray fisheries and trade (BFD 2022).

Mitigation measures to improve the monitoring and management of international trade in threatened sharks and rays and their body parts were identified during Non-Detriment Finding (NDF) assessments conducted in February 2022 for mobulid and rhino rays, smooth hammerhead and silky sharks (GoB 2022a,b,c,d). The NDF assessments were developed by 24 representatives from the BFD, DoF, BFRI, and national universities in two three-day

workshops facilitated by an international shark and ray expert. The results were validated by senior government representatives, including the heads of both the BFD and the DoF, along with national fisheries and wildlife experts in February 2022 and approved for implementation by the Scientific Committee that advises the Chief Conservator of Forests (CCF) of the BFD on permissible imports and exports of wild animals and plants.

Technical support for developing the NCS/NPOA-Sharks & Rays was provided by a national working group formed by the MoFL in 2021 with representatives of the MoFL, DoF, BFD, BFRI, FAO-BD, IUCN-BD, WCS, and national universities, and by WCS under the SUFAL project of the BFD. The NCS/NPOA-Sharks & Rays aligns with commitments to international conventions and regional agreements and with national development priorities for promoting productive, sustainable fisheries as a key component of a blue economy.

The NCS/NPOA-Sharks & Rays was presented and discussed in a third national consultation in June 2022 with 42 senior government representatives, including the Honorable Minister Md. Shahab Uddin (MP), Secretary Dr. Farhina Amed, and Additional Secretary Iqbal Abdullah Harun from the MoEFCC, and from the MoFL, Ministry of Commerce (MoC), BFD, DoF, BFRI, BFDC, National Board of Revenue (NBR), Coast Guard, Navy, and Police. The strategy and recommended actions were positively received, with strong commitments to support official endorsement and implementation.

Based on these inputs, the NCS/NPOA-Sharks & Rays was finalized in July 2022 for government endorsement and officially endorsed by the MoEFCC on 8 February 2023.

2. Significance of shark and ray diversity

Sharks and rays, also called elasmobranchs, are distinguishable from bony fishes by uncovered gill slits and a soft, cartilaginous skeleton. The gill slits of sharks are on the side of their body, while gill slits and the mouth of rays are on the underside of their flattened bodies.

Compared to bony fish, sharks and rays grow slowly, reach sexual maturity late in life and produce few young. This means that their numbers are naturally low compared to other fishes. These biological characteristics make them particularly vulnerable to overfishing, the primary threat to sharks and rays. The global abundance of oceanic sharks and rays has declined by 71% over 50 years (Pacoureau *et al.* 2021). One third of the world's 1,199 shark and ray species assessed against International Union for Conservation of Nature (IUCN) Red List criteria are considered threatened with extinction, making them one of the most endangered vertebrate lineages, second only to the amphibians in the risks they face (Dulvy *et al.* 2021).

Elasmobranchs, the oldest jawed vertebrates on earth, play a crucial role in maintaining healthy fish stocks. Sharks and rays are a diverse species group that require a range of approaches for their effective management and conservation. Some species with extremely low levels of reproduction require strict protection to minimize mortality, while more prolific species can be sustainably fished if catches are rigorously limited and monitored throughout their range.

As of July 2022, 31 shark and 59 ray species have been confirmed as occurring in Bangladesh, with an additional 25 shark and 12 ray species suspected to occur based on their occurrence in neighboring countries in ocean habitat that is also found in Bangladesh (Appendix 1 and 2). Two-thirds of all shark and ray species known or suspected to occur in Bangladesh are globally threatened with extinction. Between 2001 and 2020, landings of

sharks and rays in Bangladesh declined by half, despite a slight growth in the marine fisheries production, while the export of shark and ray products fluctuated between zero and over two thousand tons (DoF 2021). Discrepancies between the exports reported by Bangladesh and records from importing countries indicate that a substantial portion of shark and ray exports does not follow proper legal procedures (BFD 2021a).

Without science-based conservation management implemented by multiple government agencies in partnership with both small-scale and industrial fishers, shark and ray diversity and abundance in Bangladesh will further decline with potentially harmful effects on economically valuable fisheries, fishery livelihoods, food security, and the national economy.

3. Conservation status

Of the species documented or suspected to occur in Bangladesh, 37 shark and 62 ray species are considered threatened (Critically Endangered (CR), Endangered (EN) or Vulnerable (VU)) in the Global IUCN Red List. Three ray species are listed in CITES (Convention on International Trade in Endangered Species of Wild Fauna and Flora) Appendix I and 33 shark and 13 ray species in CITES Appendix II. According to CITES, Appendix I includes species threatened with extinction and international trade is generally prohibited. Appendix II includes species not necessarily threatened with extinction, but international trade should be controlled to safeguard their survival.

Bangladesh is a stronghold for several CR and EN sharks and rays in need of urgent protection, including CR Scalloped *Sphyrna lewini* and Great *Sphyrna mokarran* hammerhead sharks; Giant *Glaucostegus typus*, Bowmouth *Rhina ancylostoma* and Sharpnose *Glaucostegus granulatus* guitarfishes; Largetooth sawfish *Pristis pristis*; and EN Ocellate eagle rays *Aetomylaeus milvus*, Giant devilrays *Mobula mobular*; and Giant freshwater *Urogymnus polylepis*, Bleeker's *Pateobatis bleekeri*, and Honeycomb *Himantura undulata* whiprays. The large numbers of CR Scalloped hammerhead sharks, EN Honeycomb whiprays, and VU Bengal whiprays *Brevitrygon imbricata* being landed are of particular concern (BFD 2021a, Chapter 1).

Landings from small-scale fisheries are dominated by a few relatively common species considered Near Threatened (NT) and Least Concerned (LC) in the IUCN Red List. These include NT Spadenose *Scoliodon laticaudus*, Spottail *Carcharhinus sorrah*, and Tiger *Galeocerdo cuvier* sharks, and LC Bluespotted maskrays *Neotrygon caeruleopunctata* (BFD 2021a, Chapter 1).

4. Distribution

As many as 1,250 ecologically and evolutionarily diverse sharks and rays inhabit the marine and fresh waters of our planet (Bräutigam *et al.* 2015) with more than one-third threatened by overfishing (Dulvy *et al.* 2021). They are found in a variety of habitats from large rivers, including the Jamuna, Padma, and Meghna in Bangladesh, to the world's deepest oceans, and they help maintain healthy and productive ocean ecosystems via their role as top predators.

Extraordinary oceanographic conditions, including freshwater flow from among the largest river systems on earth, a seasonally reversing current that concentrates redistributes and recycles nutrients, and upwelling from a deep submarine canyon, make the northern Bay of

Bengal in Bangladesh a global hotspot for supporting a large portion of the world's most threatened marine megafauna, including sharks and rays.

Habitat suitability models used to predict the distribution of sharks and rays from data collected by gillnet fishers operating offshore of the Sundarbans mangrove forest south to the Swatch-of-No-Ground (SoNG) submarine canyon and east to Nijhum Dwip indicate that the most suitable habitat for shark and rays occurs offshore the Sundarbans to the SoNG. The Sundarbans provide breeding and nursery grounds for juvenile sharks and rays, several of depend on mangrove habitat for reproduction (BFD 2021a, Chapter 2). Based the catches of industrial and small-scale fishing operations, and reports from fish traders and government officials at fish landing sites, the Chattogram-Cox's Bazar coastal area and shallow shelf areas as deep as 40 meters, including associated coral structures, mangroves, and mud or sand banks, also support abundant shark and ray diversity (Hossain, M.S. in BFD 2021b).

5. International agreements and conventions

The Government of Bangladesh (GoB) has ratified several international agreements, including the UN Convention on the Law of the Sea (UNCLOS), UN Fish Stocks Agreement, and UN FAO Code of Conduct for Responsible Fisheries. The *Vision-2021, Eighth Five Year Plan 2020-2025*, and *National Biodiversity Strategy and Action Plan of Bangladesh 2016-2021* prioritize the protection and sustainable management of marine fisheries.

As a signatory to the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), the Convention on the Conservation of Migratory Species of Wild Animals (CMS), and the Indian Ocean Tuna Commission (IOTC), the GoB is committed to improve the protection of marine resources, including effectively managing shark and ray fisheries and trade. A detailed list of international and regional obligations for Bangladesh to manage shark and ray fisheries and trade is in Appendix 3.

6. Threats

Unsustainable catches in small-scale and industrial fisheries, unregulated trade, and increasing local consumption are the primary threats to sharks and rays in Bangladesh. Degradation or loss of habitat due to climate change is also an emerging threat. These threats not only affect sharks and rays but can also lead to considerable loss of other marine biodiversity, ocean productivity and to the national Blue Economy. Below is a brief overview of conservation threats and challenges. More comprehensive information is provided in the SAR (BFD 2021a).

Direct killing

Annual landing statistics published by the DoF indicate that catches of sharks and rays constitute less than 1% of the total marine fisheries catch and have been gradually decreasing. Between 3,865-4,274 metric tons of sharks and rays were reported landed annually between 2011-12 and 2018-19. Between 2012-2019, 546 to 918 metric tons of sharks and rays were reported as landed annually from pelagic trawl fisheries that generally fish in deeper offshore waters compared to small-scale fisheries. These statistics grossly underestimate the total catches of sharks and rays in Bangladesh since they only include information from a few landing sites. It is difficult to categorize whether these sharks and rays were targeted or caught incidentally in fisheries targeting other finfish or crustaceans. However, the

substantial value of shark and ray products, particularly fins and gill plates, for international export means that these catches cannot be considered as strictly bycatch (BFD 2021a, Chapter 5).

Non-target catches and bycatch

Although sharks and rays have significant value, it appears that most catches in small-scale fisheries are incidental to other finfish and crustaceans that are primary targets. For instance, between December 2016 and January 2019, more than 96% of all sharks landed at eight landing sites were caught in medium-mesh gillnets and set-bag nets that do not specifically target sharks. The situation is different for rays with direct killing in longlines that specifically target rays accounting for about 85% of the total number of rays landed at the same fish landing sites (BFD 2021a, Chapter 1).

This implies that enforcement of laws and rules regulating trade and consumption of rays could be more effective at reducing fishery related ray mortality, while reducing the demand for shark products through strengthened enforcement of laws regulating trade and consumption will not substantially reduce fishery related shark mortality. Direct measures to reduce fishery related mortality, such as gear restrictions and time-area closures in priority habitat, will be needed along with enforcement of laws on trade and consumption. An overview of applicable fishing gear regulations for marine waters of Bangladesh is provided in Appendix 4.

International and domestic trade

Trade data from the FAO indicate that Bangladesh ranks among the top twenty shark fin exporting countries. According to GoB statistics, as many as two thousand tons of dried shark fins are exported from Bangladesh each year, earning over a million US dollars in tax revenue. However, these statistics do not differentiate between sharks and rays or among species. The statistics also group shark and ray fins with fish swim bladders and do not include other products, such as shark or ray skins and mobulid ray gill plates, that are traded internationally. This limits the ability to use government statistics to monitor shark and ray trade or make evidence-based management recommendations (BFD 2021a, Chapter 5).

In Bangladesh, shark and ray fins are generally cut off at landing, salted and sun dried for export. Dried fins are graded according to size with a value of about 1,000 BDT/kg for fins between two to four inches long increasing to over 8,000 BDT/kg for fins over 20 inches (BFD 2021a, Chapter 5).

Demand for gill plates is the largest driver for global manta and devil ray fisheries. Fresh gill plates more than twelve inches long are sold at landing sites for 8,000-9,000 BDT/kg and then resold dry for 30,000-35,000 BDT/kg for export (BFD 2021a, Chapter 5).

Traders in Bangladesh buy processed shark and ray fins, meat, and skins, and then export them, generally by sea, to Myanmar for re-export to Singapore, Hong Kong, China with only a small portion following proper legal procedures (WCS 2018).

High demand for shark and ray fins and ray gill plates has led to a domestic market for shark and ray meat. Dried meat from larger specimens is generally shipped to Myanmar while the meat from smaller specimens is sold for local consumption. Prices vary with small sharks sold locally for 60-130 BDT/kg for fresh meat to about 500 BDT/kg for dried meat. The meat from large sharks is sold fresh for about 250 BDT/kg and dried for about 800-950 BDT.

Prices also vary from small rays sold locally for 50-80 BDT/kg for fresh meat and 250 BDT/kg for dried meat, and for larger rays that sell for 120-320 BDT/kg for fresh meat and 750 BDT/kg for dried meat to buyers mainly from Myanmar. Left-over shark and ray body parts, including fins too small for the export market, are processed into fish or poultry feed (BFD 2021a, Chapter 5).

The high market value and demand for shark and ray fins and ray gill plates creates an incentive for fishers to target and retain sharks and rays. It has also created a domestic market for fresh and dried meat that previously did not exist in Bangladesh.

Use and consumption

Cartilaginous fin needles are extracted from dried shark fins and used in shark fin soup that is a luxury food particularly in China, Hong Kong, and Singapore. Sawfish and wedgefish fins are also highly valued due to their large number of fin needles. Dried gill plates of filter-feeding manta and devil rays are highly valued in China for their use in ‘health tonics’.

Sharks and rays have large oily livers to keep them afloat. Their liver oil is rich in Vitamin A used in skincare products. Squalene, which is used as a boosting agent in vaccines, is also extracted from shark and ray livers and there is concern that the global demand for squalene used in Covid-19 vaccines could further worsen the status of already threatened sharks.

Other products from sharks and rays include dried cartilage, which is believed to have medicinal properties, and teeth and jaws, which are sold for ornamental purposes. Both these products are sold domestically and internationally. The meat of sharks and rays is increasingly being locally consumed and processed into fishmeal for livestock and exported to neighboring Myanmar (BFD 2021a, Chapter 5).

Habitat status and degradation

The SoNG Marine Protected Area (MPA) protects at least 11 shark species with two CR, one EN, four VU, three NT, and one LC, and seven ray species with three CR, one EN, two VU, and one NT. Considering the habitat preferences of sharks and rays found in Bangladesh, another 28 shark and 48 ray species are suspected to occur in the SoNG MPA (WCS 2021).

The Nijhum Dwip MPA protects at least six ray species with two CR, three EN, one VU. Six shark species with one CR, two VU, and three NT. Fifteen additional ray species with four CR, seven EN, and four VU were reported caught during standardized interviews conducted with fishers at sea (WCS/IUCN-BD 2021).

The Saint Martin’s MPA provides protection for several threatened shark and ray species, including the EN whale shark *Rhincodon typus* (WCS 2018a).

Overall, the current habitat condition in Bangladesh is favorable for sharks and rays but with some localized threats especially for nearshore/estuarine habitat (e.g., Sonadia and Moheshkhali islands with massive ongoing and planned industrial development, including a deep-sea port and liquid natural gas terminal and power plant). One major long-term threat is climate change with potential negative impacts on species diversity and productivity due to changes in upstream freshwater regimes, sea-level, ocean temperatures, and current patterns.

Cool, upwelled waters in the SoNG may provide an ecological refuge for marine species, including sharks and rays, that cannot shift their ranges northward from increasing ocean

temperatures and expected declines in biological productivity in the Bay of Bengal. This gives waters at the head of the submarine canyon particular conservation importance not only for elasmobranchs but also for threatened dolphins, whales, and marine turtles (BFD 2021a, Chapter 2).

7. Challenges

Research and monitoring

There is much scope to improve shark and ray research and monitoring. For example, there is a lack of rigorous information on sustainable catch levels, how to prevent incidental catches of threatened species, or on value-enhanced products from sustainably caught non-threatened species. Significant hurdles include a lack of standardized procedures for collecting, compiling, and analyzing catch and landing site records.

Institutional capacity for monitoring shark and ray catches and landings, and for analyzing and interpreting shark and ray data are limited. Mandated reporting of species-specific catches and landings for priority species is also needed to inform stock assessments and species-specific conservation management strategies and to comply with regional and international conventions.

Laws and policies

Institutional and legal frameworks are the foundation for marine conservation and fisheries management. The existing institutional and legal framework for shark and ray conservation and management is fragmented, with different laws, regional mandates, and international commitments covering different aspects.

The *Wildlife (Conservation and Security) Act 2012* provides the legal basis for the conservation and management of wildlife and biodiversity, including protection for threatened sharks and rays. The list of Schedule I and II species in the act was amended in September 2021. Eight genera and 23 species of sharks and rays are listed in Schedule I and one genus and 29 species are listed in Schedule II (WCS 2020). Currently, the Act lacks legal definitions for the respective schedules and guidance on penalties resulting from infractions.

The *Marine Fisheries Act 2020* is the primary law governing marine fisheries in Bangladesh. It does not specifically regulate shark or ray fisheries, but it does empower the Ministry of Fisheries and Livestock (MoFL) to declare MPAs, regulate the number of licensed fishing vessels, and issue gear-specific fishing licenses. The *Marine Fisheries Rules* published in 2023 to operationalize the *Marine Fisheries Act 2020* include some regulations pertaining to sharks and rays. Amendments should further specify shark and ray conservation and management measures.

The *Protection and Conservation of Fish Rules 1985* prohibits the use of estuarine set-bag nets in waters less than ten meters deep. The DoF *Quality Control Sub-strategy 2006* provides guidelines for issuing licenses for processing, export certificates, and improving the traceability of fish and fisheries products. The *Marine Fisheries Sub-strategy 2006* suggests that all fishing should be prohibited in areas less than five meters deep or within five kilometers from the shore to allow migration of juvenile fish, and that areas beyond ten kilometers offshore and as deep as 40 meters should be allocated to mechanized boats operating drifting gillnets, marine set-bag nets, and longlines.

The *Export Policy 2021-2024* refers to Section 29 of the *Wildlife (Conservation and Security) Act 2012* for regulations on the export of wild animals and their body parts. Import and Export Policy Orders issued by the Ministry of Commerce triennially under the *Imports and Exports (Control) Act, 1950* (Act No. XXXIX of 1950) specify the use of Harmonised Systems (HS) Codes developed by the World Customs Organization as an international tool to describe commodities being shipped across international borders, including product-specific commodity codes for sharks and rays.

Assisting shark and ray traders, including on-line traders, navigate through the process of registering their business and obtaining a trade license from the City Corporation/Council and/or Ministry of Commerce could incentivize compliance with national and international trade regulations and species protection laws, and increase traceability of shark and ray products in trade as well as government revenue (BFD 2021a, Chapter 5).

Institutional mandates and capacity

The conservation management of sharks and rays in Bangladesh is a shared responsibility of the BFD, responsible for conserving wildlife, and the DoF, responsible for managing fisheries, with additional assistance needed from the Navy, Coast Guard, and River Police for enforcing fisheries regulations, as well as from Customs, Police, and Border Guards for enforcing trade regulations and combatting illegal trade.

The BFD is the national CITES management authority for issuing CITES export permits for Appendix II listed species that have been assessed with a positive CITES NDF.

As Bangladesh's IOTC focal point, the DoF provides annual reports on tuna fisheries, including details on shark and ray catches. As a member of the FAO COFI, Bangladesh endorsed the IPOA-Sharks, committing the country to develop and implement a NPOA to reverse shark and ray population declines and improve their conservation and management. The present NCS/NPOA-Sharks & Rays is intended to meet this requirement.

Bangladesh is a member of the CMS, which aims to conserve terrestrial, aquatic, and avian migratory species throughout their range. However, Bangladesh has not signed the *CMS Memorandum of Understanding on the Conservation of Migratory Sharks* (CMS Sharks MoU), which aims to improve the conservation status of migratory sharks listed in Appendices I and II of the Convention (Appendix 1 and 2). The CMS National Focal Point for Bangladesh is in the BFD.

The current recording and reporting on shark and ray catches and landings lack spatial coverage, geo-spatial information, and details on genera or species that are crucial for quantifying fishery impacts and reporting to FAO, CITES, CMS, and IOTC. Information on pelagic sharks and rays caught by industrial longliners and bottom and midwater trawlers is particularly needed as well as information on at-sea transfers of sharks and rays which are largely uncontrolled and often done to avoid laws and rules regarding the possession and trade of protected sharks and rays. Furthermore, shark and ray catches are frequently landed, processed, and traded at unofficial landing and processing sites, which further inhibits monitoring and enforcement (BFD 2021a, Chapter 6).

Enforcement

The 2021 amendment to the Schedule I and II list of sharks and rays under the *Wildlife (Conservation and Security) Act 2012* brings much needed clarity to species protection and

trade regulations. This amendment reflects recent information on the occurrence of sharks and rays in Bangladesh and revised status assessments in the IUCN Global Red List. It also aligns national legislation with regional and international conventions. However, an additional amendment is needed to the *Wildlife (Conservation and Security) Act 2012* to clarify legal definitions of the relevant schedules (BFD 2021a, Chapter 6).

A key challenge faced in combatting illegal shark and ray trade is the difficulty of arresting and prosecuting criminals under *Wildlife (Conservation and Security) Act 2012*. One significant impediment is a provision in this Act that makes BFD officers criminally liable if a judge finds there is insufficient evidence to prove violations of the Act and prosecute an arrested violator. The implication of this provision is that, instead of using this law to arrest and prosecute wildlife criminals, the BFD often uses the *Forest Act (1927)* to arrest illegal wildlife traders. The relatively minor penalties of this law, applicable only in forested areas, provide little deterrence for criminals (WCS 2018).

The law enforcement capacity of the BFD and DoF is limited (see sections on ‘institutional mandates and capacity’ and ‘coordination and collaboration’). Collaborative support from other government agencies is vital and should be mandated by amending agency policies, rules, and acts to include combatting illegal wildlife trade and institutionalized through joint trainings, shared intelligence, and centralized reporting.

Safely releasing protected sharks, rays, and other threatened marine megafauna that are caught but found still alive in fishing gears and discarding the carcasses at sea of those that are found already dead, as well as regulations on permissible fishing gears and practices (e.g., time-area closures and mesh size restrictions), need to be incorporated in the *Marine Fisheries Rules 2023* under the *Marine Fisheries Act 2020*. These provisions should be included in fishery rules, be widely communicated, and equitably enforced.

Mass communication

Protected sharks and rays are often illegally retained, traded, and consumed due to a lack of knowledge about wildlife, fisheries, and trade laws and rules. The BFD and DoF, with support from NGOs such as WCS, have initiated efforts to increase public awareness about the importance of sharks and rays for a healthy ocean and healthy people, encourage safe releases of protected species, prevent them from entering international and domestic markets, improve compliance with fishery laws and rules, and engage communities in monitoring priority shark and ray habitat. Much more remains to be done, particularly to increase the area coverage and accountability of educational outreach. Practical and innovative communication tools developed under the SUFAL Project can strengthen awareness about and support for shark and ray conservation (BFD 2021a, Chapter 7).



Coordination and collaboration

Limited resources, infrastructure, technical capacity, and staffing as well as overlapping mandates pose considerable challenges to improving the protection of threatened sharks and rays. Interagency coordination and collaboration, as well as engagement with communities and private enterprises, is paramount for overcoming these challenges and ensuring long-term institutional capacity.

An encouraging example of a coordinated interagency effort is an initiative to combat illegal wildlife trade led by the BFD in close collaboration with the DoF, law enforcement agencies, as well as judges and magistrates. Recent training workshops conducted under the SUFAL project on detecting, identifying, and prosecuting illegally landed and traded sharks and rays have strengthened the technical capacity and interagency collaboration among officers from the BFD, DoF, BFRI, BFDC, and Customs (BFD 2021c).

Standardized reporting of shark and ray catches or landings from small-scale and industrial fisheries and declaration of exported products derived from sharks and rays are essential for monitoring and improved management, as well as for fulfilling international and regional reporting requirements. *Standard Operating Procedures (SOP) for Shark and Ray Data Collection from Fish Landing Sites in Bangladesh*, developed under the SUFAL project and introduced in October/November 2021 through the interagency training workshops mentioned above, support systematic data collection and reporting of landings.

The NDF assessment process, which evaluates the biological vulnerability and conservation concern, trade and fishing pressures, and existing management measures for CITES Appendix II listed shark and ray species, provides an additional tool for informing sustainable fisheries management. In February 2022, 30 officers from the DoF, BFD, and BFRI along with national fisheries and wildlife experts received training and conducted four NDFs for sharks and rays (see above) under the SUFAL project.

A citizen science network established and maintained by WCS in Bangladesh engages coastal fishers in collecting geo-referenced and photo-verified records of their fishing effort and catches, including sharks and rays, in return for training and equipment that improves their at-sea safety (BFD 2021a, Chapter 2). This approach could be adapted for monitoring MPAs and landing sites, and for developing informant networks for reporting illegal processing and trade of protected sharks and rays and their products.



PART B – STRATEGIC PRIORITIES

1. Overview

The priorities of the *National Conservation Strategy and Plan of Action for the management and protection of sharks and rays in Bangladesh* (NCS/NPOA-Sharks & Rays) are to significantly improve the long-term survival of threatened sharks and rays in Bangladesh and ensure the sustainability of fisheries vital to the food security and livelihoods of more than 3.5 million people living in communities along the country's 710 km coastline (BFD 2016). Research, policy, capacity building, education, and governance interventions are proposed for implementing the conservation strategy and measuring its effectiveness.

Vision, goal, and objectives

The NCS/NPOA-Sharks & Rays envisions sharks and rays effectively protected, sustainably managed, and delivering ecological and socio-economic benefits to local people.

The NCS/NPOA-Sharks & Rays provides strategic guidance on the conservation management of sharks and rays to protect threatened species and populations from extinction and manage the sustainable use of non-threatened species for a healthy ocean and healthy coastal people.

The key objectives identified in the NCS/NPOA-Sharks & Rays are to reduce mortalities of threatened shark and ray species, protect priority habitat, strengthen governance and enforcement, engage fishing communities, and improve monitoring and reporting, along with strengthening governance and coordination.

The NCS/NPOA-Sharks & Rays recommends practical and locally feasible actions needed to achieve these objectives, with resource requirements, responsible agencies and institutions, possible sources of funding, projected outcomes, and performance indicators.

2. Road to Conservation

Data and information collection sources

The NCS/NPOA-Sharks & Rays was jointly developed by the BFD and the DoF in consultation with other government and non-government stakeholders to protect threatened species and ensure the sustainable exploitation of non-threatened species.

The strategy and priority actions are informed by field research, a review of relevant literature, and consultations with national experts and local stakeholders. This NCS/NPOA-Sharks & Rays aligns with Bangladesh's commitments to international conventions and regional agreements as well as national development priorities for developing a Blue Economy.

Proposed research, policy, capacity building, education, governance and monitoring actions were informed by the *Shark and Ray Status and Threat Assessment Report* or SAR (BFD 2021a) that provides baseline information on the status, threats and governance of sharks and rays in Bangladesh from scientific investigations, stakeholder consultations, published reports and scientific papers. Recommendations were generated during an intensive two-day

consultation workshop (BFD 2021b) with national experts convened in May 2021, a day-long consultation workshop (BFD 2022) conducted with local shark and ray fishery and trade stakeholders in November 2021, facilitated discussions during four technical training workshops with almost 100 field- and mid-level government officers in October/November 2021 (BFD 2021c), and Non-Detriment Finding (NDF) assessments conducted by fisheries/wildlife experts from the BFD, DoF, BFRI, WCS, and national universities, with support from an international expert and WCS, in February 2022.

Situation analysis

Shark and ray fisheries in Bangladesh are complex, involving many species (although dominated by a few) and gear types (both as targeted and non-targeted catches), and with a great deal of variation in the number of landings and individuals landed at different landing sites and during different months.

Bangladesh is a stronghold for several Critically Endangered and Endangered shark and ray species in need of urgent protection. Frequent landings of large numbers of individuals of other relatively common and non-threatened species provide opportunities for developing a sustainable shark and ray fishery based on rigorous science and in compliance with national wildlife laws and international obligations.

Based on shark and ray species diversity, threats to their survival, and the likelihood of achieving conservation success, Bangladesh was prioritized in *The Global Priorities for Conserving Sharks and Rays, A 2015-2025 Strategy* for (i) Preventing the extinction of the most threatened species; (ii) Investigating the status and conservation needs of poorly known species; and (iii) Taking concerted action and investing in sustainable fisheries management to stop the downward trend in vulnerable populations (Bräutigam *et al.* 2015).

Recognizing the need to improve protection for threatened sharks and rays in Bangladesh, the BFD initiated the *Shark and Ray and Associated Species Conservation Strategy Development and Non-Detriment Findings* project under the SUFAL project. The objectives of the SUFAL assignment are to make major contributions towards (1) Protecting sharks and rays threatened by overexploitation from targeted and non-targeted catches; (2) Ensuring that the exploitation of non-threatened sharks and rays is sustainable and does not result in them becoming threatened; (3) Sustaining fishing livelihoods through the conservation of threatened sharks and rays and sustainable exploitation of non-threatened species; (4) Developing an informed public about the critical role of sharks and rays in maintaining a healthy ecosystem through mass awareness programs for species conservation; (5) Establishing a strong capacity among government and community stakeholders for the conservation management of sharks and rays; (6) Achieving compliance with CITES regulating international trade in globally threatened sharks and rays; and (7) Strengthening coordination with the DoF regarding shark and ray conservation.

Since a first NPOA for sharks and rays in Bangladesh was drafted in 2014 by the BFRI with support from the BOBLME project, substantial new information has become available. To reflect the best available science and locally feasible solutions, the NCS/NPOA-Sharks & Rays was developed by the BFD and the DoF with technical support from WCS and after extensive consultations with national experts and local stakeholders. The resulting NCS/NPOA-Sharks & Rays aligns with commitments to international conventions and regional agreements and with national development priorities for promoting productive, sustainable fisheries as a key component of a blue economy.

Problem analysis

About two-thirds of the over one hundred shark and ray species confirmed or suspected to occur in Bangladesh are considered threatened in the global IUCN Red List (Appendix 1 and 2). Few management interventions have been made to reduce overexploitation, whether from direct or incidental catches, or to reduce/eliminate international and domestic trade in protected species (BFD 2021a). There is an urgent need to address the protection of sharks and rays that are at risk of extinction and to ensure the sustainable exploitation of non-threatened species, which could become endangered if catches are not sustainably managed and trade is not brought under control.

Target setting and strategic planning

The NCS/NPOA-Sharks & Rays identifies conservation priorities and recommends priority management actions for protecting sharks and rays threatened by overexploitation and for sustaining fishing livelihoods by ensuring that the exploitation of non-threatened sharks and rays does not result in them becoming threatened. The strategy does this by creating informed constituencies for conservation management, establishing strong capacity among government agencies and coastal communities, and strengthening interagency coordination for achieving compliance with international trade regulations.

3. Implementation strategy

Coordination

Implementation of the NCS/NPOA-Sharks & Rays should be well coordinated between the DoF, which is responsible for managing fisheries, and the BFD, which is responsible for conserving wildlife and their habitats. Efforts also need to be coordinated with the Navy, Coast Guard, and River Police for effectively enforcing fishery laws and rules particularly in MPAs, and with Customs, Police, and Border Guards Bangladesh (BGB) for enforcing trade laws and rules.

Collaboration

Reversing shark and ray population declines and ensuring the sustainability of legal fisheries and trade require a collaborative effort among government agencies, coastal fishing communities, research institutions, NGOs, and private enterprises.

Partnerships and financing

The NCS/NPOA-Sharks & Rays serves as a blueprint for government agencies, local communities, NGOs, research institutions, and private enterprises to engage in protecting the most endangered sharks and rays from extinction and ensuring sustainable, productive fishery livelihoods in coastal communities.

Cost estimates and proposed sustainable financing mechanisms for implementation of the NCS/NPOA-Sharks & Rays, including private-public partnerships, are intended to encourage and direct local, national, and international investments and ensure the long-term financial sustainability of actions needed to ensure the effective conservation management of sharks and rays.

4. Monitoring and evaluation

Results from conservation and management interventions should be regularly evaluated to ensure that actions are effective in achieving NCS/NPOA-Sharks & Rays objectives. Institutional capacity for monitoring NCS/NPOA-Sharks & Rays effectiveness should be built within the government structures to sustain and strengthen adaptive conservation management.



PART C – CONSERVATION ACTIONS

Priority actions that need to be taken to effectively protect threatened shark and ray species and populations from extinction and manage the sustainable use of non-threatened species, so that they continue to deliver ecological and socio-economic benefits to people and ecosystems, are detailed below. Locally feasible actions are summarized in Table 1 along with requirements for financial and human resources, responsible agencies and institutions, proposed sources of funding, outcomes, and performance indicators.

The proposed conservation management interventions aim to reduce mortalities of threatened shark and ray species, protect priority habitats, strengthen governance and enforcement, engage fishing communities, and improve monitoring and reporting.

(i) *Reduce mortalities of threatened sharks and rays*

Live-release requirements and retention prohibitions

- (a) Under the Marine Fisheries Rules for small-scale and industrial fishing operations, require live releases and prohibit the retention of protected sharks and rays.
- (b) In accordance with IOTC Resolution 19/03, discards of mobulid rays from industrial fishing operations must be documented with information recorded on their condition on release.
- (c) In line with the DoF's precautionary approach to fisheries management, prohibit shark and ray finning which is the removal of fins and discarding the rest of the body at sea.
- (d) Promote safe releases of protected and gravid sharks and rays through awareness, training, and species identification tools.

Gear restrictions

- (a) Enforce existing fishery laws and rules prohibiting estuarine set-bag nets in waters <10 meters deep and trawl fishing in waters <40 meters deep; gear regulations including mesh-size requirements of >65 mm for gillnets, >45 mm at the cod end of set-bag nets and shrimp trawling nets, and >60 mm for fish trawling nets; and the prohibition on the production, sale, and deployment of monofilament gillnets with <45mm mesh-size.
- (b) Prohibit the use of all bottom set fishing gears (set-bag nets, bottom set long-lines, and anchored small-mesh gillnets) in waters <10 meters deep.
- (c) Require the use of circle hooks (versus J-hooks) made of iron or other corrosive metals and prohibit the use of wire leaders on long-lines and gaffing and/or spearing of protected sharks and rays.
- (d) Evaluate the effectiveness of gear modifications (e.g., deployment depths, soak times, mesh-size, and material) and technological solutions (e.g., illuminated nets) for reducing incidental catches and mortalities of threatened sharks and rays in small-scale and industrial fisheries.

(ii) *Protect priority shark and ray habitat*

- (a) Incorporate time-area fishing or gear-specific closures into MSP, MPA management plans, and OECMs using predictive models of the overlap between species occurrence (particularly during critical life history stages, e.g., breeding, pupping, and juvenile growth) and fishing intensity.
- (b) Improve the protection of shallow nearshore waters offshore the Sundarbans identified as critical habitat for numerous threatened shark and ray species, including Critically Endangered sawfish, rhino rays, and Ganges sharks, by expanding the SoNG MPA to connect with the Sundarbans Reserve Forest.

(iii) *Strengthen legal protection and enforcement*

Amending current laws and rules to be consistent with biodiversity protection priorities in the national constitution and international obligations to CITES, CMS, and IOTC.

- (a) Fully operationalize the Wildlife (Conservation and Security) Act 2012 by defining Schedule I and II species, the penalties for the possession, consumption, and trade of protected species, and the process for issuing permits for possession and trading of Schedule II listed species and their body parts and products.
- (b) Improve interagency cooperation and make combatting illegal trade in protected sharks and rays (including body parts and products) a joint responsibility by amending the Customs Act 1969, Imports and Exports (Control) Act 1950, Coast Guard Act 2016, Border Guards Bangladesh Act 2012, Armed Police Battalions Ordinance 1979, and their implementation rules.
- (c) Empower Customs through amended Export Rules and the DoF Fish Inspection and Quality Control (FIQC) Unit through amended Fish and Fish Products (Inspection and Quality Control) Rules (1997) to enforce CITES regulations and the Wildlife (Conservation and Security) Act 2012, including prohibiting trade of CITES Appendix/Schedule I species and restricting trade in CITES Appendix/Schedule II species and their body parts and products.
- (d) Review and update the list of shark and ray species protected under the Wildlife (Conservation and Security) Act 2012 every ten years to reflect new scientific findings, and changes in taxonomy/nomenclature, conservation status, regional agreements, and international conventions.
- (e) Conduct NDF assessments for evaluating if retention and trade permits should be issued for CITES Appendix II listed species or species groups and evaluating species or species-specific size retention and trade restrictions, and export quotas to ensure that international trade does not negatively impact the viability of species or populations.
- (f) Harmonize the Marine Fisheries Act 2020 with the Wildlife (Conservation and Security) Act 2012 to align species protection and trade regulations, and prohibit the retention of protected sharks and rays and shark and ray finning under Marine Fisheries Rules.
- (g) Review and update the NCS/NPOA-Sharks & Rays every 10 years.

Conducting joint law enforcement operations with other law enforcement agencies, including Customs, Police, Coast Guard, Border Guards and Navy

- (a) Share available resources and technical expertise among government agencies on compiling and evaluating legal evidence for prosecution (e.g., forensic procedures to confirm the legality of shark and ray parts found in export shipments, authentication of legal documents such as CITES certificates or import/export permits).
- (b) Improve enforcement and monitoring of fishery rules in MPAs and priority habitat for sharks and rays, including stricter surveillance to prevent foreign fishing vessels from operating in Bangladesh's Exclusive Economic Zone (EEZ), through systematic multi-agency SMART patrols¹ conducted by the BFD, DoF, Navy, and Coast Guard.
- (c) Strengthen border controls, particularly around the Teknaf peninsula, to stop illegal shark and ray trade with Myanmar by enhancing coordination and collaborations among the Coast Guard, Navy, Customs, and BGB.
- (d) Collaborate with international bodies such as Interpol, CITES, the World Customs Organisation (WCO), NGOs, and the governments of shark and ray importing countries to identify how, where, and by whom their products are being exported and on effective means of exchanging intelligence.
- (e) Sensitize local administrative officers and the judiciary to ensure that illegal wildlife trade in protected sharks and rays, their body parts and products is recognized and prosecuted.
- (f) Create a web-based national wildlife crime database for enabling multiple agencies to monitor investigations and prosecutions as well as understand patterns and trends in illegal shark and ray trade.
- (g) Develop an incentive system for exceptional shark and ray law enforcement achievements (e.g., awarding outstanding officers in an annual prize-giving ceremony or highlighting them in agency publications).

Empowering law enforcement officers with training, mentoring, and the provision of resource materials

- (a) To enhance government capacity for enforcing the Wildlife (Conservation and Security) Act 2012, Marine Fisheries Act 2020, Fish and Fish Products (Inspection and Quality Control) Rules (1997), and Marine Fisheries Rules, and CITES trade regulations, provide interagency training and mentoring for field staff from law enforcement agencies on detecting, identifying, and prosecuting illegally landed, processed, and traded sharks and rays
- (b) Adopt identification guides for dried fins and gill plates of CITES listed shark and ray species and implement training programs on aspects specific to illegal international shark and ray trade (e.g., concealment techniques, online trading, national and international trade laws and rules, verification of trade documents) as part of the curricula of government training institutes for law enforcement officers.

¹ SMART is a suite of tools that enables resource managers to collect, communicate, and evaluate the effectiveness of wildlife conservation efforts (smartconservationtools.org). This law enforcement and monitoring approach for wildlife and conservation area patrols has been successfully used by the BFD in the Sundarbans Reserved Forest.

- (c) Increase the sustainability of efforts to combat the illegal trade of sharks and rays by enhancing the capacity of the BFD's Wildlife Crime Control Unit (WCCU) to train and mentor law enforcement staff from other agencies on enforcing wildlife laws and rules.
- (d) Use genetic tools available at national universities to improve the identification of products (e.g., oil or meat) that cannot be visually identified.
- (e) Use informal communication groups (e.g., WhatsApp, Imo) with local and international shark and ray identification experts to assist law enforcement officers in identifying sharks and rays or their body parts from photographs.

(iv) *Engage fishing communities in shark and ray protection*

Enabling fishers, processors, and traders to identify protected species with practical tools and training

- (a) Develop a durable, locally tailored, visually enhanced identification guide, posters, leaflets, billboards, and stickers that enable fishers and traders to identify protected shark and ray species/genera.
- (b) Disseminate identification tools during training programs, consultations, SMART enforcement and monitoring patrols, and educational outreach activities.

Reducing domestic demand for protected species through targeted awareness raising

- (a) Publicize revised laws and rules, including the prohibition on consuming protected sharks or rays, through audience-tailored communication tools made widely available within coastal communities and government agencies.
- (b) Develop a targeted communication strategy and tools using mass communication tools or channels (e.g., television and radio, short documentary films, interactive community events, and billboards at fish landing, processing, and trading sites) and information on markets and consumers to reduce/stop the consumption and trade of protected sharks and rays by debunking false beliefs on medicinal properties, particularly about sawfish and rhino ray meat.
- (c) Use examples from successful prosecutions in news reports at fishery association meetings or in educational outreach programs to deter fishers, traders, and consumers from engaging in the illegal landing, trade and domestic consumption of protected sharks and rays.

Empowering community-based monitoring of protected species

- (a) Engage fishers as citizen scientists to record and report data on protected sharks and rays caught or bycaught in their fishing gears, including the location, gear type, specimen size, sex, maturity, and condition of released individuals.
- (b) Empower community-based SMART patrols to monitor compliance with laws and rules and support prosecutions of illegal fishing (e.g., use of illegal gears or fishing in restricted areas) especially in areas identified as priority habitat for sharks and rays and MPAs or OECMs.

- (c) Train and mentor local fishery stakeholders as data collectors to monitor landings and trade in sharks and rays and their body parts including species identification, determining sex and maturity, documenting gear types that caught the specimens, and recording length and other relevant measurements.
- (d) Train and mentor government officers to verify shark and ray species identifications from photographs, enter and quality check data entered into a centralized database, conduct basic analysis and mapping, and ensure that results are published in annual fishery statistics and reported by DoF to IOTC and by BFD to CITES.
- (e) Encourage marine fishery stakeholder association members to comply with protected species and fishery regulations in their statutory rules.
- (f) Communicate laws and rules on spatial (e.g., MPAs), temporal (e.g., seasonal bans) and gear (e.g., deployment depth, allowable mesh sizes) restrictions designed to protect threatened sharks and rays and sustain fisheries that catch non-threatened species.
- (g) Publicly recognize, through news reports, social media posts, and government publications and events, compliant fishers who safely release protected sharks and rays as encouragement for others to follow.

Identifying and promoting value-enhanced products from sustainably caught non-threatened sharks and rays

- (a) Collaborate with traders and processors in the leather, pharmaceutical, cosmetics, and other industries that use shark and ray products to identify opportunities for improving the quality and profits derived from the trade in sustainably caught non-threatened sharks, increasing financial benefits from legally obtained non-threatened species, and reducing the demand for and exploitation pressure on threatened species.

(v) *Improve monitoring and reporting of shark and ray catches, landings, and trade*

Improving systematic monitoring of shark and ray catches and landings and ensuring that international reporting requirements are fully met

- (a) Develop and adopt SOPs for improved and systematic recording and reporting of shark and ray data from fish landing centers, supported by technical training for landing site data collectors.
- (b) Improve shark and ray landing records by including species-specific monitoring, expanding the coverage of monitored landing sites and markets, and strengthening the technical capacity and accountability of, as well as collaborations between, the DoF's Marine Fisheries Survey Management Unit (MFSMU), Fisheries Resources Survey System (FRSS), and BFDC for investigating shark and ray landings.
- (c) Consolidate data collection and reporting procedures used by the MFSMU, FRSS, and BFDC to provide species-specific details on priority species and fully meet reporting requirements from IOTC, CITES, and FAO.
- (d) Harmonize data collection protocols and procedures for publishing national statistics and reporting to the IOTC, FAO, and CITES on catches and bycatches of sharks and rays.

- (e) Include a list with images of the protected shark and ray species/genera and illustrated instructions for safe handling and release in the fishing permit booklet issued by the DoF for small-scale and industrial fishing operations, supported by training and the provision of additional identification tools, to ensure protection efforts, including live release/no retention requirements, are effectively applied.
- (f) Mandate the recording and reporting of priority shark and ray species, including information on species, numbers, and weight, landed from small-scale fisheries at fish landing sites and markets, particularly those operated by the BFDC.
- (g) Provide technical training, mentoring, and oversight to comply with IOTC/CITES/CMS/FAO requirements by improving species-specific information reported by industrial fishing operations on protected sharks and rays, including catch locations, live releases, discards, species/genera identifications, numbers caught and their size, sex, and maturity.
- (h) Improve species-specific catch monitoring by placing trained observers on industrial trawl vessels or installing camera-based catch monitoring systems.
- (i) Increase the inspection at fish landing sites and enforcement of laws and rules on the possession and trade of protected sharks and rays to ensure compliance with national laws and prevent protected species from entering international trade.

Improving systematic monitoring of shark and ray trade and ensuring that international reporting requirements are fully met

- (a) Establish traceability and improve reporting of shark and ray exports/imports through mandatory species/genus and product specific HS codes, which is an internationally standardized system of codes for classifying traded products.
- (b) Include species or genus specific information on shark and ray catches, landings, and trade in annually published government statistics.
- (c) Report revenue payments levied on species or genus specific shark and ray products in annual published government statistics.
- (d) To enable better monitoring of exports/imports, identify opportunities with Customs for designating a limited number of ports of exit/entry for sharks and rays while also making sure to monitor other ports for illegal trade.
- (e) Assist legal shark and ray traders in registering their business and obtaining a commercial trade license to ensure that their business, including online trade, pays required taxes and fees to the GoB and so they can be more easily monitored for compliance with trade and wildlife protection laws and rules.
- (f) Provide trade licenses to fish traders and exporters only after they have watched a short educational film on laws and rules regarding catching/bycatching, possession, and trade in sharks and rays, and they have reviewed the list of protected sharks and rays in the Bangladesh Wildlife (Conservation and Security) Act 2012.
- (g) Create an incentive system for processors and traders, which could include reduced fees or expedited issuance of government-issued trade licenses and CITES permits for trade in NDF-regulated species, to comply with national and international trade regulations.

- (h) Make CITES permits, certificates, and trade licenses issued by the BFD for shark and ray products available online, and consider introducing an electronic CITES permission system, to enable verification and authentication by DoF and Customs inspectors.
- (i) Inform shipping and courier services about export/import regulations for CITES-listed and nationally protected sharks, rays, and their body parts and products, and penalties for illegal wildlife trade.
- (j) Increase the inspection of exported goods, particularly crossing to Myanmar, confiscate shipments with shark and ray products from protected species and prosecute traders without appropriate permits/legal documents.
- (k) Require exporters and importers of shark and ray products to register with the DoF and declare their export/import shipments to the species level.
- (l) Require traders to provide copies of export/trade permits issued by the BFD and verified by the DoF before export certificate/permission is issued by Customs.
- (m) Ensure compliance with national wildlife protection laws and international wildlife trade regulations by including verification of species-specific documentation (e.g., correct labeling of fish species, CITES trade permission issued by the BFD) in the DoF's current inspection process for fishery export.
- (n) Improve export shipment monitoring and DoF and Customs inspections, including document verification, for detecting fins, meat, skins, and gill plates, and other body parts from nationally and internationally protected sharks and rays.
- (o) Prepare and implement a methodology for DoF FIQC officers to sample export shipments for shark and ray products based on suspicious packaging or declaration, destinations with a known demand for shark and ray products (e.g., Hong Kong, Singapore, China), or intelligence (e.g., blacklisted courier services or exporting companies) in collaboration with Customs and the BFD.
- (p) Ensure that all cases of illegal possession, trade, or consumption of protected sharks and rays are shared with the BFD/WCCU for inclusion in the national wildlife crime database which will enable multiple agencies to monitor investigations and prosecutions and facilitate international reporting requirements.

Evaluating monitoring results to ensure that protection efforts are being effectively applied

- (a) Conduct updated NDF assessments for shark and ray species/genera to evaluate the effectiveness of mandatory conditions for trade and management resulting from previous NDF assessments.
- (b) Strengthen the capacity of the DoF's MFSMU and FRSS to analyze and report on shark and ray catches, landings, and trade to inform management and report to CITES, FAO, IOTC, and CMS.
- (c) Build capacity within the BFD and the DoF to analyze and report on results from interagency and community-led SMART patrols aiming to strengthen the spatial protection of threatened sharks and rays and ensure the sustainable exploitation of non-protected species.
- (d) Use recommendations generated from improved monitoring efforts to update wildlife protection, fisheries, and trade rules.

(vi) *Strengthen governance and coordination*

- (a) Improve the legal recognition of compliant fishers by helping them obtain formal documentation (e.g., fisher identification card, employment contract), which will enable them to access government and non-government support systems (e.g., banking, insurance schemes, and legal representation), decrease their risk of exploitation, and incentivize their support for shark and ray conservation management regulations.
- (b) Use existing non-government and government support networks and local fishery associations to identify and promote alternative employment and training opportunities (e.g., operating and/or repairing rickshaw vans, motorcycles, or easy-bikes, servicing mobile phones or solar power systems, value-enhanced dry fish production) for community members, particularly woman engaged in shark processing and trade and fishers engaged in shark and/or ray fisheries.
- (c) Sustain and equitably allocate government provisions for fishers during fishing ban periods to reduce their dependency on selling protected sharks and rays.
- (d) Improve participatory management through active stakeholder engagement in the development, implementation, and evaluation of national fisheries policies, conservation management or species conservation action plans to enhance marine stewardship and strengthen shark and ray conservation constituencies.
- (e) Strengthen or establish open communication channels between the GoB and governments of countries importing shark and ray products to monitor and combat illegal trade more effectively.
- (f) Develop a risk index for exporters/importers (e.g., enterprises caught violating trade regulations) to support the screening of export/import permit requests by the DoF, BFD, and Customs and the investigation of trading agencies and online exporters of shark and ray parts identified from intelligence shared by importing countries.
- (g) Strengthen engagement of Bangladesh at the IOTC to advocate for better regulation of shark and ray fisheries by all IOTC members, such as prohibiting the use of FADs, requesting all IOTC members to share their CITES NDFs for sharks and rays falling under the IOTC Area of Competence, and encouraging the development of regional NDFs to better address conservation concerns of shared stocks.
- (h) Consider signing the CMS Sharks MoU, a non-binding international agreement that could open opportunities for shark and ray capacity building among government agencies and communities.
- (i) Engage in ongoing regional and international genetic studies to clarify shark and ray taxonomy and population structure by providing tissue samples for regional population stock assessments and life history studies.
- (j) Encourage adoption of Environmental Justice Foundation's 10 Principals for Global Transparency in Fisheries.²

² <https://ejfoundation.org/news-media/ejfs-ten-principles-for-global-transparency-in-the-fishing-industry-launched>

Table 1. Matrix summarizing priority actions for achieving NSCPOA-Sharks & Rays (2023-2033) objectives with resource requirements, possible sources of funding, projected outcomes, and performance indicators.

BFD=Bangladesh Forest Department, BFDC=Bangladesh Fisheries Development Corporation, CITES=Convention on International Trade in Endangered Species of Wild Fauna and Flora, CMS= Convention on the Conservation of Migratory Species of Wild Animals, DoF=Department of Fisheries, FIQC=Fish Inspection and Quality Control, GoB=Government of Bangladesh, IOTC=Indian Ocean Tuna Commission, LE=Law Enforcement (agencies), LG=Local Government (City Corporation, City Council, Union/Upazilla Parishad), MoC=Ministry of Commerce, MoD=Ministry of Defence, MoDMR=Ministry of Disaster Management and Relief, MoEFCC=Ministry of Environment, Forest, and Climate Change, MoF=Ministry of Finance, MoFL=Ministry of Fisheries and Livestock, MoHA=Ministry of Home Affairs, MoPA=Ministry of Public Administration, MoU=Memorandum of Understanding, MPA=Marine Protected Area, MSP=Marine Spatial Planning, NBR=National Board of Revenue, NCS=National Conservation Strategy, NDF=Non-Detriment Finding, NPOA=National Plan of Action, OECMs=Other effective area-based conservation measures, SMART=Spatial Monitoring and Patrolling Tool, SoNG=Swath-of-No-Ground, SOP=Standard Operating Procedures, SSF=Small-scale Fishers/Associations, Uni=University, WCCU=Wildlife Crime Control Unit.

Objectives	Sub-objectives	Actions	Priority	Short term (1-3 years)	Mid term (4-7 years)	Long term (8-10 years)	Resources required (mio BDT)	Possible source of funding	Lead Agencies/ Institution	Projected outcomes	Performance indicators
Reduce mortalities of threatened sharks and rays	Require live releases and prohibit retention.	Require live releases and prohibit retention of protected sharks and rays under Marine Fisheries Rules	High	✓			500	GoB budget allocations	DoF, MoFL	Fewer shark and ray mortalities leading to recovery of threatened species populations.	Catches and landings of protected species measurably reduced.
		Require documentation of mobulid ray discards from industrial fisheries under Marine Fisheries Rules as per IOTC	Med	✓				GoB budget allocations	DoF, MoFL		
		Prohibit shark and ray finning under Marine Fisheries Rules	Low	✓				GoB budget allocations	DoF, MoFL		
		Promote safe releases of protected and gravid sharks and rays	High	✓	✓	✓		Donor funding	DoF, BFD NGOs		

Objectives	Sub-objectives	Actions	Priority	Short term (1-3 years)	Mid term (4-7 years)	Long term (8-10 years)	Resources required (mio BDT)	Possible source of funding	Lead Agencies/ Institution	Projected outcomes	Performance indicators
	Mandate gear modifications under Marine Fisheries Rules.	Enforce existing fishery laws and rules	High		✓			GoB budget allocations	DoF, Navy, Coast Guard, BFD		
		Prohibit use of all bottom set fishing gears in waters <10 meters/33 feet deep in Marine Fisheries Rules	High	✓				GoB budget allocations	DoF, MoFL		
		Require use of corrosive circle hooks and prohibit wire leaders on long-lines and gaffing and spearing in Marine Fisheries Rules	Med		✓			GoB budget allocations	DoF, MoFL		
		Evaluate effectiveness of gear modifications for reducing incidental catches and mortalities, and amend gear regulations accordingly	Med			✓		Research grants	DoF, BFD, BFRI, Uni, SSF, NGOs		
Protect priority shark and ray habitat	Incorporate priority shark and ray habitat in MSP, MPAs, and OECMs.	Incorporate time-area or gear-specific fishing closures into MSP, MPAs and OECMs.	Med		✓		20	Donor funding, GoB budget allocations	DoF, BFD, SSF, Uni, NGOs	Bycatch risk reduced in priority habitat leading to recovery of threatened species and sustainable fisheries.	Reduced infractions per patrolling day from baseline generated during first three years of NCS/NPOA. Catches, landings, trade of protected species measurably reduced
		Improve protection of shallow nearshore waters offshore the Sundarbans by expanding SoNG MPA	Med		✓			GoB budget allocations	MoEFCC, BFD, DoF		

Objectives	Sub-objectives	Actions	Priority	Short term (1-3 years)	Mid term (4-7 years)	Long term (8-10 years)	Resources required (mio BDT)	Possible source of funding	Lead Agencies/ Institution	Projected outcomes	Performance indicators
Strengthen legal protection and enforcement	Amend laws and rules to be consistent with CITES, CMS, and IOTC	Fully operationalize Wildlife (Conservation and Security) Act 2012	High	✓			1,000	GoB budget allocations	BFD, MoEFCC,	Threatened sharks and rays protected by law. Non-threatened species regulated under fisheries rules. Enforcement institutionalized.	Gazette notifications of amended laws and rules. Exports reported by species and product. Number of NDFs developed.
		Amend Customs Act 1969, Imports and Exports (Control) Act 1950, Coast Guard Act 2016, Border Guards Bangladesh Act 2012, and Armed Police Battalions Ordinance 1979	Med		✓			GoB budget allocations	BFD, MoC, MoD, MoHA		
		Empower Customs through amended Export Rules, and the DoF FIQC unit through amended Fish Inspection and Quality Control Rules	High	✓				GoB budget allocations	NBR, DoF, MoFL		
		Harmonize Marine Fisheries Act 2020, Marine Fisheries Rules, Protection and Conservation of Fish Rules (1985) with Wildlife (Conservation and Security) Act 2012	Med		✓			GoB budget allocations	MoFL, DoF, BFD		
		Review and update list of shark and ray species protected under Wildlife (Conservation and Security) Act 2012 every ten years	Low			✓		Donor funding	BFD, DoF, BFRI, MoEFCC		

Objectives	Sub-objectives	Actions	Priority	Short term (1-3 years)	Mid term (4-7 years)	Long term (8-10 years)	Resources required (mio BDT)	Possible source of funding	Lead Agencies/ Institution	Projected outcomes	Performance indicators
		Conduct NDF assessments to ensure that permitted international trade does not negatively impact species or populations.	Med		✓	✓		GoB budget allocations	BFD, DoF, BFRI, Uni, NGOs		
		Review every five years and update NCS/NPOA-Sharks & Rays every ten years.	Low		✓	✓		GoB budget allocations, Donor funding	MoFL, DoF, MoEFCC, BFD		
		Share available resources and technical expertise among GoB agencies	Med		✓	✓		GoB budget allocations	LE		
	Conduct joint LE operations to stop illegal possession, trade, and consumption of protected sharks and rays and their products.	Improve enforcement and monitoring of fishery rules in MPAs and other priority habitat for sharks and rays	Med	✓	✓	✓	2,000	GoB budget allocations, Marine Conservation Trust Fund	DoF, Navy, Coast Guard, BFD	Export shipments and processing centers inspected, infractions reported and prosecuted.	Number of seizures and convictions initially increase followed by a decline as the number of protected sharks and rays traded is reduced.
		Strengthen border controls to stop illegal shark and ray trade with Myanmar	High	✓				GoB budget allocations	BGB, Police, Navy		
		Collaborate with international bodies and governments of shark and ray importing countries to investigate and combat illegal trade	Med	✓	✓	✓		GoB budget allocations, Donor funding, Research grant	NBR, MoEFCC, BFD, MoFL, DoF, NGOs		

Objectives	Sub-objectives	Actions	Priority	Short term (1-3 years)	Mid term (4-7 years)	Long term (8-10 years)	Resources required (mio BDT)	Possible source of funding	Lead Agencies/ Institution	Projected outcomes	Performance indicators
		Sensitize local administrative officers and the judiciary to ensure that illegal wildlife trade is prosecuted	Med	✓	✓			Donor funding	BFD, DoF, NGOs		
		Create web-based national wildlife crime database	High	✓				Technical innovation/ support grant	BFD		
	Empower LE officers with training, mentoring, and resource materials to combat illegal trade	Develop incentive system for exceptional shark and ray LE achievements	Low			✓	100	GoB budget allocations, Marine Conservation Trust Fund	LE, MoD, MoHA	Institutional capacity sustained for detecting, identifying, prosecuting protected species in export shipments and processing centers.	Number of detections of protected species initially increase followed by a decline as the number of protected sharks and rays traded is reduced.
		Provide interagency training and mentoring for field staff from LE agencies	High	✓				GoB budget allocations, NGOs	BFD, DoF, NGOs		
		Adopt identification guides for CITES listed species/parts and implement training in curricula for LE officers.	Med			✓		Donor funding	LE, Uni, NGOs		
		Enhance capacity of WCCU to train and mentor LE staff.	Med		✓			GoB budget allocations, Trust Fund	MoEFCC, NGOs		
		Use genetic tools to improve identification of products that cannot be visually identified	Med		✓			Research grants, GoB budget allocations	LE, BFRI, Uni, NGOs		

Objectives	Sub-objectives	Actions	Priority	Short term (1-3 years)	Mid term (4-7 years)	Long term (8-10 years)	Resources required (mio BDT)	Possible source of funding	Lead Agencies/ Institution	Projected outcomes	Performance indicators
		Communicate with experts for identifying sharks and rays or their body parts from photographs.	Med	✓				NGOs	LE, Uni, SSF, NGOs		
Engage fishing communities and consumers in shark and ray protection	Enable fishers and traders to identify protected species	Disseminate tools to identify protected shark and ray species/genera.	High	✓	✓	✓	750	NGOs	DoF, BFD, LE, SSF, NGOs	Protected species not retained, landed, traded, or consumed.	Landings and detection of illegal trade in protected species declines.
	Reduce domestic demand for protected species through targeted awareness raising.	Publicize revised laws and rules through audience-tailored communication tools	High	✓				NGOs	BFD, DoF, SSF, NGOs	Protected species not traded or consumed.	Documented increase in awareness, reduced infractions, and increased local engagement.
		Develop and implement targeted communication strategy to reduce/stop consumption and trade of protected sharks and rays	Med	✓	✓			Research grants, NGOs, Donor funding	BFD, DoF, SSF, Uni, NGOs		
		Use examples from successful prosecutions to deter fishers, traders, and consumers from illegal landing, trade, and consumption of protected sharks and rays	Low		✓			GoB budget allocations	LE, SSF, BFD, DoF, NGOs		

Objectives	Sub-objectives	Actions	Priority	Short term (1-3 years)	Mid term (4-7 years)	Long term (8-10 years)	Resources required (mio BDT)	Possible source of funding	Lead Agencies/ Institution	Projected outcomes	Performance indicators
	Empower community-based monitoring of protected species and their habitats.	Engage fishers as citizen scientists to record and report protected sharks and rays caught or bycaught in their gears	Med		✓			Technical innovation/ support grants, Donor funding, NGOs	BFD, DoF, SSF, NGOs	Protected species not retained or landed.	Landings of threatened species reduced and verified reports of catches increased.
		Empower community-led SMART patrols to monitor compliance with protected species and fishery regulations and support prosecutions of illegal fishing.	Med		✓			Marine Conservation Trust Fund, NGOs	BFD, DoF, SSF, NGOs		
		Train and mentor local fishery stakeholders to monitor shark and ray landings and trade	High	✓				GoB budget allocations, research grants, NGOs	DoF, BFDC, BFD, SSF, Uni, NGOs		
		Encourage marine fishery stakeholder associations to promote compliance with protected species and fishery regulations	Low	✓	✓			GoB budget allocations, NGOs	DoF, BFD, SSF, Uni, NGOs		
		Communicate laws and rules on protected species, and spatial, temporal, and gear restrictions	Med	✓	✓			Marine Conservation Trust Fund, NGOs	BFD, DoF, SSF, Uni, NGOs		
		Publicly acknowledge fishers who safely release protected sharks and rays	Med		✓			GoB budget allocations	DoF, BFD, SSF, NGOs		

Objectives	Sub-objectives	Actions	Priority	Short term (1-3 years)	Mid term (4-7 years)	Long term (8-10 years)	Resources required (mio BDT)	Possible source of funding	Lead Agencies/ Institution	Projected outcomes	Performance indicators
	Identify and promote value-enhanced products from sustainably caught non-threatened sharks and rays	Collaborate with traders and processors to identify opportunities for improving quality and profits derived from sustainably caught non-threatened sharks	Med			✓		Technical innovation/ support grant, Donor funding, NGOs	BFRI, Uni, NGOs	Protected species not retained, landed, traded, or processed.	Proportion of threatened species in trade reduced. Populations of threatened species recovering and non-threatened species stable.
Improve monitoring and reporting of shark and ray catches, landings, and trade	Improve systematic monitoring of catches and landings and ensure that international reporting requirements are fully met	Harmonize shark and ray data collection protocols and procedures for national and international reporting through SOPs for improved systematic recording and reporting, including species-specific monitoring, expanding monitored sites, and strengthening capacity and accountability	High	✓			1,200	GoB budget allocations, Hilsa Trust Fund, NGOs	DoF, BFDC, BFRI, BFD, NGOs	Statistics available for detecting trends in species-specific catches, landing, and trade.	Proportion of protected species reported in fisheries statistics reduced. Species populations stable.
		Include list of protected species/genera and safe release instructions in DoF fishing permit booklet	Med	✓				GoB budget allocations	DoF		
		Mandate the recording and reporting of priority shark and ray species by BFDC and industrial fishing operations	High	✓				GoB budget allocations, NGOs	DoF, BFDC, MoFL		

Objectives	Sub-objectives	Actions	Priority	Short term (1-3 years)	Mid term (4-7 years)	Long term (8-10 years)	Resources required (mio BDT)	Possible source of funding	Lead Agencies/ Institution	Projected outcomes	Performance indicators
		Provide technical training, mentoring, and oversight to shark and ray data collectors, inspectors, and industrial fishing vessel captains/skippers	High	✓				Donor funding, Marine Conservation/ Hilsa Trust Fund, NGOs	DoF, BFD, Uni, NGOs		
		Increase inspection and LE at fish landing sites	High	✓	✓	✓		GoB budget allocations	DoF, LE, BFD, MoPA, MoF		
	Improve systematic monitoring of shark and ray trade and ensure that international reporting requirements are fully met	Establish traceability and improve reporting of shark and ray exports/imports by including species/genus/product specific information on export declarations and in GoB export/import statistics	High		✓			GoB budget allocations	NBR, DoF, BFD, MoFL, MoEFCC NGOs	Shark/ray exports procedures compliant with CITES. Species/genus specific exports and levied revenue published in GoB statistics.	GoB export reports align with records from importing countries.
		Report revenue payments levied on species/genus specific shark and ray products in GoB statistics	Low			✓		GoB budget allocations	NBR, DoF, MoFL		
		Identify opportunities for designating ports of exit/entry for sharks and rays	Med			✓		GoB budget allocations	NBR, DoF, BFD, MoFL		
		Enforce existing licensing, business, and trade laws and rules	High		✓			GoB budget allocations	LG, MoC		

Objectives	Sub-objectives	Actions	Priority	Short term (1-3 years)	Mid term (4-7 years)	Long term (8-10 years)	Resources required (mio BDT)	Possible source of funding	Lead Agencies/ Institution	Projected outcomes	Performance indicators
		Provide trade licenses to fish traders and exporters only after viewing short film and gazette notification on shark and ray regulations.	Med		✓			GoB budget allocations	LG, NBR		
		Incentivize compliance of processors and traders with national and international trade regulations.	Low			✓		Research grant, Donor funding	LG, BFD, DoF		
		Make CITES/NOC permits issued by BFD and export permits issued by DoF for shark and ray products available online.	Med		✓			GoB budget allocations, CITES/Donor funding	BFD, DoF		
		Inform shipping and courier services about export/import regulations under national wildlife laws and CITES.	High	✓				Donor funding, NGOs	BFD, DoF, LG, NGOs		
		Increase DoF and Customs monitoring and inspection of exported goods, confiscate shipments with products from protected species, and prosecute traders without permits.	High	✓				GoB budget allocations, NGOs	DoF, NBR, BFD		

Objectives	Sub-objectives	Actions	Priority	Short term (1-3 years)	Mid term (4-7 years)	Long term (8-10 years)	Resources required (mio BDT)	Possible source of funding	Lead Agencies/ Institution	Projected outcomes	Performance indicators
		Require fish/fish product exporters/importers to register with DoF and declare shark/ray product exports/imports.	Med		✓			GoB budget allocations	DoF, LG, NBR		
		Ensure compliance with national wildlife laws and CITES regulations by including species-specific documentation in DoF export/import process.	High	✓				GoB budget allocations, CITES/Donor funding	DoF, BFD, MoFL		
		Prepare and implement methodology for DoF FIQC officers to sample export shipments for shark and ray products.	High	✓				Donor funding, NGOs	DoF, BFD		
		Ensure that all cases of illegal possession, trade, or consumption of protected sharks and rays are reported in web-based national wildlife crime database.	Med		✓			GoB budget allocations	BFD, LE		
	Evaluate monitoring results to ensure that protection efforts are effective.	Evaluate effectiveness of changes in shark and ray fishery and trade management by repeating NDF assessments on a regular basis (e.g., at the end of their validity or every 5 – 10 years)	Med			✓		GoB budget allocations, CITES/Donor funding,	DoF, BFD, Uni, NGOs	Robust information available and applied in adaptive conservation management of sharks and rays	Monitoring reports published annually. Policies updated.

Objectives	Sub-objectives	Actions	Priority	Short term (1-3 years)	Mid term (4-7 years)	Long term (8-10 years)	Resources required (mio BDT)	Possible source of funding	Lead Agencies/ Institution	Projected outcomes	Performance indicators
		Strengthen capacity of the DoF to analyze and report shark and ray catches, landings, and trade	High		✓			GoB budget allocations, Hilsa Trust Fund, NGOs	MoFL, DoF, NGOs		
		Enable BFD and DoF to analyze and report on interagency and community-led SMART patrols	Med		✓			Marine Conservation Trust Fund, Donor funding, NGOs	MoEFCC, BFD, MoFL, DoF, NGOs		
		Use results from improved monitoring to update wildlife protection, fisheries, and trade rules	Med			✓		GoB budget allocations, NGOs	DoF, MoFL, BFD, MoEFCC		
Strengthen governance and coordination		Improve legal recognition of compliant fishers by helping them obtain formal documentation.	High		✓		1,000	Hilsa Trust Fund, NGOs	DoF, SSF, NGOs	GoB agencies empowered and supported by fishery stakeholders to protect threatened species and manage sustainable catch and trade of non-threatened species.	Stock assessments indicate threatened species show signs of population recovery and populations of non-threatened species stable.
		Identify and promote alternative employment for shark/ray fishers, processors, traders	Med			✓		NGOs	DoF, MoFL, LG, NGOs		
		Sustain and equitably allocate GoB provisions during fishing bans	Med		✓	✓		GoB budget allocations	MoFL, MoDMR, DoF, LG		

Objectives	Sub-objectives	Actions	Priority	Short term (1-3 years)	Mid term (4-7 years)	Long term (8-10 years)	Resources required (mio BDT)	Possible source of funding	Lead Agencies/ Institution	Projected outcomes	Performance indicators
		Improve stakeholder participation in national fisheries policy development.	Med	✓	✓	✓		Trust Fund, NGOs	SSF, DoF, NGOs		
		Enhance GoB communications with countries importing shark and ray products	High		✓			GoB budget allocations	MoEFCC, BFD, MoFL, DoF		
		Strengthen GoB engagement in IOTC advocating better regulation of shark and ray fisheries	Med		✓			Donor funds, NGOs	DoF, MoFL		
		Consider signing CMS Sharks MoU	Low			✓		GoB budget allocations	MoEFCC, BFD, MoFL, DoF		
		Engage in ongoing regional/international genetic studies	Low		✓			Research grants	BFRI, Uni, SSF, NGOs		
		Encourage adoption of Environmental Justice Foundation's <i>10 Principals for Global Transparency in Fisheries</i>	Low			✓		Donor funds, NGOs	DoF, MoFL, SSF, NGOs		

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Appendix 1. List of shark species confirmed¹ or suspected² to occur in Bangladesh with their status in the Bangladesh Wildlife (Conservation and Security) Act 2012³, IUCN Global Red List⁴, CITES⁵, CMS⁶ and IOTC*.

Scientific Name	Common/English Name	IUCN Red List Status	CITES Appendix	CMS Appendix	Schedule in Wildlife Act
Confirmed					
<i>Glyphis gangeticus</i>	Ganges shark	CR	II	NL	I
<i>Sphyrna lewini</i> *	Scalloped hammerhead	CR	II	II	I
<i>Sphyrna mokarran</i> *	Great hammerhead	CR	II	II	I
<i>Alopias pelagicus</i> *	Pelagic thresher	EN	II	II	I
<i>Chiloscyllium hasseltii</i>	Indonesian bambooshark (Hasselt's bambooshark)	EN	NL	NL	NL
<i>Eusphyra blochii</i> *	Winghead shark (Slender hammerhead)	EN	NL	NL	I
<i>Lamiopsis temminckii</i>	Broadfin shark	EN	II	NL	I
<i>Negaprion acutidens</i>	Sicklefin lemon shark (Sharptooth lemon shark)	EN	II	NL	I
<i>Rhincodon typus</i> *	Whale shark	EN	II	I	I
<i>Stegostoma fasciatum</i>	Zebra shark	EN	NL	NL	I
<i>Alopias superciliosus</i> *	Bigeye thresher	VU	II	II	I
<i>Carcharhinus amblyrhynchoides</i>	Graceful shark	VU	II	NL	II
<i>Carcharhinus amboinensis</i>	Pigeye shark	VU	II	NL	I
<i>Carcharhinus brevipinna</i>	Spinner shark	VU	II	NL	II
<i>Carcharhinus falciformis</i> *	Silky shark	VU	II	II	II
<i>Carcharhinus leucas</i>	Bull shark	VU	II	NL	I
<i>Carcharhinus limbatus</i>	Blacktip shark	VU	II	NL	II
<i>Carcharhinus melanopterus</i>	Blacktip reef shark	VU	II	NL	II
<i>Chiloscyllium burmense</i>	Burmese bambooshark	VU	NL	NL	NL
<i>Chiloscyllium griseum</i>	Grey bambooshark	VU	NL	NL	NL
<i>Hemipristis elongata</i>	Snaggleteeth shark	VU	NL	NL	II
<i>Rhizoprionodon acutus</i>	Milk shark	VU	II	NL	NL
<i>Sphyrna zygaena</i> *	Smooth hammerhead	VU	II	II	I
<i>Triaenodon obesus</i>	Whitetip reef shark	VU	NL	NL	II
<i>Atelomycteris marmoratus</i>	Coral catshark	NT	NL	NL	NL
<i>Carcharhinus macrotis</i>	Hardnose shark	NT	II	NL	NL
<i>Carcharhinus sorrah</i>	Spottail shark	NT	II	NL	II
<i>Galeocerdo cuvier</i> *	Tiger shark	NT	NL	NL	II
<i>Rhizoprionodon oligolinx</i>	Grey sharpnose shark	NT	II	NL	NL
<i>Scoliodon laticaudus</i>	Spadenose shark	NT	II	NL	NL
<i>Iago omanensis</i>	Bigeye hound shark	LC	NL	NL	NL

Scientific Name	Common/English Name	IUCN Red List Status	CITES Appendix	CMS Appendix	Schedule in Wildlife Act
Suspected					
<i>Carcharhinus hemiodon</i>	Pondicherry shark	CR	II	NL	I
<i>Carcharhinus longimanus</i> *	Oceanic whitetip shark	CR	II	I	I
<i>Carcharias taurus</i>	Sand tiger shark	CR	NL	NL	I
<i>Carcharhinus dussumieri</i>	Whitecheek shark	EN	II	NL	I
<i>Isurus oxyrinchus</i> *	Shortfin mako shark	EN	II	II	I
<i>Isurus paucus</i> *	Longfin mako shark	EN	II	II	I
<i>Alopias vulpinus</i> *	Common thresher	VU	II	II	I
<i>Carcharhinus sealei</i>	Blackspot shark	VU	II	NL	NL
<i>Carcharodon carcharias</i> *	Great white shark	VU	II	I	II
<i>Chaenogaleus macrostoma</i>	Hooktooth shark	VU	NL	NL	II
<i>Chiloscyllium indicum</i>	Slender bambooshark	VU	NL	NL	NL
<i>Glyphis glyphis</i>	Speartooth shark	VU	II	NL	NL
<i>Nebrius ferrugineus</i>	Tawny nurse shark	VU	NL	NL	II
<i>Chiloscyllium arabicum</i>	Arabian carpetshark	NT	NL	NL	NL
<i>Chiloscyllium plagiosum</i>	Whitespotted bambooshark	NT	NL	NL	NL
<i>Chiloscyllium punctatum</i>	Grey carpet shark (Brownbanded bambooshark)	NT	NL	NL	NL
<i>Loxodon macrorhinus</i>	Sliteye shark	NT	II	NL	NL
<i>Mustelus mosis</i>	Arabian smoothhound	NT	NL	NL	NL
<i>Prionace glauca</i> *	Blue shark	NT	II	II	II
<i>Scoliodon macrorhynchus</i>	New/Pacific spadenose shark	NT	II	NL	NL
<i>Centroscyllium ornatum</i>	Ornate dogfish	LC	NL	NL	NL
<i>Eridacnis radcliffei</i>	Pygmy ribbontail catshark	LC	NL	NL	NL
<i>Euprotomicrus bispinatus</i>	Pygmy shark	LC	NL	NL	NL
<i>Megachasma pelagios</i>	Megamouth shark	LC	NL	NL	NL
<i>Pseudocarcharias kamoharai</i> *	Crocodile shark	LC	NL	NL	NL

¹ Species are considered as 'confirmed' to occur in Bangladesh if there is photographic or genetic evidence provided in published references or by WCS and/or the IUCN Global Red List assessment includes Bangladesh as Country of Occurrence in the species' geographic range, as per June 2022.

² Species are considered 'suspected' to occur in Bangladesh if they are listed as suspected in published references and/or the IUCN Global Red List assessment includes the Indian Ocean in the species' geographic range, as per June 2022.

³ As per September 2021 Amendment.

⁴ As per <http://www.iucnredlist.org> accessed in May 2023.

⁵ CITES listing as per CoP19 decisions. CITES Appendix I means that international trade is prohibited. CITES Appendix II means that a positive NDF and export permit is required for international trade.

⁶ CMS Appendix I listed species are strictly protected. Appendix II species require international agreements for their conservation and management.

* IOTC mandates conservation management.

Appendix 2. List of ray species confirmed¹ or suspected² to occur in Bangladesh with their status in the Bangladesh Wildlife (Conservation and Security) Act 2012³, IUCN Global Red List⁴, CITES⁵, CMS⁶ and IOTC*.

Scientific Name	Common/English Name	IUCN Red List Status	CITES Appendix	CMS Appendix	Schedule in Wildlife Act
Confirmed					
<i>Glaucostegus granulatus</i>	Sharpnose guitarfish	CR	II	NL	I
<i>Glaucostegus obtusus</i>	Widenose guitarfish	CR	II	NL	I
<i>Glaucostegus typus</i>	Giant guitarfish	CR	II	NL	I
<i>Glaucostegus younholeei</i>	Bangladeshi Guitarfish	CR	NE	NE	I
<i>Glaucostegus thouin</i>	Clubnose guitarfish	CR	II	NL	I
<i>Maculabatis bineeshi</i>	Shorttail whipray	CR	NL	NL	NL
<i>Pristis pristis</i>	Large-tooth sawfish	CR	I	I	I
<i>Pristis zijsron</i>	Green sawfish	CR	I	I	I
<i>Rhina ancylostoma</i>	Bowmouth guitarfish (Shark ray)	CR	II	NL	I
<i>Rhinobatos annandalei</i>	Bengal guitarfish (Annandale's guitarfish)	CR	NL	NL	I
<i>Rhinobatos lionotus</i>	Smoothback guitarfish	CR	NL	NL	I
<i>Aetobatus flagellum</i>	Longhead eagle ray	EN	NL	NL	I
<i>Aetomylaeus maculatus</i>	Mottled eagle ray	EN	NL	NL	I
<i>Aetomylaeus milvus</i>	Ocellate eagle ray	EN	NL	NL	I
<i>Anoxypristis cuspidata</i>	Narrow sawfish	EN	I	I	I
<i>Gymnura zonura</i>	Zonetail butterfly ray	EN	NL	NL	II
<i>Himantura uarnak</i>	Coach whipray (Reticulated whipray)	EN	NL	NL	II
<i>Himantura undulata</i>	Honeycomb whipray (Bleeker's variegated whipray)	EN	NL	NL	II
<i>Maculabatis gerrardi</i>	Whitespotted whipray	EN	NL	NL	I
<i>Maculabatis pastinacoides</i>	Round whipray	EN	NL	NL	II
<i>Mobula birostris</i> *	Oceanic manta ray (Giant manta ray)	EN	II	I	I
<i>Mobula kuhlii</i> *	Shorthorned pygmy devil ray (Kuhl's devilray)	EN	II	I	I
<i>Mobula mobular</i> *	Spinetail devilray (Giant devilray)	EN	II	I	I
<i>Mobula tarapacana</i> *	Sicklefin devilray	EN	II	I	I
<i>Mobula thurstoni</i> *	Bentfin devilray	EN	II	I	I
<i>Narcine prodorsalis</i>	Tonkin numbfish	EN	NL	NL	NL
<i>Pastinachus gracilicaudus</i>	Narrow cowtail ray	EN	NL	NL	NL
<i>Pastinachus solocirostris</i>	Roughnose cowtail ray	EN	NL	NL	I
<i>Pateobatis bleekeri</i>	Bleeker's whipray	EN	NL	NL	I
<i>Pateobatis uarnacoides</i>	Whitenose whipray	EN	NL	NL	II
<i>Rhinoptera javanica</i>	Javan cownose ray	EN	NL	NL	I
<i>Rhinoptera jakakari</i>	Oman cownose ray (Shorttail cownose ray)	EN	NL	NL	I
<i>Urogymnus lobistomus</i>	Tubemouth whipray	EN	NL	NL	II
<i>Urogymnus polylepis</i>	Giant freshwater whipray	EN	NL	NL	I
<i>Aetobatus ocellatus</i>	Spotted eagle ray	VU	NL	NL	II
<i>Aetomylaeus nichofii</i>	Banded eagle ray	VU	NL	NL	II
<i>Brevitrygon imbricata</i>	Bengal whipray	VU	NL	NL	NL
<i>Gymnura poecilura</i>	Longtail butterfly ray	VU	NL	NL	II
<i>Hemitrygon bennetti</i>	Bennett's stingray	VU	NL	NL	NL
<i>Himantura leoparda</i>	Leopard whipray	VU	NL	NL	II

<i>Narcine brevilabiata</i>	Shortlip numbfish	VU	NL	NL	II
<i>Narcine lingula</i>	Chinese numbfish	VU	NL	NL	II
<i>Narcine maculata</i>	Smallspot numbfish	VU	NL	NL	NL
<i>Narcine timplei</i>	Brown numbfish	VU	NL	NL	II
<i>Narke dipterygia</i>	Spot-tail sleeper ray	VU	NL	NL	NL
<i>Pateobatis jenkinsii</i>	Jenkin's whipray	VU	NL	NL	II
<i>Rhinobatos ranongensis</i>	Ranong guitarfish	VU	NL	NL	I
<i>Taeniurops meyeri</i>	Blotched stingray	VU	NL	NL	II
<i>Telatrygon zugei</i>	Pale-edge sharpnose ray (Sharpnose stingray)	VU	NL	NL	NL
<i>Urogymnus asperrimus</i>	Porcupine ray	VU	NL	NL	II
<i>Urogymnus granulatus</i>	Mangrove whipray	VU	NL	NL	II
<i>Brevitrygon walga</i>	Scaly whipray	NT	NL	NL	NL
<i>Himantura fluviatilis</i>	Ganges stingray	NT	NL	NL	NL
<i>Pastinachus sephen</i>	Cowtail ray	NT	NL	NL	NL
<i>Megatrygon microps</i>	Smalleye stingray	DD	NL	NL	II
<i>Neotrygon caeruleopunctata</i>	Bluespotted maskray	LC	NL	NL	NL
<i>Pteroplatytrygon violacea</i> *	Pelagic stingray	LC	NL	NL	NL
<i>Taeniura lymma</i>	Bluespotted fantail ray	LC	NL	NL	NL
<i>Neotrygon indica</i>	Indian Ocean bluespotted maskray	NL	NL	NL	NL
Suspected					
<i>Gymnura tentaculata</i>	Tentacled butterfly ray	CR	NL	NL	II
<i>Maculabatis arabica</i>	Pakistan/ Arabic whipray	CR	NL	NL	NL
<i>Rhynchobatus australiae</i>	Bottlenose wedgefish	CR	II	II	I
<i>Rhynchobatus laevis</i>	Smoothnose wedgefish	CR	II	NL	I
<i>Aetobatus narinari</i>	Whitespotted eagle ray	EN	NL	NL	NL
<i>Maculabatis macrura</i>	Sharpnose whipray	EN	NL	NL	NL
<i>Mobula eregoodoo</i> *	Longhorned pygmy devilray	EN	II	I	I
<i>Mobula alfredi</i>	Reef manta ray	VU	NL	NL	I
<i>Pastinachus ater</i>	Broad cowtail ray	VU	NL	NL	NL
<i>Pateobatis fai</i>	Pink whipray	VU	NL	NL	NL
<i>Neotrygon kuhlii</i>	Kuhl's maskray	DD	NL	NL	NL
<i>Himantura tulul</i>	Fine-spotted leopard whipray	NL	NL	NL	NL

¹ Species are considered as 'confirmed' to occur in Bangladesh if there is photographic or genetic evidence provided in published references or by WCS and/or the IUCN Global Red List assessment includes Bangladesh as Country of Occurrence in the species' geographic range, as per June 2022.

² Species are considered 'suspected' to occur in Bangladesh if they are listed as suspected in published references and/or the IUCN Global Red List assessment includes the Indian Ocean in the species' geographic range, as per June 2022.

³ As per September 2021 Amendment.

⁴ As per <http://www.iucnredlist.org> accessed in May 2023.

⁵ CITES listing as per CoP19 decisions. CITES Appendix I means that international trade is prohibited. CITES Appendix II means that a positive NDF and export permit is required for international trade.

⁶ CMS Appendix I listed species are strictly protected. Appendix II species require international agreements for their conservation and management.

* IOTC mandates conservation management.

Appendix 3. International and regional obligations for Bangladesh to manage shark and ray fisheries or trade.

International Conventions and Agreements

Name (Number of Member States)	Objectives	Obligations pertaining to Sharks and Rays for Bangladesh
<i>United Nations Convention on the Law of the Sea</i> (UNCLOS) (168)	Global legal framework for maritime and marine activities establishes general obligations for safeguarding the marine environment and protecting freedom of scientific research on high seas.	• Protect living resources within EEZ. • Work with regional governments directly or through regional organizations to protect shared stocks and highly migratory species including sharks and rays. • Ensure compliance of fishing vessels on the high seas with international conservation and management measures
<i>United Nations Fish Stocks Agreement</i> (77 - Bangladesh signed but not ratified)	Regulating fisheries and protection of highly migratory transboundary fish stocks that regularly travel long distances through both the high seas and areas under national jurisdiction, such oceanic sharks.	• Ensure the long-term conservation and sustainable use of straddling and highly migratory fish stocks.
<i>Convention on Biological Diversity</i> (CBD) (196)	Actively promote the conservation of biodiversity and sustainable use of the biological diversity and productivity of marine and coastal areas.	• Ensure the safe passage and conservation of the country's globally endangered migratory shark and ray species.
<i>Convention on International Trade in Endangered Species of Wild Fauna and Flora</i> (CITES) (183)	Legally binding regulations on international trade and mandated adaptation of national legislation to improve the management of threatened wildlife, including sharks and rays.	• Ensure that national laws prohibit trade in violation of CITES and provide for the confiscation of specimens and penalties for violations. • Develop science-based species or genera specific NDFs to assess the impacts of trade on wild populations as a basis for permitting trade or mandating fisheries management measures. • Certify that a shark or ray specimen was not obtained in contravention of national wildlife protection laws. • Grant permits under the terms of the Convention. • Submit trade reports and implementation updates.
<i>Convention on the Conservation of Migratory Species of Wild Animals</i> (CMS) (131)	Global platform for the conservation and sustainable use of migratory animals and their habitats. The CMS Memorandum of Understanding on the Conservation of Migratory Sharks (CMS Sharks MoU) aims to improve the conservation status of migratory sharks listed in CMS Appendices I and II.	• Achieve and maintain a favorable conservation status for migratory sharks based on the best available scientific information, taking into account the socio-economic and other values of these species for the people of the Signatory States. • Bangladesh has not yet signed the CMS Sharks MoU.
<i>Food and Agriculture</i>	International standards for responsible and sustainable	• Regulate the use of fishing gears to promote sustainable and responsible

<i>Organization Code of Conduct for Responsible Fisheries</i> (194)	fisheries practices to ensure conservation, management, and development of living aquatic resources, ecosystem and biodiversity.	fisheries. • Establish sanctuaries and protected areas and use management measures such as seasonal bans and closed areas with the cooperation of concerned government agencies and stakeholders to promote conservation of aquatic resources. • Minimize waste and discards from shark catches.
<i>Food and Agriculture Organization Committee on Fisheries (COFI)</i> (194)	International Plan of Action (IPOA) developed as guidance for National Plans of Action to reverse shark population declines and improve their conservation and management.	• Develop and implement a National Plan of Action (NPOA) to reverse shark population declines and improve their conservation and management in national waters.

Regional Fisheries Management Organizations, Programs and Associations

Name (Number of Member States)	Objectives	Obligations pertaining to Sharks and Rays for Bangladesh
<i>Indian Ocean Tuna Commission (IOTC)</i> (31)	Promote cooperation among IO countries to ensure the conservation and optimum use of stocks and encouraging the sustainable development of fisheries through appropriate management.	• Prohibit catching, retention and international trade of Mobulid rays, Thresher (Alopiidae), Hammerhead (Sphyrniidae), Mako (<i>Isurus</i> spp.), Oceanic whitetip (<i>Carcharhinus longimanus</i>), and Whale (<i>Rhincodon typus</i>) sharks. • Collect and report species-specific catch and size data. • Encourage live release of sharks where possible, especially juveniles and pregnant sharks that are caught incidentally and are not used for food and/or subsistence.
<i>South Asian Association for Regional Cooperation (SAARC)</i> (8)	Promote the welfare of people of South Asia, increase collaboration and mutual assistance in scientific fields, including for conservation management of migratory or shared fish stocks.	• Formulate regional fisheries policies and contribute to reports. • Manage conservation of threatened migratory sharks and rays.
<i>Bay of Bengal Programme (BOBP)</i> (4)	Promote and facilitate the long-term development and use of marine fisheries resources of the Bay of Bengal based on responsible fishing practices and environmentally sound management programs.	• Encourage skill training, education, particularly for women involved in coastal fisheries, to implement shark and ray conservation management in the Bay of Bengal.
<i>Indian Ocean Rim Association (IORA)</i> (23)	Strengthen cooperation and sustainable development within the Indian Ocean region. The IORA Fisheries Support Unit (FSU) enhances cooperation within the fisheries sector through better utilization of fisheries resources, expertise exchange and joint research activities.	• Implement well-structured, farsighted, and pragmatic IORA Fisheries Action Plan addressing opportunities and challenges of maritime safety and security, trade, fisheries management. • Develop effective policy frameworks for blue economy initiatives to secure sustainable and inclusive growth.

Appendix 4. Fishing gear regulations for marine waters of Bangladesh as per June 2021.

Net Type	Local Name (s) (As per legislation)	Description	Prohibition	Section, Rule, Clause	Act/Rule	Date of Gazette Notification
Monofilament gillnet	Current; Japani Current; Fandi; Fash; Kapa; Badha; Kathi Jal	Fishing net made of single filament synthetic nylon fibre of different mesh sizes.	No person shall manufacture, fabricate, import, market, store, carry, transport, own, possess or use <i>Current Jal</i> . Current Jal or any net with 45 mm mesh size or with less than 45 mm are prohibited.	Section 4A (1) Rule 12	Protection and Conservation of Fish Act, 1950 Protection and Conservation of Fish Rules, 1985	September 21, 2002 January 25, 1988
Small-mesh gillnet	Zero Sutar; Dui Sutar; Tin Sutar; Nylon; Sutar; Bhasan; Ilish/Ilse; Poket/Poka; Candi/Chandi; Kona; Gulti/Khota; Sain; any other jal for Hilsha harvest	Small-mesh nylon or twine nets targeting primarily Hilsa	Use of any nets with less than 65 mm mesh size for catching Hilsa is prohibited as specified in the local name.	Section 3, Subsection 3, Clause (iii), Rule 12 (a) (b)	Protection and Conservation of Fish Rules, 1985	July 15, 2020
Estuarine Set Bag Net- ESBN (<i>Fixed funnel net, estuarine</i>)	Badha; Pekua; Bingi; Gara; Chingri Pona Dhora; Khuti/Khuta; Tong; Bindi Jal	Any type of cotton, nylon, or synthetic net	The use of estuarine set bag nets of any size, type or mesh size in any freshwater areas or coastal waters up to 10 meters depth at high tide is prohibited year-round.	Rule 12, Sub- Rule 4 (b)	Protection and Conservation of Fish Rules, 1985	April 07, 2013
Fine-mesh drag, seine or set-bag net, Mosquito nets	Katha; Ver; Jagat Ver; Bhim Jal (<i>Moshari/Chot Jal</i>)	Any type of cotton, nylon, or synthetic net up to 10 mm length or diameter.	Banned from the Bengali months of Falgun to Sravan (<i>mid-February to mid-August</i>). No person shall catch or cause to be caught fry or post larvae of fish, shrimp, and prawns of any kind, in any form and in any way in the estuary and coastal waters of Bangladesh.	Section 3, Sub- section (3), Clause (iii), Rule 12 (a) (b) Rule 8 (1A)	Protection and Conservation of Fish Rules, 1985 Protection and Conservation of Fish Rules, 1985	April 07, 2013 September 21, 2000

