Memorandum of Understanding on the Conservation of Migratory Sharks

Fact Sheet

DEVIL & MANTA RAYS
RAIES MOBULA & MANTA
MOBULA Y MANTA RAYAS

Reef Manta Ray
Manta alfredi

DEVIL AND MANTA RAYS

Class: *Chondrichthyes*
Order: *Rajiformes*
Family: *Mobulidae*
Species:

- *Manta birostris* – Oceanic Manta Ray
- *Manta alfredi* – Reef Manta Ray
- *Mobula mobular* – Giant Devil Ray
- *Mobula japanica* – Spinetail Devil Ray
- *Mobula thurstoni* – Bentfin Devil Ray
- *Mobula tarapacana* – Sicklefin Devil Ray
- *Mobula eregoodootenkee* – Longhorned Pygmy Devil Ray
- *Mobula hypostoma* – Atlantic Pygmy Devil Ray
- *Mobula rochebrunei* – Guinean Pygmy Devil Ray
- *Mobula munkiana* – Munk's Pygmy Devil Ray
- *Mobula kuhlii* – Shortfin Devil Ray

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Shark MOU Advisory Committee

This fact sheet was produced by the Advisory Committee of the Memorandum of Understanding on the Conservation of Migratory Sharks (Sharks MOU) and the Manta Trust.

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1. Species[1]

Spinetail Devil Ray
Mobula japanica

Bentfin Devil Ray
Mobula thurstoni

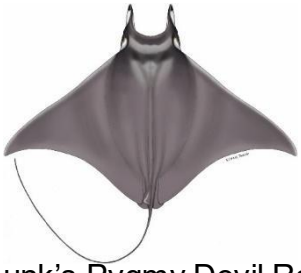
Sicklefin Devil Ray
Mobula tarapacana

Longhorned Pygmy Devil Ray
Mobula eregoodootenkee

Shortfin Pygmy Devil Ray *Mobula kuhlii*

Atlantic Pygmy Devil Ray
Mobula hypostoma

Guinean Pygmy Devil Ray
Mobula rochebrunei



Munk's Pygmy Devil Ray
Mobula munkiana

[1] Taxonomy of *Mobulidae* in accordance with the 2014 definition in Eschmeyer's Catalog, found at: https://www.calacademy.org/scientists/projects/eschmeyers-catalog-of-fishes.
NOTE: Based on a recent taxonomic revision of mobulid rays by White et al. (2017) the genus *Manta* is abandoned and nested within *Mobula,* changing *Manta birostris* and *Manta alfredi* to *Mobula birostris* and *Mobula alfredi,* respectively, while *Mobula japanica*, *Mobula eregoodootenkee* and *Mobula rochebrunei* are found to be synonyms of *Mobula mobular*, *M. kuhlii* and *M. hypostoma,* respectively. Since then, *M. eregoodootenkee* has also been resurrected (Notarbartolo di Sciara et al. 2019; Hosegood et al. 2020), and is again considered a valid species under the name of *Mobula eregoodoo*.

2. Biology

Devil and Manta Rays (family *Mobulidae*, the Mobulids or Mobulid Rays) are slow-growing, large-bodied animals with some species occurring in small, highly fragmented populations. Mobulids are pelagic, filter-feeders, with populations sparsely distributed across tropical and warm temperate oceans. Currently, nine species of Devil Ray (genus *Mobula*) and two species of Manta Ray (genus *Manta*) are recognized by CMS[2] and will be referred to throughout the rest of this document. However, it should be noted that a recent taxonomic revision of the group have nested the genus *Manta* within *Mobula*, resulting in a single genus with nine nominal species (see footnote 1 in previous page) (White et al.2017; Notarbartolo di Sciara et al. 2019; Hosegood et al. 2020). Mobulids have among the lowest fecundity of all elasmobranchs (1 young every 2-3 years), and a late age of maturity (up to 8 years), resulting in population growth rates among the lowest for elasmobranchs (Dulvy et al. 2014; Pardo et al. 2016).

3. Distribution

The three largest-bodied species of *Mobula* (*M. japanica, M. tarapacana, and M. thurstoni*), and the Oceanic Manta Ray (*M. birostris*) have circumglobal tropical and subtropical geographic ranges. The overlapping distribution ranges of several Mobulids, difficulties differentiating between species, and lack of standardized reporting of fisheries data, make it challenging to determine each species' geographical extent.

Figure 1: Distribution of *Manta (Mobula) birostris*, courtesy of The Manta Trust[3].

[2] Convention on the Conservation of Migratory Species of Wild Animals (CMS).
[3] For figures 1–10, maps obtained from The Manta Trust on 15 February 2021. Darker areas indicate confirmed range; lighter areas indicate expected range.

Figure 2: Distribution of *Manta* (*Mobula*) alfredi, Courtesy of The Manta Trust

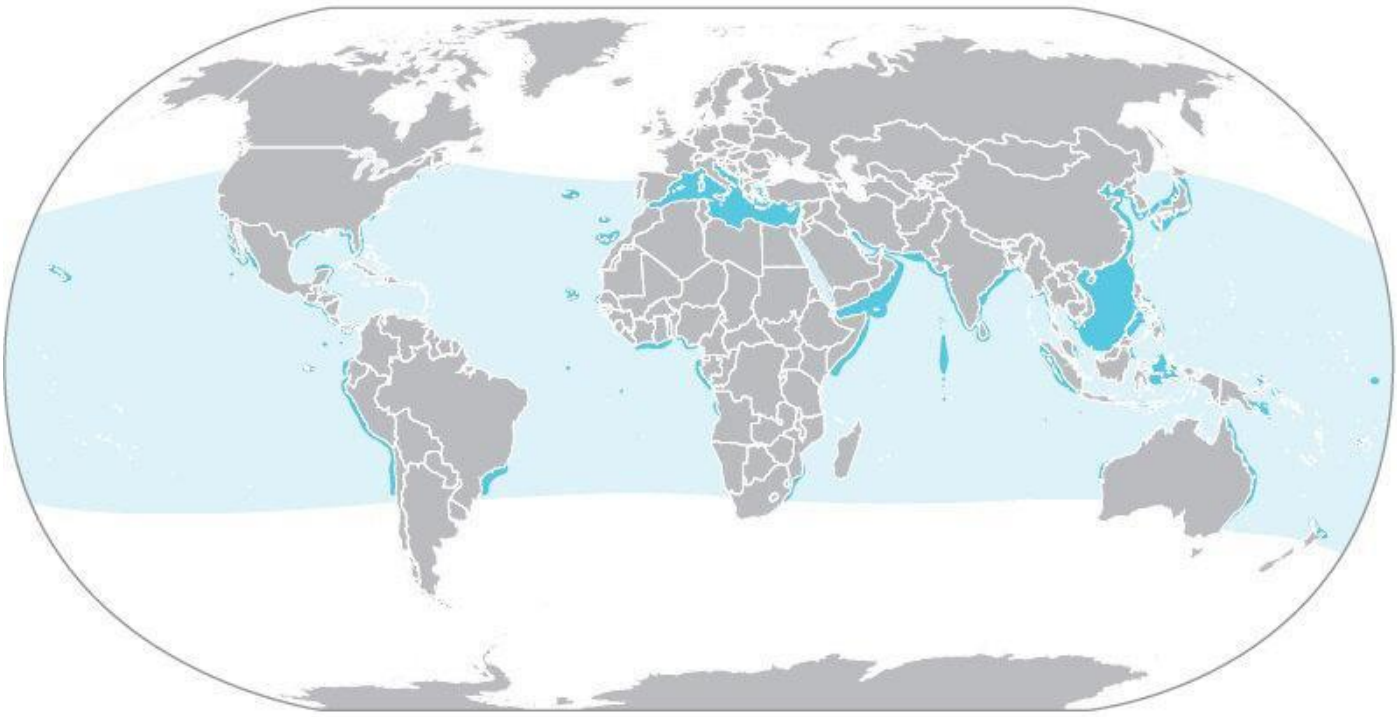


Figure 3: Distrubition of *Mobula mobular* (and *M. japanica*), courtesy of The Manta Trust

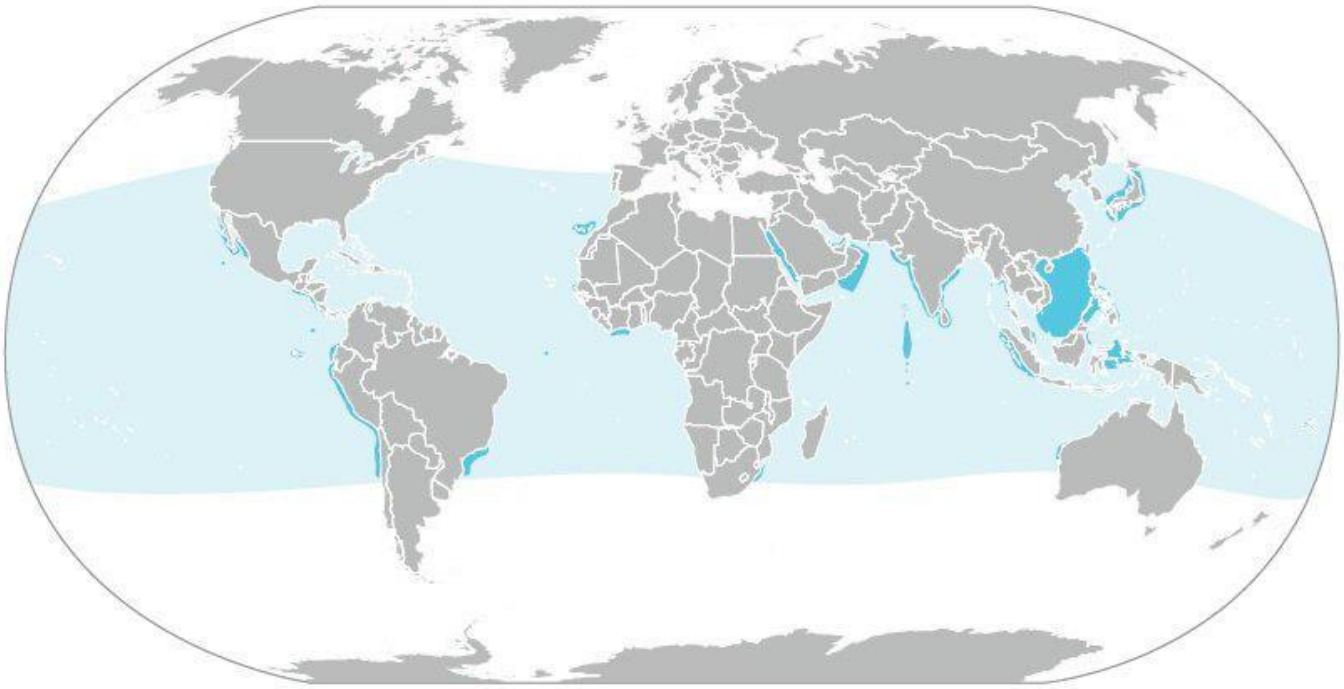


Figure 4: Distribution of *Mobula thrustoni*, courtesy of The Manta Trust

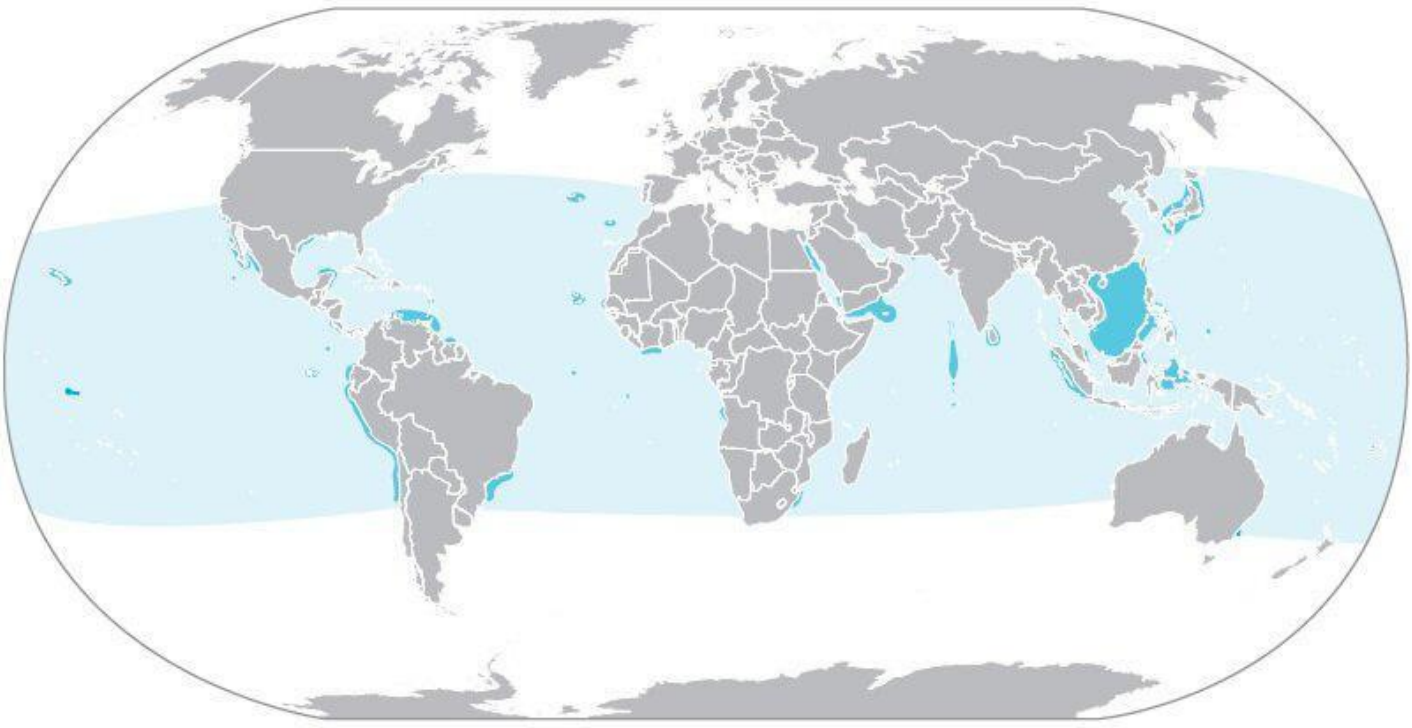


Figure 5: Distribution of *Mobula tracapana*, courtesy of The Manta Trust

Figure 6: Distribution of *Mobula eregoodootenkee*, courtesy of The Manta Trust

Figure 7: Distribution of *Mobula kuhlii*, courtesy of The Manta Trust

Figure 8: Distribution of *Mobula hypostoma*, courtesy of The Manta Trust

Figure 9: Distribution of *Mobula rochebrunei*, courtesy of The Manta Trust

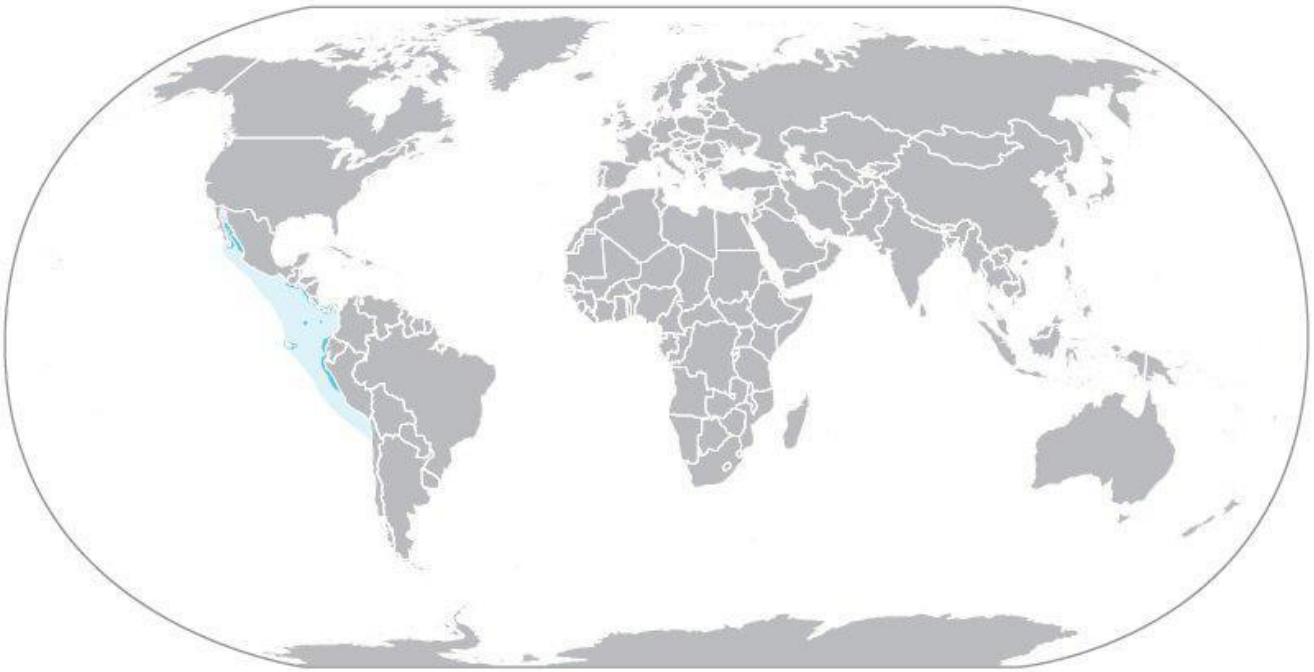


Figure 10: Distribution of *Mobula munkiana*, courtesy of The Manta Trust

4. Critical Sites

Critical sites are those habitats that may have a key role for the conservation status of the shark and ray populations, and may include feeding, mating, pupping, overwintering grounds and other aggregation sites, as well as corridors between these sites such as migration routes. Mobulids rely on several habitats at specific sites during different life stages, including pupping and feeding aggregation areas.

5. Population Status and Trends

There are no stock assessments for Mobulids, however, information on population trends are available for some species and areas. Whilst global population numbers of Mobulids are unknown, some records show local, genus-wide declines in several regions around the world (Couturier et al. 2012; Lewis et al. 2015; Ward-Paige et al. 2013). The current IUCN Red List status for the global populations for Mobulids are: 'Endangered' for *M. birostris* (Marshall et al. 2020), 'Vulnerable' for *M. alfredi* (Marshall et al. 2019), 'Endangered' for *M. mobular* (Marshall et al. 2019), 'Endangered' for *M. japanica*[4] (Marshall et al. 2019), 'Endangered' for *M. thurstoni* (Marshall et al. 2019), 'Endangered' for *M. tarapacana* (Marshall et al. 2019), 'Endangered' for *M. eregoodootenkee* (Rigby et al. 2020), 'Endangered' for *M. kuhlii* (Rigby et al. 2020), 'Endangered' for *M. hypostoma* (Marshall et al. 2019), 'Endangered' for *M. rochebrunei* (Marshall et al. 2019), and 'Vulnerable' for *M. munkiana* (Marshall et al. 2019). More details of the population status and trends can be found in the IUCN assessment[5].

[4] Due to the merging of *Mobula japanica* and *Mobula mobular* as per White et al. (2017), the IUCN status of the *Mobula mobular* is reported here.

[5] The IUCN Red List of Threatened Species uses a set of criteria to evaluate the extinction risk of species and subspecies. For more

6. Threats

- **Fisheries:** Targeted and incidental fisheries pose a major threat to Mobulids on a global scale. Mobulids are caught by a variety of fishing gears, including harpoon, longline, purse seine, gillnet and trawl (White et al. 2006b; Lewis et al. 2015) and retained for their meat and gill plates. Targeted fishing in critical habitats and aggregation sites raises concern as a large number of individuals can be captured in a short period. There can also be low post-release survival in some fisheries. Mobulid meat is an important protein source in some developing countries particularly in South and Central America and Asia (Fernando and Stevens 2011; Lewis et al. 2015).
- **International trade:** Recent market surveys documented an alarming increase in the demand for Mobulid gill plates, with the estimated number of individuals increasing almost threefold from early 2011 to late 2013 (O'Malley 2013). The high and increasing value of gill plates drives increased target fishing pressure for all Mobulids in key Range States, with many former bycatch fisheries now targeting Mobulids (Fahmi 2014; Lewis et al. 2015).
- **Other actual or potential threats:** Manta rays often spend a significant amount of time next to the water surface, making them vulnerable to collisions with vessels which cause serious injuries and even death. Accidental entanglement with abandoned fishing gear (lines in particular) and protective shark nets cause mortality of Mobulids, but the impact on their populations remains uncertain. Tourism interactions and ingestion of plastics while filter-feeding in the water column may further harm these species.

7. Key Knowledge Gaps

A comprehensive analysis of knowledge gaps with recommendations for action is described by Lawson et al. (2017). More recently, a group of 30 leaders and emerging experts in the fields of Mobulid biology, ecology, and conservation highlighted currently critical knowledge gaps that must be filled to facilitate improved science-based management of these vulnerable species (Stewart et al. 2018).

8. Key Management and Conservation Gaps

- Few Range States provide specific protections to Mobulids, and enforcement of these laws can be poor;
- Regional/multilateral cooperation among and between countries and RFMOs[6] is lacking;
- A limited number of RFBs[7] have agreed on fishery or conservation measures for Mobulids;
- Not all RFBs have adopted technical bycatch mitigation or handling guidelines.

information see https://www.iucnredlist.org/.
[6] Regional fisheries management organisations (RFMOs).
[7] Regional Fishery Bodies (RFBs).

9. Suggestions for Conservation and Management Action

a) Incorporate Mobulid protection into national legislation of all parties to CMS/Range states

- Implement relevant international measures (e.g. CMS, CITES[8] and RFMOs) that prohibit targeting, retaining, landing, transshipping, and selling of Mobulid parts;
- Consider and implement the CMS Concerted Action for Mobulids[9].

b) Improve the understanding of Mobulids' populations through research, monitoring and information exchange

- Clarify the existing taxonomy and diversity of Mobulids;
- Identify critical sites of Mobulid abundance and seasonality;
- Improve the current knowledge of population trends;
- Address the impacts of fisheries and by-catch;
- Improve the knowledge of foraging and diving behavior;
- Determine and quantify the impacts of anthropogenic activities including tourism, habitat degradation, climate change, entanglements and interactions with pollutants and contaminants;
- Address data gaps in biological knowledge (life history parameters) of Mobulids;
- Support research to define management units within the *Mobulidae* family;
- Conduct long-term monitoring of Mobulid populations;
- Develop capacity in research, data collection and monitoring;
- Establish conservation time-bound targets and indicators to assess progress toward objectives (as outlined in Lawson et al. 2017).

c) Improve multilateral cooperation among regions and RFBs

- Support the introduction of appropriate management and conservation measures for Mobulids at international and regional fora, including relevant RFMOs (e.g. co-sponsor proposals/resolutions within multilateral agreements);
- Improve the effectiveness of the 2015 IATTC[10] Mobulid Ray protection measure (i.e. by ending the exceptions for small scale fisheries);
- Promote standardized data reporting and safe release techniques.

d) Enforce landing and trade bans

- Prioritize enforcement, including to conduct market surveys and patrols, protected area patrols;
- Adopt the Port State Measures Agreement and Implement port-state controls;
- Improve capacity in species identification through training workshops and the dissemination of available ID guides.

e) Identify effective approaches to reduce bycatch and improve survivorship of mobuilds

- Identify gear modifications and best fishing practices e.g. gear restrictions, pole and line, safe release handling guidelines (Poisson et al. 2014).
- Explore options for spatial management.
- Investigate post-release survival of Mobulids to inform improved handling and release protocols.

[8] Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES).
[9] Concerted Action 12.6 (Rev.COP13) Concerted Action for the Mobulid Rays (Mobulidae), available at https://www.cms.int/en/document/concerted-action-mobulid-rays-mobulidae-2
[10] The Inter-American Tropical Tuna Commission (IATTC).

- Encourage ICCAT[11], IOTC[12], and WCPFC[13] to develop recommendations, Resolutions, and CMM[14], respectively, for the safe release of all Mobulids incidentally caught.

f) Enhance or develop where necessary collection of fishery data (including landings, discards, size frequency, catch and effort where needed)

- Collection of bycatch data.
- Develop capacity in research and monitoring in all regions.
- Report national species-specific landings of Devil and Manta Rays to FAO[15] and RFMOs.

g) Engage local communities in the conservation of Mobulids

- Provide training to fishing communities on species identification and safe release guidelines.
- Involve local communities in the development of regional management (i.e. eco-tourism, sustainable fisheries and aquaculture).

h) Reduce gill plate demand

- Increase awareness of human health risk of consuming gill plates and conservation threat to Mobulids through science-based campaigns.

[11] International Commission for the Conservation of Atlantic Tunas (ICCAT).
[12] Indian Ocean Tuna Commission (IOTC).
[13] Western and Central Pacific Fisheries Commission (WCPFC).
[14] Conservation Management Measures (CMMs).
[15] Food and Agriculture Organization (FAO).

10. Legal Instruments

Instrument/Organiastion	Description	Species
Barcelona Convention Protocol concerning Specially Protected Areas and Biological Diversity in the Mediterranean (SPA/BD Protocol) of the Convention for the Protection of the Marine Environment and the Coastal Region of the Mediterranean (Barcelona Convention)	**Annex II**: Endangered or threatened species; Parties shall ensure the maximum possible protection and recovery of, while prohibiting the damage to and destruction of these species.	*M. mobular*
Bern Convention Convention on the Conservation of European Wildlife and Natural Habitats	**Appendix II**: Strictly protected fauna species; Contracting Parties shall ensure the special protection of these species through particularly prohibiting deliberate killing, taking, disturbance, trade and possession	*M. mobular*
Cartagena Convention Specially Protected Areas Wildlife Protocol (SPAW) to the Convention for the Protection and Development of the Marine Environment of the Wider Caribbean Region	**Annex III**: Parties may regulate the use of these species of flora and fauna in order to ensure and maintain their populations at the highest possible levels.	*M. alfredi* *M. birostris*
CITES Convention on International Trade in Endangered Species of Wild Fauna and Flora	**Appendix II**: Species not necessarily threatened with extinction, but in which trade must be controlled in order to avoid utilization incompatible with their survival.	all species
CMS Convention on the Conservation of Migratory Species of Wild Animals	**Appendix I**: Migratory species threatened with extinction; CMS Parties strive towards strictly protecting these species, conserving or restoring the places where they live, mitigating obstacles to migration and controlling other factors that might endanger them. **Appendix II**: Migratory species that have an unfavorable conservation status and need or would significantly benefit from international cooperation; CMS Parties shall endeavor to conclude global or regional agreements to benefit these species.	all species

Instrument/Organiastion	Description	Species
EU European Union	**Council Regulation (EU) 2019/1241**: Article 10 provides the prohibition for Union flag vessels to fish for, retain on board, tranship, land, store, sell, display or offer for sale the species listed in Annex I, including Mobulids.	Mobulids
FAO Food and Agriculture Organization	**IPOA Sharks:** International Plan of Action for Conservation and Management of Sharks based on which states should adopt and implement a national plan of action for conservation and management of shark stocks (NPOA Sharks) if their vessels conduct directed fisheries for sharks or if their vessels regularly catch sharks in non-directed fisheries.	all species
GFCM General Fisheries Commission for the Mediterranean	**Rec.GFCM/42/2018/2:** shark species listed under Annex II of SPA/BD Protocol to the Barcelona Convention shall not be retained on board, transhipped, landed, transferred, stored, sold or displayed or offered for sale and must be released unharmed and alive to the extent possible.	*M. mobular*
IATTC Inter-American Tropical Tuna Commission	**Res. C-15-04:** Resolution on the conservation of Mobulid rays caught in association with fisheries in the IATTC Convention Area	all species
IOTC Indian Ocean Tuna Commission	**Resolution 19/03**: Resolution on the conservation of Mobulid Rays caught in association with fisheries in the IOTC area of competence.	all species
Sharks MOU Memorandum of Understanding on the Conservation of Migratory Sharks	**Annex 1**: Signatories should endeavor to achieve and maintain a favorable conservation status for these species based on the best available scientific information and taking into account their socio-economic value	all species
SPRFMO South Pacific Regional Fisheries Management Organisation	Considering both the precautionary approach and an ecosystem approach to fisheries management, SPRFMO adopts, as necessary, protocols and conservation measures meant to safeguard shark species related to fisheries in the area	all species

Instrument/Organiastion	Description	Species
WCPFC Western and Central Pacific Fisheries Commission	**CMM 2019-05**: Conservation and management measure on Mobulid rays caught in association with fisheries in the WCPFC Convention area.	all species

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About the Sharks MOU

The Memorandum of Understanding on the Conservation of Migratory Sharks (Sharks MOU) is the first global instrument for the conservation of migratory species of sharks, rays, skates and chimaeras.

The Sharks MOU is an instrument of the Convention on the Conservation of Migratory Species of Wild Animals (CMS) that engages all relevant stakeholders in addressing threats to migratory species in concert with all other aspects of wildlife conservation and management.

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