Introduction to Species
(Mobula Rays)

By
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History

- All manta rays species were listed under Appendix II CITES during CoP16 in 2013.
- In CoP 17, 2 species were proposed (M. japanica and M. tarapacana) but due to look a-like issues, all 9 recognised species of Mobulids were proposed to be listed in Appendix II CITES in CoP 17.
  - The top five M. japanica and M. tarapacana fishing countries (Sri Lanka, India, Peru, Indonesia and China),
  - CoP 17 CITES will be held in South Africa from 24th September to 5th October 2016

**PROPONENTS:**
- Republic of Fiji, Bahamas, Bangladesh, Benin, Brazil, Burkina Faso, the Comoros, Ecuador, Egypt, The European Union and its Member States, Gabon, Ghana, Guinea, Guinee-Bissau, the Maldives, Mauritania, Palau, Samoa, Senegal, the Seychelles, Sri Lanka, the United Arab Emirates, and the United States of America.

- Out of nine species five of them were recorded in the SEA region and three species in Japan

1. Mobula japanica *
2. M. tarapacana *
3. M. eregoodootenkee
4. M. kuhlii
5. M. thurstoni*
6. M. hypostoma
7. M. munkiana
8. M. mobular
9. M. rochebrunei

- Found in the SEA Region/* Found in Japan
- Found in other region
Geographical distribution of Mobulas species in the SEA Region and Japan

<table>
<thead>
<tr>
<th>Species</th>
<th>BD</th>
<th>Cam</th>
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**Mobula japanica** (Müller & Henle, 1841): IUCN Red list: Near Threatened (Global) and Vulnerable in Southeast Asia

Consider as the most abundant species in the SEA Region
Mostly caught as by-catch in drift gillnet targeted for tuna in Indonesia and Gill nets and trawlers in Malaysia.
Very important species for socio economy and livelihood for fishes in this region

**DW:** up to 3.2 m

***M. japanica*** traveled 1,400 – 1,800 km, at minimum speeds of 47 and 63 km per day, crossing high seas from New Zealand to Vanuatu and south of Fiji (Francis & Jones, 2016).
Data on the bycatch fishery and reproductive biology of mobulid rays (Myliobatiformes) in Indonesia

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Abstract

This paper provides some of the only fisheries and quantitative biological data for the Mobulidae (manta and devil rays), a group of large pelagic species that are widely distributed in tropical and warm temperate waters. The data were derived from 409 mobulids that were taken as bycatch of drift gillnet fisheries for the skipjack tuna Katsuwonus pelamis and subsequently examined at fish landing sites in Indonesia. The most abundant of the five species was Mobula japonica (~50%), followed by Mobula tarapacana (~24%), Manta birostris (~14%), Mobula thurstoni (9%) and Mobula cf kuhlili (2%). The four most abundant species were represented by a wide size range of each species and, in the case of Mobula japonica, by embryos, neonates and fully mature individuals. The disc width at maturity (DW50) of males, derived from the proportion of males at each size class with fully calcified claspers, ranged from 1538 mm for Mobula thurstoni to 3752 mm for M. birostris. As the claspers of males become calcified over a relatively narrow size range, the process of maturation is presumably relatively rapid. There is an increasing demand for various body parts of mobulids. Branchial filter plates, which are used for traditional Chinese medicines, are the most valuable, fetching as much as 30 SUS a kilo (dry weight). The skins are dried and deep fried and the flesh salted and dried and these are used for human consumption, while cartilage is dried for export as a filler for shark-fin soup. The very low fecundity of the large and probably long-lived mobulid rays make the stocks of their species particularly susceptible to further increases in fishing.

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Keywords: Mobulidae; Manta; Mobula; Indonesia; Biology; Fisheries

Source: White et al., 2006
Mobula tarapacana (Philippi, 1892): IUCN Red list: Data Deficient with SE Asian population as Vulnerable

Abstract

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M. tarapacana tagged in the Azores traveled straight-line distances up to 3,800 km over 7 months, crossing through oligotrophic tropical and subtropical waters (Thorrold et al. 2014). Source: White et al., 2006  DW: up to 3.7 m
**Mobula eregoodootenkee** (Bleeker, 1859): IUCN Red list: Near Threatened

As a precautionary measure to ensure the sustainability and conservation of the Mobula species in the Philippines, Fisheries Administrative Order 193 (FAO 193) or the “Ban on taking or catching, selling, purchasing and processing, transporting and exporting of whale sharks and manta rays” was issued by the Philippine Bureau of Fisheries and Aquatic Resources (BFAR) in April 1998. Moreover, as part of the measure and as requested by various communities and NGOs, rapid resource assessment (RRA) of the manta or devil rays in Philippine waters, particularly in Bohol Sea in Central Philippines, was conducted from April 2002 to March 2003. The results of the RRA suggested that the exploitation ratio (proportion of fishing mortality over the total mortality) of the rays has reached the critical level of 0.52. Of the total Mobulas caught during the study period, manta rays (*Manta birostris*) comprised 6% of the catch while the other species that include the bentfin devil ray (*Mobula thurstoni*), longfin devil ray, (*Mobula eregoodootenkee*), and shortfin devil ray (*Mobula khulii*) comprise the remaining 94% (unpublished report).

Source: Rayos et al., 2012
Mobula kuhlii (Müller & Henle, 1841): IUCN: Data Deficient

Devil rays (family Mobulidae) comprise nine living species measuring from 1 to about 4 m of disc width (DW), and distributed worldwide in warm temperate and tropical seas (Notarbartolo-di-Scaria, 1987; Last and Stevens, 1994). Four species of this genus have been reported in the Philippines (Compagno et al., 2005). As with sharks except for the piked dogfish Squalus acanthus, rays have also been generally considered by-catch of some major fisheries, especially from the late 1960s to early 1980s (Barut and Zartiga, 1997).

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Source: Rayos et al., 2012
**Mobula thurstoni** (Lloyd, 1908): IUCN Red list: Near Threatened

The "Mobula thurstoni" (Lloyd, 1908) is a species of ray known for its unique distribution and conservation status. This species is known for a disc width (DW) up to 3.1 meters, making it a notable species in the Order Rajiformes, Family Mobulidae. It is distributed worldwide in warm temperate and tropical seas and is considered a Near Threatened species by the IUCN.

As a precautionary measure, the Philippines has implemented measures to safeguard the Mobula species, including the issuance of Fisheries Administrative Order 193 (FAO 193) or the “Ban on taking or catching, selling, purchasing and processing, transporting and exporting of whale sharks and manta rays” was issued by the Philippine Bureau of Fisheries and Aquatic Resources (BFAR) in April 1998. Moreover, rapid resource assessment (RRA) of the manta or devil rays in Philippine waters, particularly in Bohol Sea in Central Philippines, was conducted from April 2002 to March 2003. The results of the RRA suggested that the exploitation ratio (proportion of fishing mortality over the total mortality) of the rays has reached the critical level of 0.52. Of the total Mobulas caught during the study period, manta rays (*Manta birostris*) comprised 6% of the catch while the other species that include the bentfin devil ray (*Mobula thurstoni*), longfin devil ray (*Mobula eregoodoottenke*), and shortfin devil ray (*Mobula khulii*) comprise the remaining 94% (unpublished report).
*Mobula mobular* (Bonnaterre, 1788): IUCN Red list: Endangered
Mobula munkiana (Notarbartolo di Sciara, 1987): IUCN Red list: Near Threatened
Mobula hypostoma (Bancroft, 1831): IUCN Red list: Data Deficient
Mobular rochebrunaei (Vaillant, 1879): IUCN Red list: Vulnerable
4.2 Population Size

- Global population sizes of *M. japanica*, *M. tarapacana* and all *Mobula* spp. are unknown. Without significant natural markings on which to base photo-identification studies (which are used to determine population sizes in genus *Manta*), efforts to quantify numbers of *Mobula* spp. are effectively limited to fisheries data, aerial surveys and studies that employ conventional tags. Such approaches have so far not produced reliable population estimates for these species.
- (INFORMATION ON LANDING DATA AT SPECIES LEVEL VERY LIMITED)

4.3 Population Structure

- Despite their broad ranges, *M. japanica* and *M. tarapacana* populations appear to be sparsely distributed, highly fragmented, and highly vulnerable to depletion (Clark *et al.* 2006, White *et al.* 2006a). Molecular analysis of subpopulations is underway (Poortvliet *et al.*, 2011) to determine how genetically distinct they are, but much work is still needed to define the population and species structure of genus *Mobula*. 
4.4 Population Trends

Global population numbers are unknown for *Mobula* spp. (Ward-Paige *et al.* 2013 - see Annex IV Figure 1).

Global catch of manta and mobula rays from five countries reported to FAO have risen from less than 1,000 t before 2005 to 6,319 t by 2013. (Sri Lanka, India, Indonesia (Indian Ocean) Peru and China (Pacific Ocean and South China Sea, International waters))
• In Indonesia, catches of *M. tarapacana* and *M. japanica* at the country’s three largest mobulid landing sites (Tanjung Luar, Lombok; Lamakera, Solor; Cilacap, West Java) declined dramatically over 10 to 15 years, despite evidence of increased directed fishing effort in Tanjung Luar and Lamakera (effort data were not available for Cilacap) (Lewis *et al.* 2015).

• *M. tarapacana* landings declined by 77% in Cilacap from 2001-05 to 2014 and by 99% in Tanjung Luar from 2001-05 to 2013-14. Over the same time periods, *M. japanica* landings declined by 50% in Cilacap and 96% in Tanjung Luar. Landings of *Mobula* spp. in Lamakera, primarily *M. tarapacana* and *M. japanica*, declined by 86% from 2002 to 2014.

• Need comprehensive landing data up to species level for clarification
• Rayos et al. (2012) reported increased landings of *M. thurstoni* and *M. eregoodootenkee* in 2010 surveys compared with 2002 in the Bohol Sea, concluding that these fisheries were sustainable.
Utilisation

- Almost all body parts were utilised
- Branchial filter plates (gill rakers) was exported for traditional medicines
- Skin are dried and deep fried for human consumption
- Flesh are utilise fresh/or salted and dried
- Cartilage is dried for export as a filler for shark-fin soup or cooking as soup for local consumption
By-catch of Mobula in SEA region

These species are occasionally caught as by-catch by trawlers and others traditional fishers especially in this region and fully utilised.
Mobula gill rakers/Gill plates

**Trade Names** (for Mobula Ray gill plates or rakers): English: Flower Gills, Fish Gills, Manta Gills, Ray Gills; Chinese: Peng Yu Sai.

*M. japanica* is the primary species landed in the markets and recorded in trade, and “white” gill plates from *M. tarapacana* are marketed separately.

A single mature *Mobula* can yield up to 3.5 kilos of dried gills that retail for up to US $557 per kilo in China.

Imported by Malaysian traders from Indonesia and re-exported to China
Price of Gill Plates

- High value *M. japanica* (black) and *M. tarapacana* (white) gill plates are the most important mobulid products in international trade.

- *M. japanica* gill plates retailing at up to US$290 per kg in Chinese markets, *M. tarapacana* gill plates (the largest gill plates after *Manta* spp.) selling at up to US$557/kg and other unidentified *Mobula* spp. retailing at up to US$317/kg (Heinrichs et al. 2011)

- Mobulid gill plate consumption occurs primarily in southern China with smaller markets in Hong Kong, Macau and Singapore (Heinrichs et al. 2011)

- The manager of a mobulid processing plant in Puqi, Zhejiang Province, China reported shipping *M. japanica* carcasses to a plant in Shandong, where the cartilage is processed to make chondroitin sulfate supplements for export to Japan and Britain (Heinrichs et al. 2011).
Markets

Price up to USD$500/kg

Photo credit: Manta ray of Hope, page 23,24
## Conclusion

### Summary: IUCN Red List Categories

<table>
<thead>
<tr>
<th>Species</th>
<th>IUCN Red List</th>
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<tbody>
<tr>
<td><em>M. japanica</em></td>
<td>Near Threatened (global) and Vulnerable in Southeast Asia</td>
</tr>
<tr>
<td><em>M. tarapacana</em></td>
<td>Data Deficient (global) and Vulnerable in Southeast Asia</td>
</tr>
<tr>
<td><em>M. eregoodootenkee</em></td>
<td>Near Threatened</td>
</tr>
<tr>
<td><em>M. kuhlii</em></td>
<td>Data Deficient</td>
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<tr>
<td><em>M. rochebrunei</em></td>
<td>Vulnerable</td>
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</table>
IUCN RED LIST CATEGORIES

- Extinct in the wild
  - Extinct
    - Critically endangered
      - Endangered
      - Vulnerable
    - Threatened
      - Endangered
      - Vulnerable
      - Lower risk
        - Near threatened
          - Least concern
        - Data deficient
          - Conservation dependent
      - Data deficient
      - Not evaluated
  - Adequate data
    - Evaluated
      - Evaluated
      - Not evaluated
      - Data deficient: 3 species
      - Near threatened: 4 species
      - Vulnerable: 1 species
      - Endangered: 1 species
Landings of mobulid and manta rays (t) reported to FAO by fishing Area, 1994-2014. (Source FishStat 2016)
1. Since only one species listed as endangered by IUCN, why another 8 species also need be listed?

2. Proposal should be considered as pre-mature due to limited regional and global scientific landing data.

3. Information on the impact on socio economy still scanty.