Devil Rays

In Dangerous Decline

Recognising the significant population declines of mobula rays worldwide, the Government of Fiji is proposing all nine species be listed on Appendix II of the Convention on International Trade in Endangered Species of Wild Fauna and Flora at the 17th Meeting of the Conference of the Parties in September 2016. As a nation that depends on the health of its oceans, Fiji is committed to helping halt the declines of mobula rays as shown by its recent efforts to list these species on Appendices I and II of the Convention on the Conservation of Migratory Species of Wild Animals (CMS) and the Annex to the CMS MoU for Migratory Sharks.

Mobula ray declines are a result of both severe targeted and incidental fishing pressure driven by the international demand for *Mobula* gill plates. These gill plates allow the mobula to strain plankton from the water for food, but once the rays are caught and these gill plates are dried, they are highly valued for use in Chinese medicine. A single mature *Mobula* can yield up to 3.5 kilos of dried gills that retail for upwards of $500 per kilo in China. The increase in demand is so sharp surveys show the number of individual rays represented in the market has almost tripled from early 2011 to late 2013.[1]

Targeted fisheries, which are mostly unregulated and unmonitored, are increasing due to the demand for gill plates. This increase in fishing pressure has led to local catch declines of up to 99% in the Indo-Pacific region in just the past ten to fifteen years.[2]

The need for global regulation of trade in mobula rays in order to prevent further significant population declines is clear. Rather than prohibiting trade, an Appendix II listing would ensure trade in mobula ray products is legally sourced and occurs at sustainable levels.

Photo: K.Vandevelde

1 O'Malley, M., Townsend, K., Hilton, P. (In Press) Characterization of the Trade in Manta and Devil Ray Gill Plates in China and Southeast Asia Through Trader Surveys. Aquatic Conservation: Marine and Freshwater Ecosystems.

2 Lewis SA, Setiasih N, Fahmi , Dharmadi , O'Malley MP, Campbell SJ, Yusuf M, Sianipar AB. (2015) Assessing Indonesian manta and devil ray populations through historical landings and fishing community interviews. PeerJ PrePrints 3:e1642 https://dx.doi.org/10.7287/peerj.preprints.1334v1

Global Distribution

There are nine species of mobula ray, all of which are proposed to be listed on Appendix II of CITES (Figure 1). Mobula rays are also commonly called devil rays due to their cephalic fins, which when rolled up look like horns projecting from their heads. The CITES proposal focuses on the two largest species of mobula rays with the most valuable gill plates and highest market demand – the Spinetail devil ray (*Mobula japanica*) and the Sicklefin devil ray (*Mobula tarapacana*). These two species have worldwide distributions, having been reported in both the tropical and temperate waters of the Pacific, Atlantic, and Indian Oceans, but their populations are highly fragmented as seen in Figure 2.[3] [4] [5] [6] Data on the remaining species indicate overlapping global distributions, which makes species specific identification extremely challenging (Figure 3).

NINE EXTANT SPECIES WITHIN THE GENUS *MOBULA* (RAFFINESQUE, 1810)

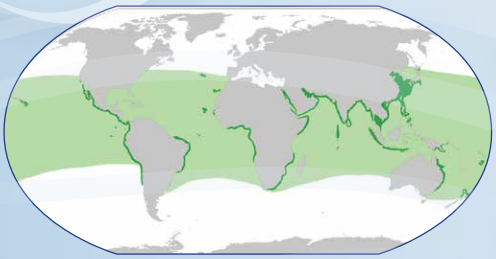
Scientific Name	Common Name
Mobula mobular (Bonnaterre, 1788)	Giant Devil Ray
Mobula japanica (Müller & Henle, 1841)	Spinetail Devil Ray
Mobula thurstoni (Lloyd, 1908)	Bentfin Devil Ray
Mobula tarapacana (Philippi, 1892)	Sicklefin Devil Ray
Mobula eregoodootenkee (Bleeker, 1859)	Longhorned Pygmy Devil Ray
Mobula kuhlii (Müller & Henle, 1841)	Shortfin Pygmy Devil Ray
Mobula hypostoma (Bancroft, 1831)	Atlantic Pygmy Devil Ray
Mobula rochebrunei (Vaillant, 1879)	Guinean Pygmy Devil Ray
Mobula munkiana (Notarbartolo-di-Sciara, 1987)	Munk's Pygmy Devil Ray

and any other putative Mobula species.

FIGURE 1

M. japanica © Guy Stevens

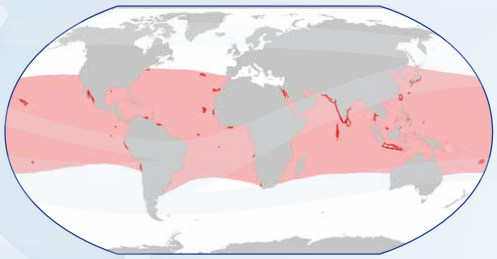
M. tarapacana © Tom Burd



M. japanica's probable range (light shading) and confirmed sightings (dark shading)

FIGURE 2

The Spinetail Devil Ray *M. japanica* is categorised by the International Union for Conservation of Nature (IUCN) on the Red List™ as Near Threatened globally and Vulnerable in Southeast Asia.



M. tarapacana's probable range (light shading) and confirmed sightings (dark shading)

FIGURE 3

The Sicklefin Devil Ray *M. tarapacana* is categorised by IUCN as Data Deficient globally and Vulnerable in Southeast Asia.

Photos: K.Vandevelde

3 Couturier, L.I.E., Marshall, A.D., Jaine, F.R.A., Kashiwagi, T., Pierce, S.J., Townsend, K.A., Weeks, S.J., Bennet, M.B., and Richardson, A.J. 2012. Biology, ecology and conservation of the Mobulidae. Journal of Fish Biology, 80: 1075-1119..

4 White, W.T., Clark, T.B., Smith, W.D. & Bizzarro, J.J. 2006. *Mobula japanica*. In: IUCN 2011. IUCN Red List of Threatened Species. Version 2011.2. www.iucnredlist.org

5 Clark TB, Smith WD, Bizzarro JJ 2006. Mobula tarapacana. The IUCN Red List of Threatened Species. Version 2014.3. www.iucnredlist.org.

6 Bustamante, C., Couturier, L. and Bennett, M. 2012. First record of Mobula japanica (Rajiformes: Myliobatidae) from the south-eastern Pacific Ocean. Marine Biodiversity Records; Volume 5; e48; 4 pages.

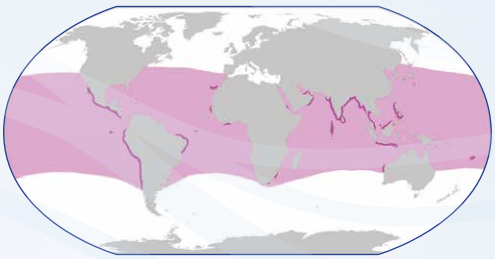
Mobula Rays

Mobula rays' behavioural and biological characteristics make them inherently vulnerable to overexploitation. They are one of the least fecund of all shark and ray species, giving birth to a single pup every two to three years after a gestation period of around one year.[7] [8] Certain species also form seasonal aggregations in order to mate or exhibit schooling behaviour, likely for protection from predators. This behaviour, in addition to their highly migratory nature, places them at greater risk of overexploitation from both commercial and artisanal fisheries. The rising demand for gill plates coupled with these characteristics has resulted in significant local declines of mobula ray populations over the last ten to fifteen years (Figure 4).

EXAMPLES OF DECLINES

Estimated Decline	Region	Time Period	Species
INDO-PACIFIC			
86%	Lamakera, Indonesia	12 years (2002 to 2014)	*M. tarapacana*, *M. japanica* and other Mobula spp.
99%	Tanjung Luar, Indonesia	7–13 years (2001–5 to 2013–14)	*M. tarapacana*
96%	Tanjung Luar, Indonesia	7–13 years (2001–5 to 2013–14)	*M. japanica*
77%	Cilacap, Indonesia	8–13 years (2001–5 to 2014)	*M. tarapacana*
50%	Cilacap, Indonesia	8–13 years (2001–5 to 2014)	*M. japanica*
PACIFIC			
78%	Cocos Islands, Costa Rica	21 years (Jan 1993 to Dec 2013)	*M. tarapacana* and other Mobula spp.
89%	Tumbes, Peru	14 years (1999 to 2013)	*M. japanica*, *M. munkiana*, *M. thurstoni* and *M. tarapacana*
>50%	Eastern Pacific	3 years (2006 to 2009)	Mobula spp.
ATLANTIC			
61%	Guinea	4 years (2004 to 2008)	Mobula spp.
INDIAN OCEAN			
>50%	India	10 years (1993–5 to 2012–13)	*M. tarapacana*, *M. japanica* and other Mobula spp.
Unspecified declines	Sri Lanka	2–5 years (2010 to 2015)	Mobula spp.

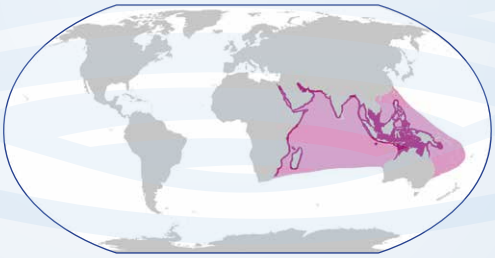
GLOBAL DISTRIBUTION



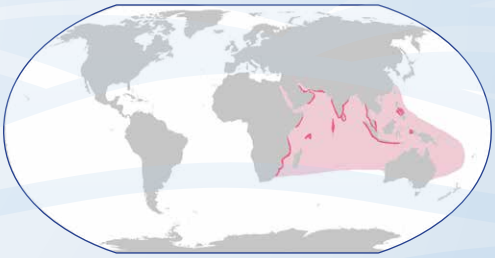
M. thurstoni

M. rochebrunei, *M. hypostoma* and *M. munkiana*

*M. mobular**



M. eregoodootenkee



M. kuhlii

*Morphological similarities between *M. japanica* globally and *M. mobular* from the Mediterranean Sea, raise questions regarding the validity of these two separate species. Investigations are currently underway to determine validity of species and possible existence of an isolated subpopulation.

Light shading denotes respective species probable range while dark shading are confirmed sightings.

FIGURE 4

Maps: Manta Trust

7 Notarbartolo di Sciara, G. 1988. Natural History of the Rays of the Genus Mobula in the Gulf of California. Fishery Bulletin 86(1): 45-66.

8 Dulvy NK, Pardo SA, Simpfendorfer CA, Carlson JK. (2014) Diagnosing the dangerous demography of manta rays using life history theory. PeerJ 2:e400 http://dx.doi.org/10.7717/peerj.400

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Management Gaps

Minimal protections exist globally for mobula rays. Of the regional fisheries management organisations (RFMO), only the Inter-American Tropical Tuna Commission and the General Fisheries Commission for the Mediterranean have passed resolutions to regulate catch of mobula rays. Beyond these protections, the remaining RFMOs have failed to take any action. Among the top five countries catching *M. japanica* and *M. tarapacana*, no management measures exist in their mobula fisheries.[9] The lack of management across the majority of these species' range leaves them vulnerable to continued overfishing driven by the demand for gill plates.

Protection through CITES

CITES has long been considered one of the most effective and enforceable tools to guarantee global trade does not threaten the survival of a species. An Appendix II listing of mobula rays is necessary to ensure the demand for gill plates does not continue to drive significant population declines. If listed, international trade will be supplied by legally obtained products from sustainably managed fisheries, preventing the need for an Appendix I listing, which would entirely prohibit trade of mobula ray products.

Previous Ray Listings on CITES and Tools for Future Success

In March 2013, Parties to CITES added both species of manta ray (*Manta birostris* and *M. alfredi*) to CITES Appendix II. The protections went into effect on September 14, 2014 and implementation efforts to date have been a global effort. Manta rays are also prized for their gill plates and both national and regional level workshops have been held across the world to assist governments to effectively implement these listings. The workshops
focus on training
officials to visually ID manta ray gill plates, develop non-detriment findings that would allow for sustainable trade to continue, and explore how CITES listings can complement other management measures such as those in RFMOs or CMS. Workshops to ensure the effective implementation of the 2013 CITES shark and ray listings will continue in addition to potential workshops focusing on implementation of future listings.

The listing of mobula rays on CITES Appendix II would complement the current manta ray Appendix II listings because manta and mobula rays are often caught in the same fisheries and their gill plates move through similar supply chains. Additionally, because mobula and manta ray gill plates can be difficult to distinguish depending on the species, listing both will streamline implementation and enforcement efforts.

Experts have developed identification guides for mobula gill plates, similar to those used for the manta ray listings. These identification guides lay the foundation for successful implementation efforts, which would include continued assistance with training relevant officials such as wildlife inspectors, customs agents, and fisheries personnel on species identification to ensure the listings are meaningful and enforced properly.

Conclusion

Mobula ray populations have experienced drastic declines in recent decades. The demand for mobula products will continue to drive poorly controlled fisheries and push these species toward extinction unless global trade protections are implemented. A CITES Appendix II listing offers a chance for these species to recover and ensure sustainable trade can continue into the future.

9 Heinrichs, S., O'Malley, M., Medd, H., Hilton, P. 2011. Manta Ray of Hope 2011 Report: The Global Threat to Manta and Mobula Rays. WildAid, San Francisco, CA.

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