

# Field Identification Guide of the Prebranchial Appendages (Gill Plates) of Mobulid Rays for Law Enforcement and Trade Monitoring Applications

The genus *Manta*, which includes the oceanic manta ray (*Manta birostris*) and the reef manta ray (*Manta alfredi*), is proposed for inclusion in Appendix II at the 16th Conference of the Parties to the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES).

Manta rays are closely related to mobula rays, of which there are nine species. Together, these species comprise the family of Mobulidae and are known as the “mobulid rays.”

Manta rays are found throughout the world’s tropical and temperate oceans. They are large animals with few natural predators. The manta ray’s biological characteristics make them highly vulnerable to directed fisheries. They take a long time to reach sexual maturity, have long gestation periods, and often give birth to a single pup. Both species of manta rays are considered Vulnerable by the IUCN Red List of Threatened Species.



**Effective enforcement and monitoring of international trade will be enhanced through the ability to easily distinguish between the gill plates of the mobula rays and those of manta rays.**

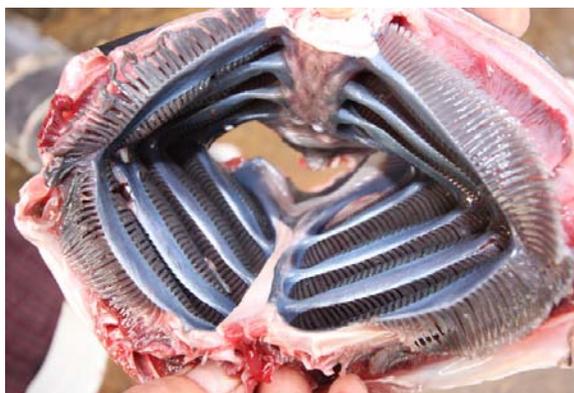
**This guide is intended to help enforcement and customs personal in the provisional identification of manta rays and manta gill plates. Definitive DNA tests are also available to confirm visual identification if needed for prosecution or verification purposes.**

## Prebranchial Appendages (Gill Plates)

All mobulid rays are filter feeders, using their mouths and modified gill rakers to strain plankton and small fishes from the water. Each mobulid ray has five pairs of gill slits, each of which is encircled internally by a ring of feathery gill filaments known as prebranchial appendages or “gill plates.”



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Feathery prebranchial appendages encircle the gill slits inside the mouth of a mobulid ray.

## Mobulid Ray Fisheries

The gill plates of manta and mobula rays are used in Asian medicine. As a result, there is an increasing demand, driving a global fishery.

When the gill plates are removed from the dead animals, they are cut in half before being dried and then shipped to the point of sale.



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## Gill Plate Trade

Gill plates from five different types of manta and mobula rays have been found in the gill plate trade (Townsend *et al.* in prep). Gill plates from the two species of manta rays can be visually identified from the other species.

Gill plates from the sickle-fin devil ray (*Mobula tarapacana*) are known as “flower gills” in the gill plate trade.



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## Distinguishing Features

In general, mobula rays are much smaller than the mantas and can be distinguished by morphological differences in their mouths.

Mobula rays have a bottom jaw which is undercut, so that when their mouths are closed, the edge of the lower jaw rests much further back than the upper jaw (ventral). The manta ray's jaws are aligned evenly (terminal).

**Is the mouth terminal?**

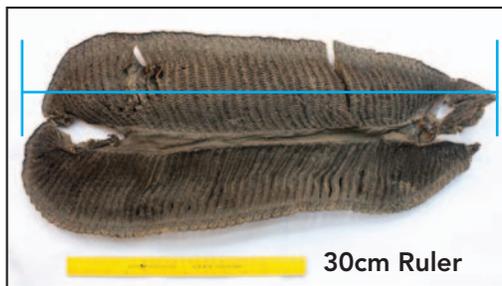
<b>YES</b> <b>Manta: Terminal Mouth</b>	<b>NO</b> <b>Mobula: Ventral Mouth</b>
	
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## Gill Plate Distinguishing Features

There are three key features that can be used to easily identify each gill plate type:

- 1) Gill Plate Size
- 2) Gill Plate Colour
- 3) Gill Plate Filament Edging

**1. Size:** measured as the total length of the traded gill plate

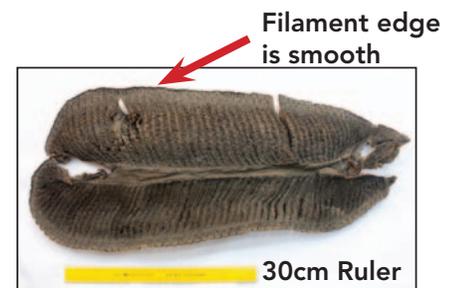


## Manta Ray Gill Plates — *Manta birostris* & *M. alfredi*

1. Gill Plate Size = Large (more than 30cm)
2. Gill Plate Colour = Uniform Brown/Black
3. Filament Edging = Smooth



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## Key to Visual Identification of Traded Mobulid Ray Gill Plates

### Question 1:

Is the gill plate longer than 30cm and uniform dark brown/black in coloration?

**Yes** = Manta  
**No** = Mobula

### Question 2:

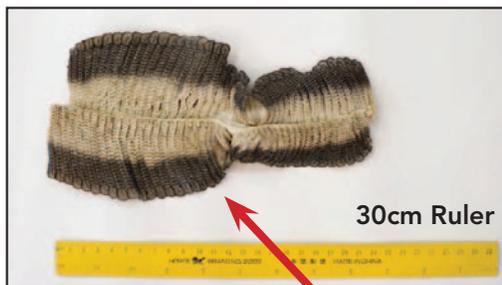
Does the gill plate have central or white edges and/or separated bristled filament tips?

**Yes** = Mobula  
**No** = Manta

### Mobula



**2. Colour:** bicoloured (below) or uniform (above)



**3. Filament Edging:** smooth (above) or separated/bristled (below)



Gill Plate images © Paul Hilton

## Conclusions

Manta ray gill plates can easily be distinguished from the traded mobula ray species' gill plates using this simple visual ID Guide.

The size, colour patterning, and filament edging of the gill plates can be used as an effective and easy indicator to determine the species of origin.

Manta ray gill plates are uniform brown/black in colour and usually much larger than their mobula ray counterparts.



Sickle-fin devil ray—*Mobula tarapacana*

Spine-tail devil ray—*Mobula japonica*

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