

GIANT MANTA RAY

By Libby Hopkins

The Giant Manta Ray is the world's largest ray with a wingspan of up to 26 feet. They are filter feeders and eat large quantities of zooplankton. Giant Manta Rays are slow-growing, migratory animals with small, highly fragmented populations that are sparsely distributed across the world.

The main threat to the giant manta ray is commercial fishing, with the species both targeted and caught as bycatch in a number of global fisheries throughout its range. Manta Rays are particularly valued for their gill plates, which are traded internationally. In 2018, Giant Manta Rays were listed as threatened under the Endangered Species Act.

The global population size is unknown. With the exception of Ecuador, the few regional population estimates appear to be small, ranging from around 600 to 2,000 individuals, and in areas subject to fishing, they have significantly declined. Ecuador, on the other hand, is thought to be home to the largest population of Giant Manta Rays, comprising over 22,000 individuals, with large aggregation sites within the waters of the Machalilla National Park and the Galapagos Marine Reserve. Overall, given their life history traits, particularly their low reproductive output, Giant Manta Ray populations are inherently vulnerable to depletions, with low likelihood of recovery. Additional research is needed to better understand the population structure and global distribution of the Giant Manta Ray.

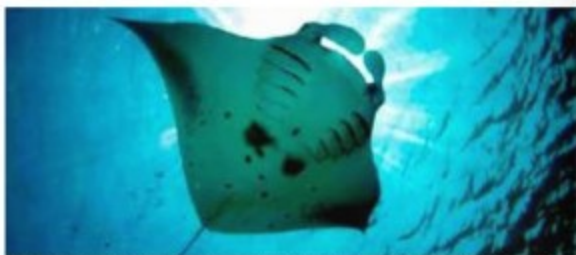
Manta Rays are recognized by their large diamond-shaped body with elongated wing-like pectoral fins, ventrally placed gill slits, laterally placed eyes and wide, terminal mouths. In front of the mouth, they have two structures called cephalic lobes, which extend and help to channel water into the mouth for feeding activities, making them the only vertebrate animals with three paired appendages.

Manta Rays come in two distinct color types: chevron, mostly black back and white belly and black, almost completely black on both sides. They also have distinct spot patterns on their bellies that can be used to identify individuals.

There are two species of Manta Rays. The Giant Manta Ray, or the *Mobula birostris*, as it's known by its scientific name, and the Reef Manta Ray, or the *Mobula alfredi* as it's known by its scientific name. Giant Manta Rays are generally larger than Reef Manta Rays, have a caudal thorn, and rough skin appearance. They can also be distinguished from Reef Manta Rays by their coloration.

The Giant Manta Ray is a migratory species and seasonal visitor along productive coastlines with regular upwelling, in oceanic island groups, and near offshore pinnacles and seamounts. The timing of these visits varies by region and seems to correspond with the movement of zooplankton, current circulation and tidal patterns, seasonal upwelling, seawater temperature and possibly mating behavior.

Although the Giant Manta Ray tends to be solitary, they aggregate at cleaning sites and to feed and mate. Manta Rays primarily feed on planktonic organisms such as euphausiids, copepods, mysids, decapod larvae, and shrimp, but some studies have noted their consumption of small and moderately sized fish as well.



When feeding, Mantas hold their cephalic fins in an "O" shape and open their mouths wide, creating a funnel that pushes water and prey through their mouth and over their gill plates. Manta rays use many different types of feeding strategies, such as barrel rolling, doing somersaults over and over again, and creating feeding chains with other mantas to maximize prey intake.

Giant Manta Rays also appear to exhibit a high degree of plasticity or variation in terms of their use of depths within their habitat. During feeding, Giant Manta Rays may be found aggregating in shallow waters at depths less than 10 meters. However, tagging studies have also shown that the species conducts dives of up to 200 to 450 meters and is capable of diving to depths exceeding 1,000 meters. This diving behavior may be influenced by season and shifts in prey location associated with the thermocline.

The Giant Manta Ray is found worldwide in tropical, subtropical, and temperate bodies of water and is commonly found offshore, in oceanic waters, and in productive coastal areas. The species has also been observed in estuarine waters, oceanic inlets, and within bays and intercoastal waterways. Manta Rays have among the lowest fecundity of all Elasmobranchs, a subclass of Cartilaginous Fish, typically giving birth to only one pup every two to three years. Gestation is thought to last around a year. Although Manta Rays have been reported to live at least 45 years, not much is known about their growth and development.

The most significant threat to the Giant Manta Ray is overutilization for commercial purposes. Giant Manta Rays are both targeted and caught as bycatch in a number of global fisheries throughout their range and are most susceptible to artisanal fisheries and industrial purse-seine fisheries.

Efforts to address overutilization of the species through current regulatory measures are inadequate, as targeted fishing and illegal retainment of the species still occur despite prohibitions in a significant portion of the species' range. Also, measures to address and minimize bycatch of the species in industrial fisheries are rare.

Demand for the gill plates of Manta and other *Mobula* Rays has risen dramatically in Asian markets. With this expansion of the international gill plate market and increasing demand for Manta Ray products, estimated harvest of Giant Manta Rays, particularly in many portions of the Indo-Pacific, frequently exceeds numbers of identified individuals in those areas and are accompanied by observed declines in sightings and landings of the species of up to 95 percent.

Other potential threats that should be monitored include entanglement, vessel strikes, marine debris/pollution, climate change, recreational fishing interactions, tourism, and the aquarium trade.