MEMORANDUM OF UNDERSTANDING ON THE CONSERVATION OF MIGRATORY SHARKS

CMS/Sharks/MOS2/Doc.8.2.4/ Rev.1

22 September 2015

Original: English

Second Meeting of the Signatories
San José, Costa Rica, 15-19 February 2016
Agenda Item 8

PROPOSAL FOR THE INCLUSION OF THE GIANT MANTA RAY, *MANTA BIROSTRIS,* IN ANNEX 1 OF THE CMS MEMORANDUM OF UNDERSTANDING ON THE CONSERVATION OF MIGRATORY SHARKS

(Prepared by the Secretariat)

1. The present proposal for the inclusion of the entire population of the Giant Manta Ray (*Manta birostris*) in Annex 1 to the MOU represents the original proposal for inclusion of the species in CMS Appendix I and II, submitted as UNEP/CMS/COP10/Proposal I/5.Rev.1&II/3Rev.1 by the Government of Ecuador to the 10th Meeting of the Conference of the Parties (CMS COP10). The proposal was subsequently adopted by the Parties.

2. As agreed at the 1st Meeting of the Signatories (MOS1) and in line with the procedure explained in CMS/Sharks/MOS2/Doc.8.2.1, the original proposal is now being resubmitted for consideration by the Second Meeting of the Signatories (MOS2). Signatories are requested to consider the inclusion of *Manta birostris* in Annex 1 of the Memorandum of Understanding on the Conservation of Migratory Sharks (Sharks MOU) based on the information provided in this document.

3. The Advisory Committee of the MOU has presented a review of the proposal in CMS/Sharks/MOS2/Doc.8.2.10 in which the Committee recommends the entire population of *Manta birostris* for inclusion in Annex 1.

PROPOSAL FOR INCLUSION OF SPECIES ON THE APPENDICES OF THE CONVENTION ON THE CONSERVATION OF MIGRATORY SPECIES OF WILD ANIMALS

(Originally submitted as UNEP/CMS/COP10/Proposal I/5.Rev.1&II/3Rev.1 to CMS COP10 by the Government of Ecuador on 19 October 2011)

A. PROPOSAL: Inclusion of the species *Manta birostris* Giant manta ray in Appendix I and II.

B. PROPONENT: Government of Ecuador.

C. SUPPORTING STATEMENT:

1. Taxon

1.1	**Class**	**:**	Chondrichthyes, subclass Elasmobranchii
1.2	**Orde**	**:**	Rajiformes
1.3	**Family**	**:**	Mobulidae
1.4	**Genus**	**:**	*Manta* (Dondorff, 1798)
1.5	**Common name(s):**		when corresponding
		English:	Giant manta ray, Chevron manta ray, Pacific manta ray, Pelagic manta, Oceanic manta ray
		French:	Diable de mar
		Spanish:	Manta Diablo, Manta gigante, Manta voladora, Manta comuda, Manta raya, Manta atlantica
		Dutch:	Duivelsrog
		German:	Teufelsrochen
		Portuguese:	Jamanta, urjamanta
		Japanese:	Oniitomakiei

2. Biological data

The family Mobulidae encompasses two genera: *Manta* and *Mobula*. This group is characterized by the presence of one lobe on each side of the head, wing-liked pectoral fins, terminal mouth and a stingless tail (Notarbartolo-Di-Sciara 1987a) (Figure 1). Two species have been identified within these genera, *M. birostris* and *M. alfredi* also known as "Reef manta ray". Genetic evidence further confirms the existence of two separates species (Ito and Kashiwagi 2010). *M. birostris* is the largest, reaching up to 6.5 m wide and weighing up to 1,400 kilograms (Last and Steven 1994). The Giant manta is a highly migratory species that lives mainly in pelagic ecosystems (Compagno et al. 2005). Mantas are filter feeders. Their frontal lobes help driving water to their mouths where planktonic organisms are filtered. Like other elasmobranchs, the Giant manta has long gestation periods and low fecundity, which makes them highly vulnerable to any kind of exploitation or fishery (Bigelow and Schroeder 1953, Homma et al. 1999, Clark 2001).

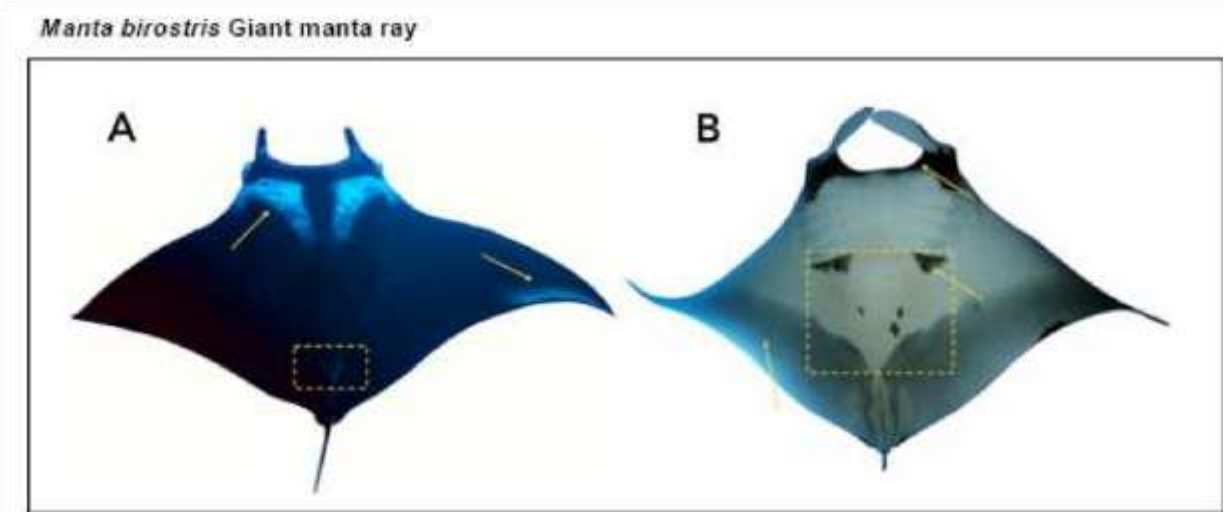

Figure 1 Natural colour *M. birostris*. Source Andrea Marshall

2.1 Distribution (actual and historical)

Manta birostris is distributed in tropical and subtropical waters throughout the world, therefore it is considered a circumglobal species (Bigelow and Schroeder 1953, Kashiwagi et al. 2011). Giant mantas are mostly pelagic and can be seen in coastal and open waters. They have been observed feeding in areas of high productivity (Dewar et al. 2008). Given their pelagic lifestyle, wide range of distribution and migratory nature of *M. birostris*, national management and protection plans are not sufficient to effectively conserve their populations; therefore regional and global conservation actions are needed urgently.

2.2 Population (estimates and tendencies)

Photo-identification studies in Brazil (Osmar et al. 2008), Mexico (Rubin unpublished), Hawaii (Clark unpublished), Maldives (Marshall 2009) and Ecuador (Baquero et al. unpublished) indicate that local populations sizes can range in the order of 50 to 600 individuals. Global population sizes are difficult to assess due to its wide distribution, migratory lifestyle, and its recent split from *M. alfredi*. Further there is a distinct paucity of information on population dynamics and local populations are likely to decline in areas of fisheries or where anthropogenic activities have been identified as a major threat to the species (Alava et al. 2002, White et al. 2006, Anderson et al. 2010 in Marshall et al. 2011). Overall, the rate of population reduction appears to be high in several regions, up to as much as 80% over the last three generations (approximately 75 years), and globally a decline of >30% is strongly suspected (Marshall et al. 2011).

2.3 Habitat (brief description and tendencies)

M. birostris lives in tropical and subtropical waters. They are often sighted over reefs, islands and continental shelf. T. Clark (unpublished data) indicates an active presence of mantas on cleaning stations, which are areas where they eliminate skin parasites or clean their wounds. In Ecuador mantas gather yearly around La Plata Island as their main identified cleaning station in the coast of the country (Baquero et al. unpublished). Data from acoustic tracks indicate that mantas migrate in short periods between cleaning stations and feeding ground (Clark

unpublished data, Baquero et al. unpublished, Hardin and Bierwagen unpublished). The species shows a circadian swimming behavior. During the day it inhabits 3 of 11 shallow reefs and superficial waters while migrating vertically at night to deeper waters (Dewar et al. 2008).

2.4 Migration (types of movement, distances, proportion of the population that migrates)

Satellite tracking results have been able to reveal that the species is capable of large migrations (over 1,100 km straight line distance) and have monitored individual movements across international borders, across large bodies of water, and into international waters (A. Marshall et al. unpubl. data, R. Rubin pers. comm. 2009). Due to its specific food (zooplankton) and reproductive habitat requirements it is more likely that migratory movements in this species respond to location of productive (up welling) areas. The gregarious behavior of mantas is attributed to food, but also to reproductive responses (Bigelow and Schroeder 1953). It is still not completely understood why they appear in a particular time of the year in certain parts of the world, nor how big the migrant population is, as in the case of La Plata Island in the coast of Ecuador (Hardin and Bierwagen unpublished data) In 2009, Ecuador´s Ministry of Environment started a tagging program using coded acoustic tags (Vemco V16) and so far 15 animals have been tagged at La Plata Island, Machalilla National Park. Preliminary results indicate connection between two identified cleaning stations and some site fidelity has been observed (Baquero et al. unpublished data). In 2011 three satellite transmitters were installed on mantas (Wildlife Computers) by the Galapagos and Machalilla National Park Services in order to understand migratory patterns of individuals and evaluate potential connection between populations along the coast and around the Galapagos Islands as well as neighboring countries. Information from other regions of the world demonstrates *M. birostris* abilities to perform long migrations. Satellite tracking studies using archival PAT tags have registered movements of the Giant manta ray from Mozambique to South Africa (a distance of 1,100 km), from Ecuador to Peru (190 km), from the Yucatan, Mexico into the Gulf of Mexico (448 km) (Marshal et al. 2011). Despite its migratory life style, regional populations have been estimated to be small relatively to its wide distributional range and, site fidelity to critical habitats such as cleaning stations and feeding sites have been shown (Marshall et al. 2011). Further, a low rate of exchange of individuals between populations is suggested (Marshall et al. 2011).

3. Threat data

The populations of the species have shown a substantial decline during the last decade. In 2006 the species conservation status was evaluated by IUCN as Near-threatened. More recent evidence clearly demonstrates the species is globally threatened. In 2011 the status was reevaluated and changed to Vulnerable, due to increased human exploitation, by catch and other direct and indirect threats.

3.1 Direct threats to the population (factors, intensity)

M. birostris has biological characteristics that make it very vulnerable to human exploitation such as direct or indirect fishing activities. Heinrichs et al. 2011 gathered fishery information of several countries indicating the existence of some important fishing grounds for this species, and also the reported reduction of sighting near fishing areas.

Currently direct and by catch fisheries are the main threats to the population. The recent increment of the demand for meat, gill filaments and other products has determined a dangerous increase in fishing around the world. Direct fisheries for local consumption occurs in certain areas of the world as Sri Lanka/India and used to be important around the Philippines, however considering the great extent of use and need for protection, these countries decided to prohibit its consumption. An illegal market has been also identified mostly to export manta and mobula parts to Asian markets (Heinrichs et al. 2011).

In Ecuador, *M. birostris* is considered by fishermen a by catch species. This species has not been identified as a target for direct fishery, however it was detected that the decline in catches of other commercial species promoted the capture of *M. birostris* as a fishing partner (Figure 2). An artisanal fishery observer program in Ecuador registered a total of 14 manta and mobula by catch events in 329 fishing trips from 2008 to 2011. In all but two of these observed catches, the animals were released alive (Baquero et al. unpublished data). In 2010, Ecuador´s fishing and environmental authorities banned the manta and mobula fishery completely and enacted the Ministerial Agreement 093 (http://www.subpesca.gob.ec/subpesca348-acuerdo-ministerial-n-093-prohibicion-depescadirigida-de-mantarrayas.html). Without this protection and control, a directed fishery for mantas could have soon started and settled, as it did for mobulas before being eliminated by this agreement.

Evidences from other threats related to fisheries, such as wounds from sport fishing and entanglement in nets can also have detrimental effects on survival and population decline. To aggravate the threats related to fishing, this species has a very conservative life history with an extremely low reproductive output (one pup per litter). These biological constraints would also contribute to its slow or lack of recovery from population reductions.

3.2 Habitat destruction (quality of the changes, quantity lost)

Coastal areas have been in high demand around the world. Coastal development causes erosion and destruction of critical marine habitats to the species. In addition, increasing human population along coastal line causes the release of chemicals, liquid and solid wastes that destroy significant areas like cleaning stations and areas for assembly of marine species (Last and Stevens 1994; Bray and Hawkins 2000). In addition to the deterioration of habitat, poisoning can also cause bioaccumulation of chemicals and heavy metals in organisms, which in turn may degenerate into birth defects and affect the reproductive ability of this marine species (Koop and Hutchings 1997; Crowe 2000; Thurman and Trujillo 2004; Deakos et al. 2011). Other negative impacts on the habitat may be caused by the increase in marine traffic; marine debris and an excessive use of aggregation areas by humans, which may affect their normal habits.

3.3 Indirect threats (e.g., reduction in the number of pubs saved due the chemical pollution)

The existence of anthropogenic pressures such as pollution and exploitation of coastal environments, pose a threat to certain critical areas such as parenting and rearing areas, which are places used as shelter for their offspring and it is in these places where the species congregates in masses.

3.4 Threats related directly to migration

There is a concern regarding the limitations of implementing national management strategies alone because of the highly migratory behavior of the species. Protection efforts by the countries in of offshore and coastal waters will not be sufficient, since a good part of the life cycle occurs in international waters, which are not legally protected nor regulated. Therefore it is critical to establish regional protection plans for the mantas.

3.5 National and international utilization

The demand for this species has grown in recent years. Mantas that used to be considered by catch are now kept and processed (Notarbartolo-di-Sciara 1987b; Alava et al. 2002; Marshall et al. 2006; White et al. 2006; Hilton unpublished data). Many parts of the body are used for traditional medicine, tallow, leather, and a recent demand for gill-rakers all of which have placed the species in a threatened position and classified it as vulnerable on the IUCN Red List of endangered species (Marshall et al. 2011).

Figure 2: Diver taking pictures of Manta, Machalilla National Park (Ecuador), Photo. Felipe Vallejo, Equilibrio Azul

The tourism industry worldwide has increased in recent years. Specifically, diving tourism has been part of this growth thanks to technological advances and human attitude changes that have allowed man to experience marine life. However, this non-extractive activity depends directly on the conservation of the marine realm. Therefore, species such as the Giant manta have become a major attraction around the world. In this context, manta hotspots such as feeding and cleaning stations are major diving destinations worldwide. A well-managed tourism industry can positively contribute to the conservation of the marine environment, while being economically profitable for the human communities that use the resources sustainably (Norman and Catlin 2007).

A good example of the increase of diving activities is the Galapagos National Park, one of the largest marine protected areas of the world. In this area giant mantas are frequently observed at

Punta Cormorant, Devil's Crown, Darwin Bay, Academy Bay, Mosquera, Gordon Rocks, Isabela and Fernandina. Galapagos marine tourism is a very important income source for Ecuador and the Islands. It is estimated that in 2000 about $210 million entered Ecuador from tourism in the Galapagos (Danulat and Edgar 2002). Being the giant manta a major attraction for this industry, their conservation is a key objective of the authorities. Likewise, La Plata Island, located in the coast of the country within the Machalilla National Park boundaries, can be considered the most important diving site of the coast of Ecuador. This activity is recent and in 2010 Ecuador´s environmental authority established a limit on the number of boats and divers per site to further protect mantas. Unlike Galapagos where sharks are the main attraction for divers, in the coast undoubtedly the giant manta is responsible for the growth and future of this activity.

4. Protection status and needs

4.1 National protection status

On August 26, 2010, the Government of Ecuador enacted a law prohibiting any type of fishery for all species of mantarays and mobulas. Nowadays, it is illegal to fish for mantas or mobulas in Ecuadorean waters. Any animal incidentally caught must be returned immediately to the sea, and cannot be retained alive or dead, whole or in part, for human consumption or for export.

The official prohibition through Ministerial Agreement 093 (MA 093) was established due to the rapid establishment of a *Mobula* sp. fishery in the country. A total of 8.269 mobulas and one *M. birostris* were observed in Puerto Lopez y Santa Rosa prior to the banning. Nearly 80% of the observed fish were recorded in the first half of 2010 prior to the banning (Baquero et al. unpublished data). This fishery was considered a directed catch by Ecuador´s fisheries authority and considering the nature of these animals it was banned.

Local fishermen indicated that the mobulidae fishery occurred because of a sudden demand for meat by Peruvian markets. Heinrichs et al. (2011) report an alarming situation for mobulas and mantas in Peru, where they are heavily fished in some areas. This indicates an urgent need of regional protection of this resource due to its migratory potential. Despite this, *M. birostris* does not yet appear in international and regional conservation treaties.

4.2 International protection status

Manta rays are internationally recognized as Vulnerable by the IUCN (www.iucnredlist.org). *M. birostris* is considered as highly susceptible to anthropogenic threats. Being a migratory pelagic species that is often observed feeding in the surface; mantas are highly susceptible to direct or by catch fishing incidents (Dewar 2002). The lack of an international protection jeopardizes the future of these animals. Their migratory characteristic makes it necessary to develop regional and international plans to reduce the impact of human pressure on their abundance and distribution (Marshall et al. 2011).

Additionally, the aggregation of mantas in some coastal areas (cleaning stations) and their short and long periodical migrations between the same areas may create genetically isolated populations (Deakos et al. 2011). Since fishermen and divers know aggregation spots, these

areas should be protected regionally to prevent massive depletions of an animal that can be easily harpooned (Dewar 2002; Dewar et al. 2008).

Imminent Protection in Mozambique - 2011

Protected in New Zealand - 2010
Absolutely protected in New Zealand under the Wildlife Act 1953

Protected in Ecuador – 2010
On the 26th August 2010 the Subsecretaria de Recursos Pesqueros declared "Acuerdo 093". A new law prohibiting all fishing of Mantas and Mobulas in Ecuador states.

Protected in the United States – 2009
In 2009 the governor of Hawaii signed House Bill 366 creating Act 092(09) establishing criminal penalties and administrative fines for knowingly killing or capturing manta rays within State waters.

Protected in the Republic of Maldives – 2009
In June 2009 the Maldivian Government announced the creation of two new Marine Protected Areas (MPA's), specifically identified for protection because of their importance as areas of critical habitats for the Maldives population of *Manta* and the occasional transient *Manta birostris.*

Western Australia – 2009
Manta rays whilst not targeted are protected from any fishing (Fisheries Act) and disturbance or harassment (DEC Act) within Marine parks only.

Protected in Yap - 2008
A marine protected area for manta rays has been created in Yap under the approval of Governor Sebastian Anefal.

Protected in Philippines - 2003
Species were protected after a study that will show the huge number of caught, especially around the Bohol Sea where the fishery was focused.

Protected in Mexico - 2002
NOM 029 provides specific protection for mantas and mobulids in all Mexican waters and prohibits their possession and trade.

4.3 Additional protection needs

The life history characteristics of *M. birostris* would make any constant extractive activity on this species highly unsustainable. Fisheries must be stopped so the stocks can rebuild and become healthy again. The creation of Marine Protected Areas (MPA) can also help protect *M. birostris*, reducing their exposure to anthropogenic pressure.

As *M. birostris* is a highly migratory species, threats often arise outside of Exclusive Economic Zones (EEZs) and marine protected areas, for this reason it is of great importance to place it in

the Appendices of the Convention on Migratory Species, as it would contribute to the protection of migratory corridors, critical habitat and areas of congregation.

Further research is needed to quantify the level of directed and undirected fisheries on the species. We must recognize that pelagic fishing has been a threat for many years (H. Dewar, personal comm.) and there is mounting evidence that there is a growing direct fishing activity of this species around the world.

On the other hand, many communities around the world depend on these animals in an economic and cultural way, and there are specific sites where locals depend on diving tourism (based mostly on manta rays). This adds economic value to this species apart from their biological value.

5. Range States

***Manta birostris* Giant Manta**

Region	Country	CMS Party
Eu - Europe	Portugal	X
	Spain	X
Af - Africa	Djibouti	X
	Egypt	X
	Kenya	X
	Mozambique	X
	Senegal	X
	Seychelles	X
	Sudan	
	South Africa	X
	United Republic of Tanzania	X
As - Asia	India	X
	Indonesia	
	Japan	
	Malaysia	
	Myanmar	
	Philippines	X
	Sri Lanka	X
	China	
	Thailand	
	Maldives	
Oc - Oceania	Australia	X
	New Zealand	X

Region	Country	CMS Party
	(USA) Northern Mariana Islands	
SCA – South & Central America & the Caribbean	Belize	
	(UK) Bermuda	
	(UK) Cayman Islands	
	Brazil	
	Colombia	X
	Costa Rica	X
	Cuba	
	Dominican Republic	X
	Ecuador	X
	El Salvador	
	(France) Clipperton Island	
	(France) French Guiana	
	Guatemala	
	Guyana	X
	Honduras	X
	Jamaica	
	Mexico	
	(Netherlands) Netherlands Antilles	
	Nicaragua	X
	Panama	X
	Peru	X
	Trinidad and Tobago	
	Uruguay	
	Venezuela	
NA – North America	United States of America	

6. Comments from Range States

7. Additional remarks

8. References

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