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Proposals Submitted by Parties of Species for listing under the Annexes of the SPAW Protocol

The Kingdom of The Netherlands

Proposal of the Kingdom of the Netherlands for listing of two shark species on the Annexes of the SPAW Protocol

Executive Summary

The Kingdom of the Netherlands is proposing to list the largetooth sawfish on Annex II and the silky shark on Annex III of the SPAW Protocol.
We feel the listing of these two species is justified for the following reasons:

Largetooth sawfish (*Pristris pristis*)

The shark specialist group of the IUCN has classed the sawfish family as the most endangered elasmobranch group. Their long lifespan and slow reproduction coupled with a high change of capture in coastal fisheries makes them extremely vulnerable and at risk of extinction. In 2017 the small tooth sawfish was listed under the SPAW protocol Annex II, we now propose to add the other Caribbean species, the large tooth, as well. The justification is similar to the small tooth with the added reasoning that it is still found in several Caribbean countries but critically endangered in all of them.

Silky shark (*Carcharhinus falciformis*)

In 2017 the silky shark was added to CITES appendix II as a species for which international trade needs to be regulated and better fisheries management is warranted. The species occurs regularly in Caribbean water, recently a population of sub-adult silky sharks was discovered on the Saba Bank, and is (by)caught in pelagic and off shore fisheries. There is active international trade in the species as it is of great value to the fin market (it is one of 3 most common species in the fin trade) but there is only limited knowledge of stock structure and migration pattern. A listing on Annex 3 of the SPAW protocol would help in aligning national management of the species with international obligations under CITES and ICCAT.

Proposal for listing of Largetooth sawfish on Annex II of the SPAW Protocol

Largetooth Sawfish (Pristis pristis)

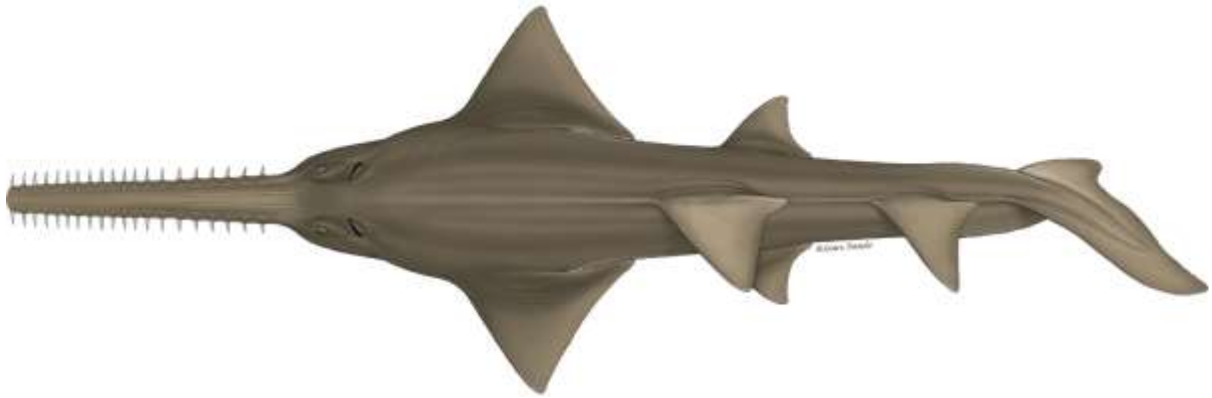

Illustration: Marc Dando

Summary

As one of the worlds most threatened fish species with a historic distribution in the Caribbean the Largetooth Sawfish qualifies for listing on the SPAW Protocol Annex 2 on the basis of the following criteria:

- criterion 1; the species shows a dramatic decline, both the globally and in the Western Atlantic, the species range has been dramatically restricted and populations have fragmented. The life history of the species marked by slow growth and late maturation makes it vulnerable to overexploitation and difficult for the species to recover. Essential habitat for the species is scarce
- criterion 3; sawfish rostra (the saw) are still highly prized in the curio trade and there is a market for its fins, meat and liver (for oil). Existing protective measures have not been sufficient in preventing the further depletion of the species.
- criterion 4; the species has been assessed as critically endangered by the IUCN
- criterion 5; it is listed on CITES on Appendix I and
- criterion 6; it is listed on CMS annex I and II as well as subject to other conservation and management protocols and legislation relevant to the region.

The Largetooth Sawfish (*Pristis pristis*) is a large ray species (6.5+ m total length) associated with shallow coastal areas, mangroves and estuaries. Juveniles occur in freshwater systems and adults in marine and estuarine environments (although in Lake Nicaragua, individuals spend much, if not all, of their lives in freshwater). All subpopulations of the species have undergone significant population declines and the species is now apparently extirpated from large areas of its former range in the Western Atlantic due to unsustainable fishing pressure and habitat destruction.

Sawfish are highly sought after for the curio trade in their distinctive rostrum, their large fins are valuable for shark fin soup in Asia and in the past their meat has been actively traded. Their slow growth rate and the late maturation makes all sawfish vulnerable to over exploitation. In the case largetooth sawfish the overlap of their habitat with heavily fished areas makes them exceptionally vulnerable to extinction.

The IUCN Shark Specialist Group has placed all sawfishes at the top of the list of most threatened elasmobranch families and the large tooth sawfish has bene assessed as critically endangered in the latest red list assessment. Worldwide measures are being taken to prevent further depletion and help the species to recover. The species has been listed on CITES appendix I since 2007, on annex I & II of CMS since 2014, it has national protection status in the US, Belize, Brazil, Nicaragua (freshwater only) and the European Union. A SPAW listing would add to the overall protection of the species as it would provide cross border protection in an area that has formerly been of key importance to the species and encompasses some of the last know populations.

Species information

Scientific and common names of the species

1.1 Class: Chondrichthyes, subclass Elasmobranchii

1.2 Order: Rajiformes

1.3 Family: Pristidae

1.4 Species: *Pristis pristis* (Linnaeus, 1758)

A recent taxonomic review has shown that *P. perotteti* (Atlantic) and *P. microdon* (Indo-West Pacific) are synonymous with *P. pristis* (Faria *et al.* (2013)

1.5 Scientific synonyms: *Pristis microdon* (Latham, 1794); *Pristis perotteti* (Valenciennes in Müller & Henle, 1841); *Pristis zephyreus* (Jordan & Starks, 1895); *Squalus pristis* (Linnaeus, 1758)

1.6 Common names:

English: Largetooth sawfish
Synonyms: Common Sawfish, Wide Sawfish, Freshwater sawfish, River sawfish
Spanish: Pez sierra común, Pez Sierra, Pejepeine, Pejesierra
French: Poisson-scie commune, Scie commune

Justification

Criterion 1:
Is the listing of the species warranted by (a) the size of the population, evidence of decline, restrictions on its range of distribution, degree of population fragmentation, (b) biology and behavior of the species, as well as other aspects of population dynamics, or (c) other conditions clearly increasing the vulnerability of the species?

a. Estimated population of species and its geographic ranges

The Largetooth Sawfish (*Pristis pristis*) has historically had a widespread distribution throughout the tropical and subtropical marine and estuarine waters. It is one of the ew elasmobranch species that has adapted to living in fresh water for at least part of its life cycle. Historically the species consisted of four subpopulations (Eastern Atlantic, Western Atlantic, Eastern Pacific and Indo-West Pacific). Until recently the Indo pacific and Atlantic populations were thought to be separate species, but a recent taxonomic review has shown that these al belong to one species (*P. pristis*). The species has in the past been recorded from several countries in the Wider Caribbean region from Uruguay through the Caribbean and Central America, the Gulf of Mexico, and seasonally to the United States. Actively commercial fisheries on some populations, bycatch in other Estimates are that it has since suffered a population reduction of ≥80% over a period of three generations (i.e., 1960s to present) and that it is now extirpated for most of its range. Recent records from the Caribbean are extremely rare. A status review from 2010 by NOAA found that the Amazon estuary appears to have the highest remaining abundance of *P. pristis* in the Atlantic, followed by the Colorado–San Juan River system in Nicaragua and Costa Rica other areas which potentially still have Largetooth sawfish are the coastal systems of Guyana, Surinam and French Guyana. A recent study found indirect evidence of Largetooth sawfish in Mexican waters (Bonfils et al, 2017).

b. biology

A productivity-susceptibility analysis by Dulvy *et al*. (2014) shows the five species of the family Pristidae are the most threatened elasmobranchs in the world, as a result of their high exposure to coastal shallow-water fisheries and their sow life history and large body size.
The life history of Largetooth Sawfish, like many elasmobranchs, is characterized by slow growth, late maturity, and low fecundity, which generally contributes to a low intrinsic rate of increase. The maximum reported size of Largetooth Sawfish is 656 cm TL, although it has been estimated up to 700 cm TL (Compagno and Last 1999). Very large individuals are now rarely seen anywhere.
The reproductive method of sawfishes is most likely lecithotrophic viviparity (eggs are hatched inside the mother's ovaries and nourished from the yolk only). The only known reproductive study of Largetooth Sawfish was from Lake Nicaragua in the 1970s (Thorson 1976) with other observations from northern Australia. Thorson (1976) found female fish had two functional ovaries and litter sizes in Lake Nicaragua were 1–13 (mean 7.3) following a gestation period of about five months. While the reproductive cycle is possibly biennial in the Western Atlantic (Thorson 1976), it appears to be annual in northern Australia (Peverell 2008). Peverell (2008) using a preliminary vertebral growth ring analysis estimated a maximum age of 35 years and age at maturity at 8-10 years in northern Australia.

c. other

Pristis pristis is thought to migrate regularly between marine and freshwater habitats. Individuals have been recorded over 1,300 km upstream from the mouth of the Amazon River and in Lake Nicaragua. The duration and extend of migrations patterns are unknown but may be associated with breeding activity and hence seasonal in nature. All sawfish species are extremely susceptible to capture in gillnets and demersal trawl nets due to their large size and the pontetial for the rostrum to get entangled in netting. In addition, the shallow coastal, brackish and freshwater habitats of sawfishes are often associated with high levels of human activity, which may result in degradation or loss of habitat through pollution, prey depletion, and coastal or riverine developments, including mangrove clearance, canal development and construction of seawalls.

Habitat degradation and loss threaten Sawfishes throughout their range (CITES, 2007). The largetooth sawfish relies on a variety of specific habitat types including estuaries and mangroves; these are all affected by human development (CITES, 2007). Agricultural and urban development, commercial activities, dredge-and-fill operations, boating, erosion, and diversions of freshwater runoff as a result of continued coastal and catchment development has caused substantial loss or modification of these habitats (CITES, 2007).
Criterion 3. what are the levels and patterns of use and how successful are national management programs?

The principal threat to the Sawfishes is from target and utilized bycatch fisheries. Their long tooth-studded rostrum (the saw) is prized in the curio trade and the large fins with high number of filaments fetch a high prize in the shark fin market. The meat is utilized for human consumption and the large liver produce liver oil. There have been some targeted Sawfish fisheries: in Lake Nicaragua and possibly in Brazil from 1960s to 1980s (NOAA, 2010). Commercial targeting Sawfish stocks is however no longer economically viable as populations have been severely depleted throughout its range. Sawfish fins occur but are now extremely rare in the Asian dried shark fin trade and may have once had their own trade name given their value (Clarke et.al. 2006b).

The dependence of sawfish of coastal, shallow areas for a mayor part of their life history makes them highly susceptible to interactions with fisheries and the shape of the rostrum makes them extraordinarily vulnerable to entanglement in any sort of net gear. The Nicaraguan government imposed a temporary moratorium on targeted fishing for Sawfishes in Lake Nicaragua in the early 1980s (Thorson, 1982), after the population collapsed following intensive fishing in the 1970s. The aim was to allow the population to recover, but no such recovery has occurred (McDavitt, 2002). It appears that even bycatch mortality is sufficient to prevent population growth.

Sawfish are regularly used for their meat; however, most of the consumption is local and so they appear to be only occasionally traded beyond local markets (NMFS, 2009). The meat is white and tender, particularly in juveniles, and is one of the most valuable and preferred of all elasmobranchs (sharks and rays) sold in the city of Belém, Pará State, Brazil (Charvet-Almeida, 2002) and caught by Guinéan fishers (Doumbouya, 2004). A large individual can yield several hundred kg of valuable meat (Last and Stevens 1994). The rostral saws can be very valuable as curios (particularly those from the largest specimens). In North Brazil (Pará State) Charvet-Almeida (2002) reports that large saws (>1.5 m) were ordered by buyers before fishing starts and may be worth up to US$ 300 to the fisherman, depending upon size. There is a significant market in Chinese Taipei for Sawfish saws that are part of the ceremonial equipment/weapons of spirit mediums (there are an estimated 23,000 of these mediums in Taiwan). The small saws, from newborn and juvenile Sawfish, are sold as curios, or ground up as a local treatment for asthma (in Brazil) or exported for use in traditional Chinese medicine.

As the species is migratory for at least part of its adult life, any national conservation initiative intended to prevent these Critically Endangered species from being driven further towards extinction is unlikely to be successful if Sawfishes are not protected during their seasonal migrations through other range States' waters. This is a particular problem when the population is distributed along a coastline that is divided into a large number of small countries, as is the case in the Central Caribbean.

Criterion 4. Does the evaluation according to IUCN criteria, applied in a Caribbean context, i.e., the status of the population at the regional level, warrant listing of the species?

The Western Atlantic sub-population of largetooth sawfish has been assessed as critically endangered by the IUCN, justification:
"Western Atlantic Largetooth Sawfish (Pristis pristis) were once found from Uruguay to the United States and commonly found from Brazil to Mexico. They have been nearly extirpated primarily by fishing (trawl and inshore netting) throughout their range inferring a population reduction based on a reduction in extent of occurrence (EOO) of ≥80% over a period of three generations (i.e., 1961 to present). Despite protections in Brazil, Nicaragua, Mexico and the United States (it is possibly extinct in the latter two range states), the species is still subject to threats region-wide from gillnets used in rivers, river mouths, estuaries and nearshore waters, and trawling. Coastal development and the loss of mangroves also contributed to the decline and will slow any potential recovery of the species. Current records indicate that Largetooth Sawfish can only be regularly encountered today in the Amazon River basin, the Rio Colorado-Rio San Juan area in Nicaragua, and possibly some remote areas of French Guiana, Suriname, and Guyana. Declines and continuing threats result in a Critically Endangered assessment for this subpopulation" (Carlson & Smith, 2013)

Criterion 5. Is the species subject to local or international trade, and is the international trade of the species regulated under CITES or other instruments?

CITES listings

All species of sawfish (family Pristidae) have been listed on Appendix I since 2007.
The Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) provides a legal framework to monitor and control the international trade in species that are overexploited by such trade; it is one of the most effective agreements in regulating natural resource use (Fowler and Cavanagh 2005).
Animals and plants threatened with extinction may be listed in Appendix I, essentially banning international trade in these species or their parts. Appendix II is reserved for species that could become threatened if trade is not controlled; trade in these species is closely monitored and allowed only after exporting countries provide evidence that such trade is not detrimental to

populations of the species in the wild. Currently 183 countries are Party to CITES, including all Caribbean, North American, and Central American countries except for Haiti (CITES 2017a). See also: **www.cites.org**

Criterion 6. How important and useful are regional cooperative efforts for the protection and recovery of the species? [Include strengthening of existing cooperative efforts through global MEAs such as CMS]
Several global, regional and national conservation measures and protective legislation aimed and the protection of largetooth sawfish (and other shark and ray species)

Relevant global management and protection

IPOA Sharks
Widespread concern over the lack of management of shark fisheries and the impact that expanding catches may had on shark populations led to the adoption and endorsement of the Food and Agriculture Organization of the United Nations (FAO) International Plan of Action for the Conservation and Management of Sharks (IPOA–SHARKS) in 1999.

The IPOA-Sharks is a voluntary international instrument, developed within the framework of the 1995 FAO Code of Conduct for Responsible Fisheries, that guides nations in taking positive action on the conservation and management of sharks and their long-term sustainable use. Its aim is to ensure the conservation and management of sharks and their long-term sustainable use, with emphasis on improving species-specific catch and landings data collection, and the monitoring and management of shark fisheries. The code sets out principles and international standards of behavior for responsible fishing practices to enable effective conservation and management of living aquatic organisms while considering impacts on the ecosystem and biodiversity. The IPOA-Sharks recommends that FAO member states 'should adopt a national plan of action for the conservation and management of shark stocks (NPOA-Sharks), if their vessels conduct directed fisheries for sharks or if their vessels regularly catch sharks in non-directed fisheries'. Additionally, the IPOA-Sharks directs that states that implement a NPOA-Sharks should regularly, at least every four years, assess its implementation for the purpose of identifying cost-effective strategies for increasing its effectiveness.'

To assist countries in implementing the IPOA-Sharks the FAO developed a dedicated set of technical guidelines for the conservation and management of sharks. The guidelines provide general advice and a framework for development and implementation of national level shark assessment and management consistent with the IPOA-Sharks, including the preparation of shark assessment reports.

CMS
The Convention on Migratory Species (the full name is the Convention on the Conservation of Migratory Species of Wild Animals) is an environmental treaty under the aegis of the United Nations Environment Programme (UNEP). The CMS provides a global platform for the conservation and sustainable use of migratory animals and their habitats. CMS brings together the States through which migratory animals pass, the Range States, and lays the legal

foundation for internationally coordinated conservation measures throughout a migratory range. Caribbean members are: Cuba, Costa Rica, Domincan Republic, Brazil, Panama Honduras and the European Union.

All sawfish species were listed on both appendix I and II of the treaty in 2014, listing on the appendices has the following implications:
CMS Appendix I - include migratory species threatened with extinction. Signatory states are asked to protect these animals, conserve or restore the habitats in which they live, remove obstacles to migration and control other factors that might endanger them. It is prohibited for any Range State to catch these species.
CMS Appendix II - includes migratory species with an unfavorable conservation status or those that would significantly benefit from international co-operation. Range States have to enter into auxiliary agreements with each other to protect these species.

CMS MOU SHARKS

The Memorandum of Understanding (MOU) on the Conservation of Migratory Sharks is the first global instrument for the conservation of migratory species of sharks negotiated under the auspice of CMS. It was first adopted in 2010 and now has 39 signatories supporting is objectives. The MOU is a non-binding international instrument. It aims to achieve and maintain a favorable conservation status for migratory sharks based on the best available scientific information and taking into account the socio-economic value of these species for the people in various countries. Brazil, Colombia, Costa Rica, The Netherlands and the United States are signatories to the MoU.

The objectives of the Conservation Plan are listed in Annex III of the MoU and include:

- Improving the understanding of migratory shark populations through research, monitoring and information exchange
- Ensuring that directed and non-directed fisheries for sharks are sustainable
- Ensuring to the extent practicable the protection of critical habitats and migratory corridors and critical life stages of sharks
- Increasing public awareness of threats to sharks and their habitats, and enhance public participation in conservation activities
- Enhancing national, regional and international cooperation

In pursuing activities described under these objectives, Signatories should endeavor to cooperate through regional fisheries management organizations (RFMOs), the FAO, Regional Seas Conventions (RSCs) and biodiversity-related Multilateral Environmental Agreements (MEAs).

In 2016 the Sharks MoU set up an Advisory committee and a Conservation Working group to assist signatories in the implementation of the MoU. In this role the shark MoU is a facilitating body to assist signatories in implementing measures associated with the CMS listings.

Regional Protection

SICA

The Dominican Republic has, together with Belize and six other Central American countries, united under the name SICA (Central American Integration System), signed an agreement to prohibit shark finning. This ban is also applicable to fishing vessels in international waters under the flag of SICA member states. This arrangement OSP-05-11 entered into force in 1 January 2012.

OSPESCA

The Organization of the Fisheries and Aquaculture Sector of the Central American Isthmus (Organización del Sector Pesquero y Acuícola del Istmo Centroamericano, OSPESCA) OSPESCA aims at promoting coordinated and sustainable development of fishing and aquaculture, in the framework of the Central American integration process (SICA), defining, approving and implementing policies, strategies, programmes and regional projects on fisheries and aquaculture. This is a legally binding framework and its members are Belize, Costa Rica, Dominican Republic, El Salvador, Guatemala, Honduras, Nicaragua, and Panama.
In 2011 it adopted measures on shark finning and for the management of whale sharks.

- Regional Regulation OSP-05-11 which prohibits the practice of shark finning and establishes regional management measures for the sustainable use of sharks, which contributes to finning eradication.
- Regional Regulation OSP-07-2014 which strengthens the sustainability of the Whale Shark species (Rhincodon typus) by adopting management measures by the SICA Member States.

National Protection

The United States listed *Pristis pristis* on the US Endangered Species Act in 2007, following earlier protection in the State waters of Florida and Louisiana and protection under the USA Atlantic & Gulf Coasts Fishery Management Plan since 1997.

Outside United States waters, Nicaragua imposed a permanent ban on targeted Sawfish fishing in Lake Nicaragua. In Brazil, the largetooth sawfish is protected by the Ministry of Environment and in Mexico, the take of all Sawfishes is banned. The European Union has paced all sawfish species on the prohibited species list of the TAC & Quota regulation of the EU's Common Fisheries Policy. This bans all targeting, retention, transshipping and landing of sawfishes in EU waters and by EU vessels and operators.

Other national measures

Honduras

In June 2011 Honduras created the first shark sanctuary in Central America and declared all its marine waters in both the Pacific and Caribbean as a permanent shark sanctuary. This had been preceded in 2010 by a shark fishing moratorium and created the first shark sanctuary of the Americas amounting to about 240,000 km2 of national waters, most of which lie along the 700 km-long Caribbean coast of the nation.

Bahamas
In July 2011 the Bahamas banned all shark fishing in its EEZ. That law firmly turns all 630,000 sq km of Bahamian waters into a shark sanctuary17. The fines for shark fishing were raised from 3000 to 5000 USD per incident.
Venezuela
Towards implementing its Plan de Acción Nacional (PAN) de conservación for sharks, in June 2012 Venezuela joined the rest of the Americas in outlawing the finning of sharks in its waters and established a 3,730 km2 shark sanctuary surrounding the touristic archipelago of Los Roques. Recent research (e.g. Tavares 2005, 2008 2009) had demonstrated the importance of the shallow waters of Los Roques as a shark nursery area.
St. Maarten
On the 12th of October 2011 the government of St. Maarten issued a temporary moratorium on shark fishing. The shark fishing moratorium prohibits the take and landing of sharks and requires immediate release of incidentally caught sharks, under penalty of a maximum of 500,000 Antillean Guilders or 3 months in prison.
Bonaire, St. Eustatius and Saba and (Caribbean Netherlands)
In 2015, the Dutch government declared the *Yarari* sanctuary for sharks and marine mammals in the Economic Exclusive Zones of Saba and Bonaire, and that provisions will be considered and implemented as necessary to regulate activities that may have a negative impact on sharks.

Management and recovery plans for the species

In 2014 the IUCN Shark Specialist Group together with its partners published a Global Strategy for the conservation of sawfish (Harrison & Dulvy, 2014). This strategy sets out priority regions for research, fisheries management, and outreach and education programs as well as creates network with an aim to develop a network to develop regional capacity and more focused and tailored regional conservation action. In 2018 the strategy was updated and the Caribbean was described as a particular area of interest for the largetooth sawfish with the SPAW protocol listed as the most relevant regional protective legislation.

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Proposal for listing of silky shark on Annex III of the SPAW Protocol

Silky shark (*Carcharhinus falciformis*)

Illustration © FAO

Summary

The silky shark qualifies for listing under Annex 3 of the SPAW protocol based on the following criteria:

- Criterion 1: With estimated declines of 46-98% in the Atlantic, including the Gulf of Mexico and the Caribbean, it has been estimated that fishing mortality in the northwest Atlantic would need to be reduced by ~60%, as a minimum baseline, to ensure the survival of silky sharks. The life history of the species is marked by slow growth and late maturation, which makes it vulnerable to overexploitation.
- Criterion 2: A precautionary approach should be taken due to a limited knowledge of stock structure and migration patterns.
- Criterion 3: The silky shark is a pelagic migratory species that is both targeted and caught as bycatch in the Atlantic in most in offshore pelagic longline fisheries. Also, the species is greatly threatened by international trade, as it is one of the three most traded shark species in the global shark fin trade. Management of silky shark should focus on preventing capture and include small-scale measures such as temporal and spatial fisheries closures as well as large-scale regulations. No such national regulations have are put in place specifically for silky sharks.
- Criterion 4: The species is listed as Vulnerable globally by the IUCN.
- Criterion 5: The silky shark is one of the three most traded shark species in the global shark fin trade, and is listed in Appendix II of CITES since 2017.
- Criterion 6: As the silky shark is a highly migratory pelagic species, there is a need for international cooperation in management of this species. The silky shark is listed on Appendix II of CMS since 2014.

- Criterion 7: The silky shark is a circumglobal species with panmictic populations along the western Atlantic Ocean. However, recent studies suggest there may be a distinctive population structure between the Northwest and Southwest Atlantic.
- Criterion 8: The silky shark *Carcharhinus falciformis* is a species in the *Carcharhinid* family.
- Criterion 9: Declines of silky sharks are found throughout the Atlantic, including the Gulf of Mexico and the Caribbean.

The silky shark is an oceanic and coastal shark found near the edge of continental shelves and out in the open ocean, outside the EEZs of coastal States. Estimated declines of silky shark in the Atlantic, including the Gulf of Mexico and the Caribbean, range from 46-90%. The species is greatly threatened by international trade, as it is one of the three most traded shark species in the global shark fin trade. The need for international cooperation and management of this migratory species is recognized by CMS and CITES, both of which list the silky shark on their appendices.

Whereas most conservation measures in the Caribbean are coastal-oriented, the silky shark is a pelagic migratory species that, in the Atlantic, is targeted and bycaught most in offshore pelagic longline fisheries. A SPAW listing would help ensure cross-border management, which should focus on preventing capture and include small-scale measures such as temporal and spatial closures, as well as regulations on a regional scale.

Species information

Scientific and common names of the species;

Taxonomy

1.1 Class: Chondrichthyes, subclass Elasmobranchii

1.2 Order: Carcharhiniformes

1.3 Family: Carcharhinidae

1.4 Species: *Carcharhinus falciformis* (Müller & Henle, 1839)

1.5 Scientific synonyms: *Carcharias falcipinnis* (Lowe, 1839), *Aprionodon sitankaiensis* (Herre, 1931), *Carcharinus floridanus* (Bigelow, Schroeder & Springer, 1943), *Eulamania malpeloensis* (Fowler, 1944), *Carcharhinus atrodorsus* (Deng, Xiong & Zhan, 1981)

1.6 Common names:

English: Silky shark, blackspot shark, grey whaler shark, olive shark, reef shark, ridgeback shark

Spanish: Requin, soyeux

French: Tiburon jaqueton, tollo mantequero

Estimated population of species and its geographic ranges;

There is almost no information about the stock structure of silky sharks. Nevertheless, on the basis of variations in life-history parameters in different parts of the world, it appears that there are several distinct populations in the Northwest Atlantic Ocean, in the Pacific Ocean, and in the Indian Ocean (Bonfil, 2009). Clarke *et al*. (2015) examined silky shark phylogeography and population genetics on a global scale, finding strong phylogeographic partitioning with two highly divergent, matrilineal evolutionary lineages corresponding to the western Atlantic and Indo-Pacific Oceans, but panmitic populations along the western Atlantic Ocean. Having included more samples from both the Northwest and Southwest Atlantic, Domingues *et al.* (2017) found silky shark exhibited high mitochondrial control region genetic diversity, and statically significant population structure between the Northwest and Southwest Atlantic that was not detected in previous studies.

Silky sharks are oceanic and coastal sharks found near the edge of continental shelves and out in the open ocean, outside the EEZs of coastal States. They can be found from shallow waters to depths of 500 meters. Silky sharks are circumglobal in tropical waters. They are found in FAO Areas 21, 31, 34, 37, 41, 47, 51, 57, 61, 71, 77, 81, and 87. In the western Atlantic Ocean, the range of the silky shark extends from Massachusetts to southern Brazil and includes the Gulf of Mexico (GOM) and Caribbean Sea (Compagno, 1984). A recent study by Arocha *et al.* (2017) of the pelagic longline observer programs in the Caribbean Sea between 1994-2015 indicated the overall spatial distribution of the total relative abundance of silky shark to be highly concentrated (>3 sharks/1000 hooks) off the central coast of Venezuela and around the off-shore islands (figure 1), while important catches (1-3 sharks/ 1000 hooks) were common in the area off the northern shelf of South America. Catch rates were low in the central areas of the Caribbean Sea. In the Northwest Atlantic, silky sharks were found to have left the exclusive economic zone of the United States, moved into and out of the Gulf of Mexico, and moved into the Caribbean Sea, with a maximum distance of 723 miles traveled (Kohler *et al*., 1998).

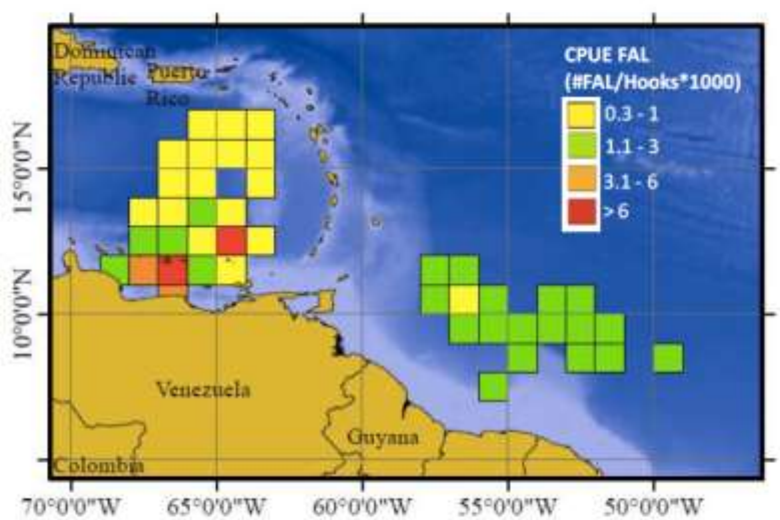

Figure 1: Overall spatial distribution of silky shark (*Carcharhinus falciformis*) nominal catch rates during 1994- 2015, from observed sets (Arocha *et al*., 2017).

There is no stock assessment of the silky shark in the Atlantic Ocean. In the Gulf of Mexico, silky sharks were historically one of the most commonly caught shark species, but subsequently experienced drastic population declines: in the 1950s, silky sharks were found on 35% of sets and accounted for 24% of all sharks caught in the longline fishery. Catch rates then declined from 1.71 (±3.49 SD) per 1000 hooks in the 1950s to 0.10 (±0.42 SD) per 1000 hooks in the 1990s (Baum and Myers, 2004). The authors estimate this decline in catch rate equates to a 10-fold decline, or 91.2%, in silky shark abundance in 40 years in the Gulf of Mexico. The mean size is also notably smaller than during the 1950s, with silky sharks averaging 97 cm in the 1990s, which is well below the size of maturity of 180 cm for the region (Baum and Myers, 2004).

United States pelagic longline observer and logbook data (1992-2005) that encompasses both the northwest and western central Atlantic regions was used to estimate a decrease of 46 and 50% respectively in silky shark standardized CPUE (Cortés *et al*., 2007). Population reductions of 95% and 98% respectively were estimated over three generations. However, Cortés *et al*. (2007) also reported that relative abundance of silky shark appeared to be increasing in the area since 2000 and advised caution in interpreting the catch trends due to shortcomings in the data and the highly migratory nature of the silky shark that requires a more comprehensive analysis of trends throughout their range. Another analyses of the observer data from this same fishery over 1992-2005 combined catches of dusky shark (*Carcharhinus obscurus*), silky shark, and night shark (*Carcharhinus signatus*), grouped because of identification problems, and reported that the standardized catch rates of this species complex were suspected to have declined by 76% (Baum and Blanchard, 2010). The International Union for the Conservation of Nature (IUCN) categorizes the silky shark as Vulnerable, meaning it is considered to be facing a high risk of extinction in the wild.

Status of legal protection, with reference to relevant national legislation or regulation;

The silky Shark is a member of the family *Carcharhinidae*, which is listed on Annex I, Highly Migratory Species, of the UN Convention on the Law of the Sea. They were listed on the Convention on Migratory Species (CMS) under Appendix II in 2014. A Memorandum of Understanding (MOU) was signed by 38 countries in 2010 for migratory sharks, and silky shark was added to the MOU in February 2016. The silky shark was listed in Appendix II of CITES in 2017, due to the threat posed by international trade, as it is one of the three most traded shark species in the global shark fin trade.

IPOA Sharks:
There are since the 1990s several shark protection plans, both internationally at intergovernmental and non- governmental level, as well as at national level by several nations in the Wider Caribbean region. Within the framework of the Code of Conduct for Responsible Fisheries the FAO (Food and Agriculture Organization) developed the International Plan of Action for the Conservation and Management of Sharks (IPOA Sharks) in 1999. The objective of IPOA Sharks is to ensure the conservation and management of sharks and their long-term sustainable use. IPOA Sharks is voluntary and intends to give states guidelines on how to establish a National Plan of Action (NPOA) through guiding principles and procedures for implementation.

Sharks MoU:
The Memorandum of Understanding on the conservation of migratory sharks (Sharks MoU) of the Convention on the Conservation of Migratory Species of Wild Animals (CMS) is a legally non-binding instrument of the CMS and the first global instrument for the conservation of migratory shark species. The Sharks MoU entered into force on 1 March 2010 with the aim to sustainably manage and protect migratory shark species, in particular the species included in

appendices I en II of the CMS. As of November 2013 the Sharks MoU has 27 members, 26 national governments and the European Union.
National legislations in the Caribbean region applying to sharks (as reviewed by Van Beek *et al*., 2014) are as follows:

US Caribbean Region:
NOAA fisheries service presented the amendment 4 to the 2006 Consolidated Atlantic Highly Migratory Species (HMS) Fishery Management Plan (FMP). The PowerPoint states that "in 2010, Puerto Rico reported approximately 11.8 mt of commercial shark landings and less than one megaton was reported by St. Thomas and St. John combined. These landings were not species specific and it is unknown if they were harvested from Federal or Territorial waters". Proposed management measures for small-scale HMS commercial fisheries include specific authorized gears and retention limits for sharks.

US Gulf of Mexico and (Caribbean) Florida:
Following years of declines in catches, and concern about the protection status of many shark species, in 1993 the USA established a Federal Management Plan for Shark Fisheries in the Atlantic Ocean, particularly directed at the coastal bottom long-line fishery. Since 1993 several amendments of the original plan have been implemented and local state governments have tied in by implementing complementary legislation. Measures included successively restrictive catch quotas, finning limitations, area closures, seasonal closures, adjustments of size limits, limits to retention in recreational fisheries, establishment of protected species lists, establish a shark research fishery and the use of regional and species specific quotas.

Honduras:
In June 2011 Honduras created the first shark sanctuary in America and declared all its marine waters in both the Pacific and Caribbean as a permanent shark sanctuary. This had been preceded in 2010 by a shark fishing moratorium and created the first shark sanctuary of the Americas amounting to about 240,000 km2 of national waters, most of which lie along the 700 km-long Caribbean coast of the nation.

Bahamas:
The Bahamas have had a longline fishing ban since 1993 and consequently there has been no commercial shark fishing activity. This longline ban has effectively made the whole archipelago of the Bahamas a shark "no-take" zone. The last export of shark from the Bahamas was a lot of 2 metric tons in 2004. In July 2011 the Bahamas went a step further and legally banned all shark fishing. That law firmly turns all 630,000 sq km of Bahamian waters into a shark sanctuary17. The fines for shark fishing were raised from 3000 to 5000 USD per incident.

Venezuela:
Towards implementing its Plan de Acción Nacional (PAN) de conservación for sharks, in June 2012 Venezuela joined the rest of the Americas in outlawing the finning of sharks in its waters and established a 3,730 km2 shark sanctuary surrounding the touristic archipelago of Los

Roques. Recent research (e.g. Tavares 2005, 2008 2009) had demonstrated the importance of the shallow waters of Los Roques as a shark nursery area.

The Dominican Republic has, together with Belize and six other Central American countries, united under the name SICA (Central American Integration System), signed an agreement to prohibit shark finning. This ban is also applicable to fishing vessels in international waters under the flag of SICA member states. This arrangement OSP-05-11 entered into force in 1 January 2012.

St. Maarten:
On the 12th of October 2011 the government of St. Maarten issued a temporary moratorium on shark fishing. The shark fishing moratorium prohibits the take and landing of sharks and requires immediate release of incidentally caught sharks, under penalty of a maximum of 500,000 Antillean Guilders or 3 months in prison. This temporary ban was changed to an infinite ban in 2016.

Cayman Islands:
The Cayman Islands declared their intention to establish a Shark Sanctuary in 2016 with a provision under the National Conservation Law.

British Virgin Islands
A designation of a Shark Sanctuary on the British Virgin Islands was done by the cabinet of the British overseas territory prohibiting the commercial fishing of all shark and ray species throughout the full exclusive economic zone. As of May, 2014 the following actions are prohibited within the British Virgin Islands and its waters:
- Intentional fishing for sharks;
- The sale, export, import, or possession of sharks, rays, or shark and ray products, including meat and fins;
- Intentional removal of the fins or tail of a shark;
- Intentional injury of a shark or a ray;
- Intentional feeding of sharks or rays or use of food to attract them.

Bonaire, St. Eustatius and Saba:
In 2015, the Dutch government designated the waters of Saba and Bonaire including the EEZ as the '*Yarari'* sanctuary for sharks and marine mammals, declaring that provisions will be considered and implemented as necessary to regulate activities that may have a negative impact on sharks. In Sep. 2018 St. Eustatius joined this declaration, so the *Yarari* Sanctuary now encompasses all the waters of the Caribbean Netherlands.

Ecological interactions with other species and specific habitat requirements

Silky sharks are found in the oceanic and coastal-pelagic habitats of tropical waters, often associated with seamounts, and juveniles with floating objects. Silky sharks often inhabit continental shelves and slopes from the surface to 500 m of depth. Older silky sharks are typically in oceanic waters, but often found more offshore near land than in the open ocean (Baum and Myers, 2004). Silky sharks can be found on reefs that are adjacent to deep water, for example in the Red Sea (Clarke *et al*., 2011). Their foraging occurs more inshore and they will return to the shelf to reproduce. Nurseries are along the outer continental shelf edge, and neonates stay near the reefs until they are large enough to move to the pelagic habitat, possibly the first winter after pupping in the early summer (Beerkircher *et al*., 2002). Around 130 cm in length, silky sharks move to an oceanic habitat where they join schools of pelagic fish, such as tuna. Juveniles are often caught in very large numbers by fishing gear set on floating fish aggregating devices (FADs; as reviewed by Rigby *et al.,* 2017).

While silky sharks can be found in warmer tropical waters above 23˚C, they have been found to migrate according to temperature. Silky sharks were found to remain within the uniform temperature surface layer, but those north of 10°N remained significantly deeper and in cooler temperatures than those south of 10°N. It has also been noted that silky sharks have shown sexual segregation. A diel vertical movement pattern was observed with silky sharks spending greater time at depth during the day than at night. Plasticity of vertical habitat utilization was noted with occasional forays to depths in excess of 550 m during both day and night (Rigby *et al.,* 2017; Hueter *et al.,* 2018).

Silky sharks are a high trophic level predator in ocean ecosystems feeding mainly on teleosts and cephalopods (Compagno, 1984). Cortés (1999) determined the trophic level based on diet for silky shark was 4.2 (maximum = 5.0).

Management and recovery plans for the species;

Silky shark retention bans are in place for all vessels operating under ICCAT and WCPFC management. Additionally, any silky shark that is brought on board must be released in the best condition possible and as quickly as possible. All interactions are recorded and the status upon release is recorded (alive or dead). ICCAT has exemptions for developing countries that report the catch of silky shark, that have no increase in catch of silky shark and ensure that it will not enter international trade. IATTC has prohibited retention of silky shark on purse seine vessels, limited longline vessel silky shark bycatch to a maximum of 20% by weight of total catch per fishing trip, and in multi-species fisheries that use surface longlines limited the catch of silky sharks that are less than 100 cm total length to 20% of the total number of silky sharks caught per trip (Rigby *et al.,* 2017).
Management of silky shark should focus on preventing capture and include small scale measures such as temporal and spatial closures as well as large scale regulations, however, this management is made difficult by the limited knowledge of stock structure and migration patterns (Rigby *et al.,* 2017).

Research programs and available scientific and technical publications relevant to the species;

A shark conservation program in Belize called Earthwatch researches whether protected reef areas are effective in helping populations recover. A goal of the project is to better describe the niche of the dominant shark species on the Belize Barrier Reef, including Caribbean reef shark, nurse shark, Caribbean sharpnose, great hammerhead, blacktip shark, lemon shark, silky shark, night shark and tiger sharks. A tag and release program is implemented using hook-and-line shark fishing gear. Tissue samples are collected from tagged sharks and from local fishermen's catches. Associated environmental data like water quality, salinity and pH are collected. Habitats are recorded by means of snorkel surveys and video is used to record abundance and diversity of coral and fish species.

After a first official observation of silky sharks on the Saba Bank in early 2018, scientists associated with the Saba Conservation Foundation have an expedition planned in the Summer of 2018 to tag silky sharks.

American and Cuban Collaboration Tracking Silky Sharks in Cuban Waters
To prepare Cuba's National Plan of Action for Sharks, Cuban scientists have been working together with many international institutions including the U.S.-based Environmental Defense Fund (EDF) and Mote Marine Laboratory. After a 2015 expedition, in which the scientific team tagged three silky sharks in the Jardines de la Reina (Gardens of the Queen) National Marine Park off Cuba's south coast. The shark research conservation work is still ongoing, but did result in a first revealing publication (Hueter *et al.,* 2018).

Threats to the species, its habitats and associated ecosystems, especially threats which originate outside the jurisdiction of the Party.

The Silky shark is the second most caught species of shark globally, after the Blue Shark (*Prionace glauca*). It is both targeted or caught as incidental (bycatch) by longline fisheries and purse seine fisheries (especially those using drifting fish aggregating devices [FADs]) as well as by artisanal fisheries. FADs are made of a floating object and nets that lie vertical in the water column to attract schools of fish. The silky shark, as well as other species, is also easily entangled in the nets; and there have been large increases in the use of FADs since 1996. In the Atlantic pelagic longline fishery, silky sharks are ranked first in vulnerability to the Atlantic pelagic longline fishery. They are an important part of the Cuban longline fishery, where they are targeted for meat, and are actually one of the five most captured shark species caught (Aguilar *et al*., 2014; Espinosa, 2004). In the shark bottom longline fishery in Gulf of Mexico and Southern Atlantic, silky sharks represent a major by-product species (Enzenauer *et al*., 2015). Whether they are targeted or an incidental catch, the silky shark is often either retained for its meat and fins where regulations allow, or released with high mortality rates apparent in the tropical purse seine fisheries (as reviewed by Rigby *et al.,* 2017).

The Silky Shark was found to represent at least 3-4% of the fins auctioned in Hong Kong, the world's largest shark fin trading center—the third highest after blue shark and hammerhead shark (general)—and Hong Kong is thought to make up more than half of the global shark fin trade. Silky shark fins are valuable to the trade, although they are not one of the highest value fin types (S. Clarke, unpubl. data; as reviewed by Rigby *et al.,* 2017).

The offshore pelagic and oceanic habitats of most silky shark populations are not currently directly affected by habitat loss and destruction, although climate change and rising sea temperatures may affect this species and their prey. Aggregations of female silky sharks have been found on reefs in the Red Sea; coral reef habitats are at a particularly high risk of degradation from climate change and human activities. The increasing use of FADs is of concern because this leads to the mortality of the very large numbers of juvenile silky sharks associated with floating object habitats.

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THE GOVERNMENT OF FRANCE

1. PROPOSAL FOR INCLUSION OF SPECIES ON THE APPENDICES OF THE SPAW PROTOCOL

A. PROPOSAL: Inclusion of the great hammerhead shark *Sphyrna mokarran* on Appendix II of the Protocol concerning Specially Protected Areas and Wildlife (SPAW Protocol)

B. PROPONENT: Government of France

C. SUPPORTING STATEMENT:

1. Taxon

1.1 Classis: Chondrichthyes, subclass Elasmobranchii
1.2 Ordo: Carcharhiniformes
1.3 Familia: Sphyrnidae
1.4 Genus/species: *Sphyrna mokarran*
1.5 Common name:
English: Great hammerhead shark
Spanish: Tiburón martillo gigante
French: Grand requin-marteau

2. Biological data

Sphyrna mokarran is the largest hammerhead shark. The first dorsal fin is very tall with a pointed tip and strongly falcate in shape, while the second dorsal is also high with a strongly concave rear margin. The origin of the first dorsal fin is opposite or slightly behind the pectoral fin axil with the free rear tip falling short to above the origin of the pelvic fins. The rear margins of the pelvic fins are concave and falcate in shape, not seen in scalloped hammerheads. The posterior edge of the anal fin is deeply notched. The font margin of the head is nearly straight with a shallow notch in the center in adult great hammerheads, distinguishing it from *S. lewini* and *S. zygaena*. The teeth of this hammerhead are triangular and strongly serrated unlike *S. lewini*'s oblique cusps.

2.1 Distribution

The *S. mokarran*'s habitat ranges widely throughout the tropical waters of the world, from latitudes 40°N to 35°S (Last and Stevens 1994). It is apparently nomadic and migratory, with some populations moving towards the poles in the summer (Compagno 1984). It is a coastal-pelagic and semi-oceanic species of hammerhead occurring close inshore and well offshore, over the continental shelves, island terraces, and in passes and lagoons of coral atolls, as well as over deep water near land (Compagno et al. 2005) where it co-exists with the scalloped hammerhead, also an inhabitant of the tropic, and the smooth hammerhead, which favors cooler waters (Cliff 1995, Bass et al. 1975).

2.2 Population

Great hammerhead sharks are viviparous with a reported maximum total size of 550 to 610 cm (Compagno et al. 2005), though 450 cm is more common for a mature adult (Last and Stevens

2009). Litter size ranges from 6 to 33 (maximum 42) and pups are born after 11 months gestation with females breeding only once every two years thus increasing the species' susceptibility to population depletion (Stevens and Lyle 1989). Great hammerheads have one of the oldest reported ages for any elasmobranch (44 years) but grow at relatively similar rates to other large hammerhead species (Piercy et al. 2010). In waters off Australia, males reach maturity at a length of 7.4 feet (2.25 m) corresponding to a weight of 113 pounds (51 kg) and females are mature at a total length of 6.9 feet (2.10 m) corresponding to a weight of 90 pounds (41 kg) (Stevens and Lyle 1989).

Due to the distinctive head shape of this genus, it is typical for catches to be reported at the genus level, *Sphyrna* spp. Therefore, it is rare to find population statistics specific to one species of hammerhead shark. Due to the great hammerhead's preference for warmer waters, it can be expected to make up a greater portion of tropical catches of hammerheads than more temperate fisheries, most notably that of *S. zygeana.* S. mokarran is taken by target and bycatch, fisheries (Dudley and Simpfendorfer 2006, Zeeberg et al. 2006) and is regularly caught in the tropics, with longlines, fixed bottom nets, hook-and-line, and possibly with pelagic and bottom trawls. Hammerhead sharks, *S. mokarran* in particular, have been noted as a favored target species due to the size of their fins (CITES, 2013). On this note, fin prices are rising, driven by the Asian Fin market (CITES, 2013).

Great hammerhead shark populations have suffered tremendous commercial fishing pressure from both target and bycatch fisheries (IUCN 2014). In addition to extremely high bycatch mortality in incidental fisheries (greater than 90%), great hammerheads are also targeted for their characteristic large fins, which are prized in Asian seafood markets. The fact that this species has such high market value likely leads to high retention rates of sharks caught incidentally as bycatch. Less than 10% of great hammerheads survive capture – many of that 10% are likely killed and stripped of their fins so that fishers can take advantage of the incidental profit. As a result of these fishing pressures, and in response to significant population declines, the IUCN recognizes great hammerheads as "endangered" globally.

2.3 Habitat

S. mokarran is a costal-pelagic and semi-oceanic shark found throughout the world's oceans in depths ranging from 1-300 m. (Ebert et al. 2013). It is found over continental shelves, but more often in coastal zones near island terraces, in passes and lagoons of coral atolls and on coral reefs. Inshore areas are utilized by early life-stages of the species (Pikitch et al. 2005).

2.4 Migrations

The species is listed on Annex I, Highly Migratory Species, of the UN Convention on the Law of the Sea. The great hammerhead shark is not usually found in aggregations like other members of the Sphyrnidea family, but rather it is nomadic and migratory in its worldwide coastal-pelagic tropical range. A recent study (Hammerschalg et al., 2011) revealed that during a 62 day journey an individual, travelled 1,200 km from the coast of South Florida (USA) to the mid-Atlantic off the coast of New Jersey (USA). The evidence that great hammerhead sharks are capable of traveling such large distances in a relatively short time also indicates that the species could potentially be migrating into international waters. In the Bahamas, the species has been observed using designated locations or stop-offs along what are believed to be migratory paths for these animals.

3. Threat data

Great hammerhead shark populations are threatened by the destruction and modification of their habitats and ranges, the overutilization of the species for commercial purposes, a high propensity for contaminate (mercury and arsenic) absorption, and the lack of adequate regulatory mechanisms.

3.1 Direct threats to the population

There was a directed shark fishery operated by Taiwan around the Northern coast of Australia that regularly caught great hammerheads up until 1986 (Stevens and Lyle 1989). Other possible threats include sport fishing (Pepperell 1992) and capture in anti-shark measures around the beaches of Australia and South Africa (Paterson 1990, Cliff 1995). Bonfil (1994) gives an overview of global shark fisheries. This species is mentioned specifically with reference to fisheries in Brazil, the Eastern USA and Mexico; however, *Sphyrna* spp. are mentioned in the majority of tropical fisheries cited.

3.2 Habitat destruction

Coastal ecosystems that serve as nurseries for multiple species of sharks including hammerheads face both environmental and anthropogenic threats to their integrity (Knip et al. 2010). Environmental threats include fluctuations in temperature and salinity due to rising water temperatures and other climate change factors (Masselink et al. 2008) while fishing practices (Pauly et al. 1998) and habitat degradation and loss caused by human settlement initiatives including dredging, construction, pollution and deforestation are among the major man made threats to coastal shark populations (Suchanek 1994; Vitousek et al. 1997). And it is this decline of great sharks from coastal ecosystems that has caused trophic cascades with marked ecological consequences (Baum at al. 2003).

3.3 Indirect threat

A 30 year old study by Lyle (1984) indicated that S. mokarran had the highest concentrations of mercury in muscle tissue (>4 mg kg-1) in in Australian waters than any other shark species tested. As the largest hammerhead, often reaching over 20 feet, and a very long-lived species, often living 20-30 years, great hammerheads are particularly susceptible to mercury accumulation and have been observed with exceptionally high levels of mercury in their tissue (Lyle 1984). Lyle (1986) also determined that great hammerhead embryo has levels of mercury contamination near the health limits for human seafood consumption.

Furthermore, climate change will continue to cause the destruction of important great hammerhead coral reef habitat through bleaching events and other impacts associated with increased concentrations of greenhouse gases in the atmosphere. Anthropogenic climate change will also raise ocean temperatures and cause great hammerheads to absorb more mercury than they would in cooler waters, thus subjecting them to severe health problems associated with high levels of mercury in the body. Increasing amounts of airborne mercury rise from Chinese power plants, cross the Pacific Ocean, and deposit on or near American shores (Geiger 2011). This trend suggests that the biological effects of mercury on great hammerhead sharks will only increase. High levels of arsenic, a compound with carcinogenic potential, have also been reported in hammerheads (Storelli et al. 2003).

If left unchecked, population growth will lead directly to an increase in fishing pressure on the great hammerhead population in the future.

3.4 Threat related to migration

Species-specific population numbers for great hammerheads are rarely available (Camhi et al. 2009, Piercy et al. 2010). Due to the similar appearance and head shape among the species of hammerhead sharks, there is often confusion as to which hammerhead has been caught and catch numbers are typically reported at the genus level, e.g. *Sphyrna* as part of a complex (Camhi et al. 2009). Population levels of all large hammerhead sharks have registered significant declines in virtually all oceans (Camhi et al. 2009) as their long migration routes commonly put them in contact with multiple coastal and continental shelf fisheries. Abundance trend analyses of catch-rate data specific to *S. mokarran* and to a hammerhead complex of *S. mokarran*, including *S. lewini* and *S. zygaena*, have reported large declines in abundance ranging from 60-99% over recent years. Because S. mokarran regularly migrates between the EEZs of different Range States and into the high seas, no part of any stock can benefit fully from any management measures that are introduced within its waters by a single Range State.

3.5 National and international utilisation

National utilization

According to Vannuccini (1999), countries documented to consume hammerhead meat (usually salted or smoked) include Mexico, Mozambique, Philippines, Seychelles, Spain, Sri Lanka, China (Taiwan), Tanzania, and Uruguay. In other regions recreational and sport fisheries target great hammerheads. These areas mainly include the entire Southeast coast of the United States. In addition, Vooren et al. (2005) report an expanding recreational hammerhead fishery in the State of Rio Grande do Sul, in southern Brazil.

Fins

Hammerhead shark fins are highly desired in the international trade because of the fin size and high needle (ceratotrichia) count (Rose 1996). According to Japanese fin guides (Nakano 1999), *S. zygaena* fins, which are morphologically similar to *S. lewini*, are thin and falcate with the dorsal fin height longer than its base. Because of the higher value associated with the larger triangular fins of hammerheads, traders sort them separately from carcharhinid fins, which are often lumped together. Abercrombie et al. (2005) reported that traders stated that hammerhead fins were one of the most valuable fin types on the market. Using commercial data on traded weights and sizes of fins, the Chinese category for hammerhead shark fins, coupled with DNA and Bayesian statistical analysis to account for missing records, Clarke et al. (2006a,b) estimated that between 1.3 and 2.7 million sharks of these species, equivalent to a biomass of 49,000–90,000t, are taken for the fin trade each year.

Illegal trade

There is little regulation of trade in these species, and the extent of illegal trade activities is unknown. While CITES lists *S. lewini, S. mokarran,* and *S. zygaena* in Appendix II, its implementation was delayed 18 months (September 2014) and five countries filed reservations (Canada, Guyana, Japan, Yemen) (CITES, 2014).

Most RFMO regulations and some national laws prohibit finning sharks at sea (discarding the carcass and transhipping the fins at sea). With the exception of finning sharks at sea, which is prohibited under most Regional Fisheries Management Organizations' regulations and some national laws, there is little control of trade in this species (however, see 2010 ICCAT provision below). Other countries have an outright ban on the trade of sharks. For example, The Bahamas banned the sale, import, and export of sharks, shark parts, and shark products within its waters. The Maldives and Marshall Islands also prohibit the trade of sharks, while Honduras has declared a moratorium on shark fishing in the country's waters. In addition, Guam and the Commonwealth of the Northern Mariana Islands (U.S. territories) both prohibit the sale or trade of shark fins within their waters. ICCAT members are prohibited from retaining, transhipping, landing, storing, selling, or offering for sale any part or whole carcass of hammerhead sharks from the family Sphyrnidae (except *S. tiburo*). While developing coastal States are exempt from this prohibition, they are to ensure that Sphyrnidae do not enter international trade. Thus, there should be no trade occurring from ICCAT fisheries. To date, the ICCAT Compliance Committee has not reviewed the contracting Parties' implementation of this measure. All ICCAT Parties have not reported on their domestic implementation, so their level of international trade that may be out of compliance is unknown. It is likely possible that neither potential exporting nor importing countries of these products have not implemented domestic regulations to monitor or prevent such trade. Furthermore, not all potential importing countries are parties to ICCAT and may not be aware of or required to comply with this measure.

Hammerhead sharks have been documented in IUU fishing activities. For example, about 120 longline vessels were reportedly operating illegally in coastal waters of the western Indian Ocean prior to 2005, and this number was expected to increase (IOTC 2005). These vessels were primarily targeting *Sphyrna* spp and *Rhynchobatus djiddensis* for their fins (Dudley and Simpfendorfer, 2006). IUU fishing by industrial vessels and shark finning are reported in other areas of the Indian Ocean (Young, 2006).

4. Protection status and needs

4.1 National protection status

The great hammerhead shark should benefit from legislation enacted by French Polynesia (2006), Palau (2003, 2009), Maldives (2010), Honduras (2011), The Bahamas (2011), Tokelau (2011), and the Marshall Islands (2011) to prohibit shark fisheries throughout their Exclusive Economic Zones. Other countries have protected areas where no shark fishing is allowed, such as Cocos Island (Costa Rica), Malpelo Sanctuary (Colombia), and the marine reserve of Galapagos Islands (Ecuador). Countries including the United States, Chile, and Costa Rica require sharks to be landed with their fins naturally attached. Shark finning bans implemented by 21 countries, the European Union, and nine RFMOs could also help reduce some shark mortality (Camhi et al., 2009).
The great hammerhead shark is totally protected in the European Union.

4.2 International protection status

The IUCN defines the great hammerhead shark's conservation status as endangered worldwide with a "decreasing" population trend and "Very High Risk of Extinction" (IUCN 2014). Regionally, the species is endangered in the Northwest Atlantic, Gulf of Mexico and critically endangered in the Eastern Atlantic.

This decline and susceptibility has led to a global effort to enhance the species' management and conservation. In March 2013 the great hammerhead shark was added to CITES (Convention on International Trade in Endangered Species) Appendix II. *S. mokarran* was also listed on Annex I, Highly Migratory Species, of the UN Convention on the Law of the Sea, which urges States to cooperate over their management. NOAA Fisheries Service HMS Division has also identified Florida's coastal waters as Essential Fish Habitat (EFH) for many species of sharks. This includes S. mokarran, which was recently added by the Florida Fish and Wildlife Conservation Commission (FWC) to the list of shark species prohibited from harvest in Florida state waters.

The great hammerhead shark is protected by protected by the EU Council Regulation no. 2018/120 of 23 January 2018 and the Memorandum of Understanding (MOU) on Migratory Sharks (48 signatory States) of the Convention on the Conservation of Migratory Species (CMS).

4.3 Additional protection needs

Extensive global fishing, coastal development, and human population growth all present seemingly insurmountable threats to the survival of the great hammerhead shark. Proactive, precautionary policy decisions are need to attenuate the steep declines in the species' populations witnessed over the past few decades. An Appendix II listing for *S. mokarran* would offer an unequivocal statement of concern for the species and commitment towards population rebuilding strategies.

5. Range States

All contracting Parties to the Protocol, which are 16 countries from the Caribbean region : Bahamas, Barbados, Belize, Colombia, Cuba, Dominican Republic, France (Guadeloupe, Guyane, Martinique, Saint-Barthélémy, Saint-Martin), Grenada, Guyana, Netherlands (Aruba, Bonaire, Curaçao, Saba, Sint-Eustachius, Sint Maarten), Panama, Saint-Lucia, St Vincent and the Grenadines, Trinidad and Tobago, United States (States bordering the Gulf of Mexico; U.S. Virgin Islands; Puerto-Rico), Venezuela.

And the following States : Algeria; Antigua and Barbuda; Australia (Ashmore-Cartier Is., Australian Capital Territory, Coral Sea Is. Territory, New South Wales, Northern Territory, Queensland); Bangladesh; Brazil; Cambodia; Cape Verde; China; Costa Rica (Cocos I.); Cuba; Djibouti; Ecuador; Egypt (Sinai); El Salvador; Eritrea; Haiti; Honduras (Honduran Caribbean Is.); India (Andhra Pradesh, Goa, Gujarat, Karnataka, Kerala, Maharashtra, Orissa, Pondicherry, Tamil Nadu, West Bengal); Indonesia; Iran, Islamic Republic of; Israel; Jamaica; Japan; Jordan; Kenya; Kuwait; Libya; Madagascar; Malaysia; Mauritius (Rodrigues); Morocco; Mozambique; Nicaragua; Oman; Pakistan; Palau; Panama; Philippines; Qatar; Saudi Arabia; Senegal; Seychelles (Aldabra); Somalia; South Africa (KwaZulu-Natal); Spain; Sri Lanka; Sudan; Suriname; Tanzania; Tunisia; United Arab Emirates; United Kingdom (Anguilla; British Indian Ocean Territory, Cayman Islands; Montserrat; Pitcairn; Turks and Caicos Islands;); Viet Nam; Yemen (North Yemen, Socotra, South Yemen).

6. Comments from range states

7. Additional remarks

This document is based on the proposal of the Government of Ecuador for the inclusion of the great hammerhead shark in Appendix 1 of the MOU on Migratory Shark Conservation of the CMS in 2015, and on the document "Fact Sheets, Shark & Ray Species" of the MOU.

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2. PROPOSAL FOR INCLUSION OF SPECIES ON THE APPENDICES OF THE SPAW PROTOCOL

A. PROPOSAL: Inclusion of the smooth hammerhead shark *Sphyrna zygaena* on Appendix II of the Protocol concerning Specially Protected Areas and Wildlife (SPAW Protocol)

B. PROPONENT: Government of France

C. SUPPORTING STATEMENT:

1. Taxon

1.1 Classis: Chondrichthyes, subclass Elasmobranchii
1.2 Ordo: Carcharhiniformes
1.3 Familia: Sphyrnidae
1.4 Genus/species: *Sphyrna zygaen*
1.5 Common name:
English: Smooth hammerhead shark
Spanish: Tiburón martillo liso
French: Requin marteau commun

2. Biological data

2.1 <u>Distribution</u>
Sphyrna zygaena has a circumglobal distribution in tropical to warm temperate waters, generally between the 59°N and 55°S latitude (FAO, 2010). The species has the widest temperature tolerance of all hammerhead species, allowing for a broader geographical range compared to other species of hammerhead (Compagno, 1984; Ebert et al., 2013).

In the Eastern Atlantic, *S. zygaena* occurs from the south of the British Isles to Angola, including the Mediterranean Sea and Cape Verde Islands (Ebert et al., 2013). Very few specimens have been reported from the southern British Isles, where it is considered a very occasional vagrant (Southall and Sims, 2008). Within the Mediterranean Sea, it is likely more common in the western basin. In the Western Atlantic, *S. zygaena* occurs from Canada (vagrants) to Florida, US, parts of the Caribbean, including the Virgin Islands, and as far south as southern Argentina (Ebert et al., 2013). Although the Caribbean Islands are often included in the range of this species, based on local species-lists, this cannot be confirmed (Miller, 2016).

In the Indo-Pacific, the distribution of *S. zygaena* extends from South Africa to Madagascar, Arabian Sea, around southern India and Sri Lanka, and from south-eastern Russia and Japan to Vietnam (Ebert et al., 2013). In addition, the species also occurs around Australia, New Zealand and Hawaii, U.S. (Ebert et al., 2013). In the eastern Pacific, *S. zygaena* occurs from northern California to Chile, including the waters of the Galapagos Islands (Ebert et al., 2013). Brito (2004) reported *S. zygaena* to be rare in Chilean waters, and that the southern range limit is central Chile.

2.2 Population

Misidentifications or the lack of species-specific data for hammerhead sharks result in many studies examining trends for the *Sphyrna*-complex (*Sphyrna* spp.: a combination of scalloped hammerhead *Sphyrna lewini,* great hammerhead *Sphyrna mokarran* and *S. zygaena*). As Miller (2016) noted, an accurate abundance estimate for this species on a global scale is not feasible at this stage, based on the available data for different regions.

- Atlantic Ocean

Given the absence of reliable data on *S. zygaena*, there is no stock assessment available on this species that has been accepted by the National Oceanic and Atmospheric Administration (Miller, 2016).

An exploratory assessment was undertaken by Hayes (2007; cited by Miller, 2016) that suggested a 91% decline from 1982 to 2005, with this study highlighting a number of uncertainties in the input data. As noted by Miller (2016) and Burgess et al. (2005), logbook-data have certain inherent inaccuracies (i.e. misidentification and inadequate sampling) and inferences based on such data should be treated with caution.

In the Eastern Atlantic, specifically off Northwest Africa, hammerhead sharks can make up 42% of the bycatch in pelagic trawl fisheries, with catches of hammerhead sharks peaking in July and August (Zeeberg et al., 2006). Within the same region, Dia et al. (2012; cited by Miller, 2016) indicated that catches of hammerhead species by the artisanal fleet comprised mostly *S. lewini*.

Sphyrna zygaena is the more common of the three large-bodied hammerhead shark species recorded in the Mediterranean Sea. Although Ferretti et al. (2008) concluded that hammerhead sharks had declined in the Mediterranean Sea, the magnitude of the purported decline has been questioned, and Miller (2016) indicated that two of the data sources used (i.e. public observations and catches within tuna trap logbook data) were inappropriate for the analyses. A more recent study by Sperone et al. (2012) summarised observations of Sphyrnidae off southern Italy between 2000 and 2009, indicating that hammerhead sharks still occur in the Mediterranean Sea.

- Pacific Ocean

Studies available on the abundance of hammerhead sharks in the Pacific also lack robust species-specific data (Miller, 2016). Rice et al. (2015) concluded that hammerhead species (not defined at species level) had increased in the Western and Central Pacific Ocean between 1997 and 2001, based on standardized catch-per-unit-effort time series, corrected for the fishery-dependant effects. After this period (2002–2013) the catch-per-unit-effort for hammerhead species remained stable (Rice et al., 2015). Rice et al. (2015) also noted that species-specific stock assessments were not possible, as most of the available data referred to generic “hammerhead sharks”.

- Indian Ocean

Results on the abundance trends of *S. zygaena* within the Indian Ocean are limited to two studies in South African waters, and one from Western Australia.

A tag-recapture study off South Africa (1984–2009) seemed to indicate a steep decline of smooth hammerhead (Diemer et al., 2011). However, tagging programmes are not robust indicators of abundance. Furthermore, the authors of this study highlighted that *"The general absence of S. lewini and unspecified Sphyrna spp. tags at the beginning of the study period and large numbers of S. zygaena during this time suggests that before 1988 Sphyrna spp. may have been grouped as S. zygaena. If so, this may have skewed the annual tagging distributions for S. lewini and S. zygaena",* which may affect the results and conclusions of the study (Diemer et al., 2011).

A study of the shark catches in beach protection nets (1978–2003) along the South African coast noted that catches of other hammerhead sharks (*Sphyrna lewini* and *Sphyrna mokarran*) declined over the 25-year period, but no clear trend could be determined for *S. zygaena* (Dudley and Simpfendorfer, 2003).

In summary, species-specific data on hammerhead sharks are lacking for many regions, as also highlighted by Miller (2016), making trend analyses on a species-levels inaccurate. Based on the results of the cited studies above, it is likely that populations of hammerhead sharks, as a group, have declined. The magnitude of any decline in *S. zygaena*, however, is unknown.

2.3 Habitat

Accurate data on the global range of *S. zygaena* is limited. It is a pelagic species that occurs in both coastal and oceanic waters, thus occurring along the continental shelves (at depths of 20–200 m) and also making excursions into more oceanic habitats (Smale, 1991; Ebert, 2003).

Young individuals occur in coastal habitats in the first years of their life, with their habitat range extending out to oceanic zones as they grow (Smale, 1991; Diemer et al., 2011; Clarke et al., 2015). According to Clarke et al. (2015), this is the most oceanic of all hammerhead sharks, as well as the most temperature tolerant species. It is most common in waters of 16–22°C, but has also been reported in cooler waters of 13–19°C off South Africa (Diemer et al., 2011).

Coastal developments may have resulted in habitat degradation and destruction of potential nursery areas (Knip et al., 2010), although there is no direct evidence that such habitat degradation has negatively impacted on the abundance or range of this species (Miller, 2016). Miller (2016) also noted that, given the migratory and opportunistic nature of S. zygaena, it may possibly adapt its range according to its physiological tolerance and ecological needs in response to changing environmental conditions (e.g. climate change).

2.4 Migrations

Sphyrna zygaena is a large-bodied and highly mobile hammerhead shark with active and strong swimming capacities. Little is known on the migratory behaviour of *S. zygaena*, and how the parts of the population migrate. Bass et al. (1975) documented juveniles of this species moving along the coast of South Africa in high numbers, but there was no evidence of migration in groups (Miller, 2016). In contrast, other sources indicate migrations of juvenile aggregations (Diemer et al., 2011; Ebert, 2013).

Kohler and Turner (2001) reported the largest distance travelled for *S. zygaena* was 919 km in just over two years, averaging a speed of 4.8 km/day.

Smale and Cliff (1998) suggested that *S. zygaena* migrates along the east coast of South Africa, based on distinct species of cephalopods found in the stomach of this species. The oceanic cephalopods reported in the stomach contents indicate that *S. zygaena* range offshore, which suggests they may cross into international waters.

In summary, although scientific studies on the movements and migrations of this species are limited (and more research is needed), the data available are indicative of *S. zygaena* making inshore-offshore migrations. This is evidenced by the presence of juvenile stages in more coastal areas, and that larger individuals have been found with oceanic squid in their stomach contents. Such migrations would lead to *S. zygaena* moving from national to international waters and across jurisdictional boundaries. There is also evidence of north-south movements, which may be seasonal migrations. The scale of potential movements from tagging programmes (well above 1000 km) would also indicate that *S. zygaena* are capable of moving through different national waters, as was reported from the specimen moving from California to Mexico and back, or across several countries off west Africa.

3. Threat data

3.1 <u>Direct threats to the population</u>

- Biological characteristics
Sphyrna zygaena is a large species of hammerhead shark, growing to a maximum reported size of 420 cm. However, the average size for this species is 2.5 to 3.0 m total length (Miller, 2016). Like many other shark species, this species reaches sexual maturity relatively late, at a total length between 210 and 260 cm for males and 250 and 290 cm for females (Castro and Mejuto, 1995; Miller, 2016). In the Gulf of California, both sexes of *S. zygaena* appear to mature earlier, at a total length of 194 cm for males and 200 cm for females (Nava Nava and Marquez-Farias, 2014). Age at maturity is estimated to be 9 years (Cortés et al., 2015).

Like other hammerhead shark species, *S. zygaena* are viviparous (i.e. live-bearing) (Compagno, 1984; Ebert et al., 2013). After a gestation period of 10–11 months, females give birth to 20 to 50 pups (average litter size of 33 pups), with pups 49–64 cm in total length (Compagno, 1984; Castro and Mejuto, 1995; White et al., 2006; Miller, 2016). Juveniles of this species have been observed to form large aggregations (Smale, 1991). Reproduction likely occurs annually, but this is still to be confirmed (Clarke et al., 2015).

Within the first four years, the young sharks grow approximately 25 cm per year, with growth reducing every year after (Coelho et al., 2011). Rosa et al. (2017) compared growth rates with other species in the genus, and estimated that the growth coefficients for *S. zygaena* were in the low to middle range. Growth curves for this species differ between populations in the Atlantic and Pacific Oceans, with individuals reaching smaller sizes in the Pacific Ocean (Clarke et al., 2015; Miller, 2016). Longevity is unknown, but the species has been aged to at least 18 years for males and 21 years for females (Coelho et al., 2011).

Like many large-bodied shark species, *S. zygaena* is among the top predators (feeding at trophic level 4.2) in the marine food web (Cortés, 1999). The species feeds on a large variety of teleosts (i.e. bony fish), elasmobranchs, crustaceans and cephalopod species (Smale and Cliff, 1998; Cortés, 1999).

- Fisheries

Hammerhead sharks are taken as direct catch or incidental catch in domestic and artisanal fisheries, as well as industrial pelagic fisheries on the high seas. Catches of hammerhead shark are often amalgamated as *Sphyrnidae* spp. Whilst the meat is deemed of low quality because of the high level of urea, the fins are among the most valuable in the shark fin trade because of their large size and high fin-ray count (Rose, 1996).

It is difficult to make accurate assumptions of the catch level of *S. zygaena*, as few countries and organisations collect species-specific data on hammerhead sharks. The United Nations FAO database allows the separate reporting of smooth hammerhead and scalloped hammerhead, but most catches are still reported as Sphyrnidae spp. Some data may also be reported at higher groupings (e.g. sharks). Whilst some nations do report species-specific landings for *S. lewini* and *S. zygaena*, the accuracy of these data is uncertain.

The global overview by the FAO shows a significant increase in reported landings of hammerheads in the past decade, although this could be partly attributed to increased species-specific reporting of landings.

3.2 <u>Habitat destruction</u>

Like many other shark species smooth hammerhead sharks rely on inshore areas for pupping and nursery grounds. Habitat degradation and pollution affect coastal ecosystems that juvenile *S. zygaena* sharks occupy during early life stages. However, the effects of these changes and their ultimate impact on populations of *S. zygaena* are currently unknown.

3.3 <u>Indirect threat</u>

There are no direct studies on climate change effects on *S. zygaena*. Miller (2016) noted that, as this species has a broad geographic range, large-scale impacts such as global climate change affecting water temperature, currents and potentially food chain dynamics could have a detrimental effect on the species. However, Miller (2016) also noted that the migratory behaviour of the species may provide some resilience against any risks climate change posed.

Several studies have examined levels of contaminants in sharks, as they are long lived, top-predators that can bioaccumulate and bio-magnify contaminants in their tissues. Whilst a study from Baja California found elevated levels of mercury in *S. zygaena* tissue, these were below the levels deemed safe for human consumption (Garcia-Hernandez et al. 2007).

3.4 <u>National and international utilisation</u>

Although there is a limited market for smooth hammerhead meat in some areas, as stated earlier the main driver for hammerhead fisheries (directed and bycatch) is the high value of the fins on the international market. The fins of *S. zygaena* are large and have a high fin-ray content, which is the essential element adding the gelatinous quality to shark fin soup. This makes them one of the most valuable fins on the Hong Kong market (the largest international shark fin market). Abercrombie (2015) estimated a value of $88/kg for 2003.

In an analysis of the trade through the Hong Kong fin market, Clarke et al. (2006a) estimated that 4–5% of all fins traded were from *S. zygaena* or *S. lewini* each year. This would account for an estimate of between 49000 and 90000 tons of smooth hammerhead shark which would amount to between 1.3 and 2.7 million individual animals (Clarke et al. 2006b).

4. Protection status and needs

4.1 National protection status

The smooth hammerhead shark is totally protected in the European Union.

4.2 International protection status

FAO: In 1998 the International Plan of Action for Conservation and Management of Sharks (IPOA Sharks) was agreed for all species of sharks and rays. The IPOA-Sharks is a voluntary international instrument, developed within the framework of the 1995 FAO Code of Conduct for Responsible Fisheries, which provides guidance for ensuring the conservation and management of sharks and their long-term sustainable use, with emphasis on improving species-specific catch and landings data collection, and the monitoring and management of shark fisheries. The code sets out principles and international standards of behaviour for responsible fishing practices to enable effective conservation and management of living aquatic organisms while considering impacts on the ecosystem and biodiversity. The IPOA-Sharks recommends that FAO member states 'should adopt a national plan of action for the conservation and management of shark stocks (NPOA-Sharks), if their vessels conduct directed fisheries for sharks or if their vessels regularly catch sharks in non-directed fisheries'. Several range states have developed national plans of action: Australia, Brazil, Canada, Egypt, Democratic People's Republic of Korea; Japan; Mexico; New Zealand; Oman; South Africa; United States, as well as regional plans of action for: Pacific Island States, the Central American Isthmus (OSPESCA) and the European Union.

Finning Bans: One of the main priorities in shark management and conservation in the past two decades has been the prohibition of shark finning. Many countries have already adopted finning bans in their waters and/or in their fisheries, that are in general implemented through an obligation to land all sharks with fins attached to the corresponding carcasses, or through a "fins to carcass ratio". All t-RFMOs have adopted finning bans with these two possible implementation means. NAFO and NEAFC have adopted the fins naturally attached policy as only possible means for implementing the finning ban in the areas under their purview.

ICCAT: In 2010, a recommendation was adopted which prohibits the retention onboard, transhipment, landing, storing, selling and offering for sale any part or whole carcass of hammerhead sharks of the family *Sphyrnidae* (expert for *Sphyrna tiburo*) taken in the Convention area in association with ICCAT fisheries (ICCAT recommendation 10-08). The ban has an exemption for local consumption in developing coastal states, but these are not allowed to trade hammerheads internationally.

CITES: CITES works by subjecting international trade in specimens of selected species to certain controls. All import, export, re-export and introduction from the sea of species covered by the Convention has to be authorized through a licensing system. Each Party to the Convention must designate one or more Management Authorities in charge of administering that licensing system and one or more Scientific Authorities to advise them on the effects of trade on the status of the species.

The species covered by CITES are listed in three Appendices, according to the degree of protection they need. *S. lewini, S. mokarran*, and *S. zygaena* were added to Appendix II of CITES in March 2013. Appendix-II specimens require: an export permit or re-export certificate issued by the Management Authority of the State of export or re-export is required; and an export permit may be issued only if the specimen was legally obtained and if the export will not be detrimental to the survival of the species.

CMS: The Convention on the Conservation of Migratory Species of Wild Animals is an environmental treaty under the aegis of the United Nations Environment Programme. The CMS provides a global platform for the conservation and sustainable use of migratory animals and their habitats. CMS brings together the States through which migratory animals pass, the Range States, and lays the legal foundation for internationally-coordinated conservation measures throughout the migratory range.

Sphyrna lewini and *Sphyrna mokarran* were listed on CMS Appendix II – this list includes migratory species with an unfavourable conservation status or those that would significantly benefit from international co-operation. Parties that are range states for Appendix II-listed species "shall endeavour to conclude agreements where these should benefit the species and should give priority to those species in an unfavourable conservation status".

Barcelona Convention and GFCM: *Sphyrna zygaena* is listed in Appendix II of the Barcelona Convention, affording it protection from fishing activities taking place in the Mediterranean region. GFCM adopted a recommendation according to which, all species listed in Appendix II of the Barcelona Convention must be released unharmed and alive to the extent possible, therefore cannot be retained on board, transhipped, landed, transferred, stored, sold, displayed or offered for sale (Recommendation GFCM/36/2012/1). This recommendation also stipulates that all vessels encountering these species must record information on fishing activities, catch data, incidental taking, release and/or discarding events in a logbook or similar document, then all logged information must be reported to national authorities. Finally, additional measures should be taken to improve such data collection in view of scientific monitoring of the species.

The IUCN (World Conservation Union) has classified the global population of S. zygaena as Vulnerable.

The smooth hammerhead shark is protected by protected by the EU Council Regulation no. 2018/120 of 23 January 2018.

4.3 Additional protection needs

Listing on international resource management agreements should help improving national and regional management and facilitate collaboration between states for this species. It is evident that lack of species-specific data collection is hampering management for this species. There is still a lack of understanding of the basic data needed to understand the life-history, habitat utilisation and migration patterns of this species.

As noted in section 3.1 hammerhead sharks have a high bycatch mortality rate (71% at-vessel mortality in longline) in nets, trawls and long lines. Measures aimed at reducing unwanted mortality should incorporate avoidance measures as well as gear adaptations that lead to reduced bycatches of this species.

5. Range States

Albania; Algeria; Argentina; Australia; Bahrain; Brazil; Canada; Chile; China; Croatia; Cyprus; Egypt; France, Greece; Iceland; India; Iran, Islamic Republic of Iraq; Ireland; Israel; Italy; Japan; Korea, Democratic People's Republic of Korea, Republic of Kuwait; Lebanon; Libya; Madagascar; Mexico; Montenegro; Morocco; Mozambique; Namibia; New Zealand; Oman; Pakistan; Peru; Portugal; Qatar; Russian Federation; Saudi Arabia; Slovenia; South Africa; Spain; Syrian Arab Republic; Tunisia; Turkey; United Arab Emirates; United Kingdom; United States; Uruguay.

6. Comments from range states

7. Additional remarks

This document is based on the proposal of the European Union and its Member States for the inclusion of the entire population of smootht hammerhead shark in Appendix I of the CMS MOU on Migratory Shark Conservation in 2018.

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3. PROPOSAL FOR INCLUSION OF SPECIES ON THE APPENDICES OF THE SPAW PROTOCOL

A. PROPOSAL: Inclusion of the whale shark *Rhincodon typus* on Appendix II of the Protocol concerning Specially Protected Areas and Wildlife (SPAW Protocol)

B. PROPONENT: Government of France

C. SUPPORTING STATEMENT:

1. Taxon

1.1 Classis: Elasmobranchii
1.2 Ordo: Orectolobiformes
1.3 Familia: Rhincodontidae
1.4 Genus/species: *Rhincodon typus*
1.5 Common name:
English: Whale shark
Spanish: Tiburón ballena, pez dama
French: Requin-baleine

2. Biological data

2.1 <u>Distribution</u>

Pantropical. Whale sharks are distributed *circum-tropically* from approximately 30°N to 35°S with seasonal variations (Rowat & Brooks 2012; Sequeira et al. 2014). Several aggregation sites are distributed over all three ocean basins, with major subpopulations in the Atlantic Ocean and Indo-Pacific (Sequeira et al. 2013).

2.2 <u>Population</u>

Two global-scale genetic studies on whale sharks have estimated genetic effective population size. Castro et al. (2007) estimate current genetic effective population size to be 119,000 – 238,000 sharks. Schmidt et al. (2009) estimated genetic effective population size to be approximately 103,000. An estimated 75% whale sharks inhabit the Indo-Pacific, while 25% occur in the Atlantic. Overall, the global population experienced an estimated decline of 50% over the last three generations (75 years) (Pierce & Norman 2016). In addition to the decline in abundance, a decline in mean total length was also reported from a number of locations. The current IUCN Red List status for the global populations for whale sharks is Endangered.

2.3 <u>Habitat</u>

The whale shark is basically pelagic and can be encountered in very deep water far from land. Shallow waters near the mouths of some rivers and estuaries may constitute feeding or breeding/birthing grounds where whale sharks gather seasonally.
Critical sites of whale sharks are comprised of aggregation sites, typically dominated by specific age classes (juvenile males in coastal feeding aggregations, and adult sharks at seamounts and

volcanic islands) and migration corridors. Thus, they are critical for the species and urgently need to be protected from targeted and incidental fisheries.

Virtually nothing is known about what may make these areas important to the whale sharks, i.e., water quality, concentrations of plankton and detritus, temperature range, current patterns, weather, sea state, and other characteristics.

2.4 Migrations

The whale shark is highly migratory. Movements of 1000s of km over periods of weeks or months have been recorded through satellite tracking in the eastern Pacific and Southeast Asia. One shark satellite-tagged in the Mindanao Sea in the inner Philippines traveled over 3,000 km to the EEZ of Vietnam in two months (personal communication from S. Eckert, Hubbs-Sea World Research Institute, San Diego, California, Sep 1998). Several sharks satellite-tagged in the Gulf of California, Mexico moved over 12,000 km southeast into international waters and the waters of offshore South Pacific nations (loc. cit.). Migrations have a seasonal component: aggregations of whale sharks appear in certain coastal waters and may remain for several months. It is not known whether all components of the population(s) (adults, juveniles, males, females) undergo these migrations, but it is clear that the migratory sharks are shared by two or more nations.

3. Threat data

3.1 Direct threats to the populations

Sharks are more vulnerable to exploitation than most other fishes, because of their longevity, delayed maturation and relatively low fecundity (Rose 1996). In their life histories they are in general more similar to marine mammals than to other fishes. The whale shark is ovoviviparous (live-bearing), but the basic reproductive parameters of its age at maturation, life span and fecundity are unknown.

3.2 Fisheries and international trade

The whale shark is hunted or has been hunted for its fins and meat in several places in Asia (India, Pakistan, China, Indonesia, Philippines, Taiwan, Japan, Maldives and elsewhere), in some cases despite legal protection (e.g., in the Philippines).

Whale sharks, incidentally captured in tuna purse seine or gillnet fisheries, are believed to have a predominant impact on a populations level than targeted fisheries (Pierce & Norman 2016). Although the current large-scale fisheries in southern China, where whale sharks are routinely captured and retained when sighted, are of major concern (Li et al. 2012). Recent surveys indicated that whale shark fins are demanding high prices, which could lead to increased targeted fisheries and trade (Li et al. 2012).

It is not known to what degree hunting in one area affects population(s) in other areas, although the fact that the sharks migrate long distances suggests that the effects may not be purely local.

3.3 Habitat destruction and pollution

Whale sharks seasonally frequent shallow-water areas near estuaries and river mouths. These waters are highly vulnerable to contamination with sewage and industrial effluent and alteration due to human activities.

Environmental pollution events occurring in whale shark hotspots, such as the Deepwater Horizon oil spill in the Gulf of Mexico could have population level impacts (McKinney et al. 2012). As filter feeding organisms, they are likely to be affected by high concentrations of microplastic pollution (Fossi et al. 2017).

3.4 Ship strikes

Whale sharks are exposed to the threat of vessel strikes due to their frequent feeding behaviour close to the surface. Propeller injuries are commonly recorded during monitoring programs (Rowat et al. 2007; Speed et al. 2008; Fox et al. 2013). However, the total scope of this issue remains largely unexplored.

3.5 Tourism

Tourism activities may increase the risk of vessel strikes, local disturbance from interference, crowding or provisioning.

3.6 Climate change

Climate change might have adverse effects on prey availability, ocean acidification and currents. The dimension of these effects and how whale sharks will manage to cope with them remains uncertain.

4. Protection status and needs

4.1 National protection status

The whale shark is totally protected in the European Union.

4.2 International protection status

The whale shark is listed as "Endangered" on the IUCN Red List. The whale shark was added to CITES (Convention on International Trade in Endangered Species) Appendix II in 2003 and to the CMS Appendix I in 2017. It is protected by the EU Council Regulation no. 2018/120 of 23 January 2018

4.3 Additional protection needs

Range States should consider cooperative investigation, assessment and management of likely shared populations.

5. Range States

All states having tropical or warm-temperate marine coasts and particularly the contracting Parties to the Protocol, which are 16 countries from the Caribbean region : Bahamas, Barbados, Belize, Colombia, Cuba, Dominican Republic, France (Guadeloupe, Guyane, Martinique, Saint-Barthélémy, Saint-Martin), Grenada, Guyana,Netherlands (Aruba, Bonaire, Curaçao, Saba, Sint-Eustachius, Sint Maarten), Panama, Saint-Lucia, St Vincent and the Grenadines, Trinidad and Tobago, United States (States bordering the Gulf of Mexico; U.S. Virgin Islands; Puerto-Rico), Venezuela.

6. Comments from range states

7. Additional remarks

This document is based on the proposal of the Government of the Philippines for the inclusion of the whale shark in Appendix II of the CMS in 1999, and on the document "Fact Sheets, Shark & Ray Species" of the MOU.

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4. PROPOSAL FOR INCLUSION OF SPECIES ON THE APPENDICES OF THE SPAW PROTOCOL

A. PROPOSAL: Inclusion of the oceanic whitetip shark *Carcharhinus longimanus* on Appendix II of the Protocol concerning Specially Protected Areas and Wildlife (SPAW Protocol)

B. PROPONENT: Government of France

C. SUPPORTING STATEMENT:

1. Taxon

1.1 Classis: Chondrichthyes, subclass Elasmobranchii
1.2 Ordo: Carcharhiniformes
1.3 Familia: Carcharhinidae
1.4 Genus/species: *Carcharhinus longimanus*
1.5 Common name:
English: Oceanic whitetip shark
Spanish: Tiburón oceánico
French: Requin océanique ou longimane

2. Biological data

2.1 Distribution

Carcharhinus longimanus is a circumtropical species and the only true oceanic species within the *Carcharhinus*-genus, occurring in waters between the 30ºN and 35ºS latitudes (CITES, 2013). It is considered to be one of the most widespread shark species, ranging across all tropical and subtropical waters (Baum et al., 2015). Within the eastern Atlantic Ocean, *C. longimanus* occurs from northern Portugal to Angola (including possibly the Mediterranean Sea). In the western Atlantic the species ranges from the United States to Argentina, including the entire Gulf of Mexico and Caribbean Sea. In the Indian Ocean, *C. longimanus* occurs from South Africa to Western Australia, including the entire Red Sea. In the Pacific the species is distributed from China to East Australia. Within the central Pacific the species occurs off all islands (Hawaii, Samoa, Tahiti). Within the eastern Pacific, *C. longimanus* occurs from southern California to Peru (CITES, 2013; Ebert et al., 2013).

2.2 Population

Sharks and rays are vulnerable to overexploitation due to overfishing and the K-selected life history characteristics of the species (Dulvy et al., 2014). *C. longimanus,* once among the most abundant oceanic sharks, has experienced serious declines as high as 70% within the western North Atlantic between 1992 and 2000. This species is assessed to be critically endangered in the Northwest and Western Central Atlantic (Baum et al., 2015). Anecdotal data exists for this species, originating from fisheries (Bonfil et al., 2008).
Overall, global quantitative abundance estimates and trends are lacking for the oceanic whitetip.

However, there are several studies on the abundance trends for a few regions and/or populations of oceanic whitetip sharks. There is also a recent stock assessment for the oceanic whitetip shark in the Western and Central Pacific (Rice and Harley 2012). Thus, the following section provides some insight into the abundance trends of the species. It should be noted that catch records of sharks, especially non-target shark species, are often inaccurate and incomplete. The oceanic whitetip shark is predominantly caught as bycatch and the reporting requirements for bycatch species have changed over time and differ by organization, and have therefore affected the reported catch.

-Atlantic Ocean

Data on *C. longimanus* from the Atlantic Ocean comes from studies varying on gear or data source. According to Baum et al. (2003), based on logbook data of the U.S. pelagic longline fleet, *C. longimanus* has experienced a 70 % population decline between 1992 and 2000 within the Northwestern Atlantic Ocean and Gulf of Mexico. Based on the same dataset, Cortés et al. (2008) estimated a decline of 57 % for this species from 1992 to 2005 (as cited by CITES, 2013).

The results of interferences based on logbook data has been subject of debate (Burgess et al., 2005; Baum et al., 2005), as a change of fishing methods and practices could cause a bias in this data.
During a survey from 1992 to 1997 in the southwestern equatorial Atlantic Ocean (Brazilian exclusive economic zone), 29% of the total elasmobranch catches were *C. longimanus*. After the blue shark (Prionace glauca), *C. longimanus* was the most common species among the elasmobranch catches (Lessa et al., 1999). Elasmobranchs constituted for 95% of the bycatch in the Spanish swordfish fishery in the Atlantic and Mediterranean Sea in 1999 (Mejuto et al., 2002). *C. longimanus* only made up 0.2% of the total elasmobranch catches (by rounded weight) within this fishery. The species was present in 4.7% of the purse seine sets in the eastern Atlantic Ocean (Santana et al., 1997; Bonfil et al., 2008). Per 1000 hooks set, Domingo (2004) reports a catch rate of this species of 0.006 sharks in the southern Atlantic and 0.09 sharks off western Africa (as cited in Bonfil et al., 2008). Data from the Japanese longline fleet operating in the Atlantic Ocean indicates that *C. longimanus* makes up 0.12% of the bycatch of elasmobranch species (Senba and Nakano, 2005).

Although several studies indicate that large pelagic sharks (including *C. longimanus*) declined over the past decades, the magnitude of these declines is unclear, due to sampling differences and origin of the data.

Young et al, (2016) list several tagging studies of Atlantic Oceanic Whitetip sharks from the Gulf of Mexico, Bahamas and Brazilian longline fleet in the Central Atlantic. Even though these studies only followed a limited number of animals some observations can be made. The sharks preferred to remain at relatively shallow depth in warm waters with temperatures between 24 and 30ºC. And several seemed to show a strong site fidelity returning to the place they were tagged after traveling thousands of kilometers (Tolotti et al. 2015a).

- Pacific Ocean

Catches of *C. longimanus* within the Pacific Ocean have been included in a number of fishery dependent studies. Based on catches of the Japanese longline fishing fleet, a significant difference in catch-per-unit-effort (CPUE) of *C. longimanus* between the period of 1967 – 1970 and the period of 1992 – 1995 was reported. Within the east of the study area (east of the 180º latitude), an increase of 40 to 80% was determined just above the equator (10ºN), whereas slightly further north (10º - 20ºN) a decrease of 30 to 50% was reported for the species (Matsunaga and Nakano, 1999; Bonfil et al., 2008). However, just like the studies conducted in the Atlantic, the authors reported that multiple variables could cause a bias in these trends. Another study based on Japanese research longline surveys indicates that *C. longimanus* comprised of 22.5% of the total shark catches in the western Pacific and 21.3% in the eastern Pacific (Taniuchi, 1990, as cited in CITES, 2013).

Within the tropical western and central Pacific Ocean, *C. longimanus* is among the four most caught species in the tuna longline fishery and is the second most caught species (after silky sharks, *Carcharhinus falciformis*) in the tuna purse sein fishery (Williams, 1999). For this same region, Lawson (2011) analyzed the results of the observer program of the longline (1991 - 2011) and purse seine (1994 - 2011) tuna fishery. For the longline fishery, *C. longimanus* were observed on 43% of the fishing trips, with a decreasing trend in sharks per 100 hooks over the study period. A similar trend was determined based on observer data from the purse seine fishery, as the number of sharks per day declined over the study period. Similar, but slightly different trends were published for this region by Clarke et al. (2013). This study concluded that catch rate of *C. longimanus* within the longline fishery declined with 17% per year.

- Indian Ocean
According to Santana et al. (1997; as cited by Bonfil et al., 2008), *C. longimanus* was present in 16% of the purse seine nets deployed by the Spanish and French fishing fleets operating in the western Indian Ocean. Catches of *C. longimanus* in the shark longline fishery operating off northern Maldives decreased from 19.9% in 1987 – 1988 to 3.5% in 2002 – 2004 (Anderson et al., 2011; CITES, 2013).

For many elasmobranch species, including *C. longimanus,* inferences based on historical (logbook) data tend to be biased by multiple variables. Changes in fishing techniques, species targeting and unreported catches can cause biases in trends. However, as many cited studies show, populations of *C. longimanus* although the magnitude of decline remains unclear, this species is likely threatened by overfishing on a global scale (Baum et al., 2015).

In 2016, Young et al. conducted an extensive review of available literature on the state of the global Oceanic Whitetip Shark population as part of a Status Review to assess the species for the Endangered Species list in the US. They summarized that: Overall, evidence (both quantitative and qualitative) suggests that while the oceanic whitetip shark was once considered to be one of the most abundant and commonly encountered pelagic shark species wherever it occurred, this oceanic species has likely undergone population abundance declines of varying magnitudes throughout its global range. Where more robust information is available, declines in oceanic whitetip shark abundance range from 86% to greater than 90% in some areas of the Pacific Ocean (with declines observed across the entire basin), and between 57%-88% in the Atlantic and Gulf of Mexico.

Although information from the Indian Ocean is highly uncertain and much less reliable, the best available information points to varying magnitudes of decline, with the species becoming rare across the basin over the last 20 years. The only population that currently shows a stable trend, based on standardized CPUE observer data, is the Northwest Atlantic.

2.3 Habitat

Young et al. (2016) report *C. longimanus* as a truly oceanic species usually found far offshore in the open sea in waters over 200m deep. The species occurs in both coastal and pelagic zones, utilizing shallow habitats from surface waters to a depth of 20 meters.

The oceanic whitetip has been reported from waters between 15ºC and 28ºC, however the species exhibits a strong preference for the surface mixed layer in water with temperatures above 20°C.It can tolerate colder waters down to 7.75°C for short periods in deep dives into the mesopelagic zone below the thermocline (>200 m), presumably for foraging (Howey-Jordan et al. 2013; Howey et al. 2016).

The low tolerance to lower water temperatures appear to create a barrier between the western Atlantic and Indo-Pacific population. Ruck (2016) found genetic differentiation between the populations on both sides of the tip of South Africa.

2.4 Migrations

C. longimanus is a large oceanic shark species, with active and strong swimming capabilities. Only a handful of studies provide detailed information on the movements of this species. As part of the Cooperative Shark Tagging Program of the National Marine Fishery Service, 542 *C. longimanus* were tagged from 1962 to 1993. During this period, only 6 individuals were recaptured, moving from the Gulf of Mexico to the Atlantic coast of Florida, from the Lesser Antilles to the central Caribbean Sea and along the equatorial Atlantic Ocean. The longest tracked distance for this species was 1,226 km, and the maximum speed was 17.5 NM/day (32.4 km/day) (Kohler et al., 1998). Howey-Jordan et al. (2013) tracked 11 *C. longimanus* tagged in the vicinity of Cat Island, Bahamas. During the tracking period of 30 to 245 days, each individual moved 290 to 1,940 km away from the initial tagging site. Four of these individuals moved in a southeastern direction towards the Lesser Antilles, three remained mostly within the exclusive economic zone of the Bahamas, and one individual moved in northeastern direction for approximately 1,500 km. The majority of these individuals spend the first ± 30 days within the waters of the Bahamas and returned to these waters after ± 150 days. Maximum displacement from initial tagging location occurred from the end of June through September. Backus et al. (1956) indicates that *C. longimanus* possibly leaves the Gulf of Mexico in winter months and will move south as the temperature drops below 21ºC. Relatively little is known of population dynamics of this population, and if only a proportion of the population is migratory. Howey-Jordan et al. (2013) report that only part of the tagged animals undertake long-distance movements, whereas the other part of the 11 tagged animals remained within or within the vicinity of the Bahamas.

3. Threat data

3.1 Direct threats to the population

Carcharhinus longimanus is a large-bodied shark species from the family Carcharhinidae (requiem sharks). This species can reach a maximum size of 325 - 346 cm, with most specimens measuring between 150 and 205 cm (Lessa et al., 1999; CITES, 2013; D'Alberto et al., 2016; Joung et al., 2016). The size at birth for *C. longimanus* is 55 to 75 cm, with some regional variation (Seki et al., 1998). Like many elasmobranch species, *C. longimanus* reaches maturity relatively late (CITES, 2013). With an estimated growth coefficient (k in von Bertalanffy growth function) of 0.085 year-1, *C. longimanus* is estimated to reach maturity (50% maturity) at an age of 8.9 years for males and 8.8 years for females in the western North Pacific. Associated length at 50% maturity for both sexes in this region are 194 cm for males and 193 cm for females (Joung et al., 2016). D'Alberto et al. (2016), estimated a growth coefficient of 0.059 year-1 for males and 0.057 year-1 for females of *C. longimanus* in the western Central Pacific. Here, females and males reached 50% maturity at a total length of 224 cm (15.8 years) and 193 cm (10.0 years) respectively. Within the southwestern Atlantic Ocean, *C. longimanus* was estimated to have a grow coefficient of 0.075 year-1 for both sexes, and to reach maturity at an age of 6 to 7 years or total length of 180 to 190 cm (Lessa et al., 1999). Longevity was estimated to be 25 years.

Like other carcharhinid-species, female *C. longimanus* reproduces viviparous. Mating in the northern Pacific occurs in June and July, and parturition occurs between February and July (Seki et al., 1998). After a gestation period of 12 months, the female produces a litter of 1 to 14 pups (mean: 6). Both Seki et al. (1998) and Lessa et al. (1999) report a positive correlation between female size and litter size.

C. longimanus can easily be distinguished from other shark species by its large, rounded fins. Especially the pectoral fins are long, and paddle-shaped. On the tip of the first dorsal fin, pectoral fins and caudal fins, adults have white mottled markings.

Like other large shark species, *C. longimanus* feeds close to the top of the marine food web (trophic level 4.2), occupying a top predator position along with other large pelagic teleost species (Cortés, 1999; Madigan et al., 2015). The species exhibits higher site fidelity in areas where large pelagic teleosts are abundant, for feeding purposes (Madigan et al., 2015). Although specific studies indicating the consequences of *C. longimanus* removal have not been published, the loss of predatory sharks can have cascading effects throughout marine ecosystems (Meyers et al., 2007). In 2012 Cortes et al. conducted an ecological risk assessment (ERA) for pelagic shark species in the Atlantic they concluded that of the 11 species studied Oceanic Whitetip was the 5th most vulnerable species. Although the life history parameters of this species are consistent with intermediate among shark species their specific biology indicate that it is a species with a low resilience to fishing and a low productivity with a high catchability due to its preference for surface water and presence in tropical latitudes where tuna fisheries are most active (FAO, 2012).

- Fisheries

Oceanic Whitetip Sharks have been caught in both target fisheries and as bycatch in virtually all part of their range. Due to their foraging strategy they are particularly vulnerable to capture in pelagic longline, purse seine and driftnet fisheries. This species was initially described as the most common pelagic shark beyond the continental shelf in the Gulf of Mexico (Wathne, 1959; Bullis, 1961), and throughout the warm-temperate and tropical waters of the Atlantic and Pacific (1954, Strasburg 1957). In the Gulf of Mexico, for example, between 2 and 25 of these sharks were usually observed following the vessel during longline retrieval on the exploratory surveys in the 1950s and their abundance was considered as a serious problem because of the high proportion of tuna they damaged (CITES, 2013).

The Food and Agricultural Organization (FAO) of the United Nations (UN) Global Capture Production dataset gives species specific catch data for Carcharhinus longimanus. The database shows a large increase in catches in late 1990s and a decline after that. However, it should be noted here that even though species specific data is requested by FAO only very few countries provide this data whilst many countries just give a general category (sharks nei) for all shark catches. Furthermore, many nations only report the landings data and disregard the level of discards at sea, so no overview of actual catches level can be given (Rose 1996). This knowledge led researchers to suggest that annual global catch data compiled by the FAO are significantly underestimated for all sharks (Clarke et al. 2006b).

- Post release survival

Some studies have been conducted on survival of this species after capture indicating that for long-line fisheries this species have a potential for high survival after release. Gallagher et al. (2014) found an at vessel survival percentage of 77,3 % in Atlantic longline fisheries which would put this species in the highest survival category for shark species. It should be notes that no post release mortality study was conducted so the long-term survival rate is unknown and should be presumed to be lower. Survival in purse seine and drift net fisheries is negligible as the sharks cannot keep swimming after capture and pressure in the net will cause internal damage.

- Fin trade

Oceanic whitetip sharks are caught as bycatch in high seas pelagic fisheries. Space for retaining meat from this species is often limited and reserved for higher-value species such as tunas and swordfish. As the meat is generally of low value, oceanic whitetip shark fins would not be interesting to retain if the fins were not of a high value (USD 45 to USD 85 per kg). This is a strong driver for shark finning (cutting of the fins and discarding the body at sea). Young et.al (2016) note that C. longimanus is a preferred species in the shark fin trade in the Hong Kong fin market. An analysis of traded fins (by weight) and genetic information from species by Clarke et al. (2006a).
The high value of the fins combined with prohibitions on catches is thought to be a driver for Illegal, Unreported and Unregulated Fisheries. A study that provided regional estimates of illegal fishing (using FAO fishing areas as regions) found the Western Central Pacific (Area 71) and Eastern Indian Ocean (Area 57) regions have relatively high levels of illegal fishing (compared to the rest of the regions), with illegal and unreported catch constituting 34% and 32% of the region's catch, respectively (Agnew et al. 2009).

3.2 Habitat destruction

The habitat for the oceanic whitetip is defined as the water column or attributes to the water column, where cumulative impacts from HMS and non-HMS fishing gears are anticipated to be minimal. However, a better understanding of the specific habitat types and characteristics that influence the abundance of these sharks within those habitats is needed to determine the effects of fishing activities on habitat suitability for oceanic whitetip sharks.

3.3 Indirect threat

There are no directed studies on climate change effects on oceanic whitetip but Young (2016) noted that as this species has a broad geographic range large-scale impacts such as global climate change, effecting water temperature, currents and potentially food chain dynamics could have a detrimental effect on the species. The migratory behaviour of the species can also be an advantage to mitigate the risks climate change poses to the species as it is less dependent on one discrete geographic area.

Several studies have been done on elevated levels of environmental contaminants in sharks, as they as long lived, top-predators build up contaminants in their tissue. A study from Baja California found elevated levels of mercury in tissue of large shark species but these were below the levels deemed safe for human consumption (Garcia -Hernandez et.al 2007).

3.4 National and international utilisation

Although there is a limited market for oceanic whitetip meat in some areas, mainly through artisanal fisheries, as stated earlier the main driver for the fishery (directed and bycatch) is the high value of the fins on the international market. *C. longimanus* fins are large and deemed prime quality in the Hong Kong fin market. This makes them one of the most valuable fins on the Hong Kong market (the largest international fin market), with values ranging between $45–85 per kg (Clarke et.al. 2006b).

4. Protection status and needs

4.1 National protection status

The oceanic whitetip shark is totally protected in the European Union.

4.2 International protection status

FAO: In 1998 the International Plan of Action for Conservation and Management of Sharks (IPOA Sharks) was agreed for all species of sharks and rays. The IPOA-Sharks is a voluntary international instrument, developed within the framework of the 1995 FAO Code of Conduct for Responsible Fisheries, that guides nations in taking positive action on the conservation and management of sharks and their long-term sustainable use. Its aim is to ensure the conservation and management of sharks and their long-term sustainable use, with emphasis on improving species-specific catch and landings data collection, and the monitoring and management of shark fisheries. The code sets out principles and international standards of behaviour for responsible fishing practices to enable effective conservation and management of living aquatic organisms while considering impacts on the ecosystem and biodiversity. The IPOA-Sharks recommends that FAO member states 'should adopt a national plan of action for the conservation and management of shark stocks (NPOA-

Sharks), if their vessels conduct directed fisheries for sharks or if their vessels regularly catch sharks in nondirected fisheries'.

Several range states have developed national action plans: Australia, Brazil, Canada, Egypt, Democratic People's Republic of Korea; Japan; Mexico; New Zeeland; Oman; South Africa; United States, as well as regional action plans: Pacific Island States, the Central American Isthmus (OSPESCA), the EU and the Mediterranean.

RFMO's: All relevant RFMO's have developed management measures banning the retention of oceanic whitetip shark.

CITES: CITES works by subjecting international trade in specimens of selected species to certain controls. All import, export, re-export and introduction from the sea of species covered by the Convention must be authorized through a licensing system. Each Party to the Convention must designate one or more Management Authorities in charge of administering that licensing system and one or more Scientific Authorities to advise them on the effects of trade on the status of the species.

The species covered by CITES are listed in three Appendices, according to the degree of protection they need. the oceanic whitetip shark was listed under Appendix II of CITES in 2013.
Appendix-II specimens require: an export permit or re-export certificate issued by the Management Authority of the State of export or re-export is required ; and an export permit may be issued only if the specimen was legally obtained and if the export will not be detrimental to the survival of the species.

Barcelona Convention: The Oceanic Whitetip shark is listed in Appendix II of the Barcelona Convention, affording it protection from fishing activities taking place in the Mediterranean region. All species listed in Appendix II must be released unharmed and alive to the extent possible, therefore cannot be retained on board, transhipped, landed, transferred, stored, sold, displayed or offered for sale (Recommendation GFCM/36/2012/1). The recommendation continues to stipulate that all vessels encountering these species must record information on fishing activities, catch data, incidental taking, release and/or discarding events in a logbook or similar document, then all logged information must be reported to national authorities. Finally, additional measures should be taken to improve such data gathering in view of scientific monitoring of the species

The SPAW Protocol: The SPAW protocol of the Cartagena convention is the only cross border legal instrument for species and habitat protection in the wider Caribbean region. Oceanic Whitetip was added to Annex III protocol in March 2017. Species on Annex III may be utilized on a rational and sustainable basis, but parties are obliged to in co-operation with other Parties, formulate, adopt and implement plans for the management and use of such species, this can include:
1. the prohibition of all non-selective means of capture, killing, hunting and fishing and of all actions likely to cause local disappearance of a species or serious disturbance of its tranquillity;
2. the institution of closed hunting and fishing seasons and of other measures for maintaining their population;
3. the regulation of the taking, possession, transport or sale of living or dead species, their eggs, parts or products

The IUCN defines the oceanic whitetip shark's conservation status as vulnerable.

4.3 Additional protection needs

Listing on international agreements, such as the SPAW Protocol Annex II, could help to drive improvements in national and regional management and facilitate collaboration between states, for this species. It is evident that lack of specific data collection is hampering management for this species. There is still a lack of understanding of the basic data needed to understand the life history, habitat utilisation and migration patterns of this species. Alignment of policy between areas is also needed to improve the effective management of this species.

5. Range States

Angola; Antigua and Barbuda; Argentina (Malvinas); Australia (Christmas Island; Cocos Keeling Islands; Heard Island and McDonald Islands; New South Wales, Northern Territory, Queensland, South Australia, Western Australia); Bahamas; Bangladesh; Barbados; Belize; Benin; Brazil; Brunei Darussalam; Cambodia; Cameroon; Cabo Verde; Chile; China; Colombia; Comoros; The Democratic Republic of the Congo,; Costa Rica; Côte d'Ivoire; Cuba; Denmark (Faroe Islands); Djibouti; Dominica; Dominican Republic; Ecuador; Egypt; El Salvador; Equatorial Guinea; Eritrea; Fiji; France (French Guiana; French Polynesia; French Southern Territories; Guadeloupe; Martinique; New Caledonia; Réunion; Saint Martin) Gabon; Gambia; Ghana; Grenada; Guatemala; Guinea; Guinea-Bissau; Guyana; Haiti; Honduras; India; Indonesia; Israel; Jamaica; Japan; Jordan; Kenya; Liberia; Madagascar; Malaysia; Maldives; Marshall Islands; Mauritania; Mauritius; Mexico (Baja California, Baja California Sur, Campeche, Chiapas, Colima, Guerrero, Jalisco, Michoacán, Nayarit, Oaxaca, Quintana Roo, Sinaloa, Sonora, Tabasco, Tamaulipas, Veracruz, Yucatán); Morocco; Myanmar; Nauru; Netherlands (Aruba, Bonaire, Curaçao; Sint Eustatius and Saba; Sint Maarten); Nicaragua; Niger; New Zealand (Cook Islands; Niue, Tokelau;); Norway (Bouvet Island); Oman; Pakistan; Palau; Panama; Papua New Guinea; Peru; Philippines; Portugal (Azores, Madeira); Puerto Rico;, Saint Kitts and Nevis; Saint Lucia; Saint Vincent and the Grenadines; Samoa; Sao Tomé and Principe; Saudi Arabia; Senegal; Seychelles; Sierra Leone; Singapore; Slovenia; Solomon Islands; Somalia; South Africa (KwaZulu-Natal, Northern Cape Province, Western Cape); Spain (Canary Is.); Sri Lanka; Sudan; Suriname; United Republic of Tanzania,; Thailand; Togo; Tonga; Trinidad and Tobago; Tuvalu; UK (Anguilla; Ascension and Tristan da Cunha; Bermuda, Saint Helena; Cayman Islands; Montserrat; Pitcairn; Turks and Caicos Islands; Virgin Islands); USA (Alabama; American Samoa; California, Connecticut, Delaware, District of Columbia, Florida, Georgia, Guam; Hawaiian Is., Johnston I., Louisiana, Maine, Maryland, Massachusetts, Mississippi, New Hampshire, New Jersey, New York, North Carolina, Northern Mariana Islands; Rhode Island, South Carolina, Texas, Virginia; Wake Is); Uruguay; Vanuatu; Bolivarian Republic of Venezuela,; Viet Nam.

6. Comments from range states

7. Additional remarks

This document is based on the proposal of the Government of Brazil for the inclusion of the oceanic whitetip shark in Appendix I of the CMS MOU on Migratory Shark Conservation in 2018.

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5. PROPOSAL FOR INCLUSION OF SPECIES ON THE APPENDICES OF THE SPAW PROTOCOL

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

B. PROPONENT: Government of France

C. SUPPORTING STATEMENT:

1. Taxon

1.1 Class : Chondrichthyes, subclass Elasmobranchii
1.2 Order : Rajiformes
1.3 Family : Mobulidae
1.4 Genus : Manta (Dondorff, 1798)
1.5 Common name(s):
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

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). 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. birostrisis 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).

<u>2.1 Distribution</u>

Manta birostrisis 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

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) (Marshall et al. 2011).

2.3 Habitat

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. 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

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. Information from different 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

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). 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. 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

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). 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).

4. Protection status and needs

4.1 National protection status

M. birostris is totally protected in the European Union.
Several other states, outside the European Union, have banned all forms of manta rays' capture and even created marine parks to promote their protection.

4.2 International protection status

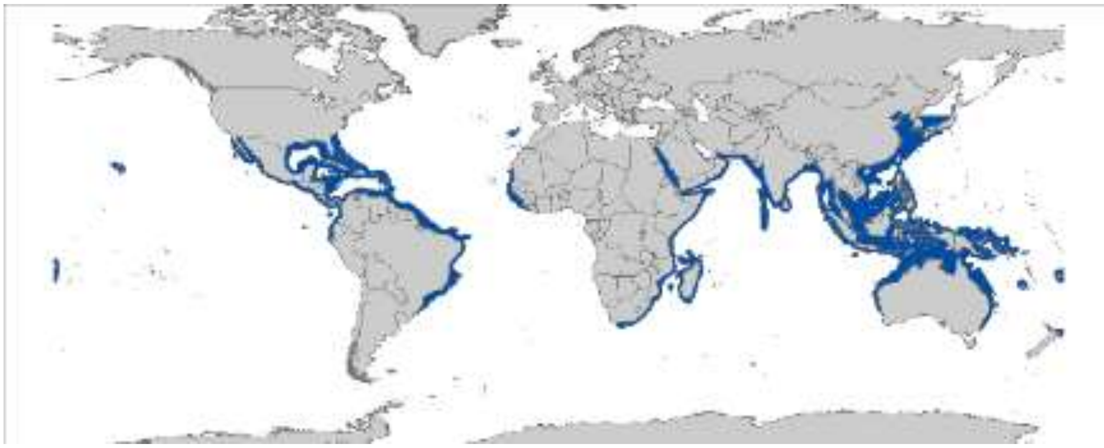
M. birostris is internationally recognized as Vulnerable by the IUCN Red List (www.iucnredlist.org). (Marshall et al., 2018). M. birostris is considered highly sensitive to anthropogenic threats. It is listed in Appendix II of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) since 2017 and in Appendices I and II of the Memorandum of Understanding on the Conservation of Migratory Sharks (48 Signatory States) of the Convention on the Conservation of Migratory Species of Wild Animals (CMS) since 2011. It is also protected by EU Regulation No. 2018/120 of 23 January 2018.

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).

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 SPAW Protocol, 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



IUCN Courtesy

6. Commentaires des Etats de l'aire de répartition

7. Remarques supplémentaires

8. Références

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FRANCE PROPOSES THE ESTABLISHMENT OF A DEDICATED WORKING GROUP WHOSE OBJECTIVE IS TO PREPARE AS A FIRST STEP, A RECOMMENDATION ON PARROTFISH AND IF APPLICABLE, OTHER CORAL HERBIVORES, INCLUDING THEIR CLASSIFICATION IN ANNEXES II OR III OF THE PROTOCOL.

France supports the need for the Cartagena's Convention, specially under the frame of its Protocol Concerning Specially Protected Areas and Wildlife for the Wider Caribbean Region, to take into account the recommendation on addressing the decline in coral reef health throughout the wider Caribbean: the taking of parrotfish and similar herbivores adopted on 17 October 2013, at the 28th International Coral Reef Initiative (ICRI) General Meeting which took place in Belize City.
https://www.icriforum.org/sites/default/files/ICRIGM28-Recommendation_parrotfish.pdf

This recommendation is based on the latest report of the Global Coral Reef Monitoring Network (GCRMN), entitled: Status and Trends of Caribbean Coral Reefs: 1970-2012 is the first report to document quantitative trends of coral reef health based on data collected over the past 43 years throughout the wider Caribbean region.

The results of the study clearly show:
- Coral reef health requires an ecological balance of corals and algae in which herbivory is a key element;
- Populations of parrotfish are a critical component of that herbivory, particularly since the decline of Diadema sea urchins in the early 1980s;
- The main causes of mortality of parrotfish are the use of fishing techniques such as spearfishing and, particularly, the use of fish traps.

The ICRI's recommendation, in its 4th alinea, calls Member State of the Protocol Concerning Specially Protected Areas and Wildlife for the Wider Caribbean Region to consider listing the parrotfish in the Annexes of the SPAW Protocol (Annex II or III).

As a result, France is proposing the establishment of a dedicated working group whose objective is to prepare, as a first step, a recommendation on parrotfish and, if applicable, other coral herbivores, and secondly their classification in Annexes II or III of the Protocol. This working group could be facilitated by the SPAW-RAC.