MEMORANDUM OF UNDERSTANDING ON THE CONSERVATION OF MIGRATORY SHARKS

CMS/Sharks/MOS2/Doc.8.2.10

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Agenda Item 8

ASSESSMENT OF PROPOSALS FOR THE INCLUSION OF SPECIES IN ANNEX 1 OF THE MEMORANDUM OF UNDERSTANDING ON THE CONSERVATION OF MIGRATORY SHARKS

(Cover note prepared by the Secretariat)

1. The Advisory Committee was requested to prepare an assessment of proposals for the inclusion of species in Annex 1 of the MOU as outlined in their Terms of Reference (CMS/Sharks/Outcome 1.1), which were adopted at the 1st Meeting of Signatories to the CMS Sharks MOU (MOS1).

2. As agreed at MOS1, any shark or ray species listed in the CMS Appendices would automatically be considered by the Advisory Committee as a proposed listing in Annex 1 of the MOU. This is without prejudice to the final listing decision of the Signatories.

3. A total of 22 species of sharks and rays have been listed in CMS Appendices I and/or II at the last two Conferences of the Parties to CMS (COP10 and COP11). Following the agreed procedure, the Secretariat transmitted each of these original proposals for the inclusion of shark and ray species in CMS Appendices as submitted to CMS COP10 and CMS COP11 to members of the Advisory Committee for their review. The proposals are presented as documents Sharks/MOS2/Doc.8.2.2 – 8.2.9.

4. Listing proposals and accompanying information were assessed by the Advisory Committee and recommendations concerning the inclusion of the species in Annex 1 of the Sharks MOU were prepared for the consideration of Signatories at MOS2. Detailed assessments of all proposals and recommendations on the inclusion of the respective species in Annex 1 of the MOU are presented as Annex 1 - 8 to this document.

5. The Advisory Committee based its assessments on the agreed criteria for inclusion of species in Annex 1 after deciding not to apply additional criteria.

6. The Advisory Committee has recommended all of the proposed species for inclusion in Annex 1 of the MOU.

Action requested:

The Meeting of the Signatories is invited to take note of the Advisory Committee's assessments and recommendations, presented in Annex 1-8 to this document.

CMS SHARKS MOU ADVISORY COMMITTEE ASSESSMENT REPORT

Species: Sawfishes (family Pristidae)

- *Anoxypristis cuspidata*, narrowtooth sawfish
- *Pristis clavata*, dwarf sawfish
- *Pristis pectinata*, smalltooth sawfish
- *Pristis zijsron*, green sawfish
- *Pristis pristis*, largetooth sawfish

Proposal: CMS COP11

- UNEP/CMS/COP11/Doc.24.1.8

Sharks MOS2

- CMS/Sharks/MOS2/Doc.8.2.2

Background: The family Pristidae was proposed for inclusion in CMS Appendix I and II by the Government of Kenya at CoP11. The proposal was adopted.

Assessment:

a) Migratory behaviour:

Sawfish can be considered migratory because seasonal movements are of a scale that may allow crossing of national borders. Temperature driven migrations have been reported or hypothesized for smalltooth sawfish, *P. pectinata*, in the USA and Gulf of Mexico (Bigelow and Schroeder, 1953; Simpfendorfer, 2005, Adams and Wilson, 1996, Fernandez-Carvalho *et al.*, 2013). In addition, satellite tagged smalltooth sawfish in South Florida USA indicated individuals travelled up to approximately 280 km, with females showing significantly more movement in autumn and winter (Carlson *et al.*, 2014). Largetooth sawfish, *P. pristis*, undertake movements from marine to freshwater environments which could result in the crossing of national boundaries. Historically, *P. pristis* migrated from Central America and Mexico to the United States, but migrations are now limited due to the drastic fragmentation of their current populations (Fernandez-Carvalho *et al.*, 2013)

Migrations of the other sawfish species are less certain. Fragmentations of sawfish populations indicate that it may no longer be possible to observe seasonal coastal migrations as population numbers are so low. Migrations of sawfish species across national borders are more likely in areas where they are distributed along a coastline that is divided into a large number of small countries (e.g., Central America, Caribbean, and West Africa) than when the population occurs in one country with a large coastline (e.g., USA and Australia). It should be noted that the sawfish were considered to meet the migratory criteria by the CMS scientific council and that assessment was accepted by the full Conference of Parties at the November 2014 meeting.

b) Conservation status:

Sawfish species have a conservation status that would significantly benefit from an international agreement for their conservation. All sawfish species are listed as either endangered or critically endangered on the International Union for the Conservation of Nature (IUCN) Red List of Threatened Species (Harrison and Dulvy 2014). Populations of all sawfish species have declined significantly with respect to size and distribution. Bycatch in net fisheries is a major reason for decline and continues to be a threat. Habitat loss and degradation is continuing to contribute to range contractions particularly for species reliant on fresh and brackish water estuaries for part of their lifecycle. In addition, genetic research in Australia suggests that *Pristis pristis* shows strong female philopatry which divides the Australian population into subpopulations that are unlikely to be replaced by individuals from outside areas (Whitty *et al.*, 2009; Phillips *et al.*, 2009; Phillips *et al.*, 2011; Phillips, 2012). If significant philopatry is present in other range states, then it will be important that all range states implement conservation and management measures to ensure genetic diversity and maintain the extent of this species.

Although sawfish species are afforded protection by some range states at the national and international levels, they would benefit from similar protection in other range states. At the national level, several range states (including Nicaragua, Indonesia, USA, Australia, India, Mexico, Brazil, Guinea, Senegal and Guinea-Bissau) provide protection to some sawfish species in their waters through legislation, prohibiting take, initiating recovery plans, and establishing protected areas. Increased cooperation between range states would benefit conservation efforts for these species particularly with respect to collaborative research and monitoring to fill gaps in knowledge related to population status, structure, and movement.

Internationally, all sawfish are listed on in Appendix I of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES). This bans the international trade of all species in the family Pristidae. Largetooth and smalltooth sawfish, *P. pristis* and *P. pectinata*, are included on Annex II to the Barcelona Convention Protocol concerning Specially Protected Areas and Biological Diversity in the Mediterranean. This requires maximum protection for and aiding the recovery of these two species in particular.

Recommendation:

It is recommended that the family Pristidae be considered by the Signatories of the CMS Memorandum of Understanding on the Conservation of Migratory Sharks (Sharks MOU) for inclusion in Annex 1 of the Sharks MOU. Sawfish have an unfavorable conservation status. International agreement for the conservation and management under the MOU will benefit the species.

References:

Adams, W.F., and C.R Wilson. 1996. The status of the smalltooth sawfish, *Pristis pectinata Latham* 1794 (Pristiformes; Pristidae) in the United States. *Chondros* 6(4): 1-5.

Bigelow, H.B., and W.C. Schroeder. 1953. Sawfishes, guitarfishes, skates and rays. Fishes of the Western North Atlantic. *Memoirs of the Sears Memorial Foundation for Marine Research* 1(2):1-514.

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Fernandez-Carvalho J, Imhoff JL, Faria VV, Carlson JK, Burgess GH. 2013. Status and the potential for extinction of the largetooth sawfish Pristis pristis in the Atlantic Ocean. *Aquatic Conservation: Marine and Freshwater Ecosystems* DOI: 10.1002/aqc.2394.

Harrison, L.R. and Dulvy, N.K. (eds). 2014. Sawfish: A Global Strategy for Conservation. IUCN Species Survival Commission's Shark Specialist Group, Vancouver, Canada.

Phillips, N. M., Chaplin, J. A., Morgan, D. L. and Peverell, S. C. 2009. Does the freshwater sawfish, *Pristis microdon*, exhibit sex-biased dispersal in Australian waters? *8th Indo Pacific Fish Conference and 2009 Australian Society for Fish Biology Workshop and Conference*, 31 May – 5 June 2009, Freemantle, Western Australia.

Phillips, N. M., Chaplin, J. A., Morgan, D. L. and Peverell, S. C. 2011. Population genetic structure and genetic diversity of three critically endangered Pristis sawfishes in Australian waters. *Marine Biology* 158: 903-915

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Whitty, J. M.Morgan, D. L. and Thorburn D. C. 2009. Movements and interannual variation in themorphology and demographics of Freshwater Sawfish (Pristis microdon) in the Fitzroy River. In:Phillips, N. M., Whitty, J. M., Morgan, D. L. Chaplin, J. A., Thorburn D. C.and Peverell, S. C. (eds).*Freshwater Sawfish (*Pristis microdon*) movements and demographics in the Fitzroy River, Western Australia and genetic analysis of* P. microdon *and* Pristis zijsron. Centre for Fish & Fisheries Research (Murdoch University) report to the Department of the Environment, Water, Heritage and the Arts, Australian Government.

CMS SHARKS MOU ADVISORY COMMITTEE ASSESSMENT REPORT

Species: Reef Manta Ray (*Manta alfredi*)

Proposal: CMS COP11

- UNEP/CMS/COP11/Doc.24.1.9/Rev.1
- UNEP/CMS/COP11/Doc.24.1.9/Addendum

Sharks MOS2

- CMS/Sharks/MOS2/Doc.8.2.3

Background:

Manta alfredi was proposed for inclusion in Appendix I and II by the Government of the Fiji Islands at CoP11. The proposal was adopted.

Assessment:

a) Migratory behaviour:

Reef manta ray, *Manta alfredi*, are thought to regularly undertake long distance movements and are capable of moving to habitats in adjoining countries in parts of their distribution; however, no international migrations have been documented in the literature. For example, Couturier *et al.* (2014) showed reef manta ray undertaking migrations of up to 650 kilometers in a 6-month period along the eastern coast of Australia. Jaine *et al.* (2014) using satellite telemetry off eastern Australia found reef manta ray traveled up to 155 km offshore to feed, swimming up to 2,441 km (not a straight-line distance) in 118 days.

b) Conservation status:

The reef manta ray has a circumtropical and sub-tropical distribution in the Pacific, Atlantic and Indian Oceans. Within this broad range, actual populations appear to be sparsely distributed and highly fragmented. Reef manta rays are long-lived and slow-growing, possessing among the lowest fecundity of all elasmobranchs, typically giving birth to a single pup with a gestation period of approximately one year. The maximum rate of population increase for *Manta* spp. is among the lowest estimated for elasmobranchs, which indicates they are not likely to be sustainably harvested, even at moderate levels (Dulvy *et al.*, 2014).

Reef manta rays are caught in commercial and artisanal fisheries throughout their range. Directed fisheries primarily use harpoons and nets while significant bycatch may occur in purse seine, gillnet and trawl fisheries. The high value of gill plates (US$390 per kilo in China) has driven increased target fishing pressure for all *Manta* spp. Global population numbers are unknown but thought to be declining across their range.
In 2011, the species was listed as Vulnerable on the International Union for the Conservation of Nature (IUCN) Red List of Threatened Species (Marshall et al., 2011).

Few regulations exist for *Manta* spp. In 2013, the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) added the genus Manta (including *M. birostris*, *M. alfredi* and any putative Manta species) to Appendix II. Some domestic regulation is in place, but laws are rarely enforced.

Recommendation:

It is recommended that the reef manta ray, *Manta alfredi*, be considered by the Signatories of the CMS Memorandum of Understanding on the Conservation of Migratory Sharks (Sharks MOU) for inclusion in Annex 1 of the Sharks MOU. While international trade of *Manta alfredi* is regulated through CITES, domestic regulations may be inadequate. International agreement for the conservation and management under the MOU will benefit the species.

References:

Couturier, L. I. E., C. L. Dudgeon, K. H. Pollock, F. R. A. Jaine, M. B. Bennett, K. A. Townsend, S. J. Weeks, and A. J. Richardson. "Population Dynamics of the reef manta ray Manta alfredi in eastern Australia." *Coral Reefs* 33, no. 2 (2014): 329-342.

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Jaine, F. R. A., Rohner, C. A., Weeks, S. J., Couturier, L. I. E., Bennett, M. B., Townsend, K. A., & Richardson, A. J. (2014). Movements and habitat use of reef manta rays off eastern Australia: Offshore excursions, deep diving and eddy affinity revealed by satellite telemetry. *Marine Ecology Progress Series,510*, 73-86.

Marshall, A., Kashiwagi, T., Bennett, M.B., Deakos, M., Stevens, G., McGregor, F., Clark, T., Ishihara, H. & Sato, K. 2011. Manta alfredi. The IUCN Red List of Threatened Species 2011: e.T195459A8969079. http://dx.doi.org/10.2305/IUCN.UK.2011-2.RLTS.T195459A8969079.en

CMS SHARKS MOU ADVISORY COMMITTEE ASSESSMENT REPORT

Species: Giant Manta Ray (*Manta birostris*)

Proposal: CMS COP10

- Proposal I / 5 Rev

Sharks MOS2

- CMS/Sharks/MOS2/Doc.8.2.4

Background:

Manta birostris was proposed for inclusion in Appendix I and II by the Government of Ecuador at CoP10. The proposal was adopted.

Assessment:

a) Migratory behaviour:

Giant manta ray frequent remote seamounts in Isla Socorro, Mexico, Malpelo, Columbia and off islands such as the Cocos Island, Costa Rica; Galápagos, Ecuador and Laje de Santos, Brazil. Giant manta show a degree of philopatry to these sites but mantas make migrations away from these areas during parts of the year (Rubin 2002, Luiz *et al*., 2009, Marshall *et al*., 2011). In other areas, such as southern Mozambique, the giant manta ray is seen sporadically throughout the year although individuals are not commonly re-sighted over time, which would indicate that they migrate to other areas (Marshall 2009). Giant manta ray travel at least meso-scale distances, with movements over 1000 km (Marshall *et al.*, 2010).

b) Conservation status:

The Giant Manta Ray is the largest living ray, has a circumtropical and also semi-temperate distribution throughout the world's major oceans, however within this broad range, actual populations appear to be sparsely distributed and highly fragmented. This is likely due to the specific resource and habitat needs of this species. Overall population size is unknown, but subpopulations appear to be small (about 100–1,000 individuals).

Giant Manta Ray has biological characteristics that make it very vulnerable to human exploitation through direct or indirect fishing pressure. The maximum rate of population increase for mantas is among the lowest estimated for elasmobranchs, which indicates they are not likely to be sustainably harvested, even at moderate levels (Dulvy *et al*., 2014).

Giant manta ray are caught in commercial and artisanal fisheries throughout their range with directed fisheries primarily utilize harpoons and nets, while significant bycatch may occur in purse

seine, gill and trawl net fisheries. The high value of gill plates (US$390 per kilo in China) has driven increased target fishing pressure for all Manta spp. In 2011, the species was listed as Vulnerable on the International Union for the Conservation of Nature (IUCN) Red List of Threatened Species (Marshall et al. 2011).

Few regulations exist for mantas. In 2013, the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) added the genus Manta, including *M. birostris*, *M. alfredi* and any putative Manta species, to Appendix II. Some domestic regulation is in place but laws are rarely enforced.

Recommendation:

It is recommended that the Giant Manta Ray (*Manta birostris*) be considered by the Signatories of the CMS Memorandum of Understanding on the Conservation of Migratory Sharks (Sharks MOU) for inclusion in Annex 1 of the Sharks MOU. While international trade of *M. birostris* is regulated through CITES, domestic regulations may be inadequate. International agreement for the conservation and management under the MOU will benefit the species.

References:

Dulvy, N. K., Pardo, S. A., Simpfendorfer, C. A., & Carlson, J. K. (2014). Diagnosing the dangerous demography of manta rays using life history theory.*PeerJ, 2*, e400.

Luiz, O. J. Jr., Balboni, A. P., Kodja, G., Andrade, M. & Marum, H. (2009). Seasonal occurrences of *Manta birostris* (Chondrichthyes: Mobulidae) in southeastern Brasil. Ichthyological Research 56, 96–99

Marshall, A. D., Compagno, L. J., & Bennett, M. B. (2009). Redescription of the genus Manta with resurrection of *Manta alfred*i (Krefft, 1868) (Chondrichthyes; Myliobatoidei; Mobulidae). *Zootaxa*, *2301*, 1-28.

Marshall, A. D., & Bennett, M. B. (2010). Reproductive ecology of the reef manta ray *Manta alfredi* in southern Mozambique. *Journal of Fish biology*, *77*(1), 169-190.

Marshall, A., Bennett, M.B., Kodja, G., Hinojosa-Alvarez, S., Galvan-Magana, F., Harding, M., Stevens, G. & Kashiwagi, T. 2011. *Manta birostris*. The IUCN Red List of Threatened Species 2011:e.T198921A9108067.http://dx.doi.org/10.2305/IUCN.UK.20112.RLTS.T198921A9108067.en.

Marshall, A.D., Dudgeon, C., and Bennett, M.B., 2011. Size and structure of a photographically identified population of manta rays *Manta alfredi* in southern Mozambique. Marine Biology. 158:1111 – 1124.

Rubin, R. (2002). Manta rays: not all black and white. Shark Focus 15, 4–5

CMS SHARKS MOU ADVISORY COMMITTEE ASSESSMENT REPORT

Species: Mobula Rays (genus *Mobula*)

- *Mobula mobular* (Bonnaterre, 1788)
- *Mobula japanica* (Müller & Henle, 1841)
- *Mobula thurstoni* (Lloyd, 1908)
- *Mobula tarapacana* (Philippi, 1892),
- *Mobula eregoodootenkee* (Bleeker, 1859)
- *Mobula kuhlii* (Müller & Henle, 1841)
- *Mobula hypostoma* (Bancroft, 1831)
- *Mobula rochebrunei* (Vaillant, 1879)
- *Mobula munkiana* (Notarbartolo-di-Sciara, 1987)

Proposal: CMS CoP11

- UNEP/CMS/COP11/Doc.24.1.10/Rev.1
- UNEP/CMS/COP11/Doc.24.1.10 Addendum/Rev.1

Sharks MOS2

- CMS/Sharks/MOS2/Doc.8.2.5

Background:

The Genus *Mobula* was proposed for inclusion in Appendix I and II by the Government of Fiji at CoP11. The proposal was adopted.

Assessment:

a) Migratory behaviour:

Mobula species, especially *M. japanica, M. tarapacana* and *M. thurstoni* exhibit migrations across national jurisdictional boundaries, both along the coastline between adjacent territorial waters and national Exclusive Economic Zones and from national waters into the high seas. For example, data from satellite tagged *M. japanica* captured in Baja California Sur documented long- distance movements including coastal and pelagic waters from southern Gulf of California, the Pacific coastal waters of Baja California and the pelagic waters between the Revillagigedos Islands and Baja California (Croll *et al*., 2012.). Tagging data *M. tarapacana* in the Azores indicates large-scale movements with individuals traveling straight line distances up to 3,800 km over 7 months.

While data is lacking for the other species in the Genus, it can be reasonably predicted that these species are also migratory.

b) Conservation status:

The Genus *Mobula* are slow-growing, large-bodied migratory animals with small, fragmented populations that are sparsely distributed across the tropical and temperate oceans of the world. Mobula rays are likely to be among the least fecund of all elasmobranchs, making these species particularly vulnerable to over-exploitation in fisheries and extremely slow to recover from depletion (Couturier *et al.,* 2012; Dulvy *et al.,* 2014). Mobula rays are caught in commercial and artisanal fisheries throughout their range in the Atlantic, Pacific and Indian Oceans. The greatest threat to *Mobula spp*. is unmonitored and unregulated directed and bycatch fisheries, increasingly driven by the international trade demand for their gill plates, used in an Asian health tonic purported to treat a wide variety of conditions.

There have been no stock assessments, official monitoring, catch limits or management of *Mobula spp.* fisheries in the waters of range states with the largest fisheries. Regional Fishery Management Organizations (RFMOs) have not taken any measures to minimize high seas bycatch of *Mobula spp*. Incidental landings and discards are rarely recorded at the species level. Some national and regional protections exist for Mobulid but the overall lack of regulations or monitoring of fisheries for these species highlights the need for conservation action.

There is some inconsistency in the status of Mobulids in the IUCN red list assessments. *M. mobular* is listed as Endangered; *M. rochebrunei* as Vulnerable; *M. japanica, M. thurstoni, M. eregoodootenkee,* and *M. munkiana* as Near Threatened; and *M. tarapacana, M. kuhlii, and M. hypostoma* as Data Deficient. *M. japanica and M. tarapacana* is assessed as Vulnerable in SE Asia where these species are increasingly targeted.

Recommendation:

It is recommended that the Mobulids be considered by the Signatories of the CMS Memorandum of Understanding on the Conservation of Migratory Sharks (Sharks MOU) for inclusion in Annex 1 of the Sharks MOU. Due to the difficulty in distinguishing Mobula rays at the species level, assessment of the conservation status of individual Mobula species is extremely difficult, and hence listing for the genus *Mobula* in Annex 1 of the MOU is strongly recommended as a precautionary measure. Because of the look-alike issue and factors that affect all species in the Genus, the Genus has a conservation status which would significantly benefit from the international cooperation that could be achieved by an international agreement.

References:

Dulvy, N. K., Pardo, S. A., Simpfendorfer, C. A., & Carlson, J. K. 2014. Diagnosing the dangerous demography of manta rays using life history theory.*PeerJ*, *2*, e400.

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Croll, D. A., Newton, K. M., Weng, K., Galván-Magaña, F., O'Sullivan, J., & Dewar, H. 2012. Movement and habitat use by the spine-tail devil ray in the Eastern Pacific Ocean. *Marine Ecology Progress Series*, *465*, 193.

CMS SHARKS MOU ADVISORY COMMITTEE ASSESSMENT REPORT

Species: Silky shark (*Carcharhinus falciformis*)

Proposal: CMS COP11

- UNEP/CMS/COP11/Doc.24.1.14/Rev.1

Sharks MOS2

- CMS/Sharks/MOS2/Doc.8.2.6

Background:

The silky shark, *Carcharhinus falciformis,* was proposed for inclusion in Appendix II by the Government of the Egypt at CoP11. A revised proposal was subsequently submitted by the Government of Egypt including additional information, pursuant to Rule 11 of the COP Rules of Procedure. The proposal was adopted.

Assessment:

a) Migratory behavior:

The silky shark, *Carcharhinus falciformis*, is an oceanic and coastal-pelagic shark species found in different habitats throughout its life. Tagging studies have shown that this species crosses international borders, moves between ocean and coastal systems, and migrates between northern and southern regions regularly and cyclically (Galván-Tirado *et al.,* 2013). Silky sharks travel long distances from 1,330 km (Bonfil, 2008) up to 2,200 km (Galapagos Conservancy). In the Eastern Pacific Ocean, tagged *C. falciformis* crossed the Exclusive Economic Zones of six countries within international waters (Kohin *et al.,* 2006) and in the Northwest Atlantic they have moved from the US to the Caribbean Sea (Kohler *et al.,* 1998).

b) Conservation status:

The silky shark is a common tropical-subtropical, epipelagic species that occurs in the Atlantic, Pacific and Indian oceans. High levels of fishing pressure have led to the rapid declines of silky sharks.

In the western and central Pacific Ocean, bycatch from the longline and purse seine fisheries has caused declines to 30% of the virgin biomass and spawning biomass has declined to 67% of the 1995 value (Rice and Harley, 2013). In the Atlantic Ocean, silky shark were found to be the most vulnerable pelagic elasmobranch species to pelagic longline fisheries (Cortés *et al.*, 2010). In the Indian Ocean, there is anecdotal evidence of a five-fold decrease in silky shark catch-per-unit effort from purse seine fisheries between the 1980s and 2005 (IOTC, 2013). Silky shark are also ranked second as the most vulnerable shark species for purse seine fisheries and fourth for the longline fisheries based on an ecological risk assessment (IOTC, 2013).

The silky shark is listed on the IUCN Red List of Threatened Species as Near Threatened globally; however this species is listed as Vulnerable in some regions due to continued declines observed in their populations around the world (Bonfil et al. 2009).

A number of Regional Fishery Management Organizations (RFMOs) have undertaken some regulations for silky sharks. The International Commission for the Conservation of Atlantic Tuna (ICCAT, 2011) and the Western and Central Pacific Fisheries Commission (WCPFC, 2013) prohibit retaining on board, transshipping, or landing any part or whole carcass of silky shark in the fisheries covered by the Convention. While these prohibitions protect the silky shark throughout part of its range, these measures may not be sufficient to fully protect the silky shark from continued fishing pressures.

Recommendation:

It is recommended that silky shark be considered by the Signatories of the CMS Memorandum of Understanding on the Conservation of Migratory Sharks (Sharks MOU) for inclusion in Annex 1 of the Sharks MOU. Silky shark have an unfavorable conservation status. International agreement for the conservation and management under the MOU will benefit the species.

References:

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CMS SHARKS MOU ADVISORY COMMITTEE ASSESSMENT REPORT

Species: Great Hammerhead Shark (*Sphyrna mokarran*)

Proposal: CMS COP11

- UNEP/CMS/COP11/Doc.24.1.15

Sharks MOS2

- CMS/Sharks/MOS2/Doc.8.2.7

Background:

Sphyrna mokarran was proposed for inclusion in Appendix II by the governments of Ecuador and Costa Rica at CoP11. The proposal was adopted.

Assessment:

a) Migratory behaviour:

Sphyrna mokarran is the largest of the hammerhead sharks (family Sphyrnidae) and is generally found in coastal waters. It is nomadic and migrates over long distances even though data on movement patterns are rare. Hammerschalg *et al.* (2011) reported a single great hammerhead migrated about 1200 km along the east coast of the United States. Kohler and Turner (2001) examined three studies that looked at migrations of great hammerhead sharks (n = 220) and found maximum distance travelled to be 1180 km and a maximum time at liberty of 4 years.

b) Conservation status:

Great hammerheads exhibit life-history traits and population parameters that are intermediary among other shark species. In an ecological risk assessment study of sharks caught in Atlantic pelagic fisheries, Cortés *et al.* (2012) estimated productivity, determined as intrinsic rate of population increase, as 0.070 yr^{-1}; however, these estimates were based on an earlier assumed age of maturity of 20 years. Using updated life history parameters from the northwest Atlantic Ocean, productivity was calculated at 0.096 $year^{-1}$ (reported in Miller *et al.*, 2015)

Despite possessing relative moderate productivity when compared to other sharks, low survival at capture and high demand for its large fins make great hammerheads vulnerable to overexploitation. *Sphyrna mokarran* are taken by target and bycatch fisheries and are regularly caught with longlines and gillnets.

Species-specific population trends for hammerheads are rarely available because the catches are combined for all the hammerhead species as a complex (genus Sphyrna). Catch rates associated with large hammerhead species have reported significant declines. For example, an analysis of US pelagic longline logbook data from the Northwest and Western Central Atlantic indicates that family Sphrynidae (including *S. lewini, S. mokarran* and *S. zygaena*) have declined in abundance by 89% from 1986-2000 (Baum *et al.*, 2003). In the Mediterranean Sea, compilation and meta-analysis of time-series abundance indices indicate that the family Sphrynidae (including the same three species) declined by an estimated >99% in abundance and biomass since the early 19th century (Ferretti *et al.*, 2008). Species-specific catch information from the shark nets set in the western Indian Ocean from 1978–2003 indicate a 79% decline for *S. mokarran* over the 25-year period (Dudley and Simpfendorfer, 2006). Based on these declines and inferred declines from other regions, great hammerhead are listed as Endangered on the International Union for the Conservation of Nature (IUCN) Red List of Threatened Species (Denham *et al.*, 2007).

Some existing regulatory mechanisms are in place for great hammerheads. In Atlantic waters, the International Commission for the Conservation of Atlantic Tunas (ICCAT) has afforded the species protection from fishing by ICCAT vessels by prohibiting the retention of hammerheads caught in association with ICCAT-managed fisheries. Although there are no great hammerhead shark-specific Regional Fishery Management Organization (RFMO) measures in place for the Pacific or Indian Ocean populations, many of these RFMOs have developed additional shark conservation and management measures that aim to further reduce shark waste and promote the live release of all shark species. It is unclear how effective these measures have been. Moreover, high levels of illegal, unreported and unregulated (IUU) fishing have been reported off Central and South America and in the Western and Central Pacific Ocean (Lack and Sant, 2008). Recently, great hammerheads were listed on Appendix II of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES).

Recommendation:

It is recommended that great hammerhead be considered by the Signatories of the CMS Memorandum of Understanding on the Conservation of Migratory Sharks (Sharks MOU) for inclusion in Annex 1 of the Sharks MOU. Great hammerhead shark have an unfavorable conservation status. International agreement for the conservation and management under the MOU will benefit the species.

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CMS SHARKS MOU ADVISORY COMMITTEE ASSESSMENT REPORT

Species: Scalloped Hammerhead Shark (*Sphyrna lewini*)

Proposal: CMS COP11

- UNEP/CMS/COP11/Doc.24.1.16/Rev.1

Sharks MOS2

- CMS/Sharks/MOS2/Doc.8.2.8

Background:

Sphyrna lewini was proposed for inclusion in Appendix II by the governments of Ecuador and Costa Rica at COP11. The proposal was adopted.

Assessment:

a) Migratory behavior:

The scalloped hammerhead (*Sphyrna lewini)* is a circumglobal species. *S. lewini* occurs in tropical and warm temperate seas. It occurs inshore and over the continental shelf and in adjacent deep water from the surface to at least 275 m depth. Scalloped hammerhead sharks are highly mobile and migratory species. Scalloped hammerhead sharks have been observed making migrations along continental margins as well as between oceanic islands in tropical waters (Kohler and Turner 2001, Duncan and Holland 2006, Bessudo et al. 2011, Diemer et al. 2011). Along the east coast of South Africa, average distance moved by S. lewini was 147.8 km (data from 641 tagged scalloped hammerheads; Diemer et al. 2011). These tagging studies reveal the tendency for scalloped hammerhead sharks to aggregate around and travel to and from core areas within locations (e.g. Bessudo et al. 2011), however they are also capable of traveling long distances (1941 km, Bessudo et al. 2011; 1671 km, Kohler and Turner 2001, Hearn et al. 2010; 629 km, Diemer et al. 2011). In addition, in many of these tagging studies scalloped hammerheads were tracked leaving the study area for long periods of time, ranging from 2 weeks to several months (Hearn et al. 2010, Bessudo et al. 2011) to almost a year (324 days) (Duncan and Holland 2006), but eventually returning, displaying a level of site fidelity to these areas.

b) Conservation status:

Estimates of productivity (as intrinsic rate of increase (r)) for scalloped hammerhead sharks have been estimated from a variety of studies and are relatively low, ranging from 0.028 to 0.121, suggesting general vulnerability to depletion (review in Miller et al. 2013). Although estimates of (r) for *S. lewini* are rather low, when compared to other sharks, scalloped hammerheads appear to have a moderate recovery potential.
However, a significant factor contributing to scalloped hammerheads conservation status is the fact that these sharks are obligate ram ventilators and suffers very high at-vessel fishing mortality

(Morgan and Burgess 2007, review in Miller et al. 2013) The scalloped hammerhead is taken as both a target and bycatch by trawls, purse-seines, gillnets, fixed bottom longlines, pelagic longlines and inshore artisanal fisheries. The species' aggregating behavior makes them especially vulnerable to capture in large schools.

Multiple studies have noted significant declines in scalloped hammerhead sharks throughout their range. In the Atlantic Ocean, a stock assessment found the population size in 1981 was estimated to be between 142,000-169,000 sharks, but decreased to about 24,000 animals in 2005 (an 83-85% reduction) (Hayes et al. 2009). In the southwest Atlantic Ocean off Brazil, data from fisheries targeting hammerhead sharks indicates bottom gillnet CPUE declined by 80% from 2000-2008 (FAO, 2010). In the Central East Atlantic, scientific research cruises show that scalloped hammerhead shark abundance was variable from 1982 to 2008 but there was a statistically significant decrease of 95% since 1999 (Dia *et al.,* 2012).From 1978 to 2003, catch-per-unit effort of scalloped hammerhead in shark nets deployed off the beaches of Kwa-Zulu Natal, South Africa, showed a decline of ~ 64% (Dudley and Simpfendorfer 2006), Based on these declines and inferred declines from other regions, scalloped hammerhead shark are listed as Endangered on the International Union for the Conservation of Nature (IUCN) Red List of Threatened Species (Baum et al, 2007).
Hammerhead shark fins are generally of high value compared to other species because of their high fin ray count. Hammerhead shark species *S. zygaena* and *S. lewini* were found to represent at least 4-5% of the fins auctioned in Hong Kong, the world's largest shark fin trading center. It is estimated that between 1.3 and 2.7 million *S. zygaena* or *S.* lewini are represented in the shark fin trade each year or, in biomass, 49,000 to 90,000 mt (Clarke et al. 2006). Despite their volume in international trade, few measures exist to manage and protect global populations of scalloped hammerhead sharks. In Atlantic waters, the International Commission for the Conservation of Atlantic Tunas (ICCAT) has afforded the species protection from fishing by ICCAT vessels by prohibiting the retention of hammerheads caught in association with ICCAT-managed fisheries. Although, there are no scalloped hammerhead shark specific regulations, Regional Fishery Management Organization management measures in place for the Pacific or Indian Ocean populations, many of these RFMOs have developed additional shark conservation and management measures that aim to further reduce shark waste and promote the live release of all shark species, yet it is unclear how effective these measures have been. Moreover, high levels of illegal, unreported and unregulated (IUU) fishing have also been reported off Central/South America and in the Western and Central Pacific Ocean (Lack and Sant 2008). Recently, scalloped hammerhead sharks were listed on Appendix II of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES).

Recommendation:

It is recommended that scalloped hammerhead shark be considered by the Signatories of the CMS Memorandum of Understanding on the Conservation of Migratory Sharks (Sharks MOU) for inclusion in Annex 1 of the Sharks MOU. International agreement for the conservation and management under the MOU will benefit the species.

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CMS SHARKS MOU ADVISORY COMMITTEE ASSESSMENT REPORT

Species: Thresher sharks (genus *Alopias*)

Proposal: CoP11

- UNEP/CMS/COP11/Doc.24.1.17

Sharks MOS2

- CMS/Sharks/MOS2/Doc.8.2.9

Background:

The three species of thresher shark (genus Alopias) were proposed for inclusion in Appendix II of CMS by the European Union and its 28 Member States at CoP11. The proposal was adopted.

Assessment:

a) Migratory behaviour:

Thresher sharks (family Alopiidae) are highly mobile, pelagic sharks occurring in oceanic and continental shelf habitats. Due to their regular cross boundary migrations, thresher sharks are listed in Annex 1 (Highly Migratory Species) of the UN Convention on the Law of the Sea (UNCLOS). Bigeye threshers, *Alopias superciliosus*, have been documented to undertake long distant movements. In the Pacific Ocean, bigeye threshers crossed international boundaries in Central America (Kohin *et al*., 2006). Weng and Block (2004) reported an individual moving a straight-line distance of 2,767 km (1,719 mi) from the northeast coast of the US Atlantic Ocean into the Gulf of Mexico. Kohler et al. (1998) used tag and recapture studies to document the movement of this species from the US to Central American countries.

Common threshers, *Alopias vulpinus*, are noted as a highly migratory species. Cartamil *et al*. (2010) reported the range of common threshers in the northeastern Pacific to extend from California (USA) to Mexico.

Pelagic threshers, *Alopias pelagicus*, are documented to migrate between Central America and the US. Genetic studies indicate gene flow between populations in Mexico and Ecuador with possible population links to China (Taiwan, Province of China; Trejo, 2004).

b) Conservation status:

The genus *Alopias* are slow-growing and large-bodied migratory sharks. The fecundity of the three species is very low (2–4 pups) and consequently exhibit low rates of population growth. Among other pelagic sharks, thresher sharks have lower productivity and higher susceptibility values for pelagic fisheries (Cortes *et al.*, 2010).

Thresher sharks are a bycatch in a variety of pelagic fisheries in both coastal waters as well as high seas. There are, or have been, target commercial and recreational fisheries for some species in areas of high local abundance. Several studies have indicated that the at-vessel mortality of thresher sharks is higher than for other pelagic sharks (Beerkircher *et al.*, 2002). Thresher sharks are all marketable, with their flesh and fins high value products. Catch statistics, especially earlier data, are unreliable and most Regional Fishery Management Organizations (RFMOs) have not been able to ascertain the statuses of the various stocks of thresher shark. However, ecological risk assessments indicate that these species, especially bigeye thresher, are the most vulnerable to pelagic fisheries (e.g., Cortes *et al.*, 2010).

Thresher sharks are often grouped together in catch data, making it difficult to distinguish the status of each population. However, declines have been noted in all ocean basins for each species and the species complex as a whole. For example, in the Eastern Central Pacific, trends in abundance and biomass of *Alopias* spp. indicate a decline in abundance of 83% and a decline in biomass to approximately 5% of virgin levels (Ward and Meyers, 2005). Observed declines up to 80% have been reported in the Northwest Atlantic region (Baum et al., 2003) and over 99% in abundance of *A. vulpinus* in the Mediterranean Sea (Ferretti *et al*., 2008). All members of genus Alopias are listed as Vulnerable globally on the International Union for the Conservation of Nature Red List of Threatened Species because of their declining populations

Some regulations exist for thresher sharks. The International Commission for the Conservation of Atlantic Tunas (ICCAT) advised against directed fisheries for *Alopias* spp., and prohibited any retention of bigeye thresher. The Indian Ocean Tuna Commission (IOTC) has also prohibited the retention of all species of the family *Alopiidae*. The Philippines has afforded legislative protection for thresher sharks. Management has also been put in place in the form of prohibitions on landings based on scientific advice in the Northwest Atlantic US waters. A prohibition on retaining thresher sharks has also been enacted by Spain. However, the limited monitoring of many pelagic fisheries and the paucity of knowledge regarding population status highlights the need for improved research and management action.

Recommendation: It is recommended that all thresher sharks, *Alopias* spp., be considered by the Signatories of the CMS Memorandum of Understanding on the Conservation of Migratory Sharks (Sharks MOU) for inclusion in Annex 1 of the Sharks MOU. Each member of the genus has low population productivity and likely has an unfavorable conservation status. International agreement for the conservation and management under the MOU will benefit these species.

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