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**THE HARVEST OF CMS APPENDIX I-LISTED SHARKS AND RAYS
AS AQUATIC WILD MEAT**

(Prepared by the Aquatic Wildmeat Working Group)

Summary:

This document forms an Annex to Document
UNEP/CMS/COP13/Doc.26.2.4/Rev.1 *Aquatic Wild Meat*.

THE HARVEST OF CMS APPENDIX I-LISTED SHARKS AND RAYS AS AQUATIC WILD MEAT

Background

1. The Convention on Migratory Species (CMS) COP12 expressed concern that CMS-listed species, including cetaceans, sirenians, crocodiles, turtles and seabirds, are harvested¹ as aquatic wildmeat in many regions of the world, and that there is evidence that the demand is increasing. Resolution 12.15 requested the formation of a thematic Aquatic Wildmeat Working Group of the Scientific Council and the Parties established a programme of work (Dec 12.46) for this new Working Group to implement. One of these actions (Dec 12.46 d) was to facilitate a discussion about incorporating CMS Appendix I-listed sharks and rays to the scope of the Working Group. This paper serves to instigate that discussion and provides two preliminary recommendations for consideration by the Scientific Council.

Aquatic wildmeat

2. To date, CMS has defined aquatic wildmeat as the products derived from aquatic mammals, seabirds and reptiles used for subsistence food and traditional uses, including meat, shells, bones and organs, and as bait for fisheries. The species that are the focus of these aquatic wildmeat harvests are often threatened and protected aquatic (coastal and marine) species, including sirenians, various species of turtles, cetaceans, seabirds and reptiles. Aquatic wildmeat is obtained opportunistically (e.g., from bycatch or strandings) or from illegal or unregulated hunts.
3. Until now, the harvest of sharks and rays has not been recognized by CMS as aquatic wildmeat. However, when viewed within certain criteria, we argue the exploitation of at least CMS Appendix I-listed sharks and rays should be considered as aquatic wildmeat, including those species that are:
 - a) harvested and/or caught as bycatch in unregulated fishing activities in developing countries;
 - b) caught in restricted coastal areas (including rivers and estuaries) where fishing is prohibited and/or in essential fish habitats;^[1]
 - c) caught with prohibited/restricted gear; and/or
 - d) products which are frequently traded illegally through local markets and, in some circumstances, international markets.
4. Many of these criteria are often met with sharks and rays. The intentional exploitation of CMS Appendix I-listed sharks and rays is already a significant problem recognized by CMS. Ignoring such harvest activities fails to address key utilization processes for many sharks and rays and puts local sharks and ray populations at risk of overexploitation and extirpation.^[2]
5. Indeed, the status of sharks and rays is worsening globally, and in some regions of the world several CMS Appendix I-listed species are already locally extinct (e.g., the Angelshark (*Squatina squatina*), and sawfishes (Family Pristidae), while others (e.g. Manta and Mobula rays, *Manta birostris*, *Mobula rochebrunei*) are threatened.
6. A broader and inclusive understanding on what taxa are considered as aquatic wildmeat is urgently needed.

¹ Note, there is an active discussion within the Aquatic Wildmeat Working Group about the terminology surrounding 'harvest', 'exploitation', and 'hunting' (the terms more commonly used within terrestrial wildmeat policy circles), and if they should be changed to 'fishing' and 'capture' (terms that might work for sharks and rays but could be inappropriate for aquatic mammals and turtles). This paper continues to use the original terminology until this discussion is resolved.

Common biological traits of sharks and rays

7. So far, 507 species of sharks and 646 species of rays have been described scientifically. These species have different distributions and distinct life-histories.[3] Consequently, they are exposed to various levels of harvest pressure and have individual responses to this pressure.[3]
8. Sharks and rays are members of the taxonomic subclass Elasmobranchii within the class Chondrichthyes, an ancient group of fishes dating back to the Devonian period (~418 million years ago).[4] Their main common characteristic is their cartilaginous skeleton, distinguishing them from the bony fishes. The majority of economically important Chondrichthyes are elasmobranchs, which are further divided into the two superorders Selachiomorpha (sharks) and Batoidea (rays).[5]
9. Life-history characteristics of many species of sharks and rays are more like those of marine mammals than of bony fishes.[6] For example, they grow slowly, mature late, have long gestation periods, have a small litter sizes, and some species give birth only every second year or even longer intervals. These traits result in a low ability to recover from reduced population sizes, which makes some shark and ray species threatened by even low levels of harvest.[7]

Extinction risk of sharks and rays

10. A comparison of 26 shark and 151 bony fish populations found that sharks show twice the harvest extinction risk of bony fishes.[8] Moreover, recent studies indicate that sharks and rays are among the marine taxa with the highest extinction risk.[2, 9] According to the IUCN Red List of Threatened Species, nearly a quarter of all sharks and rays are facing an elevated risk of extinction globally, while in some regions of the world (e.g. Mediterranean, Northwest Indian Ocean) over 50 per cent of the species are considered critically endangered, endangered or vulnerable. Five of the seven most threatened families are rays, only one-third of species are considered Least Concern, and almost half of the species are classified as Data Deficient.[2]
11. Like most marine species, sharks and rays face multiple, often cumulative anthropogenic stressors including fishing (direct takes and bycatch), habitat modification or destruction, pollution, climate change and ocean acidification.[10-12] They interact with a wide range of fishing gear and are often bycaught in fisheries that are difficult to regulate and manage.[13]
12. Many sharks and rays occupy high trophic levels, fulfilling key ecological roles in various coastal habitats, like structuring marine communities through predation and influencing prey behavior.[14] Therefore, the ongoing and rapid depletion of sharks and rays in coastal environments potentially has far-reaching consequences, including ecosystem shifts and the possibility of future human generations to rely on aquatic-derived protein sources.[15]

13. Already, CMS recognizes that the following 21 Appendix I-listed sharks and rays should not be the target of harvest.

Scientific names	Common names	IUCN Red List Status
ORECTOLOBIFORMES Rhincodontidae <i>Rhincodon typus</i>	Whale Shark	EN
LAMNIFORMES Lamnidae <i>Carcharodon carcharias</i> Cetorhinidae <i>Cetorhinus maximus</i>	White Shark Basking Shark	VU VU
SQUATINIFORMES Squatinae <i>Squatina squatina</i>	Angelshark	CR
RHINOPRISTIFORMES Rhinobatidae <i>Rhinobatos rhinobatos</i> (Mediterranean population) Pristidae <i>Anoxypristis cuspidata</i> <i>Pristis clavata</i> <i>Pristis pectinata</i> <i>Pristis pristis</i> <i>Pristis zijsron</i>	Common Guitarfish Narrow Sawfish Dwarf Sawfish Smalltooth Sawfish Largetooth Sawfish Green Sawfish	EN EN EN EN CR CR CR
MYLIOBATIFORMES Mobulidae <i>Mobula alfredi</i> <i>Mobula birostris</i> <i>Mobula eregoodoo</i> <i>Mobula hypostoma</i> <i>Mobula mobular</i> <i>Mobula kuhlii</i> <i>Mobula munkiana</i> <i>Mobula rochebrunei</i> <i>Mobula thurstoni</i> <i>Mobula tarapacana</i>	Reef Manta Ray Oceanic Manta Ray Longhorned Pygmy Devil Ray West Atlantic Pygmy Devil Ray Spinetail Devil Ray Shorthorned Pygmy Devil Ray Munk's Pygmy Devil Ray East Atlantic Pygmy Devil Ray Bentfin Devil Ray Sicklefin Devil Ray	VU VU NT DD EN DD NT VU NT VU

The harvest of CMS Appendix I-listed sharks and rays as aquatic wildmeat

14. Data on artisanal fisheries of CMS Appendix I-listed sharks and rays are for example, available for the Arabian region (i.e. *M. thurstoni*, *M. kuhlii*, Pristidae), Indonesia (i.e. *R. typus*), Bangladesh (i.e. Pristidae), Mexico (i.e. *M. munkiana*), India (i.e. *R. typus*, *P. pristis*, *A. cuspidata*), Madagascar (i.e. *C. carcharias*, Mobulidae, Pristidae), and Fiji (Pristidae).[16-25] Although limited, these studies highlight the importance of shark and ray exploitation in meeting the dietary needs of many coastal communities. Evidence from other parts of the world, including West Africa and Peru, suggests that artisanal fishers also profit from the local sale of shark fins.[26, 27]

Trade of sharks and rays and domestic utilization of shark and ray derived products

15. Trade networks dealing with shark and ray products can be divided into either local markets focused on meat (i.e. fresh, salted-dried, or smoked), or export markets mainly targeting shark fins or gill plates. In some, but not all, circumstances there is a crossover of these two markets. For example, in West Africa, fishermen from several countries have been involved in either the exploitation or trade of sharks and rays. Most of them come from Ghana (traders) or Senegal (fishers). Senegalese artisanal fishers have depleted shark and ray resources from their domestic waters, and have started making longer fishing trips, moving to other countries (e.g. Mauritania, Guinea-Bissau, Guinea, Sierra Leone and Liberia), exploiting their fishing zone.[28]
16. Over the last two decades, a decreasing trend in catches has been observed despite an increase in fishing effort, which is most likely due to the reduced abundance of the species (e.g. the almost complete disappearance of the sawfish species (Pristidae [28]). For instance, in Fiji, the shark fin trade has likely shifted from a previously export-oriented market to one currently dominated by domestic outlets.[21] Similarly, Vieira et al. (2017) observed a fall in shark fin production after the closure of the bêche-de-mer (sea cucumber) fishery in Papua New Guinea.[29]
17. What cannot be discounted is that many countries have traditionally relied on shark meat. Fishers and local communities experiencing declining fish stocks are often reliant on sharks and rays for food security.[30, 31] While industrial and artisanal fisheries historically discarded carcasses retaining only fins, data indicate that most artisanal fishers now retain all parts of harvested sharks.[20] In these cases, if sharks and rays are landed, the meat is mostly utilized either for local consumption or local trade. The fins may be sold locally to restaurants or to middlemen, who then trade internationally. Hence, fishers are usually not directly involved in the trade.

Management of shark and ray harvests

18. Acknowledging that the intentional exploitation of CMS Appendix I-listed sharks and rays should be prohibited (Art III, para. 5), the harvest of most sharks and rays is often through bycatch or not usually undertaken in a way that satisfies the characteristics of managed and regulated fisheries.
19. Moreover, local communities use the harvested animals for subsistence food, and locally trade parts or sale the meat, for which the demand is reportedly increasing. In this way, fishing for sharks and rays is often more characteristic of aquatic wildmeat harvest or hunts than it is of fisheries. As the harvest of aquatic wildmeat is not managed by local or regional fisheries agencies, these shark and ray harvests must be addressed by conservation and wildlife agencies. As such, we believe the harvest and use of CMS Appendix I-listed sharks and rays meet the definition of aquatic wildmeat and in this way can be drawn to attention of conservation and wildlife agencies.
20. Furthermore, as numerous sharks and rays are long-lived, overexploited throughout their range, and have an intrinsically low resilience to even low harvest pressure, we consider CMS Appendix I-listed sharks and rays of high priority for conservation efforts.

21. In addition to the CMS Appendix I-species, there is also concern about many CMS Appendix II listed sharks and rays, especially those that have a high risk of extinction and/or are similarly harvested such that these activities meet the aquatic wildmeat definitions. When viewed within the initial proposed criteria, the harvest of these Appendix II sharks and rays may also qualify as aquatic wildmeat species, as sharks and rays that:
 - a) can be fished and/or caught as bycatch in unregulated fishing activities in developing countries;
 - b) are often caught in restricted coastal areas (including rivers and estuaries) where harvest is prohibited, including essential fish habitats;
 - c) are often caught with prohibited/restricted gear;
22. Species that meet some or all these criteria include the guitarfishes, wedgefishes (Rhinidae) and hammerhead sharks (Sphyrnidae).

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