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**DETERMINING THE EXTENT OF INTERPLAY BETWEEN BYCATCH AND
AQUATIC WILDMEAT HARVESTS**

(Submitted by the Aquatic Wildmeat Working Group and the Bycatch Working Group)

Summary:

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

It has been developed by the Aquatic Wildmeat Working Group in
cooperation with the Bycatch Working Group, in response to the
activities contained within Decision 12.46.

DETERMINING THE EXTENT OF INTERPLAY BETWEEN BYCATCH AND AQUATIC WILDMEAT HARVESTS

Background

1. The Convention on Migratory Species (CMS) defines aquatic wildmeat as the products derived from aquatic mammals, birds and reptiles used for subsistence food and traditional uses, including meat, shells, bones, organs and as bait for fisheries. It is obtained opportunistically (e.g., from bycatch or strandings) or from unregulated and at times illegal hunts.
2. The 12th CMS Conference of the Parties (COP) expressed concern that CMS-listed species, including aquatic mammals, turtles, seabirds and elasmobranchs, are affected by being harvested as aquatic wildmeat in many regions of the world, and that there is evidence that the demand is increasing (Robards & Reeves, 2011). Resolution 12.15 requested the formation of a thematic Aquatic Wildmeat Working Group of the Scientific Council and established a programme of work (Dec 12.46) for this new group to implement.
3. The Working Group is tasked to advise the Scientific Council and Parties about emergent issues as they pertain to aquatic wildmeat. This paper serves to instigate a discussion and provide a preliminary recommendation for consideration by the Scientific Council about the interplay between bycatch and aquatic wildmeat harvest.

Bycatch

4. Bycatch can be defined as the capture of non-target species or undesired sizes of target species (Lewison et al. 2004). Bycatch is among the greatest threats to seabirds and marine mammals worldwide and causes declines in other migratory megafauna such as turtles and elasmobranchs (Peckham et al. 2007; US Commission on Ocean Policy 2004; Read et al. 2006; Phillips et al. 2016). Bycatch mortality in small-scale fisheries, including artisanal, traditional and subsistence fisheries, may be among the greatest current threats to aquatic megafauna, as migratory species frequent coastal high use areas which overlap with small-scale or artisanal fisheries (James et al. 2005).
5. The effect of bycatch in freshwater fisheries around the world has been even more neglected than coastal fisheries, yet it has had damaging impacts on species such as African manatees (Raby et al. 2011; Mayaka et al. 2015). The majority of inland freshwater bycatch occurs in the developing world, with one estimate finding over 90 per cent of freshwater bycatch occurring in Asia and Africa (Raby et al. 2011). To date, however, bycatch assessments and mitigation processes have largely focused on marine industrial fisheries, while small-scale fisheries often receive little attention from domestic and international authorities (Lewison et al. 2004; Lewison & Crowder 2007). As a result, both, fishing effort and bycatch from these fisheries are largely unknown or have primarily focused on seabirds. In addition, small-scale fisheries are subject to substantial illegal, unregulated, or unreported (IUU) fishing (Panayotou 1982; Pauly 2006), further precluding the understanding of fisheries' impacts on migratory megafauna in coastal waters.

Aquatic Wildmeat and Bycatch

6. In commercial/industrial fisheries bycatch is typically discarded, with the exception of sharks. Bycatch in small-scale or artisanal fisheries is often retained. For example, a diverse range of small cetaceans (e.g., *Stenella* spp., *Tursiops truncatus*), Waved Albatrosses (*Phoebastria irrorata*), Loggerhead Turtles (*Caretta caretta*), and various hammerhead sharks (*Sphyrna* spp.) are killed as bycatch and used as aquatic wildmeat (Peckham et al 2007; Mangel et al. 2010; Alfaro-Shigueto 2011; Glaus et al. 2015). Humans have hunted wildlife for over 100,000 years, but consumption and human population growth have increased considerably over the past few decades (Milner-Gulland & Bennett, 2003). To illustrate, reports estimate that wildmeat harvest in Central Africa is now in the order of 3.4 million tons per annum (Wilkie & Carpenter, 1999; Fa et al. 2001). It should be noted that the demand for aquatic wildmeat, both for consumption and trade, can turn opportunistic bycatch into a desirable component of the catch, that is retained as valuable source of food or income (White et al. 2006). Hence, what was previously considered to be bycatch can subsequently be sought intentionally and evolve into direct catches.
7. Reported bycatch may in fact be directed catch. However it is often difficult to distinguish and can change daily (Temple et al. 2018). Incorrectly declaring direct catch as bycatch can act as barrier to management. One reason for this is that bycatch appears to be difficult to prevent – a perception that hampers the willingness of individuals and management bodies to act towards bycatch mitigation. Also, although there are studies on fishing techniques to reduce bycatch, this knowledge or gear types is often not available or viable for small-scale fishermen. Another aspect of bycatch that must be considered is what is called ‘cryptic’ bycatch, i.e. the animals that are killed or fatally wounded by a fishing activity but are lost from the nets before hauling or are not brought on-board the fishing vessel, and not included in captures reported by fisheries observes. Such events are an important component of the bycatch of large whales, but smaller marine mammals, seabirds, turtles and discarded fish are also often injured and die following capture, escape or release from fishing operations (Davis 2002; Campana et al. 2009; Debski & Pierre 2014)

Affected CMS-listed Species

8. Some affected species are included in the CMS appendices. Small cetaceans, reptiles, seabirds and elasmobranch species that are known to or may have been used as aquatic wildmeat deriving from bycatch (Alfaro-Shigueto et al. 2011; Glaus et al. 2015; Alves & van Vliet 2018) and their protection status on the Appendices of CMS (Appendices I & II) are listed below. Note, this list is not complete and only those species are included whose utilization as aquatic wildmeat derived from bycatch is documented. Also, no reports were found for some countries and as the utilisation of marine mammals is illegal in many countries, harvests are likely hidden and exact numbers remain elusive. It is therefore recommended to take a precautionary approach and not assume that bycatch and its utilization as aquatic wildmeat is absent. Of note however, of all the reptiles, the turtles have been the most severely exploited by humans for food, a situation which has been directly attributed to the precarious conservation state of many of these species (Klemens & Thorbjarnarson, 1995, Mancini & Koch, 2009, Hoffmann & Cawthorn, 2012), which is why the eight CMS I listed turtles can be found in the list below.

Appendix I

- a SIRENIA AND CETACEANS:
 - i Trichechus senegalensis*
 - ii Tursiops truncatus ponticus*
 - iii Sousa teuszii*
- b REPTILES
 - i Caretta caretta*
 - ii Chelonia mydas*
 - iii Dermochelys coriacea*
 - iv Eretmochelys imbricata*
 - v Gavialis gangeticus*
 - vi Lepidochelys kempii*
 - vii Lepidochelys olivacea*
 - viii Podocnemis expansa*
- c ELASMOBRANCHS
 - i Pristis clavata*
 - ii Pristis pectinata*
 - iii Pristis zijsron*
 - iv Pristis pristis*

Appendix II

- d SIRENIA AND CETACEANS
 - i Dugong dugon*
 - ii Lagenorhynchus obscurus*
 - iii Lagenorhynchus australis*
 - iv Stenella attenuata* (eastern tropical Pacific population, Southeast Asian populations)
 - v Stenella longirostris* (eastern tropical Pacific populations, Southeast Asian populations)
- e AVES
 - i Phoebastria irrorata*
 - ii Thalassarche melanophris*
 - iii Diomedea sanfordi* (harvested from colonies in the Chatham Islands)
 - iv Thalassarche bulleri* (harvested from colonies in the Chatham Islands)
- f ELASMOBRANCHS
 - i Carcharhinus falciformis*
 - ii Sphyrna lewini*
 - iii Sphyrna mokarran*
 - iv Rhynchobatus australiae*

Recommended Actions

9. The transition of bycatch into an intentional harvest as aquatic wildmeat thereof is known to occur in fisheries that do not possess the characteristics of managed and regulated fisheries. As the harvest of aquatic wildmeat is not managed by local or regional fisheries agencies, it needs to be addressed by conservation and wildlife agencies

10. Some caution is necessary when considering these dynamics. The opportunistic utilization of bycatch as aquatic wildmeat may be the result of local demand for alternative food sources due to the loss of traditional fish stocks (Juncker et al 2006). In addition, life-sustaining income from the sale of aquatic wildmeat may motivate fishers to intentionally target larger animals, which are often more vulnerable to exploitation, with more valuable useable products. It is therefore crucial to understand the socio-economic drivers of what fishermen catch as well as the fate of bycatch. If sufficient data to understand bycatch levels in high use coastal areas are available and working in close partnership with small-scale and artisanal fishers, this may provide a possibility to mitigate bycatch, and in turn the transition to new aquatic wildmeat harvests. This could provide a way forward to ensure the persistence of vulnerable migratory megafauna. Without such information, population declines are likely to go undetected and undocumented, and local authorities will have inadequate information for drafting management plans and implementing them in a timely manner. Ignoring the potential of bycatch as a trigger for increasing aquatic wildmeat harvests will only serve to undermine conservation measures of fisheries and wildlife management bodies.

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