Agenda Item 2.5	Review of New Information on Threats and Other Issues Relevant to Small Cetaceans Other
Information Document 2.5d	**IWC-CMS Workshop on Cetacean Ecosystem Functioning**
Action Requested	Take note
Submitted by	Secretariat

ASCOBANS

IWC-CMS WORKSHOP
ON CETACEAN ECOSYSTEM FUNCTIONING

Executive Summary[1]

The Workshop was held virtually from 19-21 April 2021, co-hosted by the International Whaling Commission (IWC) and Convention on the Conservation of Migratory Species (CMS) with funding provided by the Animal Welfare Institute, Whale and Dolphin Conservation, Pro Wildlife, OceanCare, and the IWC's Scientific Committee (SC). The purpose was in response to IWC Resolution 2016-3 which "*recognized the need to include consideration of the contributions made by live cetaceans and carcasses present in the ocean to marine ecosystem functioning in conservation, management strategies and decision making*." The Resolution asked the IWC Scientific Committee to develop a gap analysis in regard to research and to develop a plan to prioritize research needs.

The workshop reviewed existing knowledge on the contribution of cetaceans to ecosystem functioning based on two dedicated expert review reports and additional presentations given by invited scientists. The two primary key-note presentations provided background and perspectives on this relatively new area of research. The series of expert presentations then provided information under four topics: whale falls; nutrient circulation and ocean fertilization and cetaceans as predators. Cetaceans' main ecosystem functions include the following (see also Table 1 of the report)

- Whales move oceanic organic matter and nutrients vertically in the water column (the "whale pump"), and horizontally, via the transport of nutrients from highly productive foraging grounds to nutrient poor, low latitude feeding grounds (the "great whale conveyor belt")

- Cetacean feces locally enhance primary production in the ocean, especially through the provision of iron

- Cetaceans - both large and small contribute to marine biogeochemical cycles, including nutrient recycling of iron, nitrogen, and phosphorus, among others

- Cetacean carcasses contribute to deep sea biodiversity (with overlapping stages of succession of many endemic species to be found at such wale falls), they provide nutrient-rich food sources as well as habitat for deep sea species and act as important stepping stones thus contributing to the dispersion of species in the depth

- Through their large body mass, cetaceans contribute to carbon storage (while animals are alive) and sequestration (when whales die, the carcasses often sink to the sea floor where the carbon will remain for a century or more)

- Cetaceans can also play important roles as both predators and prey. They thus contribute to trophic dynamics and cascades and also can enhance prey availability for other marine life

[1] This summary has been prepared by representatives of the NGOs who funded the workshop as well as individual scientists who participated in the workshop. Please note that it is not an official IWC/CMS document.

Regarding the overall and relative contribution of cetaceans to primary productivity, carbon sequestration, etc., the workshop agreed that often it is not a question of whether whales play a role in ecosystem functioning but rather what role they play, which is largely dependent on the scale (from local to global). In that sense, it is important not to generalize ecological functions given the differences between cetacean species (and other marine vertebrates) and variations in temporal and spatial scale.

It was also noted that a variety of marine species, including small cetaceans, other marine mammals, sharks, large fish, and seabirds also contribute to nutrient availability and transport to marine and terrestrial ecosystems providing important ecological benefits including increasing primary production.

The workshop highlighted the impact of population declines from commercial whaling on ecosystem functioning, the significant loss in carbon sequestration value as a result of commercial whaling and how that value is increasing as many whale populations recover.

Workshop participants also discussed the impact of climate change and other anthropogenic threats on cetaceans and the ecosystem functions they provide. It was agreed that studying human-induced changes, including climate change, and their impact on cetaceans' ecosystem functioning is important.

In summary it was agreed that large vertebrates are an integral part of a well-functioning marine ecosystem and that they provide a potentially long list of ecosystem functions and services to humans (compare Table 1 of the workshop report).

Finally, the workshop noted that interest in the issue of ecosystem functioning of cetaceans, particularly in the context of climate change, has gained momentum internationally and will likely increase. Discussions about "blue carbon" and nature-based solutions (NBS) are of interest to stakeholders, especially ENGOs and decision-makers.

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A series of tables captured questions and hypotheses identified during workshop discussions. These tables recorded the outcomes of the workshop, provided references to relevant studies, and provided a roadmap for future work on cetacean ecosystem functioning:

Table 1 ("**Summary of selected traits of cetaceans and their related ecosystem functions and services")** provides an overview of existing knowledge about cetacean ecosystem functions and services.
Table 2 ("**Ecological Functions of Cetaceans: Research and Development Needs")** sets out the research needed to improve our knowledge of the effects of cetaceans on ecosystem functioning.
Table 3 ("A list of general questions, hypotheses, and tasks to be accomplished or considered for a second workshop"), regarded as the main output of the workshop, set out scientific questions, hypotheses, and research tasks to be accomplished in the short term.
Table 4 provides a draft template for an overview summary of cetacean ecosystem functions and their relevance to different geographic areas and how such contributions change over time as whale abundance estimates have changed, particularly between the pre- and post-commercial whaling periods