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THE MIGRATORY CONNECTIVITY IN THE OCEAN (MiCO) SYSTEM: DELIVERING ACTIONABLE KNOWLEDGE OF HOW MIGRATORY SPECIES USE AND CONNECT THE OCEAN

(Submitted by The Global Ocean Biodiversity Initiative)

Summary:

This document has been submitted in reference to Agenda Items 7 *CMS Contribution to the post-2020 Biodiversity Framework*, 9 *Global Atlas on Animal Migration* and 10.4.4 *Improving Ways of Addressing Connectivity in the Conservation of Migratory Species*.

At COP12 Parties encouraged the "support for the enhancement of the databases… [and] targeted joint analyses of animal movements and other factors using these databases in an integrated way across the marine and terrestrial realms so as to improve understanding of the biological basis of migratory species connectivity" (UNEP/CMS/Resolution 12.26). This document describes the prototype Migratory Connectivity in the Ocean (MiCO) System which is focused on delivering free and easily accessible, actionable knowledge of migratory marine animal movements (distribution and connectivity).

A recent paper describing the need for information on migratory connectivity and the MiCO System was produced by 71 authors from 14 countries on behalf of the MiCO Consortium and the Global Ocean Biodiversity Initiative (GOBI). CMS Secretariat staff and Scientific Council members were among the authors. The MiCO system prototype was developed through a grant to the Global Ocean Biodiversity Initiative (GOBI) from the International Climate Initiative (IKI), an initiative of the German Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (BMU).

THE MIGRATORY CONNECTIVITY IN THE OCEAN (MiCO) SYSTEM: DELIVERING ACTIONA-BLE KNOWLEDGE OF HOW MIGRATORY SPECIES USE AND CONNECT THE OCEAN

The text of this document is largely quoted directly from a recent paper in the Proceedings of the Royal Academy B entitled, *The importance of migratory connectivity for global ocean policy[1]*. It is freely available online at: https://royalsocietypublishing.org/doi/10.1098/rspb.2019.1472.

A.   Background on the importance of connectivity to the conservation of migratory species

1.   Migratory species connect economies and ecosystems in a way that requires a shared approach to governance based on international cooperation and robust engagement with indigenous peoples and local communities, civil society, and industry actors.

2.   Obstacles to effective governance include lack of international cooperation, geographic and taxonomic gaps in governance, lack of cross-sectoral conservation tools and limited implementation of ecosystem-based approaches to management, as well as conservation strategies that focus on individual stages of a species migratory cycle with little consideration of population connectivity.

3.   These limitations have hindered the development of effective management strategies for migratory species, many of which are considered at risk of extinction and in need of improved management: 95% of albatross (21 of 22 species), 87% of assessed migratory sharks species, and 63% of assessed sea turtle subpopulations (10 of 16 subpopulations) are listed as Near Threatened or Threatened (i.e., Vulnerable, Endangered, or Critically Endangered) by the IUCN due primarily to indirect capture in marine fisheries (bycatch), direct harvest, predation by invasive species, or loss or degradation of habitat. Similarly, straddling (those shared between two or more jurisdictions) and highly migratory fish stocks experience twice the rate of overfishing as those within a single national jurisdiction.

4.   The IPBES Global Assessment on Biodiversity and Ecosystem Services (2019) found that while some elements (i.e., areal coverage) of Aichi Target 11 were likely to be achieved by 2020, the aspect of the target pertaining to the connectivity and ecological representativeness of protected areas, have made little or no progress. Further, protected areas coverage of species distribution remains insufficient. For example, just 9 per cent of migratory bird species are adequately covered by protected areas across all stages of their annual cycle.

5.   Migratory connectivity, the geographic linking of individuals and populations throughout their migratory cycles, is a major factor affecting how stressors impact individuals at each crucial life history stage, and how these effects may scale up to effects on population abundance and distribution, and species persistence.

6.   **Understanding how a population is connected, how connectivity influences demographic rates, and designing conservation and management measures appropriate for the level of risk associated with various degrees of connectivity, are critical to the conservation and sustainable use of migratory species**.

7.   Access to baseline information on migratory connectivity in the ocean will become even more important to guide better siting of area-based management tools and conservation planning under future climate change scenarios. For example, climate change could easily disrupt cross-environment correlations that make migration routes and timing adaptive to environmental cues, potentially altering connectivity patterns and in turn, the effectiveness of protected areas.

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[1] Dunn, D.C. and A-L Harrison, et al. 2019. The importance of migratory connectivity for global ocean policy. Proceedings of the Royal Society B: Biological Sciences 286:20191472. doi:10.1098/rspb.2019.1472.

8. **The need to maintain migratory connectivity is also critical for sustaining human livelihoods** and cultural connections. Migratory species provide a diverse array of cultural, regulating and provisioning ecosystem services, including contributions to aesthetic and recreational experiences, spiritual or religious enrichment, reduction of pest infestations and disease transmission, and provision of food.

9. A further regulatory service comes from the disproportionately strong influence that highly migratory species, many of which are apex predators, play in structuring of ecological communities.

B. **The MiCO System: delivering actionable knowledge on migratory species to decision makers**

10. At COP12, Parties encouraged the "support for the enhancement of the databases… [and] targeted joint analyses of animal movements and other factors using these databases in an integrated way across the marine and terrestrial realms so as to improve understanding of the biological basis of migratory species connectivity" (UNEP/CMS/Resolution 12.26).

11. **Many ongoing international policy processes and initatives are dependent on access to information on how marine migratory species are distributed and how they move throughout their migratory cycles in order to take most appropriate conservation decisions**. Such processes include, *inter alia*, essentially all of the work done under the CMS family of instruments, the Convention on Biological Diversity's program to describe Ecologically or Biologically Signficant Areas, management of whale populations through the Interational Whaling Commission and fish stocks by Regional Fisheries Management Organizations, declaration of World Heritage Sites and Ramsar Sites, and consideration of how to develop cross-sectoral area-based management tools, including marine protected areas under a new treaty for the conservation and sustainable use of marine biological diversity beyond national jurisdiction (BBNJ).

12. These types of maps and models are also necessary to achieve societal goals including United Nations Sustainable Development Goal 14 as they inform sustainable management of coastal and marine ecosystems (14.2), underpin fisheries models required to end overfishing (14.4), support development of area-based management tools (14.5), provide economic benefit to Small Island Developing States that depend on migratory species (14.7), and increase scientific knowledge, capacity development and technology transfer (14.A). Mainstreaming marine biodiversity into the United Nations Sustainable Development Goals will require integration of migratory connectivity information and its application to 'other effective conservation measures' such as sectoral 'in-situ' efforts to conserve biodiversity.

13. Of note, the IPBES Global Assessment on Biodiversity and Ecosystem Services (2019) found that while the numeric components of Aichi Target 11 were on a path to being achieved, other important aspects of the target, including the connectivity and ecological representativeness of protected areas, have made little or no progress.

14. **A lack of easily accessible and actionable geospatial information prevents the full consideration of migratory connectivity in these processes and hinders nation's ability to achieve global targets.**

15. To date, with the notable exceptions of Birdlife International's work to identify Important Bird and Biodiversity Areas, and the IUCN Marine Mammal Protected Area Task Force's development of Important Marine Mammal Areas, efforts to address this challenge have centered around the development of data and metadata repositories (e.g., , the Global Biodiversity Information Facility, the Ocean Biogeographic Information System and it's sub-nodes, GEOSS, EMODnet, the Seabird Tracking Database, MoveBank, the Ocean Tracking Network, the Animal Telemetry Network, the European Telemetry Network, seaturtle.org, etc.).

16. **Data repositories are absolutely critical, but the data they house require cleaning and analysis to be developed into actionable knowledge that can be easily used by management or policy processes, or by industry for use in scoping, siting and environmental impact assessments.**

17. The databases and processes described above provide critical services as data and information brokers, but **provide limited actionable geospatial knowledge on migratory connectivity** to management and policy arenas.

18. In response to this need, a consortium of data repositories, national observing systems, taxa conservation groups, museums, environmental non-governmental organizations (NGOs), universities, individuals, intergovernmental organizations and UN bodies have now developed a global open-access online system **to facilitate delivery of actionable knowledge of migratory connectivity in the ocean to policy and management arenas (MiCO: www.mico.eco).**

19. **A prototype system (www.mico.eco/system) was developed to provide a basis for contributors and policymakers to offer feedback on methods and usability to ensure the final system is as useful as possible.** The system was launched in April 2019 at the second UN Intergovernmental Conference on a new international treaty for the conservation and sustainable use of marine biological diversity of areas beyond national jurisdiction.

20. Currently, the MiCO system contains geographic descriptions (i.e., polygons) of areas used by migratory species segmented by species, migratory cycle stage, and population, sex and age class (when known), as well as network models that describe how various parts of a species migratory cycle are connected.

21. **All MiCO products are freely available for download and automated reports by species or EEZ can be generated.** The methods used to develop the products are transparent and available on the website. The code used to develop the products will be available in the near future.

22. MiCO products, metadata from the literature review and cases studies have already informed the work of three regional seas organizations (Nairobi Convention, Abidjan Convention and the Comisión Permanente del Pacific Sur), the CMS in their development of resolution 12.26, and considerations of area-based management tools, environmental impact assessments and capacity building and technology transfer in the negotiations for a new treaty for marine biodiversity in ABNJ.

23. **A key component of the system is its ability to track how contributor data have been used in these arenas without disseminating raw data**, providing individual researchers the ability to assess and report their impact on management and policy for a while at the same time protecting raw data that may not yet be available for public sharing.

24. MiCO seeks to build on its strong foundation and invites engagement from additional stakeholders to inform its continued development and enhancement to best serve both users and contributors. **Any feedback from delegations with respect to how the system could be improved to support their efforts to conserve migratory species or to report to national, regional or international fora would be most welcome.**

25. With reference to the work of the Convention on Migratory Species, MiCO hopes to inform the Atlas of Animal Migration in whatever way is deemed useful, and future resolutions on connectivity and ecological networks through the provision of knowledge and case studies for the marine environment.

26. Looking forward, MiCO also welcomes the opportunity to support CMS efforts to gain broader

inclusion of migratory connectivity in the Post-2020 Biodiversity Framework by providing: 1) transparent and standardized information on where international cooperation is necessary to conserve marine migratory species; 2) a platform for international cooperation to deliver actionable knowledge of migratory connectivity; 3) reporting mechanisms to decrease the reporting burden on nations; 4) freely available geospatial files and network models to support development of area-based management tools including *but not limited to* marine protected areas; 5) network models to support better understanding of the importance of migratory connectivity across multiple goals/targets not just area-based protection targets; 6) a baseline of information on the distribution of, and connectivity generated by, migratory species to support better understanding of the impacts of climate change on those populations.

27.   The MiCO System is specific to the marine environment, but its release has prompted strong interest and acknowledgement that **the type of actionable knowledge of migratory connectivity held in the MiCO System is required for all migratory species.**