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Convention on the Conservation of Migratory Species of Wild Animals

CMS

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CMS CONTRIBUTION TO THE POST-2020 GLOBAL BIODIVERSITY FRAMEWORK

(Prepared by Secretariat)

Summary:

This document summarizes the latest contributions of CMS to the development of the post-2020 global biodiversity framework and its monitoring approach. The Sessional Committee is invited to take note of the document and provide advice, particularly as part of its mandate on the formulation of ecological connectivity indicators for the post-2020 global biodiversity framework for enhancing the scientific understanding of connectivity issues in relation to migratory species.

CMS CONTRIBUTION TO THE POST-2020 GLOBAL BIODIVERSITY FRAMEWORK

Background

1. Following the adoption by CMS COP13 of the Gandhinagar Declaration (Resolution 13.1), and Decisions 13.7 – 13.8 *Migratory Species in the Post-2020 Global Biodiversity Framework* by the 13th meeting of the Conference of the Parties, the CMS Secretariat has continued engaging in the process related to the development of the post-2020 global biodiversity framework.

2. The post-2020 global biodiversity framework is to be adopted by the 15th meeting of the Conference of the Parties (COP15) of the Convention on Biological Diversity (CBD). Due to the COVID-19 pandemic, the CBD COP15 was postponed until October 2021, and related preparatory meetings were also rescheduled.

3. The Twenty-fourth meeting of the Subsidiary Body on Scientific, Technical and Technological Advice (SBSTTA-24) and the Third meeting of the Subsidiary Body on Implementation (SBI-3) of CBD are being held online during the period from 3 May to 13 June 2021. These meetings will contribute important elements towards the development of the post-2020 global biodiversity framework. The CMS Secretariat has been actively participating in these and other relevant meetings to identify and raise attention to CMS priorities.

4. In particular, SBSTTA-24 was tasked with carrying out and providing advice on a scientific and technical review of the updated goals and targets, and related indicators and baselines, of the draft post-2020 global biodiversity framework. Documents to be considered by SBSTTA-24 are:

   - Document SBSTTA-24/3/Add.1 which proposes indicators and a monitoring approach;
   - Document SBSTTA-24/3/Add.2 which provides scientific and technical information to support the review of the proposed goals and targets;
   - Document SBSTTA-24/3 which contains a draft decision for COP15. Annex II of the decision contains the terms of reference of a technical expert group which is proposed to be established to advise on the further operationalization of the monitoring framework for the post-2020 global biodiversity framework.

5. The Secretariat reviewed and analyzed the above-referenced documents and undertook work to address the lack of adequate indicators in the proposed monitoring framework for ecological connectivity. The Secretariat held a workshop on ecological connectivity indicators on 23 March 2021 along with further informal exchanges of ideas among parties, partners and experts including Scientific Council members. On 20 April 2021, the Secretariat also convened the Third Meeting of the Working Group (WG) on CMS Family inputs to the post-2020 global biodiversity framework, which comprises representatives of governments and organizations and CMS Councillors.

6. These meetings and consultations provided inputs and recommendations which were reflected in submissions to SBSTTA-24 as well as in documents which were disseminated to CMS Parties focal points aiming at supporting them in the consultations with their CBD counterparts and in the deliberations at SBSTTA-24 and SBI-3. The document "*Ecological Connectivity Indicators for the Post-2020 Global Biodiversity Framework*" which was circulated to CMS Parties and submitted to SBSTTA on 3 May is contained in the annex of this document.

7. Other indicators of relevance to CMS include those related to Target 4, on the harvesting, trade and use of wild species of fauna and flora. The Secretariat also drew attention of the CMS Family Working Group to areas of possible improvement for such indicators.

Discussion and analysis

8. Issues of relevance to CMS under the post-2020 global biodiversity framework are also related to topics to be discussed under several other agenda items of ScC-SC5, namely the Programme of Work of the Sessional Committee, to be discussed under agenda item 3, and the development of a report on the conservation status of migratory species, to be discussed under agenda item 5.1.

9. SBSTTA-24 was ongoing at the time of the preparation of this document. The document will be supplemented after 13 June, when the meeting concludes.

Recommended actions

10. The Sessional Committee is recommended to:

    a) take note of this document and its annex;

    b) provide advice, as appropriate, on the formulation of indicators for the post-2020 global biodiversity framework of particular relevance to CMS.

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ANNEX

Ecological Connectivity Indicators for the Post-2020 Global Biodiversity Framework

(as at 3 May 2021)

I Introduction

1. **Ecological connectivity** plays a critically important role for achieving the objectives of the Convention on Biological Diversity, namely biodiversity conservation, sustainable use and genetic diversity. It has been defined as "*the unimpeded movement of species and the flow of natural processes that sustain life on Earth*" (CMS Resolution 12.26 (Rev.COP13), 2020).

2. The current "updated zero draft" of the post-2020 Global Biodiversity Framework (GBF) (CBD/POST2020/PREP/2/1, 17 August 2020) includes ecological connectivity as follows:

   Goal A: "The area, **connectivity** and integrity of natural ecosystems increased by at least [X%] supporting healthy and resilient populations of all species while reducing the number of species that are threatened by [X%] and maintaining genetic diversity".

   This is accompanied by a "milestone" for 2030 that reads "The area, **connectivity** and integrity of natural ecosystems increased by at least [5%]".

   Target 1: "By 2030, [50%] of land and sea areas globally are under spatial planning addressing land/sea use change, retaining most of the existing intact and wilderness areas, and allow to restore [X%] of degraded freshwater, marine and terrestrial natural ecosystems and **connectivity** among them".

   Target 2: "By 2030, protect and conserve through **well connected** and effective system of protected areas and other effective area-based conservation measures at least 30% of the planet with the focus on areas particularly important for biodiversity".

3. SBSTTA-24 (Agenda item 3) will take up the issue of indicators and a monitoring approach for the post-2020 GBF. The main documents for this agenda item, (CBD/SBSTTA/24/3) and (CBD/SBSTTA/24/3/ADD1), do not envision a specific headline indicator on ecological connectivity. While a number of possibilities for "component" and/or "complementary indicators" are noted, these only partly address ecological connectivity. This is not solved by a technical expert group as proposed in SBSTTA/24/3, because that group will focus on developing headline indicators for those "partial" indicators listed – and connectivity is not one of those. Further, the technical expert group will only report back to CBD COP16, which would normally take place two years after COP15 – far too late to ensure that an indicator on connectivity will be part of national plans, GEF projects, etc.

4. The present document aims to provide information about indicators for ecological connectivity, and to suggest possible indicators that could be considered in the GBF monitoring framework, with the goal of ensuring that connectivity is meaningfully addressed as part of implementation of the GBF at national and global levels.

II. Importance of Connectivity Indicators

5. Ecological connectivity critically underpins many of the biodiversity outcomes sought by several of the targets in the GBF. Measuring the achievement of those outcomes will require being able to assess the status and trends of connectivity itself. There are a number of scientifically validated indicators that address various aspects of connectivity. For the purposes of the monitoring framework for the GBF, one or more measure of connectivity might be relevant, depending on the final provisions of the goals and targets. Examples of what aspects of connectivity might be measured include:

- Creating or maintaining/restoring effectively conserved sites (though protected and conserved areas) that are ecologically well-connected and support the migration systems of animals;
- Restoring connections where ecosystems and habitats have been fragmented and degraded;
- Removing or modifying barriers to the movement of species/flow of processes;
- Creating ecological corridors/bridges/tunnels/ passes to facilitate movements of animals, spread of plants and flow of processes where they would otherwise risk being obstructed;
- Safeguarding, conserving and/or restoring those relatively intact areas connected to existing fauna and flora distributions that the flora and fauna may need to colonise as ranges shift with climate change or other factors e.g. human encroachment and other forms of habitat loss and degradation.

III. Options for Connectivity Indicators for the GBF

6. For the purposes of the GBF, four different approaches are suggested below, with some main priority examples suggested for each; several aspects could also be combined into a composite indicator:

a. Species migration connectivity

This can be measured through use of existing global species indices, providing a proxy measure for the status of connectivity as it affects these species (and others):

- Conservation status of terrestrial and aquatic migratory species, as a proxy indicator of connectivity.

  Given that migratory species by definition are a connection between places, a change in status of these species can itself represent a change in the quality of the connection, and it can provide a form of proxy indicator for the connectivity-related objectives in the Framework. The Strategic Plan for Migratory Species 2015-2023 adopted exactly this approach, providing for disaggregation of the sub-set “migratory species” for the following species indices, as a way of addressing changes in connectivity:

  The Living Planet Index (LPI) for migratory species. This shows trends in abundance of species of mammal, bird, reptile, amphibian and fish from all around the globe which can also be calculated for selected regions, nations, biomes or taxonomic groups. The LPI data are accessible online through the Living Planet Database (www.livingplanetindex.org). The LPI is a CBD indicator for several of the Aichi Targets, and a proposed Headline indicator (Goal A, A.0.2.) for the post-2020 Global Biodiversity Framework.

The Red List Index for migratory species. This shows trends in survival probability (the inverse of extinction risk) for migratory species (currently birds and mammals; fish being added). The RLI is based on the number of species moving between Red List categories owing to genuine improvement or deterioration in status. As migratory species are better conserved (including improved connectivity) and populations recover, the index goes up. As they deteriorate in status and populations decline and ranges shrink (and are less well connected), the index goes down. This metric is already available (globally and for 21 UN regions; see https://www.iucnredlist.org/search). The RLI is UN SDG indicator 15.5.1, a CBD indicator for several of the Aichi Targets, and a proposed Headline indicator (Goal A, A.0.3) for the post-2020 Global Biodiversity Framework. See Kirby et al 2008, Butchart et al 2004, 2007, 2010[1].

The Wild Bird Index (WBI) for migratory species. This shows the average trend in abundance of groups of bird species, often grouped by habitats. It is particularly suited to tracking trends in the condition of habitats including changes in connectivity. The WBI is a CBD indicator for several of the Aichi Targets, and a proposed complementary indicator (Goal A, A.1.1.42.) for the post-2020 Global Biodiversity Framework.

b. Connectedness of landscapes and seascapes / habitats

This can be measured through the following indicators which shows the adequacy of the coverage and connectivity of protected areas:

- Protected Connected (Protconn) index

  It measures terrestrial protected area connectivity that is defined as the percentage of a country or region covered by protected and connected lands. It assesses how well designed a protected area system is for connectivity. Although it does not address connectivity between non-contiguous areas (for example those that are protected or conserved as part of an ecological network for migratory species). ProtConn also identifies the main priorities for improving or sustaining protected areas connectivity in each country or region. It is also a CBD indicator for Aichi Target 11, and has been proposed as a Component Indicator (Target 2, 2.1.5.) for the post-2020 Global Biodiversity Framework. Saura, S., Bastin, L., Battistella, L., Mandrici, A., Dubois, G. 2017. Protected areas in the world's ecoregions: how well connected are they? Ecological Indicators 76: 144-158. www.sciencedirect.com/science/article/pii/S1470160X1630752X?via%3Dihub Saura, S., Bertzky, B., Bastin, L., Battistella, L., Mandrici, A., Dubois, G. 2018. Protected area connectivity: shortfalls in global targets and country-level priorities. Biological Conservation 219: 53-67. www.sciencedirect.com/science/article/pii/S0006320717312284?via%3Dihub.

- Coverage of Key Biodiversity Areas for migratory species by protected areas and Other

[1] Butchart, S. H. M., Stattersfield, A. J., Baillie, J. E. M., Bennun, L. A., Stuart, S. N., Akçakaya, H. R., Hilton-Taylor, C. and Mace, G. M. (2004) Measuring global trends in the status of biodiversity: Red List Indices for birds. *PLoS. Biol.* 2: 2294–2304.

Butchart, S. H. M., Akçakaya, H. R., Chanson, J., Baillie, J. E. M., Collen, B., Quader, S., Turner, W. R., Amin, R., Stuart, S. N., Hilton-Taylor, C. and Mace, G. M. (2007) Improvements to the Red List Index. *PLoS ONE* 2: e140.

Butchart, S. H. M., Walpole, M., Collen, B., van Strien, A., Scharlemann, J. P. W., Almond, R. E. E., Baillie, J. E. M., Bomhard, B., Brown, C., Bruno, J., Carpenter, K. E., Carr, G. M., Chanson, J., Chenery, A. M., Csirke, J., Davidson, N. C., Dentener, F., Foster, M., Galli, A., Galloway, J. N., Genovesi, P., Gregory, R. D., Hockings, M., Kapos, V., Lamarque, J.-F., Leverington, F., Loh, J., McGeoch, M. A., McRae, L., Minasyan, A., Morcillo, M. H., Oldfield, T. E. E., Pauly, D., Quader, S., Revenga, C., Sauer, J. R., Skolnik, B., Spear, D., Stanwell-Smith, D., Stuart, S. N., Symes, A., Tierney, M., Tyrrell, T. D., Vié, J. C. and Watson, R. (2010) Global biodiversity: indicators of recent declines. *Science* 328: 1164-1168.

Kirby, J. S., Stattersfield, A. J., Butchart, S. H. M., Evans, M. I., Grimmett, R. F. A., Jones, V., O' Sullivan, J., Tucker, G. and Newton, I. (2008) Key conservation issues for migratory land- and waterbird species on the world's major flyways. *Bird Conserv. Int.* 18 (suppl.) 49-73.

effective area-based conservation measures (OECMs) including ICCAs.

KBAs are sites of significance for the global persistence of biodiversity, identified using criteria set out in the Global Standard for the identification of KBAs. They encompass Alliance for Zero Extinction sites and Important Bird and Biodiversity Areas. Over 16,000 have been identified worldwide and are documented in the World Database of KBAs. Several thousand of these have been identified for migratory species that are either threatened, or concentrate in significant aggregations (when breeding, on migration, or in the non-breeding season). As key sites for migratory species are better protected and connected, the index goes up. "PA coverage of KBAs" forms SDG indicator 14.5.1 (marine), 15.1.2 (terrestrial/freshwater) and 15.4.1 (mountain). It is also a CBD indicator for Aichi Target 11, and has been proposed as a Component Indicator (Target 2, 2.1.2.) for the post-2020 Global Biodiversity Framework. These indicators are also available for each country at https://www.ibat-alliance.org/country_profiles. Over the next few years, this indicator can be complemented by a metric for "Proportion of KBAs for migratory species in favourable condition", based on standardised monitoring of KBAs derived from in situ and remote sensing data (building from existing monitoring and datasets for IBAs). See Butchart et al 2012, 2015, Brooks et al 2016.[2]

c. Ecosystem and habitat fragmentation:

This can be measured through a composite meta-indicator reflecting various indices of ecosystem and habitat fragmentation which address the corollary of reduced connectivity such as:

- "Trends in ecosystem and habitat fragmentation":

  Trends in mangrove forest fragmentation has been proposed as a Complementary Indicator (Goal A, A.1.1.10) for the post-2020 Global Biodiversity Framework. See Bryan-Brown, D.N., Connolly, R.M., Richards, D.R. *et al.* Global trends in mangrove forest fragmentation. *Sci Rep* **10,** 7117 (2020). https://doi.org/10.1038/s41598-020-63880-1

  Forest Fragmentation Index has been proposed as a Complementary Indicator (Goal A, A.1.1.25) for the post-2020 Global Biodiversity Framework. Some such indicators have been developed for specific studies at national level (e.g. USA, Paraguay, India), and the European Joint Research Centre has assisted FAO with a forest fragmentation indicator for its recent State of the World's Forests report. It should therefore be possible to build on these methodologies to produce a general indicator (forest fragmentation index) for wider use.

  Relative Magnitude of Fragmentation (RMF) has been proposed as a Complementary Indicator (Goal A, A.1.1.31) for the post-2020 Global Biodiversity Framework. It shows change in ecosystem fragmentation by measures the fragmentation of specific land

[2] Butchart, S. H. M., Scharlemann, J. P. W., Evans, M., Quader, S. Arinaitwe, J., Bennun, L. A., Besançon, C., Boucher, T., Bomhard, B., Brooks, T. M., Burfield, I. J., Burgess, N. D., Clay, R. P., Crosby, M. J., Davidson, N. C. De Silva, N., Devenish, C., Dutson, G. C. L., Díaz Fernández, D. F., Fishpool, L. D. C., Foster, M., Hockings, M., Hoffmann, M., Knox, D., Larsen, F., Lamoreux, J. F., Loucks, C., May, I., Millett, J. Parr, M., Skolnik, B., Upgren, A. & Woodley, S. (2012) Protecting important sites for biodiversity contributes to meeting global conservation targets. *PLoS ONE* 7(3): e32529.

Butchart, S. H. M., Clarke, M., Smith, B., Sykes, R., Scharlemann, J. P. W., Harfoot, M., Buchanan, G., Angulo, A., Balmford, A., Bertzky, B., Brooks, T. M., Carpenter, K. E., Comeros, M., Cornell, J., Ficetola, G. F., Fishpool, L. D. C., Harwell, H., Hilton-Taylor, C., Hoffmann, M., Joolia, A., Joppa, L., Kingston, N., May, I., Milam, A., Polidoro, B., Ralph, G., Richman, N., Rondinini, C., Skolnik, B., Spalding, M., Stuart, S. N., Symes, A., Taylor, J., Visconti, P. Watson, J. E. M. and Burgess, N. D. (2015) Shortfalls and solutions for meeting national and global protected area targets. *Conserv. Lett.* 8: 329–337.

Brooks, T. M., Akçakaya, H. R., Burgess, N. D., Butchart, S. H. M., Hilton-Taylor, C., Hoffmann, M., Juffe-Bignoli, D., Kingston, N., MacSharry, B., Parr, M., Perianin, L., Regan, E., Rodrigues, A. S. L., Rondinini, C., Shennan-Farpon, Y. and Young, B. E. (2016) Analysing biodiversity and conservation knowledge products to support regional environmental assessments. *Sci. Data.* 3: 160007.

cover types using spatially contiguous, global remote-sensing data which are accessible online through Database https://portal.geobon.org/ebv-detail?id=4.

River Fragmentation Index has been proposed as a Complementary Indicator (Goal A, A.1.1.37) for the post-2020 Global Biodiversity Framework.
It measures river fragmentation by barriers on structural connectivity per basin or sub-basin and is conceptually equivalent to the River Connectivity Index as defined in Grill et al (2014). The RFI of an unfragmented river network is 0%, with each subsequent dam or other barrier increasing the value to a maximum of 100%. A single dam in a previously undisturbed network leads to greatest fragmentation if it splits the network into two equal volume fragments, in which case the RFI increases to 50%.

Methods for assessing river fragmentation (and the corollary, "free flowing rivers"), such as a Dendritic Connectivity Index and a River Fragmentation Index, have been used by the World Resources Institute, the European Environment Agency and others – See: *www.grida.no/resources/5633*, *www.nature.com/articles/s41586-019-1111-9?utm_source=newsletter&utm_medium=email&utm_campaign=newsletter_axiosscience&stream=science*, *https://onlinelibrary.wiley.com/doi/full/10.1002/rra.3386* and https://iopscience.iop.org/article/10.1088/1748-9326/10/1/015001

Dendritic Connectivity Index has been proposed as a Complementary Indicator (Goal A, A.1.1.38) for the post-2020 Global Biodiversity Framework.
It shows quantitative measures of connectivity in dendritic ecological networks, regardless of extent or complexity, and might be used to predict fish community response to fragmentation. See Perkin JS, Gido KB. Fragmentation alters stream fish community structure in dendritic ecological networks. Ecol Appl. 2012 Dec;22(8):2176-87. doi: 10.1890/12-0318.1. PMID: 23387118. https://pubmed.ncbi.nlm.nih.gov/23387118/

Connectivity Status Index (Free flowing rivers) has been proposed as a Complementary Indicator (Target 1, 1.1.1.16.) for the post-2020 Global Biodiversity Framework.
It measures of the current state of connectivity at a river reach scale. A baseline Connectivity Status Index was published in 2019. Periodic updates could be undertaken, subject to availability of resources. See Grill, G., Lehner, B., Thieme, M. et al. (2019) Mapping the world's free-flowing rivers, Nature 569, 215–221; https://doi.org/10.1038/s41586-019-1111-9 and *https://wp.geog.mcgill.ca/hydrolab/free-flowing-rivers/*.

d. Policy and management measures supporting ecological connectivity:

This can be measured through the prevalence of laws, policies, strategies and projects supporting the management, restoration and improvement of ecological connectivity using an indicator such as:

- Number of National Biodiversity Strategies and Action Plans (NBSAPs) including provisions for improving ecological connectivity;
- Number of national laws, regulations, and policies promoting ecological connectivity;
- Number of international projects promoting ecological connectivity.