



TOWARDS POST-2020 EXPERTISE ON #22

RETHINKING ECOLOGICAL CONNECTIVITY – A PATHWAY TOWARDS LIVING IN HARMONY WITH NATURE.

Meriem Bouamrane

Chief of Section Ecology and Biodiversity, Division of Ecological and Earth Sciences, UNESCO Man & the Biosphere Programme ¹

Laura Cerasi

Fundraising and Partnership Officer, Secretariat of the Convention on the Conservation of Migratory Species of Wild Animals ² (CMS)

Despite the recognized importance of ecological connectivity, so far, its operationalization remains poorly understood or limited to structural aspects. This paper highlights the need to effectively integrate the various aspects of connectivity in the new global biodiversity framework to reconcile human activities with nature.

With COVID-19 shining a spotlight on the linkages between infectious diseases and the destruction of nature, the importance of biodiversity for a healthy planet and human well-being has never been more apparent. Yet, biodiversity loss continues at unprecedented levels ³. The approach to implementing some targets of the Strategic Plan for Biodiversity for 2011–2020 has brought about mixed results. Target 11 called for the conservation of at least 17% of terrestrial and inland water areas and 10% of coastal and marine areas by 2020 ⁴. Yet implementation focused on achieving the quantitative components of the target, with little progress made with respect to qualitative aspects such as connectivity and ecological representativeness. This poses several concerns:

- + This suggests a greater emphasis on the area covered, rather than on the designated areas' ecological significance, diversity, and functioning.
- + Applying a place-based rather than an ecosystem approach means that some key areas for ecological functioning are not included.
- + Focusing on conservation of low-use areas may omit areas of mixed-use that are important for species, particularly migratory ones.
- + This overlooks sustainable use of biodiversity in remaining areas, in line with the 2050 vision.

“CONNECTIVITY IS ESSENTIAL FOR NATURE, AND THUS IT MUST BE EFFECTIVELY ADDRESSED IN THE POST-2020 GLOBAL BIODIVERSITY FRAMEWORK.”

Amy Fraenkel, Executive Secretary of the Convention on Migratory Species of Wild Animals

1. WHAT IS ECOLOGICAL CONNECTIVITY?

A definition for ecological connectivity was developed at a meeting of experts held in 2019. It was later endorsed by the Thirteenth Conference of the Parties of the Convention on Migratory Species (COP13 CMS)⁵: “Ecological Connectivity is the unimpeded movement of species and the flow of natural processes that sustain life on Earth”. Ecological connectivity can be understood through various aspects:

- + Connections facilitated by ecological networks and ecological corridors that make pollination, dispersal, genetic mixing, hydrological cycling and other vital environmental processes possible;
- + The availability of important sites to support natural movements of animal species;
- + Conditions needed to support the flow of natural processes in terrestrial and aquatic environments;
- + As a central principle for ensuring ecological interlinkages and ecosystem services in line with social and cultural connections with nature, traditional knowledge systems and human development needs;
- + Connections within and across national borders;
- + Connections that involve people and require cooperative approaches⁶.

Connectivity for water flows, nutrients and many plant and animal species is easily conceived in terms of adjacent habitat areas and management tools such as “wildlife corridors” for promoting necessary linkages. However, ecological connectivity frequently depends on links between places that are not necessarily physically contiguous. For instance, migratory animals, including various avian and insect species, may depend on multiple staging areas and a sequentially timed availability of resources at different points along a migration pathway.

A disruption or an obstacle affecting part of that pathway may jeopardize the entire migration system. In such cases, the key locations may be far apart and may encompass multiple countries.

2. CONNECTIVITY’S RELEVANCE TO GLOBAL AND REGIONAL ENVIRONMENTAL AGREEMENTS

Connectivity is a crucial concept for the Convention on CMS⁷ and refers to:

- + Systems that maintain the cyclical and predictable movements of animals through and between areas which may or may not be contiguous;
- + An expression of conservation objectives framed as whole migration systems and the migration processes’ functionality itself, not just the status of populations or habitats.

CMS and its family of agreements provide the primary intergovernmental framework for cooperative efforts on connectivity issues related to migratory species conservation. The Strategic Plan for Migratory Species 2015-2023 called for taking a “migration systems approach” in conservation strategies, embracing the multi-dimensional connectedness of migratory species. This attribute means that migratory species are ecological keystone species and indicators of the linkages between ecosystems and ecological change while exposed to heightened survival risks. A Resolution adopted by COP12 CMS in 2017, later reiterated in 2020, emphasizes the need for connectivity as a critical element in the definition of appropriate conservation management units, including at the landscape and seascape scales, and for actions addressing the connections between places. It encourages intensified efforts to address threats including barriers to migration, additional anthropogenic mortality, fragmented resources and disrupted processes, genetic isolation, population non-viability, altered behaviour patterns, range shifts caused by climate change or depletion of food or water resources, inconsistencies in management across and beyond national jurisdictions, and other factors.

ECOLOGICAL CONNECTIVITY IN MULTILATERAL AGREEMENTS

Ecological connectivity plays an important role in numerous international multilateral agreements. For the Convention to Combat Desertification (UNCCD), it is relevant to:

- + Actions designed to achieve targets for Land Degradation Neutrality (maintaining or enhancing the amount and quality of land resources necessary to support ecosystem functions and services and improve food security).

For the Convention on Biological Diversity (CBD), it is relevant for the achievement of its three objectives; including:

- + Conserving species by allowing movements and adaptation to environmental change, and addressing threats created by obstacles to movement;
- + Safeguarding ecosystem services and functions that make meaningful contributions to human survival;
- + Ensuring diversity of genetic resources.

For the United Nations Educational, Scientific and Cultural Organization (UNESCO), it includes:

- + Ecological or habitat connectivity as part of the basis for designating serial sites of outstanding universal value under the World Heritage Convention⁸.
- + Connectivity between different components of the landscape in Biosphere Reserves⁹.



Ho Sy Minh. Water wheel – an irrigation system, Chau Kim commune, Que Phong district, Vietnam

¹ In collaboration with Maximilien Guéze, Sara Guadilla-Sáez (UNESCO MAB Programme) and Susanna Kari, Akane Nakamura (UNESCO World Heritage Centre).

² In collaboration with Amy Fraenkel, CMS Executive Secretary and Dave Pritchard

³ IPBES, 2019. Summary for policymakers of the global assessment report on biodiversity and ecosystem services of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services. IPBES Secretariat, Bonn, Germany.

⁴ “Through ... ecologically representative and well-connected systems of protected areas and other effective area-based conservation measures, and integrated into the broader landscape and seascape.” Convention on Biological Diversity, 2011. Strategic Plan for Biodiversity 2011-2020, Including Aichi Biodiversity Targets. Decision X/2: <https://cutt.ly/dx2ADz1>

⁵ Convention on Migratory Species, 2020b. Improving ways of addressing connectivity in the conservation of migratory species. COP Resolution 12.26 (Rev COP13): <https://cutt.ly/4x2AUOS>

⁶ Convention on Migratory Species, 2020. Ecological Connectivity in the Post-2020 GBF. COP document UNEP/CMS/COP13/Doc.17/Add.2/Annex 1: <https://cutt.ly/Hx2Amw1>



Jaguar (*Panthera onca*) in the water, South America.

At the regional level, references to connectivity can be found in the Jaguar 2030 Conservation Roadmap for the Americas, the European Union regulations (Habitats Directive) and policy implementation schemes (Natura 2000) and strategies (Pan-European biological and landscape diversity strategy-PEBLDS). Furthermore, the European Union's new biodiversity strategy for 2030 not only sets a target of 30% of land and 30% of sea to be protected, but it also stresses the need for a coherent and resilient Trans-European Nature Network in which ecological corridors will be essential¹⁰.

3. A CONNECTIVITY CASE STUDY: UNESCO'S MAN AND THE BIOSPHERE PROGRAMME (MAB)

Without connectivity, area-based conservation systems are hampered in their ability to meet their long-term biodiversity conservation goals. An evaluation of protected areas networks' connectivity in global terrestrial ecoregions carried out in June 2016 identified key priorities to improve or sustain area-based conservation connectivity. They include coordinated management of neighbouring protected areas within countries and protected areas' transboundary coordination and planning¹¹. With 714 biosphere reserves located in 129 countries as of June 2020, including 21 transboundary sites, UNESCO's World Network of Biosphere Reserves contributes to large-scale connectivity. Biosphere reserves aim to combine effective conservation and sustainable use of multi-functional landscapes and seascapes. This encompasses representative networks of interconnected protected areas, other area-based conservation measures (OECMs) such as indigenous territories, and ecosystems, including urban ones, to cover key biodiversity areas. Environmental management in biosphere reserves is based on good practices, creating and maintaining complex landscape heterogeneity that improves connectivity¹².

People are at the core of activities in biosphere reserves, which entail building capacity and enhancing cooperation among all stakeholders. By including indigenous peoples, local communities and local and subnational governments (cities, metropolitan areas, etc.), we allow for a better representation of different world views and multiple values and interests. Tools used for that purpose include landscape-scale and seascape-scale participatory mapping. For instance, indigenous peoples and local communities have often managed landscapes and seascapes now comprised in biosphere reserves in ways adjusted to local conditions over generations.

These practices often remain compatible with or even actively support biodiversity conservation by "accompanying" natural processes with anthropogenic assets¹³. Thus, by providing frames for people working together to reach conservation and development goals to connect protected areas and OECMs within their limits¹⁴, biosphere reserves show a sustainable model to maintain connectivity with other areas deprived of protection or under different tenure regimes.

This conception of connectivity across people and areas is a valuable tool to help identify the natural and managed areas that warrant conservation management, and those slated for human settlements and infrastructure promoting the coexistence between humans and nature.

PILOT SITES FOR MIGRATORY BIRDS' MONITORING AND CONSERVATION IN AFRICA

Every year Afro-Palaearctic migratory birds travel thousands of kilometres between African wintering and European breeding grounds. Their migration involves the crossing of large ecological barriers such as the Sahara Desert or the Mediterranean Sea. The availability and distribution of suitable wintering and staging sites along the flyway are crucial for their survival.

Direct and indirect anthropogenic threats put these key sites' spatial, ecological and functional connectivity at risk. An Action Plan was adopted by CMS Parties in 2014, for the conservation of Migratory Landbirds in the African-Eurasian Region through a flyway approach, taking into consideration the birds' requirements across the distribution range. From 2016 to 2019, a project (AfrBiRds) supported the integration of this plan and African Biosphere Reserves as pilot sites for monitoring and conservation of migratory birds.

The asset is to showcase biosphere reserves as examples of areas where human development and environmental practices are compatible with bird migration habitat requirements. Based on a rigorous process, out of 79 biosphere reserves in 29 African countries, two sites were selected for piloting bird monitoring: Comoé (Cote d'Ivoire) and Omo (Nigeria), with a view of replicating similar systems and expanding them to other African biosphere reserves and the broader landscape.

THE WORLD HERITAGE SITES – A BUTTRESS FOR CONNECTIVITY

UNESCO's World Heritage Convention complements the MAB Programme to enhance connectivity between nature and people by protecting sites considered to be of outstanding universal value to humanity. In June 2020, the 252 natural and mixed sites inscribed on the World Heritage List protected nearly 360 million hectares of land and sea in all the world's major ecosystems.

⁷ <https://cutt.ly/Gx2KfsO>

⁸ Operational Guidelines for the Implementation of the World Heritage Convention. <https://cutt.ly/Zx2A3SZ>

⁹ Technical Guidelines for Biosphere Reserves. <https://cutt.ly/ex2AX3n>

¹⁰ Ward et al., 2020. Just ten percent of the global protected area network is connected. *Nature Communications* 11:4563. (DOI: 10.1038/s41467-020-18457-x).

¹¹ Saura et al., 2018. Protected area connectivity: Shortfalls in global targets and country-level priorities. *Biological Conservation* 219, 53–67. <https://cutt.ly/dx2Prte>

¹² Kremen, C., 2015. Reframing the land-sparing/land-sharing debate for biodiversity conservation. *Annals of the New York Academy of Sciences* 1355, 52–76. <https://cutt.ly/Dx2Q24p>

¹³ IPBES, 2019. Summary for policymakers of the global assessment report on biodiversity and ecosystem services of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services. IPBES Secretariat, Bonn, Germany.

¹⁴ Guevara, S., Laborde, J., 2008. The Landscape Approach: Designing New Reserves for Protection of Biological and Cultural Diversity in Latin America. *Environmental Ethics* 30(3), 251–262. <https://cutt.ly/Hx2OH5K>



Itaipu biosphere reserve, Paraguay. © James Spalding Hellmers.

These sites are considered to transcend national boundaries, and their designation takes into account their connectivity to other sites, e.g., for flyway. Some of these sites, which may or may not be physically connected (serial properties), reflect cultural, social or functional links of its components over time that provide landscape, ecological, evolutionary or habitat connectivity.

An example of this is found in the Kenya Lake System in the Great Rift Valley, a natural property of outstanding beauty, which comprises three inter-linked relatively shallow lakes. It is the single most important foraging site for the lesser flamingo anywhere. It is also major nesting and breeding ground for great white pelicans.

Transboundary cooperation is imperative as the site's natural value is partly dependent on the protection of other lake and wetland areas that support migratory species in neighbouring countries. In this regard, there is potential for other sites, including Lake Natron in Tanzania, to be considered as part of a future transnational serial World Heritage property.

It is also essential to include dedicated indicators for connectivity in the framework. The proposed monitoring framework does not adequately address indicators on ecological connectivity. Indexes of rivers and forests' fragmentation and the protected area connectedness indicators – namely “PARC-Connectedness” and “ProtConn” – all address aspects of habitat connectivity. However, they are single-dimensional as they only address “ecological connectivity” in its previous limited acceptance. The critical need to measure connectivity involving non-contiguous areas, as well as the functionality of connectivity by, for instance, measuring progress in removing obstacles to migration remains. Various efforts are currently underway to articulate possible indicators for inclusion in the GBF. Further steps are also needed to ensure that adequate attention is paid in the future to the operationalization of connectivity on the ground through adequate national legislation, the provision of guidance and the promotion of international, regional, bilateral and transboundary cooperation.

“UMBILICAL CONNECTIVITY” IN THE 2030 AGENDA FOR SUSTAINABLE DEVELOPMENT

The destruction of biodiversity relates to “the crisis of our relationships with living beings¹⁶”, since many human beings dominate and destroy other living beings feeling superior to these and forgetting our interconnectedness with the rest of the living. At the same time the basic ecological principles have long emphasized this interdependence of all living things among themselves and with their environment. It is now time to acknowledge that human beings are not disconnected from these relationships, and to build connectivity across areas, people, values, and worldviews based on ecological solidarity¹⁷. Humans must look beyond domination and be true companions of the biosphere. The “umbilical connectivity” between humans and nature is reflected in the 2030 Agenda for Sustainable Development, with calls to bring nature at the centre of our existence, advocating a “whole-of-society” approach in the post-2020 global biodiversity framework¹⁸ to reach the 2050 Vision of “Living in Harmony with Nature”. Since associating the conservation and development is crucial to allow and improve spatial connectivity, countries will need to shift focus to implement and monitor this integrative approach of the post-2020 framework. The World Network of Biosphere Reserves may play a pivotal role by providing powerful and representative examples of reconciliation of biodiversity conservation with its sustainable use that could be reproduced everywhere.

4. ADDRESSING ECOLOGICAL CONNECTIVITY IN THE POST-2020 GLOBAL BIODIVERSITY FRAMEWORK

Given its importance, connectivity should be effectively included in the post-2020 global biodiversity framework (GBF). While connectivity appears in the updated draft framework in Goals A and Targets 1 and 2¹⁵, the language in Target 1 is currently narrowly focused only on restoration and needs to be improved to ensure (i) that ecological connectivity is established and/or improved among other areas and (ii) that spatial planning takes place at different levels and is optimized for biodiversity conservation. This would also translate into a clear commitment to international, regional, bilateral and transboundary cooperation for the framework's implementation to improve ecological connectivity.

¹⁵ CBD/POST2020/PREP/2/1 <https://cutt.ly/kx2SfiO>

¹⁶ Morizot, B. 2020. Manières d'être vivant. Actes Sud.

¹⁷ Mathevet, R. 2016. La solidarité écologique. Actes Sud.

¹⁸ Maruma Mrema, E. 2021 <https://cutt.ly/mx2StE6>

Cover photo Middle Creek Wildlife Management Area, Stevens, United States

4POST2020BD.NET
@4POST2020BD

POST2020 BIODIVERSITY FRAMEWORK – EU SUPPORT IS FUNDED BY THE EUROPEAN UNION AND IMPLEMENTED BY EXPERTISE FRANCE. IT AIMS AT FACILITATING A COMPREHENSIVE AND PARTICIPATORY PROCESS LEADING TO THE ADOPTION OF AN AMBITIOUS POST-2020 GLOBAL BIODIVERSITY FRAMEWORK THAT FOSTERS COMMITMENT AND IMPLEMENTATION.

TOGETHER
CBD COP 15 ____ KUNMING 2021
TOWARDS
A GLOBAL
DEAL FOR
NATURE & PEOPLE

IN PARTNERSHIP WITH



THIS PROJECT IS FUNDED BY THE EUROPEAN UNION



IMPLEMENTED BY EXPERTISE FRANCE