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**UPDATE ON RELEVANT GEO BON ACTIVITIES FOR THE NINETEENTH MEETING OF
THE SUBSIDIARY BODY ON SCIENTIFIC, TECHNICAL AND TECHNOLOGICAL ADVICE**

Note by the Executive Secretary

INTRODUCTION

1. The Executive Secretary is circulating herewith, for the information of participants in the nineteenth meeting of the Subsidiary Body on Scientific, Technical and Technological Advice, a note received from the Group on Earth Observations Biodiversity Observation Network (GEO BON) on the above-mentioned subject.
2. The information is provided in the form and language in which it was received by the Secretariat.

* UNEP/CBD/SBSTTA/19/1.

I. Introduction

1. In decision XI/3 (paragraph 13) the Conference of the Parties of the Convention on Biological Diversity invited the Group on Earth Observation Biodiversity Observation Network (GEO-BON) to continue its work on the identification of Essential Biodiversity Variables and the development of associated data sets, as presented in the document on adequacy of biodiversity observation systems to support the CBD 2020 Targets (UNEP/CBD/SBSTTA/15/INF/8).
2. An expert workshop on enhancing biodiversity data and observing systems in support of the implementation of the Strategic Plan for Biodiversity 2011-2020 was held as a pre-event to SBSTTA17. Participants in the workshop suggested that the development of “BON in a Box”, a toolkit to support the development of national biodiversity observation networks around Essential Biodiversity Variables, should be a top priority for GEO BON. The Essential Biodiversity Variables and “BON in a Box” were among the cross-cutting issues identified by Parties in SBSTTA Recommendation 17/1) (see also UNEP/CBD/SBSTTA/17/INF/14).
3. In decision XII/1 the Conference of the Parties of the Convention on Biological Diversity invited parties, indigenous and local communities and other relevant stakeholders to collaborate with the Group on Earth Observations Biodiversity Observation Network and other relevant organizations that contribute to building observing systems and to biodiversity monitoring, to address the priority needs identified by Parties related to biodiversity observations and monitoring.
4. This information note provides a brief summary of the activities that have been developed by GEO BON to address the previous decisions of the COP and recommendations of SBSTTA. An extended description of these activities can be found in the GEO BON Bi-Annual Progress Report 2014-15, available at www.geobon.org.

II. The Network

5. GEO BON is a global network dedicated to monitoring the planet’s biodiversity. GEO BON develops ways to improve the acquisition, coordination and delivery of biodiversity and ecosystem service observations to users interested in biodiversity change. GEO BON users include governments developing national and regional biodiversity observation systems, international and regional conventions, and the scientific and resource manager community at large. Working with more 400 experts worldwide, GEO BON’s strength is founded on partnerships, collaboration and policy initiatives. Over 25 partner organizations have been leading the development of GEO BON initiatives at the national, regional and global scales.
6. The intergovernmental Group on Earth Observations will meet in Mexico later this year to approve a new 10 year Strategic Plan (GEO-XI-Document 6). GEO BON is one of the key initiatives to continue to be developed under this plan.
7. In mid-2016 GEO BON will convene an Open Science Conference to initiate the process of development of a 10 year implementation plan (2016-2025).
8. GEO BON is developing three core activities in order to address user needs, including those of the Convention on Biological Diversity and of the Strategic Plan for Biodiversity 2011-2020. These inter-related activities are: (1) a framework for collecting, harmonizing and reporting observations based on Essential Biodiversity Variables, and associated indicators for the Aichi targets; (2) a web toolkit to support the development of biodiversity observation networks, Bon-in-a-Box; (3) the development of national, regional and thematic Biodiversity Observation Networks. These activities are supported by nine working groups of experts working on topics ranging from terrestrial species monitoring, to the development of data integration and inter-operability tools. The three activities are addressed in more detail in the subsequent three sections of this Note.

III. Essential Biodiversity Variables, Aichi indicators, and ecosystem services

9. GEO BON seeks to answer the question of how biodiversity is changing and of whether the status of biodiversity is improving or worsening. That is, GEO BON aims to describe the magnitude, velocity

and direction of the changes to biodiversity, across multiple spatial scales. These three components constitute and define the framework concept of the Essential Biodiversity Variables (EBV). This guiding framework can be applied to develop and implement cost-effective biodiversity observation systems at multiple spatial scales, which can be easily integrated into a global biodiversity monitoring system. The EBV framework support countries and organizations to fulfil their national and international reporting obligations with regards to biodiversity monitoring.

10. The EBV concept has been cited over 150 times in the scientific literature. It has been recognized by major global initiatives including the CBD (UNEP/CBD/COP/XI/3), Future Earth, and IPBES. Some countries have initiated processes to discuss the use of the EBV framework in their national biodiversity observation systems (eg. France, Colombia).

11. After an initial stage of development of the overall EBV framework concept, GEO BON is moving to the operationalization of individual EBV. This includes an open process for the submission of new EBV by the community to GEO BON, and the assignment of organizations and partnerships to the development of each individual EBV¹. The components of an EBV include the set of measurement methods, the data collection systems and initiatives, and the modelling and publication of datasets under open data standards. From the current set of 22 EBV candidates, a sub-group of individual EBVs should be in active development by 2016, and most should be concluded by 2020. GEO BON is also developing and seeking support for an online dashboard on the status of EBV development. Such a dashboard will allow for a wide and coordinated user engagement in EBV development.

12. GEO BON, with the support of NASA and iDiv (German Centre for Integrative Biodiversity Research), has funded four projects dedicated to developing EBV in 2014 and 2015: Black Listing Invasive Species for Monitoring and Reporting (lead by Monash University), Developing guidelines for standardized global butterfly monitoring (lead by UNEP-WCMC and Dutch Butterfly Conservation), Finalizing, visualizing and communicating global remote-sensing supported species EBVs and change indicators (lead by Yale University), Remote sensing of Essential Biodiversity Variables (lead by Twente University). The European Commission funded four projects (GLOBIS-B, EU-BON, ECOPOTENTIAL and SWOS) to help to develop EBVs in Europe and GEO BON hopes other regions will follow.

13. A list of EBVs that can be monitored from remote sensing has been developed and include: Species occurrence, plant traits, ecosystem distribution, fragmentation and heterogeneity, land cover, vegetation height, fire occurrence, vegetation phenology, primary productivity and leaf area index, and inundation. These variables include continuous variables such as leaf area as well as threshold-based thematic measures such as land cover².

14. GEO BON is developing a new generation of biodiversity indicators, based on integrating information from a small set of EBV. They are based on global datasets for four EBV: Species Distributions, Taxonomic Diversity, Ecosystem Extent, and Primary Productivity. These EBV are spatially explicit allowing for disaggregation of the indicators at sub-national to regional scales. The calculations of the EBVs and associated indicators are based on open methodologies and data sources. This illustrates the power of EBVs as an intermediate layer between direct observations and indicators.

15. These indicators, are being developed in collaboration with partner organizations and initiatives including, Map of Life, CSIRO, Predicts, iDiv, NASA, Yale University, Natural History Museum (UK), among others. They were presented to the meeting of the Ad hoc Technical Expert Group on Indicators for the Strategic Plan for Biodiversity 2011-2020 held in Geneva (UNEP/CBD/ID/AHTEG/2015/1/INF/13).

¹ More information about this process can be found at:

geobon.org/Downloads/reports/2015/Essential_Biodiversity_Variable_Strategy_v1.pdf

² Skidmore, A.K., Pettorelli, N., Coops, N.C., Geller, G.N., Hansen, M., Lucas, R., Múcher, C.A., O'Connor, B., Paganini, M., Pereira, H.M., Schaepman, M.E., Turner, W., Wang, T. & Wegmann, M. (2015) Agree on biodiversity metrics to track from space. *Nature* 523: 403–405.

16. These EBV based indicators cover multiple Aichi Targets: the Species Habitat Indices (Targets 5 and 12), the Biodiversity Habitat Index (Target 5), the Species Protection Index (Target 11), the Protected Area Representativeness and Connectedness Indices (Target 11), the Global Ecosystem Restoration Index (Target 15), and the Species Status Information Index (Target 19).

17. The GEO BON has also proposed a set of metrics to monitor ecosystem services globally at different stages of the supply chain³. These indicators were used to report the supply, delivery and monetary value of ecosystem services at national scales from 1996 to 2005. They include eight provisioning services (water supply for hydropower, non-fisheries marine products, crop, livestock, game, meat, fisheries, mariculture and timber provisioning) and one regulating service (carbon sequestration). Important data gaps and reason for those gaps have also been identified.

IV. BON in a Box (Biodiversity Observation Network in a Box)

18. BON in a Box is a capacity building and technology transfer mechanism, functioning as an online, customizable and continually updated toolkit for biodiversity observations. Its purpose is to make it easier for countries or regions to develop or enhance a biodiversity observation system. BON in a Box allows users to access the latest biodiversity observation design tools, monitoring protocols, data standards and management systems and analysis and reporting tools to facilitate more integrated and interoperable biodiversity observations. In addition, it creates a link between biodiversity observation tool developers and users to create a means for continually improving and advancing existing tools as well as for the identification of new tools that are needed.

19. At the GEO BON pre-SBSTTA17 workshop, BON in a Box was ranked as the first priority for GEO BON by the participants. Therefore BON in a Box is being developed to support nations in designing their own national biodiversity observation networks (see: SBSTTA Recommendation 17/1). The first prototype of BON in a Box will be pre-launched during CBD SBSTTA19 with a full launch at Group on Earth Observations Plenary in Mexico City from 9th to 13th November 2015. A fully functional version will be ready in October 2016.

20. The first version of BON in a Box has been piloted for the Latin American region and has been led by Colombia's Alexander von Humboldt Institute. The development involved a number of Latin American regional organizations and governments from eight countries.

21. Beginning in 2016, GEO BON will begin working in conjunction with UNEP WCMC (who is leading the future GEF CONNECT project) and three sub-Saharan countries (Ghana, Uganda and Mozambique) to develop an Africa version of the BON in a Box toolkit. The toolkit will be tailored with these countries needs in mind but will be accessible throughout all of Africa to facilitate enhanced biodiversity observations. BON in a Box: Africa will be fully operational in 2018.

22. Discussions are also currently underway with GEO BON's marine biodiversity partner organizations and the Intergovernmental Oceanographic Commission's Ocean Biogeographic Information System to develop a marine version of the biodiversity observation toolkit – serving as a delivery mechanism for more standardized and cost-efficient marine biodiversity observation approaches globally.

V. Developing National, Regional, and Thematic BONs

23. The GEO BON network is structured in working groups as well as in national, regional and thematic Biodiversity Observation Networks (BONs). GEO BON actively facilitates the development of BONs by engaging stakeholders (particularly national governments, institutes, scientists and practitioner) to build capacity and set up BONs (UNEP/CBD/COP/XII/1). National BONs can act as national units and networks bringing biodiversity change data and information together.

³ Karp, D.S., Tallis, H., Sachse, R., Halpern, B., Thonicke, K., Cramer, W., Mooney, H., Polasky, S., Tietjen, B., Waha, K., Walz, A. & Wolny, S. (2015) National indicators for observing ecosystem service change. *Global Environmental Change* 35: 12-21.

24. China, Japan, Korea and Nepal have national BONs already functioning or in development. The Asia Pacific BON (AP-BON), the Circumpolar Biodiversity Monitoring Program (Arctic BON) and the Marine Biodiversity Observation Network (MBON) are regional BONs associated with GEO BON. Starting in late 2015, GEO BON will be working directly with Colombia's Alexander von Humboldt Institute to design a Colombian national BON, in part, through the application of the BON in a Box: Latin American toolkit.

25. GEO BON is ready to engage and build capacity with more countries, especially in biodiversity rich areas of the world. Therefore a call has been published for national and regional BON proposals⁴. This call includes the criteria which should be followed by a BON to become associated with GEO BON. These include criteria on data continuity and interoperability, data availability, data discovery, products, interaction, branding, and authorizing environment. National and regional BONs are also encouraged to harmonize information that feeds directly into the development of EBV.

⁴ The call document is available at geobon.org/Downloads/PDF/Draft%20Criteria%20for%20BON's.pdf