

One Earth review of the information document on indicators for the draft goals and targets of the post-2020 GBF

Submission of One Earth in response to Notifications 2020-045 and 2020-053, “Peer review of draft documents for the twenty-fourth meeting of the Subsidiary Body on Scientific, Technical and Technological Advice (SBSTTA 24).”

General Comments

Page	Comment
3-4	Section 2.2. We concur with the list of criteria proposed and suggest adding one clarification, given the rapid pace of technological advances, geospatial informatics and novel data products: “A wide variety of indicators should be embraced, allowing for multiple perspectives, even if some may seem potentially redundant to legacy indicators.” Such a statement would signal to governments and scientists, especially from the Global South, to invest in and contribute towards the production of high-quality data products to inform the Convention. A condition of mutual exclusivity would send the wrong signal -- that institutions in the Global North should continue to dominate the discourse, measurement, and verification of progress towards the goals. Meta-analyses of multiple overlapping models, generally peer-reviewed, have played a key role in advancing the science supporting the Framework Convention on Climate Change. The Convention on Biological Diversity should adopt a similar position. Rather than excluding innovation and scientific progress, such an approach could lead to better insights and benchmarks on the path towards achieving the common goals of the CBD.
10	Section 4.4. Gaps in current indicators: geospatial biodiversity composite. The list of indicators on area based targets is quite extensive, but there seems to be a lack of cohesion. This makes it difficult for officials at various levels of government, broader stakeholders, and the general public alike, to track progress under the Convention. We propose a supplemental indicator that compiles many of the commonly held indicators into a global index, allowing people to see for the first time the relative progress of all the signatory countries of the CBD. One Earth supported an effort to develop such an indicator, which is peer-reviewed and scheduled to be published in <i>Science Advances</i> this September, entitled “A Global Safety Net to Reverse Biodiversity Loss and Stabilize the Earth’s Climate” (Dinerstein et al. 2020). This analysis (GSN1) overlays widely held geospatial data sets to identify unprotected land areas of “particular importance for biodiversity” organized in three main land classes -- (1) species rarity sites (consisting of 6 layers: AZE single populations of species, Hill et al. range rarity in vertebrates, IUCN ranges of threatened vertebrates, Key Biodiversity Areas, Pimm et al. vertebrate species distributions, and Enquist et al. species rarity in plants); (2) high biodiversity areas (consisting of 2 layers: biodiversity hotspots, and Hannah et al. high beta-diversity ecoregions); and (3) large mammal landscapes (consisting of Morrison et al. large mammal assemblages). Many of the layers overlap, so additional areas not included in preceding layers are compiled at 1 km resolution and intersected with the World Database on Protected Areas (WDPA) to determine the extent of the three composite layers not currently protected. Including PAs, the baseline adds up to <i>29.9% of the global land surface</i> . This index will be updated on an annual basis, in partnership with Google Earth Engine, with higher resolution data products and updates from the WDPA.
10	Section 4.4. Gaps in current indicators: potential habitat. In 2020 the world has reached 1.1°C in global average temperature rise, and ecosystems are already under extreme pressure. The post-2020 GBF needs to recognize this reality and expand the horizon of “potentially suitable habitat” that can be protected in anticipation of further warming, as both plant and animal species migrate to find climatological conditions suitable for their specific metabolic processes (i.e. macrorefugia). For this reason, GSN1 includes an analysis of two additional land classes -- (4) intact wilderness (consisting of 2 layers: ‘Last of the Wild’ by ecoregion, and Venter et al. remaining wilderness areas); and (5) additional climate stabilization (consisting of 2 layers: areas of natural or seminatural land with > 250 tC/ha median total carbon density, and areas with 50-249 tC/ha median total carbon density). These layers are compiled at 1 km resolution and intersected with the World Database on Protected Areas (WDPA) to determine the extent of the two composite layers not currently protected, which adds up to <i>20.5% of the global land surface</i> . This index will be updated on an annual basis, in partnership with Google Earth Engine, with higher resolution data from other institutional partners.
10	Section 4.5. Indicators under development: Beta-diversity index. Climate resilience for ecosystems, especially forest ecosystems, improves with increased complexity, or beta-diversity. One Earth has funded work at ASU led by Greg Asner to detect beta-diversity remotely, directly supporting land use planning at the national level. Some work has been funded to scope out a global platform on beta-diversity for tropical and subtropical forests, which would go far beyond the current products utilized in forest monitoring at a global scale. The technology uses a remote sensing technique called spectral lidar to map individual tree colonies, as well as understory growth, by species at 3m resolution. Current forest monitoring leans on 30m resolution imagery, making it difficult to determine the difference between a monoculture forest and a forest with a diverse array of species. As satellite imagery improves and AI routines become more sophisticated, this product would be of great benefit to the signatories of the CBD in the coming 5-10 years.
11	Section 4.6. Support for the gaps. As referenced above the post-2020 GBF must take into account the impacts of climate change upon ecosystems. We identify two major gaps that need cooperation and discussion -- (a) emergence of macrorefugia : signs that one or more species is migrating to new habitat, which should therefore receive a special status in long term conservation and spatial planning efforts; and (b) the identification of microrefugia : small pockets of land missed by global scale analyses (including the GSN1), which are vitally important to the preservation of species as habitat shrinks due to human modification and/or climate change. We were surprised that neither of these concepts appear in any of the SBSTTA literature, as they are so crucial to the

success of the CBD goals. Both fields of study are growing, taking advantage of new technologies. One Earth supports a groundbreaking effort housed at the Cascadia Partners Forum that incorporates climate modeling to predict the emergence of macrorefugia, which will be so crucial for the survival of many species in the coming decades. And new data products, including an upcoming 10m resolution global-scale land cover map, will help identify important microrefugia. One Earth suggests the creation of a microrefugia index, to put special attention on these important pockets of habitat, and encourage their inclusion in national or state-level conservation, restoration, and connectivity plans.

In reference to the above comments, One Earth proposes a number of additional criteria for goals and targets. These additions are presented in tables 1 and 2 below.

Table 1. Indicators for monitoring elements of the draft goals

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Components of the draft Goals (copy/paste text from CBD/SBSTTA-24/post-2020-monitoring.en.pdf)	Goal Monitoring Elements (copy/paste text from CBD/SBSTTA-24/post-2020-monitoring.en.pdf)	Indicator name	Responsible Institution for the indicator	Available today (X) or under active development (Y)	Date of availability for indicator in development (Year)	Year of last update (e.g. 2019)	Time series and frequency of updates (e.g. 1985-2019, annually)	Methodology available for national use (Y/N)	Global indicator can be disaggregated for national use (Y/N)	National data aggregated to form global indicator (Y/N)	Used in GBO-4 (Y/N)	SDG indicator (Y/N)	Indicator used to measure other MEAs or processes (e.g. Ramsar Convention, IPBES, CMS)	Comments
GA1. Increased extent of natural ecosystems (terrestrial, freshwater and marine ecosystems)	Trends in area of forest ecosystems	Forest area as a percentage of total land area	FAO	X		2020	1990-2015	Y	Y	N	N	Y (SDG 15.1.1)		This indicator needs refinement as forest area is often conflated with plantations, and in areas where afforestation has occurred (tree planting within non-forest biomes), this could lead to a “false positive” indicator of improvement, when little biodiversity value has been added.
GA1. Increased extent of natural ecosystems (terrestrial, freshwater and marine ecosystems)	Trends in area of coral reefs	NEW: Coral reef extend and condition	ASU	Y	2019	2020	Annually	Y	Y	N	N	Y (SDG 14.2.1)		Remote sensing can now play a major role in tracking the health of coral reefs. The Global Coral Atlas uses spectral lidar to map the diversity and health of corals.
GA1. Increased extent of natural ecosystems (terrestrial, freshwater and marine ecosystems)	Trends in area of forest ecosystems, dry & sub-humid lands, grasslands, and other terrestrial ecosystems	NEW: Human Modification	TNC	X	Done	2019	Periodically from 2020	Y	Y	N	N		N=	The Human modification index is an important advance in understanding the conversion of natural lands to human use based on 13 stressors. https://geospatial.tnc.org/datasets/5555c101d66d40668e07123dac1f82a9

GA4. Increase the number and health of species	Trends in species abundance	IN DEVELOPMENT: Bioacoustics	Princeton U/TNC	Y													This isn't yet a global indicator but with support could become one of the best ways to detect the abundance of species in converted forests. See https://science.sciencemag.org/content/363/6422/28
GA6. Protection of critical ecosystems	Trends in areas of particular importance for biodiversity conserved	NEW: GSN1 Protected Area coverage of Species Rarity Sites, High Biodiversity Areas, and Large Mammal Landscapes	One Earth & partners	X	Done	2019	Annually from 2020	Y	Y	N	N	Y (SDG 15.5.1; 15.1.2; 15.9.1)	Y (land-based targets for UNFCCC)	As referenced above, this new annual product will provide an index of each country's progress toward protecting areas of particular importance for biodiversity (compiled from 9 global-scale data sets) at 1 km resolution. The 2021 version will be published at much higher resolution and will be accessible via an interactive web application (GSNapp.org).			
GB1. Nature's regulating contributions including climate regulation, disaster prevention and other	Trends in regulation of climate	NEW: GSN1 Protected Area coverage of Intact Wilderness and Additional Climate Stabilization Areas	One Earth & partners	X	Done	2019	Annually from 2020	Y	Y	N	N	Y (SDG 12.2.1; 15.1.2)	Y (land-based targets for UNFCCC)	As referenced above, this new annual product will provide an index of each country's progress toward protecting areas of particular importance for carbon storage (compiled from 3 global-scale data sets) at 1 km resolution. The 2021 version will be published at much higher resolution and will be accessible via an interactive web application (GSNapp.org).			

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Table 2. Indicators for monitoring elements of the draft targets (with example entries)

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Components of the draft Targets	Target Monitoring Elements													
(copy/paste text from CBD/SBSTTA-24/post-2020-monitoring.en.pdf)	(copy/paste text from CBD/SBSTTA-24/post-2020-monitoring.en.pdf)	Indicator name	Responsible Institution for the indicator	Available today (X) or under active development (Y)	Date of availability for indicator in development (Year)	Year of last update (e.g. 2019)	Time series and frequency of updates (e.g. 1985-2019, annually)	Methodology available for national use (Y/N)	Global indicator can be disaggregated for national use (Y/N)	National data aggregated to form global indicator (Y/N)	Used in GBO-4 (Y/N)	SDG indicator (Y/N)	Indicator used to measure other MEAs or processes (e.g. Ramsar Convention, IPBES, CMS)	Comments
T1.3. Priority retention of intact / wilderness areas	Trends in extent of natural intact / wilderness	NEW: GSN1 Index of Species Rarity Sites, High Biodiversity Areas, Large Mammal Landscapes, Intact Wilderness, and Climate Stabilization Areas by ecoregion and country.	One Earth & partners	X	Done	2019	Annually from 2020	Y	Y	N	N	Y (SDG 12.2.1; 15.1.2)	Y (land-based targets for UNFCCC)	As referenced above, this new annual product will provide an index of remaining areas of particular importance for biodiversity and carbon storage (compiled from 9 global-scale data sets) at 1 km resolution. The 2021 version will be published at much higher resolution and will be accessible via an interactive web application (GSNapp.org).
T2.2. Areas of particular importance for biodiversity are protected and conserved as priority	Trends in proportion of areas of particular importance for biodiversity protected and conserved	NEW: GSN1 Quantification by ecoregion type by country of Species Rarity Sites, High Biodiversity Areas, and Large Mammal Landscapes	One Earth & partners	X	Done	2019	Annually from 2020	Y	Y	N	N	Y (SDG 12.2.1; 15.1.2)		As referenced above, this new annual product will provide an index of each country's progress toward protecting areas of particular importance for biodiversity (compiled from 9 global-scale data sets) at 1 km resolution. The 2021 version will be published at much higher resolution and will be accessible via an interactive web application (GSNapp.org).

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