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\* The name and email of data providers are listed in the table for each suggested indicator.

**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**](https://www.cbd.int/sbstta/sbstta-24/post2020-monitoring-en.pdf)**)** | **Goal Monitoring Elements**  **(copy/paste text from** [**CBD/SBSTTA-24/post-2020-monitoring.en.pdf**](https://www.cbd.int/sbstta/sbstta-24/post2020-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 - key literature** |
| GA1. I*ncreased extent of natural ecosystems (terrestrial, freshwater and marine ecosystems)* | * *Trends in area of forest ecosystems* * *Trends in area of other terrestrial ecosystems* * *Trends in area of mangroves* * *Trends in area of other marine and coastal ecosystems* * *Trends in wetlands* | Extents/areas of 59 standardized ecosystem types globally | iDiv  Carsten Meyer  ([carsten.meyer@idiv.de](mailto:carsten.meyer@idiv.de)) | Y | 2020/2021 | 2018 | 1992-2018, annually | Y | Y | N | N | N | N | Remelgado & Meyer (submitted)  <https://portal.geobon.org/ebv-detail?id=10> |
| GA1. Increased extent of natural ecosystems (terrestrial, freshwater and marine ecosystems) | Trends in area of forest ecosystems  Trends in area of other terrestrial ecosystems | Biodiversity Habitat Index (BHI) | CSIRO | X |  | 2015 | 2005-2015, every 5 years | Y | Y | N | N | N | IPBES | <https://doi.org/10.1016/j.envsoft.2020.104806> |
| GA1. I*ncreased extent of natural ecosystems (terrestrial, freshwater and marine ecosystems)* | Trends in area of other marine and coastal systems | Kelp canopy extent. Spatial coverage primarily US west coast, gradually expanding, eventually to global | SBC-LTER, KEEP, Zooniverse, &  Kyle Cavanaugh (kcavanaugh@geog.ucla.edu) | Y |  | 2020 | 1984-present | Y | Not global yet | N | N | N |  | <https://portal.edirepository.org/nis/mapbrowse?scope=knb-lter-sbc&identifier=74&revision=newest>  <https://www.zooniverse.org/projects/zooniverse/floating-forests/about/results>  <https://www.kelpecosystems.org/>  https://www.kelpecosystems.org/  Bell, T. W. et al. (2020). *Remote Sensing of Environment*, *238*, 110811.  Cavanaugh et al. MEPS 403, pp. 13327 2010. |
| GA1. I*ncreased extent of natural ecosystems (terrestrial, freshwater and marine ecosystems)* | Trends in area of other marine and coastal systems | Seascape Ecosystem Distribution | Oregon State University  Maria Kavanaugh (maria.kavanaugh@oregonstate.edu) | X |  |  | 2002-present |  |  |  | N |  |  | Kavanaugh et al., 2014 (Progress in Oceanography); Kavanaugh et al., 2016 (ICES); Kavanaugh et al., 2018 (Frontiers in Marine Science) |
| GA1. I*ncreased extent of natural ecosystems (terrestrial, freshwater and marine ecosystems)* |  | Live Cover via Vegetation Continuous Fields | NASA | X | 2000 | 2019 | 2000-present annually | Y | Y- | N |  |  |  | https://lpdaac.usgs.gov/products/mod44bv006/ |
| GA1. I*ncreased extent of natural ecosystems (terrestrial, freshwater and marine ecosystems)* | Trends in area of forest ecosystem | Forest distribution (presence and absence; fragmentation) | Temple University Victor Gutierrez (tug61163@temple.edu) | X |  | 2019 | 2000-2018 |  |  |  | N | N |  | R-package to derive EBV on forest distribution using data from Hansen, et al(2013). High-resolution global maps of 21st-century forest cover change. Science, 342(6160), 850-853. |
| GA1. I*ncreased extent of natural ecosystems (terrestrial, freshwater and marine ecosystems)* |  | Ecosystem live cover | Temple University Victor Gutierrez (tug61163@temple.edu) | X |  |  | 2000-2015 |  |  |  |  |  |  | R-package to derive EBV on tree cover using data from Sexton, Joseph O., et al. "Global, 30-m resolution continuous fields of tree cover: Landsat-based rescaling of MODIS vegetation continuous fields with lidar-based estimates of error." International Journal of Digital Earth6.5 (2013): 427-448. |
| GA2. *Ecosystem Integrity and connectivity (terrestrial, freshwater and marine ecosystems)* | *Trend in the area of degraded terrestrial ecosystems restored*  *Trends in habitat connectivity  Trend in the area of degraded wetlands restored  Trend in the area of converted agricultural lands restored* | *GERI - Global Ecosystem Restoration Index* | *iDiv - German Centre for Integrative Biodiversity Research* (nestor.fernandez@idiv.de) | *Y* |  | *2019* | *Every 5 years* | *Y* | *Y* |  | *N* | *N* |  | UPDATED INFORMATION FOR GERI Indicator.  *Torres et al. (2018). Phil. Trans. Roy. Soc. B, 373:20170433*  *Fernández et al. (2020). Boosting Ecological Restoration for a Wilder Europe. DOI:10.978.39817938/57* |
| *GA2. Ecosystem Integrity and connectivity (terrestrial, freshwater and marine ecosystems)* | *Trends in fragmentation and quality of forest*  *ecosystems*  *Trends in*  *fragmentation and quality of dry and*  *sub-humid lands, grasslands and other*  *terrestrial ecosystems*  *Trends in integrity for*  *all ecosystems* | *Biodiversity Habitat Index (BHI)* | *CSIRO* | *X* |  | *2015* | *2005-2015, every 5 years* | *Y* | *Y* | *N* | *N* | *N* | *IPBES* | [*https://doi.org/10.1016/j.envsoft.2020.104806*](https://doi.org/10.1016/j.envsoft.2020.104806) |
| *GA2. Ecosystem Integrity and connectivity (terrestrial, freshwater and marine ecosystems)* | *Trends in fragmentation and quality of forest*  *ecosystems*  *Trends in*  *fragmentation and quality of dry and*  *sub-humid lands, grasslands and other*  *terrestrial ecosystems*  *Trends in integrity for*  *all ecosystems* | *Bioclimatic Ecosystem Resilience Index (BERI)* | *CSIRO* | *X* |  | *2015* | *2005-2015, every 5 years* | *Y* | *Y* | *N* | *N* | *N* |  | [*https://doi.org/10.1016/j.ecolind.2020.106554*](https://doi.org/10.1016/j.ecolind.2020.106554) |
| GA2. *Ecosystem Integrity and connectivity (terrestrial, freshwater and marine ecosystems)* | Trends in fragmentation and quality of other marine and coastal systems | Phytoplankton functional types and size distribution | Oregon State University  Maria Kavanaugh (maria.kavanaugh@oregonstate.edu) | X |  |  |  |  |  |  |  |  |  | Kostadinov et al 2009 (JGR-oceans; doi: 10.1029/2009jc005303) |
| GA2. *Ecosystem Integrity and connectivity (terrestrial, freshwater and marine ecosystems)* | Trends in fragmentation and quality of inland waters | Algal Blooms | PBL  Jan Janse (Jan.Janse@pbl.nl) | X |  |  | (1900-)1970-2015(-2070) |  |  |  |  |  |  | Beusen et al. 2015; Janssen et al., 2019 (https://doi.org/10.1016/j.cosust.2018.09.001) |
| GA2. *Ecosystem Integrity and connectivity (terrestrial, freshwater and marine ecosystems)* |  | Productivity Seasonality | Clark University Florencia Sangermano (fsangermano@clarku.edu) | Y | 2021 | 2019 | 2001-2019 annually |  |  |  |  |  |  | Eastman, Sangermano, Machado-Machado, et al. 2013.Remote Sensing 5(10):4799-4818 (https://doi.org/10.3390/rs5104799); Eastman, Sangermano et al. 2009. International Journal of Remote Sensing 30(10): 2721-2726 (https://doi.org/10.1080/01431160902755338) |
| GA2. *Ecosystem Integrity and connectivity (terrestrial, freshwater and marine ecosystems)* |  | Net primary production | UBC  William Cheung (w.cheung@oceans.ubc.ca) | X |  |  | 1981-2100 |  |  |  |  |  |  |  |
| GA2. *Ecosystem Integrity and connectivity (terrestrial, freshwater and marine ecosystems)* |  | Distribution of Ecosystem Functional Types;  Ecosystem Functional Diversity [richness, rarity, Shannon Index] | Virginia University Howard Epstein (hee2b@virginia.edu) | X |  |  | 2001-2020 (operational) |  |  |  |  |  |  | Alcaraz-Segura et al. (2013). "Environmental and Human Controls of Ecosystem Functional Diversity in Temperate South America". Remote Sensing. 5: 127–154. (https://doi.org/10.3390/rs5010127)  Paruelo et al. (2001). "Current distribution of ecosystem functional types in temperate South America". Ecosystems. 4 (7): 683–698. |
| GA2. *Ecosystem Integrity and connectivity (terrestrial, freshwater and marine ecosystems)* | Trends in fragmentation and quality of forest ecosystems  Trends in fragmentation and quality of dry and sub-humid lands, grasslands, and other terrestrial ecosystems | Relative Magnitude of Fragmentation (RMF) | University of Amsterdam W. Daniel Kissling (wdkissling@gmail.com) | X |  | 2020 | 1992-2018 | Y | Y | N | N | N | N | Naimi, B. & Kissling, W.D. (2020): Relative magnitude of fragmentation (RMF). EBV Data Portal (<https://portal.geobon.org/ebv-detail?id=4>)  Paper on metric (not indicator calculation):  Naimi, B. et al. ELSA: Entropy-based local indicator of spatial association.Spat. Stat.29, 66–88 (2019) |
| GA2. *Ecosystem Integrity and connectivity (terrestrial, freshwater and marine ecosystems)* |  | Area of habitat | Sapienza University  Carlo Rondinini (carlo.rondinini@uniroma1.it) | X |  |  | current |  |  |  |  |  |  | Rondinini et al. 2011 PTRSB; Brooks et al. 2019 |
| GA5. Maintain Genetic diversity | Trends in the genetic diversity of wild species | Number of populations within species with effective population size (Ne) above 500 versus those with Ne below 500. | GEO BON Genetic Composition Working Group, IUCN Conservation Genetic Specialist Group, GBIKE  shoban@mortonarb.org | Y |  | 2021 | annually | partly (Hoban et al 2020) | Y | Y | N | N | N | <https://doi.org/10.1016/j.biocon.2020.108654>,  <https://doi.org/10.1126/science.abb2748> |
| GA5. Maintain Genetic diversity | Trends in the genetic diversity of wild species | The proportion of distinct populations maintained within species | GEO BON Genetic Composition Working Group, IUCN Conservation Genetic Specialist Group, GBIKE  shoban@mortonarb.org | Y |  | 2021 | annually | partly (Hoban et al 2020) | Y | Y | N | N | N | <https://doi.org/10.1016/j.biocon.2020.108654>,  <https://doi.org/10.1126/science.abb2748> |
| GA5. Maintain Genetic diversity | Trends in the genetic diversity of wild species | Number of species and populations in which genetic diversity is being monitored using DNA based methods | GEO BON Genetic Composition Working Group, IUCN Conservation Genetic Specialist Group, GBIKE  shoban@mortonarb.org | Y |  | 2021 | annually | partly (Hoban et al 2020) | Y | Y | N | N | N | <https://doi.org/10.1016/j.biocon.2020.108654>,  <https://doi.org/10.1126/science.abb2748> |
| Ax |  | Terrestrial Mean species abundance | PBL  Aafke Schipper (Aafke.Schipper@pbl.nl) | X |  |  | 1850 - 2050 |  |  |  |  |  |  | Schipper et al., 2019 |
| Ax |  | Species richness / Changes in local terrestrial diversity (PREDICTS) | NHM  Andy Purvis (Andy.Purvis@nhm.ac.uk) | X |  |  | 01.1000-12.2015 |  |  |  |  |  |  | Newbold et al. 2015 Nature; Hill et al. 2018 bioRxiv; Kim et al. 2018 GMD |
| Ax |  | Overall organism abundance | NHM  Andy Purvis (Andy.Purvis@nhm.ac.uk) | X |  |  | 01.1000-12.2015 |  |  |  |  |  |  | Newbold et al. 2015 Nature; Hill et al. 2018 bioRxiv; Kim et al. 2018 GMD |
| Ax |  | Current global functional diversity of mammals and birds | Sapienza University  Carlo Rondinini (carlo.rondinini@uniroma1.it) | Y |  |  | current |  |  |  |  |  |  | Rondinini et al. 2011 PTRSB; Brooks et al. 2019 |
| Ax |  | Current global phylogenetic diversity of mammals and birds | Sapienza University  Carlo Rondinini (carlo.rondinini@uniroma1.it) | Y |  |  | current |  |  |  |  |  |  | Rondinini et al. 2011 PTRSB; Brooks et al. 2019 |
| Ax |  | Freshwater mean species abundance | PBL  Jan Janse (Jan.Janse@pbl.nl) | X |  |  | (1900-)1970-2015(-2070) |  |  |  |  |  |  | Janse et al, 2015 |
| Ax |  | Marine Biomass density by size class | Memorial University of Newfoundland  Tyler Eddy (Tyler.Eddy@mi.mun.ca) | X |  |  | 1950-2005 |  |  |  |  |  |  | Tittensor et al. 2018 GMD; Lotze et al. 2019 PNAS |
| Ax |  | Marine Species richness | UBC  William Cheung (w.cheung@oceans.ubc.ca) | X |  |  | 1950 - 2100 |  |  |  |  |  |  |  |
| GB1. *Nature's regulating contributions including climate regulation, disaster prevention and other* | *Trends in pollination and dispersal of seeds and other propagules* | Pollination | PBL  Rob Alkemade  (Rob.Alkemade@pbl.nl) | X |  |  | 1970-2050 |  |  |  |  |  |  | Stehfest et al., 2014 |
| GB1. *Nature's regulating contributions including climate regulation, disaster prevention and other* | *Trends in regulation of climate* | Carbon storage | PBL  Rob Alkemade  (Rob.Alkemade@pbl.nl) | X |  |  | 1970-2050 |  |  |  |  |  |  | Stehfest et al., 2014 |
| GB1. *Nature's regulating contributions including climate regulation, disaster prevention and other* | *Trends in regulation of climate* | Carbon storage | Stanford University  Becky Chaplin-Kramer  (bchaplin@stanford.edu) | X |  |  | 2000-2018 (tbc) |  |  |  |  |  |  |  |
| GB1. *Nature's regulating contributions including climate regulation, disaster prevention and other* | *Trends in pollination and dispersal of seeds and other propagules* | Pollination | Stanford University  Becky Chaplin-Kramer  (bchaplin@stanford.edu) | X |  |  | 2015 land cover (but can do annually), crop types are year 2000 |  |  |  |  |  |  | Chaplin-Kramer et al. 2019 Science, https://dx.doi.org/10.1126/science.aaw3372 |
| GB1. *Nature's regulating contributions including climate regulation, disaster prevention and other* | *Trends in formation, protection and decontamination of soils and sediments* | Sediment retention | Stanford University  Becky Chaplin-Kramer  (bchaplin@stanford.edu) | X |  |  | 2015 land cover (but can do annually), population (every 5 years) |  |  |  |  |  |  |  |
| GB1. *Nature's regulating contributions including climate regulation, disaster prevention and other* | *Trends in regulation of hazards and extreme events* | River flood protection | PBL  Jan Janse (Jan.Janse@pbl.nl) | X |  |  |  |  |  |  |  |  |  | Ward et al. 2015 |
| GB1. *Nature's regulating contributions including climate regulation, disaster prevention and other* | *Trends in formation, protection and decontamination of soils and sediments* | Nitrogen retention | Stanford University  Becky Chaplin-Kramer  (bchaplin@stanford.edu) | X |  |  | 2015 land cover (but can do annually), population (every 5 years) |  |  |  |  |  |  | Chaplin-Kramer et al. 2019 Science, https://dx.doi.org/10.1126/science.aaw3372 |
| GB1. *Nature's regulating contributions including climate regulation, disaster prevention and other* | *Trends in regulation of hazards and extreme events* | Coastal risk reduction | Stanford University  Becky Chaplin-Kramer  (bchaplin@stanford.edu) | X |  |  | 2017 (as far back as UNEP-WCMC maps) |  |  |  |  |  |  | Chaplin-Kramer et al. 2019 Science, https://dx.doi.org/10.1126/science.aaw3372 |
| GB1. *Nature's regulating contributions including climate regulation, disaster prevention and other* | *Trends in regulation of freshwater quantity, quality, location and timing* | Water quality: N, P | PBL  Jan Janse (Jan.Janse@pbl.nl) | X |  |  | 1900-2050 |  |  |  |  |  |  | Beusen et al. 2015; Janssen et al 2019 |
| GB1. *Nature's regulating contributions including climate regulation, disaster prevention and other* |  | Pest control | PBL  Rob Alkemade  (Rob.Alkemade@pbl.nl) | X |  |  | 1970-2050 |  |  |  |  |  |  | Stehfest et al., 2014 |
| GB1. *Nature's regulating contributions including climate regulation, disaster prevention and other* | *Trends in formation, protection and decontamination of soils and sediments* | Erosion Control | PBL  Rob Alkemade  (Rob.Alkemade@pbl.nl) | X |  |  | 1970-2050 |  |  |  |  |  |  | Stehfest et al., 2014 |
| GB2.*Nature's material contributions including food, water and others* |  | Water provision | PBL  Jan Janse (Jan.Janse@pbl.nl) | X |  |  | 1900-2050 |  |  |  |  |  |  |  |
| GB2.*Nature's material contributions including food, water and others* | *Trends in the provision of food and feed from biodiversity* | Maximum catch potential | UBC  William Cheung (w.cheung@oceans.ubc.ca) | X |  |  | 1950-2100 |  |  |  |  |  |  | Cheung et al 2016 |
| GB2.*Nature's material contributions including food, water and others* | *Trends in the provision of food and feed from biodiversity* | Food production (plant based) | PBL  Rob Alkemade  (Rob.Alkemade@pbl.nl) | X |  |  | 1970-2050 |  |  |  |  |  |  | Stehfest et al., 2014 |