INDICATOR FACTSHEET

This factsheet describes candidate indicators proposed for tracking the progress in achieving the targets of the EU Biodiversity Strategy for 2030 (EU BDS 2030).

Instructions for filling the template: in the pre-filled fields please mark in bold the appropriate option and add specifications if needed. Maximum two pages.

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BdS target and subtarget	Target 1 - Legally protect a minimum of 30% of the EU's land area and a minimum of 30% of the EU's sea area, and integrate ecological corridors, as part of a true Trans-European Nature Network. Complete the designations of Natura 2000 sites
Indicator name	Mean Target Achievement (MTA)
Indicator definition	The MTA calculates, for any set of biodiversity feature of interest (e.g. habitats, species, populations) the ratio between the extent of the feature range (in area units) that is covered by protected areas and the protected range extent that is considered sufficient, or desirable. A dashboard visualizing the indicator is available here
Underlying data	The MTA requires: 1. Spatial data (either vector or raster) of the distribution of a species or habitat of interest. This could be spatial distribution data available from Article 17 and Article 12 reports, or better data (in terms of spatial accuracy, currency and resolution) if it where available, either from member states reporting (EIONET) or from scientific projects (e.g. EUROPABON, NaturaConnect, MPA Europe). 2. A spatial vector layer of protected areas with date of designation. Multiple versions of the MTA can be produced with different selection criteria for protected areas. For instance, a more inclusive MTA could be calculated using all Natura 2000 sites and national designations included in the CDDA, a more selective version could only consider Natura 2000 sites and selected national designations for which some level of management effectiveness is documented and considered acceptable. These are two possible examples but there might be more possible use-case. 3. A quantitative area target that defines the desirable area coverage of a species or habitat distributional range by protected areas. 4. Optionally, not only the protected area layer can be updated over-time but also the distribution of the habitats and species of conservation interest if they are available, to account for changes in the distribution due to local extinctions, reintroductions or spontaneous expansions. Improved knowledge on species distribution can also be accounted for retroactively to revise the MTA, similarly as it is done for IUCN assessments.
Short methodology description	The indicator formula is quite simple and intuitive: $$MTA = \sum_{1...N}^{i} \frac{min(\frac{P_i}{T_i}, 1)}{N}$$ Where P_i indicates the amount of protected range for feature *i*, T_i is the desirable (target) amount of protected range for feature *i.* The variable N is the number of features considered, e.g. all habitats in annex I of the habitat directive, and/or all species in annex II of the habitat directive and annex I of the birds directive.

	We can define the target achievement for feature *i* TA_i which indicates how close is feature *i* protected range from the desirable protected range. The indicator takes value from 0: no feature has any amount of range protected), to 1: all features have reached the protected range target. A value of 0.5 means that in average among all features, half of the protected range target was met. An additional indicator could be also produced from the TA data, which tracks the number of area protection targets met (for any given geographic unit and sets of habitats or species).
Current data availability	All species in the annex of the directives have distributional data, available from EEA. Potential distribution of EUNIS habitats based on suitability is available from the EEA Datahub database based on work published in 2016. Ongoing work from the European Topic Centre on Biodiversity and Ecosystems, EUROPABON and NaturaConnect and MPA Europe may also provide good quality gridded, EU-wide potential EUNIS habitat distribution that could be used.
Spatial resolution, extent available	The MTA can be calculated at any scale, as long as there is a protected range target. It could be a biogeographic region (respectively marine regions and subregions for marine systems), a country, or even sub-national level analysis. The MTA is a non-spatially explicit indicator, but the underlying distribution data from article 17 reports are typically at 10x10km projection ETRS LAEA 5210. Finer distributional data should become available by the end of 2023 from the NaturaConnect project and made freely available on Zenodo.
Temporal resolution, extent available	The interval could be for every reporting period of the State of Nature. i.e. 2019-2024 for the first report. However, it is technically possible to have the MTA for every year, using annual updates in the CDDA and Union List and static map of features distribution.
Update frequency	The update could be done any time there is a significant update in the CDDA and the Union List, the Emerald Network or regional sea conventions.
Used in a policy monitoring system	The Mean Target Achievement is also known as Species Protection Index, in the context of the Global Biodiversity Framework Target 3. The indicators are identical, here we refer to MTA instead of SPI because this is the original name of the indicator in Jantke et al. (2019) who first proposed it. Additionally, the SPI is calculated using IUCN range maps, whereas here it is proposed to use Article 12/17 distribution data, or better data where available. Furthermore, SPI is only available for species, whereas the MTA is also calculated for habitat types in Annex I of the Habitat Directive, and linked to official Natura2000 and CDDA data. Therefore, it is suggested to use a different name to distinguish between the SPI indicator using globally available but possibly less-accurate data and based exclusively on species, and the NaturaConnect version, which uses the best publicly available data for Europe. This indicator has also been calculated globally for each of the world ecoregions under the name Representation Achievement Score and is available in the Digital Observatory for Protected Areas (DOPA)
API operational	No API is operational at the moment. As an interim solution, it is proposed that all MTA calculations are uploaded on a public repository, such as Zenodo where they can be programmatically accessed to have machine-readable data available.
Source	References: Adams, Vanessa M., Piero Visconti, Victoria Graham, and Hugh P. Possingham. "Indicators keep progress honest: A call to track both the quantity and quality of protected areas." One Earth 4, no. 7 (2021): 901-906.

	Jantke, K., Kuempel, C. D., McGowan, J., Chauvenet, A. L., & Possingham, H. P. (2019). Metrics for evaluating representation target achievement in protected area networks. Diversity and Distributions, 25(2), 170-175. NaturaConnect MTA Dashboard https://martin-jung.github.io/EUMTA/dashboard.html#eu https://naturaconnect.eu/ http://www.mpas-europe.org/
Pros and cons	**Pros:** The EU and global protected area targets aim to have a representative and ecologically coherent network, it is therefore important to have an indicator that tracks the ecological representativeness of a PA network. The indicator proposed does just that. The indicator can be disaggregated by geographic units, taxa/broad ecosystem types, type of designation, and allows to explore and track the quality of protection. **Cons**: The indicator is sensitive to the source of distribution data and target used. When multiple sources are available and there is uncertainty about their accuracy, it is suggested to use a range of distribution data for each habitat and species and a range of targets, to represent this uncertainty in the indicator. Finally, the date of designation of is not always available in the Natura 2000 datasets and National Designations and this data limitation need to be addressed to provide updates over time.