Terrestrial coverage statistics by protected areas

Indicator name	**Terrestrial protected area coverage**
Indicator unit	Percentage or surface (km^2) of a terrestrial (land and inland waters) area covered by protected areas
Area of interest	The indicator is available in DOPA at the country and ecoregion levels.
Related targets	 Sustainable Development Goal 15 on life on land  Aichi Biodiversity Target 11 on protected areas
Policy question	How much are terrestrial and inland water areas covered by protected areas at the country and ecoregion level? This is a key question for measuring progress on the coverage element of Aichi Target 11 of the Convention on Biological Diversity (CBD).
Use and interpretation	The indicator can be used to assess how far countries or ecoregions are from the Aichi Target 11 of having 17% of the land covered by well-connected systems of protected areas. Inversely, the information highlights where on the globe additional efforts are most needed in expanding or reinforcing the coverage by protected areas.
Key caveats	Country boundaries include disputed territories which may contain protected areas. In such cases, protected areas are assigned to all the countries claiming this territory. Note that the designations employed and the materials and maps produced in DOPA do not imply the expression of any opinion whatsoever on the part of the European Commission concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries. Protected areas with a reported area and a point but no boundaries are artificially generated using buffers. This approach can underestimate or overestimate the level of protection of an ecoregion as well inaccurate estimates of the elements that are marine or terrestrial when buffered points cover coastal areas. See Visconti *et al.* (2013) for further discussions.
Indicator status	Standard indicators of the Biodiversity Indicators Partnership (BIP) as an indicator to measure PA coverage under Aichi Target 11. Published in UNEP-WCMC & IUCN (2016).

Available data and resources

Data available

DOPA Explorer (http://dopa-explorer.jrc.ec.europa.eu/) provides typical metrics such as the amount of protection for each terrestrial ecoregion within a country; the relative contribution that a country is making to the protection of an ecoregion worldwide; and the number of different ecoregions which fall within a particular protected area.

Data updates

Planned with each update of DOPA.

Codes

The complex procedure, which currently involves the use of a wide range of software to handle the different steps, is documented in Bastin *et al.* (2017).

Additional guidance from the curators of the World Database on Protected Areas can be found at https://www.protectedplanet.net/c/calculating-protected-area-coverage

Methodology

Methodology

The DOPA uses the Global Administrative Unit Layers (GAUL) to compute protected area coverage of countries. PA coverage statistics are also calculated for terrestrial ecoregions because these represent more meaningful entities within which to analyze the ecological representativeness of the global protected area network (Figure 1). The terrestrial ecoregion boundaries used in the DOPA are provided by WWF, the Nature Conservancy and partners. The Terrestrial Ecoregions of the World (TEoW) dataset identifies 827 ecoregions (Olson *et al.*, 2001). These biogeographic classification systems can help ensure that the full range of ecosystems is represented in global and regional conservation and development strategies.

Following current practice, the UNESCO Man and Biosphere Reserves are not included in the calculations, as many of their buffer areas do not meet the IUCN's protected area definition (Watson *et al.*, 2014; UNEP-WMC & IUCN, 2016). PAs that are proposed (but not yet fully designated or established) and PAs recorded as points without a reported area are also excluded. In addition, all overlaps between different PA records are removed from the calculations to avoid double counting.

A GIS analysis is used to calculate terrestrial protection. For this a global protected area layer is created by buffering the points recorded in the WDPA based on their reported areas and combining them with the polygons recorded in the WDPA. This layer is overlaid with country boundaries and ecoregions to obtain the absolute and relative coverage of protected areas at national, regional and global scales.

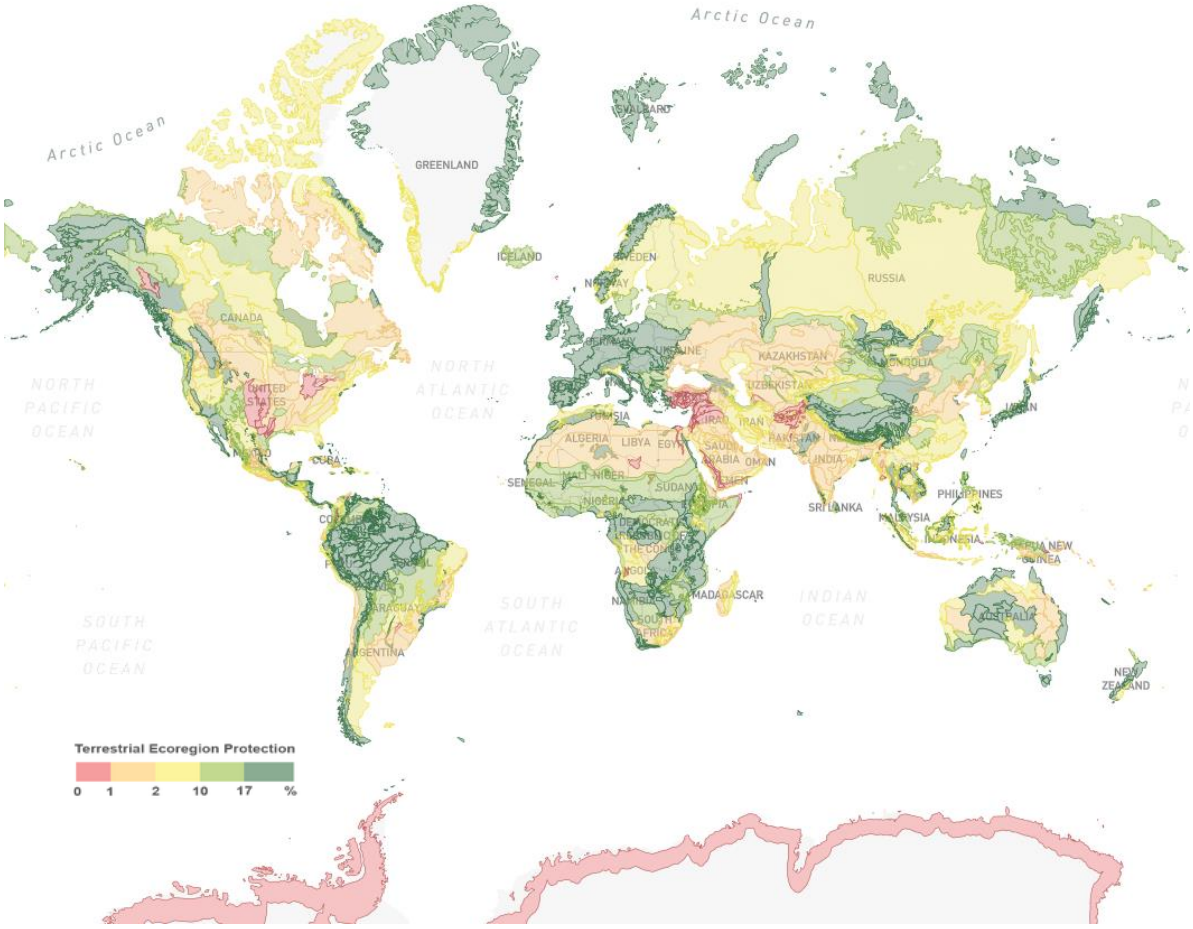

Figure 1. Example of a global assessment: Protected land (% of ecoregion area) for the world's terrestrial ecoregions as of April 2016 produced by the DOPA for the Protected Planet Report 2016.

Input datasets

The indicator uses the following input datasets:

Protected Areas

- WDPA of July 2018 (UNEP-WCMC & IUCN, 2018).
    - Latest version available from: www.protectedplanet.net

Country boundaries

Country boundaries are built from a combination of GAUL country boundaries and EEZ exclusive economic zones (see Bastin *et al.*, 2017).

- Global Administrative Unit Layers (GAUL), revision 2015.
    - Latest version available online: http://www.fao.org/geonetwork/srv/en/metadata.show?id=12691

- Exclusive Economic Zones (EEZ) v9 (2016-10-21)
    - Latest version available from: http://www.marineregions.org/downloads.php

Terrestrial Ecoregions of the World

- TEOW (Olson *et al.*, 2001)
    - Latest version available from: https://www.worldwildlife.org/publications/terrestrial-ecoregions-of-the-world

References

Bastin, L., *et al.* (2017). Processing conservation indicators with Open Source tools: Lessons learned from the Digital Observatory for Protected Areas. In: *Free and Open Source Software for Geospatial (FOSS4G)* Conference Proceedings: Vol 17, Article 14. August 14-19, 2017, Boston, MA, USA. http://scholarworks.umass.edu/foss4g/vol17/iss1/14

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Olson, D. M., *et al.* (2001). Terrestrial ecoregions of the world: A new map of life on Earth. *Bioscience*, 51: 933–938. https://doi.org/10.1641/0006-3568(2001)051[0933:TEOTWA]2.0.CO;2

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Watson, J. E. M., *et al.* (2014). The performance and potential of protected areas. *Nature*, 515: 67–73. http://dx.doi.org/10.1038/nature13947

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