Built-up areas pressure

**Indicator name**  
Built-up area pressure index (BUAPI)

**Indicator unit**  
The built-up area pressure index (BUAPI) assesses the surface covered by constructions per km² in a given area for the year 2020.

**Area of interest**  
The BUAPI has been calculated for each country, each ecoregion, each terrestrial protected area and the terrestrial parts of each coastal protected area. We further computed the indicators for the 10 km unprotected buffer zone around protected areas. BUAPI is reported in DOPA Explorer for each terrestrial and coastal protected area of size ≥ 1 km² and their unprotected buffers.

**Related targets**

- [Sustainable Development Goal 14 on life below water](http://dopa.jrc.ec.europa.eu/)
- [Sustainable Development Goal 15 on life on land](http://dopa.jrc.ec.europa.eu/)
- Aichi Biodiversity Target 11 on protected areas
- Aichi Biodiversity Target 12 on species

**Policy question**

How much potential impact may humans living in a protected area have on that protected area and on the habitats, species and ecological processes therein? How much land is lost to constructed areas? How fast is this impact increasing over time? By identifying protected areas with high percentages of built-up areas, it is possible to highlight locations that are most threatened by human activities. Built-up areas can also contribute to the assessment of physical barriers for species dispersion.

**Use and interpretation**

There are several reasons why a high population density inside a terrestrial or coastal protected area may be of concern and lead to negative outcomes for the conservation of the habitats, species and ecological processes therein (see e.g. Mcdonald *et al.*, 2009; Güneralp & Seto, 2013). To assess such pressure, in addition to information on road density (see Factsheet H2), on population density and population change (see Factsheet H3) and on land-cover change (see Factsheet G1) inside protected areas, the DOPA further provides estimates on built-up areas and their increase over the time period 1975-2020. The information is computed using the Global Human Settlement Layer which is derived from spatial-temporal interpolation of observed collections of multiple-sensor, multiple-platform satellite imageries: Landsat (MSS, TM, ETM sensor) and Sentinel-2 (S2) image composite (GHS-composite-S2 R2020A). It provides therefore a more detailed picture than the one proposed by the land cover.
maps. The evolution of built-up areas is an important indicator of the level of land consumption and of the potential fragmentation of our environment.

**MAGALIESBERG PROTECTED NATURAL ENVIRONMENT**

South Africa

![Map of the Magaliesberg Biosphere Reserve (RSA) with current built-up areas](http://dopa.jrc.ec.europa.eu/)

**Figure 1.** Map of the Magaliesberg Biosphere Reserve (RSA) with current built-up areas

**Key caveats**

- Built areas are derived from earth observations and associated uncertainties and accuracy will vary in space and time. Clouds are often obstructing observations in tropical regions and coastal areas, and vary a lot from year to year.

- There is little imagery that is freely available for 1975 and information obtained for this year should be interpreted with great care.

- While the information can be used as a proxy to assess the potential impact of human activities on the marine environment in coastal areas, the information from the GHSL covers most of the global terrestrial surface and might be missing smaller isolated islands.

We refer to Pesaresi et al., (2015), Pesaresi et al. (2023) and Freire et al. (2016) for more details regarding the use of the product.

**Indicator status** Published in De la Fuente B. et al., (2020)
Available data and resources

Data available  BUAPI values are available for each terrestrial and coastal protected area of size \( \geq 1 \text{ km}^2 \) and its associated 10 km unprotected buffer zone. The values and can also be compared at country and ecoregion levels, on the DOPA Explorer website: [http://dopa-explorer.jrc.ec.europa.eu/dopa_explorer/](http://dopa-explorer.jrc.ec.europa.eu/dopa_explorer/).

Data updates  Planned with each update of DOPA.

Codes  Standard GIS operation applied to raster data.

Methodology

Methodology  The GHS-BUILT-S data contain a multi-temporal information layer on the distribution of built-up surfaces, expressed as number of square metres, derived from multiple collections of Landsat and Sentinel-2 images. Provided with a resolution of 100 m, the GHS-BUILT-S data were overlaid with the boundaries of countries, ecoregions and protected areas to calculate the absolute (km\(^2\)) and relative surface (%) of the area covered by the built-up areas. UNESCO Biosphere Reserves were discarded as well as protected areas with known areas but undefined boundaries.

Input datasets  The indicator uses the following input datasets:

Protected Areas

  - Latest version available from: [www.protectedplanet.net](http://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.

- Exclusive Economic Zones (EEZ) v9 (2016-10-21)

Terrestrial Ecoregions of the World

- TEOW (Olson et al., 2001)
Global Human Settlements


References


Contact

Please contact us at: JRC-DOPA@ec.europa.eu

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@EU_DOPA