Species lists and statistics

Indicator name **Species lists and statistics**

Indicator unit Counting of number of threatened species at site and country levels.

Area of interest Species lists are generated for each terrestrial and coastal protected area, and are provided in DOPA Explorer for all protected areas of size ≥ 1 km^2, and for protected portion of countries. General statistics are reported at country level, species richness is mapped at global level.

Related targets

Sustainable Development Goal 14 on life below water

Sustainable Development Goal 15 on life on land

Aichi Biodiversity Target 11 on protected areas

Aichi Biodiversity Target 12 on species

Policy question Where are the areas in the world hosting most species? How many species in a country have their ranges covered at least partially by protected areas? How many threatened species are endemic and how many of these have their ranges protected? Where are the main gaps in terms of species observations? These are key questions for assessing whether conservation measures have been taken to prevent extinctions on to measuring progress on Aichi Targets 11 and 12 of the Convention on Biological Diversity (CBD).

Use and interpretation Species assessed by the International Union for the Conservation of Nature (IUCN) and documented in the IUCN Red List of Threatened Species ™ (RLTS) have been used to provide end-users of DOPA Explorer with theoretical lists of species in protected areas (IUCN, 2022b; Birdlife, 2019) as well as country summary statistics on the number of endemic and threatened species (IUCN, 2022c).

Species included in the Red List are classified into the following categories based on Red List criteria such as rate of decline, population size, area of geographic distribution, and degree of population and distribution fragmentation:

Threatened species fall into one of the following three categories:

1) Critically Endangered (CR) – Extremely high risk of extinction in the wild.
2) Endangered (EN) – High risk of extinction in the wild.

3) Vulnerable (VU) – High risk of endangerment in the wild.

All other species fall in these last categories:

4) Near Threatened (NT) – Likely to become endangered in the near future.
5) Least Concern (LC) – Lowest risk. Does not qualify for a more at risk category. Widespread and abundant taxa are included in this category.
6) Data Deficient (DD) – Not enough data to make an assessment of its risk of extinction.
7) Not Evaluated (NE) – Has not yet been evaluated against the criteria.

The IUCN further provides information about endemic species, i.e. species occurring naturally within one country only.

Site level statistics:

Lists and counts of Threatened (Critically Endangered, Endangered, Vulnerable) and Near Threatened species (Figure 2) are derived from the overlay of the Protected Areas boundaries with the species ranges provided by the IUCN for Mammals, Amphibians, Sharks, Rays & Chimaeras, and Corals (*Anthozoa* and *Hydrozoa* classes aggregated), and by Birdlife for Birds. Note that species will not necessarily be present in the Protected Area. Species ranges provided by IUCN and Birdlife are mapped as generalized polygons which often include areas of unsuitable habitat, and therefore species may not occur in all of the areas where they are mapped. In general, for range-restricted taxa, ranges are mapped with a higher degree of accuracy, sometimes down to the level of individual subpopulations, compared with more widely distributed species. See http://www.iucnredlist.org/ for more details. Expert-based lists of species can thus significantly differ from the indicative lists provided here.

We provide the following two tables regarding species, both derived from the overlay of the park boundaries with the species range for the selected *taxa*:

1) Species summary data (Figure 1)
2) Species lists (Figure 2).

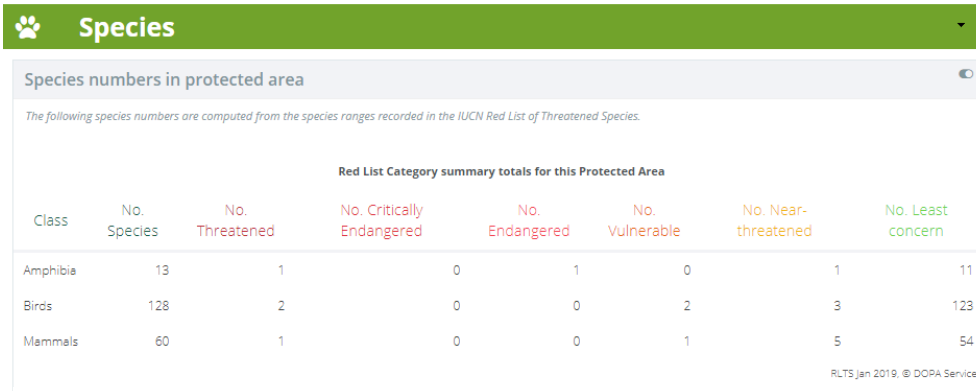


Figure 1 Summary statistics computed at the site level using the species assessed globally by IUCN and Birdlife.

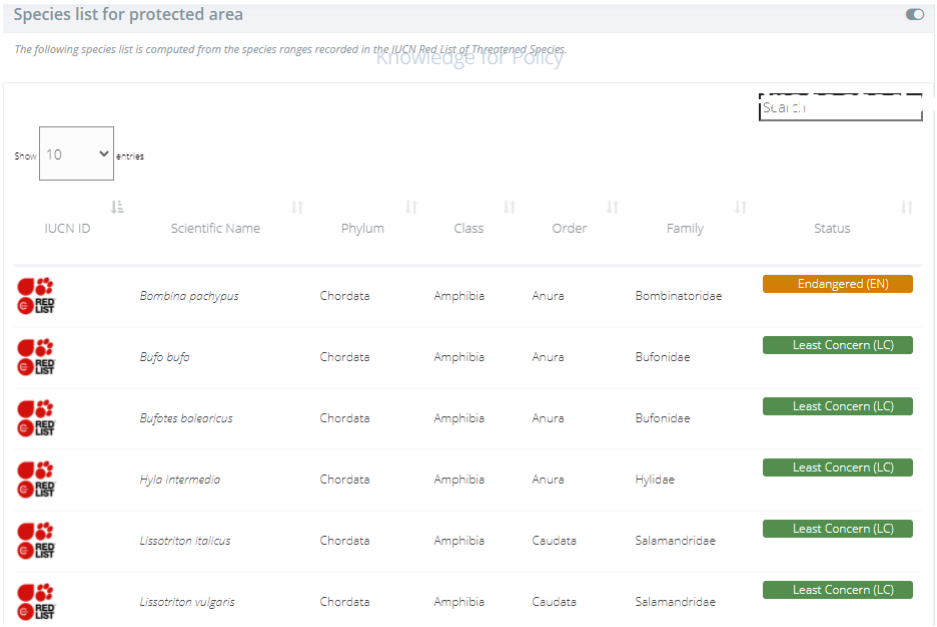


Figure 2 Species checklist computed at the site level using the species assessed globally by IUCN and Birdlife.

Country statistics:

Information regarding the RLTS has been used in two ways at the country level:

1) Country summary statistics on threatened and endemic species are expert based and proposed in DOPA Explorer (Figure 3) as reported by the IUCN in their summary tables: https://www.iucnredlist.org/resources/summary-statistics

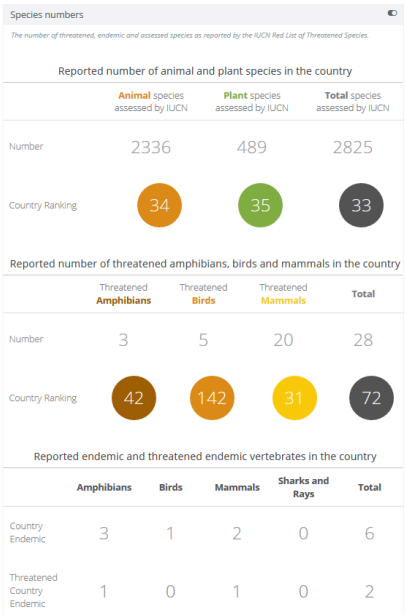
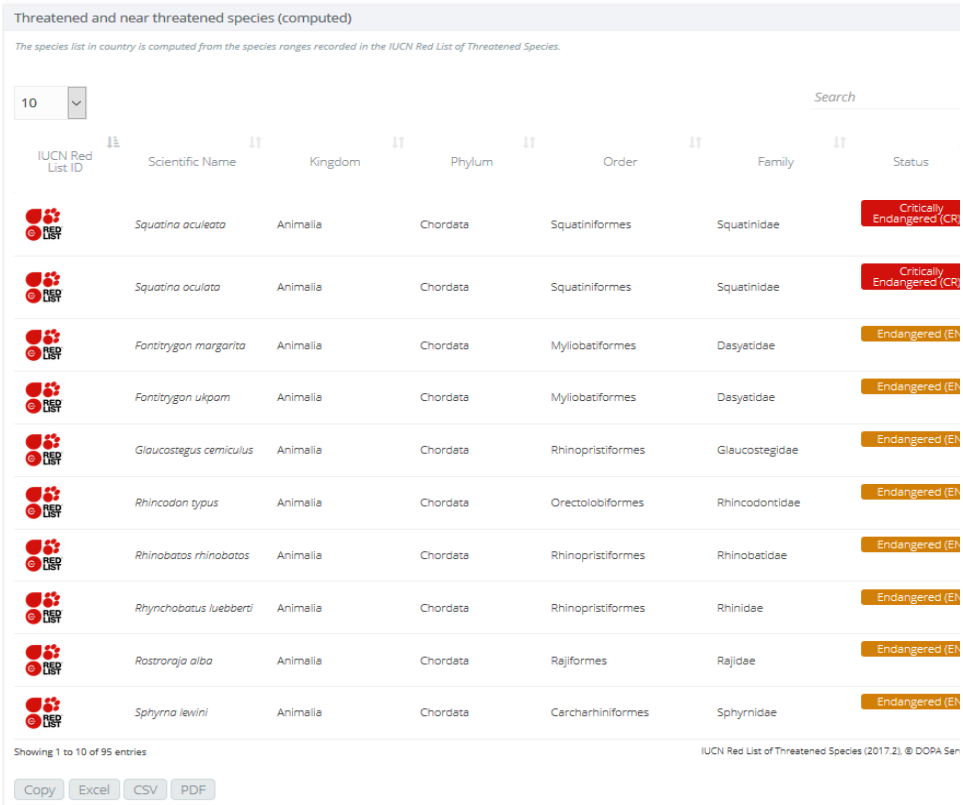


Figure 3 Summary statistics regarding species assessed by the IUCN at country level. These tables should be consulted for example, to obtain a summary of the number of threatened mammals and/or endemic species in any particular protected portion of country.

2) Country lists of (protected) Threatened (Critically Endangered, Endangered, Vulnerable) and Near Threatened species (Figure 4) are derived by the previously described overlay within protected areas and species ranges, aggregating the results by the ISO3 code reported for the Protected Area by WCMC. Note that species will not necessarily be present in the country. Species ranges provided by the IUCN are mapped as generalized polygons which often include areas of unsuitable habitat, and therefore species may not occur in all of the areas where they are mapped. In general, for range-restricted taxa, ranges are mapped with a higher degree of accuracy, sometimes down to the level of individual subpopulations, compared with more widely distributed species. See http://www.iucnredlist.org/ for more details. Expert-based country lists of species can thus significantly differ from the indicative lists provided here.



Threatened and near threatened species (computed)

The species list in country is computed from the species ranges recorded in the IUCN Red List of Threatened Species.

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IUCN Red List ID	Scientific Name	Kingdom	Phylum	Order	Family	Status
	Squatina aculeata	Animalia	Chordata	Squatiniformes	Squatinidae	Critically Endangered (CR)
	Squatina oculata	Animalia	Chordata	Squatiniformes	Squatinidae	Critically Endangered (CR)
	Fontitrygon margarita	Animalia	Chordata	Myliobatiformes	Dasyatidae	Endangered (EN
	Fontitrygon ukpam	Animalia	Chordata	Myliobatiformes	Dasyatidae	Endangered (EN
	Glaucostegus cemiculus	Animalia	Chordata	Rhinopristiformes	Glaucostegidae	Endangered (EN
	Rhincodon typus	Animalia	Chordata	Orectolobiformes	Rhincodontidae	Endangered (EN
	Rhinobatos rhinobatos	Animalia	Chordata	Rhinopristiformes	Rhinobatidae	Endangered (EN
	Rhynchobatus luebberti	Animalia	Chordata	Rhinopristiformes	Rhinidae	Endangered (EN
	Rostroraja alba	Animalia	Chordata	Rajiformes	Rajidae	Endangered (EN
	Sphyrna lewini	Animalia	Chordata	Carcharhiniformes	Sphyrnidae	Endangered (EN

Showing 1 to 10 of 95 entries IUCN Red List of Threatened Species (2017.2). © DOPA Ser

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Figure 4 Theoretical list of species assessed by the IUCN found within protected portion of country

DOPA Explorer shows also richness (Figure 5), calculated at global level overlapping the selected taxa distribution maps.

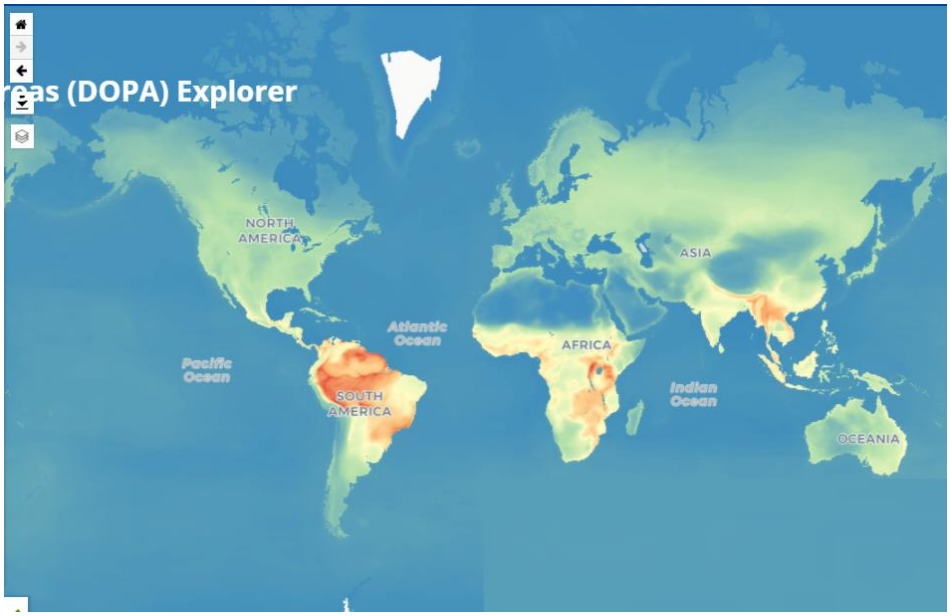

Figure 5 Richness for selected taxa (birds)

DOPA Explorer also provides a ranking of the protected areas within each country in terms of total number of threatened and near-threatened species (Figure 6)

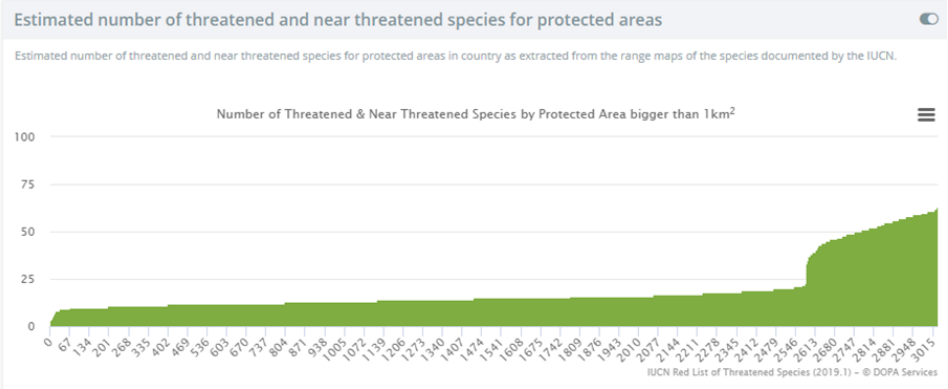

Figure 6 Ranking of PAs by Threatened and Near Threatened Species. The numbers are computed over the mammals, birds, amphibians, sharks rays and chimaeras, and corals.

Overall, the species distribution maps used for the species statistics cover more than 25,000 species. These maps invariably represent current, known limits of distribution for individual species within their native historical range (Table 1).

Species from the RLTS used in DOPA	All species (used for site levels only) …	… from which Threatened & Near Threatened (used for country statistics)
Warm-water reef-building corals	842	407
Sharks and Rays	1 115	316
Amphibians	6 643	2 504
Birds	10 952	2 476
Mammals	5 704	1 564
Total	*25 256*	*7267*

Table 1 Number of species maps from the IUCN Red List of Threatened Species and Birdlife used in DOPA.

DOPA Explorer also provides spatial layers made available from the Global Biodiversity Information Facility (GBIF) showing species occurrences as reported from many sources, including everything from museum specimens collected in the 18th and 19th century to geotagged smartphone photos shared by amateur naturalists in recent days and weeks. This dataset may help you identifying information gaps and factors limiting the dissemination of biodiversity information that are recognized as priorities both at the political and scientific levels of the UN Convention on Biological Diversity (CBD) (Figure 7 Species occurrences in a country as reported by the GBIF and country statistics. GBIF provides further web services allowing the data to be selected by phylum.). See https://www.gbif.org for more details.

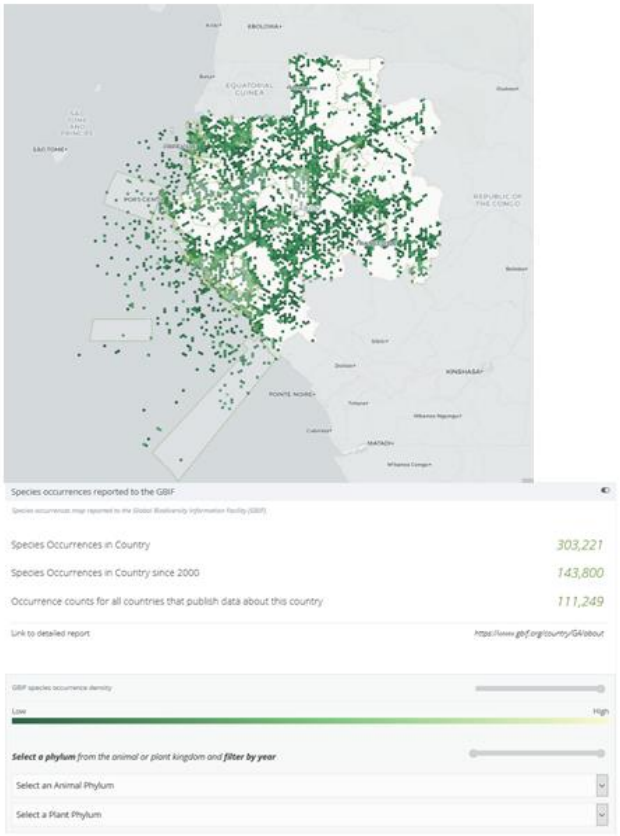

Figure 7 Species occurrences in a country as reported by the GBIF and country statistics. GBIF provides further web services allowing the data to be selected by phylum.

Key caveats

The species list produced for each protected area is derived from the processing of the data from the World Database on Protected Areas (WDPA) and the IUCN Red List of Threatened Species ™ and is therefore depending on the quality of the spatial data.

The IUCN Red List of Threatened Species ™ is the world's most comprehensive information source on the global conservation status of animal, fungi and plant species. It contains a rich compendium of supporting information of the distribution range, ecological requirements, habitats and threats to species and on conservation actions that can be taken to reduce or avoid extinctions. For further details, see www.iucnredlist.org. Global species maps from the red list represent current, known limits of distribution for individual species within their native historical range. Although these maps have many uses, they generally have a coarse resolution and consequent limitations. Species ranges are mapped as generalized polygons which often include areas of unsuitable habitat, and therefore species may not occur in all of the areas where they are mapped. In general, for range-restricted taxa, ranges are mapped with a higher degree of accuracy, sometimes down to the level of individual subpopulations, compared with more widely distributed species.

Indicator status

Standard indicators of the Biodiversity Indicators Partnership (BIP) as an indicator to measure species conservation under Aichi Target 12.

Available data and resources

Data available

Species lists are available for each protected area ≥ 1 km^2 from the DOPA Explorer website http://dopa-explorer.jrc.ec.europa.eu/

Data updates

Planned with each update of DOPA.

Codes

Computed on PostgreSQL 10.5 with PostGIS 2.4 spatial extension. No codes publicly available yet. For details see our Documentation section on the DOPA web site at http://dopa.jrc.ec.europa.eu

Species occurrences are obtained directly from the GBIF API, see more details at https://www.gbif.org/developer/species

Methodology

Methodology

Range maps of all birds, amphibians, mammals, corals and rays and sharks assessed globally the IUCN (2022.2 version of the IUCN Red List of Threatened Species ™ (RLTS)) have been used to generate country and site level statistics.
Import has been restricted to polygons that are categorized by IUCN with the following attributes:

- the presence is either extant, or probably extant (maintained for compliance with previous analyzes);
- the origin is either native or introduced;
- the seasonality is breeding, non-breeding or resident.

The above polygons have been rasterized at the resolution of 1 km, then dissolved (reducing the redundancy of multiple ranges by species).

The species statistics were then obtained by computing the spatial intersection of:

- the distribution range data for species;
- country, ecoregions, and the entire set of protected areas from the World Database on Protected Areas (WDPA) for all designated protected areas (PAs), excluding UNESCO Biosphere Reserves (for more details, see Dubois *et al.*, 2016).

The number of threatened species by country as reported by the IUCN are directly derived from the IUCN's summary statistics (IUCN, 2017b).

Input datasets

The indicator uses the following input datasets:

Protected Areas

- WDPA of February 2023 (UNEP-WCMC & IUCN, 2023).
    - 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
    -

Marine Ecoregions and Pelagic Provinces of the Worlds

- MEOW&PPOW (Nature Conservancy (2012), derived from Spalding *et al.*, 2007 and Spalding *et al.*, 2012)

- Latest version available from:

  http://data.unep-wcmc.org/datasets/38

Species Ranges

- IUCN Red List of Threatened Species ™ 2022 version 2 (IUCN, 2022a)
  - Latest version available from: https://www.iucnredlist.org/resources/spatial-data-download
- Bird species distribution maps of the world ™ 20222019 version 2 (Birdlife, 2022)
  - Latest version available from: http://datazone.birdlife.org/species/requestdis

Species non-spatial attributes

- IUCN Red List of Threatened Species ™ 2022 version 1 (IUCN, 2022b)

Threatened species statistics by country as reported by the IUCN

- IUCN Red List of Threatened Species ™ country summaries (IUCN, 2022c)
  - Latest version available from: http://www.iucnredlist.org/about/summary-statistics

Species Occurrences

- The Global Biodiversity Information Facility (GBIF, 2021)
  - Latest version available from:

    https://www.gbif.org/developer/summary

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