Assessing the conservation status of a species

Andrew Rodrigues | Programme Officer for Participation and Engagement

Colobus vellerosus (Geoffroy, Saint-Hilaire, 1834) observed in Ghana by Guenther Eichhorn (licensed under http://creativecommons.org/licenses/by-nc/4.0/)
Mentors

Arman Pili  Rukaya Johadieen  Maxime Coupremanne

Jean Ganglo  Leonardo Buitrago  Lizanne Roxburgh
What is the likelihood of a species becoming extinct in the near future, given current knowledge about population trends, range, and recent, current or projected threats?

It is not a final list of species that are priorities for conservation action.
What can be assessed?

- **All described taxa:**
  - Species
  - Subspecies
  - Varieties (plants)
  - Subpopulations
  - Microorganisms...

- **Undescribed taxa, only if:**
  - Clearly distinct species
  - Voucher references provided
  - Distribution information available
  - Conservation benefit to the assessment
What can be assessed?

IUCN Red List Categories and Criteria apply to:

- **Global** level assessments
- **Regional and national level** only with the *Guidelines for Application of IUCN Red List Criteria at Regional Levels*
- **Wild populations** inside their natural range, and populations resulting from conservation introductions (also called “benign introductions”)
The IUCN Categories

Extinction Risk

Threatened categories

- Critically Endangered (CR)
- Endangered (EN)
- Vulnerable (VU)

Adequate data

Evaluated

All species

Least Concern (LC)

Near Threatened (NT)

Data Deficient (DD)

Not Evaluated (NE)

Extinction Risk

Possibly Extinct CR(PE) or CR(PEW)
Nature of the Criteria

CRITERIA

A. Population reduction

B. Restricted geographic range

C. Small population size & decline

D. Very small or restricted population

E. Quantitative analysis

THREATENED CATEGORIES

- Critically Endangered (CR)
- Endangered (EN)
- Vulnerable (VU)

Quantitative thresholds
Why use multiple criteria?

Not all of the criteria will be suitable for all taxa.

- All taxa being assessed must be evaluated against all five criteria.

- Meeting **any one** of the criteria qualifies a taxon for listing at that level of threat.

- **All** criteria met at the highest level of threat should be listed.
### SUMMARY OF THE FIVE CRITERIA (A-E) USED TO EVALUATE IF A TAXON BELONGS IN AN IUCN RED LIST THREATENED CATEGORY (CRITICALLY ENDANGERED, ENDANGERED OR VULNERABLE).  

<table>
<thead>
<tr>
<th>A. Population size reduction. Population reduction (measured over the longer of 10 years or 3 generations) based on any of A1 to A4</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Critically Endangered</strong></td>
</tr>
<tr>
<td>A1</td>
</tr>
<tr>
<td>A2, A3 &amp; A4</td>
</tr>
<tr>
<td>A1a</td>
</tr>
<tr>
<td>A2a</td>
</tr>
<tr>
<td>A3a</td>
</tr>
<tr>
<td>A4a</td>
</tr>
<tr>
<td>(a)</td>
</tr>
<tr>
<td>(b)</td>
</tr>
<tr>
<td>(c)</td>
</tr>
<tr>
<td>(d)</td>
</tr>
<tr>
<td>(e)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>B. Geographic range in the form of either B1 (extent of occurrence) AND/OR B2 (area of occupancy)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Critically Endangered</strong></td>
</tr>
<tr>
<td>B1. Extent of occurrence (EOO)</td>
</tr>
<tr>
<td>B2. Area of occupancy (AOO)</td>
</tr>
</tbody>
</table>

AND at least 2 of the following 3 conditions:

(a) Severely fragmented OR Number of locations

(b) Continuing decline observed, estimated, inferred or projected in any of: (i) Extent of Occurrence (EOO), (ii) Area of Occupancy (AOO), (iii) Area extent and/or quality of habitat, (iv) Number of Locations or Subpopulations, (v) Number of Mature Individuals

(c) Extreme fluctuations in any of: (i) Extent of Occurrence (EOO), (ii) Area of Occupancy (AOO), (iii) Number of Locations or Subpopulations, (iv) Number of Mature Individuals

<table>
<thead>
<tr>
<th>C. Small population size and decline</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Critically Endangered</strong></td>
</tr>
<tr>
<td>Number of mature individuals</td>
</tr>
</tbody>
</table>

AND at least one of C1 or C2

C1. An observed, estimated or projected continuing decline of at least (up to a max. of 100 years in future):

- 25% in 3 years or 1 generation (whichever is longer)
- 20% in 5 years or 2 generations (whichever is longer)
- 10% in 10 years or 3 generations (whichever is longer)

C2. An observed, estimated, or inferred continuing decline AND at least 1 of the following 3 conditions:

(a) Number of mature individuals in each subpopulation

(b) Extreme fluctuations in the number of mature individuals

<table>
<thead>
<tr>
<th>D. Very small or restricted population</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Critically Endangered</strong></td>
</tr>
<tr>
<td>Number of mature individuals</td>
</tr>
</tbody>
</table>

D2. Only applies to the VU category restricted area of occupancy or number of locations with a plausible future threat that could drive the taxon to CR or EN in a very short time.

<table>
<thead>
<tr>
<th>E. Quantitative Analysis</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Critically Endangered</strong></td>
</tr>
<tr>
<td>Indicating the probability of extinction in the wild to be:</td>
</tr>
</tbody>
</table>

| ≥ 50% in 10 years or 3 generations, whichever is longer (100 years max.) | ≥ 20% in 20 years or 5 generations, whichever is longer (100 years max.) | ≥ 10% in 100 years |

1. Excerpt from the IUCN Red List of Threatened Species.
Rabb’s Fringe-limbed Treefrog
*Ecnomiohyla rabborum*

Category: Critically Endangered

CR A2ace;B1ab(iii)
Dealing with a lack of high quality data

• The threatened categories use quantitative thresholds

• BUT a lack of high quality data should not deter assessors from applying the IUCN Criteria

• Assessments can be based on observations, estimations, projections, inferences and suppositions

• GBIF-mediated data provides valuable information for the application of Criterion B and for producing species distribution maps
Essential tools for Red List assessments

www.iucnredlist.org
Online Training

IUCN Red List Assessor Training

Restricted geographic range + fragmentation/few locations, continuing decline or extreme fluctuations
R Packages - packages for R, e.g. rCAT, red, redlistr.
SUMMARY OF THE FIVE CRITERIA (A-E) USED TO EVALUATE IF A TAXON BELONGS IN AN IUCN RED LIST THREATENED CATEGORY (CRITICALLY ENDANGERED, ENDANGERED OR VULNERABLE).

### A. Population size reduction

<table>
<thead>
<tr>
<th>Critically Endangered</th>
<th>Endangered</th>
<th>Vulnerable</th>
</tr>
</thead>
<tbody>
<tr>
<td>≤ 90%</td>
<td>≥ 70%</td>
<td>≥ 50%</td>
</tr>
<tr>
<td>≥ 80%</td>
<td>≥ 50%</td>
<td>≥ 30%</td>
</tr>
</tbody>
</table>

- **A1**: Population reduction observed, estimated, inferred, or suspected in the past where the causes of the reduction are clearly reversible AND understood AND have ceased.
- **A2**: Population reduction observed, estimated, inferred, or suspected in the past where the causes of reduction may have ceased OR may not be reversible.
- **A3**: Population reduction projected, inferred or suspected to be met in the future (up to a max of 100 years) (it cannot be used for A3).
- **A4**: An observed, estimated, inferred, projected or suspected population reduction where the time period must include both the past and the future (up to a max of 100 years in the future), and where the causes of reduction may have ceased OR may not be reversible.

Based on any of the following:

- **(a)** direct observation [except A3]
- **(b)** an index of abundance appropriate to the taxon
- **(c)** a decline in area of occupancy (AOO), extent of occurrence (EOO) and/or habitat quality
- **(d)** actual or potential levels of exploitation
- **(e)** effects of introduced taxa, hybridization, pathogens, pollutants, competitors or parasites.

### B. Geographic range in the form of either B1 (extent of occurrence) AND/OR B2 (area of occupancy)

<table>
<thead>
<tr>
<th>Critically Endangered</th>
<th>Endangered</th>
<th>Vulnerable</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 100 km²</td>
<td>&lt; 5,000 km²</td>
<td>&lt; 20,000 km²</td>
</tr>
<tr>
<td>≤ 10 km²</td>
<td>≤ 500 km²</td>
<td>≤ 2,000 km²</td>
</tr>
</tbody>
</table>

AND at least 2 of the following 3 conditions:

- **(a)** Severe fragmentation OR Number of locations ≥ 1 ≤ 5 ≤ 10
- **(b)** Continuing decline observed, estimated, inferred or projected in any of: (i) extent of occurrence; (ii) area of occupancy; (iii) area, extent and/or quality of habitat; (iv) number of locations or subpopulations; (v) number of mature individuals
- **(c)** Extreme fluctuations in any of: (i) extent of occurrence; (ii) area of occupancy; (iii) number of locations or subpopulations; (iv) number of mature individuals

### C. Small population size and decline

<table>
<thead>
<tr>
<th>Critically Endangered</th>
<th>Endangered</th>
<th>Vulnerable</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 250</td>
<td>&lt; 2,500</td>
<td>&lt; 10,000</td>
</tr>
</tbody>
</table>

AND at least one of C1 or C2

- **C1**: An observed, estimated or projected continuing decline of at least (up to a max of 100 years in future):

  - 25% in 3 years or 1 generation (whichever is longer)
  - 20% in 5 years or 2 generations (whichever is longer)
  - 10% in 10 years or 3 generations (whichever is longer)

- **C2**: An observed, estimated, projected or inferred continuing decline AND at least 1 of the following 3 conditions:

  - (a) Number of mature individuals in each subpopulation ≤ 50 ≤ 250 ≤ 1,000
  - (b) Extreme fluctuations in the number of mature individuals

### D. Vary small or restricted population

<table>
<thead>
<tr>
<th>Critically Endangered</th>
<th>Endangered</th>
<th>Vulnerable</th>
</tr>
</thead>
<tbody>
<tr>
<td>≤ 50</td>
<td>≤ 250</td>
<td>≤ 1,000</td>
</tr>
</tbody>
</table>

- **D1**: Typically: AOO < 20 km² or number of locations < 5

### E. Quantitative Analysis

Indicating the probability of extinction in the wild to be:

<table>
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<tr>
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<th>Endangered</th>
<th>Vulnerable</th>
</tr>
</thead>
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<tr>
<td>≥ 50% in 10 years or 3 generations, whichever is longer (100 years max)</td>
<td>≥ 20% in 20 years or 5 generations, whichever is longer (100 years max)</td>
<td>≥ 10% in 100 years</td>
</tr>
</tbody>
</table>
Must meet:

**B1**: Estimated extent of occurrence

AND / OR

**B2**: Estimated area of occupancy

**AND** at least **TWO** of the sub-criteria a-c:

a. Severely fragmented, or few locations

b. Continuing decline

c. Extreme fluctuations
**Extent of Occurrence**: area within the shortest continuous imaginary boundary drawn around all known, inferred, or projected sites presently occupied by the taxon.

...*EOO ≠ the species’ range.*

**Area of Occupancy**: area within the extent of occurrence which is actually occupied by the taxon (measured by overlaying a 2x2 km grid and counting number of occupied cells).
• Distribution map
  – Data points (red dots)
  – Limits to distribution (blue polygons)

• Extent of occurrence (EOO)
  – Entire area within the minimum convex polygon (e.g., 121,536 km²)

• Area of occupancy (AOO)
  – Total occupied 2x2 km grid cells (e.g., 40 km²)
### Presence/origin codes and EOO

<table>
<thead>
<tr>
<th>Code</th>
<th>Presence</th>
<th>Code</th>
<th>Origin</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Extant</td>
<td>1</td>
<td>Native</td>
</tr>
<tr>
<td>2</td>
<td>Probably Extant</td>
<td>2</td>
<td>Reintroduced</td>
</tr>
<tr>
<td>3</td>
<td>Possibly Extant</td>
<td>3</td>
<td>Introduced</td>
</tr>
<tr>
<td>4</td>
<td>Possibly Extinct</td>
<td>4</td>
<td>Vagrant</td>
</tr>
<tr>
<td>5</td>
<td>Extinct</td>
<td>5</td>
<td>Origin Uncertain</td>
</tr>
<tr>
<td>6</td>
<td>Presence Uncertain</td>
<td>6</td>
<td>Assisted Colonisation</td>
</tr>
</tbody>
</table>

#### EOO calculator tool

![EOO calculator tool diagram](image-url)
### B. Geographic range in the form of either B1 (extent of occurrence) AND/OR B2 (area of occupancy)

<table>
<thead>
<tr>
<th></th>
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<th>Endangered</th>
<th>Vulnerable</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>B1. Extent of occurrence (EOO)</strong></td>
<td>&lt; 100 km²</td>
<td>&lt; 5,000 km²</td>
<td>&lt; 20,000 km²</td>
</tr>
<tr>
<td><strong>B2. Area of occupancy (AOO)</strong></td>
<td>&lt; 10 km²</td>
<td>&lt; 500 km²</td>
<td>&lt; 2,000 km²</td>
</tr>
</tbody>
</table>

**AND at least 2 of the following 3 conditions:**

1. (a) Severely fragmented OR Number of locations
   - = 1
   - ≤ 5
   - ≤ 10

2. (b) Continuing decline observed, estimated, inferred or projected in any of: (i) extent of occurrence; (ii) area of occupancy; (iii) area, extent and/or quality of habitat; (iv) number of locations or subpopulations; (v) number of mature individuals.

3. (c) Extreme fluctuations in any of: (i) extent of occurrence; (ii) area of occupancy; (iii) number of locations or subpopulations; (iv) number of mature individuals.
Most individuals (>50%) found in small, isolated subpopulations between which there is very little dispersal. These subpopulations may be too small to be viable.

Taxa with highly mobile adult stages or producing large numbers of small, mobile diaspores can disperse more easily and are not so vulnerable to isolation through fragmented habitats.

Taxa producing small numbers of diaspores (or none at all), or only large ones are less able to disperse over wide areas and are more easily isolated.
Location is a geographically or ecologically distinct area in which a single threatening event can rapidly affect all individuals of the taxon.
Location

2 locations

Invasive species
Location

Pollution

4 locations
Location

Parts of the distribution not affected by any threats?

• Don’t consider locations at all (if >50% of distribution is unaffected); OR
• Use subpopulations as surrogate for locations; OR
• Use smallest area affected to determine locations; OR
• Use most likely threat to occur in unaffected areas to determine locations there.

4-5 or >5 locations...?
If most serious threat does not affect entire distribution: can use other threats to count locations in areas not affected by most serious threat.

If there are no plausible threats, do not consider locations at all.
Continuing Decline is a recent, current or projected future decline which is liable to continue unless remedial measures are taken. Can be observed, estimated, inferred or projected.

Extreme Fluctuations

Wide, rapid and frequent variation in population size, or subpopulations, or locations, or distribution (typically tenfold increase or decrease)
Example: a cone snail

- Known from only 6 sites along a 25 km stretch of coastline with a city occupying part of the area.
  - EOO = 150 km²
  - AOO = 28 km²
- Dispersal abilities between areas is not well known; there may be movement between groups. So severe fragmentation unknown.

Main threats recorded are:

- Collection for shell trade.
- Habitat loss and decline from pollution and urban expansion.
- Locations = 5
- Continuing decline in habitat quality & population size
- No known extreme fluctuations
Example: a cone snail

- Known from only 6 sites along a 25 km stretch of coastline with a city occupying part of the area.

- EOO = 150 km²  \( \text{EN B1} \)
- AOO = 28 km²  \( \text{EN B2} \)

- Dispersal abilities between areas is not well known; there may be movement between groups. So severe fragmentation unknown.

- Main threats recorded are:
  - Collection for shell trade.
  - Habitat loss and decline from pollution and urban expansion.

- Locations = 5  \( \text{EN B1a+2a} \)

- Continuing decline in habitat quality & population size

- No known extreme fluctuations

\( \text{EN B1ab(iii,iv)+2ab(iii,iv)} \)
Exercise: Applying Criterion B

You will use www.geocat.kew.org to determine EOO and AOO measurements for the species *Brachypelma smithi* (F.O. Pickard-Cambridge, 1897) and *Aphonopelma anax* (Chamberlin, 1940) - two tarantula species – and apply criterion B of the IUCN Categories and Criteria in your group.

Remember, in a real assessment you would apply all criteria.

For the purposes of this exercise you will use the global IUCN Categories and Criteria. Ordinarily, you would use the Guidelines for Application of IUCN Red List Criteria at Regional and National Levels for national assessments.

We will discuss your assessments in plenary.
**Brachypelma smithi** (F.O. Pickard-Cambridge, 1897)

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Extent of occurrence</strong></td>
<td>11,848 km² VU</td>
</tr>
<tr>
<td><strong>Area of Occupancy</strong></td>
<td>64 km² EN</td>
</tr>
</tbody>
</table>

**Justification (please state whether this is observed, estimated, projected, inferred or suspected)**

Severe Fragmentation: Yes or No - (MAYBE)

Possibly, we know that it is restricted to clearings and this could prevent movement between populations, particularly if we also have evidence of habitat degradation.

**Number of Locations**

1

The illegal pet trade could occur across all of its distribution, not tied to specific locations.

**Continuing Decline**

Yes or No

Suspected continuing decline of mature individuals due to pressure from illegal trade.

**Extreme Fluctuations**

Yes or No

NO evidence of extreme fluctuations.

**Final Assessment**

EN B2 ab(v)
**Aphonopelma anax** (Chamberlin, 1940)

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Value</th>
<th>Justification (please state whether this is observed, estimated, projected, inferred or suspected)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Extent of occurrence</td>
<td>124,985 km² LC</td>
<td></td>
</tr>
<tr>
<td>Area of Occupancy</td>
<td>268 km² EN</td>
<td></td>
</tr>
<tr>
<td>Severe Fragmentation</td>
<td>Yes or <strong>No</strong></td>
<td>The species is common over its range, I am assuming that there is movement between population.</td>
</tr>
<tr>
<td>Number of Locations</td>
<td>Many</td>
<td>Threat is from urban and agricultural development.</td>
</tr>
<tr>
<td>Continuing Decline</td>
<td><strong>Yes</strong> or No</td>
<td>Observed habitat degradation due to increasing urban and agricultural development.</td>
</tr>
<tr>
<td>Extreme Fluctuations</td>
<td>Yes or <strong>No</strong></td>
<td>No evidence</td>
</tr>
<tr>
<td>Final Assessment</td>
<td>LC (does not fulfil at least 2 of the conditions required to pass into endangered)</td>
<td></td>
</tr>
</tbody>
</table>
Mapping standards for IUCN Red List assessments
What are we mapping?

- Known or inferred limits of the species’ distribution.
- Distribution depicted as points, polygons or a combination of points and polygons.

**Polygons:**
- The species probably only occurs within the polygons.
- Does *not* mean species is distributed equally within the polygon or occurs everywhere in the polygon.
The preferred approach for preparing the map depends on the taxonomic group and the system in which the species occurs.
Mapping Standards

Preferred approaches for preparing maps for depends on the taxonomic group and the system in which the species occurs.
Polygon maps

1. Plot observation and collection data points.
2. Create a polygon around the data points using information on habitat preferences, elevation limits, dispersal patterns, bathymetry (for marine taxa), and so on.
3. Refine the polygon, removing likely unoccupied areas (e.g., heavily degraded habitats, inappropriate altitudes, climate or temperature restrictions, etc.)
Polygon maps
species with fewer than 3 data points

- Use habitat and ecology information to create the polygon.
  
  OR

- If no habitat or ecology data are available a 10 km radius circle can be drawn around data points.

- For coastal terrestrial species, clip the final polygon to the coastline (to exclude marine habitats).
Polygon maps

Freshwater species

Freshwater species are mapped to catchments as these are considered to be the minimum management unit for freshwater conservation.

- Plot known observation and collection data points.
- Intersect points with catchments to identify areas where the species currently occurs.
- Use publications and expert knowledge to expand range to other potentially occupied catchments, if necessary.
Species with sensitive spatial data

Some species should not have their exact locations published, but accurate spatial data must still be provided for analysis purposes. You can:

- withhold the map from the published assessment; or
- publish a generalised map that does not identify the exact location of the species.
Spatial Data Attributes

- **Attributes** = data attached to points and polygons.

- Attributes tell us:
  - the name of the species;
  - the exact location of the data point;
  - the identity of the HydroBASIN;
  - whether the species still exists in that area or if it is now extinct from there;
  - who compiled the data and when;
  - whether the species is data sensitive;
  - etc…

- There are minimum attribute requirements for maps supporting a Red List assessment.
# Required Data Attributes

<table>
<thead>
<tr>
<th>Field</th>
<th>Darwin Core</th>
<th>Description</th>
<th>Polygons / Basins</th>
<th>Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>SCI_NAME</td>
<td>genericName &amp; specificEpithet</td>
<td>Scientific name for species</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>HYBAS_ID</td>
<td></td>
<td>HydroBASIN ID <em>(only if mapping HydroBASINs)</em></td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>PRESENCE</td>
<td>occurrenceStatus</td>
<td>Codes identifying whether the species is currently present in the area</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>ORIGIN</td>
<td>establishmentMeans</td>
<td>Codes identifying whether the species is native to the area</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>SEASONAL</td>
<td>Behavior?</td>
<td>Codes identifying which season(s) the species is present in the area</td>
<td>✓</td>
<td>✓</td>
</tr>
</tbody>
</table>
## Codes for Presence, Origin and Seasonality

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Extant</td>
<td>1</td>
<td>Native</td>
<td>1</td>
<td>Resident</td>
</tr>
<tr>
<td>2</td>
<td>Probably Extant</td>
<td>2</td>
<td>Reintroduced</td>
<td>2</td>
<td>Breeding Season</td>
</tr>
<tr>
<td>3</td>
<td>Possibly Extant</td>
<td>3</td>
<td>Introduced</td>
<td>3</td>
<td>Non-breading Season</td>
</tr>
<tr>
<td>4</td>
<td>Possibly Extinct</td>
<td>4</td>
<td>Vagrant</td>
<td>4</td>
<td>Passage</td>
</tr>
<tr>
<td>5</td>
<td>Extinct (post 1500)</td>
<td>5</td>
<td>Origin Uncertain</td>
<td>5</td>
<td>Seasonal Occurrence Uncertain</td>
</tr>
<tr>
<td>6</td>
<td>Presence uncertain</td>
<td>6</td>
<td>Assisted Colonisation</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
# Required Data Attributes

<table>
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<tr>
<th>Field</th>
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<th>Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>COMPILER</td>
<td></td>
<td>Name of individual(s) or institution responsible for creating the map</td>
<td>✔️</td>
<td>✔️</td>
</tr>
<tr>
<td>YRCOMPILED</td>
<td>DateLastModified</td>
<td>Year in which the map was created or last modified</td>
<td>✔️</td>
<td>✔️</td>
</tr>
<tr>
<td>CITATION</td>
<td>InstitutionCode</td>
<td>Name of individual(s)/institution responsible for providing the data</td>
<td>✔️</td>
<td>✔️</td>
</tr>
<tr>
<td>DEC_LAT</td>
<td>DecimalLatitude</td>
<td>Geographical latitude, in decimal degrees (between -90 and 90)</td>
<td></td>
<td>✔️</td>
</tr>
<tr>
<td>DEC_LONG</td>
<td>DecimalLongitude</td>
<td>Geographical longitude, in decimal degrees (between -180 and 180)</td>
<td></td>
<td>✔️</td>
</tr>
<tr>
<td>SPATIALREF</td>
<td>GeodeticDatum</td>
<td>Ellipsoid, geodetic datum or spatial reference system upon which the geographic coordinates are based (WGS84 preferred)</td>
<td></td>
<td>✔️</td>
</tr>
</tbody>
</table>
## Required Data Attributes

<table>
<thead>
<tr>
<th>Field</th>
<th>DARWIN CORE</th>
<th>Description</th>
<th>Polygons / Basins</th>
<th>Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>SUBSPECIES</td>
<td>infraspecificEpithet</td>
<td>Subspecies name <em>(only if a subspecies is being mapped)</em></td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>SUBPOP</td>
<td>N/A</td>
<td>Subpopulation name <em>(only if a subpopulation is being mapped)</em></td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>DATA_SENS</td>
<td>informationWithheld,</td>
<td>Used to flag species with sensitive spatial data. Tells the Red List Unit to</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td></td>
<td>dataGeneralizations,</td>
<td>withhold the point or polygon from the web site.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>any ‘Remarks’ fields</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SENS_COMM</td>
<td>informationWithheld</td>
<td>Comments on why the data are considered sensitive *(required if DATA_SENS =</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td></td>
<td>dcterms:accessRights</td>
<td>“Y”)*</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
# Recommended Data Attributes

<table>
<thead>
<tr>
<th>Field</th>
<th>Darwin Core</th>
<th>Definition</th>
<th>Polygon / Basin</th>
<th>Point</th>
</tr>
</thead>
<tbody>
<tr>
<td>EVENT_YEAR</td>
<td>year</td>
<td>Year the observation was recorded or the specimen was collected.</td>
<td></td>
<td>✔</td>
</tr>
<tr>
<td>SOURCE</td>
<td>associatedReferences</td>
<td>Primary source of the data</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>CATALOG_NO</td>
<td>catalogNumber</td>
<td>An identifier (preferably unique) for the record within a larger dataset or collection</td>
<td></td>
<td>✔</td>
</tr>
<tr>
<td>DIST_COMM</td>
<td>locationRemarks / eventRemarks</td>
<td>Distribution comments, referring directly to the polygon or point</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>ISLAND</td>
<td>Island</td>
<td>Name of the island the point or polygon is on</td>
<td></td>
<td>✔</td>
</tr>
<tr>
<td>TAX_COMM</td>
<td>taxonRemarks</td>
<td>Taxonomic comments, referring directly to the polygon or point</td>
<td></td>
<td>✔</td>
</tr>
<tr>
<td>BasisOfRec</td>
<td>basisOfRecord</td>
<td>Specific nature of the record (restricted list of options)</td>
<td></td>
<td>✔</td>
</tr>
</tbody>
</table>
https://www.iucnredlist.org/resources/mappingstandards
Mapping tools and resources
GBIF Data Use Club

Aims to:

1. Showcase the science powered by GBIF

2. Provide GBIF community with tools for addressing data literacy skills gaps and support more complex data analysis and manipulation

3. Increase understanding of what GBIF-mediated data is, how it can be accessed, and what is use best practice
BUILDING DATA LITERACY

DataCamp Partnership

● 150 licences available for GBIF community
● Courses cover R, Python, SQL, Spreadsheets
● Trial one year programme
● Prioritise funded programmes and node-lead training development that supplements current training

● Those receiving licences must attend tutorial series
Dealing with data uncertainty

Uncertainty in the data itself (different to the lack of data) should also be considered in a Red List assessment.

For example: A species has a range of population size estimates from 3 separate studies.

**Study A:** Population size = 100-200  (Endangered)

**Study B:** Population size = 200-350  (Endangered or Vulnerable)

**Study C:** Population size = 280-410  (Vulnerable)
Dealing with data uncertainty

1. Record the range of possible values based on the available studies:
   
   “Based on the studies A, B and C, the current population size is between 100 and 410”

2. State the range of potential Red List Categories that may be used based on the range of data:

3. Select one of these categories using all available information (on population size, trends, habitat status, ongoing threats, etc.) to justify your decision:
Dealing with data uncertainty

4. Species with **VERY** uncertain data (suggesting in a very wide range of potential categories) should be listed as Data Deficient.