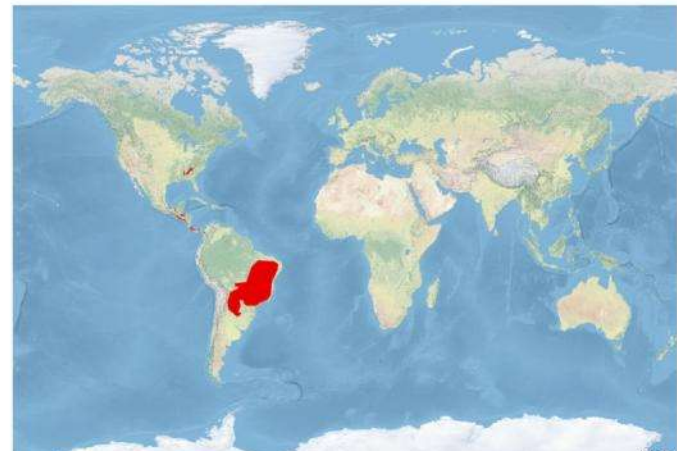
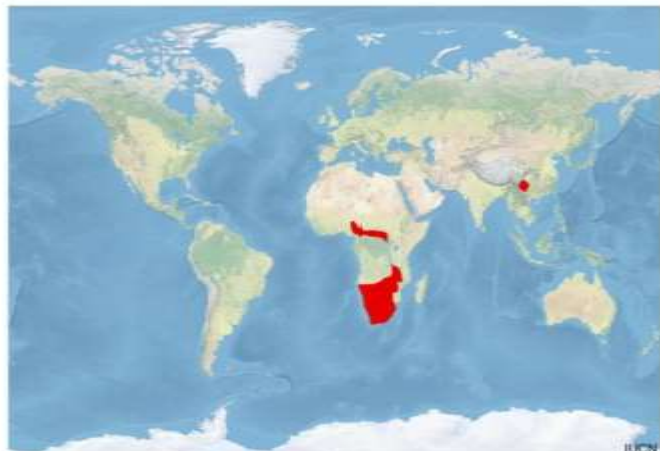


# Mapping standards for IUCN Red List assessments

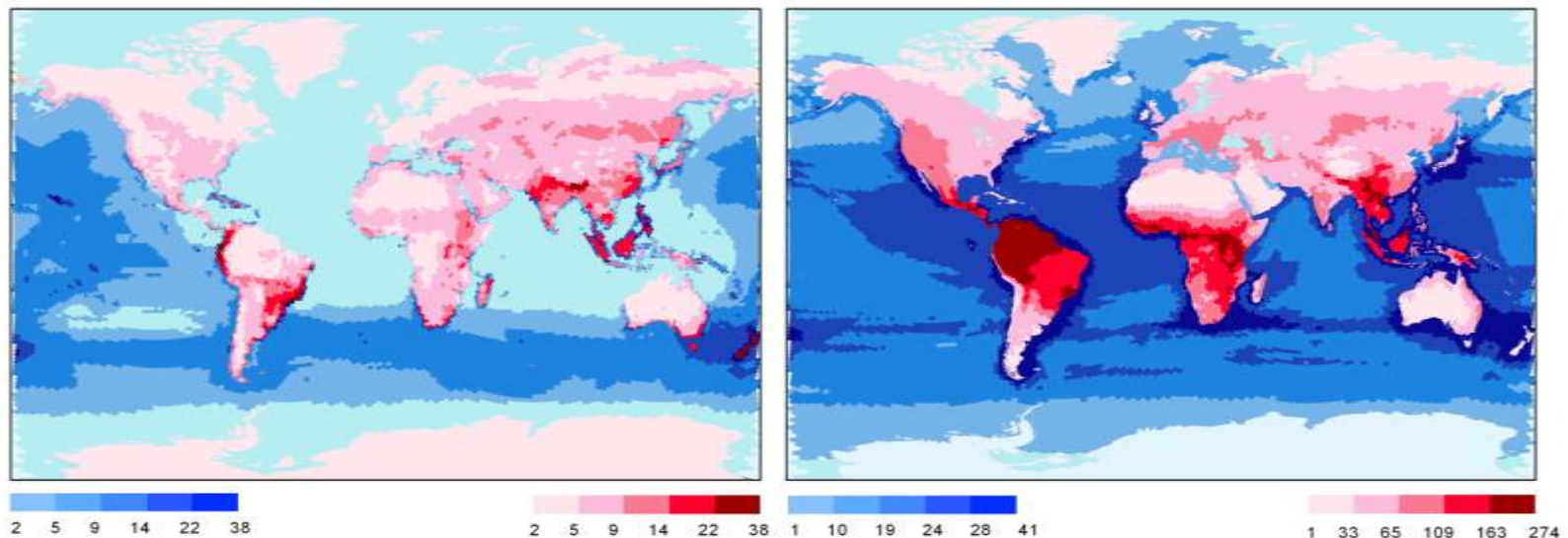


And a few of the exceptions adopted by  
the Amphibian RLA



# Purpose of including species maps on the Red List

- Visual representation of the species' distribution
- To inform Red List assessments
  - EOO/AOO
- To conduct analyses, such as global threatened species richness
- To identify conservation priorities
  - A first step in identifying priority areas for protection (AZEs, KBAs, PAs)



# What are we mapping?

Current known or inferred limits of the species' distribution within its native range.

- Distribution depicted as polygons
- Maps mean species probably only occurs within the polygon
- Does *not* mean species is distributed equally within the polygon or occurs everywhere in the polygon



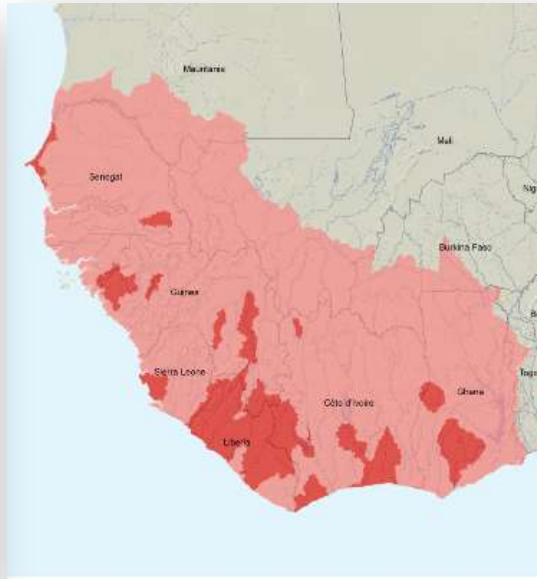
My mapping mantra:  
“Create the best possible  
representation of the  
species' distribution”.

The protocols differ slightly for species in different ecosystems:

## Marine



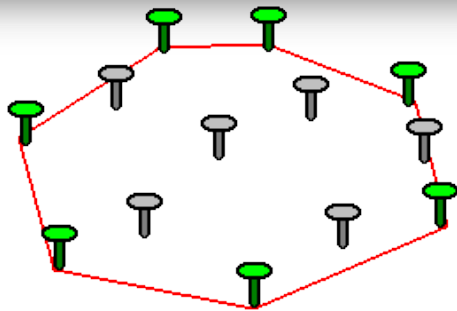
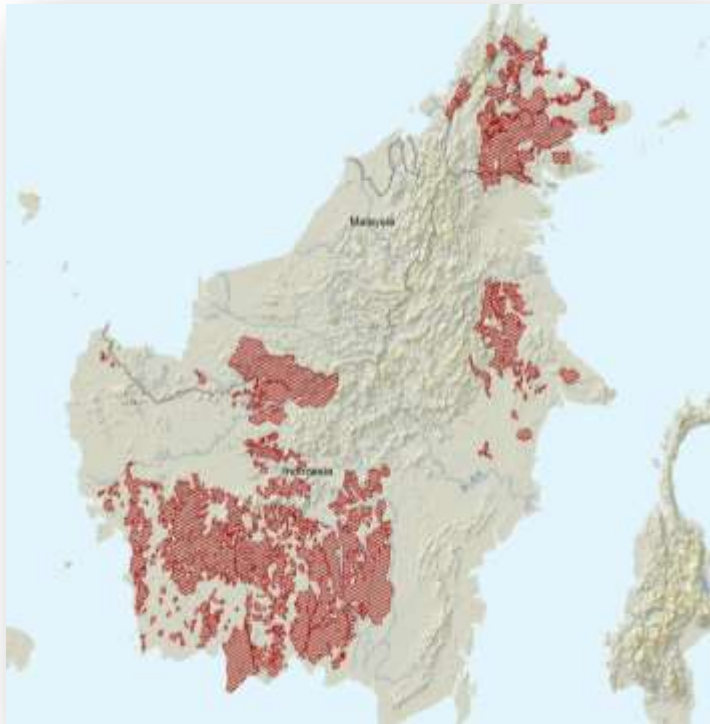
## Freshwater



## Terrestrial



# Mapping terrestrial species



## Making a range map:

1. Plot observation / locality data points (not included in final map)
2. Draw a minimum convex hull around the points
3. Expand the distribution considering knowledge of habitat preferences
4. Remove unsuitable/unoccupied habitat based on availability of suitable habitat, elevation limits, climate/temperature restrictions, other expert knowledge
5. Smooth the polygon if necessary



## Mapping terrestrial species

### Example of a fictitious species

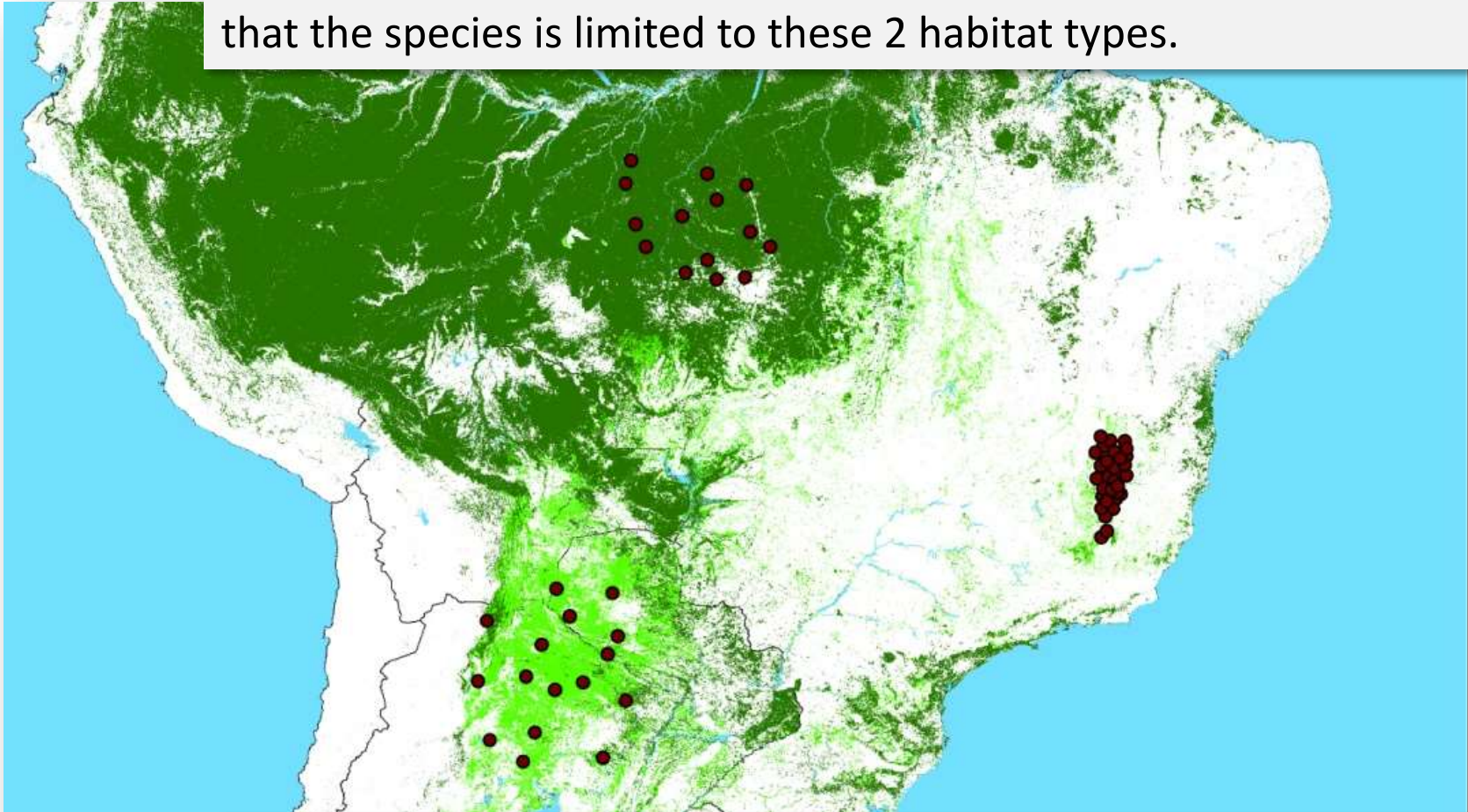
Dark green: Tree cover, broad leaved and ever green

Light green: Tree cover, broadleaved, deciduous & closed

**Expert knowledge:**  
Preferred habitat is broadleaved, evergreen and deciduous forest.

# Mapping terrestrial species

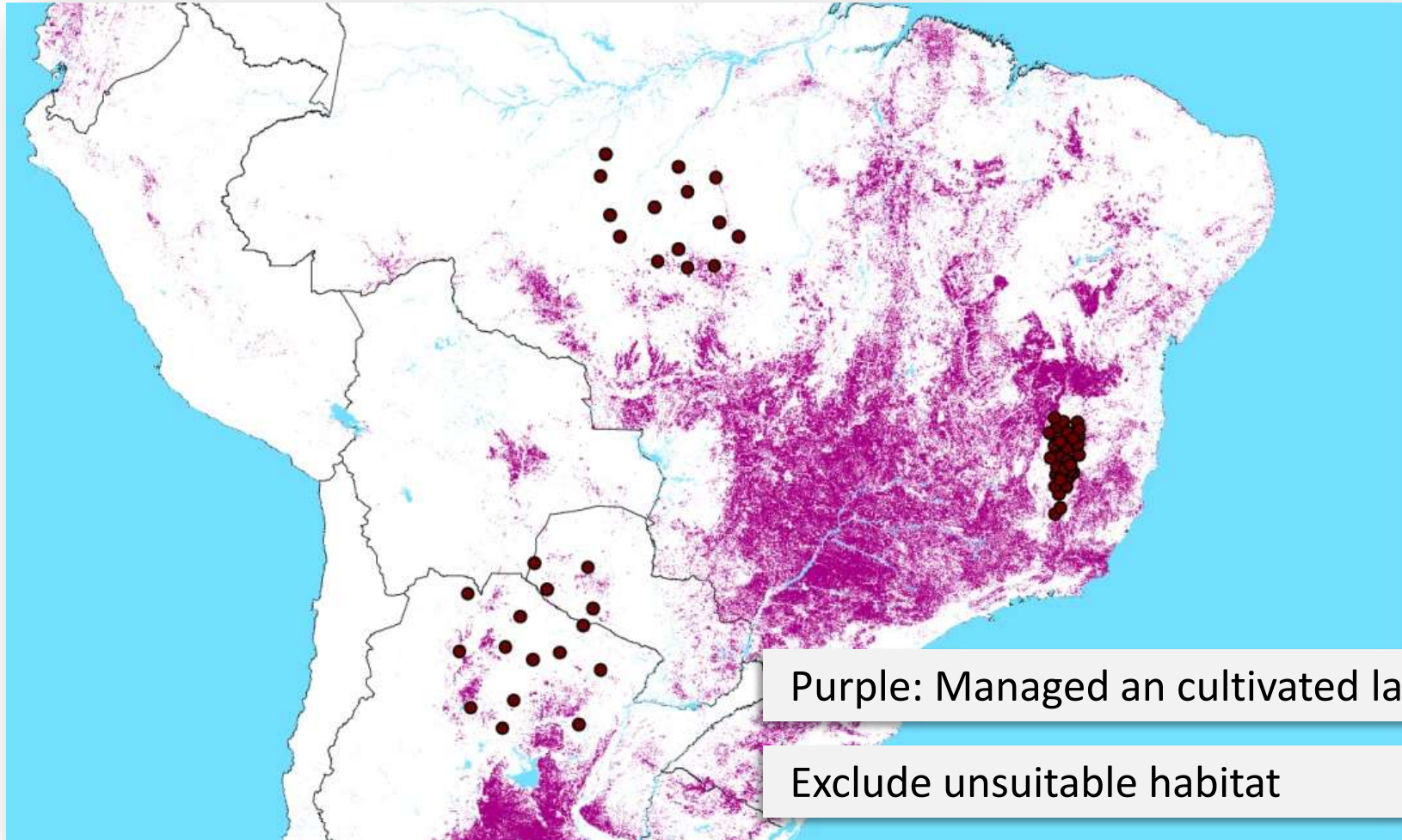
Extrapolation of observation records and expert knowledge suggests that the species is limited to these 2 habitat types.



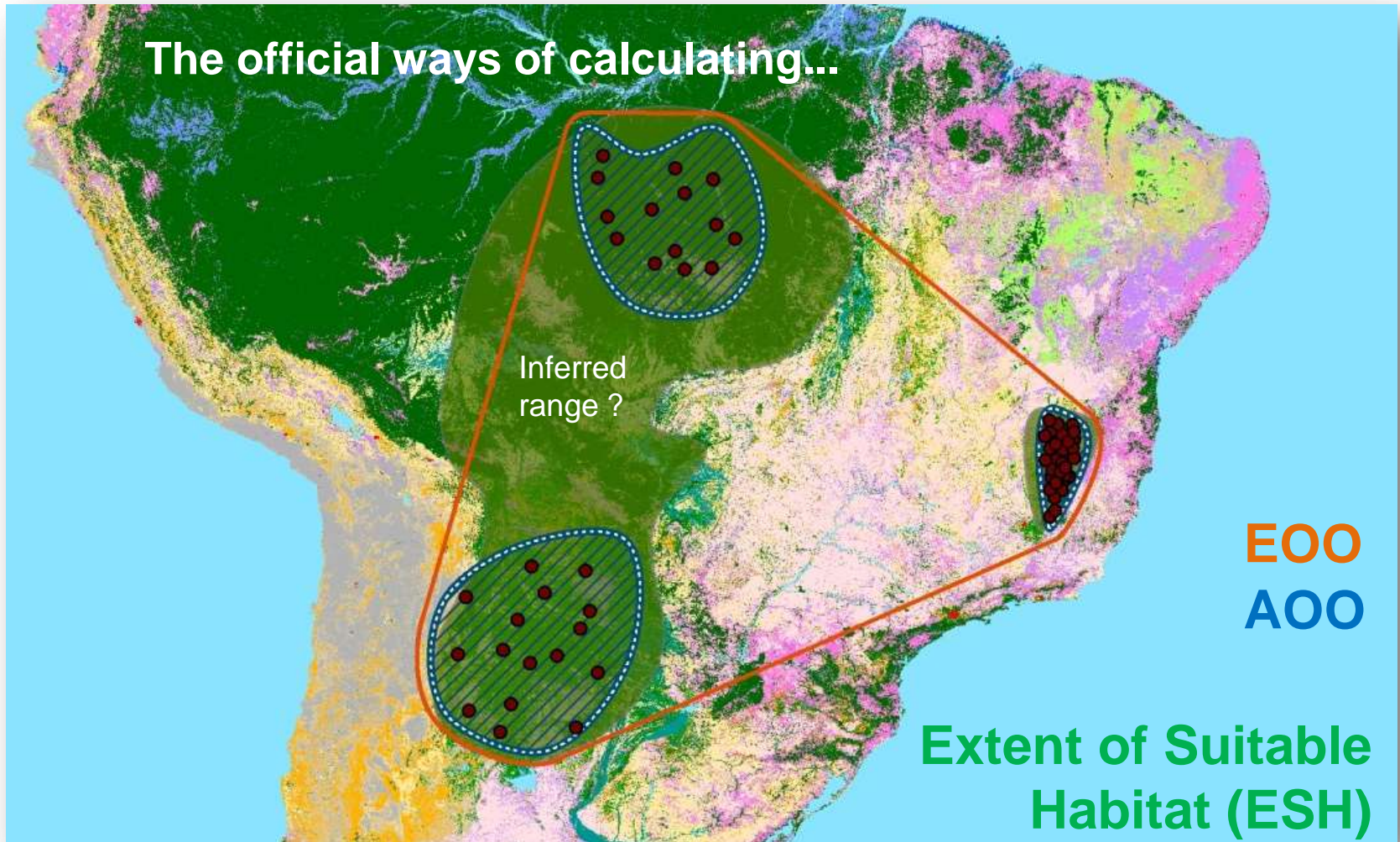
Consider other factors that may limit the distribution (e.g. elevation, temperature, natural physical barriers)



# Mapping terrestrial species



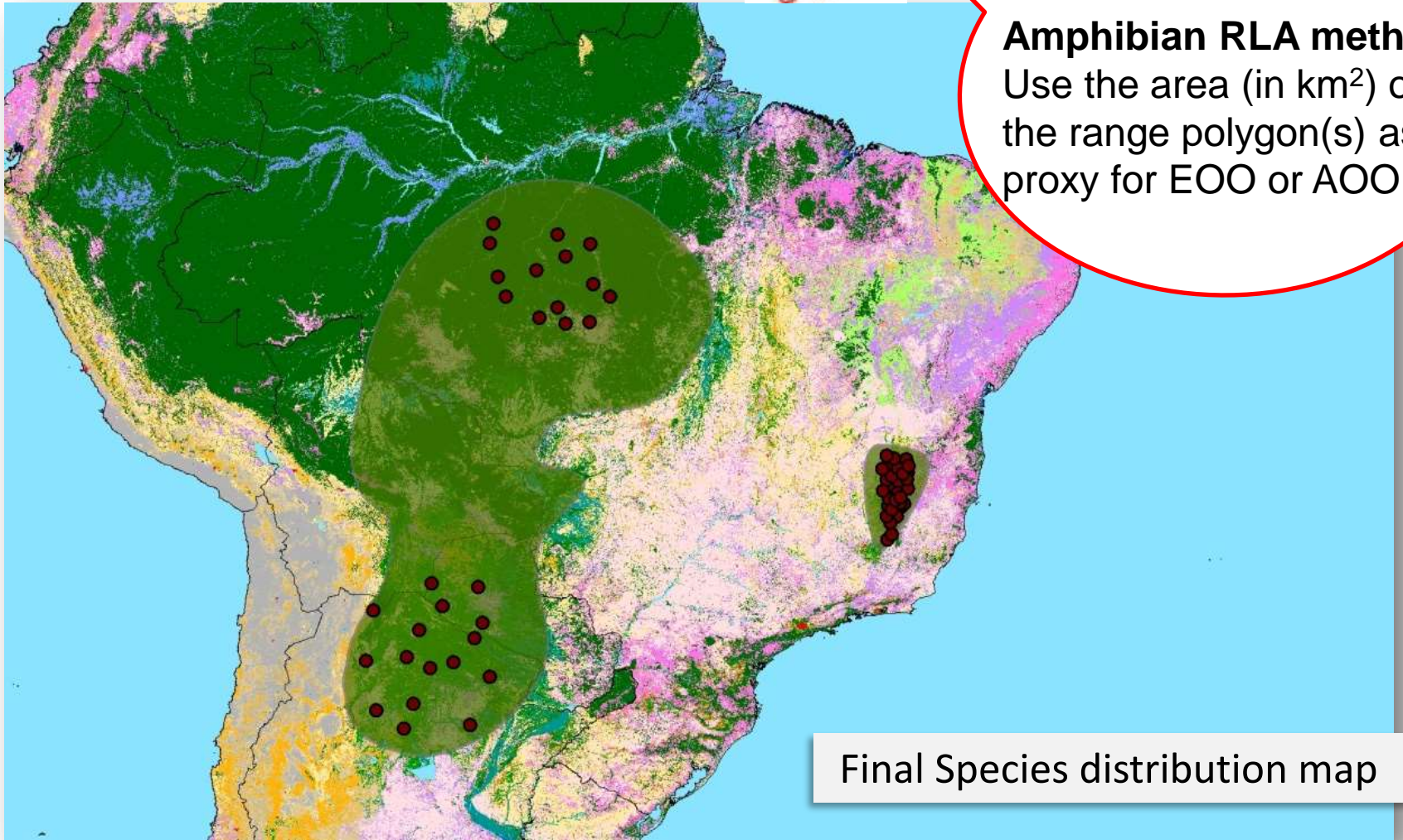




# Mapping terrestrial species



**Amphibian RLA method:**  
Use the area (in km<sup>2</sup>) of  
the range polygon(s) as a  
proxy for EOO or AOO

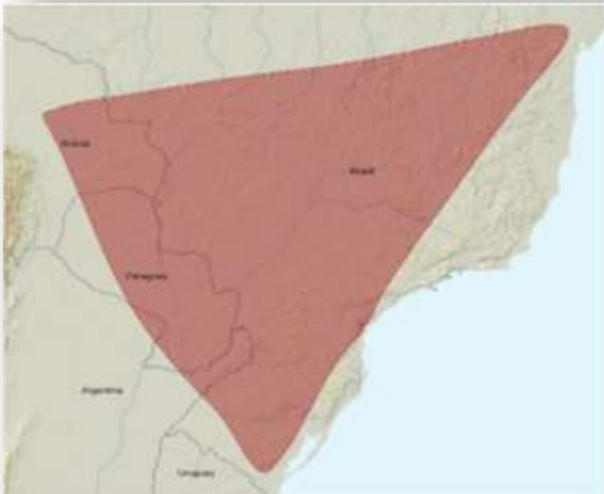


Final Species distribution map



# Examples of unacceptable maps

A maximum convex hull – no consideration given to habitat suitability!



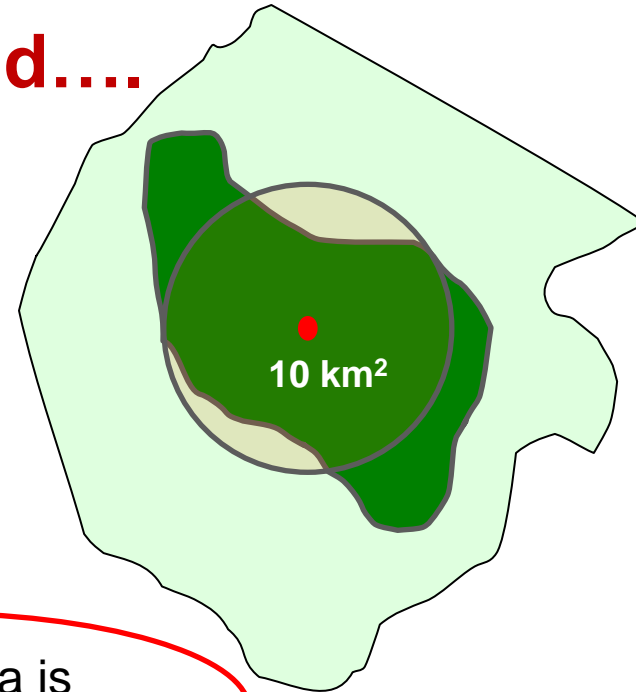


## If there are less than 3 points, a minimum convex polygon cannot be created....

- Use habitat information to inform the map

OR

- If no habitat data is available and experts have no idea where the species might be found, draw a circle with a 10 km<sup>2</sup> area around the points.



The 10 km<sup>2</sup> area is another ARLA exception!



- **For coastal species**, exclude the sea by clipping polygon to the coastline).



- **For coastal species**, exclude the sea by clipping polygon to the coastline in your GIS programme
- **For small islands**, we recommend mapping entire islands so map is easier to see

## Species with sensitive spatial data

- Collect accurate spatial data (e.g. for analyses), but either:
  - Do not publish a map on the Red List website
    - “Data\_sens” field in ArcGIS attribute table
  - Publish a vague “public” map that hides details of where the species is actually found





## Technical standards: Requirements for all maps

- Standard & preferred format = ESRI shapefiles
  - Other acceptable formats = Mapinfo, Googlemap, KML, other open source formats that can be converted
- Files are named by the scientific name: genus\_species
- All polygons should be smoothed and checked for irregularities before being submitted.
- GIS data required in Geographic coordinates [WGS84]
- Attributes are **required** with spatial data.
  - Includes codes for presence, origin and seasonality



**See “Spatial attributes and codes” for this table and more**

## Spatial data attributes: requirements

Field Name	Field type	Required	Description	Notes
Shape	String	Central*	Polygon or Point	
Binomial	String	Required	Scientific name of the species	This must match the corresponding field in SIS
Presence	Number	Required	Is/Was the species in this area	values 1-6 (default is "1" if not indicated)
Origin	Number	Required	Why/ How the species is in this area	values 1-5 (default is "1" if not indicated)
Seasonal	Number	Required	what is the seasonal presence of the species in the area	values 1-5 (default is "1" if not indicated)
Compiler	String	Required	Name of the individual/s or institution responsible for generating the polygon, if not IUCN.	Names should be given in full (e.g., John Smith; NatureServe; World Conservation Monitoring Centre etc). If not indicated, this will default to "IUCN"
Year	Date	Required	Year in which the polygon was mapped or compiled, or modified	If not indicated, this will default to the current year
Citation	String/Memo	Required	How should the entire polygon shapefile should be cited	This must be the same throughout the shapefile, and is how the map will be credited on the IUCN Red List. If not indicated, this will default to "IUCN (International Union for Conservation of Nature)"
Source	String	Optional	Source of distribution range given.	Relates to the primary source used to compile the map, especially a recently published range map, or a set of point data. If compiled in a workshop, or compiled from numerous sources, then field may be left empty. References should be in the format "AuthorX and AuthorY, date" and the reference should be in the corresponding IUCN Red List account.
Dist_comm	String	Optional	Distribution comments that refer directly to the polygon.	Examples include whether the polygon represents the type locality, names of protected areas or geographical features, and so forth. May also include specific notes on presence, origin or seasonality. Max 255 characters
Island	String	Optional	Name of the island the polygon is on	This relates mainly to very small islands or atolls (e.g. Midway Atoll; Meemu Atoll; Borneo; Bohol), particularly those not on the Vmap 1 base layer. Names must conform with the Times Atlas.
Subspecies	String	Required (if relevant)	Epithet	Only if assessed at the subspecies level. This must then match the corresponding field in SIS
Subpop	String	Required (if relevant)	Epithet	Only if assessed at the subpopulation level
Tax_comm	String	Optional	Taxonomic comments that refer directly to the polygon. Includes notes on polygons pertaining to subspecies or subpopulations.	Max 255 characters
Data_sens	Y/N	Optional	Flags up whether or not the polygon distribution is sensitive. This is most likely to be the case if the polygon/s effectively correspond to individual localities.	Yes or No field. If "Yes", then the field "Sens_comm" should be completed
Sens_comm	String	Required (if Data_sens is coded "Y")	Comments on why the data are considered sensitive.	Max 255 characters
Legend	String	Central*	This corresponds to the legend code resulting from combinations of the presence, origin and seasonality fields, and determines how the map will be displayed on the IUCN Red List	



**This table and definition of terms also “Spatial attributes and codes”**

**Coded values**

**Seasonality**

**Please note: some codes are mutually exclusive AND #3 is no longer in use (as of 2014).**

Code			Seasonality
1	Extant	Native	Resident
2	Probably Extant	Reintroduced	Breeding Season
3	Possibly Extant	Introduced	Non-breeding Season
4	Possibly Extinct	Vagrant	Passage
5	Extinct (post 1500)	Origin Uncertain	Seasonal Occurrence Uncertain
6	Presence Uncertain	—	—



## Options for creating maps:

- ESRI products (ArcMap 10.x)
  - ESRI training courses
    - Free online courses available
    - And possibly a few available through IUCN
  - Extensions (Spatial Analyst, Geostatistical Analyst)
- qGIS
- Googlemaps (create polygons in Google Earth)
- Hand-drawn maps (*absolute last resort!!*)
- Spatial data wiki: <http://speciesmapping.pbworks.com>



Free 1-year  
licence for ESRI  
ArcMap from the  
ARLA!



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ArcGIS 10.2.1 for Desktop Advanced software and the following extensions:

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- ArcGIS Network Analyst
- ArcGIS Publisher
- ArcGIS Schematics
- ArcGIS Spatial Analyst
- ArcGIS Tracking Analyst
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- ArcGIS Data Reviewer
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## Tools & resources available

- ArcGIS scripts and tools
- Additional tools to help manage data and expedite map generation (X tools, ET, Hawth's, Python, etc.)
- Tools specially developed to facilitate mapping in ArcGIS
  - Consistency checking and validating data
  - Many different scripts and extensions (e.g. customized extension which creates empty file with req fields; consistency checks to ensure no req fields are empty)



## Tools & resources available

- Master Amphibian shapefile
  - Isolate your species from this before editing them
  - If polygons do not need editing, the attribute table still requires updating (see “Spatial Attributes and codes” for guidance on how to complete this table)



**See RLA website for these  
and other resources**

**[http://www.amphibians.org/  
redlist/](http://www.amphibians.org/redlist/)**