



# ENDANGERED WILDLIFE TRUST

## Putting South African mammals on the map: updating the National Mammal Red List

### Who is the Endangered Wildlife Trust (EWT)?

The EWT is a non-governmental, non-profit, conservation organization, founded in 1973. It is based in South Africa, but operates with partners throughout sub-Saharan Africa. The EWT conserves threatened species and ecosystems in Southern Africa by initiating research and conservation action programmes, implementing projects which mitigate threats facing species diversity and supporting sustainable natural resource management.

### The Goal

The EWT and the South African National Biodiversity Institute (SANBI) launched the 2016 Red List of Mammals of South Africa, Lesotho and Swaziland in December 2016.

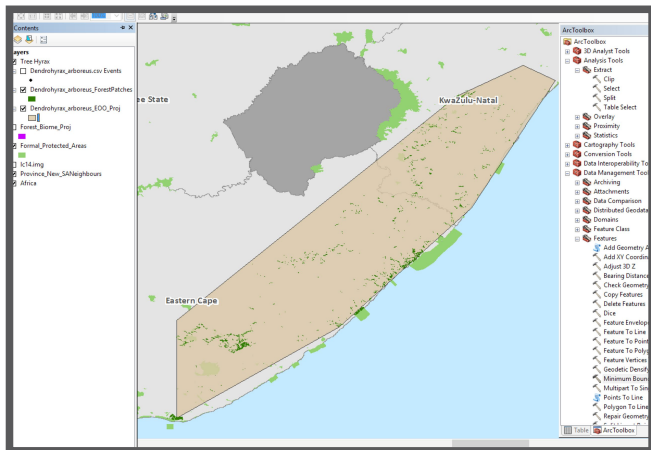
The 2016 Red List of Mammals was funded by SANBI (through a grant by the Norwegian Government that aims to build capacity in the Southern Africa region for undertaking assessments), the EWT, the Department of Environmental Affairs, E Oppenheimer & Son and the De Beers Group of Companies, and several species champions.

The project entails the process of updating the National Mammal Red List. Red Lists are used globally to assess the extinction risk of species and to guide governments and conservation organisations to prioritise their conservation efforts on those species that are most threatened with extinction. Red List assessments are done in a standardised way so that assessments are comparable across the world and between different species.

The Red List covers all of South Africa's indigenous mammal species, from the smallest Critically Endangered Juliana's Golden Mole, to economically important and relatively common species that are used for wildlife ranching, such as Cape Buffalo, Sable, Kudu and Blesbok, to popular charismatic species, such as Leopard, Rhino and Wild Dog, that are becoming increasingly threatened and restricted to fenced game reserves.

The assessment process involves gathering data from researchers, National Parks and other protected area surveys, citizen scientists, museums and NGOs. This data is integrated into a single database, analysed and mapped. After applying the Red List criteria, writing assessments and consulting experts, the final assessments are published. This is a huge collaborative project that, for the first time, has produced a large national mammal occurrence database that can be used for detailed mapping and spatial analyses. This provides the basis for more robust and objective assessments to be done, an important baseline for future Red List re-assessments, which are ideally repeated every 10 to 15 years.

The geographic range that a species covers is one of the most important criteria that is used to categorise the status of a species for the Red List. The geographic range of a species is typically assessed using two measures: the extent of occurrence (EOO) and the area of occupancy (AOO). The EOO is equivalent to the range of the species and the AOO encompasses those areas within the EOO that a species actually uses.



Assessment of EOO and AOO for the Tree Hyrax in ArcGIS

For example, a forest species will only be found within forest patches within its EOO, and not within grassland or woodland. Thus AOO is nearly always smaller than EOO.

The size of a species' EOO and AOO is used to assess how vulnerable it is to extinction. In addition, with land use change and, specifically, conversion of natural land to agriculture or urban settlements, species are losing their habitats, leading to declines in their population sizes. The extent of declines in habitat size is also used to assess a species vulnerability to extinction.

### The Challenge

To map the distribution and assess the status of all of South Africa's 300+ mammal species for the National Red List, an important document that guides conservation action and sets national priorities for the next decade.

### The Solution

Whereas in the previous Red List assessment, published in 2004, EOO and AOO were roughly estimated, in this 2016 revision, these were calculated more precisely, using ArcGIS.

ArcGIS geoprocessing tools for a precise calculation:

- Bounding Geometry Tool
- Clipping suitable habitat layers to the EOO

An example is the Tree Hyrax, which is an Endangered hyrax or dassie species. This tree-dwelling mammal is restricted to forest habitats occurring along the coast and inland areas in the Eastern Cape and KwaZulu-Natal provinces. With standardized techniques, its EOO can now be calculated as 49,232 km<sup>2</sup>, while its area of occupancy within forest patches is only 503 km<sup>2</sup>. These values can now be objectively re-calculated in future revisions of the Red List, and conservation action on the ground can be directed to the correct forest patches within its distribution range.

### The Benefits

ArcGIS assists in a precise calculation of geographic ranges for 300+ mammals for the 2016 Red List of Mammals of South Africa.

### Relevant links:

- Mammal of the week <http://www.ewt.org.za/>
- 2016 Mammal Red List assessments <https://www.ewt.org.za/Reddata/reddata.html>