Orycteropus afer – Aardvark


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Regional Red List status (2016)	Least Concern*†
National Red List status (2004)	Least Concern
Reasons for change	No change
Global Red List status (2015)	Least Concern
TOPS listing (NEMBA)	Protected
CITES listing	None
Endemic	No

*Watch-list Species †Watch-list Threat

Aardvarks are ecosystem engineers as their burrows create microclimates that enable a wide range of vertebrate species to survive in arid and semi-arid environments (Whittington-Jones et al. 2011).

Taxonomy

Orycteropus afer (Pallas 1766)

ANIMALIA - CHORDATA - MAMMALIA - TUBULIDENTATA - ORYCTEROPODIDAE - *Orycteropus* - *afer*

Synonyms: *Myrmecophaga afra* (Pallas 1766); *Myrmecophaga capensis* (Gmelin 1788)

Common names: Aardvark (English, Afrikaans), Antbear (English), Aardvark, Erdvark, Erdmannetjie (Afrikaans), Sambane (Ndebele, Swati, Zulu), Thakadu (Sesotho, Setswana), Xiyambana (Shangaan), S-ámbane (Swazi), Thagalu (Tshivenda), Ihodi (Xhosa), Xomboni (Xitsonga)

Taxonomic status: Species

Taxonomic notes: Aardvarks were originally thought to be congeneric with the South American anteaters (*Myrmecophaga*), until they were put in their own genus: *Orycteropus*. After 1872, Aardvarks were also put in their own order: the Tubulidentata. But this order was long considered to be closely related to the Xenarthrans and the pangolins in the now obsolete clade "Edentata" (Lehmann 2007). It is only since the beginning of the 20th century, that Aardvarks have been considered to be basal "ungulates". It was also at this time that the seven formerly recognised species were merged into the single species *Orycteropus afer* (Shoshani et al. 1988). Since then, Tubulidentata is the only order of mammals to be represented by a single living species. To date, 18 subspecies have been described (Shoshani et al. 1988; Skinner & Chimimba 2005; Lehmann 2007), of which only *O. a. afer* occurs in the assessment region (Meester et al. 1986). However, their validity is doubtful and studies in this regard are ongoing. Thus, although subspecies are likely to occur throughout their range in Africa, these are unresolved, and there is unlikely to be more than one subspecies in South Africa, Swaziland and Lesotho. Finally, at the turn of the millennium, molecular phylogenetic analyses integrated the Aardvarks into the new super-cohort Afrotheria, next to elephants, hyraxes, sea-cows, sengis, tenrecs, and golden moles. A taxonomic review has been made by Lehmann (2007).

Assessment Rationale

Although widespread within the assessment region, Aardvarks are nowhere common. They occur at low densities (for example, a study in the Karoo estimated the density to be *c*. 8 animals / 10 km^2). However, they are sometimes considered rare because of their elusive behaviour and not necessarily a result of low numbers. Further density estimates across their range are required to estimate population size. The reproductive rates of Aardvarks are low (maximum one offspring / year), which makes them vulnerable to disturbance. For example, the effects of the bushmeat and traditional medicine trade, as well as persecution for damaging fences and croplands, may cause local population declines and extinctions. As such, their numbers undoubtedly are reduced in areas where their habitat is altered by human activities or where there is high human density. Human settlements have expanded by 0.8% to 38% across all South African provinces between 2000 and 2013. Furthermore, evidence is amassing that climate change is causing population decline in some areas. Thus, long-term systematic monitoring of subpopulation trends is needed to assess the impact of these cumulative threats and this species should be reassessed when such data are available as it may qualify for the Near Threatened category in the future. The conversion from livestock to wildlife ranching may be counteracting habitat loss for this species and sustaining the ant and termite resources on which this species depends, but should be weighed against possible increases in persecution resulting from fence damage. Similarly, the effectiveness of interventions to reduce persecution, such as swing-gates and tyres, should be tested. Aardvarks might be a keystone species and ecosystem engineer in natural habitats as some species could rely on their burrows for increased survival. Thus the conservation of this species is important for wider biodiversity.

Regional population effects: Rescue effects are possible as much of their current habitat is connected to natural habitat outside of the assessment region, especially in the

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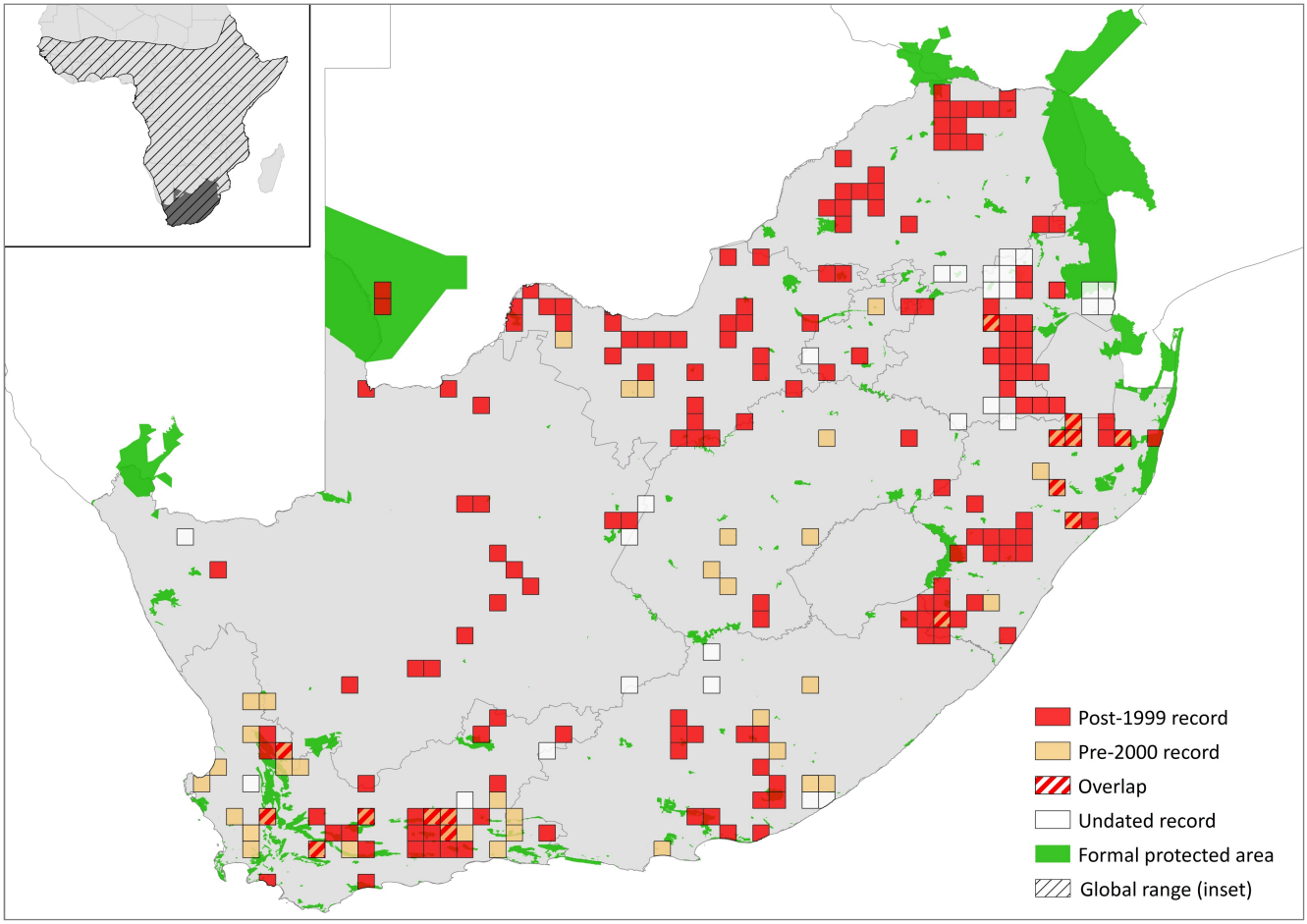

Figure 1. Distribution records for Aardvark (*Orycteropus afer*) within the assessment region

Table 1. Countries of occurrence within southern Africa

Country	Presence	Origin
Botswana	Extant	Native
Lesotho	Possibly Extant	Native
Mozambique	Extant	Native
Namibia	Extant	Native
South Africa	Extant	Native
Swaziland	Extant	Native
Zimbabwe	Extant	Native

semi-arid regions. Their dispersal capacity is suspected to be good, seeing as they have been measured to cover 2.7–8.4 km per night when foraging (van Aarde et al. 1992; Taylor & Skinner 2003).

Distribution

The Aardvark is widely distributed south of the Sahara from Senegal to Ethiopia to South Africa, being absent from the Sahara and Namib Deserts. It is also present in the Congo Basin, although its distribution in West African rainforests is poorly known (Taylor 2013). In southern Africa, they are widespread in Namibia (except the Namib Desert), Botswana, Zimbabwe, Mozambique and South Africa (Skinner & Chimimba 2005). The distribution of the Aardvark is largely determined by the distribution of suitable ant and termite species and where the soils are conducive to digging burrows. Geographic range has not changed in recent times, although they may be disappearing from countries where the bushmeat trade is a problem, and they certainly experience habitat loss locally due to agriculture and human expansion.

Within the assessment region, Aardvarks occur almost throughout the entire country of South Africa, where sightings indicate presence in all provinces, and are only absent from small parts of the Western Cape and Northern Cape. Although there are no records available for Swaziland, they occur widely in the country (Monadjem 1998). While Lynch (1994) predicted it might marginally occur in Lesotho, there are no records from the region. Occurrence is sparse but extensive. They occur on human-disturbed habitats too, such as in the Natal Midlands on farmlands that are grazed or cut. No range contractions or expansions have been recorded.

Population

Current population trends are not known. In southern Africa there is no reason to believe that they are decreasing or increasing significantly due to any factors other than natural variations resulting from the nature of the arid habitats they occupy. Densities vary according to habitat suitability, including the abundance of prey, but cannot be directly tied to observed burrow densities as Aardvarks change burrows frequently and an area may contain many abandoned burrows (Taylor 2013). A study in the Karoo estimated the density of Aardvarks to be *c*. 8 animals / 10 km^2 (Taylor & Skinner 2003).

Within the assessment region, the number of mature

individuals is unknown but likely to be > 10,000 given their extensive distribution. This may represent 10–30% of the global population because Aardvark numbers have declined in countries where bushmeat poaching is an issue. There are no quantified data on population trends, but we can assume they are not declining as there are no major threats in the country and protected areas in South Africa are not subject to significant bushmeat poaching, as is the case in countries outside the region (Lindsey et al. 2013). However, anecdotal evidence suggests that numbers may be declining slowly in smaller natural or protected areas, due to the cumulative impacts of persecution, hunting and climate change, but further research and monitoring is needed to confirm these suspected local declines.

Their level of fragmentation is unknown, but suspected to not be severe. Aardvarks occur inside and outside of protected areas and are therefore able to move fairly freely. Fences are not always a barrier to Aardvarks as they burrow underneath them (Schumann et al. 2006). Thus, it is unlikely that Aardvarks occur in distinct subpopulations because they have relatively free movement across their range.

Reproductive rates and survival rates are unknown in the wild. Zoo animals are known to live up to 14–20 years, although it is unlikely Aardvarks live this long in the wild. Although zoo animals grow quickly, this is not the case in the wild where the diet is restricted to ants and termites. Aardvarks are unlikely to reproduce in the wild before three years of age. If they live to an average age of 15 years, an educated guess for average age of reproduction would be somewhere between six and 10 years (A. Taylor unpubl. data). Pacifici et al. (2013) have estimated generation length in the wild to be 9.9 years.

Current population trend: Stable, but local declines are suspected.

Continuing decline in mature individuals: Unlikely

Number of mature individuals in population: Unknown, but suspected to be > 10,000.

Number of mature individuals in largest subpopulation: Unknown

Number of subpopulations: Unknown

Severely fragmented: No. Can occur in multiple land uses and can get through fences.

Habitats and Ecology

Aardvarks occur in a broad range of habitats, including the semi-arid Karoo areas of southern Africa, grasslands, all savannah types, rainforests, woodlands and thickets (Shoshani et al. 1988; Taylor 2013). They are well-adapted for multiple habitats, including arid regions, as long as sufficient prey are available (Taylor & Skinner 2004). They are absent from hyper-arid habitats and avoid very rocky terrain that is difficult to dig in. They occur at all altitudes within the assessment region, but are not common on steep slopes (Skinner & Chimimba 2005; Taylor 2013). They are also known to occupy farmlands, for example in the Drakensberg Midlands of KwaZulu-Natal Province (Ramesh & Downs 2015). Mean home range size in the Karoo has been estimated at 3.5 km^2 for both sexes: 2–4.7 km^2 for males and 4.4–4.6 km^2 for females (van Aarde et al. 1992). A more recent study in the same region estimated 2.4–2.7 km^2 for females and 2.1–3 km^2 for males (Taylor & Skinner 2003).

They feed almost exclusively on ants and termites but sometimes eat other insects, such as pupae of scarabaeid beetles or grasshoppers (Taylor et al. 2002), and possibly the fruit of the wild "Aardvark-cucumber" (*Cucumis humifructus*) (Meeuse 1963). In Tussen-die-Riviere Nature Reserve, Free State Province, 13 species of ants and two species of termites consumed, *Anoplolepis custodiens* was the most dominant prey species (Willis et al. 1992). They are thought to obtain most of their water requirements from their food, however, there are no physiological studies to support this and it is an assumption based on observations from the Nama Karoo where Aardvarks hardly ever drink. It has been suggested that feeding on the Aardvark Cucumber may be a way of increasing their water intake in some regions (Melton 1976). They also require soils amenable to digging that are not too shallow (in order to dig burrows). They are anatomically adapted to dig, and they extract all their food from underground. They also dig burrows in which they rest during the day and which they use to escape predators (Taylor & Skinner 2003). A recent study in Ghana (Bui National Park) suggested that the burrow density was dependent on the distance to a watercourse (Oduro & Boateng 2009). They are generally nocturnal, although they may come out in the afternoon in cold weather. They are solitary, only coming together occasionally for very short periods. Very little is known about their reproduction in the wild.

Ecosystem and cultural services: Aardvarks are considered a keystone species in grasslands as their burrows create a micro-habitat which facilitates the existence of many other vertebrate (and invertebrate) species (Taylor & Skinner 2000, 2001; Cilliers 2002; Whittington-Jones et al. 2011). As many as 39 nocturnal and diurnal species (25 mammals, seven birds, six reptiles and one amphibian) have been recorded to make use of Aardvark burrows for short- or long-term shelter and as a place to rear their young. One notable species that relies on Aardvark burrows is the threatened Blue Swallow (*Hirundo atrocaerulea*) (Evans & Bouwman 2010). Blue Swallows are listed as Critically Endangered in South Africa (Evans 2015), and nest in mist-belt grasslands and construct cup-shaped nests in Aardvark burrows (Wakelin & Hill 2007; Wakelin et al. 2013). A loss of Aardvarks in areas where Blue Swallows occur may have dire consequences for their survival.

Use and Trade

Aardvarks are used for meat, curios (skin, claws and teeth), and for some traditional medicinal purposes. Within the assessment region, it is highly sought after in the traditional medicine trade and hunted for bushmeat (tails regarded as a delicacy). This is especially the case in Swaziland, but the degree to which this occurs nationally is not thought to negatively impact the population. However, they may be increasingly sourced from core conservation areas. They have been recorded in traditional medicine markets in the Eastern Cape and Gauteng provinces at least (Simelane & Kerley 1998; Whiting et al. 2011). The most severe threat is the bushmeat trade, but the degree of use within the assessment region is unknown. In western Kenya, local hunters flooded burrows to kill animals for food (Rathbun 2011). No international trade issues are known.

Table 2. Use and trade summary for the Aardvark (*Orycteropus afer*)

Category	Applicable?	Rationale	Proportion of total harvest	Trend
Subsistence use	Yes	Likely to be taken for bushmeat in some areas.	Unknown but small	Unknown
Commercial use	Yes	Taken for traditional medicine purposes and sold in markets.	Unknown but small	Unknown
Harvest from wild population	-	-	-	-
Harvest from ranched population	-	-	-	-
Harvest from captive population	-	-	-	-

Table 3. Possible net effects of wildlife ranching on the Aardvark (*Orycteropus afer*) and subsequent management recommendations

Net effect	Positive
Data quality	Suspected
Rationale	Informal sightings on game farms/wildlife ranches suggest the species can thrive on these land-uses, especially if the veld is left fallow and not managed to increase herbivore biomass.
Management recommendation	Allow natural termite and ant densities on land; don't attempt to exterminate ants and termites.

Wildlife ranching is generally considered to be increasing and enhancing habitat for this species. However, the land should be left unmanaged as far as possible to sustain termite and ant density. Managing for herbivore biomass alone might not benefit this species. However, Whittington-Jones (2006) suggests that increased trampling of grass pastures by cattle creates favourable conditions for termites. It may also be persecuted as a damage causing animal for digging under fences and facilitating escapes of economically important game species. We suspect that, in general, the increase in wildlife ranching is having a positive effect on Aardvark subpopulations because of the increase in the amount of optimal habitat, but this requires further research.

Threats

There are no known major threats to the species that have been quantified. However, local declines are likely due to the cumulative impacts of habitat loss from agricultural and human settlement expansion and associated subsistence hunting and persecution. Climate change may represent an emerging threat. The following threats occur within the assessment region:

1. *Agricultural expansion*: Currently, Aardvarks both lose habitat to agricultural practices, particularly croplands, and are persecuted by farmers because of the damage caused by burrows to dams, fences, roads, mechanical equipment and injury to domestic livestock falling in burrows. Damage to game fences allow valuable game species to escape and also allow predators to access game-fenced areas (Schumann et al. 2006; Weise et al. 2014; Rust et al. 2015) This is an ongoing but low-severity threat. For example, in the North West Province, farmers have mentioned that they are a problem due to digging holes on roads and are blamed for injuries to cattle calves that have fallen in their holes (Power 2014).
2. *Hunting*: Aardvarks are killed for claws, teeth and skins, and used in traditional medicine or for curios. This is probably an ongoing but low-severity threat. Similarly, they are killed for their protein, either for sale in illegal markets or for personal consumption. The level of this threat is unknown in the assessment region, but is probably very low. Outside of the assessment region, this is a significant threat (Lindsey et al. 2013).

Table 4. Threats to the Aardvark (*Orycteropus afer*) ranked in order of severity with corresponding evidence (based on IUCN threat categories, with regional context)

Rank	Threat description	Evidence in the scientific literature	Data quality	Scale of study	Current trend
1	*2.3.2 Small-Holder Grazing, Ranching or Farming*: current stress *2.1 Species Mortality*: persecution for damage to fences and infrastructure.	-	Anecdotal	-	Possibly increasing with expansion of wildlife ranching and breeding of valuable game species.
2	*5.1.1 Hunting & Collecting Terrestrial Animals*: harvesting of species for use in traditional medicine and bushmeat trade.	Whiting et al. 2011	Empirical	Local	Possibly increasing with human settlement expansion.
3	*11.2 Droughts*: increased aridity and drought conditions caused by climate change.	Erasmus et al. 2002	Simulation	National	Increasing

Table 5. Conservation interventions for the Aardvark (*Orycteropus afer*) ranked in order of effectiveness with corresponding evidence (based on IUCN action categories, with regional context)

Rank	Intervention description	Evidence in the scientific literature	Data quality	Scale of evidence	Demonstrated impact	Current conservation projects
1	*2.1 Site/Area Management*: install swing gates and/or car tyres into wildlife-proof fences to reduce persecution rates.	Schumann et al. 2006	Indirect	Local	Number of Aardvark holes created significantly decreased following swing-gate or tyre installation in fences.	None known.
		Rust et al. 2015	Indirect	Local		
		Weise et al. 2014	Indirect	Local		
2	*4.3 Awareness & Communications*: educate and sensitise farmers and landowners about the importance of Aardvarks in ecosystems and holistic management techniques.	-	Anecdotal	-	-	None

3. *Climate change*: Food sources may be affected by increasing desiccation of habitat. In 2013, there was a significant die-off of Aardvarks in an area of the Tswalu Kalahari Reserve studied by a WITS research team (L. Meyer unpubl. data). This die-off resulted from an abnormally hot and dry period. Most of the animals observed were extremely thin before they died. From the temperature and activity data loggers from some of the dead animals, a slow decline in minimum body temperature was observed, a finding that is known to reflect a poor nutritional state. Interestingly, these Aardvarks also completely shifted their activity patterns and became more diurnal and foraged more in the mornings and late afternoons. At the time food availability was not measured directly but assumptions are that the dry and hot conditions decreased the ant and termite populations. Similar activity shifts and dies-offs have been reported during droughts in Namibia in the 1980s (Stuart & Stuart 2007). Other anecdotal reports have indicated similar die-offs in areas of Limpopo.

Current habitat trend: The habitat for this species is stable, seeing as they can utilise multiple habitat types and land uses, and it is suspected that wildlife ranching is creating more available habitat. However, recent remote sensing data reveal a continuing expansion in both urban and rural settlements, having increased from 0.8% to 38% across all provinces between 2000 and 2013 (GeoTerraImage 2015), which may increase local declines from hunting. Climate change also has the potential to reduce Aardvark habitat, especially as wet areas continue to contract eastwards in South Africa and droughts become more frequent (Erasmus et al. 2002).

Conservation

They are present in a number of large and well-managed protected areas across the assessment region. No targeted conservation measures are necessary at present, but this should be revisited if further data becomes available. Additionally, conservationists should work with land owners to trial wildlife-friendly fences and collate the evidence for their effectiveness in reducing persecution rates. For example, research from Namibia has shown that swing gates may be an effective alternate passageway for burrowing animals: both Schumann et al. (2006) and Rust et al. (2015) showed that the installation of swing gates decreased the number of holes created by Aardvark across the duration of the study, as the Aardvarks selected swing-gates instead. Similarly, the use of discarded car tyres installed into wildlife-proof fences has been demonstrated to be a cost-efficient and effective way to reduce damage and facilitate dispersal, where Aardvarks were observed to use the tyres as passageways (Weise et al. 2014). Similar interventions should be conducted in the assessment region. Awareness and education campaigns should be used to target farmers, wildlife ranchers and other landowners on the importance of Aardvarks as a keystone species and on potential mitigation measures for any potential damage caused.

Recommendations for land managers and practitioners:

- No management plans are currently necessary, but land managers should allow ants and termites to reach natural densities. They should also be encouraged to trial wildlife-friendly fence designs.
- Practitioners and researchers should use the correct drug combination when immobilising Aardvarks so as not to impair recovery (Nel et al. 2000; Rey et al. 2014).

Research priorities:

- Determine population size and trends across its range to quantify potential decline rates.
- Quantify the effects of threats on population, especially persecution and bushmeat mortalities.
- Research effectiveness of wildlife-friendly fencing in reducing persecution rates.
- Determine breeding success (and general breeding observations) of individuals in the wild.

Encouraged citizen actions: As the Aardvark is a large and easily identifiable species, it lends itself to being recorded by citizens on virtual museum platforms (for example, iSpot and MammalMAP). This would be very useful to help determine area of occurrence, which has not been determined for Aardvarks within the assessment region.

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Data Sources and Quality

Table 6. Information and interpretation qualifiers for the Aardvark (*Orycteropus afer*) assessment

Data sources	Field study (literature), indirect information (expert knowledge)
Data quality (max)	Inferred
Data quality (min)	Suspected
Uncertainty resolution	Expert consensus
Risk tolerance	Evidentiary

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Details of the methods used to make this assessment can be found in *Mammal Red List 2016: Introduction and Methodology.*

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