Mungos mungo – Banded Mongoose


Chris & Mathilde Stuart

Regional Red List status (2016)	Least Concern
National Red List status (2004)	Least Concern
Reasons for change	No change
Global Red List status (2016)	Least Concern
TOPS listing (NEMBA) (2007)	None
CITES listing	None
Endemic	No

In addition to living in groups numbering tens of individuals, Banded Mongooses are plural breeders, females giving birth synchronously, and provide cooperative care to the communal litter of pups (Cant & Gilchrist 2013).

Taxonomy

Mungos mungo (Gmelin 1788)

ANIMALIA - CHORDATA - MAMMALIA - CARNIVORA - HERPESTIDAE - *Mungos - mungo*

Synonyms: *Viverra mungo* Gmelin 1788

Common names: Banded Mongoose, Zebra Mongoose (English), Gebande Muishond, Barasinga (Afrikaans), Usikibhoror (Ndebele), Moswe, Moswê (Sepedi), Letodi (Sesotho), Letôtôtô, Letara, Lejara (Setswana), Lichacha (Swati), Nkala (Tsonga), Tshihoho, Tzwikitowe (Venda), Ubuhala, Ubuhaye (Zulu)

Taxonomic status: Species

Taxonomic notes: Although there is historic recognition of the southern African subspecies, *Mungos mungo taenionotus* (Kingdon 1997), from KwaZulu-Natal and Mpumalanga, and *M. m. grisonax* from the North West, Limpopo and Gauteng provinces (Skinner & Chimimba 2005), these subspecies are no longer recognised. Skinner and Chimimba (2005) describe the variation in pelage colour between these previously recognised subspecies, with *M. m. grisonax* lighter in colour than *M. m. taenianotus*.

Assessment Rationale

The Banded Mongoose is listed as Least Concern as, although its distribution is restricted to the northeast of the assessment region, it is generally common in suitable habitat and is present in several protected areas. There are no major threats that could cause range-wide population decline. Accidental persecution through poisoning, controlled burning, and infectious disease may lead to local declines, whilst wildlife ranching might have a positive effect by conserving more suitable habitat and connecting subpopulations.

Regional population effects: Dispersal across regional borders is suspected as the range extends widely into Mozambique and is continuous into southeastern Botswana and southern Zimbabwe, and the species is not constrained by fences.

Distribution

This species is distributed widely in sub-Saharan Africa from Senegal and Gambia to Ethiopia, Eritrea and Somalia, and south to about 31° in South Africa. It has been recorded to 1,600 m asl. in Ethiopia (Yalden et al. 1996). Although fairly widespread in southern Africa, *M. mungo* appears to be rare in West Africa. Its relative scarcity in West Africa may be due to niche overlap with its congener, the Gambian Mongoose (*M. gambianus*), endemic to West Africa and reported to occupy similar habitat and have a similar diet (Cant & Gilchrist 2013; van Rompaey & Sillero-Zubiri 2013).

Within the assessment region, Banded Mongooses occur in bushveld in Limpopo Province, Mpumulanga, Gauteng, North West Province, and KwaZulu-Natal bushveld and South Coast. They are also present as an apparently isolated population in the Kgalagadi Transfrontier Park, centred on the Nossob River, Northern Cape Province (C. Stuart & M. Stuart pers. obs. 2000). It is possibly linked to either the northern or eastern population, but information is lacking. Although uncommon, the species also occurs in Swaziland (Monadjem 1998).

Population

Recorded densities vary widely between habitats and locations. In South Africa, Maddock (1988) estimated population density in Vernon Crookes Nature Reserve (KwaZulu-Natal) at 2.4 individuals / km^2. On the Serengeti plains (Tanzania), density was estimated as 2.2 individuals / km^2 (Waser et al. 1995). By contrast, a population in Queen Elizabeth National Park (Uganda) was reported to live at higher densities, averaging 18 individuals / km^2 (Cant & Gilchrist 2013). Generation length is estimated to be 4.3 years (Gilchrist & Do Linh San 2016).

Current population trend: Unknown, but probably stable based on wide habitat tolerance and lack of threats.

Continuing decline in mature individuals: Unknown, but unlikely.

Recommended citation: Gilchrist JS, Stuart C, Stuart M, Do Linh San E. 2016. A conservation assessment of *Mungos mungo*. In Child MF, Roxburgh L, Do Linh San E, Raimondo D, Davies-Mostert HT, editors. The Red List of Mammals of South Africa, Swaziland and Lesotho. South African National Biodiversity Institute and Endangered Wildlife Trust, South Africa.

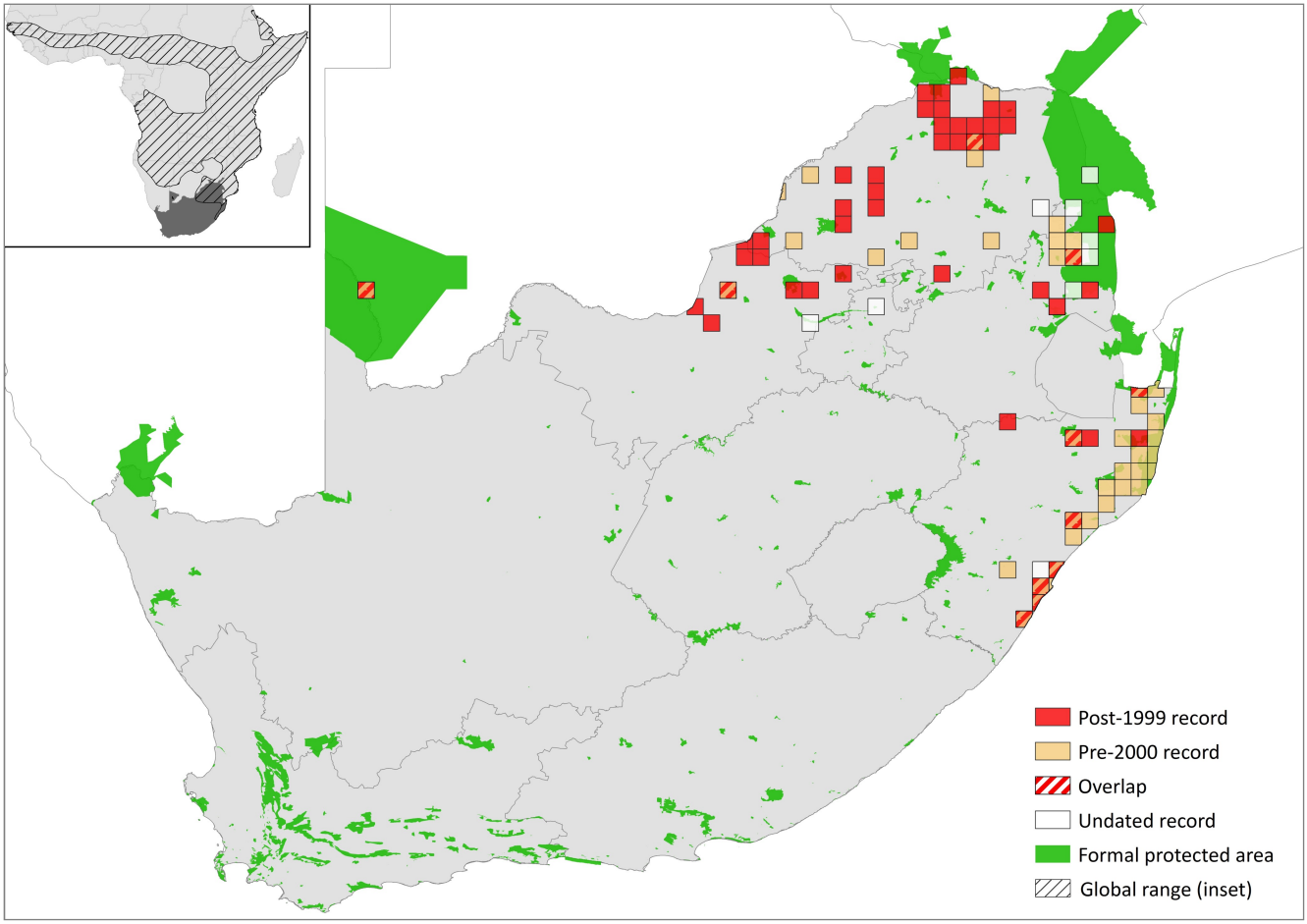

Figure 1. Distribution records for Banded Mongoose (*Mungos mungo*) within the assessment region

Table 1. Countries of occurrence within southern Africa

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

Number of mature individuals in population: Unknown

Number of mature individuals in largest subpopulation: Unknown

Number of subpopulations: It is not currently possible to determine the extent or number of subpopulations.

Severely fragmented: No. Favourable habitats are relatively well connected across this species' range.

Habitats and Ecology

Banded Mongooses occur in a wide range of habitats, but they are primarily found in savannah and woodland, usually close to water, and are absent from desert, semi-desert and montane regions (Cant & Gilchrist 2013). They are often found in habitats containing termitaria, which are used as den sites: with an average den density of 0.71 dens / ha on a beef and game farm in Natal (Hiscocks & Perrin 1991a). They have also been observed in towns and villages. Their diet consists mainly of insects, with other invertebrates, vertebrates (including reptiles, amphibians, the eggs and young of birds, small mammals), and wild fruits also consumed (Hiscocks & Perrin 1991b; Gilchrist et al. 2009; Maddock et al. 2016). Banded Mongooses have been observed to remove ectoparasites (ticks) from Common Warthog (*Phacochoerus aethiopicus*; Plumptre 2016). They are also known to forage on human garbage (Gilchrist & Otali 2002; Otali & Gilchrist 2004; Fairbanks Flint et al. 2016).

The Banded Mongoose is a highly social and territorial species that lives in groups of 4–29 individuals (Photo 1)

Photo 1. Banded mongoose group (*Mungos mungo*). Groups consist of multiple adult males and females with associated dependent pups. Banded Mongooses are plural breeders – most adults engage in reproduction (Jason S. Gilchrist)

Table 2. Possible net effects of wildlife ranching on the Banded Mongoose (*Mungos mungo*) and subsequent management recommendations

Net effect	Positive
Data quality	Inferred
Rationale	Conservation of habitat and restricted use of burning as a management tool may help to sustain denser subpopulations. However, Banded Mongooses may sometimes be killed as bycatch as part of damage-causing animal (DCA) control.
Management recommendation	Do not burn too frequently and conserve termite mounds where possible. Use holistic (selective or non-lethal) control methods for DCAs.

with low reproductive skew, i.e. most females breed (Gilchrist et al. 2009), hence making populations less vulnerable to stochastic effects than other social mongoose species such as Suricate (*Suricata suricatta*) and Common Dwarf Mongoose (*Helogale parvula*). Home range size is likely larger in more arid areas of South Africa compared to equatorial Uganda (0.61 to 2.01 km^2; Gilchrist & Otali 2002). The species is diurnal and foraging distance ranges from 2 to 10 km per day (Neal 1970; Rood 1975, 1986). Dispersal occurs via voluntary fission and eviction (Cant et al. 2013). Within groups, relatedness is high within (but not between) females and males (Cant et al. 2013). In Queen Elizabeth National Park, Banded Mongooses breed up to four times a year, while only one to two litter(s) per year have been recorded in drier regions (Cant & Gilchrist 2013). Mean age of first conception is 321 days and mean litter size per female at birth (all females) is estimated at 3.32 (Gilchrist et al. 2004), with a gestation period of 90 days (Cant 2000). Within groups, parturition is usually synchronous (Hodge et al. 2011). Group demography impacts female reproductive success via abortion, eviction and infanticide with younger females bearing the costs (Gilchrist 2006a; Cant et al. 2013). Fecundity and reproductive success are correlated with female age and size (Gilchrist 2006b; Nichols et al. 2012). Survival rate is low in pups (0.299) and high in adults (0.857) (Otali & Gilchrist 2004). Maximum lifespan is 13 years in males and 11 years in females (Cant & Gilchrist 2013). The species is a carrier of *Leptospira interrogans,* a pathogen capable of infecting humans (Jobbins et al. 2013), as well as a possible vector of rabies. The Banded Mongoose is susceptible to human tuberculosis (*Mycobacterium tuberculosis*; Alexander et al. 2002) and the novel derivative *M. mungi* (Alexander et al. 2010). The latter has shown to be acute and cause high mortality, and to be associated with increased aggression and injury at garbage sites (Fairbanks Flint et al. 2016).

Ecosystem and cultural services: Mongooses in general are known to predate snakes and rats. Banded Mongooses are no exception and will occasionally take both.

Use and Trade

This species is not known to be used or traded in any form in the assessment region. Consumption of Banded Mongoose meat has been recorded in Botswana (Jobbins et al. 2013) and Mozambique (Fusari & Carpaneto 2006), but is not known within the assessment region.

Wildlife ranching may have a positive effect on this species by conserving more suitable habitat (e.g. Cousins et al. 2008, with research in southern Africa suggesting that intensive livestock farming can degrade natural habitat, e.g. Dougill et al. 2006) and possibly helping to connect subpopulations. More research needs to be carried out, however, to determine this relative to livestock farms.

Threats

There are no major current threats to this species.

Wildlife ranchers do not persecute Banded Mongooses directly, but some animals may be killed as bycatch in control programmes of damage-causing animals (DCAs), especially where poison baits are in use. Impact, however, is likely minimal.

Like small mammals, Banded Mongooses may be affected by controlled burning via changes to habitat structure and therefore food availability and predation risk. Research on small mammals has shown that the population effect of fire can be negative or positive (it is species specific; Yarnell et al. 2007). Mongooses may escape fire by using their subterranean dens or termitaria (as for the Short-snouted Elephant Shrew *Elephantulus brachyrhynchus*; Yarnell et al. 2008) and then may benefit from increased invertebrate availability, firstly via the burn,

Table 3. Threats to the Banded Mongoose (*Mungos mungo*) 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	*5.1.2 Hunting & Collecting Terrestrial Animals*: accidental persecution (i.e. as bycatch) through poisoning for damage-causing animals.	-	Anecdotal	Local	Unknown, but probably minimal and stable.
2	*7.1.1 Increase in Fire Frequency/Intensity*: incorrect burning regime.	-	Anecdotal	Local	Unknown, but possibly increasing (based on unpubl. data on fire management).
3	*8.4.2 Problematic Species/Diseases of Unknown Origin*: e.g. *Mycobacterium tuberculosis*.	Alexander et al. 2002, 2010	Empirical	Local	Unknown, but possibly increasing.

Table 4. Conservation interventions for the Banded Mongoose (*Mungos mungo*) 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*: avoid use of poison and promote use of the "holistic" approach to the management of damage-causing animals instead.	-	Anecdotal	-	-	-
2	*2.3 Habitat and Natural Process Restoration*: employ appropriate fire management for savannah and grassland habitats used by the species.	-	Anecdotal	-	-	-
3	*4.3 Awareness & Communications*: education to minimise disease transfer between humans and wildlife.	-	Anecdotal	-	-	

and subsequently via the fresh growth attracting insects. It is notable that data on fire impact on *E. brachyrhynchus* and the Lesser Red Musk Shrew (*Crocidura hirta*), two insectivorous small mammals, indicate no significant impact of controlled burns on survival (Yarnell et al. 2007, 2008). Fire impact on Banded Mongoose has not yet been quantified.

Banded Mongooses can be susceptible to infectious disease, including human pathogens (Alexander et al. 2002, 2010).

Current habitat trend: Stable or possibly increasing due to increase in wildlife ranching industry.

Conservation

The Banded Mongoose has been recorded in many national parks and provincial and private nature reserves, as well as on game ranches in six of the nine South African provinces, and occurs in proximity to villages and towns.

Recommendations for land managers and practitioners:

- Minimise use of non-selective control methods (e.g. poison) for DCAs.
- Private landowners should ensure that they do not burn the land too frequently and that termite mounds are conserved.
- Create conservancies to protect and connect favourable habitat.
- Limit exposure to human pathogens, including TB, e.g. by restricting mongoose access to garbage pits and human excrement.

Research priorities: This is one of the few African small carnivore species which has been relatively well studied (see review in Cant & Gilchrist 2013). However, the majority of behavioural ecology research is derived from Uganda with disease monitoring from Botswana. The following research topics will assist in gathering conservation-relevant information:

- Long-term monitoring of (some) subpopulations.
- Evaluation of relative impact of wildlife ranching on habitat and populations.
- Documenting the degree to which controlled burning impacts on population levels.
- Disease evaluation in southern African populations.

Encouraged citizen actions:

- Report sightings on virtual museum platforms (for example, iSpot and MammalMAP), especially outside protected areas. As confusion with Suricates (and other mongoose species) is possible, a photograph is required for confirmation of identification, especially when sightings are made in areas where the distribution ranges of both mongoose species overlap.
- Limit Banded Mongoose access to garbage pits and human excrement.

Data Sources and Quality

Table 5. Information and interpretation qualifiers for the Banded Mongoose (*Mungos mungo*) 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

References

Alexander KA, Pleydell E, Williams M, Lane EP, Myange JFC, Michael AF. 2002. *Mycobacterium tuberculosis*: an emerging disease of free-ranging wildlife. Emerging Infectious Diseases **8**:598–601.

Alexander KA, Laver PN, Michel AL, Pleydell E, Williams MC, van Helden PD, Warren RM, Gey van Pittius NC. 2010. Novel *Mycobacterium tuberculosis* complex pathogen, *M. mungi*. Emerging Infectious Diseases **16**:1296–1299.

Cant MA. 2000. Social control of reproduction in banded mongooses. Animal Behaviour **59**:147–158.

Cant MA, Gilchrist JS. 2013. *Mungos mungo* Banded Mongoose. Pages 354–360 in Kingdon J, Hoffmann M, editors. The Mammals of Africa. Volume V: Carnivores, Pangolins, Equids and Rhinoceroses. Bloomsbury Publishing, London, UK.

Cant MA, Vitikainen E, Nichols HJ. 2013. Demography and social evolution of banded mongooses. Advances in the Study of Animal Behaviour **45**:407–445.

Cousins JA, Sadler JP, Evans J. 2008. Exploring the role of private wildlife ranching as a conservation tool in South Africa: stakeholder perspectives. Ecology and Society **13**:43.

Dougill AJ, Akanyang L, Perkins JS, Eckardt FD, Stringer LC, Favretto N, Atlhopheng J, Mulale K. 2016. Land use, rangeland degradation and ecological changes in the southern Kalahari, Botswana. African Journal of Ecology **54**:59–67.

Fairbanks Flint B, Hawley DM, Alexander KA. 2016. Do not feed the wildlife: associations between garbage use, aggression, and disease in banded mongooses (*Mungos mungo*). Ecology & Evolution **6**:5932–5939.

Fusari A, Carpaneto GM. 2006. Subsistence hunting and conservation issues in the game reserve of Gile, Mozambique. Biodiversity & Conservation **15**:2477–2495.

Gilchrist JS. 2006a. Female eviction, abortion, and infanticide in banded mongooses (*Mungos mungo*): implications for social control of reproduction and synchronized parturition. Behavioral Ecology **17**:664–669.

Gilchrist JS. 2006b. Reproductive success in a low skew, communal breeding mammal: the banded mongoose, *Mungos mungo*. Behavioral Ecology and Sociobiology **60**:854–863.

Gilchrist JS, Do Linh San E. 2016. *Mungos mungo*. The IUCN Red List of Threatened Species 2016: e.T41621A45208886.

Gilchrist JS, Otali E. 2002. The effects of refuse-feeding on home-range use, group size, and intergroup encounters in the banded mongoose. Canadian Journal of Zoology **80**:1795–1802.

Gilchrist JS, Jennings AP, Veron G, Cavallini P. 2009. Family Herpestidae (mongooses). Pages 262–328 in Wilson DE, Mittermeier RA, editors. Handbook of the Mammals of the World, Volume 1: Carnivores. Lynx Edicions, Barcelona, Spain.

Gilchrist JS, Otali E, Mwanguhya F. 2004. Why breed communally? Factors affecting fecundity in a communal breeding mammal: the banded mongoose (*Mungos mungo*). Behavioral Ecology and Sociobiology **57**:119–131.

Hiscocks K, Perrin MR. 1991a. Den selection and use by dwarf mongooses and banded mongooses in South Africa. South African Journal of Wildlife Research **21**:119–122.

Hiscocks K, Perrin MR. 1991b. A dietary comparison between two sympatric viverrids, *Helogale parvula* (Sundevall 1846) and *Mungos mungo* (Gmelin 1788). Journal of African Zoology **105**:307–312.

Hodge SJ, Bell MBV, Cant MA. 2011. Reproductive competition and the evolution of extreme birth synchrony in a cooperative mammal. Biology Letters **7**:54–56.

Jobbins SE, Sanderson CE, Alexander KE. 2013. *Leptospira interrogans* at the human–wildlife interface in northern Botswana: a newly identified public health threat. Zoonoses and Public Health **61**:113–123.

Kingdon J. 1997. The Kingdon Field Guide to African Mammals. Academic Press, London, UK.

Maddock AH. 1988. Resource partitioning in a viverrid assemblage. Ph.D. Thesis. University of Natal, Pietermaritzburg, South Africa.

Maddock AH, Do Linh San E, Perrin MR. 2016. Some data on the feeding habits of the banded mongoose in a coastal area (South Africa). African Journal of Ecology **54**:245–247.

Monadjem A. 1998. The Mammals of Swaziland. Conservation Trust of Swaziland and Big Game Parks, Mbabane, Swaziland.

Neal E. 1970. The banded mongoose *Mungos mungo* Gmelin. East African Wildlife Journal **8**:53–71.

Nichols HJ, Bell MBV, Hodge SJ, Cant MA. 2012. Resource limitation moderates the adaptive suppression of subordinate breeding in a cooperatively breeding mongoose. Behavioral Ecology **23**:635–642.

Otali E, Gilchrist JS. 2004. The effects of refuse feeding on body condition, reproduction and survival of banded mongooses. Journal of Mammalogy **85**:491–497.

Plumptre A. 2016. Banded mongooses grooming warthogs. Suiform Soundings **14**:31.

Rood JP. 1975. Population dynamics and food habits of the banded mongoose. East African Wildlife Journal **13**:89–111.

Rood JP. 1986. Ecology and social evolution in the mongooses. Pages 131–152 in Rubenstein D, Wrangham R, editors. Ecological Aspects of Social Evolution. Princeton University Press, Princeton, USA.

Skinner JD, Chimimba CT. 2005. The Mammals of the Southern African Subregion. Third edition. Cambridge University Press, Cambridge, UK.

Van Rompaey H, Sillero-Zubiri C. 2013. *Mungos gambianus* Gambian Mongoose. Pages 353–354 in Kingdon J, Hoffmann M, editors. The Mammals of Africa. Volume V: Carnivores, Pangolins, Equids and Rhinoceroses. Bloomsbury Publishing, London, UK.

Waser PM, Elliott LF, Creel NM, Creel SR. 1995. Habitat variation and mongoose demography. Pages 421–447 in Sinclair ARE, Arcese P, editors. Serengeti II: Dynamics, Management, and Conservation of an Ecosystem. University of Chicago Press, Chicago, USA.

Yalden DW, Largen MJ, Kock D, Hillman JC. 1996. Catalogue of the mammals of Ethiopia and Eritrea. 7. Revised checklist, zoogeography and conservation. Tropical Zoology **9**:73–164.

Yarnell RW, Scott DM, Chimimba CT, Metcalfe CJ. 2007. Untangling the roles of fire, grazing and rainfall on small mammal communities in grassland ecosystems. Oecologia **154**:387–402.

Yarnell RW, Metcalfe CJ, Dunstone N, Burnside N, Scott DM. 2008. The impact of fire on habitat use by the short-snouted elephant shrew (*Elephantulus brachyrhynchus*) in North West Province, South Africa. African Zoology **43**:45–52.

Assessors and Reviewers

Jason S. Gilchrist[1], Chris Stuart[2†], Mathilde Stuart[2†], Emmanuel Do Linh San[34]

[1]Edinburgh Napier University, [2]African–Arabian Wildlife Research Centre, [3]University of Fort Hare

[†]IUCN SSC Afrotheria Specialist Group, [‡]IUCN SSC Small Carnivore Specialist Group

Contributors

Michael Hoffmann[1]

[1]International Union for the Conservation of Nature

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