Otomops martiensseni – Large-eared Giant Mastiff Bat


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Regional Red List status (2016)	**Near Threatened D1***
National Red List status (2004)	Vulnerable D2
Reasons for change	Non-genuine change: New information
Global Red List status (2008)	Near Threatened A2c
TOPS listing (NEMBA) (2007)	Vulnerable
CITES listing (2006)	Appendix II
Endemic	No

*Watch-list Data

Although previously thought to be localised to residential areas surrounding Durban, KwaZulu-Natal, recent acoustic data have revealed its occurrence in both Kruger and Mapungubwe National Parks in Limpopo, extending the known range by 870 km within the assessment region (Adams et al. 2015).

Taxonomy

Otomops martiensseni (Matschie 1897)

ANIMALIA - CHORDATA - MAMMALIA - CHIROPTERA - MOLOSSIDAE - *Otomops* - *martiensseni*

Synonyms: *Otomops martiensseni* (Chubb 1917) spp. *Icarus*, *Nyctinomus martiensseni* (Matschie 1897)

Common names: Large-eared Giant Mastiff Bat, Large-eared Free-tailed Bat, Martienssen's Big-eared Bulldog Bat, Giant Mastiff Bat, Martienssen Bat, Martienssen's Free-tailed Bat (English), Bakoor-losstertvlermuis (Afrikaans)

Taxonomic status: Species

Taxonomic notes: Two subspecies, including the nominate *Otomops martiensseni martiensseni* and *O. m. icarus* (from South Africa, Zimbabwe and Angola) were recognised by Meester et al. (1986). However, recent ecological, morphometric and molecular data indicate that there is ongoing gene flow between widely scattered populations across locations of southern, western and eastern Africa (Lamb et al. 2006, 2008; Richards et al. 2012; Ralph et al. 2015). In light of a newly described northeastern species, *O. harrisoni*, the distribution of *O. martiensseni* in sub-Saharan Africa has been revised to exclude the Arabian Peninsula, Djibouti, Eritrea, Ethiopia, and Kenya (Ralph et al. 2015). Although previously included within *O. martiensseni* (Simmons 2005), populations from Madagascar are now considered a distinct species (*O. madagascariensis*) following genetic and morphometric studies (Dorst 1953; Lamb et al. 2008; Richards et al. 2012; Ralph et al. 2015).

Assessment Rationale

This species is widely but patchily distributed across much of sub-Saharan Africa. Within the assessment region, it has been recorded from a number of localities in KwaZulu-Natal around the Durban area and has recently been shown to be more widely distributed, having been recorded from both Kruger (KNP; 11 localities) and Mapungubwe National Parks (MNP; two localities) with an estimated extent of occurrence of 194,973 km^2 covering 33 known localities in total. Subpopulations are suspected to be stable and (in Limpopo at least) fairly well protected in the assessment region. However, extant synanthropic roof roosts within the greater Durban area, on which the species relies, are rare and may still be subject to persecution from ill-informed home owners. Worryingly, very few breeding males have been recorded or re-sampled in the Durban area within recent times (K. Richardson unpubl. data). While it is difficult to sample due to its high-altitude foraging behaviour, it is considered rare (typically < 1% of recorded calls during acoustic sampling). Since there are typically 10–30 mature individuals in each colony within the assessment region, we infer a mature population size of 330–990 animals. While continuing decline is not suspected, colony sizes are small and vulnerable to local extinction due to roost disturbance and loss. This species thus qualifies as Vulnerable D1 as inferred population size is < 1,000 mature individuals. However, due to its good dispersal capacity, we assume rescue effects are possible and employ the regional criterion to downlist to Near Threatened D1. Further data on its occurrence, subpopulation sizes and trends are urgently needed and this species may qualify for a more threatened listing once additional data are available.

Regional population effects: With the discovery of subpopulations in Limpopo and Botswana, this species' range is suspected to be connected with that of Zimbabwe and northeastern Mozambique. Wing-loading is high (Norberg & Rayner 1987), and thus dispersal capacity is assumed to be good, indicating that rescue effects are possible.

Distribution

The Large-eared Giant Mastiff Bat has a patchy distribution across Africa occurring from Ghana and Côte

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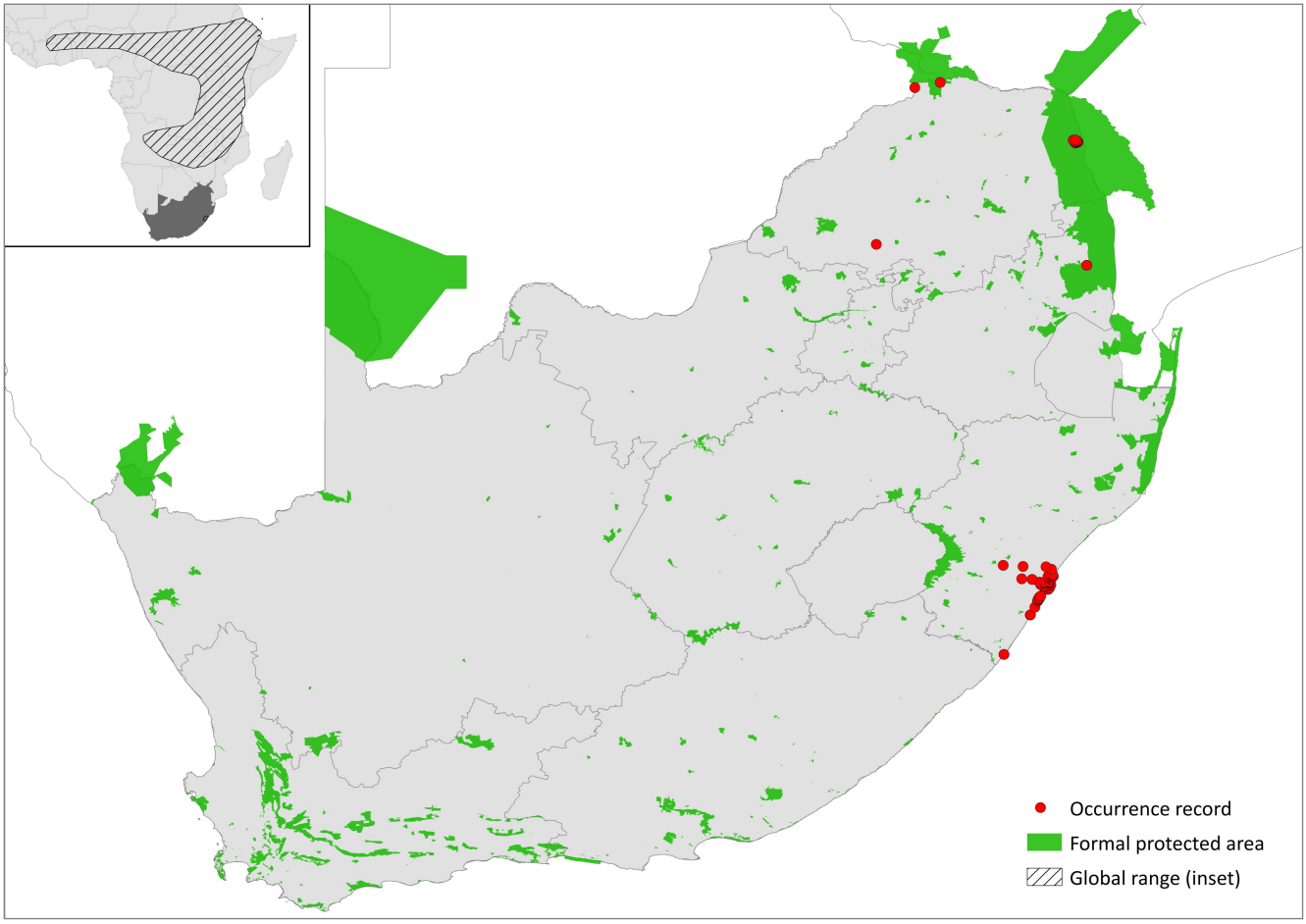

Figure 1. Distribution records for Large-eared Giant Mastiff Bat (*Otomops martiensseni*) within the assessment region

Table 1. Countries of occurrence within southern Africa

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

d'Ivore in the West, extending eastward through to Central African Republic, Rwanda, Uganda, Tanzania, and southwards towards Angola, Zambia, Zimbabwe, northwestern Mozambique and South Africa (Skinner & Chimimba 2005; Monadjem et al. 2010; Adams et al. 2015). Adams et al. (2015) also recorded its presence in the Tuli Block of Botswana, the first published records for the country, which indicates the species is more widespread in southern Africa than previously thought but the species continues to be rare throughout most of its range. Within the assessment region, this species was originally thought to be restricted to several localities in the KwaZulu-Natal Province, centred around Durban (Fenton et al. 2004; Monadjem et al. 2010). However, acoustic data has expanded its range 870 km north to Limpopo Province where the species has recently been recorded from several localities in KNP and MNP (Adams et al. 2015). These data thus bridge the gap between the most southerly localities in the greater Durban area with those of the nearest known occurrence records from southwestern Zimbabwe in 1978 at the Sengwa Wildlife Research Area (Fenton & Bell 1981), and northwestern Zimbabwe near the Kariba Dam (Hutton 1986). Current gaps in distribution probably reflect insufficient sampling rather than absence. However, the record from southwest Limpopo is probably attributable to a vagrant animal swept off course by strong winds as it appeared to be starving and was collected dead clinging to the wall of a house. Current estimated extent of occurrence within the assessment region is 194,973 km^2.

Population

This species occurs in isolated regions across a broad distributional range and is considered rare. For example, of 32 sites surveyed in KNP, it accounted for 0.74% of 11,655 echolocation call sequences and similarly comprised 0.16% of 1,284 call sequences in MNP (Adams et al. 2015). However, past surveys have proved that this species can be locally common in certain areas (Long 1995; Taylor 1998; Fenton et al. 2002; Skinner & Chimimba 2005). For example, within the residential and agricultural areas around Durban, KwaZulu-Natal, it was once regularly observed (Fenton et al. 2002; Monadjem et al. 2010). However, there have been very few recent records of adult males from the Durban region (K. Richardson unpubl. data), and thus field surveys are required to ascertain current occupancy. In the Durban region, colonies consist of 30 or fewer individuals (Fenton et al. 2002). While colony size estimates are not available from Limpopo, we tentatively infer that that there are 10–

30 mature individuals in each colony within the assessment region. Thus, based on 33 identified localities, this corresponds to a total mature population size of 330–990 animals. This could be an underestimate, based on as yet undiscovered subpopulations, which is corroborated by the observation that this species is difficult to sample given that it forages at altitudes exceeding 600 m (Fenton & Griffin 1997), making trapping in mist-nets difficult. However, it could also be an overestimate, as recent surveys in the Durban region have not been able to identify even 20 extant colonies. Further field data and research are needed to estimate population size more accurately.

In other parts of southern Africa, fewer than 10 specimens of this species have been collected (Monadjem et al. 2010). Globally, this species is suspected to be declining (but probably at a rate of less than 30% over ten years), owing to the probable continued loss of the known major East African populations, which now most likely refer to *O. harrisoni* (Ralph et al. 2015), while smaller subpopulations from southern Africa may be increasing (Mickleburgh et al. 2008).

Current population trend: Stable

Continuing decline in mature individuals: No

Number of mature individuals in population: 330–990

Number of mature individuals in largest subpopulation: 30

Number of subpopulations: 33 identified

Severely fragmented: No

Habitats and Ecology

This species has been recorded from a range of habitats throughout Africa, from montane forest to savannah/ woodland habitats in eastern Africa, up to altitudes of 2,000 m asl (Skinner & Chimimba 2005). Across their range, they are known to roost within caves, tree hollows or buildings (Fenton et al. 2002). Within the Durban region they will forage in areas of agriculture, such as areas of intensive sugar cane farming, and areas of urban development; and roost in urban and semi-urban areas, often utilising the roof rafters and inner brick surfaces of houses and other buildings (Fenton et al. 2002). Roost sites have not been located yet in Mapungubwe National Park, but it seems plausible that the presence of human buildings and other infrastructure would provide roosting opportunities for colonies (Adams et al. 2015).

The Large-eared Giant Mastiff Bat is so named because they have extraordinarily large, rounded ears, which lie flat along the nose (Skinner & Chimimba 2005). This species has large, narrow wings, which allow for long-distance flight (Schoeman & Jacobs 2008), and although there is no direct evidence of migration, in East Africa, seasonal absence of the sister species *O. harrisoni* at important colony sites, indicates that migration may occur (Mutere 1973). Similarly, Adams et al. (2015) found this species to be more active in KNP during the dry season than in the wet season, which supports the suggestion that foraging distances may be longer during the dry season. They are rapid fliers, but are incapable of taking off from a flat surface, thus need to drop vertically from their roosting sites as they take off (Skinner & Chimimba 2005). *Otomops* spp. can perform unique flight manoeuvres involving sequences of slide-slips that alternate to the left and right when making steep descents into caves (Norberg & Rayner 1987). From faecal studies in Ethiopia the diet of *O. harrisoni*, was found to consist predominantly of Lepidoptera, as well as a small percentage of Hemiptera and Orthoptera (Rydell & Yalden 1997). It is assumed the same holds true for *O. martiensseni* as it has a similar jaw structure to that of *O. harrisoni* and is designed for specialising in soft-bodied insect prey such as Lepidopterans (Freeman 1981).

In the Durban area, this species occurs in colonies of fewer than 30 individuals, which usually consist of single males or females, male–female pairs or stable harems with a single male and 10 or more females with their young (Richardson & Taylor 1995; Taylor 1998; Taylor et al. 1999). However, in lava tunnels in East Africa, colonies of hundreds of individuals have been recorded (Kingdon 1974), although these are attributable to the sister species *O. harrisoni*. In males, sexual maturity is reached after approximately one year, when they are evicted from the colony (Richardson & Taylor 1995). Studies have shown that this species may have an extended breeding season, from September to April (Taylor 1998).

Ecosystem and cultural services: As this species is insectivorous, it may contribute to controlling insect populations (Boyles et al. 2011; Kunz et al. 2011). Bats belonging to the family Molossidae often prey on the insect species which destroy crops (Boyles et al. 2011; Kunz et al. 2011). Ensuring a healthy population of insectivorous bats can thus result in a decrease in the use of pesticides.

Use and Trade

There is no evidence to suggest that this species is traded or harvested within the assessment region.

Threats

The leading threat to this species across its range appears to be roost disturbance. Major colonies of *Otomops* spp. in East Africa seem to have disappeared through disturbance of their cave habitats (Mickleburgh et al. 2008). Monitoring of subpopulations in KwaZulu-Natal over the past 10 years has shown that this species is not stable, yet is able to make use of human-modified landscapes for roost sites. However, localised threats still include roost disturbance and possible indirect poisoning through the use of toxic timber treatments and persecution from ill-informed home-owners (Fenton et al. 2002). While threats to the Limpopo subpopulations are not yet identified, roost disturbance and removal of large trees used as roost sites are plausible threats. Agricultural expansion and the use of pesticides may also impact the prey populations on which this species depends.

An emerging threat to this species may be wind farm development in KwaZulu-Natal due to the open-air foraging behaviour of, and large nightly distances covered by this species. When bats fly near to turbine blades, they either collide directly with the blade or they experience barotrauma which is tissue damage caused by rapid excessive changes in air pressure near turbine blades (Baerwald et al. 2008; Rydell et al. 2010).

Current habitat trend: Stable. The savannah biome is not threatened in the assessment region (Driver et al. 2012). However, recent land-cover analysis reveals that 20% of forest and woodland cover was lost from 1990 to 2006 in

Table 2. Threats to the Large-eared Giant Mastiff Bat (*Otomops martiensseni*) 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	*5.1.3 Persecution/Control*: persecution as a pest species when roosting in the crevices of buildings and roofs.	-	Anecdotal	-	-
2	*6.1 Recreational Activities*: roost disturbance during traditional ceremonies, which often take place in caves.	-	Anecdotal	-	-
3	*5.3.3 Logging & Wood Harvesting*: loss of large trees used for roosting.	Munyati & Kabanda 2009	Indirect	Local	Increasing
4	*3.3 Renewable Energy*: mortality by barotrauma or direct collision with turbine blades at wind farms..	Cryan & Barclay 2009	Indirect	Global	Increasing with the expansion of wind energy plants.
		Baerwald et al. 2008	Indirect	Regional	
		Rydell et al. 2010	Indirect	Regional	
5	*9.3.3 Agricultural & Forestry Effluents*: loss of prey base from insecticide use. Current stress *1.2 Ecosystem Degradation*.	-	Anecdotal	-	Ongoing

Table 3. Conservation interventions for the Large-eared Giant Mastiff Bat (*Otomops martiensseni*) 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*: protection of key roost sites, specifically large trees.	-	Anecdotal	-	-	-

Soutpansberg Mountain region due to logging, residential expansion and pine/eucalyptus plantations (Munyati & Kabanda 2009). Similar threats could be occurring within the range of the species.

Conservation

For African populations, this species is listed as Appendix II (2006) under the Convention on the Conservation of Migratory Species of Wild Animals (CMS). Within the assessment region, it has been recorded from both KNP and MNP in Limpopo (Adams et al. 2015); and Queen Elizabeth Park Nature Reserve in KwaZulu-Natal. It is protected by provincial ordinance in KwaZulu-Natal. An IUCN Species Action Plan has been developed for this species (Hutson et al. 2001). Continued monitoring of roost sites is important for the conservation of this species. There is an urgent need to reassess the status of all known roosts (and to locate additional localities) to ascertain numbers and status of colonies, so that key sites can be identified (Mickleburgh et al. 2008). Subsequently, disturbance of key localities should be restricted or managed to reduce the impact on colonies. Additionally, more research is necessary to better understand the natural history of this species and its relationship to habitat modification to develop a comprehensive and effective conservation plan (Adams et al. 2015).

Recommendations for land managers and practitioners:

- Reduce pesticide use in agricultural landscapes.
- Identification and protection of key roosting sites.

Research priorities:

- Systematic field surveys to determine distribution and population size and trends throughout the assessment region.
- Quantification of threats facing this species. This includes monitoring the impact of wind farming on Large-eared Giant Mastiff Bat populations within KwaZulu-Natal and investigations into effective mitigation methods to reduce bat mortality around wind farms.
- Basic research into life history and ecology.

Encouraged citizen actions:

- Citizens can assist the conservation of the species by reporting sightings on virtual museum platforms (for example, iSpot and MammalMAP), and therefore contribute to an understanding of the species distribution.

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Data Sources and Quality

Table 4. Information and interpretation qualifiers for the Large-eared Giant Mastiff Bat (*Otomops martiensseni*) assessment

Data sources	Field study (literature, unpublished), indirect information (literature, expert knowledge), museum records
Data quality (max)	Estimated
Data quality (min)	Suspected
Uncertainty resolution	Best estimate
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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