Myotis tricolor – Temminck's Hairy Bat

Regional Red List status (2016)	**Least Concern**
National Red List status (2004)	Near Threatened C
Reasons for change	Non-genuine: New information
Global Red List status (2016)	Least Concern
TOPS listing (NEMBA) (2007)	None
CITES listing	None
Endemic	No

This species roosts gregariously in caves (of up to a few thousand individuals) and switches between winter hibernacula and summer maternity caves (McDonald et al. 1990; Taylor 1998).

Taxonomy

Myotis tricolor (Temminck 1832)

ANIMALIA - CHORDATA - MAMMALIA - CHIROPTERA - VESPERTILIONIDAE - *Myotis* - *tricolor*

Synonyms: *Eptesicus lovenii* Granvik 1924

Common names: Cape Hairy Bat, Cape Myotis, Temminck's Mouse-eared Bat, Temminck's Myotis, Three-coloured Bat (English), Temminck se Langhaarvlermuis, Kaapse Langhaarvlermuis (Afrikaans)

Taxonomic status: Species

Taxonomic notes: None

Assessment Rationale

Listed as Least Concern in view of its wide distribution (extent of occurrence in the assessment region is 860,020 km^2), its occurrence in multiple protected areas across its range, its known large population (colonies up to 2,000 individuals) and because there are no major identified threats that could be causing widespread population decline. However, its dependence on large caves as roosting sites makes colonies vulnerable to human disturbance and its migratory behaviour may make it vulnerable to wind farm construction and operation. Such threats should be monitored for their impacts on subpopulations and the population overall.

Regional population effects: The range of this species is continuous across the borders of the assessment region into Zimbabwe through its occurrence in transfrontier conservation areas. However, wing loading is low (M. Happold unpubl. data) so rescue effects are uncertain.

Distribution

This species has been patchily recorded in sub-Saharan Africa from Ethiopia to South Africa. In West Africa, it has currently only been reported from the northwestern uplands of Liberia (Koopman et al. 1995), while in central Africa it is known only from a few records in the Democratic Republic of the Congo and Rwanda (Hayman et al. 1966; Baeten et al. 1984). It is much more widely recorded in East Africa, ranging from Ethiopia in the north, through Uganda, Kenya, Tanzania, Malawi, Zambia, Mozambique and Zimbabwe through to southern South Africa (ACR 2015). Within the assessment region, it is widespread across eastern regions of South Africa, including Lesotho and Swaziland. It occurs from Cape Town east along the coast to the Eastern Cape (Herselman & Norton 1985), then north through Lesotho and the Free State (Watson 1990) to northern South Africa and east to KwaZulu-Natal (Monadjem et al. 2010). It is restricted to areas with suitable caves for roosting, which may explain its absence from flat and featureless terrain and its close association with mountainous areas (Monadjem et al. 2010). The estimated extent of occurrence in the assessment region is 860,020 km^2.

Population

Appears to be uncommon or rare throughout most of its range besides the assessment region. Here it has been recorded in many localities in the eastern regions, comprising colonies of hundreds up to 2,000 animals (Taylor 2000).

Current population trend: Stable

Continuing decline in mature individuals: None

Number of mature individuals in population: Unknown

Number of mature individuals in largest subpopulation: > 1,500

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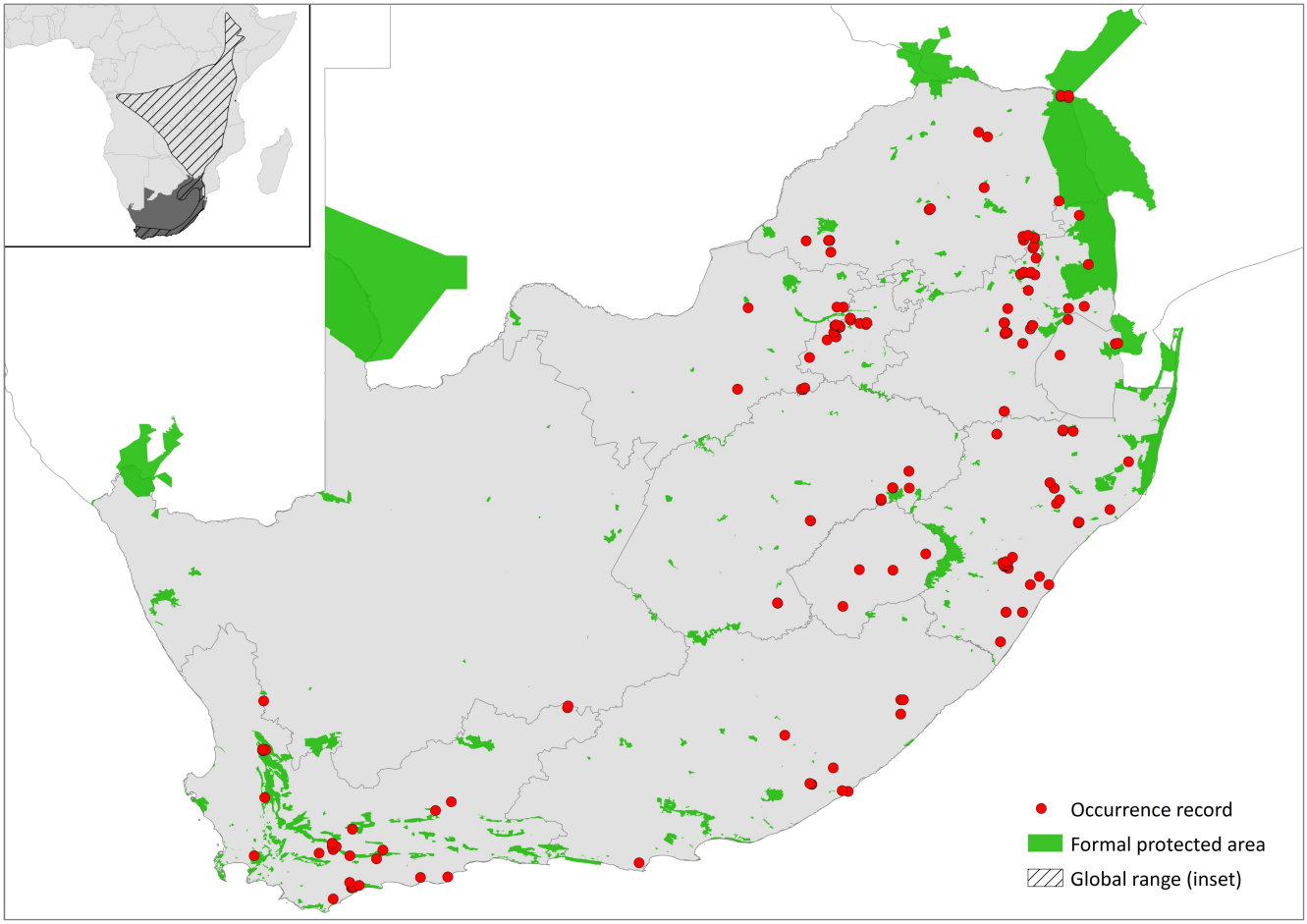

Figure 1. Distribution records for Temminck's Hairy Bat (*Myotis tricolor*) within the assessment region

Table 1. Countries of occurrence within southern Africa

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

Number of subpopulations: Unknown

Severely fragmented: No

Habitats and Ecology

It occupies very varied habitats, including montane forests, rainforests, coastal forests, savannah woodlands (including mopane and miombo), arid thickets and fynbos. It has a close association with mountainous terrain which may be due to its roosting requirements (Monadjem et al. 2010). Within the assessment region, it occurs mainly in woodland savannah habitats but also dry grassland savannahs and montane grasslands in the Drakensberg Mountains (Lynch 1994; Taylor 1998). Most records in the region are from areas of > 500 mm of annual rainfall (Rautenbach 1982), which indicates that its distribution is probably limited by rainfall and the availability of humid caves and mines. It may tolerate disturbed habitats to a degree. For example, it was recorded along the polluted Umbilo River in the Durban region in 2008 (Naidoo et al. 2011). However, this may have been influenced by the presence of nearby Paradise Valley Nature Reserve (Naidoo et al. 2011). It has been mist-netted in open spaces close to trees and close to the surface of running water (for example, Sirami et al. 2013).

Roosts by day in moist caves and mine shafts hanging freely from ceilings or clinging to walls. Mostly found in larger caves usually containing pools of water where disturbance is minimal (Roberts 1951; Herselman & Norton 1985), but this is not always the case. In the North West Province, it was recently recorded in old mine tunnels in the Vredefort Dome area (Power 2014). In some areas, it migrates hundreds of kilometres between warmer summer maternity caves (such as De Hoop Gauno Cave in the Western Cape) and colder winter hibernation caves (Monadjem et al. 2010). It is a clutter-edge forager with a diet consisting of Coleoptera, Hemiptera, Diptera, Neuroptera and Hymenoptera (Monadjem et al. 2010).

Ecosystem and cultural services: As this species is insectivorous, it may contribute to controlling insect populations that damage crops (Boyles et al. 2011; Kunz et al. 2011). Ensuring a healthy population of insectivorous bats can thus decrease the need for pesticides.

Use and Trade

There is no evidence to suggest that this species is traded or utilised in any form.

Table 2. Threats to the Temminck's Hairy Bat (*Myotis tricolor*) 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	*2.1.3 Annual & Perennial Non-Timber Crops*: habitat loss from agro-industry expansion. Current stress	Pence 2014	Indirect	Regional	Ongoing
	1.3 Indirect Ecosystem Effects: loss of insect prey base.	Jewitt et al. 2015	Indirect	Regional	
2	*9.3.3 Agricultural & Forestry Effluents*: indirect poisoning. Current stress *1.3 Indirect Ecosystem Effects*: loss of prey base.	Pence 2014	Indirect	Regional	Ongoing
		Jewitt et al. 2015	Indirect	Regional	
3	*6.1 Recreational Activities*: roost disturbance at caves from traditional ceremonies and tourism activities.	-	Anecdotal	Regional	Increasing
4	*3.2 Mining & Quarrying*: re-mining old adits reduces roost sites.	Jewitt et al. 2015	Indirect (remote sensing)	Regional	Ongoing
5	*3.3 Renewable Energy*: mortality from turbine blades and disruption to migration patterns.	Sowler et al. 2017	Indirect	National	Increasing

Threats

Overall, there are no major known threats to this species. To date, disturbance of roost sites in caves due to tourism and traditional ceremonies and rituals has been the largest threat to this species. It is also threatened by habitat loss around roost sites due to agricultural expansion and poor land-use management practices, as well as alien and invasive plants infestations, which depletes insect biomass (the prey base for this species). In parts of its range, (for example, Mpumalanga), the species is threatened by legal and illegal mining, and re-commissioning of old mines. Wind energy may pose a future significant threat as this species has a medium to high risk of mortality from wind turbine blades due to its migratory habits (Sowler et al. 2017).

Current habitat trend: Stable overall with local and/or regional declines. An average of 1.2% natural habitat has been transformed per annum since 1994 in KwaZulu-Natal, primarily due to agriculture, timber plantations, human settlements and industry and mines (Jewitt et al. 2015). Similarly, in the Western Cape Province, Pence (2014) calculated that between 2006 and 2011, 536 km^2 of land was converted to agriculture (107 km^2 per year, which equates to 0.08% of the surface area of the province per year).

Conservation

This species occurs in more than ten protected areas within the assessment region, including Great Limpopo Transfrontier Park, and is a well-conserved species. It must, however, be noted that in parts of its range, large populations often occur in caves and mines outside formally protected areas. As such, continued roost protection is necessary. Additionally, this species would benefit from holistic land management that reduces pesticide use and conserves buffer strips of natural vegetation to sustain insect biomass. To pre-empt wind farms becoming a severe threat, mortalities from turbine collisions on wind farms should be mitigated through interventions such as using ultrasound to deter bats and curtailing turbines at low wind speeds (Baerwald et al. 2009; Berthinussen et al. 2010; Arnett et al. 2011).

Recommendations for land managers and practitioners:

- Reduce pesticide use in agricultural landscapes and maintain buffer strips of natural vegetation.
- Data sharing by wind farm managers into a national database is needed to be able to calculate cumulative impacts and thereafter implement collaborative mitigation and management efforts.

Table 3. Conservation interventions for the Temminck's Hairy Bat (*Myotis tricolor*) 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.	-	Anecdotal	-	-	-
2	*2.3 Habitat & Natural Process Restoration*: reduction of pesticide use in agricultural landscapes and conservation of buffer strips of natural vegetation.	-	Anecdotal	-	-	-
3	*2.1 Site/Area Management*: manage wind turbines to reduce bat mortality.	Baerwald et al. 2009 Berthinussen et al. 2010 Arnett et al. 2011	Review	International Review International	Bat mortalities lowered using ultrasonic deterrents and turbine curtailment during low wind speed.	-

Research priorities:

- Quantification of severity of local threats. For example, monitoring mortalities linked with windfarm operations and assessing impact on populations.
- Systematic monitoring to measure overall population size and trends.

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.

Data Sources and Quality

Table 4. Information and interpretation qualifiers for the Temminck's Hairy Bat (*Myotis tricolor*) assessment

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

Assessors and Reviewers

Ara Monadjem[1], David S. Jacobs[2], Lientjie Cohen[3], Kate MacEwan[4], Leigh R. Richards[5], Corrie Schoeman[6], Theresa Sethusa[7], Peter J. Taylor[8]

[1]University of Swaziland, [2]University of Cape Town, [3]Mpumalanga Tourism and Parks Agency, [4]Inkululeko Wildlife Services, [5]Durban Natural Science Museum, [6]University of KwaZulu-Natal, [7]South African National Biodiversity Institute, [8]University of Venda

Contributors

Samantha Page-Nicholson[1], Domitilla Raimondo[2], Matthew F. Child[1]

[1]Endangered Wildlife Trust, [2]South African National Biodiversity Institute

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

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