Rhinolophus smithersi – Smithers's Horseshoe Bat


Trevor Morgan

Regional Red List status (2016)	**Near Threatened D1***
National Red List status (2004)	Not Evaluated
Reasons for change	Genuine change: New species
Global Red List status (2016)	Near Threatened D1
TOPS listing (NEMBA) (2007)	None
CITES listing	None
Endemic	Near

*Watch-list Data

Once considered synonymous with *Rhinolophus hildebrandtii*, research has revealed *Rhinolophus smithersi* to be a distinct species, occurring in Zimbabwe and South Africa (Taylor et al. 2012).

Taxonomy

Rhinolophus smithersi (Taylor, Stoffberg, Monadjem, Schoeman, Bayliss & Cotterill, 2012)

ANIMALIA - CHORDATA - MAMMALIA - CHIROPTERA - RHINOLOPHIDAE - *Rhinolophus* - *smithersi*

Common names: Smithers's Horseshoe Bat (English)

Taxonomic status: Species

Taxonomic notes: This species was formerly included in *Rhinolophus hildebrandti* but acoustic, biogeographical, morphological and molecular data show it to be a distinct species (Taylor et al. 2012). The isolated population from Zimbabwe may constitute a distinct species from the South African populations but more sampling is required to test this.

Assessment Rationale

This newly described species is near endemic to the assessment region, occurring in riparian woodlands across the Limpopo Valley and the Soutpansberg, Blouberg and Waterberg Mountains of Limpopo Province. Recent field surveys have shown that, although essentially limited to one province of South Africa (with a small, isolated Zimbabwean population), the species is quite widespread so areas of occupancy and occurrence exceed thresholds for Vulnerable under Criterion B. While there is no evidence for decline in the species or its habitat as the Savannah biome is well protected within the assessment region, it is not common: colony sizes are small (possibly < 40 individuals) and the species appears to have a scattered occurrence in the landscape since it is limited by availability of roosting sites, and possibly suitable water sources. There are 19 known localities, which would yield a population size of 760 individuals within the assessment region. While this may be an underestimate due to unidentified localities, we assume the overall population is not significantly more than 1,000 mature individuals and list as Near Threatened D1. We urge further field surveys to identify further colonies and estimate population size more accurately. This species should be reassessed once such data are available as it may qualify for a more threatened listing.

Regional population effects: This species has intermediate wing loading (Aldridge & Rautenbach 1987; Norberg & Rayner 1987; Schoeman & Jacobs 2008), and thus dispersal capacity is limited. Additionally, as the Zimbabwean population appears to be isolated from the assessment region, we assume no rescue effects are possible.

Distribution

This species is known to occur in two isolated areas, the Lutope-Ngolanola confluence just south of the Zambezi Escarpment in Zimbabwe (one known locality), and the Limpopo Province of South Africa (19 localities) where it is associated with the Limpopo Valley and the Soutpansberg, Blouberg and Waterberg Mountains (Taylor et al. 2012, 2013). It is likely more widespread across savannah woodlands of the Limpopo and Zambezi valleys, and their escarpments (the Gwembe horst, and the Soutpansberg and Waterberg Mountains, respectively). Accurate delimitation of this species' range is subject to further collecting and reappraisal of existing museum material previously assigned to *R. hildebrandti* (Taylor et al. 2012). The estimated extent of occurrence within the assessment region is 87,132 km^2.

Population

This species is relatively widespread within the northern parts of the assessment region. However, colony sizes are very small (just a few individuals) and the species appears to have a scattered occurrence in the landscape as, for example, it is rarely collected with harp traps or recorded with bat detectors during surveys of the Soutpansberg. While Smithers (1971) recorded colonies of over 100 individuals of *R. hildebrandti* in Botswana, we assume the colony structure of *R. smithersi* is closer to that of *R. cohenae*, which roosts in colonies of up to

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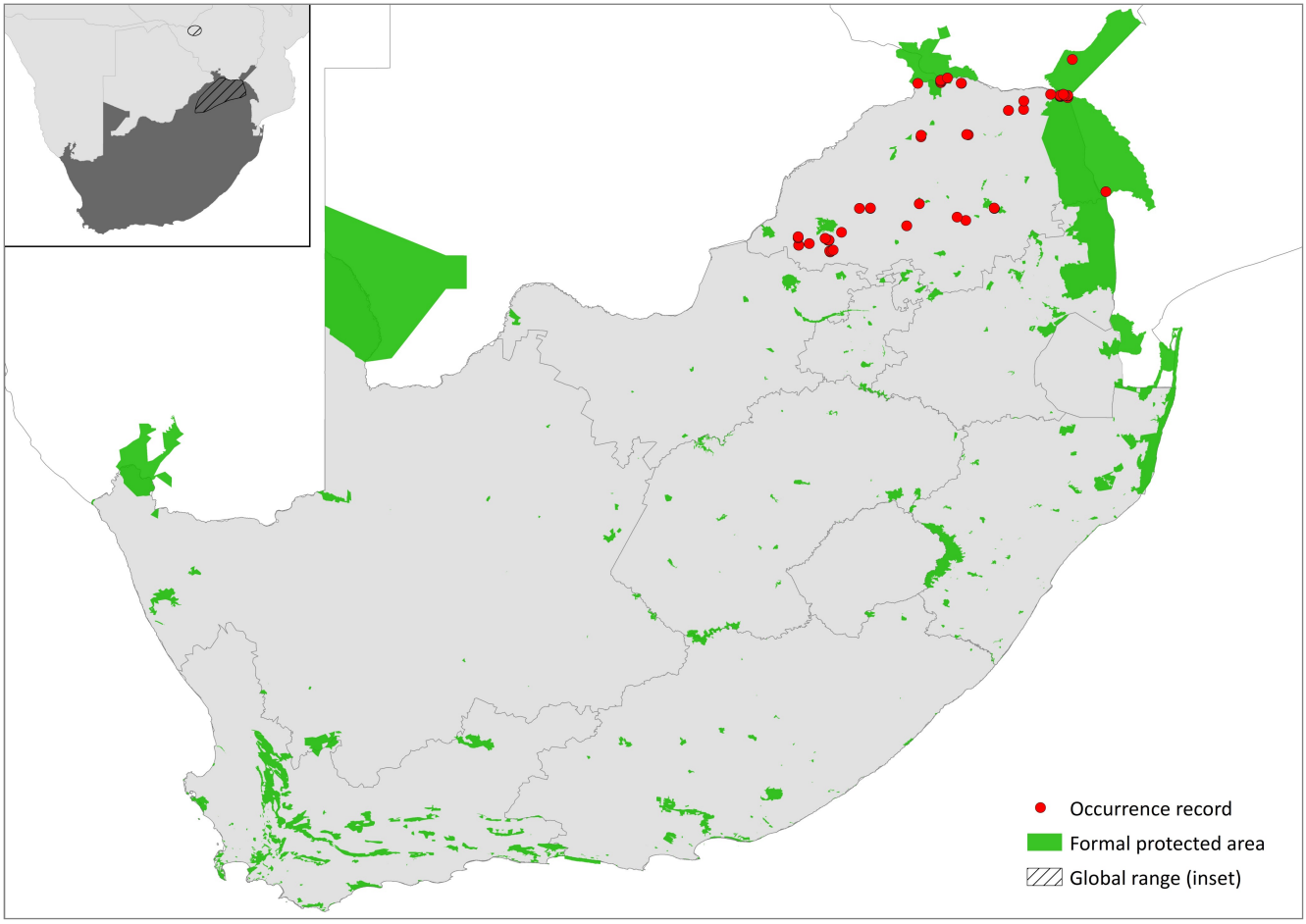

Figure 1. Distribution records for Smithers's Horseshoe Bat (*Rhinolophus smithersi*) within the assessment region

Table 1. Countries of occurrence within southern Africa

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

40 individuals. This would yield an overall population estimate of 760 individuals occurring in 19 localities in the assessment region. While it is likely that some localities have been missed, we assume that the overall mature population is not significantly more than 1,000 individuals, especially considering that some colonies are likely to be fewer than 40 individuals. This inference is supported by the observation that it is limited by the availability of roosting sites and possibly suitable water sources. Further monitoring is necessary to determine population size and trend more accurately.

Current population trend: Stable

Continuing decline in mature individuals: No

Number of mature individuals in population: *c.* 1,000

Number of mature individuals in largest subpopulation: Probably < 40

Number of subpopulations: At least 19

Severely fragmented: No

Habitats and Ecology

This species occurs in miombo savannah on Karoo Sandstone, and in diverse riparian woodland fringes of the Lutope and Ngolanola rivers as well as along the Limpopo River at Pafuri (Taylor et al. 2012). It appears to be locally quite widespread in the Soutpansberg, Blouberg and Waterberg ranges in Limpopo Province as well as in the Limpopo Valley (19 localities known), where it is dependent on natural caves (such as sandstone cliffs or hollows in baobabs) or man-made underground cavities such as old mine adits (Pearl 1994; Taylor et al. 2013). One roost in the Soutpansberg comprised an underground spring which had been opened to the surface artificially. This species is insectivorous.

Ecosystem and cultural services: Insectivorous bats are important regulators of insect populations (Boyles et al. 2011; Kunz et al. 2011). Several bat species feed on arthropods that damage crops, and thus agricultural areas with bats require less pesticides (Kunz et al. 2011).

Use and Trade

This species is not known to be traded or utilised in any form.

Threats

There are no known major threats to this species at present as much of its range occurs throughout the

Soutpansberg, Blouberg and Waterberg ranges of Limpopo Province where human impacts and habitat transformation are not yet severe. The threat of extensive planned coal, platinum, natural gas (fracking) and other mining developments over much of the Limpopo Valley and the foothills of the Soutpansberg and Waterberg mountains and the Mahabeng Plateau (Desmet et al. 2013), however, could impact heavily on subpopulations through roosting and foraging habitat loss, noise, air and water pollution and water abstraction leading to degradation of riparian habitats. For example, *R. smithersi* was amongst five bat species recorded for the first time at Gatkop Cave (compared to surveys in the 1960s and 1980s), Limpopo Province, in December 2011 when thousands of *M. natalensis* use the cave, which may indicate a loss of other roost sites in the region (Kearney et al. 2016).

Suppression of fire, together with over-grazing of cattle and game, and climate change (*sensu* Sherwin et al. 2013) has resulted in serious bush encroachment of savannahs across much of its range (for example, the western Soutpansberg) which has been shown to have a negative effect on biodiversity generally (for example, Taylor et al. 2016). In the eastern Soutpansberg, afforestation and alien plant invasions have considerably altered natural habitats (*sensu* Armstrong & van Hensbergen 1996; Armstrong et al. 1998). Limpopo Province is extremely drought-prone and water-stressed and is projected to experience climate change (Erasmus et al. 2002; Boko et al. 2007). Since the species seems to be dependent on water sources for drinking, extreme droughts in the area have had potentially devastating effects on wildlife generally.

Current habitat trend: As the Savannah biome is not threatened (Driver et al. 2012; Desmet et al. 2013), much of Limpopo Province's habitat remains intact. However, local studies give insight into the rate of habitat loss in Limpopo, especially woodland cover loss from unsustainable fuelwood extraction. For example, 20% of woodland cover was lost from 1990 to 2006 in the Soutpansberg Mountains region due to fuelwood extraction from settlement expansion and pine/eucalyptus plantations (Munyati & Kabanda 2009).

Conservation

In the assessment area, the species is recorded from many protected areas, including Greater Mapungubwe

Table 2. Threats to the Smithers's Horseshoe Bat (*Rhinolophus smithersi*) 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 Agro-industry Farming*: loss of suitable foraging areas through agricultural intensification. Current stress *1.2 Ecosystem Degradation*: loss of prey base from pesticide use and suppression of fire.	Driver et al. 2012	Indirect	National	Ongoing
2	*2.3.4 Livestock Farming & Ranching*: foraging habitat loss and degradation from livestock farming. Current stress *1.2 Ecosystem Degradation*: habitat degradation through overgrazing.	Driver et al. 2012	Indirect	National	Ongoing
3	*2.2.2 Agro-industry Plantations*: habitat loss from pine plantations. Current stress *1.2 Ecosystem Degradation*: loss of prey base from alien species infestation.	Munyati & Kabanda 2009	Indirect (remote sensing)	Regional	20% loss of woodland cover from 1990 to 2006.
4	*3.2 Mining & Quarrying*: loss of roost sites and disturbance to existing roosts from coal, platinum and gas developments.	Desmet et al. 2013	Indirect	Regional	Increasing (based on permit applications)
5	*5.3.3 Logging & Wood Harvesting*: alteration of vegetation structure and loss of foraging areas through fuelwood extraction.	Munyati & Kabanda 2009	Indirect (remote sensing)	Regional	20% loss of woodland cover from 1990 to 2006.
6	*6.3 Human Intrusions & Disturbance*: disturbance to roost sites through subsurface activities.	-	Anecdotal	-	Inferred to be increasing from rural settlement expansion.
7	*7.1.2 Suppression in Fire Frequency/Intensity*: alters vegetation structure and reduces prey base.	-	Anecdotal	-	Possibly increasing with small-scale ranching expansion.
8	*8.1.1 Invasive Non-Native/Alien Species/ Diseases*: alien plant infestation reducing habitat quality and decreasing prey base.	-	Anecdotal	-	Increasing
9	*11.2 Droughts*: increased frequency of water stress due to climate change reducing roost sites and prey base.	Erasmus et al. 2002	Simulation	National	Increasing
		Boko et al. 2007	Simulation	Continental	
		Sherwin et al. 2013	Review	International	

Table 3. Conservation interventions for the Smithers's Horseshoe Bat (*Rhinolophus smithersi*) ranked in order of effectiveness with corresponding evidence (based on IUCN action categories, with regional context)

Rank	Intervention description	Evidence in the scientific	Data quality	Scale of evidence	Demonstrated impact	Current conservation projects
1	*1.1 Site/Area Protection*: identification of key roost sites for inclusion in protected area expansion strategies.	-	Anecdotal	-	-	SANParks; Limpopo Department of Economic Development, Environment & Tourism
2	*2.1 Site/Area Management*: protection of key roost sites required by limiting access/implement best land-use management practices and limit disturbance to roosting sites.	-	Anecdotal	-	-	-
3	*2.2 Invasive/Problematic Species Control*: clear alien vegetation to increase foraging areas.	-	Anecdotal	-	-	-
4	*2.3 Habitat & Natural Process Restoration*: reduce grazing pressure and employ correct fire regime to sustain vegetation structure.	-	Anecdotal	-	-	-
5	*5.2 Policies & Regulations*: integrate bat roost and foraging area data into conservation plans.	-	Anecdotal	-	-	Limpopo Department of Economic Development, Environment & Tourism
6	*5.4.2 Compliance & Enforcement*: enforce penalties for illegal activities that impact ecosystems.	-	Anecdotal	-	-	National and Provincial Department of Environmental Affairs
7	*5.4.3 Compliance & Enforcement*: enforce penalties for transgressing provincial ordinances.	-	Anecdotal	-	-	Limpopo Department of Economic Development, Environment & Tourism

Transfrontier Conservation Area, Kruger National Park, Nwanedi Nature Reserve, Blouberg Nature Reserve, Wolkberg Wilderness Area and Legalameetse Nature Reserve. Not counting the Zimbabwean population, the majority of the species' range within South Africa is included within two UNESCO Biosphere Reserves, the Vhembe and Waterberg Biosphere Reserves. Defining and refining core and buffer areas is a critical part of the ongoing management of these reserves. Roosting sites of bats should be included in determining the location of such zones within biosphere reserves. This means that important bat underground (natural and man-made) roosts (including those of *R. smithersi*) should be included wherever possible in core or buffer areas where developments (including mining) would have to be regulated. Such conservation zonation plans (including Strategic Environmental Frameworks, EMFs) would inform planning by Provincial Nature Conservation (including the protected areas expansion strategy) and municipal Integrated Development Plans (IDPs), thereby affording protection to roosting sites.

Recommendations for land managers and practitioners:

- Landowners should implement best land-use management practices to maintain sustainability and limit disturbance at roosting sites. To achieve this, ecological advisory services and training are needed.

Research priorities:

- Field surveys and niche modelling to more accurately delimit distribution range, and to identify key roost sites for protection.
- Further vetting of *R. hildebrandti* specimens to more accurately delimit distribution range.
- Investigating patterns of movement to establish level of demographic and genetic exchange between colonies and quantifying the effects on transformation/fragmentation on such processes. This would also enable a more accurate estimate of population size and trend.

Encouraged citizen actions:

- Limit disturbance to roost sites.
- Avoid or limit the use of pesticides/insecticides for agricultural and household purposes as this can potentially negatively affect the prey base and lead to poisoning of individuals of this species and bats in general.

Data Sources and Quality

Table 4. Information and interpretation qualifiers for the Smithers's Horseshoe Bat (*Rhinolophus smithersi*) assessment

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

- Deposit any dead specimens at your local conservation agency for identification.

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