Otolemur crassicaudatus – Thick-tailed Bushbaby


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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 (2008)	Least Concern
TOPS listing (NEMBA) (2007)	None
CITES listing (1977)	Appendix II
Endemic	No

This very vocal species is the origin of the term "bushbaby"; its repetitive cry sounds much like the cry of a human infant.

Taxonomy

Otolemur crassicaudatus (É. Geoffroy Saint-Hilaire 1812)

ANIMALIA - CHORDATA - MAMMALIA - PRIMATES - GALAGIDAE - *Otolemur* - *crassicaudatus*

Synonyms: *Otolemur argentatus* was distinguished by Kingdon (1997) and *O. monteiri* by Grubb et al. (2003) as separate species. No evidence has been provided, however, that either is more than a subspecific variant of *O. crassicaudatus* (Groves 2001). Both taxa are on the large side of the body size range, and have a silvery-grey pelage.

Common names: Thick-tailed Bushbaby, Thick-tailed Greater Galago, Greater Bushbaby, Greater Galago, Large-eared Greater Galago (English), Bosnagaap (Afrikaans), Impukunyoni (Ndebele), Chimhavira (Shona), Xideweta (Xitsonga), Sinkwe (Zulu)

Taxonomic status: Species

Taxonomic notes: The genus *Otolemur* (the eared-lemur) was proposed by Coquerel (1859) for the Small-eared Greater Galago (*O. garnettii*) found in eastern Kenya, Tanzania and the offshore East African islands. The generic rubric was lost for much of the 20th century, but later resurrected (Olson 1981; Nash et al. 1989; Groves 2001), and is now the accepted terminology. *Otolemur* differs from other galago genera on the basis of its large size (adult body weight 800–1500 g), relatively flat basicranium, low-crowned molars and reduced third upper molars (M3). Both species have a cornified region of skin proximal to the plantar pads of the hind foot that is rubbed noisily against the substrate during periods of agitation or insecurity. The distal margins of the nails are convex in young animals, but wear quickly to form a semi-lunar, concave margin in adults. The subspecies, *O. c. crassicaudatus* (Groves 2001), occurs in Mpumalanga, Limpopo and KwaZulu-Natal provinces in South Africa and Mozambique south of the Limpopo River. Across this region the pelage is variable, ranging from dark grey to chocolate brown, and various admixtures of the two. Pelage variation is likely to be linked to varying needs for camouflage in different vegetation types, and possibly different seasons, as the animals are most vulnerable to predation when asleep during the day.

Assessment Rationale

Listed as Least Concern, as the species is relatively widespread within the assessment region and in sub-Saharan Africa, and present in several protected areas in South Africa (including Kruger National Park). Northern and northeastern South Africa, however, comprise the southernmost limit of its distribution, within which the species is confined to moist savannah and riverine forest, which are naturally fragmented habitats, and Thick-tailed Bushbaby subpopulations are highly localised. Both the large size of the animals and their habit of sleeping in tree holes during the day make them favoured bushmeat in northern KwaZulu-Natal, and their presence in markets attests to their use in traditional medicine. The effect of this culling on population viability cannot be assessed from available information. The species' range is unlikely to have expanded as a result of the conversion of land use from livestock to savannah wildlife ranching, and is likely to have contracted due to urbanisation and transformation of suitable habitat to agricultural fields. Removal of dead trees from these areas is also likely to limit available day-time resting sites and consequent protection from predators. An assessment of population size and density, and the degree of population fragmentation, is necessary to assess the status of this species. Once these data have been generated, a reassessment is recommended.

Regional population effects: The species' range is apparently continuous through tropical and subtropical sub-Saharan Africa, but areas of suitable habitat within this range are fragmented and likely to confer a degree of genetic isolation. Dispersal is suspected to occur along the northern border of South Africa through the Greater Mapungubwe and Great Limpopo transfrontier conservation areas between Zimbabwe, the Tuli Block and Mozambique, and into northeastern KwaZulu-Natal, via riparian and dune forest corridors through the Lubombo Transfrontier Conservation Area. The South African population comprises the southerly extreme of the species' distribution, and much of the available habitat is likely to be marginal. Nevertheless, rescue efforts are unlikely to be necessary at this stage.

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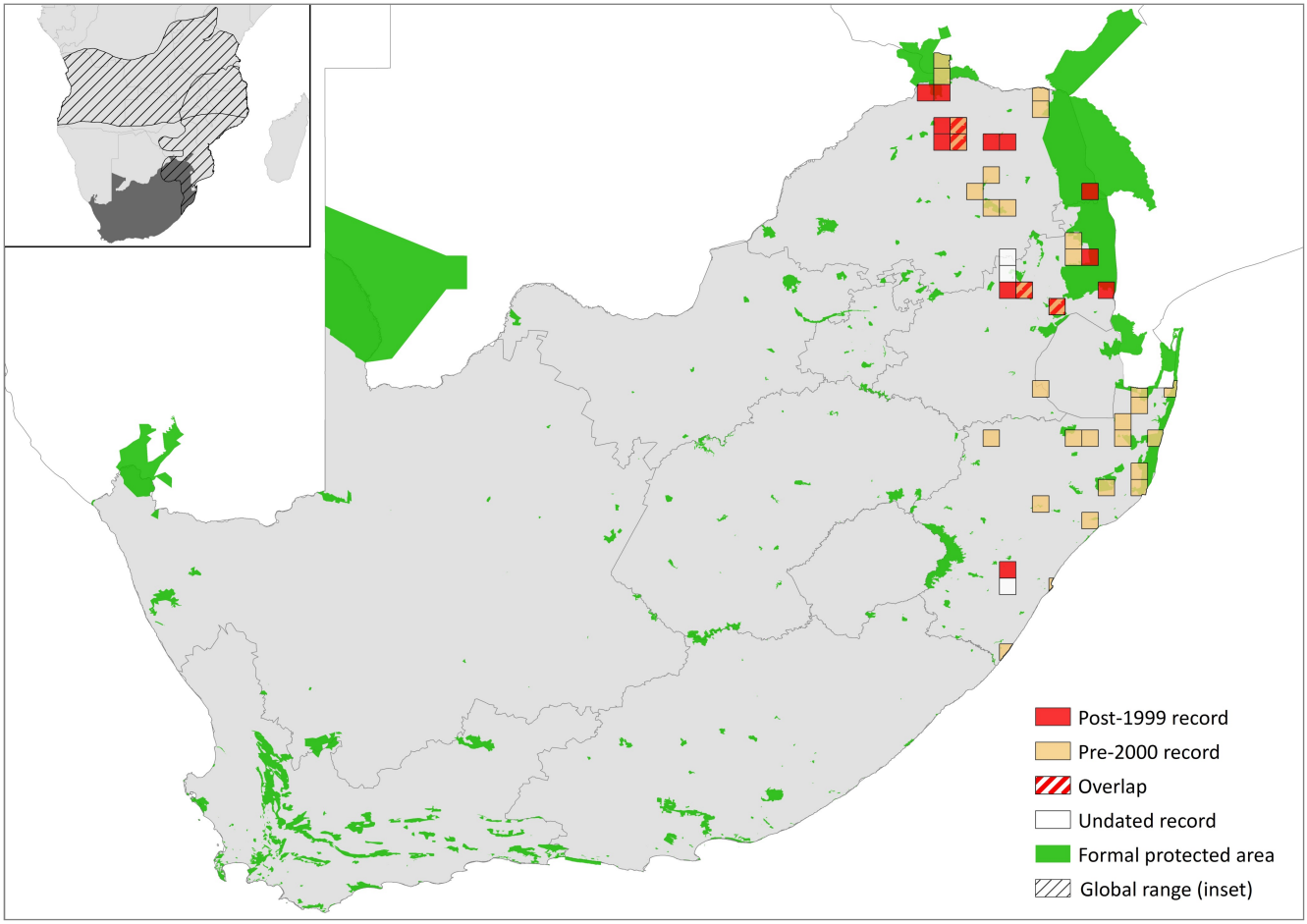

Figure 1. Distribution records for Thick-tailed Bushbaby (*Otolemur crassicaudatus*) within the assessment region

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	Extant	Native
Zimbabwe	Extant	Native

Distribution

At species level, *O. crassicaudatus* has a "Zambezian" distribution, from Angola in the west to Kenya and Tanzania in the east, and KwaZulu-Natal Province, South Africa, in the south. Its preferred habitat is a natural mosaic of coastal or riverine forest-savannah transition, so that it is most abundant in fragmented habitat. In dry regions, Thick-tailed Bushbabies follow rivers, creating a discontinuous distribution. On the east coast it is found in coastal forest and thicket, and the population was probably continuous in the recent past, but is less so today because of incursions from urbanisation and agriculture (sugar cane and forestry plantations).

The only subspecies to occur within the assessment region is *O. c. crassicaudatus*. Its range extends north from the vicinity of Mokopane and Makhado into northern Limpopo Province, and eastwards through Mpumalanga and Swaziland into northern KwaZulu-Natal and southern Mozambique (Figure 1), occurring marginally on the Eastern Cape coast (Skinner & Chimimba 2005). In western Swaziland, it has adapted to wattle forests and is found around Mbabane (Skinner & Chimimba 2005). *Otolemur c. crassicaudatus* grades into and is replaced by *O. c. kirkii* in Zimbabwe, the Botswanan Tuli Block, southern Malawi (Chikwawa region) and central Mozambique. The pelage of this subspecies is paler than that of *O. c. crassicaudatus,* and the tail and extremities have a rufous brown tint. Further north, in Angola, Zambia, Malawi and northern Mozambique (predominantly in *Brachystegia* woodland), and into southern Democratic Republic of the Congo and southern Tanzania (Tabora), *O. c. kirkii* is replaced by *O. c. monteiri*, a silvery-grey subspecies with brown ear pinnae and extremities. *Otolemur c. monteiri* has also been reported from Rwanda, northern Tanzania and Kenya, where dark brown to black ears and extremities have led to it being given the name *O. c. argentatus* by some researchers.

Population

This is a relatively common species within a restricted part of the country. No population estimates have been made as the subpopulations are not considered to be threatened. However, the fragmented nature of its preferred habitat and the potential for genetic isolation that this confers indicate in favour of population studies to investigate local levels of genetic diversity. Dispersal ability is unknown but suspected to be greater than subspecies at low latitudes (Beaudrot et al. 2014). At present we suspect that the population is stable as the

species is present in many protected areas, but this awaits confirmation.

Current population trend: Assumed stable

Continuing decline in mature individuals: No

Number of mature individuals in population: Unknown

Number of mature individuals in largest subpopulation: Unknown

Number of subpopulations: Unknown

Severely fragmented: Yes. Incursions into natural forest patches (for example, Ngoye) for firewood; increasing destruction of natural forest on KwaZulu-Natal Province north coast by plantations and urban developments.

Habitats and Ecology

Thick-tailed Bushbabies are mostly found in forests, moist savannah woodland, riparian bushland and thickets in higher rainfall regions, but penetrate into drier areas along riparian corridors (Skinner & Chimimba 2005). They can occur in urban gardens and farmland where there is sufficient tree cover for shelter and fruit-bearing species to provide food. Thick-tailed Bushbabies feed on a mixed diet comprised approximately of 50% animal food (usually insects and molluscs, although small vertebrates are occasionally taken), with the remainder made up of fruit or gum, depending on the season (Masters et al. 1988). They are particularly fond of *Albizia* gum.

Like all living galagos, Thick-tailed Bushbabies have an elongated ankle region that allows some leaping, but this species is primarily a quadrupedal climber. Spaces between trees are generally crossed by "bridging" (the animal retains its grip on the original tree with its hind feet, and secures a branch on the destination tree with its hands before attempting to cross). Other, more saltatory species, like *Galago moholi*, leap across open spaces.

Thick-tailed Bushbabies communicate primarily by vocalizations – including the long distance "crying baby" calls from which the animals derive their colloquial name – as well as by olfaction. *Otolemur crassicaudatus* is one of several galago species that practise "urine-washing", a stereotyped behaviour in which urine is dribbled onto the palm of one hand and wiped across the sole of the ipsilateral foot. The behaviour is then repeated with the contralateral hand and foot. Urine-washing enables galagos to leave a scent trail behind them as they pursue their nightly activities. Thick-tailed Bushbabies also have a bare patch of skin on the sternum which is rich in scent glands. The major component of the chest/sternal gland secretion is benzyl cyanide, and the complex odour changes with time as the volatile components evaporate, enabling neighbours to track one another's movements over a period of hours. Thick-tailed Bushbabies sleep alone or in groups of 2–6, and disperse at sunset to forage solitarily or in small groups. Mating generally occurs in July, when there is a great increase in the frequency of the loud calls as potential mating partners locate each other, and the established adult males remind rivals of their locations. Thick-tailed Bushbabies are not territorial, but restrict their activities to home ranges, the borders of which are patrolled, announced, and scent-marked regularly. When mating occurs, it involves prolonged bouts of copulation (up to 45 minutes); the adult male penis is furnished with epidermal spines that point backwards (Dixson & Van Horn 1977) and provide a "genital lock". Penile spines occur in several galago species, and the pattern of the spines is species-specific. Female Thick-tailed Bushbabies give birth in early November to 1–3 infants per year, and twinning is common.

Ecosystem and cultural services: The frugivorous habits of Thick-tailed Bushbabies mean that they play a role in seed dispersal for indigenous thicket and woodland plant species. As fruit-eating primates they carry seeds for greater distances and create a more scattered seed dispersal compared to terrestrial seed-dispersers (Entwistle & Dunstone 2000). No detailed study of the effects of galagos on forest regeneration or diversity has been carried out to date. Galagos are also likely to assist in the control of insect numbers.

Use and Trade

This species is used locally for the traditional medicine trade and also as bushmeat. Although the impacts have not been measured, it is often seen in muthi markets (for example, Whiting et al. 2011) and anecdotal evidence suggests its use in the bushmeat trade. Although the trend in offtake is unknown, this is not suspected to have a major effect on the population overall.

Threats

The only potential threat is habitat destruction and fragmentation. The species occurs in several protected areas, but may be locally threatened in parts of its range through the loss of suitable forest habitat. Within the assessment region, timber plantations and human settlement have fragmented the Thick-tailed Bushbaby's habitat, which may lead to inbreeding in isolated subpopulations. For example, in the Soutpansberg, Limpopo Province, pine and eucalyptus plantations and residential housing expansion reduced forest cover by 20% over a 16-year period between 1990 and 2006 (Munyati & Kabanda 2009). The animals are also illegally harvested for the pet trade, and traditional medicine, and are also poached for human consumption (for example, in

Table 2. Use and trade summary for the Thick-tailed Bushbaby (*Otolemur crassicaudatus*)

Category	Applicable?	Rationale	Proportion of total harvest	Trend
Subsistence use	Yes	Used as bushmeat	Unknown	Unknown
Commercial use	Yes	-	-	-
Harvest from wild population	Yes	Seen in muthi markets	Unknown	Unknown
Harvest from ranched population	No	-	-	-
Harvest from captive population	No	-	-	-

Table 3. Threats to the Thick-tailed Bushbaby (*Otolemur crassicaudatus*) 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	*2.2.2 Wood & Pulp Plantations*: forest habitat loss. Current stresses *1.3 Indirect Ecosystem Effects*: fragmentation of remaining habitat into small patches.	Armstrong & van Hensbergen 1996	Indirect	Regional	Species richness lower in plantations.
		Munyati & Kabanda 2009	Indirect (remote sensing)	Local	Ongoing: 20% forest cover lost between 1990 and 2006 in Soutpansberg, Limpopo Province.
		Jewitt et al. 2015	Indirect (remote sensing)	Regional	Ongoing: 1.2% habitat loss per annum from 1994–2008.
2	*2.1.3 Agro-industry Farming*: sugarcane farming has reduced forest habitat significantly.	Lawes et al. 2004	Indirect	Local	Rate of habitat loss was 5.7% from 1944–1996 in Karkloof Forest, KZN.
		Jewitt et al. 2015	Indirect (remote sensing)	Regional	Ongoing: 1.2% habitat loss per annum from 1994–2008.
3	*1.1 Housing & Urban Areas*: human settlement leading to habitat loss and degradation. Current stresses 1.3 *Indirect Ecosystem Effects*: fragmentation of remaining habitat into small patches.	Munyati & Kabanda 2009	Indirect (remote sensing)	Local	20% forest cover lost between 1990 and 2006 in Soutpansberg, Limpopo Province.
		GeoTerraImage 2015	Indirect (remote sensing)	National	Ongoing: 1.1–14.9% expansion in rural and urban settlement from 2000–2013.
4	*5.1.1 Hunting & Collecting Animals (species being assessed is the target):* Bushmeat poaching.	-	Anecdotal	-	Suspected to be increasing with human expansion.
5	*5.1.1 Hunting & Collecting Terrestrial Animals*: traditional medicine use.	Whiting et al. 2011	Empirical	Local	Carcasses present at Faraday market. Suspected to be increasing with human expansion.
6	*5.1.1 Hunting & Collecting Terrestrial Animals*: pet trade.	-	Anecdotal	-	Suspected to be increasing with human expansion.

KwaZulu-Natal Province), which may result in local declines.

Current habitat trend: Continuing decline. In KwaZulu-Natal, the coastal lowland forest is under threat of further fragmentation as land is cleared, and exotic plantations extended. Between 2000 and 2013, there has been a 5.6% –14.9% rate of urban and 1.1–8.8% rate of rural expansion in KwaZulu-Natal, Limpopo and Mpumalanga provinces (GeoTerraImage 2015). Overall for KwaZulu-Natal Province, there was a 19.7% loss of natural habitat from 1994 to 2008, with an average loss of 1.2% per annum (Jewitt et al. 2015). Remaining coastal dune forest is mostly within protected areas. Sugar cane farming has cleared most of the historical extent of coastal lowland forest. The primary problem is further fragmentation and isolation of indigenous forest areas, which become surrounded by exotics. This cuts off migration between forest areas, and potentially leads to inbreeding. The habitat of the Thick-tailed Bushbaby has always been more fragmented than that of the Lesser Bushbaby.

Conservation

Key conservation areas for the Thick-tailed Bushbaby include the Ezemvelo KZN Wildlife game reserves in KwaZulu-Natal, particularly Mkhuze, Hluhluwe-iMfolozi, Ndumo and Tembe, as well as the iSimangaliso Wetland Park complex, where Cape Vidal and St. Lucia hold strong populations. They are abundant in Kruger National Park. Their cryptic nocturnal habits make bushbabies difficult to observe for casual tourists, but in Ithala, Hluhluwe and Skukuza they often visit the rest camps. They can also be seen in the Sodwana camping ground, as they visit the *Albizia* trees to gather gum.

Protected area expansion and connection of forest habitats through corridors and transfrontier conservation areas, such as that being developed in Maputaland (Smith et al. 2008), are the most important interventions for this species. Protection of riparian forest passageways are particularly important. Conservationists should continue to enforce protected area rules and prevent the illegal harvesting of firewood.

Galagos adapt well and breed very successfully in captivity, and such facilities can be used to reintroduce this species into conservancies and other protected areas. However, reintroductions are not recommended at this stage.

Recommendations for land managers and practitioners:

- Landowners should continue to form conservancies to protected critical forest habitat.
- Reserve managers should prevent the removal of dead trees for firewood. These old trees comprise an important source of wood boring insects, as well as cavities for shelter.

Table 4. Conservation interventions for the Thick-tailed Bushbaby (*Otolemur crassicaudatus*) 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	*1.1 Site/Area Protection:* establish further formally protected forests through national, private and transfrontier initiatives.	-	Anecdotal	-	-	-
2	*1.2 Resource & Habitat Protection:* form conservancies to protect forest habitat, especially riparian corridors in Limpopo, Mpumalanga and KwaZulu-Natal provinces. Prevent residential expansion in riverine forest belts in the interior of the species' range.	-	Anecdotal	-	-	-
3	*5.4 Compliance & Enforcement:* enforce regulations forbidding illegal harvesting of firewood.	-	Anecdotal	-	-	-

- Captive breeding programmes for reintroduction would be counter-productive at this stage, as they would confuse the picture of standing genetic diversity. Our recommendations are that managers investigate the potential presence of local *Otolemur* subpopulations before targeting riverine forest belts for tourist accommodation or housing developments.

Research priorities: The African Primate Initiative for Ecology and Speciation (APIES) at the University of Fort Hare has an ongoing project plotting morphological, genetic and behavioural diversity of galago species throughout sub-Saharan Africa against past and present vegetation maps. The project aims to characterise the crucial habitat characteristics necessary for the survival of all extant species, and to assess which populations are most at risk of extinction.

Research has also been undertaken on the impacts of changing land-use on biodiversity, particularly on mammals. The study, based at the University of KwaZulu-Natal, and a collaboration with Ezemvelo KZN Wildlife, examined the metapopulation dynamics of forest mammals in the fragmented sub-tropical coastal forests of southern KwaZulu-Natal (June 2014 – June 2016).

Current research priorities are:

- The taxonomy of this species has been relatively well researched. What is urgently required is a phylogeographic assessment of the degree of isolation of local subpopulations, and the potential for gene exchange among them. A measure of whether fragmentation is increasing, or affecting population sizes and heterozygosity will enable more robust projections of population impacts.
- Thick-tailed Bushbabies' requirement for moist riparian woodland and thicket in the interior regions of its range is likely to limit dispersal. No data exist for population size, extent of occurrence and trends. Little is known about the degree of isolation between, or level of inbreeding within, fragmented populations, and no survey has been undertaken as to the likely size of the South African population.
- Investigating the efficacy of educating local communities to decrease poaching rates.

Data Sources and Quality

Table 5. Information and interpretation qualifiers for the Thick-tailed Bushbaby (*Otolemur crassicaudatus*) assessment

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

Encouraged citizen actions:

- Because of the crucial need for genetic information on local *Otolemur* populations, tissue samples would be extremely useful. Anyone encountering a dead animal is requested to take a sample of muscle tissue or even a small piece of the ear pinna, either deep freeze it or place it in 70% alcohol, and submit it to the APIES team (website link above). Complete bodies are also invaluable for research; transport can be organised. A non-invasive technique for genetic sampling of live animals is to pull a few hairs from the body, including some follicular cells that contain DNA.
- With respect to habitat preservation, landowners can create conservancies to protect natural forest habitat in KwaZulu-Natal, Limpopo and Mpumalanga. *Albizia* trees are much preferred by *Otolemur crassicaudatus*. Any person residing within the assessment region can assist the local wildlife by planting trees and shrubs indigenous to their area, rather than exotic species.
- Sightings outside private lands or protected areas can be reported on virtual museum platforms (for example, iSpot and MammalMAP).

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