Galago moholi – Southern Lesser Galago

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 species makes the longest leaps of all galagos, clearing distances of up to 5 metres between *Acacia* trees with ease (Bearder 1987).

Taxonomy

Galago moholi Smith 1834

ANIMALIA - CHORDATA - MAMMALIA - *PRIMATES* - *GALAGIDAE* - *Galago* - *moholi*

Synonyms: *australis, bradfieldi*, *conspicillatus*, *intontoi*, *mossambicus*, *tumbolensis*

Common names: Southern Lesser Galago, South African Lesser Galago, Lesser Galago, Night Ape, Bushbaby (English), Nagapie (Afrikaans), Impukunyoni (Ndebele), Maselale-ntlwë (Sesotho), Mhimbi (Tsonga), Mogwele (Tswana), Tshimondi (Venda)

Taxonomic status: Species

Taxonomic notes: *Galago moholi* was recognised as a new species by Sir Andrew Smith during his epic journey into the South African interior between 1834 and 1836. Schwarz (1931) and Hill (1953) downgraded it to a subspecies of the Senegal Lesser Bushbaby (*Galago senegalensis*), because of morphological similarities, but it was resurrected as a distinct species on the basis of consistent differences in the structure of its advertisement calls (Zimmermann et al. 1988). Currently, we recognise it as one species with two subspecies (Meester et al. 1986; Grubb et al. 2003): *Galago m. moholi* in the eastern part of the range, and *G. m. bradfieldi* (Roberts 1931) in the northern reaches. *Galago moholi* is slightly smaller in body size than the northern species, and has much longer ears. The species share a chromosome number of 2n = 38. *Galago moholi* can be distinguished from *Galagoides granti* by its paler pelage colouration: while *G. granti* has a dark brown body and tail, *G. moholi* is predominantly pale grey on the dorsum, head and outer surfaces of the limbs. The back and rump may be washed with russet brown, while the tail is generally covered in a mix of brown and grey hairs. The face is suffused with white, and the pale nose stripe has diffuse margins. The limbs are washed with yellow, and the ventral surface is white.

Assessment Rationale

Listed as Least Concern, as the species is widespread in *Acacia* woodland habitats. No major threats are assumed as the species occurs in many protected areas throughout its range. As in the case of the Thick-tailed Greater Galago (*Otolemur crassicaudatus*), northern South Africa marks the southernmost limit of the species' range, but the Lesser Galago habitat is more continuous and less fragmented than that of its larger relative. Although the species is used opportunistically as bushmeat, traditional medicine and in the pet trade, these depredations are not expected to cause widespread population decline. Caution should be exercised, however, as few population size or density estimates have been conducted, and its cryptic nocturnal habits make it difficult to assess both its presence and abundance. Monitoring of populations is recommended.

Regional population effects: This species' range is relatively continuous throughout southern Africa to southern Tanzania, where the northern boundary of their distribution is not well defined. Dispersal is suspected to occur along the northern border of South Africa into Botswana, Zimbabwe and Mozambique through the Greater Mapungubwe and Great Limpopo transfrontier areas. The distribution of the species in northeastern KwaZulu-Natal needs to be re-examined in light of the identification of the similar-sized *Galagoides granti* in the region.

Distribution

The Southern Lesser Galago is widely distributed within the southern African region, ranging from northern Namibia and Angola, through southeastern Democratic Republic of the Congo, western Zambia, Zimbabwe, eastern and northern Botswana, eastern Mozambique,

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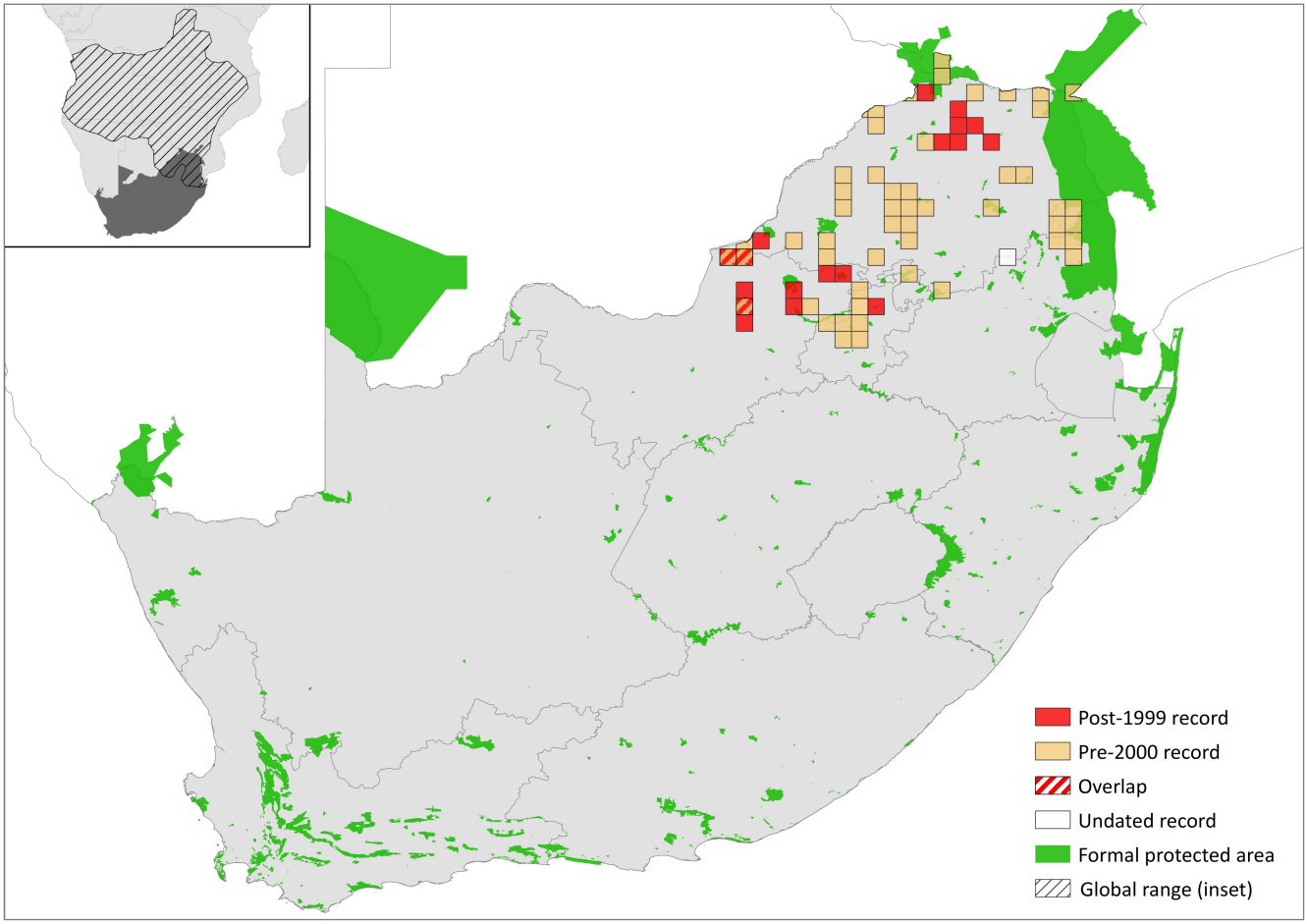

Figure 1. Distribution records for Southern Lesser Galago (*Galago moholi*) within the assessment region

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	Possibly extant	Native
Zimbabwe	Extant	Native

and the northern and northeastern parts of South Africa, and Swaziland (Pullen & Bearder 2013). The northern limits of its distribution range are not well defined, and its potential presence in Rwanda and Burundi needs confirmation. Within the assessment region, the species occurs in the bushveld and woodland areas of Gauteng, Mpumalanga, Limpopo and North West provinces (Figure 1, Table 1), and may frequent gardens in these areas. Unlike many other woodland species, there is no evidence of a range shift. Although Kyle (1996) reported the species as present in northern KwaZulu-Natal, it is possible that the true identity of the sighting was *Galagoides granti*, which is of a similar size (Génin et al. 2016). Further field surveys are needed to confirm this.

The subspecies *G. m. moholi* occupies the eastern part of the distribution, including the species' type locality on the banks of the Limpopo/Marikwa Rivers, and areas of savannah woodland in Limpopo, Mpumalanga and North West provinces, as well as northern Gauteng. In Pretoria and environs there have been several reports of groups living close to human dwellings, and even sightings in the *Acacia* thornveld that surrounds the Union Buildings. The subspecies *G. m. bradfieldi* ranges from northern Namibia into Angola, northwards and eastwards in Botswana to the Makgadikgadi Pan, moving into semi-arid regions along dry watercourses that support *Acacia* woodland; also found in western Zambia (Skinner & Chimimba 2005).

Population

This is a common and widespread species, found in highest densities associated with *Acacia karroo*. Development and land conversion for agriculture has reduced habitat in the past. However, *G. moholi* is a robust species found throughout the woodland savannah biome. Furthermore, wildlife ranching is assumed to generally improve habitat conditions for this species or conserve land that would otherwise be cleared for livestock (however, further research is needed to confirm this). No published data are available for longevity in the wild but captive individuals may live for 13 years. The age of reproductive maturity in females (first oestrus) is approximately nine months, although successful reproduction may not occur until the second oestrus period 5–6 months later. An intensive study of radio-tagged individuals in a 1x1 km area revealed 31 individuals / km^2 (Bearder & Martin 1979). Other density estimates (reviewed in Pullen & Bearder 2013) are 13.5 animals / km^2 in northeastern South Africa and > 50 animals / km^2 in Balovale, Zambia; this suggests that there are likely to be over 10,000 mature individuals given their

wide distribution and occurrence in both protected areas and transformed areas (such as gardens). Bearder and Martin (1979) found the average home range size to be around 12 ha.

Current population trend: Stable

Continuing decline in mature individuals: Not suspected, although opportunistic poaching may occur and cause localised declines.

Number of mature individuals in population: Unknown

Number of mature individuals in largest subpopulation: Unknown

Number of subpopulations: Unknown

Severely fragmented: No

Habitats and Ecology

The Lesser Galagos (*Galago*) are the most recent galagid genus to have diversified, and at least three species have evolved to occupy relatively open habitats within the last 1 million years. *Galago* is distributed across the bushveld and woodland of sub-Saharan Africa, where it encounters diverse habitat conditions, although the different species have remained morphologically very similar. It is possible that there are more cryptic species awaiting discovery within the group, north of the assessment region. Lesser Galagos can survive in relatively arid areas and are independent of water, satisfying their fluid requirements from their food. *Galago moholi* is found in all strata in savannah woodland from southern Tanzania southwards, and is particularly associated with *Acacia* spp. in South Africa which provide a source of gum. The species also occurs in miombo and mopane woodland, riverine gallery forest and at the edges of wooded areas. It is able to live in association with human settlements. Found from sea level to 1,500 m asl (Soutpansberg Mountains).

Acacia and mopane may contain tree holes, and mopane often have hollowed-out trunks, which serve both as resting and breeding sites. Females also build leafy nests during the wet season or they simply sleep hidden among branches. At dawn the animals may form sleeping groups of two to seven individuals, who will huddle together in a furry ball to sleep through the daylight hours, but the animals disperse at dusk to forage alone or, occasionally, in pairs. Female offspring may remain with the mother on maturity, sharing her home range and raising offspring together with her, while male offspring disperse out of the maternal range at the age of about nine months. After moving, young males are non-territorial and range widely over the territories of older males and females. The territory of a 'resident' or established male is smaller, overlapping those of one to three adult females.

Adult males are slightly larger than adult females when mature. Females give birth to 1–3 offspring during two birth seasons, in October/early November and again in late January/early February (Doyle et al. 1971). In a mother-daughter partnership, the mother is usually the first to breed. After birth, the females experience a post-partum oestrus, giving them the chance to breed twice during a single summer/rainy season. This is a reproductive system geared to a highly unpredictable environment with high mortality rates for offspring and juveniles, indicating that Lesser Galagos – though widely distributed and relatively flexible ecologically – live in a challenging and often lethal environment. Whether the high frequency of multiple births reported for this species (approximately 60%) is consistent throughout the species' range, or more prevalent in the most unpredictable parts (such as in South Africa and Namibia), has not been systematically investigated.


Simon Bearder

Galago moholi communicate chiefly using odour and sound, although they have excellent night vision and appear to recognise one another from a distance. Both males and females have sternal apocrine glands that secrete polysaccharides, and the animals can be seen rubbing their chests or mouths on sticks or protuberances in the areas they frequent most. Lesser Galagos also practice "urine-washing", coating the hands and feet with urine which is transferred to the fur of social group members during bouts of reciprocal grooming. Urine-washing dampens the hands and feet and may improve grip. It is often associated with fear or insecurity, and the animals will perform this stereotyped behaviour whenever they enter a new space that is not already saturated with their own odour. *Galago moholi* has an extensive vocal repertoire comprising up to 25 different calls that are emitted in a variety of contexts: alarm calls, threats, vocal advertisement by residents of a home range, gathering calls for group members prior to entry into the sleeping site, courtship calls by males to entice potentially receptive females, infant distress calls, and soothing contact calls by the mother to distressed infants. The advertisement call is peculiar to and diagnostic of the species.

Ecosystem and cultural services: Lesser Galagos are primarily insectivorous and gummivorous. They appear to have co-evolved with gum-producing trees and they help to control insect numbers (Bearder & Martin 1980). Moths are a special delicacy, many species of which are agricultural pests. The animals' penchant for nectar also suggests a role in pollination of indigenous plant species.

Use and Trade

Lesser Galagos are consumed as bushmeat, as their sleeping habits (the use of tree holes or leaf platforms by one to several animals during the daytime) make them easy prey. They are seen in muthi markets (Whiting et al. 2011), where their organs are on sale for use in traditional medicine. Their appealing faces – with their big eyes and

Table 2. Use and trade summary for the Southern Lesser Galago (*Galago moholi*)

Category	Applicable?	Rationale	Proportion of total harvest	Trend
Subsistence use	Yes	Poaching for bush meat.	Unknown	-
Commercial use	Yes	Illegal harvest for the pet trade and for traditional medicine.	Unknown	-
Harvest from wild population	Yes	Only source known.	Unknown	Unknown
Harvest from ranched population	No	-	-	-
Harvest from captive population	No	-	-	-

big ears – make them desirable as pets, and they are trapped illegally for the pet trade. These practices may be causing local population declines, but are unlikely to have an effect over the species' wide range. The private sector may have generally had a positive effect on this species as it has conserved more habitat suitable for Lesser Galagos (for example, by protecting areas of *Acacia* thornveld that might otherwise be harvested for firewood) and thus may have helped to connect subpopulations through game farming areas, for example in the Waterberg. However, this remains to be investigated.

Threats

There are no major anthropogenic threats. Bearder et al. (2008) suggests the range of the species is expanding in some areas, such as in Gauteng where it was not previously known. However, potential range expansion needs further research. Arable farming is giving way to game ranching and regeneration of natural vegetation in some areas. However, expansion of human settlements is suspected to have fragmented the Southern Lesser Galago's habitat, which may result in inbreeding amongst isolated subpopulations. This is of primary concern in Gauteng Province. The species is illegally harvested for the pet trade, and captured individuals seldom survive without expert care. Lesser Galagos are seen in muthi markets, indicating use in traditional medicine. Poaching for bushmeat is facilitated by the animals' somnolence and use of communal nests during the day, when several animals can be trapped at once by simply blocking the entrance. This widespread practice may be causing local declines and, worryingly, may be increasing around protected area edges (*sensu* Wittemyer et al. 2008).

Overall, galagos are relative generalists and can cope with habitat changes by diet shifting, but their breeding strategy also indicates habitat unpredictability and a rapid reproductive rate to cover high infant and juvenile mortality. Loss of habitat by tree-felling/harvesting will significantly affect local population viability. The species is particularly dependent upon *Acacia* gum nutrition,

Table 3. Threats to the Southern Lesser Galago (*Galago moholi*) 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 Agro-industry Plantations*: forest habitat loss: habitat loss through timber plantations in Mpumalanga and Limpopo provinces. Current stress *1.3 Indirect Ecosystem Effects*: fragmentation of remaining habitat into small patches.	Armstrong & van Hensbergen 1996	Indirect	Regional	Species richness lower in plantations. Stable.
		Munyati & Kabanda 2009	Indirect	Local	Ongoing: 20% forest cover lost between 1990 and 2006 in Soutpansberg, Limpopo Province.
2	*1.1 Housing & Urban Areas*: human settlement expansion leading to habitat loss and degradation. Current stress *1.3 Indirect Ecosystem Effects*: fragmentation of remaining habitat into small patches.	Munyati & Kabanda 2009	Indirect (remote sensing)	Local	Ongoing: 20% forest cover lost between 1990 and 2006 in Soutpansberg, Limpopo Province.
		GeoTerraImage 2015	Indirect (remote sensing)	National	Between 2000 and 2013 there has been an expansion in rural settlements of between 6.5–38.7% and an expansion in urban settlements of between 8.1–14.9% in North West, Limpopo, Mpumalanga and Gauteng provinces.
3	*5.1.1 Hunting & Collecting Animals (species being assessed is the target)*: bushmeat poaching.	-	Anecdotal	-	Possibly increasing in parallel with human settlement expansion.
4	*5.1.1 Hunting & Collecting Animals (species being assessed is the target):* traditional medicine use.	-	Anecdotal	-	Possibly increasing in parallel with human settlement expansion.
5	*5.1.1 Hunting & Collecting Animals (species being assessed is the target):* pet trade.	-	Anecdotal	-	Unknown, but possibly increasing as part of general surge in wildlife trade.

especially in winter when fewer insects are available. Thus, replacement of natural woodlands by commercial plantations will negatively impact this species (Armstrong & van Hensbergen 1996; Munyati & Kabanda 2009).

Current habitat trend: Continuing decline. Between 2000 and 2013 there has been an expansion in rural settlements of between 6.5–38.7% and an expansion in urban settlements of between 8.1–14.9% in North-West, Limpopo, Mpumalanga and Gauteng provinces (GeoTerraImage 2015). In the Soutpansberg, Limpopo Province, pine and eucalyptus plantations and residential housing expansion reduced woodland cover by 20% over a 16 year period between 1990 and 2006 (Munyati & Kabanda 2009).

Data Sources and Quality

Table 5. Information and interpretation qualifiers for the Southern Lesser Galago (*Galago moholi*) assessment

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

Conservation

This species occurs in a number of protected areas throughout its range within the assessment region, including Kruger National Park. Galagos adapt well to captivity and breed very successfully under expert care, and such facilities can be used to reintroduce this species into conservancies and other protected areas. Reintroductions are not recommended at this stage, however, as the real extent of the species' distribution, and the degree of range fragmentation, have yet to be established. Conservationists should continue to enforce protected area rules and prevent the illegal harvesting of firewood. Landowners should continue to form conservancies to protect woodland habitat.

Recommendations for land managers and practitioners:

- Captive breeding and reintroduction are not recommended at this stage, as no data exist concerning the genetic structure of this species within South Africa. Its previous confusion with *Galagoides granti* means that its geographic distribution and habitat requirements have yet to be established. We currently have a situation where one of our most common species has to be re-evaluated.
- The most proactive conservation measures at this stage would be to form conservancies for savannah-woodland habitat areas, and to prevent the uncontrolled removal of firewood.

Research priorities:

- Estimate the true extent of the *G. moholi* distribution and habitat requirements in light of the discovery of *Galagoides granti* within the borders of South Africa. A systematic census linking species and habitat types is essential for future conservation planning.
- Assess population genetics to determine the degree of population isolation and inbreeding; this is fundamental to an understanding of the health and survival prospects of this species.

Encouraged citizen actions:

- The discovery of *Galagoides granti* in northern KwaZulu-Natal places in doubt the opinion that *Galago moholi* occurs in this province. The most pressing need for an assessment of this species' population size and density estimates is a systematic census of KwaZulu-Natal Province reserves and private lands to document the true extent of its geographic range. Land owners and ecotourists can assist by attempting to identify any Lesser Galagos that occur either on their properties or within protected areas, and report these sightings on virtual museum platforms (for example, iSpot and MammalMAP) to assist in the re-assessment of the relative distributions of *G. moholi* and *Galagoides granti.*
- Woodland habitats are more fragile than they may at first appear, and *Acacia* trees in particular are sought after for firewood. Lesser Galago populations would benefit from the creation of conservancies to protect thornveld areas and prevent their over-exploitation.

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Table 4. Conservation interventions for the Southern Lesser Galago (*Galago moholi*) 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	*1.2 Resource & Habitat Protection*: form conservancies to protect woodland habitat, especially riparian corridors.	-	Anecdotal	-	-	For example, Friends of Nylsvley
2	*5.4 Compliance & Enforcement*: enforce regulations forbidding illegal or uncontrolled harvesting of firewood.	-	Anecdotal	-	-	None

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