

Herpestes ichneumon – Large Grey Mongoose



Gregg & Des Darling

Regional Red List status (2016)	Least Concern
National Red List status (2004)	Least Concern
Reasons for change	No change
Global Red List status (2016)	Least Concern
TOPS listing (NEMBA) (2007)	None
CITES listing	None
Endemic	No

The Large Grey Mongoose is largely unaffected by the venom of at least some snake species. Barchan et al. (1992) showed that the binding site of their acetylcholine receptors is resistant to the α -neurotoxins of these reptiles.

Taxonomy

Herpestes ichneumon (Linnaeus 1758)

ANIMALIA - CHORDATA - MAMMALIA - CARNIVORA -
HERPESTIDAE - *Herpestes* - *ichneumon*

Synonyms: *Viverra ichneumon*

Common names: Large Grey Mongoose, Egyptian Mongoose, Ichneumon, Ichneumon Mongoose (English), Grootgrysmuishond (Afrikaans), Mosêlamothaka (Tswana), Inhlangala (Zulu)

Taxonomic status: Species

Taxonomic notes: Meester et al. (1986) recognised two subspecies of *Herpestes ichneumon* in southern Africa; namely *H. i. cafer* (Gmelin 1788) from Hermanus in the Western Cape along the coast to KwaZulu-Natal, and into Mpumalanga, eastern Swaziland, Mozambique and Zimbabwe; and *H. i. mababiensis* Roberts 1932, which is restricted to northern Botswana.

Assessment Rationale

The Large Grey Mongoose is listed as Least Concern as the species is relatively common, with a very wide diet,

there are no major threats, and it is present in a number of protected areas within the assessment region. This species seems to be very adaptable, occupying a large range of habitats in its wide distribution range, but it might be more specialised in the assessment region, possibly as a result of intraguild competition and predation pressure. Because this species is often associated with riparian habitats and wetlands, we therefore recommend monitoring in areas where development may be affecting water supply and/or quality, to determine potential negative impacts on this mongoose through changes in understorey vegetation (for cover) and possibly food availability.

Regional population effects: The Large Grey Mongoose can disperse across regional borders between South Africa and Mozambique, as its range is continuous across much of southeast Africa and this species is not constrained by fences. Considering that this mongoose has generally not been recorded very far inland (see Figure 1), it is, however, possible that dispersal and movements are at least partially dependent upon the presence of water corridors – and related (understorey) vegetation – such as permanent and seasonal rivers and streams, dam networks or wetlands.

Distribution

The Large Grey Mongoose is found mainly in sub-Saharan Africa, from Senegal and Gambia to East Africa, then southwards in Angola, Zambia, Malawi and Mozambique. It is present in Gabon only in the south, but Bahaa-el-din et al. (2013) recently recorded the species 105 km north of its previously known range. It is absent from much of southern Africa, but is present in northeast Namibia, northern Botswana, northern and eastern Zimbabwe, and all along the South African coastline (Palomares 2013). In North Africa, it ranges in a narrow coastal strip from Western Sahara to Tunisia, and also from northern and eastern Egypt southwards to Ethiopia (Palomares 2013). It has been reported from sea level to 1,950 m asl in the Moroccan High Atlas, and to 3,000 m asl in the Ethiopian Highlands (Yalden et al. 1996). This species has not been introduced to Madagascar (Goodman 2012), contrary to what may have been suggested in some sources (e.g. Haltenorth & Diller 1980).

Extralimitally to the African mainland, this species is also found from the Sinai Peninsula to the south of Turkey (Delibes 1999), and on the Iberian Peninsula in southern and central Portugal (Borrhalho et al. 1995) and southwestern Spain (Delibes 1999). *Herpestes ichneumon* was initially believed to have been introduced by humans into Europe, based on zoogeographical considerations (Delibes 1999) and on the grounds that the species is absent from the European fossil record, although late Pleistocene and Holocene fossils are known from North Africa (Dobson 1998). However, a recent molecular and phylogeographic study rather supported a scenario of sweepstake dispersal across the strait of Gibraltar during Late Pleistocene sea-level fluctuations, followed by long-term *in situ* evolution throughout the last glaciation cycles (Gaubert et al. 2011).

Recommended citation: Do Linh San E, Emslie K, Maddock AH, Perrin MR, Stuart C, Stuart M, Palomares F. 2016. A conservation assessment of *Herpestes ichneumon*. In Child MF, Roxburgh L, Do Linh San E, Raimondo D, Davies-Mostert HT, editors. The Red List of Mammals of South Africa, Swaziland and Lesotho. South African National Biodiversity Institute and Endangered Wildlife Trust, South Africa.

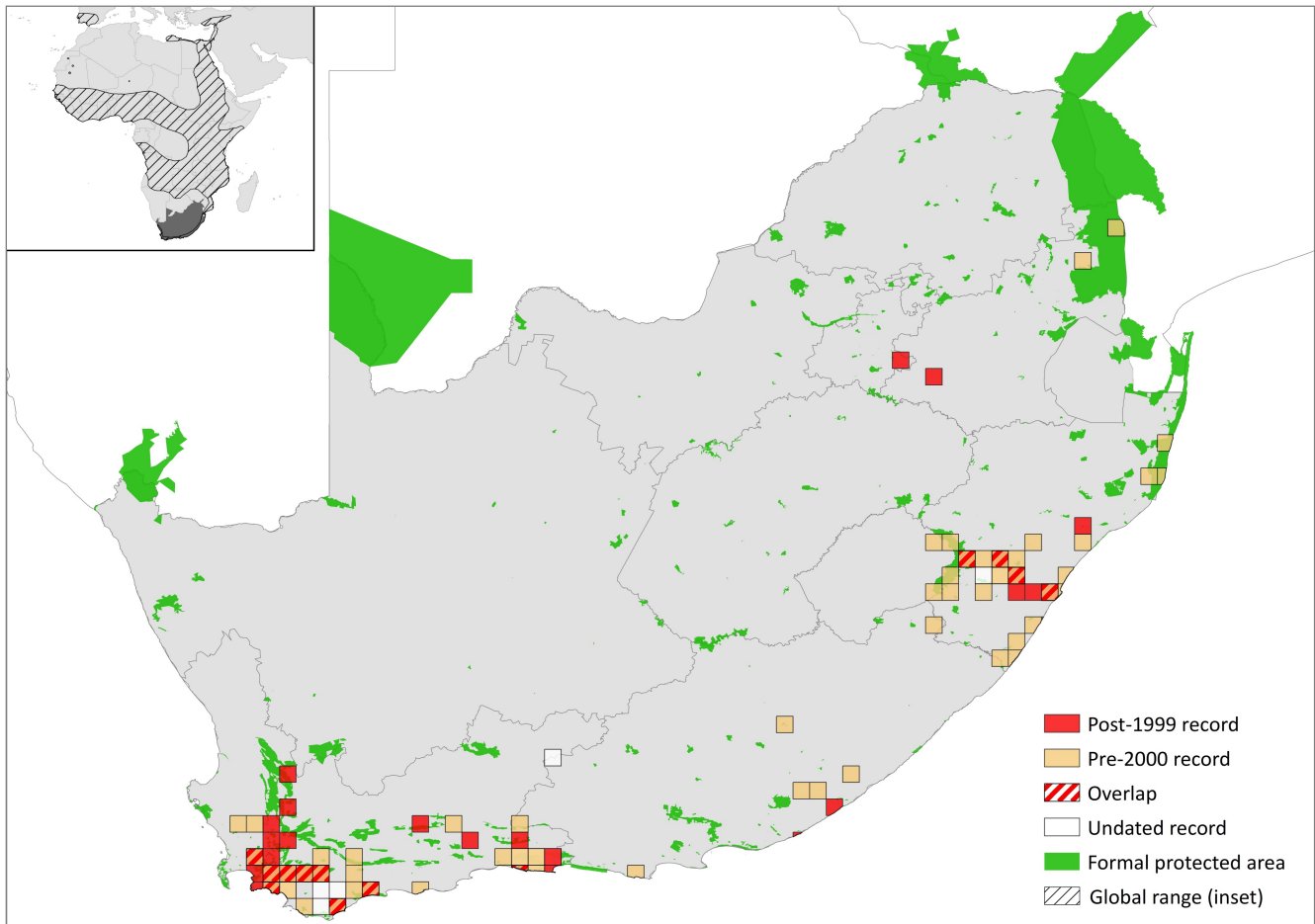


Figure 1. Distribution records for Large Grey Mongoose (*Herpestes ichneumon*) within the assessment region

Table 1. Countries of occurrence within southern Africa

Country	Presence	Origin
Botswana	Extant	Native
Lesotho	Possibly extant	Native
Mozambique	Extant	Native
Namibia	Extant	Native
South Africa	Extant	Native
Swaziland	Extant	Native
Zimbabwe	Extant	Native

In the assessment region the Large Grey Mongoose is mostly present along the coast, from the Western Cape (as far north as Kleinsee; record not indicated on Figure 1) to KwaZulu-Natal through the Eastern Cape Province. The species is possibly extant in eastern Lesotho (Lynch 1994) and has been recorded in the Lubombo region of Swaziland (Skinner & Chimimba 2005). It is present in the extreme east of Mpumalanga Province, essentially in Kruger National Park. However, the species has been observed in Marievale Bird Sanctuary, Gauteng in 2016 (V. Pretorius & M. Pretorius pers. comm. 2016), as well as camera-trapped and observed at Sasol’s Synfuels Plant in Secunda, Mpumalanga, in 2014–2016 (K. Emslie et al. unpubl. data). These recent observations therefore suggest that the distribution range of the Large Grey Mongoose in the assessment region might be much larger than initially thought. Although range expansion cannot be excluded, the most parsimonious explanation is that the

presence of this small carnivore has been overlooked in at least some areas due to its relatively low densities (see **Population**) and secretive nature. However, it is also possible that interspecific competition with other abundant and generalist small carnivores such as the Cape Grey Mongoose (*Herpestes pulverulentus*) and to a lesser extent the Slender Mongoose (*H. sanguineus*) might play a role, particularly in the Nama-Karoo and Grassland biomes, respectively. Additionally, the impact of mesopredators such as Black-backed Jackals (*Canis mesomelas*) and Caracals (*Caracal caracal*) on this mongoose is likely to be stronger in the more open habitats that characterise these two biomes. The importance of intraguild predation or at least predation pressure (creating a “landscape of fear”) on this species has been demonstrated in Spain where *Herpestes ichneumon* is rare in areas where the Iberian Lynx (*Lynx pardinus*) is abundant (Palomares et al. 1996). The presence of the Large Grey Mongoose in the inland biomes might be restricted to densely vegetated linear riverine habitats and pockets of wetlands – although it does not seem to be the case far inland (see Figure 1) – and where it may compete for food and safe resting sites with the Water Moongoose (*Atilax paludinosus*).

Population

In Europe the range and population size of the Large Grey Mongoose have increased over the past 35 years, in both Portugal and Spain, due to the reduction of this species’ natural predators (Delibes 1999), as well as land-use change and climate change (Barros et al. 2015).

On the African mainland, this species is widespread and locally common (Palomares 2013). Densities ranging from 0.1 (East Africa: Hendrichs 1972) to 1.2 individual(s) / km² (South Africa: Maddock 1988) have been recorded. Palomares and Delibes (1992a) estimated a density of 2 individuals / km² in optimal habitats in Spain. This is generally well below maximum densities documented for other mongoose species in the assessment region, but it is still relatively high. It is currently not possible to estimate population size precisely, but we infer that the population is currently stable based on this species' extent of occurrence and the lack of major threats (see **Threats**).

Current population trend: Unknown, but probably stable.

Continuing decline in mature individuals: Unknown, but probably not.

Number of mature individuals in population: Unknown

Number of mature individuals in largest subpopulation: Unknown

Number of subpopulations: It is not currently possible to determine the extent or number of subpopulations.

Severely fragmented: No. This species seems to have a relatively continuous distribution along the South African coast.

Habitats and Ecology

The Large Grey Mongoose is essentially associated with habitats possessing understorey vegetation in riparian, lacustrine and coastal (streams, rivers, marsh, swamps) habitats (Ben-Yaacov & Yom-Tov 1983; Palomares & Delibes 1993a; Angelici et al. 1999; Photo 1). It can, however, be very common locally in heavily grassed and cultivated areas, such as observed by Kingdon (1977) in East Africa. It has also been recorded in irrigated and cultivated areas in Morocco. This mongoose generally avoids humid forests and extreme deserts (Delibes 1999), but there are exceptions. For example, a large series of records originate from rainforests in the Democratic Republic of the Congo (P. Gaubert pers. obs. 2001–2005)

and in southeastern Nigeria (Angelici et al. 1999); and in Egypt, Kasperek (1993) reported that the species inhabits desert areas far from the coast. In Europe, it is found in Mediterranean maquis, with a clear preference for humid and riparian habitats (Delibes 1999).

Large Grey Mongooses are entirely terrestrial, but they are good swimmers. They can sometimes be observed foraging along pond or dam banks (Photo 1), and in the shallow waters, as Water Mongooses do. Their strong forelimbs and long, curved claws also make them particularly suited to digging for prey. They are opportunistic, omnivorous feeders, and their diet may vary seasonally, regionally, and even between neighbouring family groups (Palomares 1993a). Accordingly, the range of prey is wide and includes small mammals, birds, reptiles and amphibians, fish, crabs, insects and arachnids, gastropods, carrion, fungi, fruit and other plant material (Rowe-Rowe 1978; Smithers & Wilson 1979; Stuart 1983; Palomares 1993a; Angelici 2000). Small mammals such as *Otomys* spp., *Rhabdomys pumilio* and *Mastomys* spp. have locally been shown to dominate the diet. In Spain, young European Rabbits (*Oryctolagus cuniculus*) may locally constitute the main prey (Delibes 1976), while in Israel Ben-Yaacov and Yom-Tov (1993) found that they mainly fed on poultry and rats. Large prey are killed by a neck bite and small prey by a head bite (Estes 1991).

The Large Grey Mongoose is generally diurnal, with peaks of activity in the morning and late afternoon (Palomares & Delibes 1992b; Maddock & Perrin 1993). During the night it sleeps singly or in family groups (see below) in underground dens or dense thickets (Palomares & Delibes 1993b). The species is crepuscular in Israel (Ben-Yaacov & Yom-Tov 1983) and, according to Palomares (2013), nocturnal activity may take place where individuals are subject to human disturbance. Most of the active time is spent foraging, while travelling and social interactions only occupy a minimum of time every day (Palomares & Delibes 1992b, 1993c). Foraging is characterised by intense prey searching. Animals walk with the nose close to the ground, inspect every small hole, frequently



Photo 1. The Large Grey Mongoose (*Herpestes ichneumon*) – note the characteristic black tail-tip – is mainly associated with riparian, lacustrine or coastal habitats (Frieda Prinsloo)

excavating and sniffing around bushes and shrubs, and investigating larger burrows (Palomares 2013).

This species is predominantly solitary, although it is not rare to observe groups of one to four adult individuals – up to two or three females and one male – with their young (Maddock & Perrin 1993; Ben-Yaacov & Yom-Tov 1983; Palomares & Delibes 1993d), with even an exceptional record of a pack of 14 individuals in Namibia (Shorridge 1934). Males, however, often spend most of their time alone. Very little information is available on the spatial ecology of this species in the assessment region. In Vernon Crookes Nature Reserve, KwaZulu-Natal, Maddock (1988) found home range sizes of 2.77 km² for a female and 2.59 km² for a male that were tracked for nearly a year or more. In southwestern Spain, average home range sizes vary between 2.8 and 3.5 km² for young and adults (sex combined), respectively (Palomares 1994). Males are territorial over their entire home range, while females are only territorial in their core areas. Body mass plays an important role in this species' spatial organisation and dominance relationships, with heavier females accessing richer food patches and heavier males encompassing more female home ranges in their territories (Palomares 1993b, 1994).

Large Grey Mongooses communicate both through olfaction and vocalisation. Temporary latrines – often found in open microsites near or inside thickets or next to dens – may be located within core areas (Palomares 1993c), while more permanent ones may be used to mark home ranges (Ben-Yaacov & Yom-Tov 1983). Individuals may also use perianal gland secretions to mark the ground, large stones or rock corners. Five different calls have been recorded in free-ranging individuals in Spain, and these were related to contact, alarm, aggression, intimidation and pain (Palomares 1991). The most frequently repeated is the contact call, which is a short duration call emitted repeatedly by every member of the group to maintain contact during foraging. The alarm call is a deep, sharp growl.

Little information is available on reproductive biology in the assessment region. In Africa, births have been

recorded almost throughout the year (review in Palomares 2013). An average of 2.7 to 3.3 young (with a range of one to four) (Ben-Yaacov & Yom-Tov 1983; Palomares & Delibes 1992a) are born after a gestation period of 9–10 weeks. Normally females give birth to a single litter per year, but captive females breed again if they lose their cubs. Postnatal physical and behavioural development has been studied by Ben-Yaacov & Yom-Tov (1983). This species can live up to 13 years in captivity (Kingdon 1977).

Ecosystem and cultural services: Like other small carnivores, the Large Grey Mongoose may predate on pest species, such as rodents (including rats and mice in human-dominated habitats) and insects. In North Africa, this species is often protected by local people because it is valued as a predator of snakes (F. Cuzin & K. de Smet pers. comm. 2007). In fact the ancient Egyptians kept these mongooses as pets, presumably to control rodents and snakes (Maddock 1997); hence the other name given to this species, Egyptian Mongoose.

Use and Trade

To our knowledge this species is not harvested or traded in any form in the assessment region.

Threats

There are currently no major threats to the species in the assessment region. Like most small carnivores the Large Grey Mongoose occasionally falls victim to road traffic collisions (W. Collinson unpubl. data; see Ben-Yaacov & Yom-Tov 1983 for Israel). On farmland it might also accidentally be poisoned by carcasses set out for damage-causing predators such as Black-backed Jackals or Caracals. As this species is closely associated with riverine and wetland vegetation in a large part of its range, the loss of the corresponding habitats may potentially result in localised declines. The drainage of swamplands for conversion to arable land may, for example, constitute a local threat.

Table 2. Threats to the Large Grey Mongoose (*Herpestes ichneumon*) 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	4.1 Roads & Railroads: road collisions.	W. Collinson unpubl. data Ben-Yaacov & Yom-Tov 1983	Empirical Empirical	National National	Possibly increasing with new road construction.
2	5.1.2 Hunting & Collecting Terrestrial Animals: accidental poisoning by carcasses set out for other species.	-	Anecdotal	-	Stable, but possibly increasing in some areas.
3	2.1.3 Annual & Perennial Non-timber Crops: habitat loss from agricultural expansion. Current stresses 1.1 Ecosystem Conversion and 1.2 Ecosystem Degradation: drainage of wetlands and deteriorating ecological integrity of river systems.	Nel et al. 2007; Driver et al. 2012	Indirect (land cover change from remote sensing)	National	Increasing
4	7.2.3 Dams & Water Management/Use: water abstraction through human settlement and agriculture. Current stresses 1.1 Ecosystem Conversion and 1.2 Ecosystem Degradation: drainage of wetlands and deteriorating ecological integrity of river systems.	Nel et al. 2007; Driver et al. 2012	Indirect (land cover change from remote sensing)	National	Increasing

Table 3. Conservation interventions for the Large Grey Mongoose (*Herpestes ichneumon*) 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 <i>Site/Area Protection</i> : protected area expansion of riverine and wetland habitats.	-	Anecdotal	-	-	-
2	1.2 <i>Resource & Habitat Protection</i> : stewardship initiatives to protect riverine and wetland habitats.	-	Anecdotal	-	-	-

Current habitat trend: Stable with possible localised habitat losses.

Conservation

The Large Grey Mongoose is listed on Appendix III of the Bern Convention, and Annex V of the European Union (EU) Habitats and Species Directive (Delibes 1999). In the assessment region, this species is present in many protected areas, including Kruger National Park. Because it is often associated with riparian habitats and wetlands though, we recommend monitoring in areas where development may be affecting water supply and/or quality, to determine potential negative impacts. It is indeed unclear whether this species is as tolerant of modified or disturbed habitats within the assessment region as observed elsewhere (see **Habitats and Ecology**).

As a precautionary measure, and in line with recommendations for other water-dependent species, water management practices, especially outside protected areas, should be carefully planned to avoid negatively impacting riverine ecosystems and wetlands. The most important interventions for this species are those that conserve watersheds and riparian valleys. There is a need to enforce the National Water Act (No. 36 of 1998) and to ensure that the tools provided for in this act – for example, ecological reserve determination and resource quality objectives – are applied to protect our freshwater ecosystems.

Recommendations for land managers and practitioners:

- As a general measure, maintain and improve the ecological integrity of river systems and wetlands.

Research priorities:

- Monitoring Large Grey Mongoose subpopulation trends and measuring the impact – if any – of water

quality and quantity deterioration in areas where development takes place.

- General studies on the biology and ecology of this species in different habitat types.

Encouraged citizen actions:

- Report sightings on virtual museum platforms (for example, iSpot and MammalMAP), especially outside protected areas.
- Report illegal land- and water-use practices to the authorities.
- Protect sensitive riparian areas.

References

- Angelici FM, Luiselli L, Politano E. 1999. Distribution and habitat of selected carnivores (Herpestidae, Mustelidae, Viverridae) in the rainforests of southeastern Nigeria. *Zeitschrift für Säugetierkunde* **64**:116–120.
- Angelici FM. 2000. Food habits and resource partitioning of carnivores (Herpestidae, Viverridae) in the rainforests of southeastern Nigeria: preliminary results. *Revue d'Ecologie (Terre et Vie)* **55**:67–76.
- Bahaa-el-din L, et al. 2013. Notes on the distribution and status of small carnivores in Gabon. *Small Carnivore Conservation* **48**:19–29.
- Barchan D, Kachalsky S, Neumann D, Vogel Z, Ovadia M, Kochva E, Fuchs S. 1992. How the mongoose can fight the snake: the binding site of the mongoose acetylcholine receptor. *Proceedings of the National Academy of Sciences of the United States of America* **89**:7717–7721.
- Barros T, Carvalho J, Pereira MJR, Ferreira JP, Fonseca C. 2015. Following the trail: factors underlying the sudden expansion of the Egyptian Mongoose (*Herpestes ichneumon*) in Portugal. *PLoS One* **10**:e0133768.
- Ben-Yaacov R, Yom-Tov Y. 1983. On the biology of the Egyptian Mongoose, *Herpestes ichneumon*, in Israel. *Zeitschrift für Säugetierkunde* **48**:34–45.
- Borrhalho R, Rego F, Palomares F, Hora A. 1995. The distribution of the Egyptian mongoose *Herpestes ichneumon* (L.) in Portugal. *Mammal Review* **25**:229–236.
- Delibes M. 1976. Datos sobre la alimentación del meloncillo, *Herpestes ichneumon widdringtoni* Gray, 1842, en España. *Säugetierkundliche Mitteilungen* **24**:38–42.
- Delibes M. 1999. *Herpestes ichneumon*. Pages 356–357 in Mitchell-Jones A, Amori G, Bogdanowicz W, Kryštufek B, Reijnders PJH, Spitzenberger F, Stubbe M, Thissen JBM, Vohralík V, Zima J, editors. *The Atlas of European Mammals*. Academic Press, London, UK.
- Dobson M. 1998. Mammal distributions in the western Mediterranean: the role of human intervention. *Mammal Review* **28**:77–88.

Data Sources and Quality

Table 4. Information and interpretation qualifiers for the Large Grey Mongoose (*Herpestes ichneumon*) assessment

Data sources	Field study (literature), indirect information (literature)
Data quality (max)	Estimated
Data quality (min)	Inferred
Uncertainty resolution	Author consensus
Risk tolerance	Best estimate

- Driver A, Sink KJ, Nel JN, Holness S, van Niekerk L, Daniels F, Jonas Z, Majiedt PA, Harris L, Maze K. 2012. National Biodiversity Assessment 2011: An Assessment of South Africa's Biodiversity and Ecosystems. Synthesis Report. South African National Biodiversity Institute and Department of Environmental Affairs, Pretoria, South Africa.
- Estes RD. 1991. The Behavior Guide to African Mammals: Including Hoofed Mammals, Carnivores, Primates. University of California Press, California, USA.
- Gaubert P, et al. 2011. Comparative phylogeography of two African carnivores presumably introduced into Europe: disentangling natural versus human-mediated dispersal across the Strait of Gibraltar. *Journal of Biogeography* **38**:341–358.
- Goodman S. 2012. Les Carnivora de Madagascar. Association Vahatra, Antananarivo, Madagascar.
- Haltenorth T, Diller H. 1980. A Field Guide to the Mammals of Africa including Madagascar. Collins, London, UK.
- Hendrichs H. 1972. Beobachtungen und Untersuchungen zur Ökologie und Ethologie, insbesondere zur sozialen Organisation ostafrikanischer Säugetiere. *Zeitschrift für Tierpsychologie* **30**: 146–189.
- Kasperek M. 1993. The Egyptian Mongoose, *Herpestes ichneumon*, in Western Egypt. *Zoology in the Middle East* **9**: 31–32.
- Kingdon J. 1977. East African Mammals. Volume IIIA: Carnivores. Academic Press, London, UK
- Maddock AH. 1988. Resource partitioning in a viverrid assemblage. Ph.D. Thesis. University of Natal, Pietermaritzburg, South Africa.
- Maddock AH. 1997. Large grey mongoose *Herpestes ichneumon*. Page 212 in Mills G, Hes L, editors. The Complete Book of Southern African Mammals. Struik, Cape Town, South Africa.
- Maddock AH, Perrin MR. 1993. Spatial and temporal ecology of an assemblage of viverrids in Natal, South Africa. *Journal of Zoology* **229**:277–287.
- Meester JAJ, Rautenbach IL, Dippenaar NJ, Baker CM. 1986. Classification of southern African mammals. *Transvaal Museum Monographs* **5**:1–359.
- Nel JL, Roux DJ, Maree G, Kleynhans CJ, Moolman J, Reyers B, Rouget M, Cowling RM. 2007. Rivers in peril inside and outside protected areas: a systematic approach to conservation assessment of river ecosystems. *Diversity and Distributions* **13**:341–52.
- Palomares F. 1991. Vocalizations emitted by the Egyptian mongoose, *Herpestes ichneumon*, living in the wild. *Mammalia* **55**:148–150.
- Palomares F. 1993a. Opportunistic feeding of the Egyptian mongoose, *Herpestes ichneumon* (L.) in southwestern Spain. *Revue d'Ecologie (Terre et Vie)* **48**:295–304.
- Palomares F. 1993b. Individual variations of male mating tactics in Egyptian mongooses (*Herpestes ichneumon*): can body mass explain the differences? *Mammalia* **57**:317–324.
- Palomares F. 1993c. Faecal marking behaviour by free-ranging common genets *Genetta genetta* and Egyptian mongooses *Herpestes ichneumon* in southwestern Spain. *Zeitschrift für Säugetierkunde* **58**:225–231.
- Palomares F. 1994. Site fidelity and effects of body mass on home-range size of Egyptian mongoose. *Canadian Journal of Zoology* **72**:465–469.
- Palomares F. 2013. *Herpestes ichneumon* Egyptian Mongoose (Ichneumon). Pages 306–310 in Kingdon J, Hoffmann M, editors. *Mammals of Africa*. Volume V: Carnivores, Pangolins, Equids and Rhinoceroses. Bloomsbury Publishing, London, UK.
- Palomares F, Delibes M. 1992a. Some physical and population characteristics of Egyptian mongooses (*Herpestes ichneumon* L., 1758) in southwestern Spain. *Zeitschrift für Säugetierkunde* **57**: 94–99.
- Palomares F, Delibes M. 1992b. Circadian activity patterns of free-ranging large gray mongooses, *Herpestes ichneumon*, in southwestern Spain. *Journal of Mammalogy* **73**:173–177.
- Palomares F, Delibes M. 1993a. Key habitats for Egyptian mongooses in Doñana National Park, south-western Spain. *Journal of Applied Ecology* **30**:752–758.
- Palomares F, Delibes M. 1993b. Resting ecology and behaviour of Egyptian mongooses (*Herpestes ichneumon*) in southwestern Spain. *Journal of Zoology* **230**:557–566.
- Palomares F, Delibes M. 1993c. Determining activity types and budgets from movement speed of radio-marked mongooses. *Journal of Wildlife Management* **57**:164–167.
- Palomares F, Delibes M. 1993d. Social organization in the Egyptian mongoose: group size, spatial behaviour and inter-individual contacts in adults. *Animal Behaviour* **45**:917–925.
- Palomares F, Ferreras P, Fedriani JM, Delibes M. 1996. Spatial relationships between Iberian lynx and other carnivores in an area of southwestern Spain. *Journal of Applied Ecology* **33**:5–13.
- Rowe-Rowe DT. 1978. The small carnivores of Natal. *Lammergeyer* **25**:1–48.
- Smithers RHN, Wilson V. 1979. Check List and Atlas of the Mammals of Zimbabwe Rhodesia. Museum Memoir No 9. National Museum of Rhodesia, Salisbury, Zimbabwe.
- Shortridge GC. 1934. The Mammals of South West Africa. William Heinemann Limited, London, UK.
- Stuart CT. 1981. Notes on the mammalian carnivores of the Cape Province, South Africa. *Bontebok* **1**:1–58.
- Stuart CT. 1983. Food of the large grey mongoose *Herpestes ichneumon* in the south-west Cape Province. *South African Journal of Zoology* **18**:401–403.
- Skinner JD, Chimimba CT. 2005. The Mammals of the Southern African Subregion. Third edition. Cambridge University Press, Cambridge, UK.
- Yalden DW, Largen MJ, Kock D, Hillman JC. 1996. Catalogue of the mammals of Ethiopia and Eritrea. 7. Revised checklist, zoogeography and conservation. *Tropical Zoology* **9**:73–164.

Assessors and Reviewers

Emmanuel Do Linh San^{1†}, Kevin W. Emslie², Ant H. Maddock³, Mike R. Perrin⁴, Chris Stuart^{5†}, Mathilde Stuart^{5†}, Francisco Palomares⁶

¹University of Fort Hare, ²University of Venda, ³Joint Nature Conservation Committee, ⁴University of KwaZulu-Natal, ⁵African–Arabian Wildlife Research Centre, ⁶Estacion Biologica de Doñana CSIC

[†]IUCN SSC Small Carnivore Specialist Group, [†]IUCN SSC Afrotheria Specialist Group

Contributors

Claire Relton¹

¹Endangered Wildlife Trust

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