Civettictis civetta – African Civet


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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 (2015)	Least Concern
TOPS listing (NEMBA) (2007)	None
CITES listing (1978)	Appendix III (Botswana)
Endemic	No

In Ethiopia, there are over 200 registered and licensed African Civet farmers who capture this species in the wild and keep several thousand individuals in captivity for the production of "civetone" (civet musk), which is used as a fixing agent in the perfume industry (Kumera 2005). This is still being done even though synthetic alternatives are available.

Taxonomy

Civettictis civetta (Schreber 1776)

ANIMALIA - CHORDATA - MAMMALIA - CARNIVORA - VIVERRIDAE - *Civettictis* - *civetta*

Common names: African Civet, Civet (English), Siwetkat, Afrikaanse Siwet, Afrika-siwet (Afrikaans), Insimba (Ndebele), Tsaparangaka (Sesotho), Lifungwe, Imphicanadloti (Swati), Fungwe (Tsonga), Tsaparangaka, Tshipalere, Tshipalore, Tshipalôre, Tshipa-nôre (Tswana), Dhatshatsha, Dzamatamanga, Dzambarananga, Dzambaranwaha, Dzhatshatsha, Linyanganwaha (Venda), Inyhwagi (Xhosa), iQaqa (Zulu)

Taxonomic status: Species

Taxonomic notes: This species was formerly considered to be congeneric with Asian civets of the genus *Viverra*. It was first included in *Civettictis* by Pocock (1915) and retained in that genus by several authors, including Ray (1995, 2013), Kingdon (1997) and Wozencraft (2005), but others, such as Ellerman et al. (1953) and Coetzee (1977), continued to include it in *Viverra*. Although several subspecies have been recorded, their validity remains questionable (Rosevear 1974; Coetzee 1977; Meester et al. 1986).

Assessment Rationale

The African Civet is listed as Least Concern as it is fairly common within the assessment region, inhabits a variety of habitats and vegetation types, and is present in numerous protected areas (including Kruger National Park). Camera-trapping studies suggest that there are healthy populations in the mountainous parts of Limpopo's Waterberg, Soutpansberg, and Alldays areas, as well as the Greater Lydenburg area of Mpumalanga. However, the species may be undergoing some localised declines due to trophy hunting and accidental persecution (for example, poisoning that targets larger carnivores). Furthermore, the increased use of predator-proof fencing in the growing game farming industry in South Africa can limit movement of African Civets. The expansion of informal settlements has also increased snaring incidents, since it seems that civets are highly prone to snares due to their regular use of footpaths. Elsewhere in Africa, this species is an important component in the bushmeat trade. Although the bushmeat trade is not as severe within the assessment region, it is thought that trade in civet bushmeat will increase as other sources of bushmeat become scarce. Even though information regarding the traditional medicine trade of African Civets in the assessment region is limited, it is likely that this species has the same medicinal significance as in other regions of Africa. We recommend that research focuses on population size and trends, as well as quantification of traditional medicine use, legal removals through hunting and permeability of fences. We also recommend that local management efforts should include snare removal, especially along footpaths.

Regional population effects: The African Civet's range is continuous with the rest of its African range and there are no major barriers to this species' dispersal. We therefore assume that there is dispersal across regional boundaries, especially across the Great Limpopo Transfrontier Park (GLTP), and across the Limpopo Province with Botswana and Zimbabwe. However, within the assessment region, an increase in predator-proof fencing across the game ranching areas in Limpopo, Mpumalanga and North West provinces will severely obstruct civet dispersal.

Distribution

The African Civet is widely distributed in Africa from Senegal and Mauritania to southern Sudan, Ethiopia, Djibouti, and southern Somalia southwards in all countries to northeastern Namibia, north and east Botswana, and northeastern South Africa (Ray 2013). It is present on Zanzibar Island (Pakenham 1984; Stuart and Stuart 1998) and Sao Tome Island (Dutton 1994). The species is recorded from almost sea level to altitudes of 5,000 m asl on Mt Kilimanjaro (Moreau 1944).

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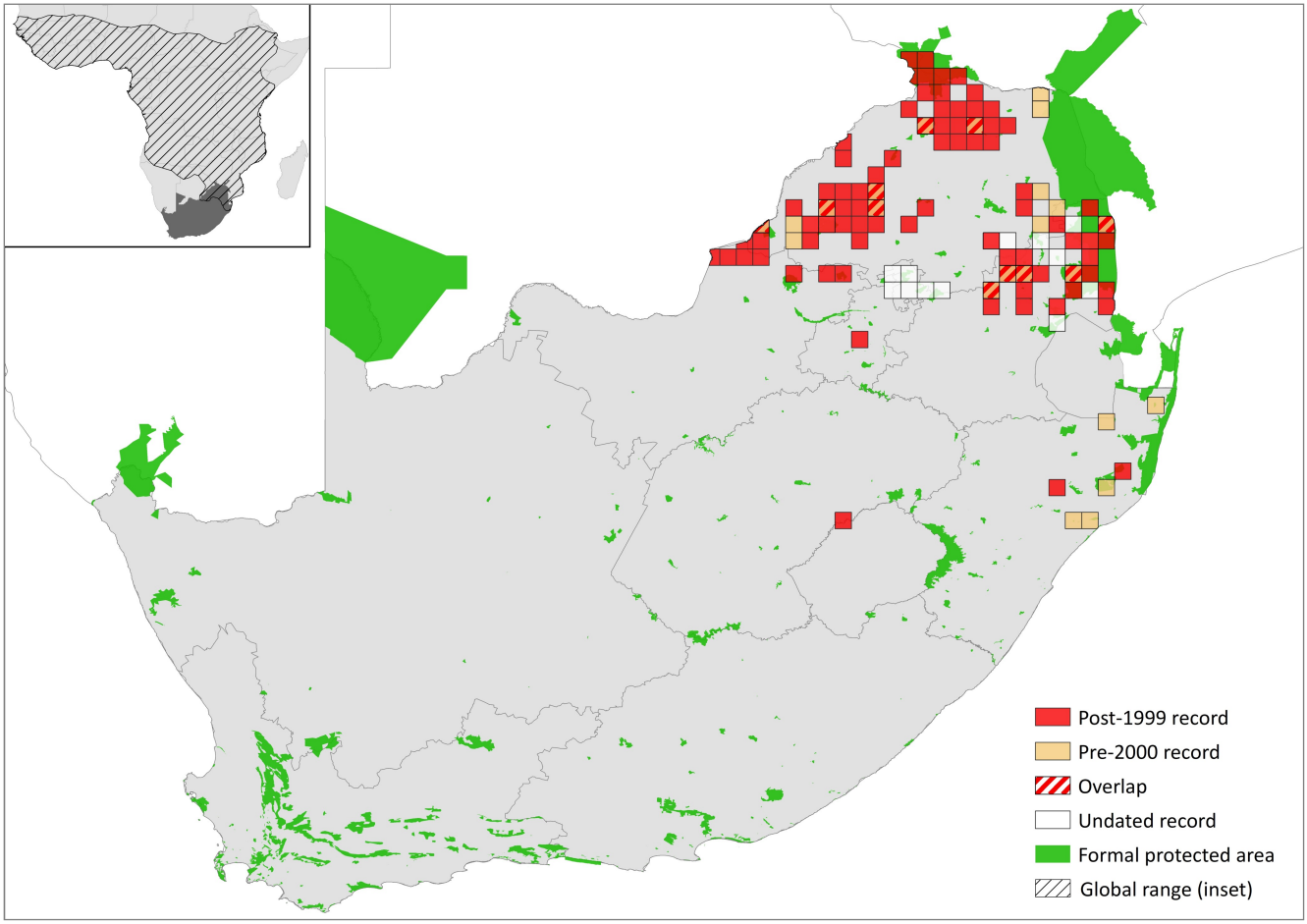

Figure 1. Distribution records for African Civet (*Civettictis civetta*) within the assessment region

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	Extant	Native
Zimbabwe	Extant	Native

Within the assessment region, it occurs in the northern parts of the South Africa, including northern KwaZulu-Natal, Mpumalanga, Limpopo and the northern parts of the North West Province. Its dispersal routes are unknown, but can be suspected to be contiguous with its distribution. Camera-trapping across Limpopo and Mpumalanga show them to be fairly common (L. Swanepoel unpubl. data), but their distribution and abundance in other provinces remains uncertain. Recent data also reveal their occurrence in the Free State Province. However, these records should be interpreted with caution as they may pertain to escapees from game farms and thus represent translocations rather than natural occurrences (N.L. Avenant pers. comm. 2016).

Although Power (2014) noted that the extent of occurrence (EOO) of this species has contracted by 36% since 1983 in the North West Province, this is a range-edge and marginal distribution, and range expansions or contractions are difficult to estimate accurately. African Civets do seem to now be absent from the Magaliesberg area – an area in which they once occurred in the pre-1980s (see Rautenbach 1978). In the North West Province they are not known further south than the 25° 30` S parallel. They are common in Madikwe Game Reserve and Borakalalo National Parks, but are rare in Pilanesberg National Park (see Power 2014). In the Limpopo Province there seem to be healthy populations in the Waterberg District (protected and non-protected areas), Soutpansberg/Vhembe District (projected and non-protected) and a number of game/livestock farming areas. In KwaZulu-Natal their distribution and abundance seem to be localised, with rare detections in Phinda and Thanda Nature Reserves (L.H. Swanepoel unpubl. data). Skinner and Chimimba (2005) documented their occurrence in the middleveld and the Lubombo region of Swaziland. This species does not occur in Lesotho (N.L. Avenant pers. comm. 2016).

Population

Within the assessment region, density estimates vary between different land uses. In Limpopo, using spatial mark–recapture models, African Civet density was estimated to be around 14.11 ± 4.15 individuals / 100 km^2 for protected areas without African Lions (*Panthera leo*) (e.g. Lapalala Wilderness), 11.39 ± 5.52 for game farming areas (e.g. the Waterberg Mountains) and 6.42 ± 1.99 for protected areas with African Lions (e.g. Welgevonden Private Game Reserve) (Isaacs et al. *in press*). These results concur with camera-trap studies elsewhere in Limpopo (2013 and 2014) where civet populations were

estimated at 10.1 ± 0.56 and 9.04 ± 0.82 individuals / 100 km² in Mogalakwena Game Reserve and 14.18 ± 0.12 individuals / 100 km² at Moyo Conservation Project Reserve (both in Alldays area; Amiard 2014). Similarly density estimates from Soutpansberg hovered around 15 individuals / 100 km² (A. Thomissen unpubl. data).

Corroborating these estimates, camera-trap studies conducted in the mountainous areas of the Greater Lydenburg area of Mpumalanga, revealed healthy populations with home range sizes between 3 and 5 km² (G. Camacho unpubl. data). The population estimation of 12.52 individuals / 100 km² at Thaba Tholo Wilderness Reserve in the Mpumalanga Province accords with the previous result (Amiard 2014).

These current population estimates suggest healthy civet populations both inside and outside protected areas and these are not thought to be declining. However, several factors seem to drive African Civet populations. First, data from Waterberg studies (Isaacs 2016; Isaacs et al. *in press*) seem to point to top-down regulation by large carnivores (*sensu* Prugh et al. 2009), which suggest that high densities of large carnivores (e.g. in small fenced reserves) might limit civet populations. Secondly, there is some evidence (e.g. Mpumalanga and Venda rural areas; L.H. Swanepoel & G. Camacho unpubl. data) that snaring can reduce civet populations. Civets seem to be highly prone to snares as they regularly use footpaths and they can feed on carrion. Snaring for bush meat is often concentrated around rural areas, where civets can investigate animal caught in snares and can subsequently be also snared. For example, within the Vhembe District Municipality of Limpopo, L.H. Swanepoel (unpubl. data) – using camera-trapping (60 days of camera-trapping; 1,060 camera-trap days; 1,500 ha study area) – did not find African Civets near local villages or near urban areas, which suggest that they are either killed directly or indirectly. They are often found on livestock farms, but here they are killed accidentally by poisoning campaigns targeting large carnivores. Thirdly, while populations might seem viable, there is currently no data on the legal removal of Civets through local and international trophy hunting. Thus, expanding human settlements, especially along the edge of protected areas (Wittemyer et al. 2008) could lead to local subpopulation declines or extinctions. More research is however needed to determine the net population trend for the assessment region.

Current population trend: Unknown

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. They have a broad habitat tolerance and can exist in agricultural and rural landscapes.

Habitats and Ecology

African Civets occupy a wide variety of habitats including secondary forest, woodland, and bush habitats, as well as aquatic environments. They are generally absent from arid regions, with the exception of riverine systems therein. They are apparently uncommon in mature interior forest habitats, but will infiltrate deep forest via logging roads, and in the forests of West and Central Africa, they thrive in degraded and deforested areas, and are regularly encountered near villages (Ray 2013). They are also found on cultivated land, for instance in Gabon (Bahaa-el-din et al. 2013) and Ethiopia (Mateos et al. 2015). In South Africa, they mainly occur in the Savannah Biome but their range includes a small part of the Grassland Biome as well. In the North West Province, camera-trapping studies indicate that they have a predilection for the Dwarsberg–Swartruggens Mountain Bushveld vegetation type (Power 2014). Wooded landscapes seem to be more favoured than open grasslands, and riverine areas adequately supported by many tributaries and rocky outcrops are preferred. African Civets generally sleep in dense vegetation during the day (but see Photo 1), such as thickets and stands of long grass, among tangled roots or under logs, as well as in burrows excavated by other animals (Ray 2013).

African Civets are omnivorous and opportunistic foragers (Ray and Sunquist 2001; Bekele et al. 2008b; Amiard 2014), and their diet may include cereals (maize, wheat, barley) and domestic fruits (e.g. bananas, figs, olives; Bekele et al. 2008b). They are avid feeders on toxic millipedes (Smithers & Wilson 1978), and they commonly feed on fruits such as raisin bushes (*Grewia* sp.) in Alldays area, Limpopo (Amiard 2014). They are thought to play an important role in the dispersal of such fruiting trees.

They are terrestrial, nocturnal and solitary, with the exception of the breeding season when two or more individuals can be seen together. In Ethiopia, in the Bale Mountains National Park, one radio-tracked sub-adult male had a home range of 11.1 km² (Admasu et al. 2004), while in Wondo Genet, one adult male (0.74 km²) and one sub-adult female (0.82 km²) ranged over much smaller areas (Ayalew et al. 2013). The last two individuals moved at an average speed of 326 m / h and travelled between 1.33 and 4.24 km each night. The African Civet characteristically moves slowly, and will often lie down or stand motionless when disturbed (Skinner & Chimimba 2005).

Ecosystem and cultural services: Civet species play an important role in seed dispersal, especially in forests of Asia and probably Africa too (Pendje 1994, but see Abiyu et al. 2015). No research has been carried out so far on the role of African Civets in seed dispersal in South Africa,

Photo 1. Unusual observation of an African Civet (*Civettictis civetta*) day-resting in a sparsely vegetated understory in Kruger National Park (Emmanuel Do Linh San)

Table 2. Use and trade summary for the African Civet (*Civettictis civetta*)

Category	Applicable?	Rationale	Proportion of total harvest	Trend
Subsistence use	Yes	Used as bushmeat, trophies, skins and traditional medicine.	Minority	Unknown, probably stable.
Commercial use	Yes	Selling of bushmeat, skins and probably traditional medicine products. Trophy hunting. Trade of civetone for the perfume industry.	Majority	Probably stable; trophy hunting predicted to increase.
Harvest from wild population	Yes	Localised and opportunistic harvest for meat, skins and traditional medicine.	Limited in the assessment region.	Probably stable.
		Trophy hunting.	Important locally.	Predicted to increase.
		Trapping of African Civets by dealers or farmers to keep in captivity for the production and trade of civetone.	Majority of harvest in Ethiopia. Not applicable in the assessment region.	Probably stable.
Harvest from ranched population	No	-	-	-
Harvest from captive population	No	African Civets (only males) kept in civet farms all come from the wild.	-	-

but it is thought that they play an important role in dispersing seeds of key plant species. Additionally, African Civets have historically been the main animal species from which a musky scent could be extracted and used in perfumery (see **Use and Trade**).

Use and Trade

Besides their prevalence in bushmeat markets in West and Central Africa (see **Threats**), in particular, African Civets are economically important because of their perineal gland secretion (civet musk or "civet"; Randall 1979; Bekele et al. 2008a; Wondmagegne et al. 2011), which has been exploited for many centuries as a fixing agent, called "civetone" in the perfume industry (Anonis 1997). Even though synthetic alternatives have been available for nearly 70 years (see Rosevear 1974), civetone remains an important export commodity in several countries, such as Ethiopia, and to a lesser extent, Niger and Senegal (Ray 1995, 2013; Abebe 2003; Ray et al. 2005). Between 1985 and 1997, civiculture (i.e. civet farming) generated a total revenue of between *c.* US$150,000–835,000 per year in Africa. According to Kumera (2005), there are over 200 registered and licensed African Civet farmers who capture this species in the wild and keep several thousand individuals in captivity for musk production in Ethiopia. Only male civets are kept, as they produce greater quantities and better quality musk than females. Apparently no attempt has yet been made to breed this species in captivity (Tolosa & Regassa 2012). In Ethiopia, only 2% of the civet musk produced is used nationally; the rest is exported, essentially to France (85%), for the perfume industry (Girma 1995). Small quantities of civet musk are also exported to Arabian countries for medicinal purposes and to India for use in the tobacco industry (Tamiru 1995). To our knowledge civet farming is not practiced in the assessment region.

African Civets are becoming an important trophy and locally hunted species in Limpopo (see e.g. https://www.discountafricanhunts.com/hunts/honey-badger-civet-and-genet-hunt-in-south-africa.html). Hunting quotas for this province during 2011 were around 50 animals. Export permits showed that an average of 58 ± 11 trophies were exported from South Africa per year between 2002 and

Table 3. CITES (Convention on International Trade in Endangered Species of Wild Fauna and Flora) trade data for African Civet (*Civettictis civetta*) exports from South Africa

Parts	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Specimens	-	-	-	1	-	-	-	-	-	-	-
Bodies	-	2	1	2	-	-	-	1	1	3	5
Feet	-	-	4	-	-	-	-	-	-	-	-
Leather products	-	1	-	-	-	-	1	1	-	-	-
Live	-	1	-	-	-	1	-	-	-	-	1
Skins	1	2	24	3	37	1	-	8	45	66	35
Skulls	4	2	16	-	38	-	1	9	56	82	37
Tails	-	-	1	-	-	-	-	-	-	-	-
Trophies	48	39	51	56	56	68	73	71	49	65	64

Table 4. Possible net effects of wildlife ranching on the African Civet (*Civettictis civetta*) and subsequent management recommendations

Net effect	Unknown
Data quality	Suspected
Rationale	Wildlife ranching may be expanding habitat for African Civets but also may cause accidental persecution and fragmentation through predator-proof fencing.
Management recommendation	Reduce persecution of this species through holistic management techniques. Drop fences to form conservancies.

2012 (Table 3). Given the estimated densities of this species in non-protected areas, it is possible that the current harvest has a low impact. However, because quotas do not take into account any non-hunting related mortality, there is a need to evaluate the sustainability of current harvest offtakes. Additionally, civet skins have been confiscated in North West Province (Power 2014), which suggests a local trade in the species, although likely not extensive owing to a marginal distribution there.

Even though information regarding the traditional medicine trade of African Civets in the assessment region is limited, it is likely that this species has the same medicinal significance as in other regions of Africa.

It is expected that wildlife ranching will play a positive role in African Civet conservation and distribution. However, two important factors can affect the role of game ranches in the conservation of this species. First, carnivore persecution among game ranches is high and can lead to accidental killing of African Civets (via poisoning for other carnivores). Secondly, the use of predator-proof fencing is increasing in popularity (due to protection of expensive game), which could limit the movement of African Civets between properties. This could lead to population fragmentation and local inbreeding in civet populations caught on such properties.

Threats

There are no major threats to the species within the assessment region. African Civets are sometimes poisoned through direct persecution by landowners for livestock and crop protection, or indirectly as part of other damage-causing animal persecution programmes. Due to the fact that African Civets are nocturnal and frequently utilise footpaths as pathways as well as roads, they are prone to being caught in snares and experience high mortalities on South Africa's roads, especially in Mpumalanga and Limpopo (Collinson 2013). In the Greater Mapungubwe Transfrontier Conservation Area, African Civets were the top three most important mammal road kills, and in a period of 120 days, 16 dead individuals were found knocked down by cars (Collinson 2013). This could amount to as many as 50 killed per year, which could have an impact on a local population. More research is needed to determine whether the hunting quotas are sustainable, especially in conjunction with non-commercial mortalities.

Throughout the rest of Africa, however, African Civets are commonly found for sale as bushmeat, and are one of the most abundant mammals found in bushmeat markets in southeast Nigeria, where they are utilised for both food and skin (Angelici et al. 1999). They are frequently found trapped for meat in other countries, including Sierra Leone, Democratic Republic of the Congo, Central African Republic, Congo Republic, and Cameroon (Ray 2013). It is suspected that, if traditional bushmeat sources in South Africa become scarce, this species may become increasingly exploited.

Current habitat trend: Stable. The Savannah Biome is not threatened within the assessment region (Driver et al. 2012).

Conservation

The African Civet is present in numerous protected areas across its range within the assessment region, for

Table 5. Threats to the African Civet (*Civettictis civetta*) 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	*5.1.3 Persecution/Control*: poisoning by landowners for livestock and crop protection.	-	Anecdotal	-	Probably stable
2	*4.1. Roads & Railways*: mortality by collision with motor vehicles.	Collinson 2013	Empirical	National	Likely to be increasing with increasing road traffic, development and rural population.
3	*5.1.2 Hunting & Collecting Terrestrial Animals*: indirect persecution targeted at other damage-causing animals.	-	Anecdotal	-	Probably stable
4	*5.1.1 Hunting & Collecting Terrestrial Animals*: direct hunting or poaching and snaring for trophies, skins, bushmeat and traditional medicine.	-	Anecdotal	-	Stable due to cultural use being localised. Trophy hunting predicted to increase.

Table 6. Conservation interventions for the African Civet (*Civettictis civetta*) 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	*5.4 Compliance & Enforcement*: systematic monitoring of trophy hunting trade.	-	Anecdotal	-	-	-
2	*1.1 Site/Area Protection*: conservancy formation.	-	Anecdotal	-	-	-
3	*2.3 Habitat & Natural Process Restoration*: development of permeable fences, for example with the use of rubber tyres.	Weise et al. 2014	Indirect	Local	Eleven mammalian species were shown to utilise tyres installed in wildlife-proof fences as a passageway.	-
4	*4.3 Awareness & Communications*: education awareness campaigns for landowners and the general public.	-	Anecdotal	-	-	-
5	*5.4 Compliance & Enforcement*: Systematic monitoring of the use of this species in the traditional medicine industry.	-	Anecdotal	-	-	-
6	*5.4 Compliance & Enforcement*: speed control on roads.					

example the Greater Mapungubwe Transfrontier Conservation Area, Marakele National Park, Blyde River Canyon Nature Reserve, Pilanesberg National Park, and the Kruger National Park, which represents the largest protected subpopulation. Additionally, the population of Botswana is listed on CITES Appendix III. Detailed recommendations to ensure the sustainable use of African Civets for musk production can be found in Abebe (2003).

Educational campaigns should be used to decrease persecution by landowners and public awareness campaigns should be used to increase the profile of this species. The trophy hunting industry should be monitored, specifically the age, sex and location where animals were hunted. Conservancy formation should be incentivised to allow African Civets to disperse. Permeable fences should also be trialled, such as done in Namibia with rubber tyre installation which allows free passage of many wildlife species between farms (Weise et al. 2014), and the same design would allow movements of African Civets too. Road mortalities should be monitored in order to evaluate the ecological impact on local populations. Many factors may influence road casualties such as habitat use and movement patterns. These factors should be considered before setting up any mitigation devices.

Recommendations for land managers and practitioners:

- Currently, no management plan is needed, although local monitoring programmes should be established to determine population size and trends, and the impacts of trophy hunting and trade, as well as monitoring of traditional medicine use and bushmeat hunting.

Research priorities:

- Population sizes in protected and non-protected areas across its range.
- Impact of harvest on population persistence.

Data Sources and Quality

Table 7. Information and interpretation qualifiers for the African Civet (*Civettictis civetta*) assessment

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

- Population demographics.
- Spatial ecology, especially effect of predator-proof fences on movement and population ecology.
- Seed dispersal as an ecosystem service provided by African Civets.
- Prevalence of African Civet body parts in traditional medicine markets.

Existing African Civet research projects by L.H. Swanepoel and colleagues at the University of Venda include a population density study in the Waterberg Biosphere, and spatial ecology and seed dispersal studies of this species in forested patches.

Encouraged citizen actions:

- Report sightings on virtual museum platforms (for example, iSpot and MammalMAP), especially outside protected areas.
- Landowners should form conservancies or employ permeable fences.

References

Abebe YD. 2003. Sustainable utilization of the African Civet (*Civettictis civetta*) in Ethiopia. Pages 197–207 in waMusiti BW, editor. 2nd Pan-African Symposium on the Sustainable Use of Natural Resources in Africa. IUCN, Gland, Switzerland and Cambridge, UK.

Abiyu A, Teketay D, Glatzel G, Gratzer G. 2015. Tree seed dispersal by African civets in the Afromontane Highlands: too long a latrine to be effective for tree population dynamics. African Journal of Ecology **53**: 588–591.

Admasu E, Thirgood SJ, Bekele A, Laurenson MK. 2004. A note on the spatial ecology of African civet *Civettictis civetta* and common genet *Genetta genetta* in farmland in the Ethiopian Highlands. African Journal of Ecology **42**:160–162.

Amiard P. 2014. Ecology of the African Civet (*Civettictis civetta*) in three different vegetation types of South Africa: study of the population density, the habitat use and the diet. M.Sc. Thesis. University of Reims Champagne-Ardenne, Reims, France.

Angelici FM, Luiselli L, Politano E, Akani GC. 1999. Bushmen and mammal fauna: a survey of the mammals traded in bush-meat markets of local people in the rainforests of southeastern Nigeria. Anthropozoologica **30**:51–58.

Anonis DP. 1997. Animal notes in perfumery: civet and civet compounds. Perfumer and Flavourist **22**:44–47.

Ayalew B, Afework B, Balakrishnan M. 2013. Home range and movement patterns of African civet *Civettictis civetta* in Wondo Genet, Ethiopia. Small Carnivore Conservation **48**:83–86.

Bahaa-el-din L, Henschel P, Aba'a R, Abernethy K, Bohm T, Bout N, Coad L, Head J, Inoue E, Lahm S, Lee ME, Maisels F, Rabanal L, Starkey M, Taylor G, Vanthomme A, Nakashima Y, Hunter L. 2013. Notes on the distribution and status of small carnivores in Gabon. Small Carnivore Conservation **48**:19–29.

Bekele T, Afework B, Balakrishnan M. 2008a. Scent-marking by the African Civet *Civettictis civetta* in the Menagesha–Suba State Forest, Ethiopia. Small Carnivore Conservation **38**:29–33.

Bekele T, Afework B, Balakrishnan M. 2008b. Feeding ecology of the African Civet *Civettictis civetta* in the Menagesha–Suba State Forest, Ethiopia. Small Carnivore Conservation **39**:19–24.

Coetzee CG. 1977. Part 8. Order Carnivora. Pages 1–42 in Meester J, Setzer HW, editors. The Mammals of Africa: An Identification Manual. Smithsonian Institution Press, Washington, DC, USA.

Collinson WJ. 2013. A standardised protocol for roadkill detection and the determinants of roadkill in the Greater Mapungubwe Transfrontier Conservation Area. M.Sc. Thesis. Rhodes University, Grahamstown, South Africa.

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.

Dutton J. 1994. Introduced mammals in Sao Tome and Principe: possible threats to biodiversity. Biodiversity and Conservation **3**:927–938.

Ellerman JR, Morrison-Scott TCS, Hayman RW. 1953. Southern African Mammals 1758 to 1951: A Reclassification. British Museum of Natural History, London, UK.

Girma G. 1995. Musk trade and export. Pages 45–53 in Proceedings of the Civet Farming, Musk Production and Trade Workshop. Ethiopian Wildlife Conservation Organisation, Addis Ababa, Ethiopia.

Isaacs L. 2016. Estimating African civet *Civettictis civetta* (Schreber 1776) density and occupancy in a mosaic of land uses in the Waterberg district, South Africa. M.Sc. Thesis. University of Pretoria, Pretoria, South Africa.

Isaacs L, Somers, MJ, Swanepoel L. in press. Density of African civets in a moist mountain bushveld region of South Africa. In Do Linh San E, Sato JJ, Belant JL, Somers MJ, editors. Small Carnivores: Evolution, Ecology, Behaviour and Conservation. Wiley-Blackwell, Oxford, UK.

Kingdon J. 1997. The Kingdon Field Guide to African Mammals. Academic Press, San Diego, California, USA.

Kumera, W. 2005. Better handling of African Civet for quality musk extraction. Agriculture and Rural Development Journal **2**: 21–34.

Mateos E, Zerihun G, Yosef M, Megersa D. 2015. Community attitude towards African Civet *Civettictis civetta* conservation in eastern sub-catchment of Lake Hawassa basin, Southern Ethiopia. Discovery **27**:2–7.

Meester JA, Rautenbach IL, Dippenaar NJ, Baker CM. 1986. Classification of southern African mammals. Transvaal Museum Monographs **5**:1–359.

Moreau RE. 1944. Kilimanjaro and Mount Kenya: some comparisons with special reference to the mammals and birds; and with a note on Mount Meru. Tanganyika Notes and Records **18**:28–68.

Pakenham RHW. 1984. The Mammals of Zanzibar and Pemba Islands. Printed Privately, Harpenden, UK.

Pendje G. 1994. Fruit consumption and seed dispersal by the African civet *Civettictis civetta* in Mayombe, Zaire. Revue d'Écologie – La Terre et la Vie **49**:107–116.

Pocock RI. 1915. On the feet and glands and other external characters of the Viverrinae with the description of a new genus. Proceedings of the Zoological Society of London **1915**:131–149.

Power RJ. 2014. The Distribution and Status of Mammals in the North West Province. Department of Economic Development, Environment, Conservation & Tourism, North West Provincial Government, Mahikeng, South Africa.

Prugh LR, Stoner CJ, Epps CW, Bean WT, Ripple WJ, Laliberte AS, Brashares JS. 2009. The rise of the mesopredator. BioScience **59**:779–791.

Randall RM. 1979. Perineal gland marking by free-ranging African Civets, *Civettictis civetta*. Journal of Mammalogy **60**:622–627.

Rautenbach IL. 1978. The mammals of the Transvaal. Ph.D. Thesis, University of Natal, Pietermaritzburg, South Africa.

Ray JC. 1995. *Civettictis civetta*. Mammalian Species **488**:1–7.

Ray JC. 2013. *Civettictis civetta* African Civet. Pages 255–259 in Kingdon J, Hoffmann M, editors. The Mammals of Africa. Volume V: Carnivores, Pangolins, Equids and Rhinoceroses. Bloomsbury Publishing, London, UK.

Ray JC, Sunquist ME. 2001. Trophic relations in a community of African rainforest carnivores. Oecologia **127**:395–408.

Ray JC, Hunter L, Zigouris J. 2005. Setting conservation and research priorities for larger African carnivores. Wildlife Conservation Society, New York, USA.

Rosevear DR. 1974. The Carnivores of West Africa. Trustees of the British Museum of Natural History, London, UK.

Skinner JD, Chimimba CT. 2005. The Mammals of the Southern African Subregion. Third edition. Cambridge University Press, Cambridge, UK.

Smithers RHN, Wilson VJ. 1978. Check List and Atlas of the Mammals of Rhodesia. Trustees of the National Museum, Salisbury, Zimbabwe.

Stuart C, Stuart T. 1998. A note on the herpestids and viverrids of south-eastern Unguja (Zanzibar) Island. Small Carnivore Conservation **18**:16–17.

Tamiru G. 1995. Civet quality control. Pages 40–44 in Proceedings of the Civet Farming, Musk Production and Trade Workshop. Ethiopian Wildlife Conservation Organisation, Addis Ababa, Ethiopia.

Tolosa T, Regassa F. 2012. The husbandry, welfare and health of captive African civets (*Vivera civetica* [sic]) in western Ethiopia. Poster presented at the 61st International Conference of the Wildlife Disease Association and the 10th Biennal Conference of the European Wildlife Disease Association. Lyon, France, 22–27 July 2012.

Weise FJ, Wessels Q, Munro S, Solberg M. 2014. Using artificial passageways to facilitate the movement of wildlife on Namibian farmland. South African Journal of Wildlife Research **44**:161–166.

Wittemyer G, Elsen P, Bean WT, Burton ACO, Brashares JS. 2008. Accelerated human population growth at protected area edges. Science **321**:123–26.

Wondmagegne D, Afework B, Balakrishnan M, Gurja B. 2011. Collection of African Civet *Civettictis civetta* perineal gland secretion from naturally scent-marked sites. Small Carnivore Conservation **44**:14–18.

Wozencraft WC. 2005. Order Carnivora. Pages 532–628 in Wilson DE, Reeder DM, editors. Mammal Species of the World: A Taxonomic and Geographic Reference. Third edition. Smithsonian Institution Press, Washington, DC, USA.

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