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MIGRATORY
SPECIES**

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Agenda Item 25.1

**PROPOSAL FOR THE INCLUSION OF
THE LION (*Panthera leo*)
ON APPENDIX II OF THE CONVENTION**

Summary:

The Governments of Chad, Niger and Togo have jointly submitted the attached proposal* for the inclusion of the Lion (*Panthera leo*) on Appendix II of CMS.

*The geographical designations employed in this document do not imply the expression of any opinion whatsoever on the part of the CMS Secretariat (or the United Nations Environment Programme) concerning the legal status of any country, territory, or area, or concerning the delimitation of its frontiers or boundaries. The responsibility for the contents of the document rests exclusively with its author.

PROPOSAL FOR THE INCLUSION OF THE LION (*Panthera leo*), INCLUDING ALL GEOGRAPHIC POPULATIONS AND SUBSPECIES, ON APPENDIX II OF THE CONVENTION ON THE CONSERVATION OF MIGRATORY SPECIES OF WILD ANIMALS

A: PROPOSAL

Inclusion of the lion (*Panthera leo*), including all geographic populations and subspecies, in CMS Appendix II.

B: PROPONENTS: Niger, Chad, Togo

C: SUPPORTING STATEMENT

1. Taxonomy

1.1 Class: Mammalia

1.2 Order: Carnivora

1.3 Family: Felidae

1.4 Genus, species or subspecies, including author and year:

Panthera leo (Linnaeus 1758) (Wilson & Reeder 2005)

[Note that in the revised taxonomy from the Cat Classification Task Force of the International Union for Conservation of Nature (IUCN) Species Survival Commission (SSC) Cat Specialist Group, the split into two subspecies, *P.l. leo* of Asia and West, Central and North Africa, and *P.l. melanochaita* of southern and East Africa, is proposed (Kitchener *et al.* 2017, Bertola *et al.* 2015)]

1.5 Scientific synonyms : *Felis leo* (Linnaeus 1758)

1.6 Common name(s), in all applicable languages used by the Convention:

English: LION

French: LION

Spanish: LEÓN

2. Overview

The 2016 IUCN Red List assessment of *Panthera leo* (Bauer *et al.* 2016) maintained the species classification as Vulnerable. *Panthera leo ssp. persica* is classified as Endangered (Breitenmoser *et al.* 2008), and *Panthera leo* (West Africa subpopulation) as Critically Endangered (Henschel *et al.* 2015). The authors of the 2016 assessment inferred a species-level 43% global reduction in lion numbers for the period 1993-2014 (approximately three lion generations), while emphasising that across the majority of its range the lion qualifies for an Endangered listing by virtue of an inferred decline in numbers exceeding 50%. While the authors did not provide a new estimate of total lion numbers they declared ‘*greater confidence in an estimate of closer to 20,000 Lions in Africa than in a number over 30,000*’.

Threats to lions identified by the authors of the Red List assessment and lion range States include habitat loss and conversion, prey base depletion, human-lion conflict, unfavourable policies, practices and political factors, ineffective lion population management, poorly managed trophy hunting operations for some populations, and the use of lion bones and other body parts in legal and illegal trade.

Lions are thought to currently occupy only 8% of their historic range (Bauer *et al.* 2016). Members of the species frequently cross national jurisdictional boundaries, and the species is already the subject of the Convention on the Conservation of Migratory Species of Wild Animals (CMS) Resolution 11.32, agreed by consensus at the 11th Conference of the Parties to CMS in 2014, which *inter alia* ‘*Invites the Range State Parties... to work towards an Appendix II listing proposal to be presented to the 12th Meeting of the Conference of the Parties*’. An assessment of existing regional conservation strategies for the African lion carried

out in part fulfilment of Resolution 11.32 concluded that while the strategies were still largely valid, their application has been fragmented and partial, and that the overall objectives had not been met (Bauer *et al.* 2015a). Participants at the CITES/CMS African Lion Range State Meeting which took place in Entebbe, Uganda, in May 2016 recognized the need for transboundary cooperation and management systems in light of the high number of transboundary lion populations (African Lion Range State Meeting Communique 2016).

The species therefore qualifies for an Appendix II listing under Article IV of the Convention on the Conservation of Migratory Species of Wild Animals (CMS) by virtue of being a migratory species which has an unfavourable conservation status which requires international agreements for its conservation and management, and would significantly benefit from the international cooperation that could be achieved by an international agreement aimed at securing effective implementation of regional conservation strategies.

3 Migrations

3.1 Kinds of movement, distance, the cyclical and predicable nature of the migration

The Convention defines “migratory species” as *the entire population or any geographically separate part of the population of any species or lower taxon of wild animals, a significant proportion of whose members cyclically and predictably cross one or more national jurisdictional boundaries* (CMS Article I (1)). Lions move freely across international boundaries, meaning that *trends in one country can impact the viability of the overall population, thus affecting conservation success in other countries* (Bauer *et al.* 2015a). Factors like sex, group size, rainfall, patterns of resource distribution, social effects, and stage of dispersal can all influence the lion migration and dispersal (Lehmann *et al.* 2008; Elliot *et al.* 2014).

As previously recognized by members of the IUCN Cat Specialist Group in discussions related to the 2008 CMS 9th Conference of the Parties, large Felidae live according to circadian cycles, life cycles, and to a smaller extent annual cycles.

Circadian cycles

Lion daily activities focus primarily on their home range, which can vary in size from 20 km², where the habitat features a strong prey base, to 2,075 km² where the habitat is arid and prey density is low (Lehmann *et al.* 2008). For females, larger pride size and lower prey biomass correlated with a larger home range, but prey dispersion throughout the landscape was also a factor (Loveridge *et al.* 2009). For males, leading influencing factors on size of home range were prey availability and density of female prides (Loveridge *et al.* 2009). As part of their circadian cycles, lions may need to cross national boundaries daily in order to, for example, access water in very arid regions like the Kalahari Desert (Mills *et al.* 1978).

Life cycles

Dispersal (movement of individuals away from their birth site) is recognized as *one of the most important life-history traits affecting species persistence and evolution and is increasingly relevant for conservation biology as ecosystems become more fragmented* (Elliot *et al.* 2014). The dispersal distance varies greatly but is on average more than 100 km (Dubach *et al.* 2013), with occasional long distance dispersal events of up to 350 km (Dolrenry *et al.* 2014). In lions dispersal is sex biased, as *subadult males always disperse, while females are usually philopatric* (returning to or remaining in a particular area) (Pusey & Packer 1987; Elliot 2014). However, females are more likely to disperse if their pride size exceeds optimum habitat or if the habitat is saturated by other prides (VanderWaal *et al.* 2009) and female dispersal events exceeding 100 km have been recorded (Donrenry *et al.* 2014). Males will disperse into either an unoccupied area or challenge a male residing in a particular territory (Elliot 2014). Lions may disperse throughout the year, and the number of transient months can be relatively prolonged (Elliot 2014).

Annual cycles

It is documented that movement of lions can vary depending on annual climate conditions such as drought, in which case lions were observed to spend significant time outside of park boundaries, as is the case in the Amboseli ecosystem in Kenya (Tuqa *et al.*, 2014). Studies of

lion distribution in correlation with hunting opportunities show movement coincident with the wet season migration of prey (Hopcraft *et al.* 2005; Sunquist & Sunquist 2009). Female pride response to prey abundance occurs on an annual scale, rather than seasonal (Loveridge *et al.* 2009).

3.2 Proportion of the population migrating, and why that is a significant proportion

Given the transboundary nature of lion migration, increasing threats to lion survival, and the impact conservation efforts (or the lack thereof) in one country can have on populations in another (Sogbohossou *et al.* 2014), there is a critical need for improved cross-border protection for this species. Some prominent examples of existing transnational efforts that have endeavoured to bring range states together in collaboration toward improved lion conservation include the Kavango-Zambezi (Angola, Botswana, Namibia, Zambia, and Zimbabwe), W-Arly-Pendjari (Benin, Burkina Faso, and Niger), and Serengeti-Mara (Kenya and Tanzania) (Bauer *et al.* 2015b).

The following countries share lion populations that are suspected to cyclically and predictably cross their national jurisdictional boundaries:

- Botswana/South Africa: Kgalagadi Transfrontier Park (Bauer *et al.* 2016)
- Mozambique/South Africa: Kruger National Park and Limpopo National Park (Chardonnet *et al.* 2009).
- Mozambique/Zimbabwe: Gairezi Wildlife Management Area and Nyangui State Forest and Manica Province (Chardonnet *et al.* 2009).
- Mozambique/Zimbabwe: Gonarezhou National Park and Gaza Province (Chardonnet *et al.* 2009).
- Angola/Namibia/Botswana: South Angola, Caprivi, Okavango (Elliot *et al.* 2014)
- Mozambique/Zambia: all along the Zambia border with Tete Province (Chardonnet *et al.* 2009; Jacobson *et al.* 2013)
- Malawi/Mozambique: between Liwonde National Park / Namizimu FR and Mangochi FR and Niassa Province (Mésochina *et al.* 2010a, b).
- Malawi/Zambia: (Mésochina *et al.* 2010b).
- Mozambique/Tanzania: between Niassa National Reserve, Mozambique and southern Tanzania (Mésochina *et al.* 2010a).
- Tanzania/Zambia: movements suspected (Mésochina *et al.* 2010a)
- Malawi/Tanzania (Mésochina *et al.* 2010a)
- Rwanda/Tanzania: Potential movements between Akagera NP (where lions were reintroduced in 2015) and Kimisi GR (Mésochina *et al.* 2010a).
- Kenya/Tanzania: Tsavo National Park and Mkomazi National Park (Mésochina *et al.* 2010a)
- Kenya/Tanzania: Serengeti Complex and Mara Complex (Frank *et al.* 2006).
- Ethiopia/South Sudan: Gambella National Park and Boma NP (National Action Plan for the Conservation of the African lion in Ethiopia, 2010).
- Ethiopia/Kenya: Northern East Kenya – South East Ethiopia (National Action Plan for the Conservation of the African lion in Ethiopia, 2010).
- Ethiopia/Sudan: Alatash NP and Dinder NP (Bauer & Rskay 2015c)
- Cameroon/Nigeria: Waza NP (Tumenta *et al.* 2010).
- Cameroon/Nigeria: Faro NP and Gashaka-Gumti NP (Cameroon Action Plan)
- Cameroon/Chad: Yamoussa Transfrontier Reserve, includes Bouba Ndjida National Park and Sena Oura National Park
- Chad/CAR: Salamat Hunting Areas in Chad; Bamingui-Bangoran National Park and ManovoGounda-Saint Floris National Park in CAR (Mésochina *et al.* 2010c)
- CAR/South Sudan: Eastern CAR Hunting Areas in CAR and South Sudan National Park in South Sudan (Mésochina *et al.* 2010c)
- Benin/Burkina Faso - Niger: WAP Ecosystem (W-Arly-Pendjari) (Sogbohossou *et al.* 2014).

Therefore, a significant proportion of the African lion population regularly crosses transnational borders and is therefore “migratory” according to the CMS convention, meaning preservation and continuity of habitat is essential.

4. Biological data (other than migration)

4.1 Distribution (current and historical)

Lions were once found in Africa, Europe, the Middle East and Southwest Asia. They inhabited a variety of habitats, which included dry deserts and wet forests (Bauer 2008). Lions did not historically occur in the Sahara in the North, the West African coastal rainforest zone and the Congo Basin rainforest zone with a westward extension into southern Nigeria. (Bauer 2008)

Today lions only remain in sub-Saharan Africa and India, having disappeared from Europe in the first century AD and from North Africa, the Middle East and most of their Asian range since the mid-1800s (Bauer 2008; Nowell & Jackson 1996). Some lions may have survived in Northern Africa through the end of the 1940s, including Morocco’s Atlas Mountains and the northern regions of Tunisia and Algeria (Nowell & Jackson 1996; Bauer *et al.* 2016). The only remaining subpopulation in Asia is in the 1,400 km² Gir Forest National Park and Wildlife Sanctuary and satellite areas of Gujarat, India (Bauer *et al.* 2016; Meena *et al.* 2014).

In sub-Saharan Africa, subpopulations now occur in Angola, Benin, Botswana, Burkina Faso, Cameroon, Central African Republic, Chad, The Democratic Republic of the Congo, Ethiopia, India, Kenya, Malawi, Mozambique, Namibia, Niger, Nigeria, Rwanda (recently reintroduced); Senegal, Somalia, South Africa, South Sudan, Sudan, Swaziland, United Republic of Tanzania, Uganda, Zambia, and Zimbabwe (Bauer *et al.* 2016). Certain areas are classified as “possibly extinct” due to absence of recent data to confirm presence of lions, and they include Côte d'Ivoire, Ghana, Guinea, Guinea-Bissau (there has been some recent evidence of lion activity in Guinea-Bissau (Breider *et al.* 2016)), Mali, and Togo (Bauer *et al.* 2016). The lion is “regionally extinct” in Afghanistan, Algeria, Burundi, Congo, Djibouti, Egypt, Eritrea, Gabon, Gambia, Islamic Republic of Iran, Iraq, Israel, Jordan, Kuwait, Lebanon, Lesotho, Libya, Mauritania, Morocco, Pakistan, Saudi Arabia, Sierra Leone, Syrian Arab Republic, Tunisia, Turkey, and Western Sahara (Bauer *et al.* 2016).

According to the latest IUCN assessment, the extant lion range is 1,654,375 km² or 8% of historical range. (Bauer *et al.* 2016). Figure 1 depicts current lion range and areas where the lion is possibly extinct.

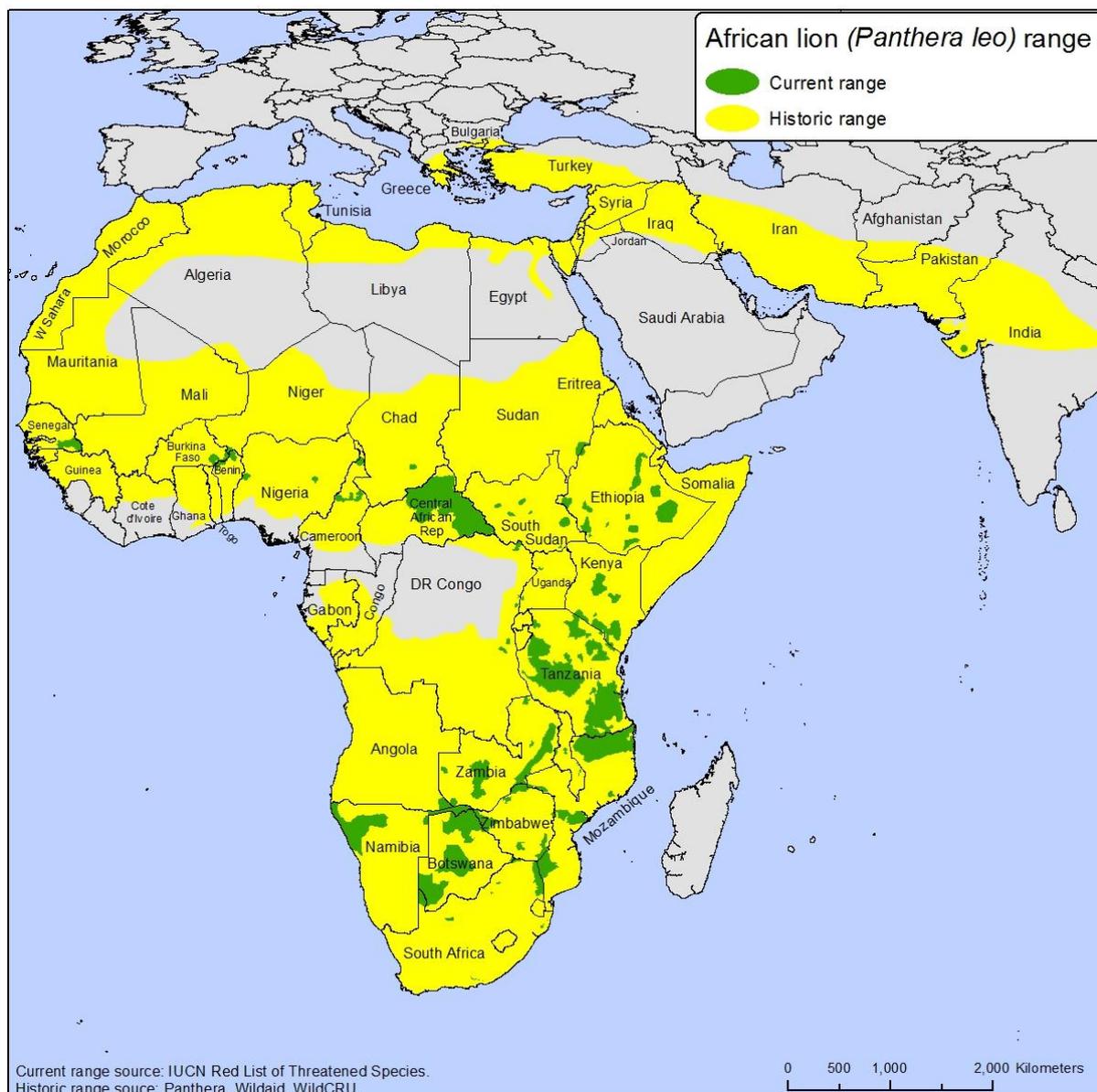


Figure 1: Current and historic lion range (Bauer et al. 2016)

4.2 Population (estimates and trends)

The 2016 IUCN *Panthera leo* Red List assessment adjusted 2002 population estimates from Bauer & Van Der Merwe (2004) and Chardonnet (2002) to account for regional population trends (Bauer et al. 2016). According to the adjusted data, the lion populations in Southern Africa, Eastern Africa, West Africa, and Central Africa range between 18,841 and 31,394. Due to issues of data quality in the original estimates the authors of the IUCN assessment assert that “we have greater confidence in an estimate of closer to 20,000 Lions in Africa than in a number over 30,000” (Bauer et al. 2016). Table 1 summarizes the IUCN assessment population data.

	Bauer & Van Der Merwe (2004)	Chardonnet (2002)
Asia	-	-
Southern Africa	10,385	15,925
Eastern Africa	7,345*	13,316
West Africa	406**	406**
Central Africa	590	1,748
Total putative Lions in Africa	18,841	31,394

*Ruaha and Tarangire ecosystems recognized as substantial missing data
**Trend applied to Central Africa only, West Africa from Henschel et al. (2014)

Source: Bauer et al. 2016 supplementary materials, p. 17.

The Asiatic lion population is isolated and exists solely in Gujarat State. As of 2014, the total population numbered at 485 lions, with 306 in Gir National Park and 179 in satellite areas (Bauer *et al.* 2016).

4.3 Habitat (short description and trends)

The most appropriate lion habitat is *open woodlands and thick bush, scrub, and grass complexes where sufficient cover is provided for hunting and denning* (Nowell & Jackson 1996). Lions are recognized as having a broad habitat tolerance, with a capacity to survive in dry climates because they can retain water from their prey or plants (Nowell & Jackson 1996). In the Bale Mountains and on Kilimanjaro, lions have been known to inhabit elevations as high as 4,000 meters (West and Packer 2013; Bauer *et al.* 2016). The Asiatic lion inhabits dry deciduous forest (Meela *et al.* 2014). Lion population size typically correlates with the herbivore biomass – therefore prey numbers can limit the pride size and lion population density within an ecosystem (Hayward *et al.* 2007).

4.4 Biological characteristics

Lion coats are a tawny colour and unique from other cats in that they have tufted tails and the males have tufted manes (Nowell & Jackson 1996). Lions have sharp and retractile claws, as well as a wide face, round ears, protruding whiskers, and a muscular build. Adult males (greater than four years old) weigh 145-225kg and females 83-168kg (Sunquist & Sunquist 2002), but males as heavy as 272 kilograms have been recorded (Nowell & Jackson 1996).

Lions live in a matriarchal society, at the centre of which is the pride. The pride size varies from 1-18 adult females (Packer *et al.* 1988). Lions breed throughout the year. Females with surviving cubs do not mate again before their cubs are at least 18 months old. The average inter-birth interval between surviving cubs is 24 months (Pusey & Packer 1994). Females losing small cubs (<4 months of age) conceive again on average 4.4 months after the loss (Packer & Pusey 1983). Gestation lasts 102-115 days, with the majority of the litters numbering between one and four cubs (Sunquist & Sunquist 2002).

Generally, males will disperse from their pride at two to four years old. They take over their first pride at the age of about four years, and their first cubs are born after six months (Packer *et al.* 1988). Females are usually incorporated into the pride to which they were born but about 33% disperse to a new pride (Pusey & Packer 1987). Females have their first oestrus (period of sexual receptivity) at the age of 3.5-4.5 years and their first litter at 4-5 years (Schaller 1972; Funston & Mills 1997). Cub mortality rates range from 14-73% (van Orsdol *et al.* 1985). Cubs die from a variety of causes such as starvation, predation, infanticide and abandonment (Schaller 1972). Males in the wild can live for 12 years and exceptionally up to 16 years, and females for 15-16 years and exceptionally as long as 18 years (Nowell and Jackson 1996). In captivity, lions can live for 25-30 years.

4.5 Role of the taxon in its ecosystem

Generally, large carnivores exert strong regulatory effects on ecosystems. Top predators like the lion *have the dual role of potentially limiting both large herbivores through predation and mesocarnivores through intraguild competition, thus structuring ecosystems along multiple food-web pathways* (Ripple *et al.* 2014). Lions are also among seven species of large carnivores which have recognized “(A) “tri-trophic cascades” from large carnivores to prey to plants, (B) “mesopredator cascades” from large carnivores to mesopredators to prey of mesopredators, and (C) both tri-trophic and mesopredator cascades” (Ripple *et al.* 2014).

For example, the lions in East, Central and Southern Africa prey on buffalo, zebra, wildebeest, roan, sable, springbok, gemsbok, kob, impala, warthog, and hartebeests, thereby both impacting and relying upon their abundance (Nowell & Jackson 1996). In another example in West Africa, as lion and leopard numbers declined there was a correlated increase in mesopredators like olive baboons which in turn led to declines in the number of small ungulates and primates, as well as a greater threat to livestock and crops (Ripple *et al.* 2014). The lion is therefore critical to ecosystem stability, and further declines or loss of this top predator would have widespread impacts on nature.

5. Conservation status and threats

5.1 IUCN Red List Assessment

The 2016 IUCN Red List assessment of *Panthera leo* maintained its categorisation of Vulnerable which has been consistently applied to the species since it was first assessed in 1996 (Bauer *et al.* 2016). The species is therefore considered to be facing a high risk of extinction in the wild (IUCN 2012). This categorisation has been arrived at on the basis that the species fulfils the IUCN Red List criteria for Vulnerable A2abcd, i.e. an observed, estimated, inferred or suspected population size reduction of $\geq 30\%$ over the last 10 years or three generations, whichever is the longer, where the reduction or its causes may not have ceased OR may not be understood OR may not be reversible, based on: (a) Direct observation; (b) an index of abundance appropriate to the taxon; (c) a decline in area of occupancy, extent of occurrence and/or quality of habitat; and (d) actual or potential levels of exploitation (IUCN 2012).

The 2016 IUCN Red List assessment concluded that the lion population is inferred to have undergone a reduction of approximately 43% over the previous 21 years (approximately three lion generations, 1993-2014) (Bauer *et al.* 2016). The inferred decline was based on time trend analysis of census data for 47 relatively well monitored lion subpopulations, comprising a substantial portion of the total species population. The authors noted that the overall classification masks a dichotomy, with observed increases in sample lion subpopulations of 12% in four southern African countries (Botswana, Namibia, South Africa and Zimbabwe) and in India, while sample populations outside these countries showed a decline of 60% representative for the remainder of its African range. In other words, in the majority of its range the lion meets the A2 criterion for Endangered with the inferred rate of decline being over 50% in three generations, but this trend is numerically mitigated by a small number of subpopulations in a restricted geographical range (Bauer *et al.* 2016).

The authors estimated extant lion range at 1,654,375 km², or 8% of historical range, and considered lion populations to be possibly extinct across a total of 1,811,087 km² comprising over half (52%) of the range classified as extant by Riggio *et al.* (2013) (Bauer *et al.* 2016). According to the authors this range reduction reflects a combination of recent known and inferred decline, as well as improved knowledge.

The 2016 Red List assessment recognises that lions have been recently extirpated in at least 12, and possibly 16, African countries (Bauer *et al.* 2016).

In addition to the Red List categorisation for the species as a whole, the IUCN has categorised *Panthera leo ssp. persica* as Endangered (Breitenmoser *et al.* 2008), and *Panthera leo* (West Africa subpopulation) as Critically Endangered (Henschel *et al.* 2015).

5.2 Equivalent information relevant to conservation status assessment

Bauer *et al.* (2015b) concluded that African lion populations are declining everywhere, except in four southern countries (Botswana, Namibia, South Africa, and Zimbabwe). Their population modelling led to a 67% probability that lions in West and Central Africa will decline by a further 50% over the following two decades, and a 37% chance that lions in East Africa will decline by a further 50% over the same period. These authors predicted a major trophic downgrading of African ecosystems with the lion no longer playing a pivotal role as apex predator.

5.3 Threats to the population (factors, intensity)

The 2016 IUCN Red List assessment identified indiscriminate killing (primarily as a result of retaliatory or pre-emptive killing to protect human life and livestock) and prey base depletion as 'main threats' to *Panthera leo* (Bauer *et al.* 2016). Some populations have been depleted and become isolated as a result of habitat loss and conversion (Bauer 2008). In the communique emerging from the joint CMS/CITES African Lion Range State Meeting which took place in Entebbe, Uganda, in May 2016, the main threats facing lions are recognised as: (1) Unfavourable policies, practices and political factors (in some countries); (2) Ineffective lion population management; (3) Habitat degradation and reduction of prey base; (4) Human-lion

conflict; (5) Adverse socio-economic factors; (6) Institutional weakness; and (7) Increasing trade in lion parts and derivatives (African Lion Range State Meeting Communiqué 2016). Inbreeding and disease have also been highlighted as a threat to some populations (e.g. Munson *et al.* 2008, Trinkel *et al.* 2011).

Indiscriminate killing

In terms of persecution, while actual losses of livestock to lions and other wild predators may be relatively low, the perceived financial cost to farmers can be high, and lions are persecuted intensely in livestock areas across Africa as a consequence. Various methods are used, although lions' scavenging behaviour makes them particularly vulnerable to the practice of lacing prey carcasses with poison (typically agricultural pesticides such as Carbofuran) to eliminate predators (Funston *et al.* 2016).

Reliable estimates of the extent of indiscriminate killing of lions are difficult to obtain, since much of the killing is carried out illegally. However, numbers can be significant, and indiscriminate retaliatory killing is considered the main threat to lions outside of protected areas (Bauer *et al.* 2016).

Lions are also frequently unintended victims of snares and traps laid for other animals, and in some cases this can have population-level consequences. In Mozambique's Niassa National Reserve, snares are by far the largest threat to lions, responsible for 52% of mortalities in the Reserve (Lindsey *et al.* 2015).

Prey base depletion

Lion population trends have broadly mirrored trends in prey base populations, as demonstrated by a broad comparison of regional trends in 69 African large mammal species (principally large herbivores) in protected areas documented by Craigie *et al.* (2010) with regional lion population trends inferred in the 2016 IUCN Red List analysis. The principal driver of population declines is uncontrolled bushmeat hunting (Lindsey *et al.* 2015), often exacerbated by weak protected area management (Lindsey *et al.* 2017).

	69 herbivore species in 78 African protected areas 1970-2005 (Craigie <i>et al.</i> 2010)	Lions 1993-2014 (Bauer <i>et al.</i> 2016)
West Africa	85% reduction	66% reduction
East Africa	52% reduction	59% reduction
Southern Africa	24% increase	8% increase

Trophy hunting

The 2016 IUCN Red List assessment noted that trophy hunting has a net positive impact in a some areas, but may have at times contributed to population declines (Bauer *et al.* 2016).

A number of publications have documented negative impacts of trophy hunting operations on lion populations. Loveridge *et al.* (2016) studied the impacts of lion trophy hunting in Zimbabwe's Hwange national park between 1999 and 2012, and identified a number of negative impacts associated with intensive hunting including reduced survival at all age and sex classes (even when only adult males were targeted), skewed sex ratios, changes in home ranges, and edge effects on animals living on the park boundary. Becker *et al.* (2012) found three Zambian national park lion populations to be male depleted as a likely result of poorly managed trophy hunting operations. Brink *et al.* (2016) examined the lion trophy hunting industry in Tanzania, and found that financial interests and the lure of short-term returns have led to unsustainable offtakes of lions from hunting blocks. Creel *et al.* (2016) summarise that trophy hunting has had negative effects on lion populations throughout Africa, and their population modelling using demographic data of a hunted population in Zambia suggests that hunting resulted in population declines over a 25-year period for all continuous harvest strategies, with large declines for quotas greater than 1 lion/concession (~0.5 lion/1000 km²) and hunting of males younger than 7 years. The authors concluded that age-restricted

harvesting is probably not sufficient to yield sustainability, and that periods of recovery, an age limit of ≥ 7 years and a maximum quota of ~ 0.5 lions per 1000km² need to be implemented. In its 2016 briefing entitled 'Informing decisions on trophy hunting', the IUCN referenced examples of weak governance, corruption, lack of transparency, excessive quotas, illegal hunting, poor monitoring and other problems in a number of countries, and recognised the urgent need for action and reform.

Other studies have indicated benefits from lion trophy hunting, including Naidoo *et al.* (2016) who described complementary benefits of tourism and trophy hunting to communal conservancies in Namibia and recommended that a singular focus on either would have a negative impact on the viability of community-based conservation in Namibia; and Bouche *et al.* (2016) who studied the impact of lion hunting in West Africa and concluded that an import embargo on lion trophies could reduce conservation incentives for lions in that region.

Trade in lion bones and other parts and products

While there is no cultural history of the consumption of lion bone as an ingredient in medicines, tonics and wines in China and other parts of Asia, lion bones are increasingly used as a substitute for tiger bone (Nowell & Pervushina 2014; Williams *et al.* 2015). Trade in lion bones was recognized as a 'main threat' by lion range States during the joint CMS/CITES African lion range State meeting which took place in Entebbe, Uganda in May 2016 (African Lion Range State Meeting Communique 2016).

According to the CITES trade database¹, in excess of 28,000 lion items were declared to have been exported between 2006-2015 inclusive, more than a third of which were declared to have been derived from wild lions (source code 'W'). Over 8,000 skeletal products (bones, bone carvings, bone pieces, skeletons and skulls) were among the declared exports for the period. Large discrepancies exist between declared exports and imports on the database, particularly in respect of lion skeletons, more than 3,000 of which were declared to have been imported by Thailand and Vietnam principally from South Africa in 2013 alone.

The 2016 IUCN Red List assessment noted *concern that wild lion parts from eastern and southern Africa could be drawn into the large illegal wildlife trade to Asia centred on elephant ivory* (Bauer *et al.* 2016). Furthermore, there is substantial trade in lion parts within Africa for use in traditional practices, as documented by CITES Parties in their responses to the Animals Committee Review of Significant Trade (CITES AC27 Doc. 24.3.3, see Annex A).

Concerns that the emergence of markets for the use of lion bones and other products in Asia and Africa and that the increasing international trade in lion bones from captive-bred lions to supply those markets could stimulate demand and serve as a cover for products illegally sourced from wild lions, led to the 17th Conference of the Parties to CITES (CoP17) adding an annotation to the Appendix II listing of *Panthera leo* at its meeting in Johannesburg in 2017. The annotation established a zero export quota for bones, bone pieces, bone products, claws, skeletons, skulls and teeth removed from the wild and traded for commercial purposes, and required South Africa to declare annual export quotas for trade in such products from captive bred lions. In January 2017, South Africa sought public input on its proposal to permit the annual export of 800 captive lion skeletons (https://www.environment.gov.za/mediarelease/africanlion_pantheraleo_exportquota).

A broad range of conservation groups expressed concerns about South Africa's proposal. They suggest that availability of parts from captive lions stimulates demand and therefore poaching of wild lions and other big cats, and there is increasing evidence from the field of lions being targeted by poachers in southern African protected areas (Panthera 2017) (see for example <https://www.panthera.org/panthera-statement-south-africa-proposed-quota-lion-skeleton-exports-impact-wild-lion>).

¹ CITES trade statistics derived from the CITES Trade Database, UNEP World Conservation Monitoring Centre, Cambridge, UK

Lion skins and other body parts are also openly for sale in traditional medicine markets across West and Central Africa (see Annex A).

Disease

Isolated lion populations have suffered dramatic losses as a result of outbreaks of infectious disease, particularly when circumstances prevail which increase disease susceptibility and the capacity for infectious agents to spread rapidly. Munson *et al.* (2008) described outbreaks of Canine Distemper Virus among Serengeti lions in 1994 which resulted in the death of a third of the population, and in the Ngorongoro crater population in 2001 associated with concomitant *Babesia* infection from high tick infestations resulting from peculiar climatic conditions. Bovine tuberculosis has been recognised as a threat to populations of lions in the Southern parts of the Kruger National park in South Africa (Ferreira & Funston 2010). However, as lion populations become increasingly fragmented and isolated, the potential impact of serious disease outbreaks becomes increasingly significant.

5.4 Threats connected especially with migrations

Of the identified threats to lions, indiscriminate killing, prey base depletion, habitat loss and conversion, trade in lion body parts, and disease, might be connected to lion movements and migrations, particularly when those movements involve traversing boundaries of national parks or other protected areas, and/or national borders.

5.5 National and international utilization

International trade in lions and parts and products derived from them is large and increasing.

According to the CITES Trade Database, the following lion items were declared to have been exported by Parties during the period 2006-2015 inclusive (excludes items declared by weight or volume):

Trophies	9324
Specimens	4033
Bones	3909
Live	3329
Skeletons	2969
Skulls	1190
Skins	1188
Claws	991
Bodies	512
Teeth	287
Hair	202
Skin pieces	36
Feet	24
Leather products	21
Derivatives	16
Garments	3
Tails	3
Bone pieces	2
Plates	2
Carvings	1
Rug	1

CITES trade statistics derived from the CITES Trade Database, UNEP World Conservation Monitoring Centre, Cambridge, UK.

Approximately 34% of these items were declared to have been sourced from wild lions.

Live lions, lion skins and other products are traded illegally both within countries and across international borders. A number of reports of illegal use of and trade in lion products are provided in Annex A.

6. Protection status and species management

6.1 National protection status

Regarding national legislation, there are 25 countries in the 2016 Red List assessment of lions that currently have native populations of African lions (Bauer *et al.* 2016). The report of Kenya and Namibia on *Panthera Leo* to the Animals Committee of CITES at its 27th meeting in 2014 explained that of those:

- Trophy hunting of lions is prohibited or subject to a moratorium in Angola, Botswana, Kenya, Malawi, Niger, Nigeria and Rwanda.
- Trophy hunting of lions is permitted in Benin, Burkina Faso, Cameroon, Central African Republic, Ethiopia, Mozambique, Namibia, Somalia, South Africa, Sudan, Tanzania, Zambia and Zimbabwe.

Just over a third of African lion Range countries have legislation to effectively implement their obligations under CITES (Table X). Based on the legislative status report provided to CoP17, nine African lion range countries are in category 1, nine are in category 2, and seven are in category 3 with no status reported for South Sudan.

Status of CITES Implementing Legislation	Countries
Category 1— legislation that is believed generally to meet the requirements for implementation of CITES	Cameroon; Democratic Republic of the Congo; Ethiopia; Namibia; Nigeria; Senegal; South Africa; Zimbabwe
Category 2— legislation that is believed generally not to meet all of the requirements for the implementation of CITES	Benin; Botswana; Burkina Faso; Chad; Kenya; Malawi; Mozambique; Sudan; Zambia;
Category 3— legislation that is believed generally not to meet the requirements for the implementation of CITES	Angola; Central African Republic; Niger; Somalia; Swaziland; United Republic of Tanzania; Uganda;

* Information as of 1 September 2016 Available at: <https://cites.org/sites/default/files/eng/cop/17/WorkingDocs/E-CoP17-22-A3-R1.pdf>

An analysis of African lion range countries by UNEP-WCMC in 2012 found that in many instances legislation was either allowing or failing to prevent unsustainable trophy hunting of lions.

6.2 International protection status

African lions (*Panthera leo leo*) have been on Appendix II of CITES and Asiatic lions (*Panthera leo persica*) have been on Appendix I since 1977. A proposal was put forward by nine Range states at CoP17 to uplist African lions to Appendix I. That proposal was not adopted but the Parties to the Convention agreed to ban trade in a number of products from wild lions, review the trade in lion bones and lion nomenclature, and require South Africa to develop and report on a quota for the trade in lion bones and parts from captive lions. The Conference of the Parties also adopted a comprehensive list of conservation measures contained in Decisions 17.241-17.245 to be implemented in cooperation with CMS and the IUCN. Prior to the 2016 proposal, African lions were proposed for uplisting to CITES Appendix I by Kenya in 2004. That proposal spurred the development of regional conservation strategies for lions by the IUCN, one for southern and eastern African lions, and the other for western and central African lions (IUCN/SSC Cat Specialist Group 2006a, b). Despite the attention paid to African lions at CITES

since the 2004 uplisting proposal, the species is continuing to decline throughout much of its range indicating the need for additional protection (Bauer *et al.* 2016; Packer *et al.* 2013).

Beyond CITES, few international legal instruments protect lions. World Heritage sites provide ancillary benefits for lions but not one agreement calls for habitat protection and restoration in the manner supported by CMS.

6.3 Management measures

In terms of joint plans for African lions, as previously discussed, the IUCN Cat Specialist Group developed two regional plans in 2006 one for western and central Africa and one for southern and eastern Africa (IUCN/SSC Cat Specialist Group 2006a, b). Additionally, a W-Arly-Pendjari Transfrontier Conservation Area Large Carnivore Action Plan has been developed for Benin, Burkina Faso, and Niger. Bauer *et al.* (2015a) identified additional transnational lion conservation efforts: one in Angola, Botswana, Namibia, Zambia, and Zimbabwe called the Kavango-Zambezi and the other in Kenya and Tanzania called the Serengeti-Mara.

At the national level, Bauer *et al.* (2015a) identified eleven countries that have developed National Lion Conservation Action Plans or equivalent plans:

1. Benin;
2. Cameroon;
3. Ethiopia;
4. Guinea;
5. Malawi (draft, not endorsed by Government);
6. Mozambique;
7. Namibia (draft, not endorsed by Government);
8. Senegal (draft, not endorsed by Government);
9. South Africa (draft, not endorsed by Government);
10. Zambia; and
11. Zimbabwe

The authors also identified four countries that have national conservation plans that benefit lions:

1. Kenya (Lion and Hyena Conservation Plan);
2. Rwanda (National Strategy and Action Plan for the Conservation of Biodiversity);
3. Tanzania (Carnivore Conservation Plan and the Lion and Leopard Conservation Action Plan);
4. Uganda (Large Carnivore Action Plan)

LionAid (2012) noted that the following range countries have not yet prepared lion conservation plans: Angola; Burkina Faso; Chad; Central African Republic; Democratic Republic of Congo; South Sudan; and Somalia. Google searches were performed and Range states were asked for any updated information during consultations to further update the information provided by Bauer *et al.* (2015a). Botswana is preparing a predator management plan.²

As explained, by Bauer *et al.* (2015a) and in the IUCN Regional Conservation Strategies (IUCN/SSC Cat Specialist Group 2006a, b), having a conservation action plan is not sufficient if resources are not dedicated to implementing that plan. Riggio *et al.* (2013) noted that the African Lion Working Group concluded that the regional conservation plans were not well followed and needed updating. To date quantification of the implementation and enforcement of action plans has been lacking.

With respect to trophy hunting, most African lion range countries allow hunting of lions although moratoriums and bans have been imposed in different countries for different durations (UNEP-WCMC 2012). The 2012 UNEP-WCMC report detailed specifics regarding lion range countries and their hunting systems explaining:

² Referenced here: https://www.save-wildlife.org/downloads/save_african_animals/Botswana%20Large%20Carnivore%20Workshop%20Report%202016.pdf

- Benin allows trophy hunting in five northern hunting areas around Pendjari and W National Parks but the allowable offtake is not suspected to be scientifically based (UNEP-WCMC 2012; UNEP-WCMC 2014).
- Botswana restricted all forms of hunting in January 2014 (UNEP-WCMC 2014).
- Burkina Faso allows hunting in 14 hunting areas without a concerted population monitoring effort (UNEP-WCMC 2012) and quotas that are the highest on the continent per unit area (Lindset *et al.* 2013).
- Cameroon has 45 hunting areas and lions are hunted in the savannah areas based on quotas that require further scientific backing (UNEP-WCMC 2012).
- Central African Republic has numerous hunting areas and quotas are set based on numerous factors that do not automatically amount to ensuring sustainability (UNEP-WCMC 2012).
- Ethiopia allows trophy hunting of lions at low levels to address problem animals (UNEP-WCMC 2012).
- Mozambique allows trophy hunting of lions under a system regulated by the Ministries of Tourism and Agriculture and concerns exist about under reporting of trophies although hunting quotas are not always met (UNEP-WCMC 2012).
- Namibia regulates trophy hunting by law although concerns exist about unsustainable hunting in Kuenene (UNEP-WCMC 2012).
- South Sudan allows hunting and has been developing its license program with no quota information (UNEP-WCMC 2012).
- Tanzania has been the largest exporter of wild lion trophies in recent years, and the sustainability of the hunting quotas set for lions has been questioned (UNEP-WCMC 2012; Packer *et al.* 2011; Brink *et al.* 2016).
- Zambia allows trophy hunting of lions after a ban in 2013-2015; previously quota levels were believed to be unsustainable for lion populations (UNEP-WCMC 2012).
- Zimbabwe allows trophy hunting of lions under a system found to be unsustainable for lion populations by several entities (UNEP-WCMC 2012; Lindsey *et al.* 2012; UICN/PACO 2009).

Trophy hunting can be a tool for conservation but also a threat, depending on how it is regulated and managed (Bauer *et al.* 2016). See discussion on trophy hunting in section 5.3 above.

In summary, as noted previously an assessment of existing regional conservation strategies for the African lion carried out in part fulfilment of CMS Resolution 11.32 concluded that while the strategies were still largely valid, their application has been fragmented and partial, and that the overall objectives had not been met (Bauer *et al.* 2015a).

6.4 Habitat conservation

Data compiled by the World Resources Institute from national authorities, national legislation and international agreements collected by the United Nations Environmental Programme and the World Conservation Monitoring Centre, documents the percentage of terrestrial land in designated protected areas (PAs) in African lion range countries in 1990, 2000, and 2014.

Table 5: Percent of total land area in terrestrial protected areas

Country Name	Terrestrial protected areas (% of total land area) 1990	Terrestrial protected areas (% of total land area) 2000	Terrestrial protected areas (% of total land area) 2014
Angola	6.97	6.97	6.98
Benin	23.81	25.01	28.07
Botswana	17.9	29.13	29.15
Burkina Faso	13.96	14.13	15.47
Cameroon	5.88	7.64	10.86
Central African Republic	17.65	17.9	18.09
Chad	11.68	11.68	17.78
Congo, Dem. Rep.	10.11	10.18	12.08
Congo, Rep.	1.68	5.25	35.24
Ethiopia	17.72	17.72	18.4
Kenya	11.44	11.75	12.37
Malawi	15.03	16.81	16.81
Mozambique	13.5	13.5	17.21
Namibia	11.61	14.87	37.86
Niger	7.74	7.74	17.61
Nigeria	11.57	12.91	14.18
Sudan	1.32	1.33	1.74
Senegal	25.18	25.19	25.2
Somalia	0.59	0.59	0.6
South Africa	5.73	6.64	8.85
South Sudan	12.83	12.83	20.8
Swaziland	3.98	4.02	4.02
Tanzania	27.01	28.29	32.02
Uganda	12.27	12.95	16
Zambia	36.05	36.06	37.85
Zimbabwe	16.9	16.9	26.61

Data obtained from: <http://data.worldbank.org/indicator/ER.LND.PTLD.ZS>

This table shows that African lion range countries with native lions have all increased the percentage of land in protected areas, albeit the scale of increase varies considerably. This table, however, pertains to all protected areas and not just those that benefit lions, which are far fewer.

More specific to protected areas with lions, Lindsey *et al.* (2017) found that *Less than one third of sampled PAs conserve lions at $\geq 50\%$ of their estimated carrying capacity (K), and less than half conserve lion prey species at $\geq 50\%$ of K.*

Using a pre-publication copy of this study, Panthera *et al.* (2016) concluded that *African PAs incorporate 1.51 million km² of lion range and that most are chronically underfunded, and only 31% of PAs with lions currently maintain the species at 50% or greater of the natural density they would reach if only suffering natural mortality.*

Some lion conservation may occur outside protected areas in places designated for hunting and some lions also occur in non-protected, non-hunting areas. UNEP-WCMC (2012) determined that most lions in Africa are in protected areas, hunting areas, or their immediate surroundings. Specific to lions, the Regional Conservation Strategies developed the concept of lion conservation units (LCUs) (IUCN/SSC Cat Specialist Group 2006a, b). Riggio *et al.* (2013) updated LCUs based on land conversion, growing human populations, country reports on distribution, and lion survey data. The authors calculated the 2006 LCUs included roughly

3,163,260 km² and their updated calculations represented roughly 3,390,821 km². These numbers rely heavily on expert opinion collected in 2006 and have to be considered as speculative; the 2016 Red List provides a much smaller figure, which is partly due to decline, but possibly also due to improved knowledge (Bauer *et al.* 2016).

This exercise illustrates the need for another review and updating of LCUs and how important having an overarching framework in which to accomplish such work and related research would be.

In summary, while progress has been made in increasing the amount of protected areas in lion range countries, there has not been a concerted, range-wide effort at increasing habitat in protected areas specifically for lions.

6.5 Population monitoring

As discussed in section 6.3, not all range countries have lion conservation plans or equivalent plans. While many range countries have legislation for regulating hunting, those requirements do not guarantee sustainable quotas nor are the tools for sufficient enforcement always available.

In terms of more recent monitoring efforts, Bauer *et al.* (2015b) compiled all “credible repeated lion surveys and present time series data for 47 lion (*Panthera leo*) populations” out of the 67 known populations. In other words at least 20 lion populations were not being monitored at all, which was reflected by other authors (Riggio *et al.* 2013). Specifically, Bauer *et al.* (2015b) found *no reliable data are available for Angola, Central African Republic, Somalia, South Sudan, and Ethiopia. Furthermore, systematic surveys are absent from large areas of potential lion habitat in countries with a rich tradition of wildlife research, such as Zambia and Tanzania.*

The communiqué from the Lion Range State Meeting in Entebbe, Uganda from 30 to 31 May 2016 noted the range states agreed *that there is a need to improve the collection of scientific information and data as a solid basis to ascertain population statuses as well as to monitor regularly changes in populations in order to allow effective conservation and management decisions to be made* (African Lion Range State Meeting Communiqué 2016).

In summary, while lion monitoring efforts are improving there is still much that must be done to ensure reliable surveying takes place throughout the lion’s range.

7. **Effects of the proposed amendment**

7.1 Anticipated benefits of the amendment

This proposal shows that while many efforts have been made on behalf of Africa’s lions there is still much work left to be done to conserve the species. Listing African lions under Appendix II of CMS is a perfect complement to the work already being undertaken on trade in lions and lion parts and derivatives under CITES. In 2002, a Memorandum of Understanding was entered between the Secretariats of the two conventions to develop a joint work program. Work on lions under both conventions has moved forward and led to this Appendix II listing proposal. Working towards a joint plan for lions under CMS to protect and restore habitat and ensure adequate legislation to protect lions complements the work done under CITES thus far to regulate unsustainable trade in lions and their parts and derivatives. An Appendix II CMS listing can pick up where the 2006 Regional Conservation Strategies for lions left off leading to the creation of a range-wide strategy for conserving lions and making resources and conservation tools available to range countries.

To date, while some progress has been made at a national level to adopt legislation and/or lion conservation plans, neither exists throughout the lion’s range. Where laws or plans exist, questions persist regarding implementation, enforcement, and efficacy of such efforts. Indeed, the African Lion Range State Communiqué called upon *Range States to strengthen their legislation on lion conservation, as well as to promote the standardization of land-use designations, such as the standards of protected areas, establish effective governance*

structures and to improve law enforcement measures vis-à-vis migrating cattle holders and poachers (African Lion Range State Meeting Communique 2016).

The classification of the species as Vulnerable by the 2016 IUCN assessment, and the classification of *Panthera leo ssp. persica* as Endangered and *Panthera leo* (West Africa subpopulation) as Critically Endangered, also reminds us that there is more work to be done (Bauer *et al.* 2016).

7.2 Potential risks of the amendment

Often concerns arise in protecting species that identifying their key habitat may lead poachers or those who wish to retaliate against members of the species to find them more rapidly. We do not believe the Appendix II listing proposal poses this risk to lions because of the abundant information that already exists on lions and their habitat. We have not identified any other risks with this proposal.

7.3 Intention of the proponent concerning development of an Agreement or Concerted Action

As proponents of this proposal, it is our intent to have the range countries for African lions work together to implement species-wide, regional and national conservation strategies, possibly under an African Carnivore Initiative. As articulated in the African Lion Range States Communique (2016), *CMS can provide a platform to exchange best conservation and management practices; support the development, implementation and monitoring of action plans; promote the standardization of data collection and assessments; facilitate transboundary cooperation; and assist in the mobilization of resources.* A CMS agreement would serve as one of the *possible mechanisms to develop and support the implementation of joint lion conservation plans and strategies, taking into consideration existing lion conservation plans and strategies* envisioned in CITES Decision 17.241, and could also help fulfil other elements of this decision adopted in 2016 (<https://cites.org/eng/dec/valid17/81883>).

The work of formulating an agreement was already begun in 2006 with the two IUCN regional conservation strategies. Many of those objectives remain relevant today, but the landscape has changed and it is time to work on lion conservation jointly throughout all of the lion's range.

8. Range States

The 2016 IUCN Red List assessment listed the following national status of *Panthera leo* (updated from Bauer *et al.* 2016):

Native:

Angola; Benin; Botswana; Burkina Faso; Cameroon; Central African Republic; Chad; Congo, The Democratic Republic of the; Ethiopia; India; Kenya; Malawi; Mozambique; Namibia; Niger; Nigeria; Rwanda (a group of seven lions was reintroduced into Rwanda's Akagera National Park in 2015); Senegal; Somalia; South Africa; South Sudan; Sudan; Swaziland; Tanzania, United Republic of; Uganda; Zambia; Zimbabwe.

Possibly extinct:

Côte d'Ivoire; Ghana; Guinea; Guinea-Bissau; Mali; Togo.

Regionally extinct:

Afghanistan; Algeria; Burundi; Congo; Djibouti; Egypt; Eritrea; Gabon; Gambia; Iran, Islamic Republic of; Iraq; Israel; Jordan; Kuwait; Lebanon; Lesotho; Libya; Mauritania; Morocco; Pakistan; Saudi Arabia; Sierra Leone; Syrian Arab Republic; Tunisia; Turkey; Western Sahara.

9. Consultations

A number of members of the IUCN Cat Specialist Group were consulted during the development of this Proposal; their comments and advice have been incorporated.

On 14th April 2017, draft copies of the Proposal in French and English (as appropriate to the country concerned) were distributed to the following contacts, inviting comments:

- CMS focal points and additional contacts in the following CMS Party range States and former range States for *Panthera leo*: Angola, Benin, Burkina Faso, Cameroon, Democratic Republic of Congo, Ethiopia, India, Kenya, Mozambique, Nigeria, Rwanda, Senegal, Somalia, South Africa, Swaziland, Tanzania, Uganda, Zimbabwe, Ivory Coast, Ghana, Guinea, Guinea Bissau, Mali
- CMS focal points in Germany and France;
- The Department of National Parks in Botswana, a non-CMS Party but a key range State.

By 14th May 2017, a response had been received on behalf of the Director of Wildlife and National Parks in Botswana, expressing support for the Proposal. The letter of support is appended.

Letters have also been received from officials in Chad and Togo, expressing their support and confirming their desire to act as co-proponents for the Proposal. These letters have also been appended.

No other responses were received.

10. Additional remarks

11. References

- African Lion Range State Meeting Communiqué. 2016. http://www.cms.int/sites/default/files/document/African_Lions_Meeting_Communique_E.pdf
- Bauer, H. 2008. Synthesis of threats, distribution and status of the lion from the two lion conservation strategies. In: B. Croes, R. Buij, H. de Iongh and H. Bauer (eds), Management and Conservation of Large Carnivores in West and Central Africa, pp. 13-28. Institute of Environmental Sciences (CML), Leiden University, Leiden.
- Bauer, H., Nowell, K., Breitenmoser, U., Jones, M. & Sillero-Zubiri, C. 2015a. Review of Lion Conservation Strategies. <http://www.cms.int/en/news/review-lion-conservation-strategies>
- Bauer, H., Chapron, G., Nowell, K., Henschel, P., Funston, P., Hunter, L. T., Macdonald, D.W. & Packer, C. 2015b. Lion (*Panthera leo*) populations are declining rapidly across Africa, except in intensively managed areas. Proceedings of the National Academy of Sciences, 112(48), 14894-14899.
- Bauer, H. & Rskay, G. 2015c. Reconnaissance visit to Alataash – Dinder Lion Conservation Unit, Ethiopia – Sudan border. Mission Report. Wildlife Conservation Research Unit, University of Oxford (WildCRU).
- Bauer, H., Packer, C., Funston, P.F., Henschel, P. & Nowell, K. 2016. Panthera leo. 2016. The IUCN Red List of Threatened Species 2016: e.T15951A107265605. <http://dx.doi.org/10.2305/IUCN.UK.2016-3.RLTS.T15951A107265605.en>. Downloaded on 21 February 2017.
- Bauer, H., Chapron, G., Nowell, K., Henschel, P., Funston, P., Hunter, L.T.B., Macdonald, D.W., & Packer, C. 2015. Lion (*Panthera leo*) populations are declining rapidly across Africa, except in intensively managed areas. PNAS 112 (48), 14894–14899, doi: 10.1073/pnas.1500664112. <http://www.pnas.org/content/112/48/14894>
- Becker, M.S., Watson, F.G.R., Droge, E., Leigh, K., Carlson, R.S. & Carlson, A.A. 2012. Estimating Past and Future Male Loss in Three Zambian Lion Populations. Journal of Wildlife Management; DOI: 10.1002/jwmg.446
- Bertola, L.D., Tensen, L., van Hooft, P., White, P.A., Driscoll, C.A., Henschel, P. et al. 2015. Autosomal and mtDNA Markers Affirm the Distinctiveness of Lions in West and Central Africa. PLoS ONE 10(10): e0137975. doi:10.1371/journal.pone.0137975.
- Bouché, P., Crosmary, W., Kafando, P., Doamba, B., Kidjo, F.C., Vermeulen, C. & Chardonnet, P. 2016. Embargo on Lion Hunting Trophies from West Africa: An Effective Measure or a Threat to Lion Conservation? PLoS ONE 11(5): e0155763. doi:10.1371/journal.pone.0155763

- Breider, M.J., Goedmakers, A., Wit, P., Niezing, G.S. & Sima, A. 2016. Recent records of wild cats in the Boé sector of Guinea Bissau. CATnews 63; 15-17.
- Breitenmoser, U., Mallon, D.P., Ahmad Khan, J. & Driscoll, C. 2008. *Panthera leo ssp. persica*. The IUCN Red List of Threatened Species 2008: e.T15952A5327221. <http://dx.doi.org/10.2305/IUCN.UK.2008.RLTS.T15952A5327221.en>. Downloaded on 21 February 2017.
- Brink, H., Smith, R.J., Skinner, K. & Leader-Williams, N. 2016. Sustainability and Long Term-Tenure: Lion Trophy Hunting in Tanzania. PLoS ONE 11(9): e0162610. doi:10.1371/journal.pone.0162610
- Chardonnet, P., Mésochina, P., Renaud, P.-C., Bento, C., Donjo, D., Fusari, A., Begg, C., Foloma, M. & Pariela, F. 2009. Conservation status of the lion (*Panthera leo* Linnaeus, 1758) in Mozambique. Maputo, June 2009. 86 p.
- Craigie, I.D., Baillie, J.E.M., Balmford, A., Carbone, C., Collen, B., Green, R.E. & Hutton, J.M. 2010. Large mammal population declines in Africa's protected areas. Biological Conservation 143: 2221-2228.
- Creel, S., M'soka, J., Droge, E., Rosenblatt, E., Becker, M., Matandiko, W. & Simpamba, T. 2016. Assessing the sustainability of African lion trophy hunting, with recommendations for policy. Ecological Applications. doi: 10.1002/eap.1377
- Dolrenry, S., Stenglein, J., Hazzah, L., Lutz, R.S. & Frank, L. 2014. A Metapopulation Approach to African Lion (*Panthera leo*) Conservation. PLoS ONE 9(2): e88081. doi:10.1371/journal.pone.0088081
- Dubach, J. M., Briggs, M. B., White, P. A., Ament, B. A., & Patterson, B. D. 2013. Genetic perspectives on "Lion Conservation Units" in Eastern and Southern Africa. Conservation Genetics 14(4): 741-755.
- Elliot, N. B., S. A. Cushman, A. J. Loveridge, G. Mtare, & D. W. Macdonald. 2014. Movements vary according to dispersal stage, group size and rainfall: the case of the African lion. Ecology. doi: 10.1890/13-1793.1
- Ferreira, S.M. & Funston, P.J. 2010. Estimating lion population variables: prey and disease effects in Kruger National Park, South Africa. Wildlife Research, 37, 194-206.
- Frank L., MacLennan S., Hazzah L., Bonham R. & Hill T. 2006. Lion killing in the Amboseli-Tsavo ecosystem, 2001-2006, and its implications for Kenya's lion population. 10 p.
- Funston P. J. & Mills M. G. L. 1997. Aspects of sociality in Kruger National Park lions: the role of males. In Proceedings of a Symposium on Lions and Leopards as Ranche Animals, Onderstepoort, October 1997, pp. 18-26. Ed. J. van Heerden.
- Funston, P., Henschel, P., Hunter, L., Lindsey, P., Nowak, K., Vallianos, C., Watts, S. & Wood, K. 2016. Beyond Cecil: Africa's lions in crisis. Report published by Panthera, Wildlaid, and the Wildlife Conservation Research Unit, University of Oxford. <http://www.wildaid.org/news/wildaid-and-panthera-launch-lion-campaign-1-year-after-cecil>
- Hayward, M., O'Brien, J. & Kerley, G. 2007. Carrying capacity of large African predators: Predictions and tests. Biological Conservation 139, 219 – 229.
- Henschel, P., Bauer, H., Sogbohossou, E. & Nowell, K. 2015. *Panthera leo* (West Africa subpopulation). The IUCN Red List of Threatened Species 2015: e.T68933833A54067639. <http://dx.doi.org/10.2305/IUCN.UK.2015-2.RLTS.T68933833A54067639.en>. Downloaded on 21 February 2017.
- Hopcraft, J.G.C., Sinclair, A.R.E. & Packer, C. 2005. Planning for success: Serengeti lions seek prey accessibility rather than abundance. Journal of Animal Ecology 74: 559-66.
- IUCN/SSC Cat Specialist Group. 2006a. Conservation Strategy for the Lion in East and Southern Africa. Johannesburg, South Africa.
- IUCN/SSC Cat Specialist Group. 2006b. Conservation Strategy for the Lion in West and Central Africa, IUCN. Yaounde, Cameroon.
- IUCN. 2012. IUCN Red List Categories and Criteria: Version 3.1. Second edition. Gland, Switzerland and Cambridge, UK: IUCN. iv + 32pp.
- IUCN. 2016. Informing decisions on trophy hunting - A Briefing Paper for European Union Decision-makers regarding potential plans for restriction of imports of hunting trophies. http://cmsdata.iucn.org/downloads/iucn_informingdecisionsontrophyhuntingv1.pdf
- Jacobson, A. P., Cattau, M. E., Riggio, J. S., Petracca, L. S. & Fedak, D. A. 2013. Distribution and abundance of lions in northwest Tete Province, Mozambique. Tropical Conservation Science 6(1): 87-107.

- Kitchener A. C., Breitenmoser-Würsten Ch., Eizirik E., Gentry A., Werdelin L., Wilting A., Yamaguchi N., Abramov A. V., Christiansen P., Driscoll C., Duckworth J. W., Johnson W., Luo S.-J., Meijaard E., O'Donoghue P., Sanderson J., Seymour K., Bruford M., Groves C., Hoffmann M., Nowell K., Timmons Z. & Tobe S. 2017. A revised taxonomy of the Felidae. The final report of the Cat Classification Task Force of the IUCN/ SSC Cat Specialist Group. Cat News Special Issue 11, 80 pp.
- Lehmann, M.B., Funston, P.J., Owen, C.R. & Slotow, R. 2009. Home range utilisation and territorial behaviour of lions (*Panthera leo*) on Karongwe Game Reserve, South Africa. PLoS ONE 3(12):e3998.
- Lindsey, P. A., Balme, G. A., Booth, V. R., & Midlane, N. 2012. The significance of African lions for the financial viability of trophy hunting and the maintenance of wild land. PLoS ONE, 7 (1): e29332.
- Lindsey, P.A., Balme, G.A., Funston, P., Henschel, P., Hunter, L., Madzikanda, H., Midlane, N. & Nyirenda, V. 2013. The Trophy Hunting of African Lions: Scale, Current Management Practices and Factors Undermining Sustainability. PLoS ONE, 8, e73808.
- Lindsey, P., Balme, G., Becker, M., Begg, C., Bento, C., Bocchino, C., Dickman, A., Diggle, R., Eves, H., Henschel, P., Lewis, D., Marnewick, K., Mattheus, J., McNutt, J.W., McRobb, R., Midlane, N., Milanzi, J., Morley, R., Murphree, M., Nyoni, P., Opyene, V., Phadima, J., Purchase, N., Rentsch, D., Roche, C., Shaw, J., van der Westhuizen, H., Van Vliet, N. & Zisadza, P. 2015. Illegal hunting and the bush-meat trade in savanna Africa: drivers, impacts and solutions to address the problem. FAO/Panthera/Zoological Society of London/Wildlife Conservation Society report, New York. 79 pages. <http://www.fao.org/3/a-bc609e.pdf>
- Lindsey, P. A., Petracca, L. S., Funston, P. J., Bauer, H., Dickman, A., Everatt, K., Flyman, M., Henschel, P., Hinks, A.E., Kasiki, S., Loveridge, A., Macdonald, D.W., Mandisodza, R., Mgoola, W., Miller, S.M., Nazerali, S., Siegel, L., Uisebn, K., & Loveridge, A. 2017. The performance of African protected areas for lions and their prey. Biological Conservation, 209, 137-149.
- LionAid. 2012. How many lions in Africa? An assessment of range states' capabilities to conserve wildlife. Available at: <http://www.lionaid.org/download/lionaid-scientific-estimate-of-lion-populations-in-Africa-2012.pdf>
- Loveridge, A. J., Valeix, M., Davidson, Z., Murindagomo, F., Fritz, H., & Mac Donald, D. W. 2009. Changes in home range size of African lions in relation to pride size and prey biomass in a semi-arid savanna. Ecography 32(6): 953-962.
- Loveridge, A.J., Valeix, M., Chapron, G., Davidson, Z., Mtare, G. & Macdonald, D.W. 2016. Conservation of large predator populations: Demographic and spatial responses of African lions to the intensity of trophy hunting, Biological Conservation, <http://dx.doi.org/10.1016/j.biocon.2016.10.024>
- Meena, V., Macdonald, D. W. & Montgomery, R. A. 2014. Managing success: Asiatic lion conservation, interface problems and peoples' perceptions in the Gir Protected Area. Biol. Conserv. 174: 120-126.
- Mésochina, P., Mbangwa, O., Chardonnet, P., Mosha, R., Mtui, B., Drouet, N., Crosmary, W. & Kissui, B. 2010a. Conservation status of the lion (*Panthera leo* Linnaeus 1758) in Tanzania. Paris, March 2010. 113 p.
- Mésochina, P., Sefu, L., Sichali, E., Chardonnet, P., Ngalande, J. & Lipita, W. 2010b. Conservation status of the lion (*Panthera leo* Linnaeus 1758) in Malawi. Paris, December 2010. 78 p.
- Mésochina, P., Mamang-Kanga, J.-B., Chardonnet, P., Mandjo, Y. & Yaguémé, M. 2010c. Statu de conservation du lion (*Panthera leo* Linnaeus, 1758) en République Centrafricaine. Bangui, Juin 2010, 69 p.
- Mills, M.G.L., Wolff, P., Le Riche E.A.N. & Meyer, I.J. 1978. Some population characteristics of the lion *Panthera leo* in the Kalahari Gemsbok National Park. Koedoe 21, 163-171
- Munson, L., Terio, K.A. Kock, R., Mlengeya, T., Roelke, M.E., Dubovi, E., Summers, B., Sinclair, A.R.E. & Packer, C. 2008. Climate extremes and co-infections determine mortality during epidemics in African lions. PLoS ONE 3: e2545.
- Naidoo, R., Weaver, L.C., Diggle, R.W., Matongo, G., Stuart-Hill, G. & Thouless, C. 2016. Complementary benefits of tourism and hunting to communal conservancies in Namibia. Cons. Biol. 30 (3); 628–638.
- Nowell, K. & Jackson, P. 1996. Wild Cats: Status, Survey and Conservation Action Plan, IUCN/Species Survival Commission Cat Specialist Group, Gland, Switzerland
- Nowell, K. & Pervushina, N. 2014. Review of implementation of Resolution Conf. 12.5 (Rev. CoP16) on Conservation and trade in tigers and other Appendix-I Asian big cats. IUCN and TRAFFIC report prepared for the CITES Secretariat, 65th meeting of the CITES Standing Committee, Geneva, 7-11 July. SC65 Doc. 38 Annex 1.

- Packer, C. & Pusey, A. E. 1983. Male takeover and female reproductive parameters: a simulation of oestrous synchrony in lions (*Panthera leo*). *Animal Behaviour* 31: 334-340.
- Packer, C., Herbst, L., Pusey, A. E., Bygott, J. D., Hanby, J. P., Cairns, S. J. & Mulder, M. B. 1988. Reproductive Success of Lions. In *Reproductive Success. Studies of Individual Variation in Contrasting Breeding Systems*: 363-383. Clutton-Brock, T. H.(Ed.). Chicago and London: University of Chicago Press
- Packer, C., Brink, H., Kissui, B., Maliti, H., Kushnir, H. & Caro, T. 2011. Effects of Trophy Hunting on Lion and Leopard Populations in Tanzania. *Conservation Biology*, 25 (1): 142-153.
- Packer, C., Loveridge, A., Canney, S., Caro, T., Garnett, S. T., Pfeifer, M., Zander, K. K., Swanson, A., MacNulty, D., Balme, G., Bauer, H., Begg, C. M., Begg, K. S., Bhalla, S., Bissett, C., Bodasing, T., Brink, H., Burger, A., Burton, A. C., Clegg, B., Dell, S., Delsink, A., Dickerson, T., Dloniak, S. M., Druce, D., Frank, L., Funston, P., Gichohi, N., Groom, R., Hanekom, C., Heath, B., Hunter, L., Delongh, H. H., Joubert, C. J., Kasiki, S. M., Kissui, B., Knocker, W., Leathem, B., Lindsey, P. A., MacLennan, S. D., McNutt, J. W., Miller, S. M., Naylor, S., Nel, P., Ngweno, C., Nicholls, K., Ogotu, J. O., Okot-Omoya, E., Patterson, B. D., Plumptre, A., Salerno, J., Skinner, K., Slotow, R., Sogbohossou, E. A., Stratford, K. J., Winterbach, C., Winterbach, H. & Polasky, S. 2013. Conserving large carnivores: dollars and fence. *Ecology Letters* 16(5): 635-641.
- Panthera, WildAid, & WildCRU. 2016. Beyond Cecil: Africa's Lions in Crisis. Available at: <http://letlionslive.org/LionReport.pdf>
- Pusey, A.E. & Packer, C. 1987. The evolution of sex-biased dispersal in lions. *Behaviour* 101: 275-310.
- Pusey, A. E. & Packer, C. 1994. Infanticide in lions: consequences and counterstrategies. In *Infanticide & Parental Care*: 277-299. Parmigiani, S. and vom Saal, F. S.(Eds.). Chur, Switzerland: Harwood Academic Publisher.
- Riggio, J., Jacobson, A., Dollar, L., Bauer, H., Dickman, A., Funston, P., Henschel, P., de longh, H., Lichtenfeld, L., Packer, C. & Pimm, S. 2013. The size of savannah Africa: a lion's view. *Biodiversity and Conservation* 22(1): 17-35.
- Ripple, W.J., Estes, J.A., Beschta, R.L., Wilmers, C.C., Ritchie, E.G., Hebblewhite, M., Berger, J., Elmhagen, B., Letnic, M., Nelson, M.P., Schmitz, O.J., Smith, D.W., Wallach, A.D. & Wirsing, A.J. 2014. Status and Ecological Effects of the World's Largest Carnivores. *Science* 343, 1241484. DOI: 10.1126/science.1241484
- Schaller, G.B. 1972. *The Serengeti Lion. A study of predator-prey relations*. University of Chicago Press. 504 p.
- Sogbohossou, E. A., Bauer, H., Loveridge, A., Funston, P. J., De Snoo, G. R., Sinsin, B. & De longh, H. H. 2014. Social structure of lions (*Panthera leo*) is affected by management in Pendjari Biosphere Reserve, Benin. *PLoS ONE* 9(1): 1-4.
- Sunquist, M. E. & Sunquist, F. 2002. *Wild Cats in the World*. University of Chicago Press, Chicago, Illinois, U.S.A. and London, United Kingdom, 452 pp.
- Sunquist, M.E. & Sunquist, F.C. 2009. Family Felidae (cats). In: Wilson DE, Mittermeier RA, editors. *Handbook of the mammals of the world. Vol. 1. Carnivores*. Barcelona (Spain): Lynx Edicions. p. 54-168.
- Trinkel, M., Cooper, D., Packer, C. & Slotow, R. 2011. Inbreeding depression increases susceptibility to bovine tuberculosis in lions: an experimental test using an inbred–outbred contrast through translocation. *Journal of Wildlife Diseases* 47: 494-500.
- Tumenta, P. N., Kok, J. S., van Rijssel, J. C., Buij, R., Croes, B. M., Funston, P. J., De longh, H.H. & Udo de Haes, H. A. 2010. Threat of rapid extermination of the lion (*Panthera leo leo*) in Waza National Park, Northern Cameroon. *African Journal of Ecology* 48(4): 888-894.
- Tuqa, J. H., Funston, P., Musyoki, C., Ojwang, G. O., Gichuki, N. N., Bauer, H., Tamis, W., Dolrenry, S., Vant Zelfde, M., De Snoo, G. R. & De longh, H. H. 2014. Impact of severe climate variability on lion home range and movement patterns in the Amboseli ecosystem, Kenya. *Global Ecology and Conservation* 2: 1-10.
- UNEP-WCMC. 2012. *Review of Panthera leo from trading range States*. UNEP-WCMC, Cambridge.
- UNEP-WCMC. 2014. *Review of trophy hunting in selected species*. UNEP-WCMC, Cambridge.
- UICN/PACO. 2009. *La grande chasse en Afrique de l'Ouest: quelle contribution à la conservation? (Big Game Hunting in West Africa. What is its contribution to conservation?)* IUCN. Gland, Switzerland and Cambridge, United Kingdom.
- VanderWaal, L.L., Mosser, A. & Packer, C. 2009. Optimal group size, dispersal decisions and postdispersal relationships in female African lions. *Animal Behaviour* 77: 949–954.

- Van Orsdol, K.G., Hanby, J. P. & Bygott J. D. 1985. Ecological correlates of lion social organization (*Panthera leo*), J. Zool. Lond. 206, 97-112.
- West, P.M. & Packer, C. 2013. *Panthera leo*. In: J. Kingdon and M. Hoffmann (eds), The Mammals of Africa. Volume V: Carnivores, Pangolins, Equids and Rhinoceroses, Bloomsbury Publishing, London.
- Williams, V.L., Newton, D.J., Loveridge, A.J. & Macdonald, D.W. 2015. Bones of Contention: An Assessment of the South African Trade in African Lion *Panthera leo* Bones and Other Body Parts. TRAFFIC, Cambridge, UK & WildCRU, Oxford, UK.
- Wilson, D.E. & Reeder, D.M. (editors). 2005. Mammal Species of the World, A Taxonomic and Geographic Reference (3rd ed). Johns Hopkins University Press, 2,142 pp.

Annex A. Illegal utilisation of and trade in lion parts.

In their report to the 27th CITES Animals Committee meeting in respect of the Periodic Review of *Panthera leo* (CITES AC27 Doc. 24.3.3), Kenya and Namibia provided responses from a number of Parties from which information had been requested. The following Parties referenced illegal utilisation and trade in their responses:

Party	Summary report
Benin	There is a recognized illegal trade, and lion products from Benin may be sold in other countries in West Africa. (Questionnaire response from Dr. Ir. Sogbohossou Etotepe A, Laboratory of Applied Ecology, University of Abomey-Calavi, Benin).
Cote d'Ivoire	Skins or partial skins originating from Burkina Faso can "readily" be found in public markets in Abidjan and that "given the rarity of lions in West Africa, this trade and the high price a lion skin can fetch is most likely one of the biggest threats to lion survival in this region." (Questionnaire response from Dr. Philipp Henschel, lion survey coordinator for the NGO Panthera).
Ghana	Occasionally lion claws and pieces of lion skins are found in Techiman, a major market in Ghana (Questionnaire response from Mr. Nana Kofi Adu-Nsiah, Executive Director, Wildlife Division of the Forestry Commission in Ghana).
Gabon	Lion skins (sold for medicinal purposes) and canines (sold as talismans) are occasionally seized in the capital, including a recent case of one skin originating from Benin. While the scale of this type of illegal trade is unknown, it is "likely one of the biggest threats to lion survival in this region." (Questionnaire response from Dr. Philipp Henschel, lion survey coordinator for the NGO Panthera).
Guinea	Trade in large carnivores' sub-products (skins, claws, teeth, skulls, fat) is important and common in the periphery of the National Park (Faranah area) and in Conakry. This trade targets essentially lions, leopards and hyenas and has a sub-regional scale. 67 lion skins were discovered in Conakry and it is reported that the skins sold in Conakry come from the entire sub-region (Mali, Niger, Nigeria, Ivory Coast, Senegal, Liberia, Guinea-Bissau and Sierra Leone). Illegal bushmeat trade is also reported to negatively impact lions. (Questionnaire response from Mr. Ansoumane Doumbouya, CITES Management Authority, Chief of the Legislative and Economy Department of the National Guinean Office for Biodiversity and Protected Areas, Guinea).
Kenya	There is reported cases of illegal market for lion claws and canines, especially in the Coast area, that may soon become a major concern as the country's large Chinese population may increase demand for the export of lion parts to Asia. (Questionnaire response from Dr. Laurence Frank, Director of the NGO Living with Lions).
Mali	Poaching is motivated by illegal trade in lion meat and other products (trophies, fat, skins, non-perishable parts), and is having a detrimental impact. Meat is sold in local villages and sent from Protected Areas to various Malian towns. Illegal trade in lion trophies poached in Mali and neighboring countries such as Guinea, Ivory Coast and Burkina Faso is well known in the region. (Questionnaire response from Mr. Bourama Niagate,

	Director of the National Park and Biosphere Reserve of the Boucle du Baoulé, National Coordinator for MIKE and CMS-AEWA focal point, Mali).
Mozambique	Illegal forms of utilization are in response to human and/or livestock casualties and in poaching for commercial or traditional purposes. (Questionnaire response from Felismina Atanásio Longamane Langa, Deputy National Director, Ministry of Tourism, Mozambique).
Nigeria	Domestic trade in illegal lion products is “massive” and illegal trade is poorly documented. Skins are illegally exported abroad for sale to wealthy Africans. For example, in 2008, a U.S. court case was brought against a Nigerian national who attempted to smuggle several lion skins from Nigeria into the U.S. The case attorney revealed this type of case was not an isolated one. Fulani herdmen admit to carrying poison to kill conflict lions and lion surveys conducted by Panthera in 2009 revealed several cases of lion poisoning. (Questionnaire response from Dr. Philipp Henschel, lion survey coordinator for the NGO Panthera).
Senegal	Lion skins (sold for medicinal purposes) and canines (sold as talismans) likely originating from Burkina Faso, Benin and Nigeria can easily be found in Dakar markets. (Questionnaire response from Dr. Philipp Henschel, lion survey coordinator for the NGO Panthera).
South Africa	Illegal trade in captive bred lions within North West province is suspected to take place, as the industry is large. Lions are targeted by the traditional medicine trade in Mpumalanga province, and poaching of lion for the medicinal trade seems to be on the increase due to the expansion of human settlements on the western boundary of the Kruger National Park. The IUCN/SSC African Lion Working Group believes that there is an illegal trade in lion between South Africa and Botswana, Zambia, Zimbabwe and Mozambique and alleges that lionesses with small cubs are shot in Botswana’s southern region in order to supply cubs to predator keepers/breeders in South Africa. As there is an excess of captive bred lions available in South Africa, this claim would certainly require further investigation and supporting evidence.
South Sudan	There is an active trade in lion cubs within the Republic of South Sudan. (Questionnaire response from Dr. Aldo Gwake Lazarus, Director, Directorate Wildlife Conservation Central Equatorial State).
Zambia	Illegal trade of lion derivatives and parts occur but most likely are insignificant. These are used for charms, magic and medicinal purposes.