

**CONSERVATION OF THE LEOPARD (*PANTHERA PARDUS*) UNDER THE JOINT CITES-  
CMS AFRICAN CARNIVORES INITIATIVE (ACI)**

*(Prepared by the CITES and CMS Secretariat)*

**Summary:**

In line with recommendations of the CITES Animals Committee and the CMS Scientific Council, ACI Range States are requested to discuss the future of the *Roadmap for the Conservation of the Leopard in Africa (Version 1.0 – September 2019)* and consider whether it should be updated or rather be used to inform the development of more specific Regional Conservation Strategies for the Leopard. Range States are urged to collaborate with the IUCN Cat SG and Panthera for developing the regional strategy for the conservation of Leopards in West Africa under the auspice of the ACI. The Secretariats are requested to report any relevant updates to the relevant Convention bodies.

This document is accompanied by one Annex: *Roadmap for the Conservation of the Leopard in Africa (Version 1.0 – September 2019)*.

## CONSERVATION OF THE LEOPARD (*PANTHERA PARDUS*) UNDER THE JOINT CITES-CMS AFRICAN CARNIVORES INITIATIVE (ACI)

### Background

1. The Leopard (*Panthera pardus*) has been listed on Appendix I of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) since 1975, and on Appendix II of the Convention on the Conservation of Migratory Species of Wild Animals (CMS) since 2017. Facing similar threats as the Lion, Cheetah and African Wild Dog, the Leopard was included in the Joint CITES-CMS African Carnivores Initiative (ACI), at its launch in 2018.
2. With the approval of the [ACI Programme of Work](#) by the Standing Committees of CITES and CMS in 2021, specific conservation measures for Leopard have been agreed.

### *Roadmap for the Conservation of the Leopard in Africa*

3. As a consequence of the listing of the Leopard on CMS Appendix II, the CMS Secretariat commissioned the IUCN SSC Cat Specialist Group to draft a Roadmap for the Conservation of the Leopard in Africa ('the Roadmap'). The Roadmap was reviewed by the first Range State Meeting of the Joint CITES-CMS African Carnivores Initiative (ACI1) in November 2018. Comments by Range States were taken on board and the document was submitted to the 18<sup>th</sup> Meeting of the Conference of the Parties to CITES (COP18, 2019, Geneva, Switzerland) and CMS COP13 (2020, Gandhinagar, India) for review.
4. CITES COP18, subsequently, adopted a set of decisions on Leopards in Africa, directing the CITES Animals Committee to review the Roadmap and make recommendations, as appropriate, concerning the aspects of it that relate to the implementation of CITES.
5. At its 31st meeting (AC31, Online, June 2021) the Animals Committee was invited to:
  - a) conclude its review of the *Roadmap for the Conservation of the Leopard in Africa*; and
  - b) using the findings and recommendations from the co-leads, make recommendations, as appropriate, concerning the aspects of it that relate to the implementation of CITES for consideration by the range States, IUCN and others, as needed.
6. In its workplan for 2019-2022, the Animals Committee tasked Mr P. Kasoma (Africa) and Ms S. Ramirez (Central and South America and the Caribbean) to review the Roadmap. The draft findings and recommendations were included in an Annex to the document considered by the Animals Committee ([AC31 Doc. 29.1 – Annex](#)). Mr Kasoma concluded<sup>1</sup> that *it is a well-researched and well written report and recommended that slight modifications be made, as follows:*

*P. 49: Under "threats" is habitat loss and fragmentation. One other causative factor that needs to be considered is conversion of savannas and woodlands to other land uses such as exotic tree plantations and other forms of commercial agriculture. This not only fragments natural habitat but reduces prey populations.*

*P.57: Under "Recommendations" Objective 11, I strongly feel that another sub-activity ought to be to Activity 11.1. This should be a module (in fact an over-arching module) on sociology and social work (or whatever appropriate name for the study of human society). Failure by most practitioners to understand the workings of human society have often failed all well-intentioned interventions resulting in a huge waste of resources.*

*One aspect that I found missing though is a specific reference to sources of funding for assessing and monitoring populations of leopards in range states, the majority of which are cash-strapped. Perhaps it is implied in statements such as cooperation but funding is likely to be a challenge to implementation of the road map.*

<sup>1</sup> AC31 Doc. 29.1 Annex: Draft findings and recommendations concerning the *Roadmap for the Conservation of the Leopard in Africa*

7. During the 31st meeting of the CITES Animals Committee (May - June 2021) ([AC31 SR](#)), the representative from Europe supported the addition of habitat alteration as a threat and welcomed more information on the *Roadmap's* chapter on sociology and social work. Botswana proposed that the review of the *Roadmap* be postponed to the 32nd meeting of the Animals Committee and that the section on trophy hunting be revised to show the role of hunting as a conservation tool. The Committee noted document AC31 Doc. 29.1 and agreed to submit to CITES COP19 draft decisions regarding the Leopard. The following Decisions on Leopard were eventually adopted by CITES COP19 (Panama, 2022):

*19.211 The Secretariat shall share with the Animals Committee the Roadmap for the Conservation of the Leopard in Africa by the International Union for Conservation of Nature (IUCN) for its review.*

*19.212 The Animals Committee shall review the Roadmap for the Conservation of the Leopard in Africa by IUCN, and make recommendations to the Standing Committee, as appropriate, concerning the aspects of it that relate to the implementation of CITES.*

8. On the CMS side, CMS COP13, in February 2020, took note of the Roadmap and adopted Decision 13.97 Conservation and Management of the Leopard (*Panthera pardus*) in Africa, directing to the Scientific Council that *the Scientific Council shall review the Roadmap for the Conservation of Leopards in Africa contained in UNEP/CMS/COP13 Doc.26.3.1/Annex 4, and formulate recommendations as appropriate for consideration by the Range States, IUCN and others, as needed.*
9. At its Fifth Meeting, the Sessional Committee of the Scientific Council of CMS agreed that the revision of the Roadmap be delegated to Leopard Range States at Range State Meetings of the ACI. To ensure a feedback loop from the ACI to the Scientific Council, the Secretariat should inform the Scientific Council regarding activities and outputs of the ACI Range State Meetings that related to the Committee's mandate, and request advice from the Scientific Council, as appropriate.
10. Together with other conservation strategies, the Roadmap formed a basis for the conservation measures set out in the ACI POW. The Roadmap was a review of the conservation status of the Leopard in Africa and a rough outline of a continental strategy. The proposed revisions of it should be discussed by ACI Range States, preferably at ACI Range State meetings, where CITES and CMS Parties are joined and no further back-and-forth exchange between Convention bodies is required. Indeed, considering the very contrasting status of the Leopard in different regions of Africa, it is difficult to develop a range-wide Conservation Strategy. The Range States are therefore asked to consider the development of Regional Conservation Strategies (as for the other three ACI species) and use the Roadmap as a blueprint for this. Suggested changes and additions to the Roadmap would then be considered in the Regional Conservation Strategies as adequate.
11. The ACI POW provides the following activities regarding the development on regional strategies for the Leopard:

*Result 1.4 Conservation strategies and other guidelines and plans for the conservation of the ACI species are integrated into the ACI POW and, as needed, updated or newly developed in the frame of the ACI and in cooperation with the Range State Parties and other partner institutions concerned. (...)*

*Activity 1.4.3. The Roadmap for the Conservation of the Leopard in Africa (RCLA) is reviewed by the relevant bodies (CMS Scientific Council, CITES Animals Committee), and is updated according to these bodies' recommendations or upon request of the ACI Range States.*

*Activity 1.4.4. Support the development of Regional Conservation Strategies and National Action Plans for the Leopard in the ACI Range States and their implementation through assistance with fundraising.*

12. Panthera started conducting conservation-oriented surveys in West Africa in 2020. The aim is to improve understanding of the status of and threats to West African Leopards. Not much used to be known about these populations; they are very isolated and supposedly of small size (but not many robust abundance estimations are available). Camera trap surveys to obtain baseline information have been conducted since 2021 in national parks in Senegal, Benin (including WAP complex), and Ghana, and are foreseen in national parks in Ivory Coast. Panthera is presently analysing data from in situ surveys in Benin, Senegal, Ghana; Ivory Coast fieldwork will start early next year; additional countries (e.g., Liberia and Guinea) will be surveyed in cooperation with other organisations. The findings from these surveys should form the baseline information for the development of a Regional Conservation Strategy, which then could be implemented through National Action Plans.
13. Panthera already has achieved a better understanding of population size, densities, and threats. In West Africa, the need for conservation of Leopards and to develop such a regional strategy and the related National Action Plans is more urgent than in other parts of Africa, with great potential for transboundary, international cooperation as there are a lot of (relatively small) range countries. A regional strategy for West African Leopard population conservation could be implemented relatively easily as all Range States have similar management systems and are francophone. Panthera is interested in supporting the advancement of Leopard conservation under the auspice of the ACI and in collaboration with the IUCN Cat SG.

#### Recommendation to the Range States

14. Range States are requested to discuss the future of the *Roadmap for the Conservation of the Leopard in Africa (Version 1.0 – September 2019)* and consider whether it should be updated or rather be used to inform the development of more specific Regional Conservation Strategies for the Leopard.
15. Range States are urged to collaborate with the IUCN Cat SG and Panthera for developing the regional strategy for the conservation of Leopards in West Africa under the auspice of the ACI.
16. Range States may request the Secretariats to report back on the outcomes of this agenda item to the CITES Animals Committee, the CMS Scientific Council and COPs.

# Roadmap for the Conservation of the Leopard in Africa

Version 1.0 – September 2019



Compilation of available information on the status of the leopard *Panthera pardus* in Africa, review of threats and a proposal for a conservation programme in the frame of the joint CMS-CITES African Carnivores Initiative

# Roadmap for the Conservation of the Leopard in Africa

Compilation of available information on the status of the leopard *Panthera pardus* in Africa, review of threats and a proposal for a conservation programme in the frame of the joint CMS-CITES African Carnivores Initiative.

The designation of geographical entities in this document, and the presentation of the material, do not imply the expression of any opinion whatsoever on the part of IUCN or the organisations of the authors and editors of the document concerning the legal status of any country, territory, or area, or of its authorities, or concerning the delimitation of its frontiers or boundaries.

## Impressum and acknowledgements

The *Roadmap for the Conservation of the Leopard in Africa* was developed as a guiding document for leopard conservation in the frame of the joint CMS-CITES African Carnivore Initiative (ACI). The work was done in close communication with the CMS Secretariat (Clara Nobbe and Yelizaveta Protas) and the CITES Secretariat (Tom De Meulenaer and Lauren Carla Lloyd Lopes). The first draft was presented and discussed at the meeting of the ACI Range States on 5–8 November 2018 in Bonn, Germany. Based on the discussion in the working groups and in the plenary of the Bonn conference, the Roadmap was revised. The revised draft was sent to the ACI Range States for commenting. The Roadmap was based on a joint workshop of the IUCN SSC Cat Specialist Group chairs together with *Panthera* in 2015. We are grateful to Luke Hunter, Guy Balme, Philipp Henschel, Sanjay Gubbi, and John Goodrich for their input to the earlier document, to Malini Pittet for the compilation of information, to Peter Gerngross for his work on the leopard distribution map and to Luc Le Grand for his contribution to the French version. The development of the *Roadmap for the Conservation of the Leopard in Africa* was coordinated by the co-chairs of the IUCN SSC Cat SG, Urs Breitenmoser and Christine Breitenmoser-Würsten, and the Cat SG Red List Authority Coordinator, Tabea Lanz, with assistance from Roland Bürki. The work was possible thanks to a financial contribution from the Belgian Government to CMS.

Frontispiece © Patrick Meier: Leopard

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## Contents

Impressum and acknowledgements .....	2
Acronyms.....	4
Country codes.....	5
1 Introduction.....	6
2 Conservation status of the leopard in Africa .....	7
2.1 Taxonomy .....	7
2.2 Habitat, ecology and behaviour .....	7
Habitat.....	7
Diet.....	7
Land tenure system.....	7
Reproduction and recruitment .....	7
2.3 Distribution.....	8
Transboundary (meta-) populations .....	8
2.4 Leopard population status, estimations and trends per conservation region.....	11
West Africa .....	11
Central Africa .....	11
East Africa.....	11
Southern Africa .....	11
2.5 CITES export quotas and trophy hunting .....	14
Trophy hunting.....	14
CITES export quotas.....	15
Non-detriment finding reports .....	17
2.6 IUCN Red List Assessment of <i>Panthera pardus</i> .....	18
3 Threats, knowledge gaps and conservation challenges .....	19
3.1 Threats .....	19
Habitat loss and fragmentation .....	19
Prey depletion .....	19
Conflict .....	19
Illegal snaring & killing for trade .....	20
3.2 Knowledge gaps and conservation challenges .....	20
4 Policy & conservation .....	22
4.1 Policy frameworks .....	22
4.2 International cooperation under the auspices of CITES and CMS .....	22
4.3 Surveys and monitoring .....	23
5 Recommendations .....	24
5.1 Strategic planning for leopard conservation .....	24
5.2 Steps towards a leopard conservation programme.....	25
5.3 Preliminary Goal, Objectives and Actions for a leopard conservation programme in the frame of the ACI.....	26
5.4 Conclusions .....	28
References.....	29
Appendix I - Leopard density estimations.....	34
Appendix II - Distribution categories according to the IUCN Red List.....	35

## Acronyms

ACI	Joint CMS-CITES African Carnivores Initiative
Cat SG	Cat Specialist Group
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
CMS	Convention on the Conservation of Migratory Species of Wild Animals
CoP	Conference of the Parties
IUCN	International Union for Conservation of Nature
NAP	National Action Plan
NDF	Non-Detriment Finding
NR	National Reserve
NP	National Park
PA	Protected Area
RCS	Regional Conservation Strategy
SSC	Species Survival Commission



**Country Codes** (in accordance with [ISO 3166-1 alpha 3](#))

<b>ISO 3166-1 alpha 3</b>	<b>English short name</b>	<b>French short name</b>
AGO	Angola	Angola (l')
BDI	Burundi	Burundi (le)
BEN	Benin	Bénin (le)
BFA	Burkina Faso	Burkina Faso (le)
BWA	Botswana	Botswana (le)
CAF	Central African Republic	République centrafricaine (la)
CIV	Côte d'Ivoire	Côte d'Ivoire (la)
CMR	Cameroon	Cameroun (le)
COD	Congo (the Democratic Republic of the)	Congo (la République démocratique du)
COG	Congo (the)	Congo (le)
DJI	Djibouti	Djibouti
DZA	Algeria	Algérie (l')
EGY	Egypt	Égypte (l')
ERI	Eritrea	Érythrée (l')
ETH	Ethiopia	Éthiopie (l')
GAB	Gabon	Gabon (le)
GHA	Ghana	Ghana (le)
GIN	Guinea	Guinée (la)
GMB	Gambia (the)	Gambie (la)
GNB	Guinea-Bissau	Guinée-Bissau (la)
GNQ	Equatorial Guinea	Guinée équatoriale (la)
KEN	Kenya	Kenya (le)
LBR	Liberia	Libéria (le)
LBY	Libya	Libye (la)
LSO	Lesotho	Lesotho (le)
MAR	Morocco	Maroc (le)
MLI	Mali	Mali (le)
MOZ	Mozambique	Mozambique (le)
MRT	Mauritania	Mauritanie (la)
MWI	Malawi	Malawi (le)
NAM	Namibia	Namibie (la)
NER	Niger	Niger (le)
NGA	Nigeria	Nigéria (le)
RWA	Rwanda	Rwanda (le)
SDN	Sudan (the)	Soudan (le)
SEN	Senegal	Sénégal (le)
SLE	Sierra Leone	Sierra Leone (la)
SOM	Somalia	Somalie (la)
SSD	South Sudan	Soudan du Sud (le)
SWZ	Eswatini (Swaziland)	Eswatini (l') (Swaziland)
TCD	Chad	Tchad (le)
TGO	Togo	Togo (le)
TUN	Tunisia	Tunisie (la)
TZA	Tanzania, United Republic of	Tanzanie, République-Unie de
UGA	Uganda	Ouganda (l')
ZAF	South Africa	Afrique du Sud (l')
ZMB	Zambia	Zambie (la)
ZWE	Zimbabwe	Zimbabwe (le)

# 1 Introduction

As a top predator, the leopard (*Panthera pardus*) plays an important role in its ecosystems and substantially influences their structure and function. The leopard is a flagship species for conservation of prey populations and habitats, especially in the regions where it is the largest carnivore of the system. No cat species has a wider distribution than the leopard, which occurs from the southernmost areas of the African continent to the Russian Far East. While some of the Asiatic subspecies are threatened – e.g. the Far Eastern leopard or Amur leopard *P. p. orientalis* was called “the rarest of all large felids” (Kelly et al. 2013) – the African subspecies *P. p. pardus* is generally regarded as being in a (very) good condition. This general view is probably due to the African leopards wide distribution and broad ecological niche. However, in terms of scientific research and conservation funding, this apparent success may have led to a neglect of the leopard in general as well as on the African continent when compared with other large cats (Breitenmoser 2015).

According to the latest assessment for the IUCN Red List of Threatened Species (henceforth IUCN Red List) by Stein et al. (2016) “there are few reliable data on changes in the Leopard (*P. p. pardus*) status (distribution or abundance) throughout Africa over the last three generations [22.3 yrs]”. Recent research and conservation projects had most often local or national scale. The last abundance survey for Sub-Saharan Africa was performed by Martin & de Meulenaer (1988). The model used by Martin & de Meulenaer (1988) has been widely criticised for methodological reasons and the results are usually regarded as impossible overestimates (e.g. Nowell & Jackson 1996). Despite this criticism, they are still sometimes used where more recent numbers do not exist on a nation-wide scale as it “still represents the only practical and quantitative attempt to date to estimate leopard number in Sub-Saharan Africa. [...] To date no attempt has been made to improve the model proposed by Martin and de Meulenaer” (Annex 1 AC30 Doc. 15, CITES 2018a). Even in some instances where more recent attempts at nation-wide estimates were made, the knowledge on abundance may not be much better as indicated by the example of South Africa where estimates “vary widely from 2,185 to 23,400 leopards [...]. None

of these estimates are based on rigorous population counts at regional scales, and their confidence intervals are so wide as to make them meaningless” (Annex 3 AC30 Doc. 15, CITES 2018a). Moreover in many areas, there are gaps in our understanding of leopard population trends, distribution and the impacts of threats, which impedes a robust status assessment and consequently the development of effective conservation measures for the species.

Under the CMS-CITES Joint Work Programme 2015–2020, the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) and the Convention on the Conservation of Migratory Species of Wild Animals (CMS) launched the joint [African Carnivore Initiative](#) (ACI) in 2017, which also covers the leopard for the African part of its range. The CMS Secretariat had commissioned the IUCN SSC Cat Specialist Group to draft a *Roadmap for the Conservation of the Leopard in Africa* as an input document to the 1<sup>st</sup> Meeting of the Range States for the ACI (ACI1) on 5–8 November 2018 in Bonn, Germany. At the ACI1, the Range States agreed “to support the further development by IUCN of a Roadmap for the Conservation of the Leopard in Africa” (CMS & CITES 2018), which should eventually be submitted to CMS CoP13 in 2020. Moreover, the delegates invited the 18<sup>th</sup> Conference of Parties to CITES and the 13<sup>th</sup> Conference of Parties to CMS to task their respective Secretariats with the development of a Joint Programme of Work for the African Carnivores Initiative (CMS & CITES 2018). As such a Programme is still lacking as of September 2019, it is hard to say how the ACI will support the conservation of the focal species in practice, but it is nevertheless expected to become a focal point for the implementation of resolutions and decisions under CITES and CMS on leopards, lions *Panthera leo*, cheetahs *Acinonyx jubatus* and wild dogs *Lycan pictus* in Africa. The *Roadmap for the Conservation of the Leopard in Africa* shall provide the background for the development of transboundary Regional Conservation Strategies and subsequently National Action Plans for the implementation of conservation actions for the leopard in Africa under the auspice of the CMS and CITES within in the frame of the ACI.



## 2 Conservation status of the leopard in Africa

### 2.1 Taxonomy

The taxonomy of the leopard was recently reviewed by the IUCN SSC Cat Specialist Group. Based on current research and an assessment of an expert task force, all leopards inhabiting Africa

belong to the subspecies *P. p. pardus* (Kitchener et al. 2017). However, the taxonomic status of the African subspecies needs to be further investigated.

### 2.2 Habitat, ecology and behaviour

#### Habitat

The leopard is believed to be highly adaptable and shows a certain tolerance for anthropogenic impacts e.g. also appearing close to major towns such as Johannesburg (Jorge 2012, Stein & Hayssen 2013, Kuhn 2014, Jacobson et al. 2016). In Africa, the leopard lives in woodland, grassland, dry scrub, savannah and forest as well as mountain areas, coastal scrub, swampy areas, semi-desert and deserts (Stein et al. 2016). In sub-Saharan Africa the leopard has been recorded up to 5,600 m on Mt. Kilimanjaro, Tanzania (Guggisberg 1975).

#### Diet

Leopards are visual and ambush hunters (Sunquist & Sunquist 2002). The leopard is also an excellent climber and prey is often dragged up into trees for eating and caching (mainly where competing carnivores are numerous; Hunter & Barrett 2011).

The leopard has a variable diet and is able to adapt to changes in prey availability. Its diet is influenced by many factors such as prey density, prey composition and by other predators, but is also affected by environmental factors and anthropogenic pressure (Balme et al. 2007, Henschel et al. 2011; Chapter 3). Leopards can kill prey up to 2 or 3 times their own weight, but they have a preference for medium sized ungulates (15–80 kg; Henschel et al. 2005, Henschel 2008, Hunter & Barrett 2011). Leopards prey on a variety of largely mammalian prey from large ungulates such as elands to small species such as rock hyraxes and arthropods (Balme et al. 2007, Hunter & Barrett 2011, Stein et al. 2016). In sub-Saharan Africa, 92 different prey species were documented (Bailey 1993).

#### Land tenure system

Leopards are solitary (Boast 2014). They use scent or scratch marks and vocalisations to communicate and to mark territories (Stein & Hayssen 2013). Across much of their range, leopards are mainly active at night with activity peaks at dawn and dusk. However, their activity pattern can vary depending

on prey availability, competing predator presence, temperature and human disturbance (Spalton & Al Hikmani 2014). In savannah and woodland areas for example, leopards were more active between sunset and sunrise, but populations in undisturbed rainforest in Gabon and in remote areas in Botswana were largely diurnal. Forest leopards seem to follow the activity patterns of their main prey species (Henschel 2008, Steinmetz et al. 2013).

Leopards are polygynous and male home ranges generally overlap with those of several females (Caro & Riggio 2014). They can be transboundary in border regions (Hunter & Barrett 2011, CMS 2017). Home range sizes of leopards are determined by resource availability, presence of other carnivores, intra-specific density and human pressures. Thus, the size of leopard home ranges is highly variable: In woodland, savannah and rainforest areas mean home ranges for females are 9–27 km<sup>2</sup> and 52–136 km<sup>2</sup> for males. In arid habitats, home ranges are larger, reaching 188–2,750 km<sup>2</sup> (Hunter & Barrett 2011). Consequently, leopard density in Africa varies widely, from 0.1–12 individuals per 100 km<sup>2</sup> (Appendix I).

#### Reproduction and recruitment

In some areas of Africa, leopard births can occur throughout the year. In other areas, birthing peaks occur towards the beginning of the wet season, which also coincides with the birth season of the leopard's main prey species (Sunquist & Sunquist 2002, Stein & Hayssen 2013). Oestrus lasts about 7–14 days, the oestrus cycle for around 46 days and gestation for 90–106 days (Sunquist & Sunquist 2002, Hunter & Barrett 2011). Females reproduce for the first time with 30–36 months and males with 42–48 months. A 16-year old female was recorded giving birth in the Sabi Sand Game Reserve, South Africa. The inter-birth interval averages 16–25 months. Litter size is 1–4 cubs (Hunter & Barrett 2011, Balme et al. 2013a, Stein & Hayssen 2013). Cub mortality is quite high and varies in the first year between 50% and 90% (Balme et al. 2013a). Leopards reach independence at 12–18 months (Sunquist & Sunquist 2002). Subadult male leopards (2–4 years) are mandatory dispersers and can cover distances over 200 km, while subadult females settle more often close to their parental home ranges (CMS 2017).

## 2.3 Distribution

The leopard has a wide distribution with an extant range of 6,613,000 km<sup>2</sup> across Africa (Appendix II; Jacobson et al. 2016). The species is extant in 40, possibly extinct in 2, extinct in 4 countries and with presence uncertain in 1 country of the continent (Table 2.4.1; Jacobson et al. 2016, Stein et al. 2016). The historic distribution of the leopard included all of Sub-Saharan Africa, except the skeleton coast of Namibia (Jacobson et al. 2016; Fig. 2.3.1). Leopards have vanished from 48–67% of their historic range across Africa (Jacobson et al. 2016). The range loss was most prominent in the northern (Sahara and Sahel zone) and southern (South Africa) parts of the continent. Stein et al. (2016) estimate that even in the leopard's stronghold – southern Africa – the species suffered a range loss of approximately 21% in the last three generations (22.3 yrs). The current distribution of the leopard across Africa is not fully understood, but the species still seems to be present in many areas (Fig. 2.3.1) although with an increasingly fragmented distribution (Boast 2014, Jacobson et al. 2016, Stein et al. 2016).

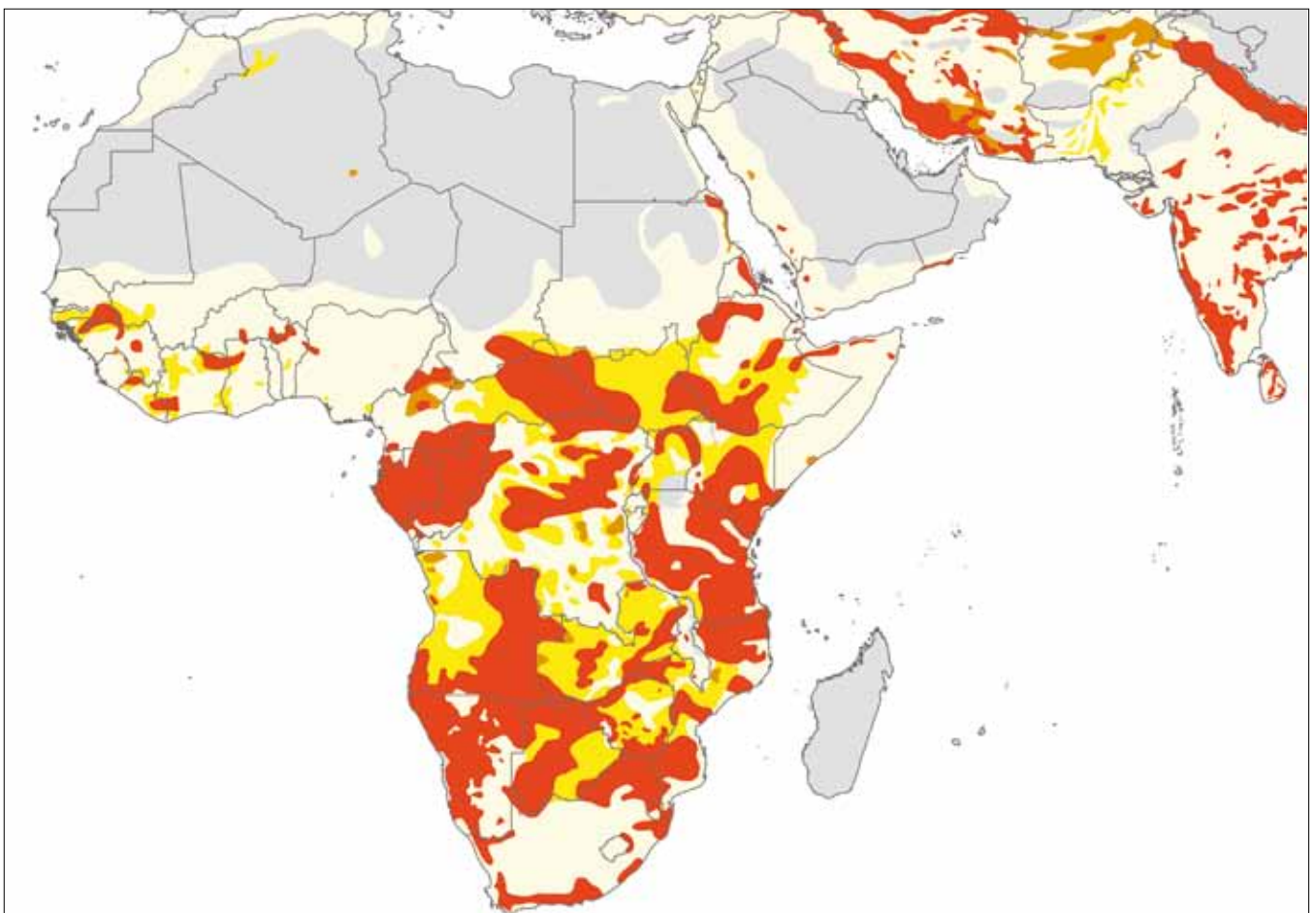
Although all populations on the African continent consist of the same subspecies, we divide the African range into four separate regions. We use the same distinction made for the well-established

Regional Conservation Strategies for the lion (IUCN SSC Cat Specialist Group 2006a, b), and cheetah & wild dog (IUCN SSC 2007, 2015): West, Central, East and southern Africa (Table 2.3.1, Fig. 2.3.2). In North Africa, the leopard is extinct in Mauretania, Morocco and Tunisia, and the populations in Algeria and Egypt are doubtful or very small (Stein et al. 2016). For the purpose of this report, we integrated these countries, where the leopard remains in very small numbers or was historically present, into East Africa (Egypt) and West Africa (Algeria, Mauritania, Morocco, Tunisia).

### Transboundary (meta-) populations

Many important leopard populations are transboundary and have the form of metapopulations. Individuals are cyclically and predictably crossing one or more national jurisdictional boundaries (CMS 2017; Table 2.3.2), and dispersing subadult animals, which are important for maintaining the demographic and genetic integrity of the populations, need to be able to cross international borders.

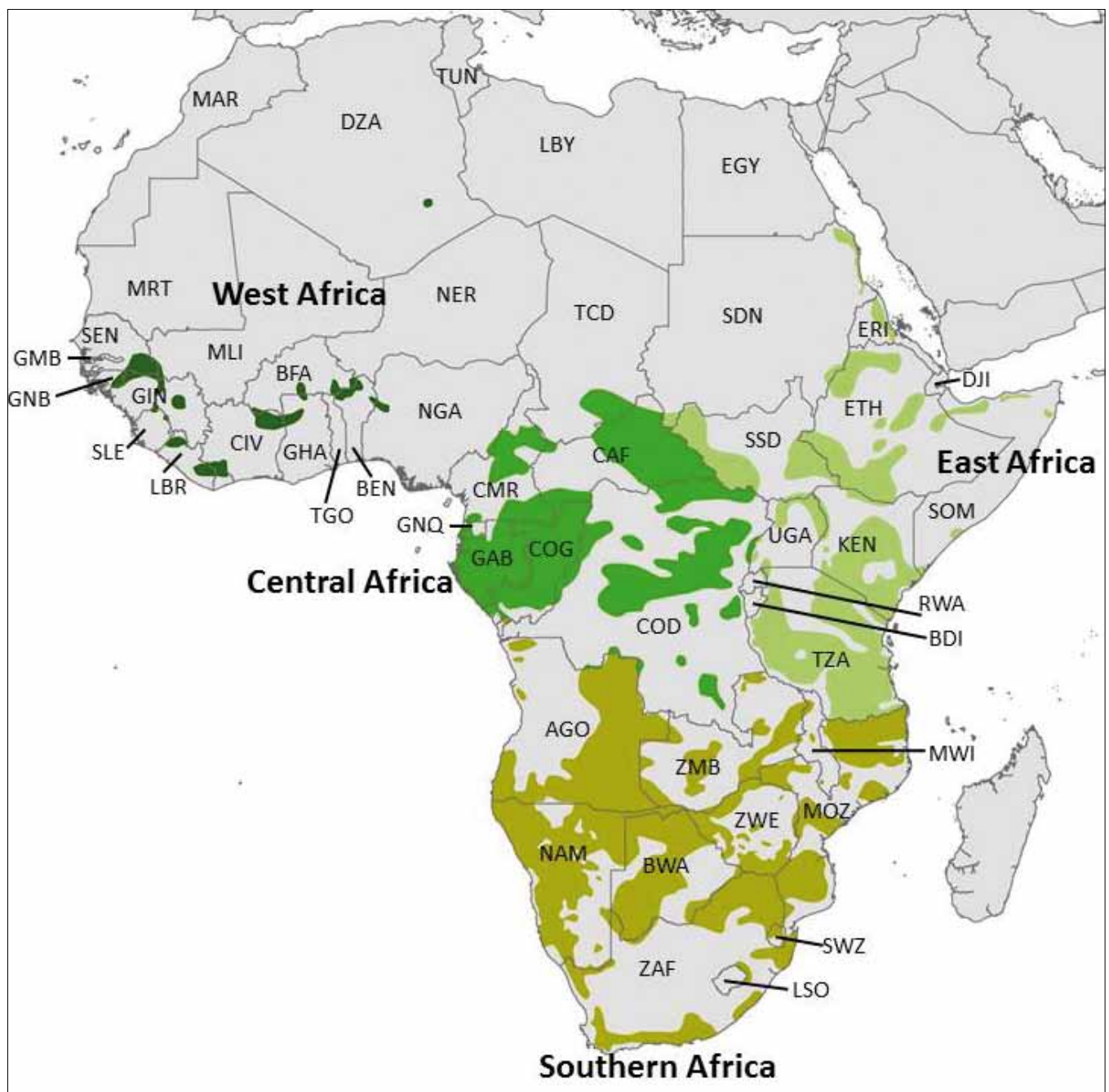
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**Fig. 2.3.1.** Leopard distribution. Red = extant, orange = possibly extant, dark yellow = possibly extinct, light yellow = historical, extinct (Appendix II; Jacobson et al. 2016). According to Gebretensae (2018), Ethiopian Wildlife Conservation Authority, the range indicated as possibly extinct in Ethiopia should, based on confirmed leopard records, be extant range.

**Table 2.3.1.** Proposed conservation regions for Africa and countries included in each conservation region.

Conservation region	Countries included
West Africa	Algeria, Benin, Burkina Faso, Cote d'Ivoire, Gambia, Ghana, Guinea, Guinea-Bissau, Liberia, Mali, Mauritania, Morocco, Niger, Nigeria, Senegal, Sierra Leone, Togo, Tunisia
Central Africa	Cameroon, Central African Republic, Chad, Republic of the Congo, Democratic Republic of the Congo, Equatorial Guinea, Gabon, Nigeria
East Africa	Burundi, Djibouti, Egypt, Eritrea, Ethiopia, Kenya, Rwanda, Somalia, South Sudan, Sudan, Tanzania, Uganda
Southern Africa	Angola, Botswana, Lesotho, Malawi, Mozambique, Namibia, South Africa, Eswatini (Swaziland), Zambia, Zimbabwe

**Fig. 2.3.2.** Proposed conservation regions for Africa. Extant and possibly extant leopard range (Jacobson et al. 2016; Fig. 2.1.1) combined. According Gebretensae (2018), Ethiopian Wildlife Conservation Authority, the extant range of the leopard is larger than indicated by Jacobson et al. 2016 (see caption Fig. 2.3.1).

**Table 2.3.2.** Transboundary leopard (meta) populations, countries sharing the transboundary leopard populations (CMS 2017) and patch name(s) according to Jacobson et al. (2016).

Countries	Patch names
Guinea/Guinea-Bissau/Mali/Senegal	Nikolo Koba and Guinea
Liberia/Sierra Leone	Foya, Gola and forests, northern Liberia
Ivory Coast/Liberia	Tai forest
Burkina Faso/Ivory Coast/Ghana	Comoe and Mole
Ghana/Burkina Faso	northern Ghana and southern Burkina Faso; Kabore-Tambi
Benin/Burkina Faso/Niger	W-Arly-Pendjari
Benin/Nigeria	Kainji and Trois Rivières
Cameroon/Nigeria/Chad	Benoue ecosystem
Cameroon/Equatorial Guinea	Camp Ma'an
Angola/CAR/Cameroon/DRC/Congo/Gabon/Equatorial Guinea	West Congo Basin
CAR/DRC/Sudan/South Sudan/Chad	Eastern Central African Republic
Egypt/Sudan	Red Sea coast
Ethiopia/Sudan	northern Ethiopia
Djibouti/Eritrea/Ethiopia	Mousa Ali Mountains
Ethiopia/Kenya/South Sudan	Boma-Gambella, southern Ethiopia
Ethiopia/Somalia	Gaan Libaax and eastern Ethiopia
Kenya/South Sudan/Uganda	northern and eastern Uganda
DRC/Uganda	greater Virunga
Rwanda/Tanzania/Uganda	Akagera, Rumanyika and Lake Mburo
Burundi/Rwanda	Nyungwe
Kenya/Mozambique/Somalia/Tanzania	Kenya, Tanzania, northern Mozambique
Angola/Botswana/DRC/Mozambique/Malawi/Namibia/South Africa/ Zambia/Zimbabwe	central Southern Africa & coastal Namib
Mozambique/Zimbabwe	Marromeu and central Mozambique
Botswana/Zimbabwe	Matopos and south-western Zimbabwe
Botswana/Mozambique/South Africa/Eswatini (Swaziland)/Zimbabwe	Kruger and eastern Southern Africa
Lesotho/South Africa	Drakensberg Mountains



## 2.4 Leopard population status, estimations and trends per conservation region

The last Africa-wide leopard population estimate dates back to a model from 1988, developed by Martin & de Meulenaer (1988), who estimated 714,000 leopards across the whole of Africa. However, this estimate was subsequently challenged by several researchers to be too simplistic and a high overestimation (Jackson 1989, Norton 1990, Jenny 1996, Nowell & Jackson 1996, Henschel 2008, Balme et al. 2010b). In fact, “few reliable data on changes in the leopard status throughout Africa exists although there is compelling evidence that subpopulations have likely declined considerably” (Stein et al. 2016).

### West Africa

The extant range of the leopard in West Africa was estimated at 196,000 km<sup>2</sup> (Jacobson et al. 2016, Table 2.4.1). The leopard has become very rare throughout West Africa mainly due to a lack of prey (i.e. due to bushmeat trade) and retaliation killing due to livestock predation. The species lost 86–95% of its historic range in West Africa (without Algeria, Mauritania, Morocco and Tunisia; Jacobson et al. 2016). It has completely disappeared from parts of the Western Sahel and from most of the West African coastal belt. Leopards are now restricted to a few PAs from Senegal (confirmed records in Niokola-Koba NP) in the west to western Nigeria in the east. Leopards also still persist at low densities in W-Arly-Pendjari Complex, a network of Protected Areas (PAs) expanding through Burkina Faso, Benin and Niger. It is unlikely that resident leopard populations exist outside PAs (Jacobson et al. 2016).

The presence of the leopard in Algeria is uncertain (Stein et al. 2016). The last leopard record – a genetically identified scat sample – is from the Ahaggar Massif in 2005, but more survey effort is needed to confirm the presence of the species. The leopard may also persist in the western Saharan Atlas Mountains extending into Morocco. An unconfirmed report from 2007 comes from near Figuig, Morocco (Jacobson et al. 2016).

### Central Africa

Leopards are considered extant in all countries in this conservation region (Table 2.4.1). The extant leopard range in Central

Africa was estimated at 1,801,100 km<sup>2</sup> (Jacobson et al. 2016<sup>1</sup>). Leopards are still widely distributed across this region, but with large expanses where the species is absent or unconfirmed. The species has lost 45–66% of its historic range across Central Africa (incl. Sudan and South Sudan; Jacobson et al. 2016). Leopard range was highly reduced in areas of increased human influence and easily accessible areas prone to illegal hunting and bushmeat trade (Jacobson et al. 2016). Close to human areas, large wildlife species are virtually gone due to heavy hunting pressure (P. Henschel, pers. comm.).

### East Africa

Leopards are considered extant in all countries in this conservation region (Table 2.4.1). The extant leopard range in East Africa was estimated at 1,743,700 km<sup>2</sup> (Jacobson et al. 2016<sup>2</sup>). The species lost 45–60% of its historic range in East Africa (without, South Sudan and Sudan; Jacobson et al. 2016). Leopard distribution has been notably reduced in Somalia, Kenya, Ethiopia and central Tanzania (Jacobson et al. 2016).

### Southern Africa

The extant leopard range in Southern Africa was estimated at 2,872,200 km<sup>2</sup> (Jacobson et al. 2016, Table 2.4.1). Nonetheless “also in southern Africa, the so called stronghold of the leopard there is no evidence that leopard populations have remained stable” (Stein et al. 2016). The species lost 28–51% of its historic range in southern Africa (Jacobson et al. 2016). However in the south and south-east of Namibia, presence records captured recently have shown a distribution throughout these areas beyond the distribution indicated by Stein et al. (2016; Richmond-Coggan 2019). Leopards are considered to be declining in Angola, Zambia, Zimbabwe, South Africa and Mozambique with leopards disappearing from areas of increased human development and areas of intensive human-leopard conflict. However, these countries are thought to have healthy populations outside of human-dominated areas (Jacobson et al. 2016). In Namibia, the majority of the population resides in private farmland where increases in leopard densities have occurred (Richmond-Coggan 2019).

<sup>1</sup> This regional total is different from the one given in Jacobson et al. (2016) due to slight differences in the distinction of regions: extant ranges for South Sudan and Sudan given by Jacobson et al. (2016) were subtracted.

<sup>2</sup> This regional total is different from the one given in Jacobson et al. (2016) due to slight differences in the distinction of regions: extant ranges for Egypt, South Sudan and Sudan given by Jacobson et al. (2016) were added.

**Table 2.4.1.** Information on the status of the leopard per range country. For each leopard range country the amount of extant range, percentage of extant range covered by Protected Areas (PAs), country wide population estimates (pop. est.), status of the leopard as described in Jacobson et al. (2016) and Stein et al. (2016), national Red List status, the presence code used by the IUCN Red List according to Stein et al. (2016)\*, if the country is party of the Convention on the Conservation of Migratory Species of Wild Animals (CMS) or the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) and if there is a National Action Plan (NAP) for the leopard in place, is displayed.

Country	Extant range km <sup>2</sup>	PA cov. %	Status <sup>1</sup> and Pop. est. [national Red List status]	IUCN Pres. Code <sup>2</sup>	CMS	CITES	NAP
<b>West Africa</b>							
DZA	3,600 <sup>3</sup>	0	Presence uncertain	Pres. uncer.	Yes	Yes	No
BEN	16,300	31	Rare	Extant	Yes	Yes	No
BFA	19,000	45	Absent from large parts	Extant	Yes	Yes	No
GMB	800 <sup>4</sup>	2.6	Possibly only small fragmented populations	Poss. extinct	Yes	Yes	No
GHA	14,700	28	Absent from large parts	Extant	Yes	Yes	No
GIN	28,700	3.1	Absent from large parts	Extant	Yes	Yes	Yes <sup>5</sup>
GNB	7,000	0	Rare	Extant	Yes	Yes	No
LBR	23,000	4.3		Extant	Yes	Yes	No
MLI	6,000	0	Nearly extinct	Extant	Yes	Yes	No
MRT				Extinct	Yes	Yes	No
MAR	3,000			Extinct	Yes	Yes	No
NER	500	99.5	Nearly extinct	Extant	Yes	Yes	No
NGA	11,500	68.4		Extant	Yes	Yes	No
SEN	29,400	25.2	Absent from large parts	Extant	Yes	Yes	No
SLE	500	63	Absent from large parts	Extant	No	Yes	No
TUN				Extinct	Yes	Yes	No
TGO	300	0		Extinct	Yes	Yes	No
<b>Central Africa</b>							
CMR	132,700	21.9	Distribution reduced and fragmented	Extant	Yes	Yes	No
CAF	369,200	19.2	Possibly present in 85%	Extant	No	Yes	No
TCO	68,700	39.3	Presence and status largely unknown	Extant	Yes	Yes	No
COG	310,000	11.7	Likely widespread	Extant	Yes	Yes	No
COD	657,600	15.6	Likely widespread, extinct or poss. extinct in large parts	Extant	Yes	Yes	No
GNQ	12,800	22	Absent from almost half of the country	Extant	Yes	Yes	No
GAB	250,000	13.3	Likely still widely distributed	Extant	Yes	Yes	No
CIV	39,200	41.5	Poss. only persist in PAs	Extant	Yes	Yes	No
<b>East Africa</b>							
BDI	900 <sup>3</sup>	54.9		Extant	Yes	Yes	No
DJI	1,600	0	Poss. present in small isolated areas	Extant	Yes	Yes	No
EGY	5,800	0	Maybe only small population left	Extant	Yes	Yes	No
ERI	22,600	7.7	Possibly still persist in a few areas	Extant	Yes	Yes	No
ETH	346,900	10.2	Few records [LC]	Extant	Yes	Yes	No
KEN	312,900	12.6	Present only in the south and centre of the country [EN]	Extant	Yes	Yes	No
RWA	2,200	41.4	Poss. extinct across the majority	Extant	Yes	Yes	No
SOM	33,700	0	Status unclear	Extant	Yes	Yes	No



Country	Extant range km <sup>2</sup>	PA cov. %	Status <sup>1</sup> and Pop. est. [national Red List status]	IUCN Pres. Code <sup>2</sup>	CMS	CITES	NAP
SSD	249,800	18.8	Poss. extinct across most of the country	Extant	No	Yes	No
SDN	31,000	25.7	Largely absent from the country	Extant	No	Yes	No
TZA	672,100	23.9	Extant across the majority of the country 19,673 <sup>6</sup>	Extant	Yes	Yes	Yes <sup>7</sup>
UGA	65,100	27.3	Extinct or possibly extinct in large parts [VU] 150–200 <sup>8</sup>	Extant	Yes	Yes	Yes <sup>9</sup>
<b>Southern Africa</b>							
AGO	678,600	8.9	Widespread but not abundant <sup>10</sup>	Extant	Yes	Yes	No
BWA	367,200	29.3	Widely distributed, continuous pop. in north and west 4,404–6,830 <sup>11</sup>	Extant	No	Yes	No
SWZ	10,100	4.5	Suspected to be transient indiv. [VU]	Extant	Yes	Yes	No
LSO	100	1.1	[VU]	Poss. extinct	No	Yes	No
MWI	11,100	69.7	Largely absent	Extant	No	Yes	No
MOZ	457,000	14.6	28,608 <sup>12</sup> min. 6,400 <sup>12</sup>  Widespread also outside of PAs <sup>13</sup>	Extant	Yes	Yes	No
NAM	568,900	18.8	5,469–10,610 <sup>14</sup> 13,356–22,706 <sup>13</sup> 11,733 <sup>15</sup>	Extant	No	Yes	No
ZAF	401,300	8.4	In many PAs, absent from large parts [VU] 2,185–6,750 <sup>16</sup> 2,813–23,400 <sup>17</sup>	Extant	Yes	Yes	No
ZMB	218,000	24.1	Extinct or possibly extinct in large parts 2,000–4,000 <sup>18</sup>	Extant	No	Yes	No
ZME	160,000	16.7	Mainly occurring in PAs	Extant	Yes	Yes	No

<sup>\*</sup>See Appendix II

<sup>1</sup>Jacobson et al. 2016 and Stein et al. 2016

<sup>2</sup>Stein et al. 2016

<sup>3</sup>Possibly extant range

<sup>4</sup>Possibly extinct

<sup>5</sup>Conservation strategy for large carnivores (including the leopard; DNDBAP no date)

<sup>6</sup>[Annex 4](#) AC30 Doc. 15, CITES 2018a

<sup>7</sup>TAWIRI 2009

<sup>8</sup>UWA 2012

<sup>9</sup>Strategic Action Plan for large carnivore conservation in Uganda (including the leopard; UWA 2012)

<sup>10</sup>MINUA 2006

<sup>11</sup>Jacobson et al. 2016

<sup>12</sup>[Annex 1](#) AC30 Doc. 15, CITES 2018a

<sup>13</sup>Stein et al. 2012

<sup>14</sup>Hanssen & Stander 2004

<sup>15</sup>Richmond-Coggan 2019

<sup>16</sup>Daly et al. 2005 (in 10 core areas)

<sup>17</sup>[Annex 3](#) AC30 Doc. 15, CITES 2018a

<sup>18</sup>[Annex 6](#) AC30 Doc. 15, CITES 2018a

## 2.5 CITES export quotas and trophy hunting

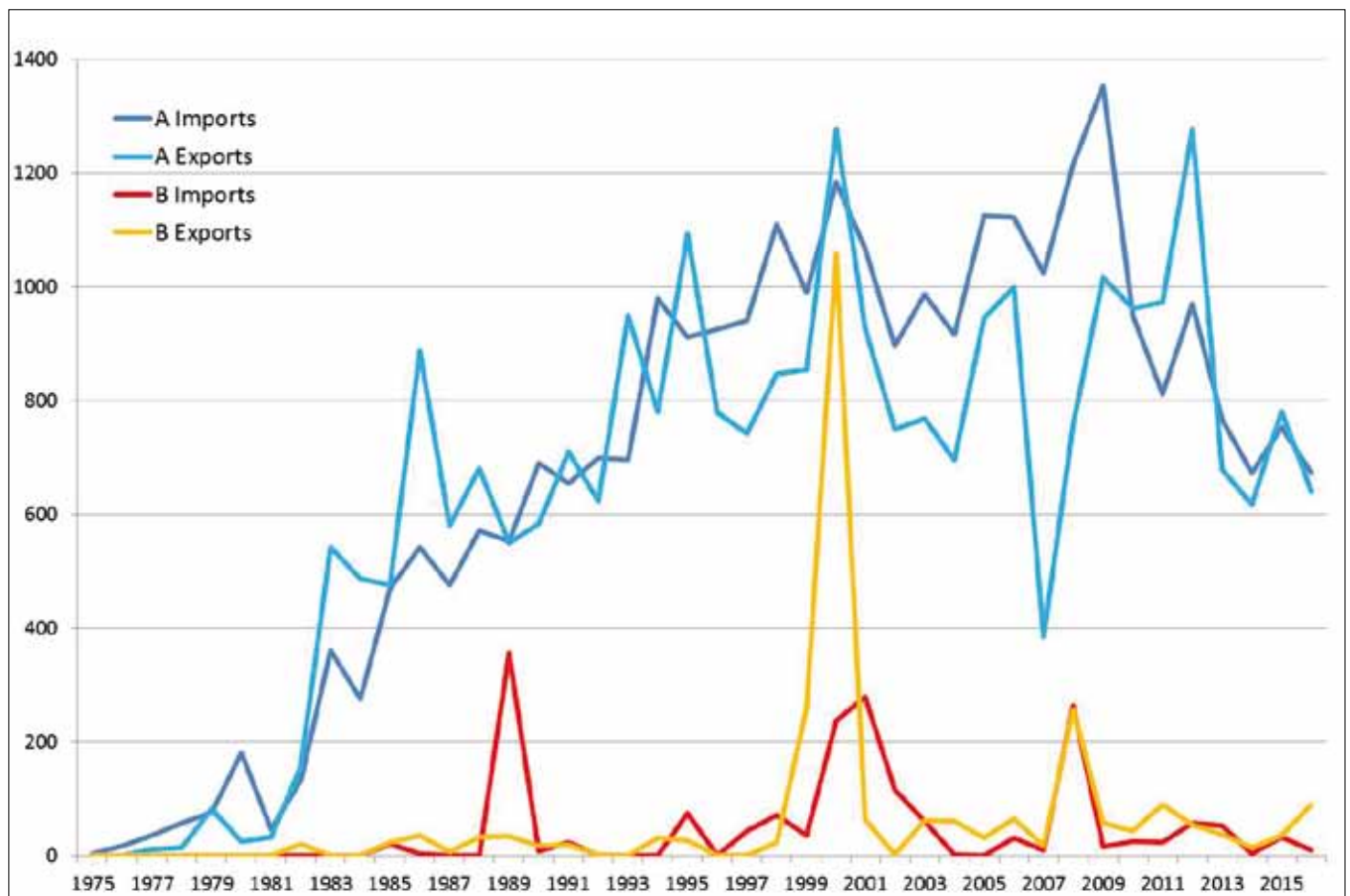
'Non-consumptive use' of leopards is e.g. wildlife viewing. Legal 'consumptive use' takes place through (trophy) hunting and permitted killing of damage-causing leopards, illegal through poaching for the wildlife trade or retaliation killing. There is very little information available on the (legal) consumptive use of leopards other than trophy hunting. The leopard is included in the provisional list of animal species used in traditional medicine compiled by the CITES Animal Committee (CITES 2002a). Skins, flesh, bones, fat and hearts of leopards are used for medicinal (or ceremonial) purposes (CITES 2002a). In some countries, the meat of the leopard is consumed (Olupot et al. 2009). The by far largest use of leopard skins for ceremonial purpose is known from the Nazareth Baptist Shembe Church in southern Africa (Balme et al. 2013b, Lindsey et al. 2015; Chapter 3).

Figure 2.5.1 shows trade in leopard items (reported imports and exports in the CITES Trade Database) from the countries with CITES export quotas (see below). In Figure 2.5.1, we grouped bodies, live animals, skins, skulls and trophies into category A,

for which one leopard can only provide one item per term. Category B consists of bones, claws and teeth, for which one leopard may provide several items per term. Reported trade for Category A items generally increased from 1975 to about 2010 with some fluctuations and appear to have decreased since then. Imports and exports for category B (bones, claws and teeth) have generally been very low but with some significant peaks in certain years (Fig. 2.5.1).

### Trophy hunting

In the following we refer to trophy hunting (also known as (tourist) safari hunting or sport hunting) as defined by the IUCN: "Trophy hunting generally involves the payment of a fee by a foreign or local hunter for a hunting experience, usually guided, for one or more individuals of a particular species with specific desired characteristics (such as large size or antlers). The trophy is usually retained by the hunter and taken home" (IUCN 2016).



**Fig. 2.5.1.** Reported leopard trade from 1975–2016 for the countries with CITES export quotas in CITES Resolution Conf. 10.14 (Rev. CoP16; CITES 2013) according to the CITES Trade Database. Category A includes bodies, live animals, skins, skulls and trophies. Category B includes bones, claws and teeth. Light blue: exports for category A from the countries with CITES export quotas as reported by those countries. Dark blue: imports for category A from the countries with CITES export quotas as reported by all member Parties to CITES. Orange: exports for category B from the countries with CITES export quotas as reported by those countries. Red: imports for category B from the countries with CITES export quotas as reported by all member parties to CITES (CITES 2019a).

Since 1975, the leopard has been included in CITES Appendix I (CITES 2012). In 1983, at the 4<sup>th</sup> CITES Conference of the Parties, the first of a series of resolutions with regard to leopard skin trade was adopted (CITES 1985a). Further CITES resolutions regarding leopard skin trade followed after Resolution Conf. 4.13 (CITES 1985b, 1989a, 1989b, 1992a, 1997, 2002b, 2004a, 2007a, 2012, Table 2.5.1). Current quotas for leopard hunting trophies and skins for personal use are specified in CITES Resolution Conf. 10.14 (Rev. CoP16; CITES 2013; Table 2.5.1). According to the Resolutions of the Conference of the Parties of CITES, a CITES leopard export quota is allocated to Botswana, the Central African Republic, Ethiopia, Kenya, Malawi, Mozambique, Namibia, South Africa, Tanzania, Uganda (only problem animals), Zambia and Zimbabwe (Table 2.5.1; Braczkowski et al. 2015). Hunting of leopards is prohibited or restricted to problem animals in Angola, Algeria, Benin, Burkina Faso, Republic of the Congo, Côte d'Ivoire, Democratic Republic of Congo, Djibouti, Equatorial Guinea, Gabon, Ghana, Guinea Bissau, Liberia, Mali, Mauritania, Morocco, Niger, Nigeria, Rwanda, Senegal, Sierra Leone, Somalia, South Sudan, Togo and Uganda. Although not listed in any Resolution of the Conference of the Parties of CITES, according to the CITES Website (CITES 2019b), the Democratic Republic of the Congo has also a CITES leopard export quota of 5 and Gabon had a quota of 5 from 2003–2008. From 1983–2013, the leopard quota of several countries was increased and the number of countries granted a CITES leopard export quota rose from 7 to 12.

### CITES export quotas

In 2016 at CoP17, it was decided that Parties which have quotas established under Resolution Conf. 10.14 (Rev. CoP16; CITES 2013) on quotas for leopard hunting trophies and skins for personal use shall “review these quotas, and consider whether these quotas are still set at levels which are non-detrimental to the survival of the species in the wild, and to share the outcomes of the review and the basis for the determination that the quota is not detrimental, with the Animals Committee at its 30<sup>th</sup> meeting” ([CITES CoP Decision 17.114](#)). Subsequently, Mozambique, Namibia, South Africa, Tanzania, Zambia and Zimbabwe submitted a non-detriment finding report (NDF) to the Animals Committee’s 30<sup>th</sup> meeting in July 2018 (CITES 2018a). At the CITES AC30 meeting in July 2018, Malawi and Kenya have expressed the wish for their CITES quotas to be removed from Resolution Conf. 10.14 (Rev. CoP16; CITES 2018b). At the CITES CoP18, it was decided that the remaining Parties which have quotas established under Resolution Conf. 10.14 (Rev. CoP16) and which have not yet submitted a NDF report, shall do so to the 31<sup>st</sup> meeting of the Animals Committee ([Annex 3](#) CoP18 Doc. 46, CITES 2019c). Moreover, in Resolution Conf. 9.21 (Rev. CoP18) it was added that quotas for species listed in CITES Appendix I – such as the leopard – had to be reviewed at least every 9 years (CITES 2019d).

Some countries with CITES export quotas had or have a ban on leopard hunting (Table 2.5.2). South Africa set its leopard quota

**Table 2.5.1.** Overview over Resolutions of the Conference of the Parties in regard to leopard export quota allocation to member Parties to CITES (CITES 1985a, 1985b, 1989a, 1989b, 1992a, 1992b, 1994, 1997, 2002b, 2004a, 2007a, 2013). NDF = submitted an NDF report to AC30 in accordance with [CITES CoP Decision 17.114](#).

	<b>Conf. 4.13 CoP 4 (1983)</b>	<b>Conf. 5.13 CoP 5 (1985)</b>	<b>Conf. 6.9 CoP 6 (1987)</b>	<b>Conf. 7.7 CoP 7 (1989)</b>	<b>Conf. 8.10 CoP 8 (1992)</b>	<b>Conf. 8.10 (Rev.) CoP 9 (1994)</b>	<b>Conf. 10.14 (Rev.) CoP 12 (2002)</b>	<b>Conf. 10.14 (Rev.) CoP 13 (2004)</b>	<b>Conf. 10.14 (Rev.) CoP 14 (2007)</b>	<b>Conf. 10.14 (Rev.) CoP 16 (2013)</b>	<b>NDF</b>
BWA	80	80	80	100	100	130	130	130	130	130	No
CAF			40	40	40	40	40	40	40	40	No
ETH			500	500	500	500	500	500	500	500	No
KEN	80	80	80	80	80	80	80	80	80	80	No <sup>1</sup>
MWI	20	20	20	20	50	50	50	50	50	50	No <sup>1</sup>
MOZ	60	60	60	60	60	60	60	60	120	120	Yes
NAM					100	100	100	250	250	250	Yes
ZAF				50	75	75	75	150	150	150	Yes
UGA									28	28	No
TZA	60	250	250	250	250	250	500	500	500	500	Yes
ZMB	80	300	300	300	300	300	300	300	300	300	Yes
ZWE	80	350	500	500	500	500	500	500	500	500	Yes

<sup>1</sup> At the CITES AC30 meeting in July 2018, Malawi and Kenya have expressed the wish for their CITES quotas to be removed from Resolution Conf. 10.14 (Rev. CoP16; CITES 2018b).

**Table 2.5.2.** Countries with CITES export quotas where trophy hunting of leopards is/was banned by the national governments and duration of the ban.

Country	Start/Duration	Reference
Botswana	2013–2019 <sup>1</sup>	Republic of Botswana 2012, Botswana Government 2019
Kenya	1977, ongoing	Republic of Kenya 2013
Malawi	?	Waterland et al. 2015
Namibia	2010 <sup>2</sup>	Stein et al. 2016
South Africa	2016–2017	<a href="#">Annex 3</a> AC30 Doc. 15, CITES 2018a
Tanzania	1973–1978	CITES 1985a
Zambia	2013–2015	Stein et al. 2016

<sup>1</sup>Moratorium only valid on public land.

<sup>2</sup>Already in 2009, Namibia issued no permits for leopard trophy hunting, but a formal one-year-moratorium was put in place in 2010.

to 0 in 2016 and 2017 allowing again the hunting of 7 leopards in 2018 ([Annex 3](#) AC30 Doc. 15, CTES 2018a).

Under CITES, the provision of benefits for conservation is not a prerequisite for the allocation of export quotas or for trophy hunting in general. However, some importing countries established specific conditions and have restricted import in the past if these demands were not met. For example, the U.S.A. had suspended the import of lion trophies from Tanzania from 2014–2019 due to insufficient information on the status and management to show that hunting enhances the survival of the species. Such import suspensions with their accompanying negative effects due to the (temporary) loss of a market and income for leopard should be pre-empted by ensuring and documenting a positive conservation impact from trophy hunting.

The leopard is a key species for the trophy hunting industry (Lindsey 2008, Brackowski et al. 2015). The monetary value of leopard trophies exported for personal purposes and hunting trophies from 2006–2010 was estimated at USD 845,400 (UNEP-WCMC 2013). In addition to direct fees, trophy hunting generates revenue from daily rates (e.g. for accommodation and staff), travel and safari expenditure, taxidermy, observer rates (e.g. accommodation for non-hunters accompanying their partners) and gratuities (de Beer 2009).

Revenue from trophy hunting and the maintenance and protection of range under a wildlife-based land use, can positively affect wildlife populations, including non-hunted species (Balme et al. 2010b, IUCN SSC 2012a, Cooney et al. 2017). Moreover, local social and economic benefits from the use of a species (e.g. through trophy hunting) can provide incentives for local people to conserve them and their habitats and especially be an important part of community-based conservation (IUCN SSC 2012a). If revenues go to local communities, they also positively enhance the local human livelihoods and likely lead to a higher tolerance of predators by local communities. Generally, the generation of substantial revenue from trophy hunting can be invested in conservation activities, and in areas where ecotourism is not economically viable, sustainable hunting can create

important incentives for biodiversity conservation (Di Minin et al. 2015). Namibia is such a case where trophy hunting has generally been shown to directly benefit wildlife conservation (G. Balme, pers. comm.), because the revenue from trophy hunting has encouraged local communities to participate in conservation. This led to an increase in the abundance of wildlife species and to an increase in the total land area under community protection through conservancies (Lindsey et al. 2007, Di Minin et al. 2015). To deliver such benefits in the long term, all harvest must be sustainable.

Sustainable hunting of large carnivores is generally a challenge because (1) such species live at low densities (compared to other game species) and viable populations require very large spaces, and (2) the characteristic land tenure and social system of large cats entails that the recruitment is sensitive to changes in the population structure. This is especially the case if a population is low, e.g. due to reduced prey availability, which is the case for several leopard populations. Where trophy hunting is poorly managed, it can have negative impacts on the viability of the population through altered age/sex structures, social disruption, deleterious genetic effects (IUCN SSC 2012a). There were a number of concerns raised with regard to the impact of trophy hunting on leopard populations (e.g. Balme et al. 2010b, Pitman 2012, Brackowski et al. 2015). Inadequate trophy hunting can reduce the genetic diversity by targeting always the fittest (e.g. the largest) individuals (Balme et al. 2010b, Brackowski et al. 2015). Moreover, if not well managed, hunting can impact demographic patterns and the social organisation of leopard populations (Balme et al. 2010b, Pitman 2012, Kerth et al. 2013, Stein et al. 2016). Repeated removal of resident male leopards can lead to a high turnover of males and result in increased infanticide (Balme et al. 2009, Packer et al. 2009, Balme 2010, Strampelli 2015).

Thus, generally, to be beneficial to conservation, trophy hunting needs to be long-term sustainable, hence non-detrimental to the population. This requires a science-informed management and economic benefits to local communities as a compensation for the costs for living alongside large carnivores (Leader-Wil-

liams & Hutton 2005, Balme et al. 2010b, Chase-Grey 2011, IUCN SSC 2012a).

### Non-detriment finding reports

In Resolution Conf. 14.7 (Rev. CoP15) on Management of nationally established quotas, the CITES Parties agreed that exports of species should be maintained at a level that has no detrimental effects on the population of the species. As in the “Guidelines for the Conservation of Lions in Africa” (CITES 2019e), we interpret this here as “needing to ensure not only that the population survives, but also that leopard numbers are maintained at a level where they are ecologically effective within the ecosystem concerned. With any hunting, there is of course detriment to the individual concerned, but our detriment consideration is aimed specifically at the population level, to ensure that hunting does not negatively impact conservation”.

Leopard export quotas under CITES were discussed in a Working Group at the 30<sup>th</sup> meeting of the CITES Animals Committee (Geneva, 16–21 July 2018; see [Executive Summary from Monday 16 July 2018 \(Rev.1\)](#), Point 15), and again at the 70<sup>th</sup> CITES Standing Committee meeting (Sochi, 1–5 October 2018). The non-detriment finding (NDF) reports submitted by the Parties (see [CoP17 Decision 17.114](#)) revealed that most countries today issue a number of leopard licenses per year that is considerably lower than the export quota, taking into consideration the presently unfavourable conservation status of many leopard populations. In Namibia, between 2004 and 2017 an average 142 leopards were hunted, corresponding to 56% annual quota uptake ([Annex 2](#) AC30 Doc. 15, CITES 2018a). In Mozambique, from 2011–2017 safari hunting offtakes were around 40–50% of the quota allocated by the Government of Mozambique (which varied between 106–117 per year; [Annex 1](#) AC30 Doc. 15, CITES 2018a). In South Africa, from 2005–2016, 73 leopard trophies were exported on

average per year. The Scientific Authority recommended a quota of 7 male leopards seven years or older for 2018 ([Annex 3](#) AC30 Doc. 15, CITES 2018a). In Ethiopia, about 5 leopards are hunted per year (CITES 2018e). In Tanzania, 162 leopards were harvested on average per year, corresponding to 32.4% of the national quota ([Annex 4](#) AC30 Doc. 15, CITES 2018a). In Zimbabwe from 2010–2017, the off-take of leopards varied between 133 and 186 animals per year ([Annex 6](#) AC30 Doc. 15, CITES 2018a).

Currently, there is no defined standardised form for an NDF report. Nonetheless, there were recurring sections and elements present in (almost) all NDF reports submitted in response to CITES CoP17 Decision 17.114 (Table 2.5.3).

In the International expert workshop on non-detriment findings for hunting trophies of certain African species included in CITES Appendices I and II, 26–29 April 2018, Seville, Spain (CITES 2018c), the leopard working group concluded that:

- NDFs should be considered at a national scale;
- Reliable leopard population size estimates are not feasible at a national scale;
- Adaptive management should be informed by estimates of population trend;
- The development of a robust monitoring framework to reliably assess population trends at a national scale (combination of intensive & extensive monitoring) is needed;
- National management plans are needed;
- A standard quota of 1–3 leopards/1,000 km<sup>2</sup> is inappropriate; and
- Hunting of older males should be encouraged.

No consensus between the experts was reached with regard to the implementation of a minimum 7 year threshold and the linkage of damage-causing-animal control and hunting (CITES 2018c).

**Table 2.5.3.** Suggested common elements of NDFs for leopard based on reports submitted to CITES under CoP17 Decision 17.114.

Section	Elements
Status & monitoring	Monitoring system Distribution, abundance, trend, assessment of data quality
Threats	Most important threats in the country & known additional mortalities (e.g. from illegal killings, Problem Animal Control...)
Legislative Tool	Relevant national laws
Management Tools	Existence and content of Management Plans
Sustainable hunting quotas	System of quota distribution & harvest restrictions
Monitoring of trophy hunting	Surveillance of compliance to quota and harvest restrictions
Benefits & Incentives	Compare with IUCN SSC Guiding principles on trophy hunting as a Tool for Creating Conservation Incentives
Conclusion	Justification of suggested quota (not justification of current off-take!)

<sup>1</sup>In accordance with current CITES policies on NDFs: “Parties seeking to establish or amend such a quota for a species included in Appendix 1 are required to present supporting information including details of the scientific basis for the proposed quota [...]” (CITES 2019f).

## 2.6 IUCN Red List Assessment of *Panthera pardus*

The leopard has a very wide geographical range with several distinct subspecies and is therefore difficult to assess as a single species at global scale. Knowledge of the leopard's status is still extremely limited at regional and national scales and surveys – if available – were done under diverging approaches and at different periods. A global assessment accordingly incorporates often information over several decades. Only few reliable data on leopard population trends are available and no recent population estimate over its whole range exists (Stein et al. 2016). The characteristic elusiveness of leopards makes them difficult to survey, but modern monitoring methods, especially camera trapping, have recently shed light on the population trend of leopard populations. The current range-wide population trend is assessed to be decreasing (Stein et al. 2016; Chapter 2.4). Based on high inferred and suspected levels of leopard population declines of over 30% over large parts of its range in the last three generations, the leopard was globally up-listed from Near Threatened (2008) to Vulnerable in 2016

under Criterion A2cd in the IUCN Red List (Henschel et al. 2008, Stein et al. 2016). The population decline is based on habitat loss, prey decrease and actual and potential levels of exploitation. The negative trend is thought to go on in the future unless appropriate conservation measures are taken (Stein et al. 2016).

Numbers of sub-Saharan leopards are declining within large portions of their range, particularly outside of Protected Areas (PAs; Stein et al. 2016). Widespread habitat loss (21% in sub-Saharan Africa in 25 years) and prey loss inside PAs (59% decline) is likely to have caused leopard declines of over 30% over the last three generation (22.3 years). Thus, the leopard subpopulations across Sub-Saharan Africa potentially qualify as Vulnerable (Stein et al. 2016).

In North Africa, the leopard is proposed as Critically Endangered, based on very small and declining numbers of mature individuals (Stein et al. 2016).



## 3 Threats, knowledge gaps and conservation challenges

Leopard populations have been reduced throughout most of their range in Africa with drastic reductions mainly across

West and Central parts of the continent (P. Henschel, pers. comm., Stein et al. 2016).

### 3.1 Threats

The major threats to leopards across Africa are anthropogenic in origin such as habitat loss and fragmentation, human-wildlife conflict, poaching, prey depletion, unsustainable trophy hunting, poaching for the wildlife trade and incidental snaring (Daly et al. 2005, Ray et al. 2005, Balme et al. 2009, 2013, Hunter & Barrett 2011, Packer et al. 2011, Boast 2014, Caro & Riggio 2014, Constant 2014, Strampelli 2015, Stein et al. 2016, Richmond-Coggan 2019). These threats have led to significant reductions and regional extirpations of leopards, especially in North, East and West Africa (Stein et al. 2016).

#### Habitat loss and fragmentation

Habitat loss and fragmentation are significant threats to leopards in East, West and Central Africa, and to a lesser extent in southern Africa (Pitman 2012, Stein et al. 2016). Although leopards are quite adaptable, they have limited levels of ecological resilience to human-caused habitat fragmentation and they need large contiguous habitats with low levels of negative human impact to reproduce successfully (Balme et al. 2010a). Subadult dispersal, including transboundary movements, is crucial for maintaining the genetic and demographic integrity of the entire (meta-) population (CMS 2017). Dispersal is not only important for the genetic fitness of a metapopulation or for an anthropogenically fragmented population, but also an important mechanism for recolonisation of lost areas. Such recolonisation also across international borders is a conservation priority for some regional metapopulations such as the whole of West Africa (CMS 2017). The free migration of leopards across international borders is a crucial factor for the recovery of various populations (CMS 2017).

Increasing habitat loss and fragmentation also negatively impact leopard prey. The consequences are increased conflicts between leopards and humans due to livestock predation, which results in more direct persecution of leopards (CITES 2007b).

#### Prey depletion

Development projects not only impact the leopard due to habitat loss and fragmentation, but have also negative consequences for its prey, especially wild ungulate populations (Stein et al. 2016). The leopard's persistence (in human-altered habitats) relies highly on the availability of prey (Jorge 2012). Prey depletion, due to overhunting and overgrazing by

livestock, is a major threat to leopards and can be an important driver of leopard population declines (Henschel 2008, Pitman 2012, Stein et al. 2016).

In Africa, natural prey species of the leopard (mainly medium sized ungulates) are widely hunted by humans for the bushmeat trade (Jorge 2012, Stein et al. 2016). There are indications that bushmeat is increasingly traded commercially in many areas due to the increased human population, leading to an increased demand for bushmeat, too (Lindsey et al. 2015). In several places in West and Central Africa the "empty forest syndrome" can be observed, where forest habitats are still intact, but prey species have been nearly wiped out by overhunting (Henschel 2008, Olupot et al. 2009, Hunter & Barrett 2011). In African rainforests, leopards seem to exhibit a strong functional and numerical response to competition with human hunters for prey as there is a high dietary overlap between them. Consequently, leopard populations are smaller or absent close to settlements where hunting pressure on prey is high (Henschel 2001, 2008, Willcox 2002). In the savannahs of Africa, important leopard prey is under threat from an unsustainable bushmeat trade leading to a collapse of prey populations (Lindsey et al. 2013a). The demand for bushmeat and other wildlife products in savannah Africa is expected to increase even more in the future (Lindsey et al. 2013a). Accordingly, the long-term solution for the problem of reduced prey availability for leopard will have to be a variety of measures at several levels.

#### Conflict

Human-leopard conflicts due to leopard predation on livestock (often as a consequence of wild prey reduction) and resulting retaliation killing are widespread across the continent. Persecution of leopards by humans has demographic consequences and poses a threat to the sustainability of populations (Swanepoel et al. 2014, 2015).

Retaliation killing due to livestock predation is considered a major threat to leopards in eastern and southern Africa and to a lesser extent in West and Central Africa. In several countries of Sub-Saharan Africa, where predators are considered a threat to life and property, the killing of predators in protection for life or property is legal and permits can even be obtained retroactively (Lemeris 2013, Boast 2014, Constant 2014, Stein et al. 2016, Richmond-Coggan 2019). However, many leopards killed due to livestock or game predation stay

unrecorded. For example in Namibia, 50% of landowners did not apply for a permit (Richmond-Coggan 2019). Generally, the extent of mortality due to persecution and conflict remains unknown (Stein et al. 2016).

Human-leopard conflict due to leopards preying on game animals is an issue in southern Africa (G. Balme pers. comm., Boast 2014). Especially in parts of South Africa, predation of leopards on game is one of the major causes of human-leopard conflict, and leopards were highly persecuted (Swanepoel 2008). In Namibia, both perceived and actual threat of livestock and game loss led to extensive leopard removals by landowners (Richmond-Coggan 2019). The conflict has increased even more when the ranching industry began breeding high-value game species or colour morphs (Thorn et al. 2013). In some regions, wildlife authorities grant permits to concerned landowners for the removal of confirmed damage-causing leopards, but the risk to eliminate non-problem leopards remains (Balme et al. 2009).

### Illegal snaring & killing for trade

Snaring is an unselective method; both predator and prey species are indiscriminately captured. This is also a direct threat to leopards as they occasionally get caught in snares set for other species, e.g. for bushmeat hunting (see above 'Prey depletion'). Besides accidental killing, leopards are also directly

poached for the wildlife trade as their skins are very popular and their bones are used as substitutes for tiger parts in Traditional Chinese Medicine (EIA 2018, Raza et al. 2012). Seizures of leopards were similar to those of tigers in many Asian range States, and outside Asia in terms of derivate seizures (Nowell & Pervushina 2014). Leopards are considered to be the most traded big cat in Asia. Since 2000, 5,030 leopards (likely representing a fraction of what is actually traded) have been seized from illegal trade in Asia (EIA 2018). Traders have occasionally claimed that leopard skins appearing in the "Golden Triangle Special Economic Zone" of Lao PDR's Bokeo Province, from where they are sold mainly to China, have been sourced from Africa (EIA 2011a, b, 2015).

The killing of leopards for their skins, canines and claws is mainly a problem in West, Central and southern Africa (Hunter & Barrett 2011, Constant 2014, Stein et al. 2016). Across the latter, leopards are excessively harvested for their skins which are used in ceremonies and for cultural purposes (Stein et al. 2016). Around 879 +/- 53 leopards were estimated to be killed and traded illegally each year in (southern) Africa to meet the demands for skins by followers of the Nazareth Baptist Shembe Church alone (Balme et al. 2013b, Lindsey et al. 2015, G. Balme, unpubl. data). It is estimated that there are 15,747 +/- 946 leopard skins in circulation among members of the church (G. Balme, unpubl. data). Also leopard skins originating from Mozambique appear in this market of skins ([Annex 1](#) & [Annex 2](#) AC30 Doc. 15, CITES 2018a).

## 3.2 Knowledge gaps and conservation challenges

From the above, it follows that the main challenges for implementing leopard conservation activities and management measures include lack of

1. Information on current leopard population size, status and trends across its African range;
2. Knowledge on the relative importance and impact of different direct and indirect threats on the leopard;
3. Awareness of the critical situation for the species and its importance in the ecosystem;
4. Capacity and resources (including financial means) on multiple levels, e.g. enforcement officers lack training to recognise protected species or parts of them; and
5. Law enforcement and implementation of protection measures.

Current population status assessments, strategic conservation plans and National Action Plans are relatively rare for leopard in Africa (Table 3.1) and no Regional Conservation Strategy for the leopard exists. Moreover, there are few conservation strategies for other large carnivores from which leopards may indirectly benefit.

There is a general need for more country-wide and leopard-focused surveys and research (especially outside of PAs) to assess the distribution, abundance, status and trends of leopard populations across Africa. Moreover, the impacts of threats are not yet fully understood but are potentially severe, and need investigation. Conflict mitigation strategies for human-leopard conflicts have been developed in some places, but are not currently enough to assure the leopard's long-term survival (Stein et al. 2016).



**Table 3.1.** Status assessments, Regional Conservation Strategies, National Action Plans, documents outlining conservation measures developed specifically for the leopard, and documents produced for other species considered being beneficial for leopard conservation.

Region/Country	Document
Africa	Setting conservation and research priorities for larger African carnivores (Ray et al. 2005)
	The leopard <i>Panthera pardus</i> in Africa (Myers 1976)
Sub-Saharan Africa	Status and conservation of leopards in Sub-Saharan Africa (Eaton 1977)
	The Status of Leopard in Sub-Saharan Africa (Martin & de Meulenaer 1988)
Guinea	Stratégie nationale de conservation des grands carnivores en Guinée (DNDBAP no date)
Liberia	Large mammal distribution in Liberia (Anstey 1991)
Mozambique	Review of the Leopard ( <i>Panthera pardus</i> ) quota of Mozambique, established per Resolution Conf. 10.14 (Rev. CoP16) and non-detriment determinations, in accordance with CITES Decision 17.114 ( <a href="#">Annex 1</a> AC30 Doc.15, CITES 2018a)
Namibia <sup>1</sup>	Interpretation and implementation of the Convention – Regular and special reports – Appendix-I species subject to export quotas – Leopard – Export Quota Review – Namibia ( <a href="#">Annex 2</a> AC30 Doc.15, CITES 2018a)
Somalia	Status of large mammals in Somalia (Fagotto 1985)
	Conservation plan for the Cape Mountain leopard population (Norton 1986)
	Threatened status for the leopards in South Africa (Arnett 1981)
South Africa	Leopard <i>Panthera pardus</i> population and habitat viability assessment (Daly et al. 2005)
	Non-Detriment Finding Assessment for the trophy hunting of leopards in South Africa (Lindsey et al. 2011a)
	Leopard Quota Review: South Africa ( <a href="#">Annex 3</a> AC30 Doc.15, CITES 2018a)
	The Tanzania Lion and Leopard Conservation Action Plan (TAWIRI 2009)
Tanzania	Report on Decision 17.114 regarding African leopard ( <i>Panthera pardus</i> ) quotas established under Resolution Conf. 10.14 (Rev. CoP16) ( <a href="#">Annex 4</a> AC30 Doc.15, CITES 2018a)
Uganda	Strategic Action Plan for large Carnivore Conservation in Uganda (UWA 2012)
Zambia	Non detrimental findings report for African leopard sport hunting in Zambia ( <a href="#">Annex 5</a> AC30 Doc.15, CITES 2018a).
Zimbabwe	Zimbabwe’s review of the convention on international trade in endangered species (CITES) leopard ( <i>Panthera pardus</i> ) quota ( <a href="#">Annex 6</a> AC30 Doc.15, CITES 2018a)

<sup>1</sup> Namibia is in the process of developing a leopard management plan based on the national leopard survey conducted in 2019 ([Annex 2](#) AC30 Doc. 15, CITES 2018a; Richmond-Coggan 2019).



## 4 Policy and conservation

### 4.1 Policy frameworks

*Panthera pardus* has been listed on [Appendix I](#) of CITES since 1975, restricting the trade of skins or products, included under [Appendix II](#) (strictly protected species) of the Bern Convention (Convention on the Conservation of European Wildlife and Natural Habitats), and included in [Appendix II](#) of CMS since 2017 (CMS 2017). The leopard is protected under the U.S. Endangered Species Act 16 United States Code, Section 1538 (Stein et al. 2016). The U.S. Fish and Wildlife

service lists the leopard as Threatened<sup>3</sup> “in Africa, in the wild, south of, and including, the following countries: Gabon, Congo, DRC, Uganda, and Kenya”. In all other parts of Africa, the leopard is considered Endangered according to the [US Fish and Wildlife Service](#). In the EU Wildlife Trade Regulations the leopard is listed in [Annex A](#). About 17% of the leopard’s global distribution range is estimated to be protected (Jacobson et al. 2016).

### 4.2 International cooperation under the auspices of CITES and CMS

CITES and CMS, the two species-oriented international conventions under the auspice of the United Nations, have agreed on a [joint work programme 2015–2020](#), which provides a framework for cooperation. The CITES and CMS Secretariats jointly developed the [African Carnivores Initiative](#) (ACI) with the objective to bring more coherence to the implementation of existing CITES and CMS Resolutions and Decisions related to four African carnivores, namely African wild dog, cheetah, leopard and lion, recognising that the four species overlap in their distribution and that overall threats, and the conservation measures called for to address them, are comparable to the four species.

holds particular potential, especially if combined with other international treaties such as CITES, the [Ramsar Wetland Convention](#), the [World Heritage Convention](#) and the transboundary conservation area (TBCA) treaties. There is a considerable amount of conceptual and [spatial overlap](#) of the different concepts, and a more conscious synergistic approach would help improving the efficiency.

At CMS CoP12, the Parties also adopted [Decision 12.60](#), requesting the CMS Secretariat to establish the Joint CMS-CITES African Carnivores Initiative (ACI) and work with the CITES Secretariat to jointly support Parties to CMS and CITES in implementing conservation measures in CMS Resolutions and Decisions pertaining to African carnivores, specifically to leopard, lion, cheetah, and wild dog.

At the 12<sup>th</sup> meeting of the Conference of the Parties to CMS (CoP12, October 2017, Manila), Parties agreed to the [proposal of Ghana, I. R. Iran, Kenya and Saudi Arabia](#) for the inclusion of the leopard (*Panthera pardus*) in Appendix II of the Convention. Although felids are, in the strict biological understanding of the term, not migratory species, many of them, including the leopard, meet the definition of a species to be considered under the CMS, as explained in the proposal: 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)). Individual resident leopards move freely across international boundaries, but more important is the migration of subadult leopards: “However, the migratory character of leopards in the understanding of the Conventions is a consequence of subadult dispersal, which is crucial for maintaining the genetic and demographic integrity of any solitary cat population, and is especially important for large cats such as leopards, whose populations generally spread across international boundaries and are increasingly fragmented through human activities and encroachment” (CMS 2017).

At CITES CoP18, the Parties decided to task the Secretariat with including the ACI in the upcoming CMS-CITES joint work programme for the period 2021–2025 and with developing a Programme of Work for the ACI in collaboration with CMS and, as appropriate, the IUCN. The draft Programme of Work shall then be submitted to the CITES Standing Committee for review and appropriate revision ([Annex 2](#) CoP18 Doc. 96, CITES 2019g, with amendments in CITES 2019h).

The CITES and CMS Resolutions and Decisions related to the four species that are currently covered by the Initiative are the following:

- CITES [Decisions 17.241 – 17.245](#) on African lion (*Panthera leo*);
- CITES [Decisions 17.114 – 17.117](#) on Quotas for leopard hunting trophies;
- CITES [Decisions 17.124 – 17.130](#) on Illegal trade in cheetahs (*Acinonyx jubatus*);

In two recent review articles, Trouwborst et al. (2017) and Hodgents et al. (2018) analysed the potential of international wildlife treaties with regard to their combined contribution to lion conservation. Although these two reviews were performed for lion, they are also valid for leopard conservation. They concluded that CMS

<sup>3</sup> According to the [USFWS ECOS Listed Animals](#), Endangered is “a species in danger of extinction throughout all or in significant portion or its range”, and Threatened is “a species likely to become endangered within the foreseeable future throughout all or a significant portion of its range”.

- CITES [Decisions 17.235 – 17.238](#) on African wild dog (*Lycaon pictus*);
- CITES [Resolution Conf. 10.14 \(Rev. CoP16\)](#) on Quotas for leopard hunting trophies and skins for personal use;
- CMS [Resolution 12.28](#) on Concerted Actions;
- CMS [Decisions 12.55 – 12.60](#) on the Joint CMS-CITES African Carnivores Initiative;
- CMS [Decisions 12.61 – 12.66](#) on the Conservation and Management of Cheetah (*Acinonyx jubatus*) and African Wild Dog (*Lycaon pictus*);
- CMS [Decisions 12.67 – 12.70](#) on the Conservation and Management of the African Lion (*Panthera leo*).

(Note: as of 10 September 2019, the Decisions and Resolutions of CITES CoP18 have not yet been numbered and published and were therefore not included in the list above).

### 4.3 Surveys and monitoring

Methodological approach, efforts and available publications and reports on monitoring, research and conservation activities vary strongly depending on the country.

There is no single monitoring method universally applied across the African leopard's range any published recommendation for a standardised approach, but in recent years, camera trapping has – as for other individually distinct solitary terrestrial mammals – been demonstrated a good way to produce reliable data on leopards.

South Africa applies an intensive monitoring using systematic camera trap surveys every year at 20 strategic sites across the country, in order to produce a robust estimate on leopard population density by means of spatial capture-recapture sampling. This method is combined with an extensive monitoring including relative abundance indices, generated by occupancy estimation, catch-per-unit effort and changes in harvest composition (CITES 2018c, Mann et al. 2018). In South Africa, norms and standards for leopard trophy hunting are under development to create a national management plan providing standardized management guidelines ([Annex 3](#) AC30 Doc. 15, CITES 2018a).

The Zambian Department of National Parks & Wildlife intends to set up a very similar system for Zambia as applied in South Africa ([Annex 5](#) AC30 Doc. 15, CITES 2018a). Also in Mozambique, monitoring frameworks are developed to reliably assess leopard population trends at a national scale ([Annex 1](#) AC30 Doc. 15, CITES 2018a).

In Namibia, leopards were monitored in the frame of the National Carnivore Monitoring Programme (LCMAN no date) and information on their status and distribution is continuously collected for the Namibia Large Carnivore Atlas which is updated every six months (Hanssen & Stander 2003, 2004). In the National Leopard Survey in Namibia, Stein et al. (2012) used a combination of questionnaires, camera trapping, spoor tracking

In particular, the ACI seeks to contribute to the enhanced conservation of the four species across their range in Africa, as provided in the relevant CITES and CMS Resolutions and Decisions, by:

- Implementing relevant activities called for in existing CMS and CITES Decisions concerning the four species;
- Developing concrete, coordinated and synergistic conservation programmes that benefit the conservation of all four carnivore species, with local and regional projects implemented across their African range;
- Developing policy guidance and recommendations for range States, CITES and CMS Parties concerning the four species; and
- Organising collaboration with other conservation initiatives and organisations, such as IUCN.

and evidence of leopard presence provided by multiple stakeholders. The study on The Namibian Leopard: National Census and Sustainable Hunting Practices was completed in 2019 and utilised a multi-disciplinary approach, inside and outside national parks, and combined ecological methodologies and social science to understand the pressures on, and status of the leopard population across Namibia (Richmond-Coggan 2019). Through the collection of multi-stakeholder presence records, camera traps, questionnaires, trophy hunting records and problem leopard removals the survey updated leopard distribution and densities, determined conflict hotspots, trophy hunting trends and sustainable off-take (Richmond-Coggan 2019).

The Tanzania Wildlife Research Institute is currently conducting nationwide leopard and lion surveys ([Annex 4](#) AC30 Doc. 15, CITES 2018a).

Ethiopia conducts leopard “census work every two years” and is performing a national leopard population survey in 2019 ([SC70 Doc. 55](#), CITES 2018b).

In Zimbabwe, the Zimbabwe Parks and Wildlife Management Authority, the Wildlife Conservation Research Unit of Oxford University and the Zambezi Society assessed the national leopard population from 2009–2012. A “monitoring framework for leopards in Zimbabwe that combines rigorous estimates of leopard population densities from camera-trap surveys undertaken annually at key sites with broader-scale estimates of leopard occupancy derived from track count at the same sites” is proposed (Panthera & ZPWMA 2018). Such a framework will allow identifying and responding to changes in leopard populations (Panthera & ZPWMA 2018). The Zimbabwe Parks and Wildlife Management Authority together with Zimbabwe Professional Hunting Guides Association and Safari Operators Association of Zimbabwe “has put in motion an action plan to cover the known range of leopard in Zimbabwe using hard ground work in the form of spoor transects, independent data submissions in the form of trail cam

pictures, historic quota and off-take trends and scientific interpretation of these” (Annex 6 AC30 Doc. 15, CITES 2018a).

Consistent monitoring across the leopard’s distribution range is crucial for a realistic assessment of the population status. Sim-

plistic extrapolation of densities from monitoring plots (e.g. by means of habitat models) risk to result in an overestimation of the total abundance as the study areas are generally in the best areas, e.g. in PAs.

## 5 Recommendations

The long-term conservation of the leopard *Panthera pardus* needs more attention and more means at global, regional and national level, both from governmental and private institutions dealing with wildlife management, conservation, and research. While all other large cats such as lions, cheetahs, tigers *Panthera tigris*, jaguars *Panthera onca* or snow leopard *Panthera uncia* have been in the focus of conservation organisations for a long time, the leopard was neglected and

leopard conservation activities under-funded (Breitenmoser 2015). The [joint CMS-CITES African Carnivore Initiative](#) (ACI) offers the opportunity to advance leopard conservation in the years to come. Many of the shortcomings and gaps mentioned in Chapter 3 can be addressed for all species considered under the ACI together (e.g. capacity development), but others will have to be tackled in projects specifically for the leopard.

### 5.1 Strategic planning for leopard conservation

Conserving species such as the leopard, who requires huge spaces for maintaining viable populations and is often in conflict with people sharing the same living space, is a particular challenge. For the outline of a possible approach following hereafter, we refer to the IUCN recommendations for the strategic planning in species conservation as outlined in IUCN SSC Species Conservation Planning Sub-Committee (2017) and Brei-

tenmoser et al. (2015) and use the principle IUCN approach of “Assess – Plan – Act” (IUCN SSC 2017; Fig. 5.1.1).

ASSESS includes the thorough analysis of the situation, e.g. the conservation status of the species in the area of interest, but also the identification of key stakeholders, potential actors and partners, and the capacities available.



**Fig. 5.1.1.** IUCN’s Assess-Plan-Act cycle (IUCN SSC 2017). KSR are Key Species Results as defined by the Species Survival Commission.

PLAN incorporates the strategic planning at range-wide or regional, in the case of large cats most often at transboundary level, but also the development of more concrete implementation plans, e.g. in form of National Action Plans (NAPs).

ACT is the phase of the implementation of the Strategy and the NAPs.

A robust monitoring of the effects of the interventions in the ACT phase is required. This includes most often a general

monitoring of the populations affected, but may need more specific measuring of indicators defined for certain results. This monitoring allows then to re-ASSESS the situation. As long as the overall goal of a conservation strategy is not reached, the continuous or periodic monitoring and evaluation will lead to a review and if needed adaptation of the PLAN in order to make it more effective. The “strategic planning cycle” (Breitenmoser et al. 2015) hence describes an adaptive process.

## 5.2 Steps towards a leopard conservation programme

Given the wide range of the leopard in Africa and the regional differences of the status of the predator and its prey, it is not possible to integrate all countries under one leopard conservation plan, although many strategic goals might be valid for the whole of the continent if not for the species’ global range. The division of the leopard range into “conservation regions” allows developing more specific and effective Regional Conservation Strategies (and subsequently National Action Plans), also in order to facilitate transboundary cooperation between Range Countries. We propose to use the same four regions already in use for the Regional Conservation Strategies for the lion: West Africa, Central Africa, East Africa and southern Africa (Table 2.3.1, Fig. 2.3.2). As the leopard is almost extinct in northern Africa (extant range: 5,800 km<sup>2</sup>, 94–99% of historical range lost; Jacobson et al. 2016), countries such as Algeria or Egypt, where some leopards may still exist, are included in the conservation regions West and East Africa, respectively (Fig. 2.3.1). However, the recovery of the leopard in Saharan Africa will require very special efforts.

A strategic planning process for the conservation of the leopard in Africa will be able to profit from the work done for the other three species in the ACI, as the key national institutions, the international players, the organisational structures as well as the conservation challenges and solutions will be the same or at least broadly overlap. What however is needed is more detailed leopard-specific information, and in this respect, the leopard is lagging behind the other ACI species. We propose the following steps to be taken towards a comprehensive conservation programme for *Panthera pardus* in Africa:

1. *Setting the context and reviewing the state of knowledge:* This Roadmap can serve as a first overview of published data on the situation of the leopard in Africa. However, our review has revealed considerable gaps with regard to detailed information from many Range Countries. We suggest taking the information provided in the Roadmap as a starting point, but to produce more detailed Status Reviews for each of the four proposed Conservation Regions. These Reviews should be done by means of a standardised approach including national institution and experts familiar with the leopard/wildlife in the respective country.
2. *Develop Regional Conservation Strategies and (National) Action Plans:* As for lion, cheetah and African wild dog, RCSs should then be developed in order to guide the development of more specific NAPs, according to the Guidelines for Species Conservation Planning (IUCN-SSC Species Conservation Planning Sub-Committee 2017). An RCS would define the Goal, Objectives, Results, and Actions at regional level. The NAPs would then concretise the Objectives and Results valid for the respective country, and define the Actions, actors, and time-frame at national level. The RCS should take into consideration the metapopulation structure of (transboundary) leopard populations as identified in Step 1. Depending on the spatial structure, the strategic and action planning could be united in one Conservation Plan for such a leopard metapopulation. But as the concrete implementation of actions is most often very country-specific, NAPs are generally the most practical way for implementing actions.
3. *Implement conservation actions and monitor the effect on leopard populations:* Conservation measures as defined in the RCS and NAPs are then implemented according to the time plan defined in the plans. A monitoring concept to observe the effects of the interventions is implemented parallel to the action plans. The implementation phase requires a good organisational structure, including a clear communication, exchange of information and sharing experiences. The [Range Wide Conservation Programme for Cheetah and African Wild dogs](#) made good experiences with regional and national coordinators who are closely working together and facilitate the implementation of the RCS and NAPs. The Range States recommended at ACI1 to set up such a network of National and Regional Coordinators also for the implementation of the ACI, of which the leopard is part.
4. *Review RCS and NAPs and adapt the conservation activities:* Regular reporting and meetings are organised to track the progress and to make adaptations wherever needed. Most strategies and plans, when developed first, are setting too ambitious Objectives and Results in a too tight time frame. Therefore, an adaptive process, informed by a good monitoring and good reporting, is highly recommended.

### 5.3 Preliminary Goal, Objectives and Actions for a leopard conservation programme in the frame of the ACI

**Goal:** To develop a comprehensive framework for leopard conservation at the continental, regional and national level in Africa.

The different status of the leopard populations in the four regions (Fig. 2.3.2) suggests that objectives and activities might be different for each conservation region. In southern and East Africa, further decline must be halted and the (connectivity between) leopard populations must be strengthened to avoid further fragmentation. In West Africa, conserving the remnant nuclei alone will likely not be sufficient to maintain the leopard. The populations are too small and too isolated to be viable at long-term. Here, lost ground must be regained in order to re-connect these small populations. Central Africa is probably in-between, but the information on the status of the leopard populations in this conservation region is so limited that basic surveys must be the first priority.

The following preliminary Objectives and Actions should be considered for a leopard conservation programme:

**Objective 1.** Strategic planning for leopard conservation at regional and national level: To develop, in a participatory process, Regional Conservation Strategies and National Action Plans for the implementation of conservation measures.

*Activity 1.1.* Develop in a participatory approach Regional Conservation Strategies for the leopard in accordance with this Roadmap.

*Result/Product:* A conservation strategy for each region (Fig. 2.3.2) coordinating the regional cooperation in leopard conservation.

*Activity 1.2.* Develop in a participatory approach National Action Plans as implementation tools in accordance with the respective Regional Conservation Strategy.

*Result/Product:* A national action plan for each range country guiding the implementation of leopard conservation activities.

The following themes (Objectives) and activities are proposed to be considered and, if appropriate, addressed in the Regional Conservation Strategies or the National Action Plans, respectively:

**Objective 2.** Baseline surveys: To survey and assess, for leopard regions with low level of knowledge, conservation status of leopards and their prey, threats, human attitudes and enabling conditions.

*Activity 2.1.* Develop best practice standards for baseline surveys for leopard conservation and a standardised list of topics to be compiled (e.g. by means of a questionnaire).

*Activity 2.2.* Identify priority areas for leopards for baseline survey.

*Activity 2.3.* Undertake the baseline surveys in the selected areas according to the defined standards under the auspice of the respective Range Country.

**Objective 3.** Monitoring: To establish a long-term monitoring scheme for leopards and implement it in the Range Countries to enable effective adaptive management of the species and assess population trends at a national/regional scale (populations and metapopulations).

*Activity 3.1.* Develop and promote the use of guidance for robust, cost-effective and reliable monitoring at a meaningful spatial scale.

*Activity 3.2.* Identify appropriate long-term reference sites that are representative for the regional conservation units (metapopulations) and apply appropriate methods to the defined standards.

*Activity 3.3.* Establish monitoring networks and build capacity to maintain long-term monitoring in the selected sites.

**Objective 4.** Conflicts and coexistence: To promote coexistence with leopards through reducing and mitigating human-leopard conflicts.

*Activity 4.1.* Develop in a participatory process (authorities in charge, experts, stakeholders, and local people), appropriate measures to reduce and mitigate human-leopard conflicts.

*Activity 4.2.* Identify areas with a conflict level threatening the (local) survival of leopards.

*Activity 4.3.* Implement appropriate mitigation measures in close cooperation with the local communities.

**Objective 5.** Trophy hunting: To ensure that trophy hunting is non-detrimental and fosters conservation of leopards.

*Activity 5.1.* Implement available best practice standards for non-detrimental leopard hunting.

*Activity 5.2.* Produce at regular intervals Non-Detriment Finding reports according to best standards to ensure sustainability of trophy hunting.

*Activity 5.3.* Design and implement policies to ensure the revenue generated from trophy hunting contributes towards meaningful leopard conservation.

**Objective 6.** Poaching of leopards and prey: To minimise poaching of leopards and prey by developing and enforcing appropriate protective frameworks.

*Activity 6.1.* Implement SMART or other adequate systems for threat and law enforcement monitoring and evaluation (for law enforcement see also Objective 11).

*Activity 6.2.* Understand and mitigate local social factors driving poaching of leopards and prey.

*Activity 6.3.* Develop local informant networks in communities in and around leopard populations.

**Objective 7.** Trade: To minimise illegal trade of leopards at national and international levels.

*Activity 7.1.* Assess global legal and illegal trade in leopard parts (TRAFFIC, CITES) and implement appropriate measures according to the findings.

*Activity 7.2.* Train law enforcement agents such as border guards and customs officials to combat illegal trade in leopards (cf. Objective 11).

*Activity 7.3.* Design and implement outreach campaigns targeting consumer groups.

**Objective 8.** Prey base conservation: To secure and enhance wild leopard prey populations through sustainable wildlife management.

*Activity 8.1.* Assess the extent and impact of illegal (bushmeat) hunting and the potential of legal subsistence hunting across the African leopard range.

*Activity 8.2.* Review, design and implement sustainable hunting practices and monitoring of prey populations where necessary.

*Activity 8.3.* Review control methods for crop-raiding prey and implement sustainable alternatives where needed.

*Activity 8.4.* Identify areas where prey populations are severely depleted or extinct and design projects to supplement and restore prey populations.

**Objective 9.** Habitat protection: To stop and reverse loss or destruction and fragmentation of habitat of leopard and their prey.

*Activity 9.1.* Identify and protect key leopard habitats and important corridors to promote connectivity between populations.

*Activity 9.2.* Assess the potential for habitat restoration and implement the findings.

*Activity 9.3.* Promote sustainable management of the consumption of fodder, forest products, fuel wood etc., and ecotourism and trophy hunting as an incentive to protect habitats for leopard and prey.

**Objective 10.** Legislation: To ensure appropriate legislative framework for maintaining viable leopard populations.

*Activity 10.1.* Review of legislative processes (e.g. laws, policies and capacity for implementation in range states) and law enforcement systems.

*Activity 10.2.* Ensure appropriate legislative framework for maintaining viable leopard populations.

**Objective 11.** Capacity development: To enable all actors/institutions involved in leopard conservation to fulfil their tasks.

*Activity 11.1.* Develop training modules and material for (1) monitoring of leopard and prey, (2) habitat management, (3) PA management, (4) law enforcement, (5) conflict mitigation.

*Activity 11.2.* Develop and implement a delivery plan for training.

*Activity 11.3.* Ensure existence of sufficient well-trained and well-equipped enforcement teams for implementation of enforcement.

**Objective 12.** Leopard partnership: To identify and foster partnerships and cooperation at continental and regional level for leopard conservation.

*Activity 12.1.* Implement this Roadmap under the governance structure to be developed in the frame of the Joint CMS-CITES African Carnivores Initiative (CMS & CITES 2018).

*Activity 12.2.* Assess the synergistic potential to cooperate with lion, cheetah and wild dog conservation programmes across Africa to advance leopard conservation.

*Activity 12.3.* Assess the need for additional/specific structures to ensure cooperation and sharing of information for leopard conservation and implement accordingly.

## 5.4 Conclusions

The Objectives and Actions listed above are identified in order to provide a basis for the development of more elaborated logistic frameworks (LogFrames) for RCS or NAPs. They are based on the leopard research up to date as compiled in this Roadmap, and on the experience in conservation programmes for other large cats. Although each species and each Range Country has its particularities that must be considered when defining concrete in situ measures, the basic threats and challenges, as well as the principle solutions are very similar for large carnivores and for different regions. The [joint CMS-CITES African Carnivores Initiative](#) – which explicitly searches

the cooperation with IUCN – offers a unique chance to also address the large-scale conservation of the leopard, which has been neglected in the shadow of the other charismatic large cats.

Furthermore, the conservation efforts under the ACI can be organised synergistically and thus help to use funding more efficiently. Among many other obstacles, the availability of funding is always a main obstacle to the implementation of conservation activities. This is true for all large cats, but most prominently for *Panthera pardus*.





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## Appendix I - Leopard density estimations

**Table A1.** Examples of leopard density estimates (adult/100 km<sup>2</sup>) in African Range States according to the literature.

Country	Study Area/Country	Density (adult/100 km <sup>2</sup> )	Reference
Botswana	Ghanzi farmland	0.1	Boast & Houser 2012
Botswana	Ghanzi region	0.48 (MMDM) 1.08 (HMMDM)	Kent 2011
Botswana	Northern Tuli Game Reserve	7.5	SLPRG 2010
Botswana	Central Kalahari Game Reserve	0.4	CARACAL no date
Botswana	Kgalagadi Transfrontier Park	1.9–3.0	CARACAL no date
Botswana	Okavango Delta, Kwando area	1.5	CARACAL no date
Botswana	Okavango Delta, Moremi area	3.2	CARACAL no date
Cameroon	Bénoué Complex (Bénoué NP, Bobandjida NP and Faro NP) and hunting zones	1.31	Bauer et al. 2016
Gabon	Lope and Ivindo NPs	2.7–12.1	Henschel 2008
Ghana	Mole NP	2–2.9	Brashares & Sam 2005
Ivory Coast	Taï NP	7–11	Jenny 1996
Kenya	Mpala ranch	8.4–12	O'Brien & Kinnaird 2011
Mozambique	Niassa National Reserve (NR)	2.18–12.65	Jorge 2012
Mozambique	Xonghile GR	1.53	Strampelli 2015
Namibia	Waterberg plateau farmland	3.6	Stein et al. 2011
Namibia	Waterberg Plateau Park	1.0	Stein et al. 2011
Namibia	Bwabwata NP	1.18 and 2.4	Funston et al. 2014
Namibia		1.2–3.1	Stein et al. 2012
Namibia	Kalahari, tree–savannah	0.19	Kent 2011
Namibia	Kalahari, dune–savannah	0.6	Kent 2011
Senegal	Niokolo Koba NP	2.0–4.0	Kane et al. 2015
South Africa	Phinda–Mkhuze Complex	2.5–11.1	Balme et al. 2010a,b
South Africa	Kruger NP	12.7	Maputla et al. 2013
South Africa	Soutpansberg mountains	10.7	Chase-Grey et al. 2013
South Africa	Soutpansberg mountains	3.65	Williams et al. 2017
South Africa	Cederberg mountains	0.25–2.3	Martins 2010
South Africa	Karongwe private game reserve	18.8	Owen et al. 2010
South Africa	Northern Kwazulu–Natal	12.7	Maputla et al. 2013
South Africa	Zululand Rhino Reserve	2.5–7.0	Chapman & Balme 2010
Tanzania	Tarangire NP	7.9	Msuha 2009
Zambia	Luambe NP and Game Management Area Chanjuzi	3.36 (NP only), 4.79	Ray 2011
Zimbabwe	Savé Valley Conservancy	7.6	Williams et al. 2016
Zimbabwe	Northeastern part of Hwange NP	1.46	Loveridge et al. 2017
Zimbabwe	Mangwe district,	1–7	Grant 2012
Zimbabwe	Gonarezhou NP	8.3	Groom & Brand 2011

## Appendix II - Distribution categories according to the IUCN Red List

*Extant:* The species is known or thought very likely to occur currently in the area, which encompasses localities with current or recent (last 20–30 years) records where suitable habitat at appropriate altitudes remains;

*Possibly Extant:* There is no record of the species in the area, but the species may possibly occur, based on the distribution of potentially suitable habitat at appropriate altitudes, although the area is beyond where the species is Extant (i.e., beyond the limits of known or likely records), and the degree of probability of the species occurring is lower (e.g., because the area is beyond a geographic barrier, or because the area represents a considerable extension beyond areas of known or probable occurrence). Identifying Possibly Extant areas is useful to flag up areas where the taxon should be searched for;

*Possibly Extinct:* The species was formerly known or thought very likely to occur in the area (post 1500 AD), but it is most

likely now extirpated from the area because habitat loss and/or other threats are thought likely to have extirpated the species, and there have been no confirmed recent records despite searches;

*Extinct:* The species was formerly known or thought very likely to occur in the area (post 1500 AD), but it has been confirmed that the species no longer occurs because exhaustive searches have failed to produce recent records, and the intensity and timing of threats could plausibly have extirpated the taxon;

*Presence uncertain:* A record exists of the species' presence in the area, but this record requires verification or is rendered questionable owing to uncertainty over the identity or authenticity of the record, or the accuracy of the location.

(Source: IUCN Red List Technical Working Group 2018)