REGIONAL CONSERVATION STRATEGY FOR THE CHEETAH AND AFRICAN WILD DOG IN EASTERN AFRICA

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Endorsements

We hereby declare that we endorse the regional conservation strategy for cheetah and African wild dog in eastern Africa

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Ministry of Wildlife and Tourism
Kenya

Signature ..... Date .....
Ministry of Environment, Wildlife Conservation and Tourism
Southern Sudan

Signature ..... Date .....
Ministry of Natural Resources and Tourism
Tanzania

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Signature ..... Date .....
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– CHAPTER 1 –

SUMMARY

The African wild dog (*Lycaon pictus*) and the cheetah (*Acinonyx jubatus*) present major challenges for conservationists in the 21st Century. All large carnivores need large areas to survive; yet wild dogs and cheetah range more widely, and hence need larger areas, than almost any other terrestrial carnivore species anywhere in the world. As human populations encroach on Africa's last wild areas, these two threatened species are often the first to disappear.

Eastern Africa supports globally important populations of both cheetah and wild dogs. This regional plan is the first step in a programme to develop action plans for the species' conservation across their geographic range, conducted as a collaboration between national wildlife authorities across Africa and the Cat and Canid Specialist Groups of IUCN/SSC. Given wild dogs' and cheetah's similar ecological needs, it makes sense to plan their conservation together. Moreover, management enacted for these two species will also benefit similar species such as lions, leopards, and hyaenas, though the converse is not necessarily the case given wild dogs' and cheetahs' requirement for far more extensive areas of wildlife-friendly habitat.

Both wild dogs and cheetah have experienced major contractions in their geographic range with eastern Africa, with resident populations known to remain in just 6% (cheetah) and 7% (wild dogs) of their historical range. Protected areas are very important for the conservation of both cheetah and wild dogs, but the majority of animals reside outside the protected areas which are the focus of most conservation effort. Nearly two-thirds of cheetah resident range, and over half of wild dog resident range, falls on community and private lands. As a result, the populations inside protected areas would not be viable if isolated from unprotected lands, and conservation activity outside protected areas is absolutely critical for the long-term survival of these two species both inside and outside reserves.

Several important wild dog and cheetah populations straddle international boundaries. Trans-boundary management is therefore likely to be needed for conserving both species in the long term. Little or no unoccupied habitat was identified where wild dog or cheetah populations could be restored. The strategic plan therefore focuses on securing the remaining populations rather than restoring those that have been lost.

The strategic plan for the species' conservation in eastern Africa recognises the need to (i) promote coexistence of cheetah and wild dogs with people and domestic animals; (ii) provide relevant stakeholders and managers with scientific and timely information on the status of and threats to cheetah and wild dog populations; (iii) strengthen human, financial and information resources for conserving cheetah and wild dogs; (iv) ensure that appropriate legislation is in place to allow wild dog and cheetah conservation at the national and international levels; (v) mainstream cheetah and wild dog conservation in land use planning and its implementation; and (vi) promote the development and implementation of national conservation plans for both species. This last point is important because almost all conservation effort is enacted within national policies, under the jurisdiction of national wildlife authorities. For this reason, the regional strategy was deliberately developed in a format that would facilitate translation into national action plans. It is expected that these action plans will be implemented by national wildlife authorities, in partnership with relevant NGOs and other institutions.

– CHAPTER 2 –

BACKGROUND AND INTRODUCTION

2.1 Background

The African wild dog (*Lycaon pictus*) and the cheetah (*Acinonyx jubatus*) present major challenges for conservationists in the 21st Century. Both species were formerly widely distributed in Africa, but both have experienced dramatic reductions in numbers and geographic range in recent decades (Ray, Hunter & Zigouris, 2005). All large carnivores need large areas to survive; yet wild dogs and cheetah range more widely, and hence need larger areas, than almost any other terrestrial carnivore species anywhere in the world. As human populations encroach on Africa's last wild areas, wild dogs and cheetah – particularly susceptible to the destruction and fragmentation of habitat – are often the first species to disappear.

Despite their threatened status (wild dogs are listed as endangered and cheetah as vulnerable, IUCN, 2006a), ecological importance as top carnivores (Woodroffe & Ginsberg, 2005b), and value to Africa's tourism industry (Lindsey *et al.*, 2007), to date remarkably little conservation action has been implemented for these two species. The majority of Africa's protected areas are too small to conserve viable populations, and active conservation efforts on unprotected lands have hitherto been restricted to a handful of projects.

Three factors have hindered conservation activity for cheetah and wild dogs:

- The species' massive area requirements mean that conservation planning is needed on a daunting geographical scale, rarely seen before in terrestrial conservation.
- Information is lacking on the species' distribution and status, and on the tools most likely to achieve effective conservation.
- Capacity to conserve these species is lacking in most African countries; expertise in managing more high-profile species such as elephants and rhinos may not be transferable to wild dogs or cheetah because the threats and conservation challenges are different.

Recognising these concerns, in 2006 the Cat and Canid Specialist Groups of the IUCN/SSC, in partnership with the Wildlife Conservation Society (WCS) and the Zoological Society of London (ZSL), initiated a Rangewide Conservation Planning Process for wild dogs and cheetah. The two species were addressed together because, despite being taxonomically quite different, they are ecologically very similar and hence face similar threats.

The Rangewide Conservation Planning Process has six stated objectives:

(1) To foster appreciation for the need to conserve wild dogs and cheetah, particularly among conservation practitioners in range states.

(2) To collate information on wild dog and cheetah distribution and abundance on an ongoing basis, in order to direct conservation efforts and to evaluate the success or failure of these efforts in future years.

(3) To identify key sites for the conservation of wild dogs and cheetah, including corridors connecting important conservation areas.

(4) To prepare specific global, regional and national conservation action plans for both cheetah and wild dogs.

(5) To encourage policymakers to incorporate wild dogs' and cheetah's conservation requirements into land use planning at both national and regional scales.

(6) To develop local capacity to conserve cheetah and wild dogs by sharing knowledge of effective tools for planning and implementing conservation action.

A key component of this process is a series of workshops, bringing together specialists on the species' biology with conservation managers from governmental and non-governmental organisations. Close involvement of government representatives was considered absolutely critical since they represent the organisations with the authority to implement any recommendations at the management and policy levels. While the process will ultimately cover the entire geographic range of both species, the large number of range states involved means that productive discussion and interchange would have been very difficult to achieve at a single workshop covering the whole area. Workshops are therefore being conducted at the regional level; this report presents the outcomes of the first regional workshop, covering eastern Africa. Details of the meeting's objectives and participants are presented in section 2.4 below.

Since wildlife conservation policy is formulated, authorised and enforced at the national level, it is critical that conservation planning be enacted at this level. The development of national plans, through national workshops, is thus a vital component of the Rangewide Conservation Planning Process. Each regional workshop is therefore followed immediately by a national workshop in the host country, to which delegates from other countries in the region are invited as observers. This is intended to provide preparation for the organisation of national workshops in other range states, leading to national workshops and the development of national action plans for all range states. The eastern Africa regional workshop described herein was followed by a Kenya national workshop; outcomes from the Kenya workshop are published separately (Kenya Wildlife Service, in prep).

2.2 Biology and conservation needs of African wild dogs

African wild dogs are highly social members of the canid family. Packs cooperate to hunt their prey (Creel & Creel, 1995), which consists mainly of medium-sized ungulates (particularly impala, *Aepyceros melampus*) but may range in size from hares (*Lepus* spp) and dik diks (*Madoqua* spp, Woodroffe *et al.*, 2007b) to kudu (*Tragelaphus strepsiceros*) and even, occasionally, eland (*Taurotragus oryx*, Van Dyk & Slotow, 2003). Packs also cooperate to breed, with usually only one female and one male being parents of the pups, but all pack members contributing to pup care (Malcolm & Marten, 1982). As females have never been observed to raise pups to adulthood without assistance from other pack members, packs, rather than individuals, are often used as the units of measuring wild dog population size.

Unlike most carnivore species (apart from cheetah), wild dogs tend to avoid areas of high prey density (Mills & Gorman, 1997), apparently because larger carnivores prefer such areas (Creel & Creel, 1996; Mills *et al.*, 1997). Lions (*Panthera leo*) and spotted hyaenas (*Crocuta crocuta*) both represent important causes of death for adult and juvenile wild dogs (Woodroffe *et al.*, 2007a).

Probably because of this tendency to avoid larger predators, wild dogs live at low population densities and range widely. Population densities average around 2.0 adults and yearlings per 100km^2 (Fuller *et al.*, 1992a) and home ranges average 600-800km^2 per pack in eastern Africa (Woodroffe & Ginsberg, 1998), with some packs ranging over areas in excess of 2,000km^2 (Fuller *et al.*, 1992a). Both wild

dogs and cheetah occupy home ranges larger than would be predicted on the basis of their energy needs (Figure 2.1).

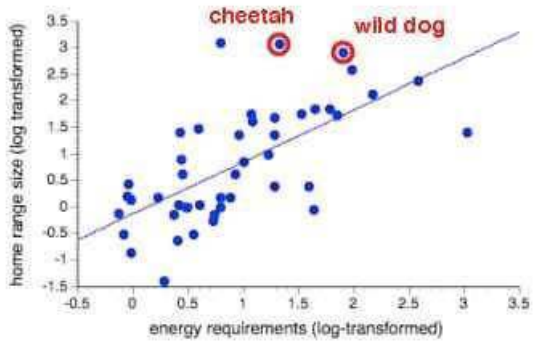


Figure 2.1 *The relationship between energy requirements and home range size in multiple carnivore species, showing the large home ranges occupied by cheetah and wild dogs in comparison with their energy needs. Wild dogs are recorded as having greater needs than cheetah because the social unit is a pack rather than an individual. Data are from Gittleman & Harvey (1982).*

Most new wild dog packs form when young animals (usually but not always in their second year, McNutt, 1996) leave their natal packs in same-sex dispersal groups, and seek new territories and members of the opposite sex. Such dispersal groups may travel hundreds of kilometres (Fuller *et al.*, 1992b), and have been recorded in areas very remote from resident populations (Fanshawe *et al.*, 1997). This dispersal behaviour can complicate the interpretation of distribution data, as sightings of small groups of wild dogs do not necessarily indicate the presence of a resident population. However, the behaviour does allow wild dogs to recolonise unoccupied space when opportunities arise.

Wild dog populations in different regions of Africa are morphologically and genetically different, but no subspecies are recognised (Girman & Wayne, 1997; Girman *et al.*, 1993). Wild dogs are habitat generalists, and have been recorded in habitats as diverse as wooded savannah (Creel & Creel, 2002), short grasslands (Kuhme, 1965), montane forest (Dutson & Sillero-Zubiri, 2005), montane moorland (Thesiger, 1970) and mangroves (see Figure 4.1).

The first status survey for wild dogs was conducted in 1985-8 (Frame & Fanshawe, 1990), and this was updated in 1997 (Fanshawe *et al.*, 1997) and 2004 (Woodroffe, McNutt & Mills, 2004). These surveys revealed substantial loss and fragmentation of wild dog populations, with the species extirpated across most of western and central Africa, and greatly depleted in eastern and southern Africa. However distribution data, which were collated mainly by exhaustive postal correspondence, were somewhat biased towards protected areas with little information available from unprotected lands. By 1997, wild dogs had disappeared from most of Africa's protected areas, persisting only in the largest reserves (Woodroffe *et al.*, 1998). In 2004 the species was estimated to number fewer than 6,000 adults and yearlings (Woodroffe *et al.*, 2004). The species is listed as 'endangered' by the IUCN (IUCN, 2006a).

Wild dogs' decline has been related to their limited ability to inhabit human-dominated landscapes. Where human densities are high and habitat consequently fragmented, wild dogs encounter hostile farmers and ranchers, snares set to catch wild ungulates, high speed traffic, and domestic dogs harbouring potentially fatal diseases (Woodroffe & Ginsberg, 1997a). While these threats are common among large carnivores, wild dogs' low population densities and wide-ranging behaviour mean that they are both more exposed to, and more susceptible to, these human impacts than are most other species (cheetah being a possible exception).

Despite these human impacts on their populations, wild dogs can coexist successfully with people under the right circumstances (Woodroffe *et al.*, 2007b). Wild dogs seldom kill livestock where wild prey remain at even comparatively low densities (Rasmussen, 1999; Woodroffe *et al.*, 2005c), and traditional livestock husbandry is a highly effective deterrent (Woodroffe *et al.*, 2006). Tools have been

developed to reduce the impacts of conflicts with game and livestock ranchers, accidental snaring, and road accidents, although safe and effective tools to manage disease risks are still under development (Woodroffe *et al.*, 2005a).

2.3 Biology and conservation needs of cheetah

The cheetah is one of the most unique and specialised members of the cat family. It can reach speeds of 64 miles per hour (103 km per hour, Sharp, 1997), making it the fastest creature on land. However, despite their specialised hunting strategy, cheetah are habitat generalists, ranging across a wide variety of habitats, from desert through grassland savannas to thick bush (Myers, 1975).

Cheetah have a social system unlike that of any other cat species. Cheetah females are tolerant of other females, and do not maintain territories, having large overlapping home ranges instead (Caro, 1994). Females are highly promiscuous, with high levels of multiple paternity within litters and no evidence of mate fidelity (Gottelli *et al.*, 2007). Cheetah males are often social, forming permanent coalitions of two or three, usually brothers, which stay together for life (Caro & Durant, 1991). Males in groups are more likely than single males to take and retain territories, which they defend against male intruders (Caro & Collins, 1987a). In the Serengeti ecosystem in northern Tanzania, male territories average 50km^2, whilst females and males without territories move over 800km^2 every year (Caro, 1994). This system, where males are social and hold small territories, and females are solitary moving across several male territories annually, is known in no other mammal species (Gottelli *et al.*, 2007).

Cheetah females are able to give birth to their first litter at two years of age, after a three-month gestation (Caro, 1994). The cubs are kept in a lair for the first two months of their life, while their mother leaves them to hunt every morning and returns at dusk (Laurenson, 1993). Cheetah cub mortality can be high: In the Serengeti, mortality of cubs from birth to independence was 95% (Laurenson, 1994). There, cubs died mostly because they were killed by lions or hyaenas: mothers cannot defend cubs against these much larger predators (Laurenson, 1994). Cubs may also die from exposure or fire, or from abandonment if their mother is unable to find food. If they survive, the cubs will stay with their mother until they are 18 months old, after which they will roam with their littermates for another six months (Caro, 1994). The longest recorded longevity in the wild is 14 years for females and 11 years for males; however females have never been recorded as reproducing beyond 12 years (Durant unpublished data). Demographic parameters are available for only a small number of populations: mean and variance of birth and survival have been published from the long term study in the Serengeti National Park in Tanzania (Durant, Kelly & Caro, 2004), whilst mean birth and survival rates are available from ranch lands in Namibia (Marker *et al.*, 2003b).

Cheetah are predominantly diurnal, although hunting at night is not uncommon (Caro, 1994). They hunt by a stealthy stalk followed by a fast chase. Because of their unrivalled speed and acceleration, cheetah can hunt successfully even if they start a chase at a much greater distance than bulkier and heavier large cats, such as lions and leopards (*Panthera pardus*). They take a wide variety of prey, depending on habitat and geographic location, but they prefer prey of 15-30kg: the size of a Thomson's gazelle (*Gazella thomsonii*) or impala.

As with wild dogs, and unlike most other large carnivore species, cheetah tend to avoid areas of high prey density, probably because other large carnivore species are found in these areas (Durant, 1998, 2000). Lions have been documented to be largely responsible for the high mortality of cheetah cubs observed in the Serengeti (Laurenson, 1994), and will also kill adults, whilst hyaenas can kill cubs and will steal kills from cheetah.

Cheetah used to be widespread across Africa and across Asia as far east as India. However, today there are no cheetah left in Asia except for a small population in Iran, and only a few populations remain in north and west Africa. Most of the remaining cheetah are concentrated in sub-Saharan Africa. The first status survey for cheetah was in the early 1970s (Myers, 1975), later surveys of selected countries were conducted in the 1980s (Gros, 1996, 1998, 2002; Gros & Rejmanek, 1999), and a summary of global status was collated in 1998 (Marker, 1998). However accurate information on status and densities are extremely difficult to collect for this species, which is shy and rarely seen across most of its range. Furthermore, the ranging patterns of the species incline it to cluster in areas that become temporarily favourable habitat (due to the absence of competitors and availability of prey), making estimating numbers additionally problematic (Durant *et al.*, 2007).

Like wild dogs, and probably because of similar tendencies to avoid larger predators, cheetah live at low densities with recorded densities ranging between 0.3-3 adult cheetah/100km^2 (Burney, 1980; Gros, 1996; Marker, 2002; Mills & Biggs, 1993; Morsbach, 1986; Purchase, 1998). Although markedly higher estimates have been documented in some areas, it is likely these estimates do not reflect true density, as individuals counted may roam outside the survey area (highlighting a general problem with surveying cheetah, see Bashir *et al.*, 2004).

Home range has been recorded as ranging from 50km^2 for territorial males in the Serengeti (Caro, 1994) to over 1,000km^2 in Namibia (Marker *et al.*, in press). Like wild dogs, cheetah home ranges are much larger than would be predicted from their energy needs (Figure 2.1). Because they can range across such large areas, cheetah can also disperse widely, having been recorded as moving over much more than one hundred kilometres (Durant unpublished data), making it difficult to determine whether occasional cheetah sightings in an area represent transient individuals or a resident population. However, this ability to disperse enables cheetah to recolonise new areas fairly easily if and when they become available.

Global population size has been 'guesstimated' at 14,000 (Myers, 1975) and 'less than 15,000' (Marker, 2002). The species is listed as vulnerable by the IUCN red list (IUCN, 2006a). Although these population size estimates do not suggest a decline, the consensus view among the world's experts on the species is that there has been a decline, either because the 1970s estimate was an underestimate or because the later estimate was an overestimate. Certainly the distribution of the species has contracted markedly from its historical range. Declines have been largely attributed to habitat loss and fragmentation (Marker *et al.*, 2003a; Marker *et al.*, 2003b; Myers, 1975). The disappearance of the species from across nearly its entire Asian range was in part also due to the habit of the Asian aristocracy to capture and use cheetah for hunting (Divyabhanusinh, 1995). Today, in sub-Saharan Africa, lethal control due to perceived or actual conflict with livestock or game ranching also plays a strong role in the decline of the species (Marker *et al.*, 2003a; Marker *et al.*, 2003b; Myers, 1975).

2.4 The eastern Africa regional workshop

The eastern Africa regional workshop on conservation planning for cheetah and wild dogs was held on 1st-6th February, 2007, at Mpala Research Centre in Kenya. It was attended by 28 delegates including government and NGO representatives from southern Sudan, Ethiopia, Uganda, Kenya and Tanzania, and species specialists from Botswana, Namibia, Kenya, Tanzania, USA and UK (Figure 2.2); the delegates' names, affiliations and contact details are provided in Appendix 1. One delegate from Sudan was not permitted to attend the workshop due to a trade embargo by the US government, but contributed data. Two other delegates from the USA were prevented from attending but contributed data and/or

expertise. No participants were invited from Rwanda, Burundi, Eritrea or Djibouti as these countries were known or strongly suspected to support no resident populations of either species. No participant from Somalia could be identified with appropriate information or authority.

Figure 2.2 *Delegates to the conservation planning workshop for African wild dogs and cheetah in eastern Africa, held at Mpala Research Centre, Kenya in February 2007 (a full list of participants is provided in Appendix I).*

The eastern Africa workshop had two principle objectives: to collate information on wild dog and cheetah status and distribution within the region, in a format that could be used to inform conservation planning, and to prepare a regional strategic plan for the species' conservation. The strategic plan was designed to form a template which could be used, with minor modifications, to develop national strategies for the species' conservation within the broader eastern African region.

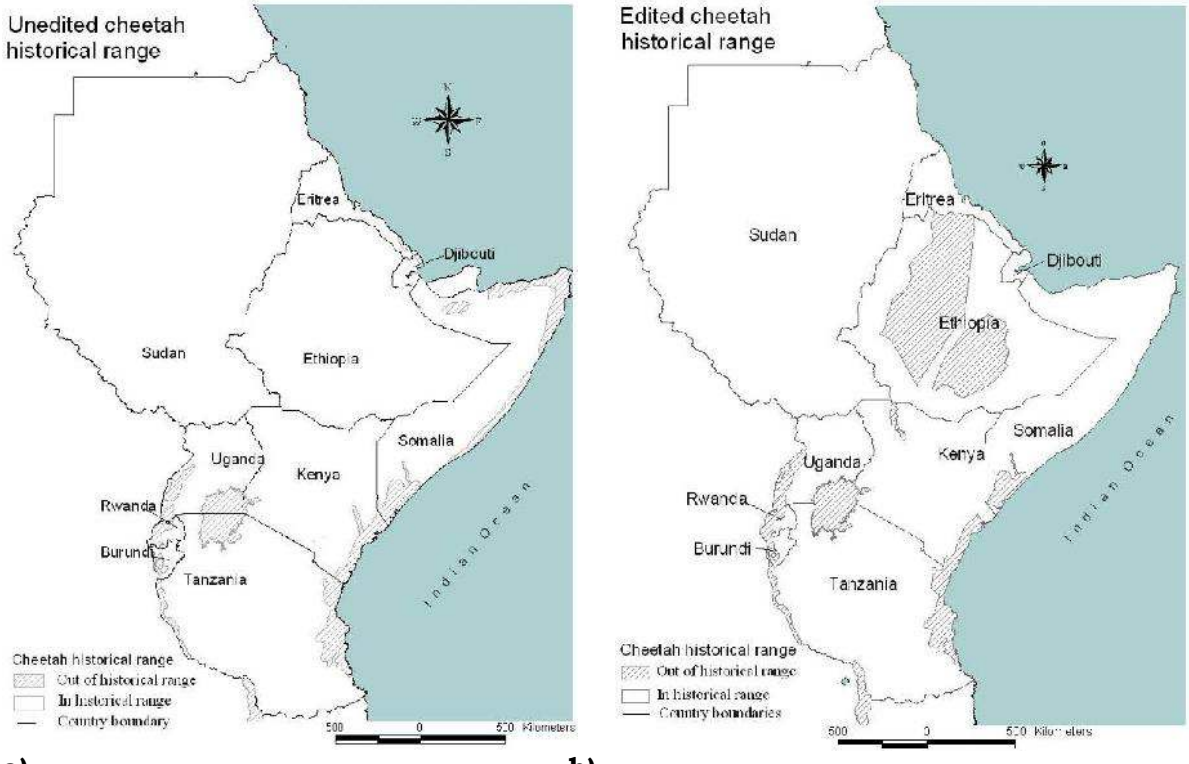
Chapters 3 and 4 of this report present details on the status and distribution of cheetah and wild dogs, respectively, in eastern Africa. Chapter 5 describes the threats to both species. Chapter 6 describes the conservation strategy developed for the region by workshop participants. The agenda for the workshop is presented in Appendix 2, the methods used to collate the data are outlined in Appendix 3, and a logical framework table of the strategic plan is provided in Appendix 4.

– CHAPTER 3 –

THE DISTRIBUTION AND STATUS OF CHEETAH WITHIN EASTERN AFRICA

3.1 Historical distribution

In the past, cheetah were broadly distributed within eastern Africa. Cheetah are habitat generalists, able to persist in a wide array of environmental conditions as long as prey are available, ranging from the Sahara desert to reasonably thick bush. Before human activity modified substantial proportions of eastern Africa's natural habitats, cheetah were presumed to have occupied nearly the entire region, bounded to the east by the Indian Ocean and to the west by the lowland rainforests of the Congo basin (Figure 3.1a). They were thought to have been excluded only from forest, and to have occurred across most other habitats of eastern Africa (Myers, 1975). However, this generally accepted historical map of cheetah distribution (Myers, 1975) was developed from what was known about preferred habitat of cheetah at that time, together with a map of known habitat distribution. Whilst the habitat maps have not altered greatly, much more is known about the habitat preferences of cheetah today, modifying the presumed previous historic range. Participants in the workshop agreed that cheetah were probably never present in the high mountains of Ethiopia, as there are no records of cheetah ever having occurred in this area (Figure 3.1b). However it also seems likely that cheetah were more widespread than initially thought along the coastal strip of Kenya and Tanzania, as well as over the horn of Africa, as they have been recorded within some of these areas. The relevant parts of these areas were therefore included in the historical range of the species used for analyses presented here.



a) **b)**

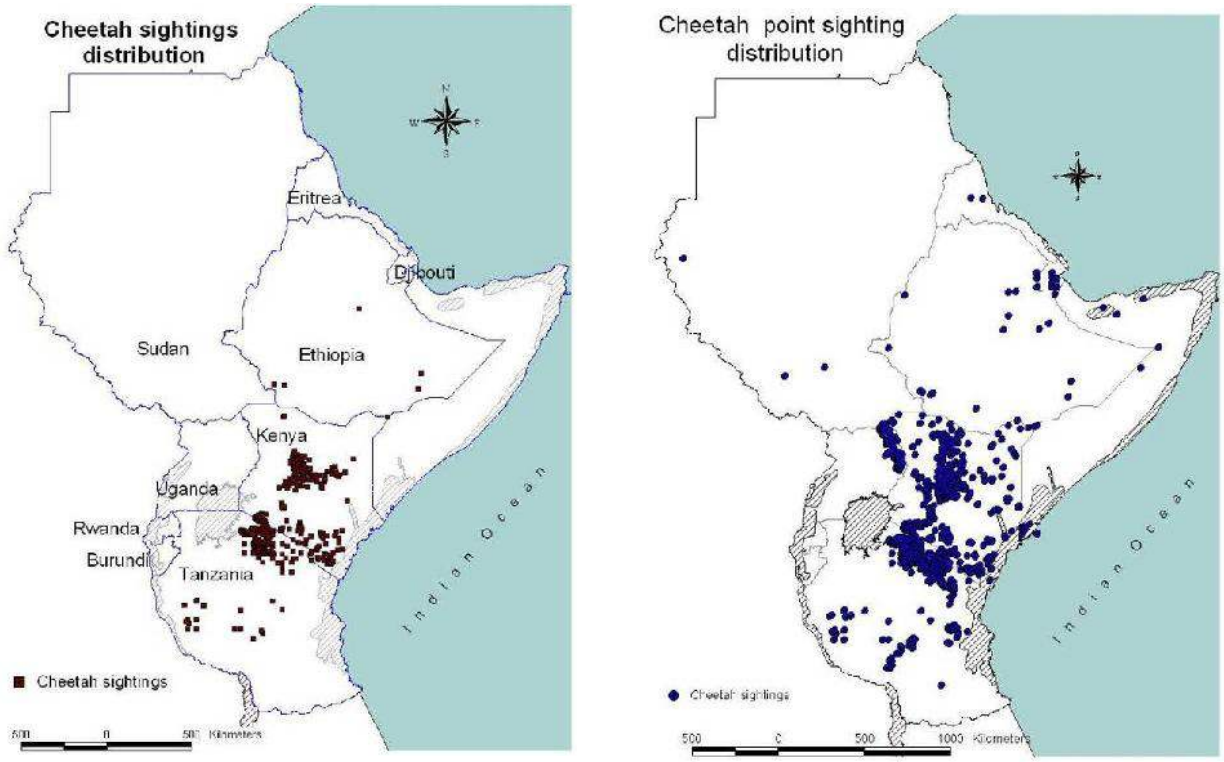
Figure 3.1 *Cheetah historical range, prior to the impact of human activity, a) as previously documented prior to this workshop (Myers, 1975) and b) after revision during the workshop.*

The highest cheetah densities have been recorded in wooded savannah (Caro, 1994; Marker *et al.*, in press). However, the species lives at low density wherever it occurs, partly because it comes into competition with other large carnivores, such as lion and spotted hyaena (Durant, 1998). Because of this, cheetah densities in pristine wilderness areas that harbour large numbers of other large carnivores are similar to densities in relatively degraded habitat where prey densities are low and large carnivores have been excluded. This is because the best habitats attract the highest densities of competing carnivores. It unlikely, therefore, that cheetah were ever abundant, despite their broad geographical distribution.

3.2 Current distribution

3.2.1 Point location data

Mapping of current distribution undertaken at the workshop was informed by maps of recent and historical data on cheetah locations (mainly sightings) compiled prior to the workshop (Figure 3.2, Appendix 3). A sighting observation signifies that cheetah have definitely occurred in a particular area, but does not signify whether there is a resident breeding population or whether the sighting involved transient individuals. Repeated sightings in a particular area are likely to indicate a resident population. The absence of sighting information in an area can mean one of two things: either there are no cheetah in the area, or there are cheetah in the area but they have not been recorded. The latter explanation is likely to be valid in areas where there are few observers, as this provides little opportunity for recording cheetah, and is a likely explanation for the absence of recent sightings from Sudan and Somalia (Figure 3.2).



a) ***b)***

Figure 3.2 *Sightings of cheetah across the region a) from 1997 to 2007 and b) including records dating from 1968-1996.*

3.2.2 Categories of current geographical range

Since cheetah distribution is imperfectly known across the region, the mapping process recognised six categories of current geographical range (Figure 3.3). These categories are more or less identical to those used for wild dogs (see chapter 4). Further details on range definitions are provided in Appendix 3.

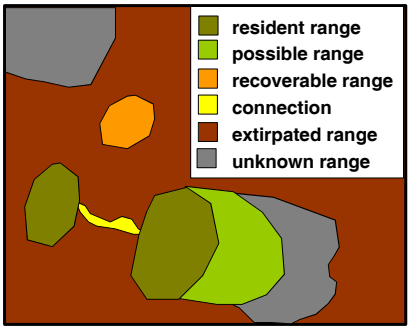


Figure 3.3 *Possible dispositions of different types of geographic range on an imaginary map*

(1) Resident range: land where cheetah are known to be still resident

(2) Possible range: land where cheetah may still be resident, but where residency has not been confirmed in the last 10 years.

(3) Connecting range: land where cheetah may not be resident, but which dispersing animals may use to move between occupied areas, or to recolonise extirpated range. Such connections might take the form of 'corridors' of continuous habitat or 'stepping stones' of habitat fragments.

(4) Unknown range: land where the species' status is currently unknown and cannot be inferred using knowledge of the local status of habitat and prey.

Extirpated range: land where the species has been extirpated. This can be further divided into:

(5) Unrecoverable range: land where habitat has been so heavily modified (e.g. by cultivation or urbanisation) or fragmented as to be uninhabitable by resident animals for the foreseeable future.

(6) Recoverable range: land where habitat and prey remain over sufficiently large areas that either natural or assisted recovery of cheetah might be possible within the next 10 years if reasonable conservation action were to be taken.

3.2.3 Current distribution across different range categories

Figure 3.4 shows cheetah geographic range as mapped by workshop participants in 2007, according to the six categories above; Table 3.1 presents the same data in a quantitative format.

The current geographic distribution of cheetah is greatly reduced in comparison with their historical distribution. Cheetah are known to be resident in only about 6% of their historical range, and are possibly present in another 18% of their historical range. Even if all the areas where they could possibly be present turn out to hold resident populations, this still represents an apparent loss of approximately three quarters of their historical range, whilst, if the possible areas are shown not to hold resident populations, there could be a loss of over 90% of historical range. Ethiopia, Kenya and Tanzania contain sizeable areas of possible range for cheetah. In these areas, surveys to establish the status of the species are a clear priority.

No information on distribution was available for 63% of the species' historical geographic range. If even a small proportion of this 'unknown' range still supports cheetah, the species' status could be more encouraging than the data on resident and possible range would imply. Most of the 'unknown' range falls in Sudan, a country which is just emerging from civil war, and where there has hence been

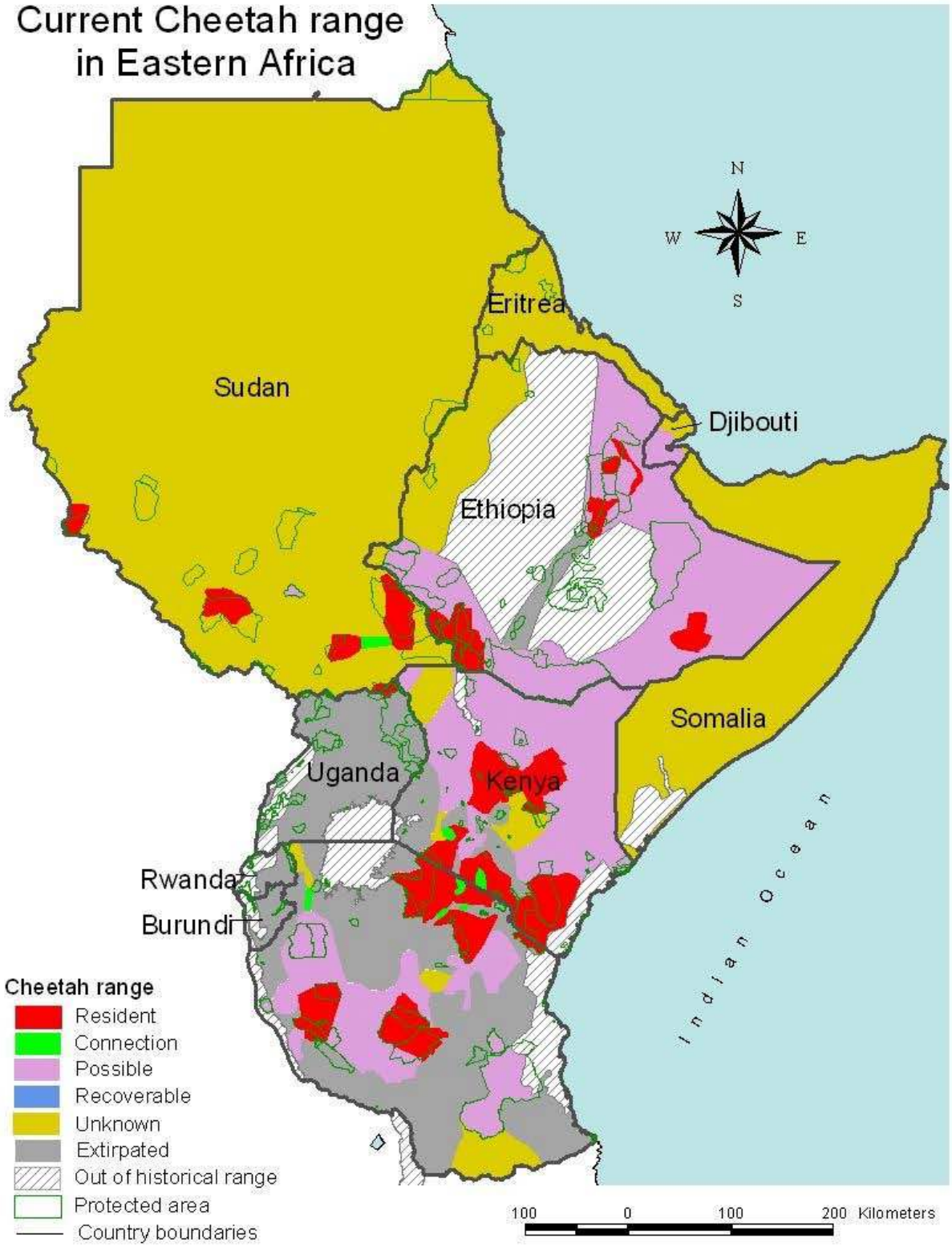


Figure 3.4 *Cheetah distribution in 2007 as mapped by participants at the workshop. Protected areas shown in this map include national parks, game reserves and conservation areas, and are all within IUCN Categories I-IV.*

Table 3.1 *Distribution of cheetah in range states within eastern Africa (note percentage sub-totals and totals were calculated as the total land area estimated to be in each category of cheetah range in 2007, divided by the total land area falling inside historic cheetah range).*

		Area (km²) and % of historic range falling in each range category											
	Historical	*resident*		*possible*		*connecting*		*unknown*		*recoverable*		*unrecoverable*	
Country	**range**	km²	%	km²	%	km²	%	km²	%	km²	%	km²	%
Countries represented at workshop													
Ethiopia	621,937	50,288	8.1	423,259	68.1	0	0.0	122,100	19.6	0	0	26,290	4.2
Kenya	475,133	107,412	22.6	266,827	56.2	3,677	0.8	40,192	8.5	0	0	57,025	12.0
Sudan	2,351,492	47,013	2.0	1,548	0.1	3,605	0.2	2,299,326	97.8	0	0	0	0.0
Tanzania	729,512	103,685	14.2	188,939	25.9	2,938	0.4	44,262	6.1	0	0	389,688	53.4
Uganda	164,125	2,188	1.3	0	0.0	0	0.0	0	0.0	0	0	161,937	98.7
Sub-total	*4,342,199*	*310,586*	*7.2*	*880,573*	*20.3*	*10,220*	*0.2*	*2,505,880*	*57.7*	*0*	*0*	*634,940*	*14.6*
Countries not represented at workshop													
Burundi	15,826	0	0	0	0	0	0	0	0.0	0	0	15,826	100.0
Djibouti	19,818	0	0	12,085	61.0	0	0	7,733	39.0	0	0	0	0.0
Eritrea	114,269	0	0	0	0	0	0	114,269	100.0	0	0	0	0.0
Rwanda	12,353	0	0	0	0	0	0	0	0.0	0	0	12,353	100.0
Somalia	537,027	0	0	0	0	0	0	537,027	100.0	0	0	0	0.0
Sub-total	*699,293*	*0*	*0*	*12,085*	*1.7*	*0*	*0*	*659,029*	*94.2*	*0*	*0*	*28,179*	*4.0*
Grand total	5,041,492	310,586	6.2	892,658	17.7	10,220	0.2	3,164,909	62.8	0	0	663,119	13.2

little survey work for any species. Somalia consists almost entirely of unknown range, having constraints similar to, if not worse than, those in Sudan. Ethiopia and Eritrea also contain sizeable areas of unknown range. Surveys in all these countries are clear priorities.

Overall, cheetah were agreed to be extirpated across a minimum of 13% of their historical range. This is almost certainly an under-estimate for reasons similar to those described for the estimate of resident range. That is, it is likely that a high proportion of the 'unknown' range, and a proportion of the 'possible' range, no longer supports cheetah. None of this extirpated range was considered recoverable, that is, it was thought to be unable to support cheetah populations in future. This suggests that, once habitat is lost to cheetah, it may be gone forever. While there are large areas of unknown range, the evidence from countries which have relatively complete information (Ethiopia, Tanzania, Kenya, Rwanda, Burundi and Uganda) suggests that a marked contraction in geographic range has occurred in this species. It is therefore likely that a similar pattern will emerge in countries with substantial areas of unknown range, such as Sudan and Somalia, once sufficient information becomes available.

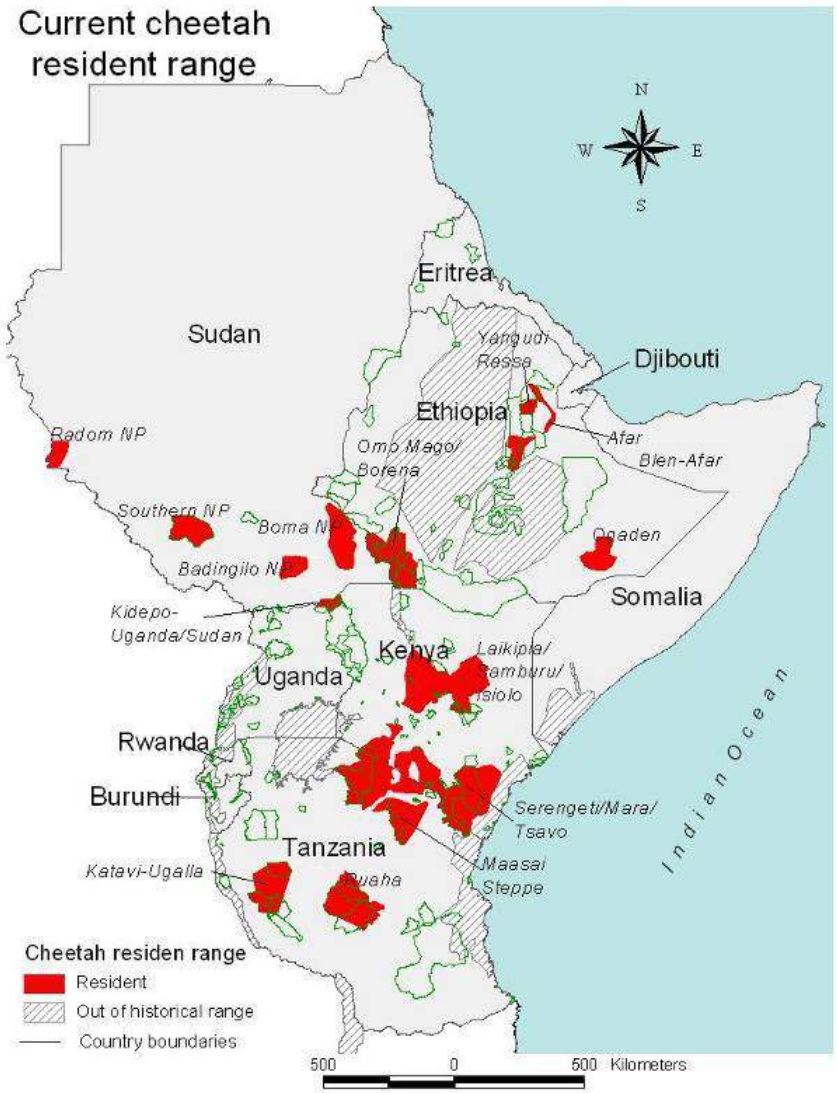


Figure 3.5 *Areas of resident cheetah range in eastern Africa, as identified by workshop participants.*

A small, but important 0.2% (10,220km^2) of historical range is considered potentially significant for cheetah conservation because it connects areas of resident or possible range. Most such connecting habitat was identified in Kenya

and Tanzania. This is probably a reflection of the better knowledge base available in those two countries, both of which have active national cheetah monitoring programmes, and does not mean that connecting range is not important in other range states. Indeed, a small amount of connecting range was identified in southern Sudan (Figure 3.4). Whilst connecting range is small in size, its importance outweighs the total area, as without maintaining such areas the regional cheetah population will become even more fragmented and genetically isolated. Connecting range, by definition (Section 3.3), is believed not to contain resident populations and hence is likely to be highly threatened.

Table 3.2 *Areas in eastern Africa considered by participants to support resident cheetah populations. Population estimates are derived from a number of different methodologies and have a very wide margin of error. Locations are shown in Figure 3.5.*

Name	**Country**	**Trans-boundary?**	**Area (km²)**		**Population estimate (adults)**	
			Total	*Protected*	*Total*	*Protected*
Afar	Ethiopia	no	4,073	997	40*	10‡
Blen-Afar	Ethiopia	no	7,342	6,497	70*	60‡
Ogaden	Ethiopia	no	11,095	0	110*	0‡
Omo Mago/Borena	Ethiopia	possibly	25,010	17,281	250*	170‡
Yangudi Rassa	Ethiopia	no	2,768	2,768	30*	30‡
Laikipia/Samburu	Kenya	no	47,390	2,074	450†	20‡
Badingilo NP	Sudan	no	7,482	1,266	70*	12‡
Boma NP	Sudan	possibly	19,294	13,106	190*	130‡
Kidepo-Uganda	Uganda/Sudan	yes	3,332	833	12†	3‡
Radom NP	Sudan	possibly	6,122	3,491	60*	30‡
Southern NP	Sudan	no	12,973	9,629	130*	100‡
Katavi-Ugalla	Tanzania	no	20,917	9,163	150*	90‡
Maasai Steppe	Tanzania	no	17,743	3,222	100*	30‡
Ruaha	Tanzania	no	26,530	20,040	200†	150‡
Serengeti/Mara/Tsavo	Kenya/Tanzania	yes	98,616	36,177	710†	260‡
	Grand total:		**310,687**	**126,544**	**2,572**	**1,095**

*population sizes estimated from the size of the polygon using a conservative density of 1 adult per 100km²; †population sizes estimated by delegates using a variety of methodologies; ‡sizes of protected populations estimated by multiplying total population size by the proportion of total land area falling inside protected areas.

Table 3.2 provides greater detail on the areas of resident range mapped by participants; locations of these areas are shown in Figure 3.5. The population estimates provided in Table 3.2 must be interpreted with great caution as they were derived using a variety of formal and informal approaches, often on the basis of extremely sparse data; however there are no alternative more accurate data available. Nonetheless, of the 15 populations, only four are estimated to number ≥200 adults and independent adolescents.

3.2.4 Distribution across protected areas

As is apparent from Figure 3.4, a comparatively small proportion of current geographical range of cheetah falls inside protected areas (Table 3.3). Overall, only slightly more than one third of the total resident range occurs on protected land, with the remaining population, close to two thirds, occurring outside the region's protected area system. These parts of the regional population are by no means secure, and in most of the areas listed there are heavy pressures on the land surrounding the protected areas. As an example, if all such unprotected lands were lost, the single largest population currently identified (the Serengeti/Mara/Tsavo population) would number around 260 individuals (rather than >700) and would

constitute a number of small fragmented sub-populations rather than a single population. Several of these sub-populations would be too small to remain viable and hence would be expected ultimately to become extinct.

Like resident range, the majority (79%) of possible range falls outside government-designated protected areas. All connecting areas fall outside protected areas, and hence the future of these valuable corridors is unlikely to be secure. There is no recoverable range for cheetah and hence ensuring the maintenance of range outside protected areas in a systematic way so as to maintain connectivity is likely to be critical for preservation of this species.

Table 3.3 *Occurrence of areas known or suspected to be important for cheetah conservation in IUCN Category I-IV protected areas. Percentages are calculated as the land area in each category falling inside protected areas, divided by the total land area in that range category.*

	Area (km²) and % of each range category falling inside protected areas							
	resident		*possible*		*connecting*		*recoverable*	
Country	km²	%	km²	%	km²	%	km²	%
Countries represented at workshop								
Ethiopia	27,542	54.8	113,685	26.9	0	0	0	0
Kenya	21,199	19.7	10,860	4.1	0	0	0	0
Sudan	12,977	27.6	1,548	30.1	0	0	0	0
Tanzania	49,474	47.7	55,244	29.2	0	0	0	0
Uganda	2,167	99.0	0	0	0	0	0	0
Sub-total	***113,359***	***36.5***	***181,337***	***20.5***	***0***	***0***	***0***	***0***
Countries not represented at workshop								
Burundi	0	0	0	0	0	0	0	0
Djibouti	0	0	0	0	0	0	0	0
Eritrea	0	0	0	0	0	0	0	0
Rwanda	0	0	0	0	0	0	0	0
Somalia	0	0	0	0	0	0	0	0
Sub-total	***0***	***0***	***0***	***0***	***0***	***0***	***0***	***0***
Grand total	***113,359***	***36.5***	***181,337***	***20.5***	***0***	***0***	***0***	***0***

3.2.5 Distribution across international boundaries

As shown in Figure 3.5, several important resident cheetah populations are known or suspected to traverse international boundaries, either because the resident population spans the boundary, or because a polygon of known resident range abuts a polygon of possible range in a neighbouring country. Of the 15 resident populations listed in Table 3.2, five (33%) are known or strongly suspected to be trans-boundary, representing an estimated 1,220 adults, nearly half the estimated population across the entire region. These populations span the borders between Uganda and Sudan, Sudan and Ethiopia, Tanzania and Kenya, and Sudan, Kenya and Ethiopia. If possible range is included, the number of trans-boundary populations is increased. This large number of trans-boundary populations, and their importance in terms of the numbers of cheetah they contain, highlights the likely need for trans-boundary management of cheetah conservation across the region.

3.2.6 Distribution across ecoregions

If ecologically representative populations of cheetah are to be conserved, then efforts should be made to ensure that populations encompass a wide range of habitats. Cheetah range (resident, possible and connecting) was therefore mapped with regard to the ecoregions identified by the World Wide Fund for Nature (WWF, Olson *et al.*, 2001). The numbers of resident and possible range polygons falling entirely or partly within each ecoregion were estimated from the distribution data

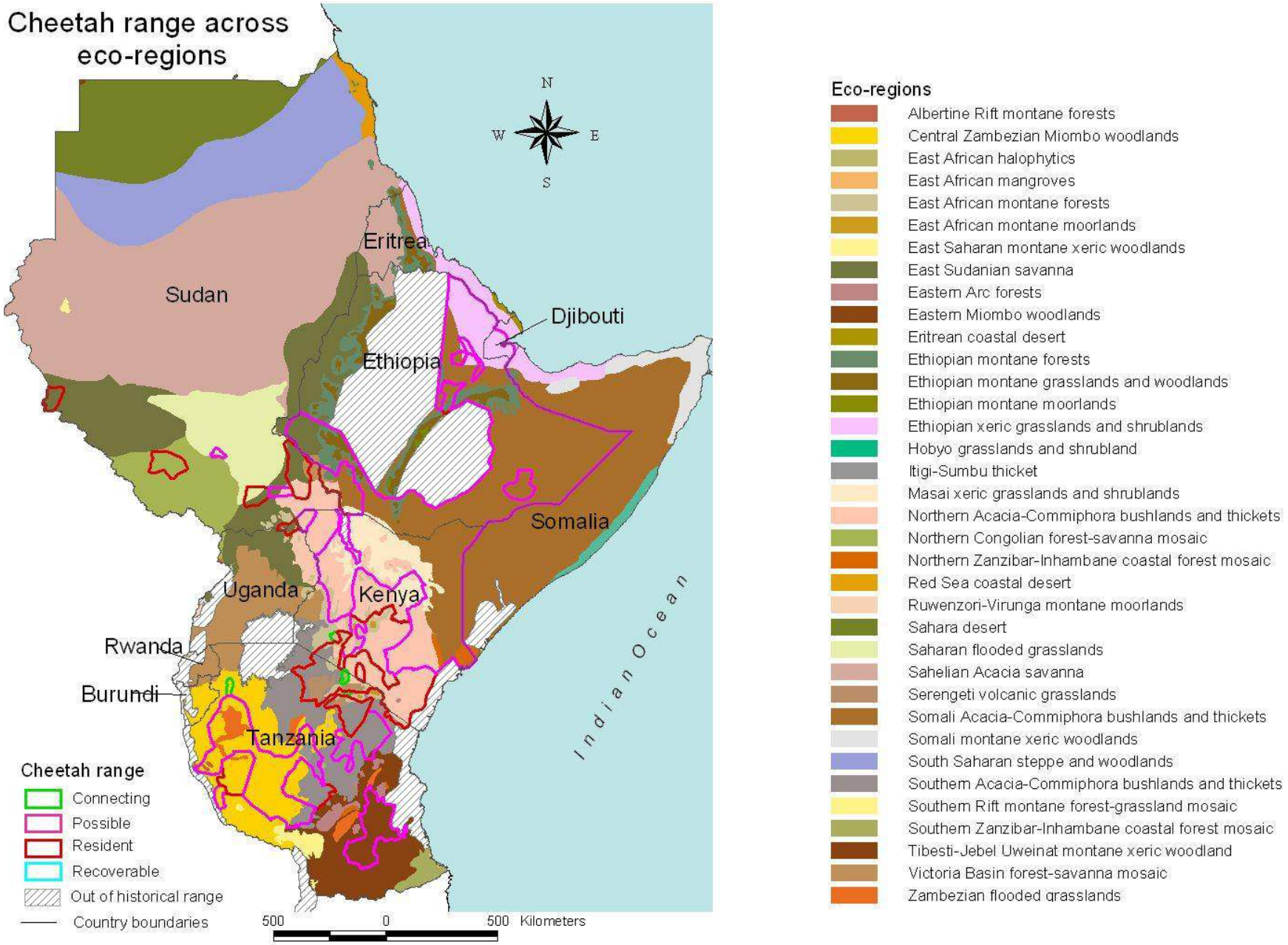


Figure 3.7 *Distribution of cheetah geographic range across WWF ecoregions*

(Table 3.4). To account for inaccurate estimation of the boundaries of each ecoregion and range polygon, and to ensure interpretation on a spatial scale relevant to cheetah home range, this analysis excludes any part of a range polygon measuring <500km^2. The data presented in Table 3.4 are of potential interest for targeting conservation activities. The analysis shows that there are several ecoregions which each contain only one resident population of cheetah.

The ecoregion that contains the greatest area of resident cheetah range by far (94,000km^2 or 30% of total resident range) comprises the northern *Acacia-Commiphora* bushlands and thickets. Another five ecoregions – East African montane forests; East Sudanian savannah; northern *Acacia-Commiphora* bushlands and thickets; Somali *Acacia-Commiphora* bushlands and thickets; and southern *Acacia-Commiphora* bushlands and thickets – each constitute part of 4-5 polygons of resident range. A further six ecoregions – Central Zambezian Miombo woodlands; Ethiopian montane forests, Ethiopian xeric grasslands and shrublands, Serengeti volcanic grasslands, and Victoria basin forest savannah mosaic – form part of the range of only two resident populations. The analysis identified three ecoregions which appear in only a single polygon of cheetah resident range within eastern Africa. These are:

1. The northern Congolian forest-savannah mosaic, which covers much of Uganda and Rwanda and also occurs in western Kenya and northwestern Tanzania, where there are no resident populations of cheetah. The only resident population of cheetah in this ecoregion is the Boma National Park population which is in a comparatively small patch of this habitat in south Sudan bordering Ethiopia.
2. Saharan flooded grassland, which only occurs in Sudan, harbours a single population in the Southern National Park polygon.
3. Zambezian flooded grassland, which comprises part of the land occupied by a single population in the Katavi-Ugalla ecosystem of western Tanzania.

The representation of possible range for cheetah across ecoregions largely follows the pattern of resident range, with those ecoregions well represented in resident range being the most common for possible range as well. However, there are four ecoregions that are represented in possible range for cheetah but which are not represented in resident range. These are:

1. The eastern miombo woodlands, which harbour two possible range polygons, in the Selous and on the Maasai steppe, covering a substantial area totalling 39,000km^2.
2. The Ethiopian montane grasslands and woodlands ecoregion, which may help support a possible population in the eastern and southern portion of Ethiopia.
3. The Itigi Sumbu thicket, in itself a very small ecoregion, crosses one polygon of possible cheetah range in central Tanzania.
4. The northern Zanzibar-Inhambane coastal forest mosaic, which is represented only in a single pocket of possible cheetah range in eastern Kenya, close to the Somalia border.

Populations within these ecoregions should be seen as priorities for surveys as they may harbour cheetah in rare ecosystems.

Connecting range is limited, but is nonetheless important for the reasons outlined earlier. It occurs in only four habitat types, of which two are relatively rare (Table 3.4).

The distribution of range polygons across ecoregions is another important way to help identify priority areas for surveys and conservation. Table 3.5 lists polygons of possible range that overlap ecoregions which are represented in two or fewer polygons of resident cheetah range. All the polygons of possible range listed in Table 3.5 overlap one or more poorly represented ecoregion, however there are two

Table 3.4 *Distribution of cheetah range across WWF ecoregions within eastern Africa. Data give the number of range polygons, and combined area of land, falling within each ecoregion. Land parcels ≤500km² are excluded, as are land parcels falling within the Albertine Rift montane forest, East African montane moorland and East African halophytics ecoregions as it is unlikely cheetah ever reside in these habitat types.*

	Resident range		**Possible range**		**Connecting range**	
Ecoregion	*number*	*area (km²)*	*number*	*area (km²)*	*number*	*area (km²)*
Central Zambezian Miombo woodlands	2	31,012	3	93,618	1	1,727
East African mangroves	0	0	0	0	0	0
East African montane forests	4	12,690	2	9,326	2	2,050
East Sudanian savannah	5	24,098	2	21,767	0	0
Eastern Arc forests	0	0	0	0	0	0
Eastern Miombo woodlands	0	0	2	38,952	0	0
Ethiopian montane forests	2	5,169	1	38,772	0	0
Ethiopian montane grasslands and woodlands	0	0	1	18,686	0	0
Ethiopian xeric grasslands and shrublands	2	3,352	1	47,872	0	0
Itigi-Sumbu thicket	0	0	1	3,072	0	0
Masai xeric grasslands and shrublands	2	16,055	2	71,514	0	0
Northern *Acacia-Commiphora* bushlands & thickets	5	94,718	4	91,424	1	2,220
Northern Congolian forest-savannah mosaic	1	12,973	0	0	0	0
Northern Zanzibar-Inhambane coastal forest mosaic	0	0	1	8,475	0	0
Saharan flooded grasslands	1	3,772	1	1,191	0	0
Sahelian Acacia savannah	0	0	0	0	0	0
Serengeti volcanic grasslands	2	13,532	0	0	1	539
Somali *Acacia-Commiphora* bushlands & thickets	5	33,487	4	420,858	0	0
South Saharan steppe and woodlands	0		0	0	0	0
Southern *Acacia-Commiphora* bushlands & thickets	4	50,640	0	0	0	0
Southern Rift montane forest-grassland mosaic	0	0	0	0	0	0
Southern Zanzibar-Inhambane coastal forest mosaic	0	0	0	0	0	0
Victoria Basin forest-savannah mosaic	2	3,925	1	1,642	0	0
Zambezian flooded grasslands	1	1,112	1	13,282	0	0

Table 3.5 *Polygons of possible range which cover ecoregions poorly represented by the resident range (using ≤2 areas of resident range each ≥500km² as a definition of 'poor' representation). Surveys of these areas could be potentially valuable for expanding cheetah conservation efforts to better represent the ecoregions formerly inhabited by cheetah. Locations of the polygons are provided in Figure 3.7.*

	Polygon name						
Ecoregion	*Kenya/ Ethiopia*	*Malagarasi/ Chunya*	*Maasai Steppe South*	*Nkasi-Ufipa*	*Selous*	*Shambe NP*	*Representation in resident range*
Central Zambezian miombo woodlands		X	X	X			2
Eastern Miombo woodlands		X	X		X		0
Ethiopian montane forests	X						2
Ethiopian montane forests and grasslands	X						0
Ethiopian xeric grasslands and shrublands	X						2
Itigi-Sumbu thicket		X					0
Masai xeric grasslands and shrublands	X						2
Northern Congolian forest-savannah mosaic						X	1
Northern Zanzibar-Inhambane coastal forest mosaic	X				X	X	0
Saharan flooded grasslands						X	1
Serengeti volcanic grasslands							2
Victoria Basin forest-savannah mosaic	X						2
Zambezian flooded grasslands		X			X		1
Total ecoregions represented in polygon	**6**	**4**	**2**	**1**	**3**	**2**	**-**

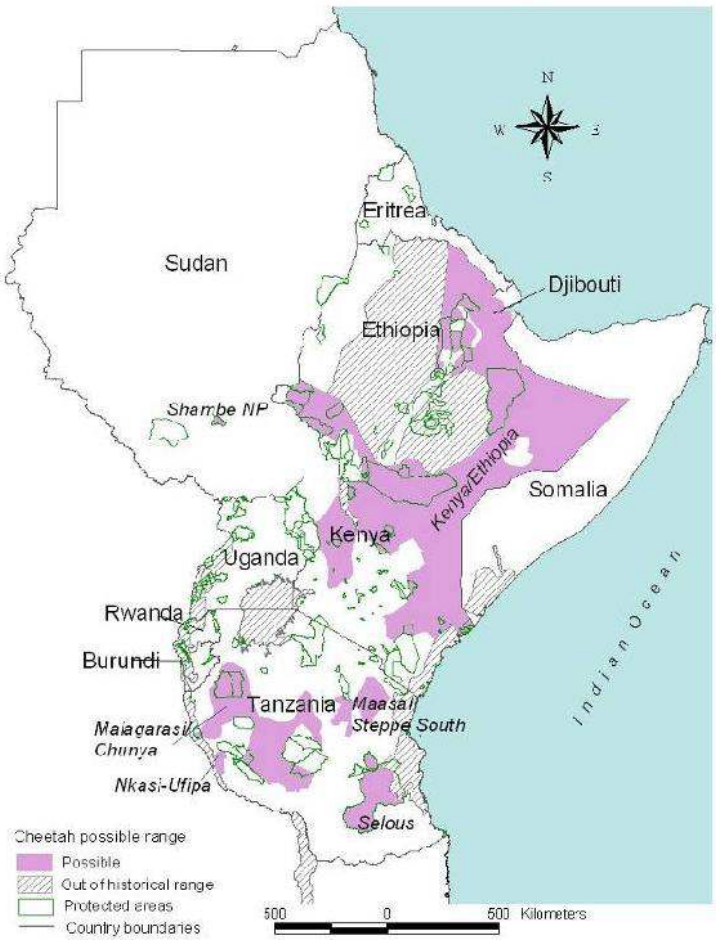


Figure 3.7 *Areas of possible cheetah range which fall in ecoregions represented by fewer than three polygons of resident range.*

polygons (Kenya/Ethiopia, and Malagarasi/Chunya in Tanzania) that together provide representation for 10 poorly represented polygons (see Figure 3.7). Only the Northern Congolian forest savannah-mosaic, Saharan flooded grasslands and Serengeti volcanic grasslands are not represented by these two polygons. The addition of Shambe National Park in Sudan would provide additional representation for the first two of these ecoregions. The latter ecoregion, Serengeti volcanic grasslands, is geographically localised and is not represented elsewhere in the region.

3.3 Conclusions

The geographical distribution of cheetah in eastern Africa has contracted drastically in recent years. Cheetah are now known to inhabit only 6% of their previous historic range, despite the fact that historic range estimated here is smaller than that previously published. Only 15 populations are known to remain, and these are distributed across six of the 10 countries in the region. One of those countries, Uganda, supports only a fraction of a very small population bordering with Sudan. Of the remaining populations, only four are estimated to hold more than 200 adult and adolescent cheetah, and 64% of the area inhabited by these populations is unprotected. Several populations, which encompass nearly half the known resident population, span international boundaries and hence will depend on international cooperation for their survival.

Nonetheless, despite the small number of known populations, a substantial part of the region (18%) may possibly harbour resident populations, while an even larger area (63%) is completely unknown. These areas are priorities for surveys as, until the true extent of the distribution of cheetah is known, it is difficult to plan

systematically for the conservation of the species. Many of these possible populations or unknown areas cross international boundaries, and several of them may serve as linkages between known resident populations and hence are potentially critical for maintaining connectivity between populations. An even larger proportion of these areas is unprotected, reflecting the fact that more information is available about populations inside protected areas than those outside. The majority of Sudan and Somalia is classified as unknown range for cheetah, due to past or ongoing civil unrest, presenting clear priorities for surveys.

No areas were identified where recovery of extirpated cheetah populations might be possible. This indicates the irreversible nature of the decline in the distribution of cheetah. Once the habitat is gone, it is very difficult to recover it, demonstrating the importance of ensuring that planning for cheetah conservation be put in place as soon as possible, before habitat is irretrievably fragmented and lost.

– CHAPTER 4 –

THE DISTRIBUTION AND STATUS OF AFRICAN WILD DOGS WITHIN EASTERN AFRICA

4.1 Historical distribution

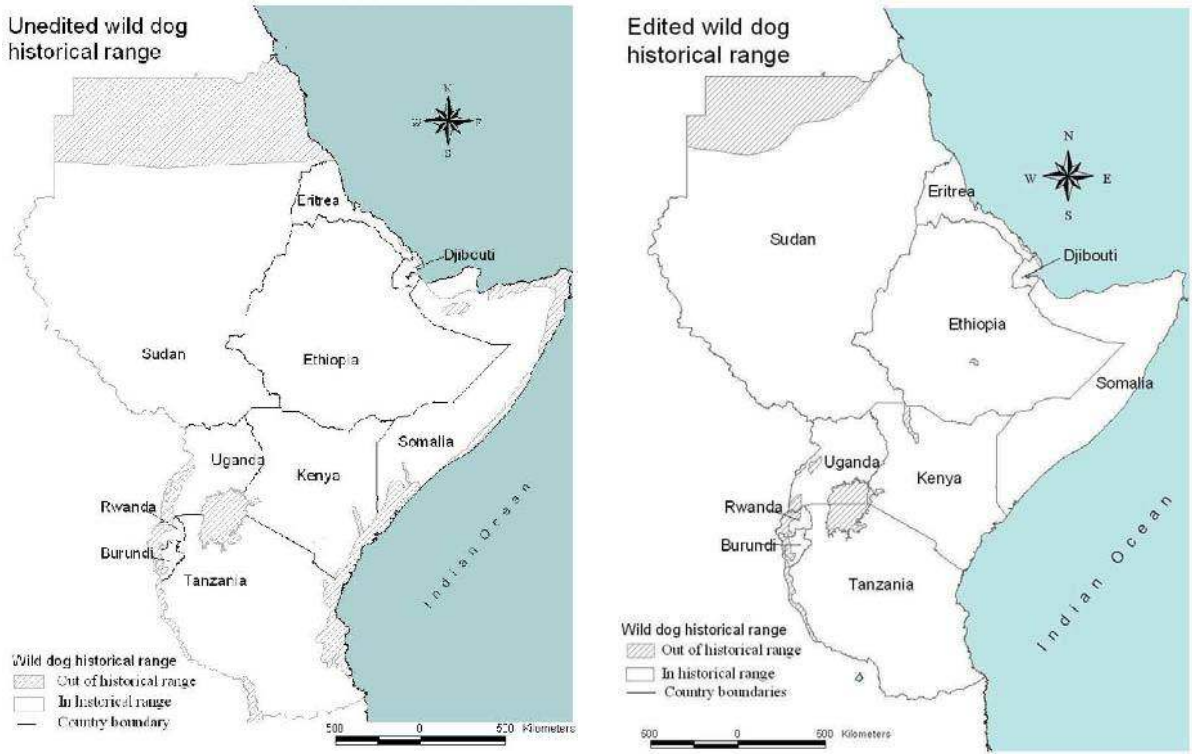
In the past, wild dogs were broadly distributed across eastern Africa. Wild dogs are habitat generalists, able to persist in a wide array of environmental conditions as long as prey are available. Although the highest wild dog densities have been recorded in wooded savannah (Creel *et al.*, 2002), populations have been recorded in habitats as diverse as short grasslands (Kuhme, 1965), montane forest (Dutson *et al.*, 2005), and mangroves (Figure 4.1). Before human activity modified substantial proportions of eastern Africa's natural habitats, wild dogs would have occupied most of the region, bounded in the east by the Indian Ocean, in the north by the sand deserts of the Sahara, and in the west by the lowland rainforests of the Congo basin.

Today, wild dogs remain uncommon even in essentially pristine wilderness, apparently due to negative interactions with larger carnivores (Creel *et al.*, 1996; Mills *et al.*, 1997). Hence, despite their formerly broad geographical distribution, wild dogs were probably never abundant.

Figure 4.1 *Wild dogs live in a wide array of habitats from montane forest (upper left, showing wild dogs in the Harenna forest in Ethiopia) and swamp margins (upper right) to desert (centre), semi-arid areas (lower left) and even, occasionally, mangrove forest (lower right, showing wild dogs swimming off the coast of Lamu District in northern Kenya).*

The map of wild dogs' historic distribution used in this process was updated in the course of the workshop from a pre-existing map. Participants amended the published historic range by (i) adding the coastal areas of Tanzania, Kenya and Somalia, where wild dogs have been reported in recent years, to the species' presumed historic range; (ii) bounding the distribution in northern Sudan by the

edge of sand deserts rather than an apparently arbitrary latitudinal line; and (iii) excluding a small area of the Ethiopian highlands that is above 3,500m (as wild dogs passing through these areas are considered vagrant; Figure 4.2).



a) **b)**

Figure 4.2 *Wild dog historical range, prior to the impact of human activity, a) as previously documented and b) after revision during the workshop.*

4.2 Current distribution

4.2.1 Point locations

The first step in mapping wild dogs' current distribution was to collate data on the locations of recent (i.e. during the past 10 years) confirmed records of wild dogs' presence, primarily (though not exclusively) sightings of live animals. The locations of these records are shown in Figure 4.3. These data are highly biased by observation effort: for example the large numbers of records from central Kenya and the eastern part of the Serengeti ecosystem in northern Tanzania reflect the presence of active wild dog research projects in these areas. By contrast, there are far fewer reports from Ethiopia and Sudan where no formal monitoring of wild dogs is underway. The wider spread of records across Tanzania partly reflects the fact that the country maintains an active national carnivore atlas.

The point locations shown in Figure 4.3 suggest that wild dogs' current geographic distribution, as estimated in 2007, is greatly reduced in comparison with their historical distribution.

4.2.2 Categories of current geographical range

Since wild dogs' distribution is imperfectly known across the region, the mapping process recognised six categories of current geographical range (Figure 4.4). Further details on range definitions are provided in Appendix 3.

(1) Resident range: land where wild dogs are known to be still resident
(2) Possible range: land where wild dogs may still be resident, but where residency has not been confirmed in the last 10 years.

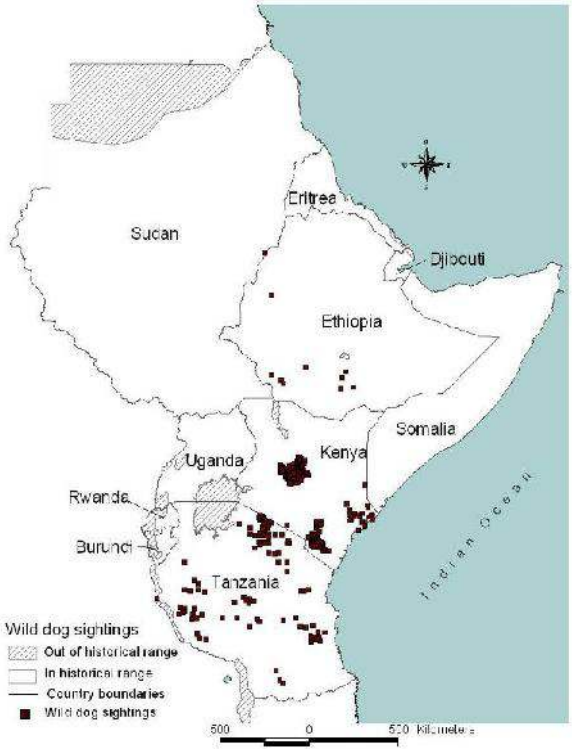


Figure 4.3 *Locations of confirmed wild dog sightings in 1997-2007*

Extirpated range: land where the species has been extirpated. This can be further divided into:

(3) unrecoverable range: land where habitat has been so heavily modified (e.g. by cultivation or urbanisation) or fragmented as to be uninhabitable by resident animals for the foreseeable future.

(4) recoverable range: land where habitat and prey remain over sufficiently large areas that either natural or assisted recovery of wild dogs might be possible within the next 10 years if reasonable conservation action were to be taken.

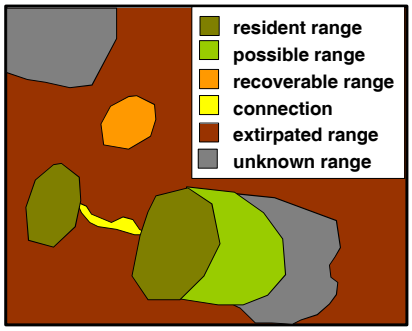


Figure 4.4 *Possible dispositions of different types of geographic range on an imaginary map*

(5) connecting range: land where wild dogs may not be resident, but which dispersing animals may use to move between occupied areas, or to recolonise extirpated range. Such connections might take the form of 'corridors' of continuous habitat or 'stepping stones' of habitat fragments.

(6) unknown range: land where the species' status is currently unknown and cannot be inferred using knowledge of the local status of habitat and prey.

4.2.3 Current distribution across different range categories

Figure 4.5 shows the areas of wild dogs' historical geographic range judged, in 2007, to fall into these six categories; Table 4.1 presents the same data in a quantitative format. Several important pieces of information are apparent.

First, wild dogs are considered to be still resident in approximately 7% of their historical range. Although this figure represents a 'worst case scenario', it does highlight the massive contraction in geographic range that appears to have occurred in this species.

Second, participants considered it possible that approximately 8% of wild dogs' historical range might still support resident populations, and no information on status was available for a massive 62% of the species' historical range. If even a small proportion of this 'possible' and 'unknown' range still supports wild dogs, the species' status could be more encouraging than the data on resident range would imply. Most of the 'unknown' range falls in Sudan, Ethiopia, Somalia and northern Kenya, highlighting the need for surveys in these countries. Ethiopia, Kenya and Tanzania contain large areas of 'possible' range. More information on promising survey areas is given in section 4.2.6 below.

Third, wild dogs are considered extirpated across approximately 23% of their historical range (including recoverable, unrecoverable and connecting range). This is almost certainly a substantial underestimate; it is likely that a high proportion of the 'unknown' range no longer supports wild dogs. Of this extirpated range, only 2.3% (26,542km^2) was considered likely to be able to support wild dog populations in future. The largest tract of such 'recoverable' range comprises the unoccupied parts of the Serengeti-Mara ecosystem on the Tanzania-Kenya border. Serengeti National Park formerly supported several wild dog packs although densities were never high (Burrows, 1995). It seems likely that recent recovery of wild dogs to the east of the protected area complex may be followed by natural recolonisation of the protected areas. Such a natural recovery would be highly beneficial for Kenya and Tanzania's tourist industries but, given past low densities inside the parks, would probably not represent a marked increase in the numbers of wild dog packs in the region.

Despite supporting no known resident populations, a further 0.8% (40,718km^2) of historical range was considered potentially important for wild dog conservation because it connected areas of resident or possible range.

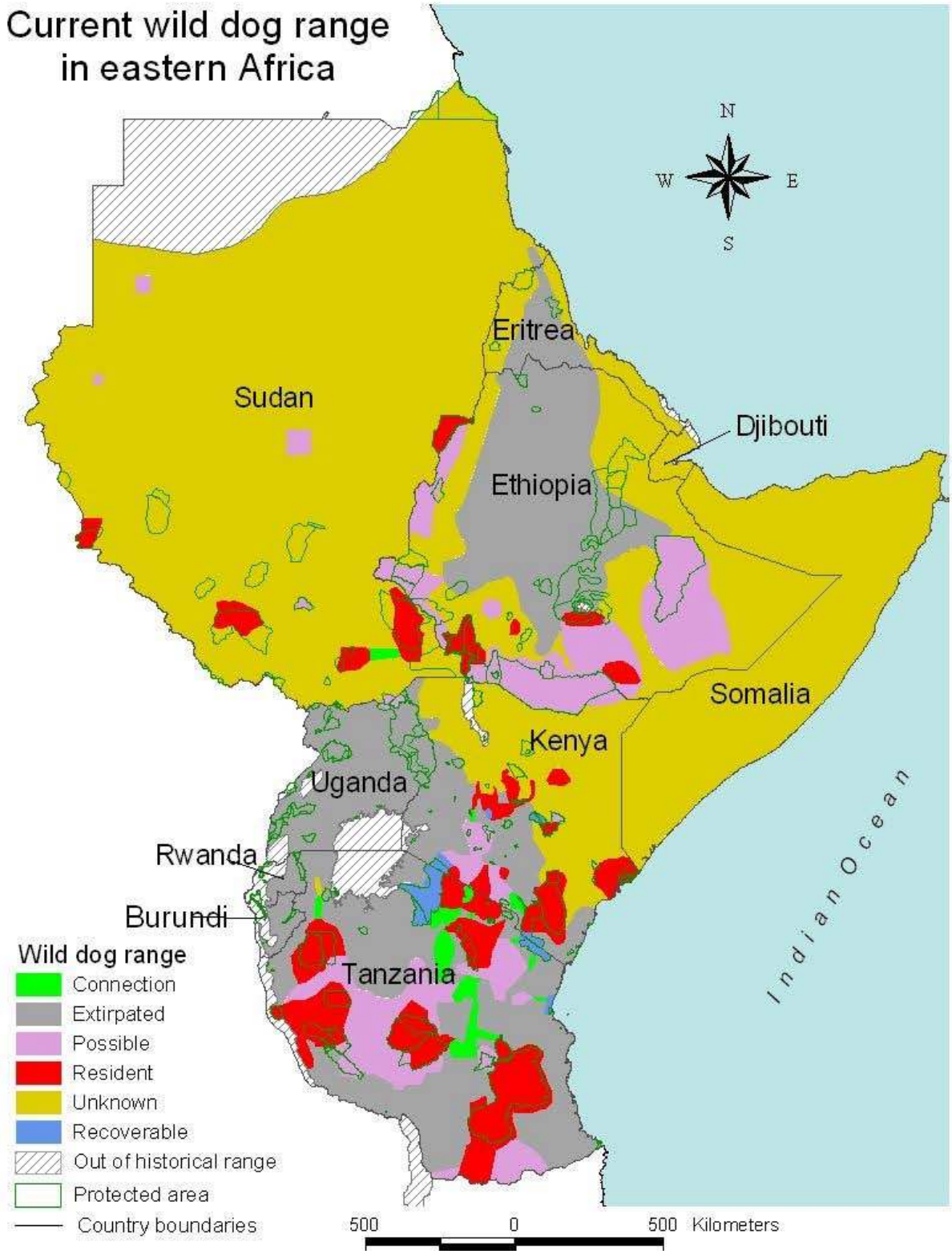


Figure 4.5 *Map of wild dog distribution and status as judged by participants in 2007. Protected areas shown in the map include national parks, game reserves and conservation areas, and are all within IUCN Categories I-IV.*

Table 4.1 *Distribution of African wild dogs in range states within eastern Africa (note that percentage subtotals and totals were calculated as the total land area estimated to be in each category of wild dog range in 2007, divided by the total land area falling inside historical wild dog range).*

		Area (km²) and % of historic range falling in each range category											
	Historical	*resident*		*possible*		*unrecoverable*		*recoverable*		*connecting*		*unknown*	
Country	**range**	km²	%	km²	%	km²	%	km²	%	km²	%	km²	%
Countries represented at workshop													
Ethiopia	1,009,389	28,389	2.8%	238,886	23.7%	373,634	37.0%	0	0%	0	0%	368,480	36.5%
Kenya	495,906	64,261	13.0%	29,513	6.0%	126,610	25.5%	6,739	1.4%	3,001	0.6%	265,782	53.6%
Sudan	2,028,708	53,664	2.6%	13,944	0.7%	2,128	0.1%	0	0%	3,605	0.2%	1,955,367	96.4%
Tanzania	777,901	196,510	25.3%	140,713	18.1%	385,469	49.6%	19,803	2.5%	34,112	4.4%	1,294	0.2%
Uganda	174,735	0	0%	1,759	1.0%	172,976	99.0%	0	0%	0	0%	0	0%
Sub-total	*4,486,639*	*342,824*	*7.6%*	*424,815*	*9.5%*	*1,060,817*	*23.6%*	*26,542*	*0.6%*	*40,718*	*0.9%*	*2,590,923*	*57.7%*
Countries not represented at workshop													
Burundi	15,827	0	0%	0	0%	15,827	100%	0	0%	0	0%	0	0%
Djibouti	18,274	0	0%	0	0%	0	0%	0	0%	0	0%	18,274	100%
Eritrea	111,660	0	0%	0	0%	47,455	42.5%	0	0%	0	0%	64,205	57.5%
Rwanda	12,354	0	0%	0	0%	12,354	100%	0	0%	0	0%	0	0%
Somalia	538,183	0	0%	0	0%	0	0%	0	0%	0	0%	538,183	100%
Sub-total	*696,298*	*0*	*0%*	*0*	*0%*	*75,636*	*10.9%*	*0*	*0%*	*0*	*0%*	*620,662*	*89.1%*
Grand total	5,182,937	342,824	6.6%	424,815	8.2%	1,136,453	21.9%	26,542	0.5%	40,718	0.8%	3,211,585	62.0%

Table 4.2 *Areas in eastern Africa considered by participants to support resident wild dog populations. Population estimates are calculated using a number of different methodologies and have a very wide margin of error. Locations are in Figure 4.6.*

Name	**Country**	**Area (km²)**		**Trans-boundary?**	**Population estimate**	
		total	*protected*		*adults*	*packs*
Arba Minch	Ethiopia	1,598	0	no	16*	1*
Filtu	Ethiopia	7,136	0	no	71*	6*
Harenna	Ethiopia	5,874	3,258	no	40†	2†
Omo-Mago	Ethiopia (& possibly Sudan)	13,783	12,565	possibly	40†	4†
Ijara-Lamu	Kenya (& possibly Somalia)	13,031	1,974	probably	130*	11*
Isiolo	Kenya	3,552	0	no	30†	2†
Kajiado-Loliondo	Kenya & Tanzania	29,089	18	yes	100†	8†
Kora-Nkitui	Kenya	2,008	2,008	no	20†	2†
Machakos	Kenya	1,062	0	no	25†	2†
Samburu-Laikipia	Kenya	13,885	368	no	220†	20†
Tsavo	Kenya	24,431	17,355	no‡	100†	12†
Bandingilo	Sudan	7,482	1,266	no	75*	6*
Boma	Sudan (& possibly Ethiopia)	19,295	13,105	possibly	193*	16*
Dinder	Sudan (& possibly Ethiopia)	7,775	7,726	possibly	78*	6*
Radom	Sudan (& possibly CAR)	6,139	3,511	probably	61*	5*
Southern	Sudan	12,973	9,629	no	130*	11*
Katavi	Tanzania	39,097	11,297	no	200†	17*
Kigosi-Moyowosi	Tanzania	23,290	11,332	no	400†	33*
Maasai Steppe	Tanzania	18,995	3,222	no	70†	8†
Rungwa-Ruaha	Tanzania	27,286	21,331	no	500†	35†
Selous	Tanzania (& Mozambique)	71,337	44,835	yes	800†¶	50†¶
	Grand total:	**349,117**	**164,800**		**3,299**	**257**

*population sizes estimated from the size of the polygon using a conservative density of 1 adult per 100km² and 12 adults (including yearlings) per pack; †population sizes estimated by delegates using a variety of methodologies; ‡recoverable range across border in Tanzania; ¶excludes the part of this population in Niassa, in neighbouring Mozambique (as Mozambique is considered to fall in southern Africa).

4.2.4 Distribution across protected areas

Much of wild dogs' current geographical range falls outside protected areas. This is quantified in Table 4.3. Overall, 52% of resident range, 76% of possible range, 18% of recoverable range and 99% of connecting range is estimated to fall outside government-designated protected areas. Hence, conservation activities outside protected areas are likely to be critical for preservation of this species.

4.2.5 Distribution across international boundaries

As shown in Figure 4.6, several important areas for wild dog conservation traverse international boundaries. Of the 21 resident populations listed in Table 4.2, seven (33%) are known or strongly suspected to be trans-boundary. These populations represent an estimated 1,400 adult and yearling wild dogs, roughly 40% of the regional total. If possible range is included, the number of trans-boundary populations is increased, with populations potentially spanning Ethiopia's borders with Sudan and Kenya, and Sudan's border with Uganda. In some cases areas of occupied habitat which appear to be disjunct within one country are in fact connected through another; for example, the areas of resident range in Kajiado District, Kenya, and to the East of the Masai Mara (also in Kenya) are connected through the Loliondo area of neighbouring Tanzania.

The large number of trans-boundary populations, and their importance in terms of the numbers of wild dogs they contain, highlights the need for trans-boundary management of wild dog conservation in several areas.

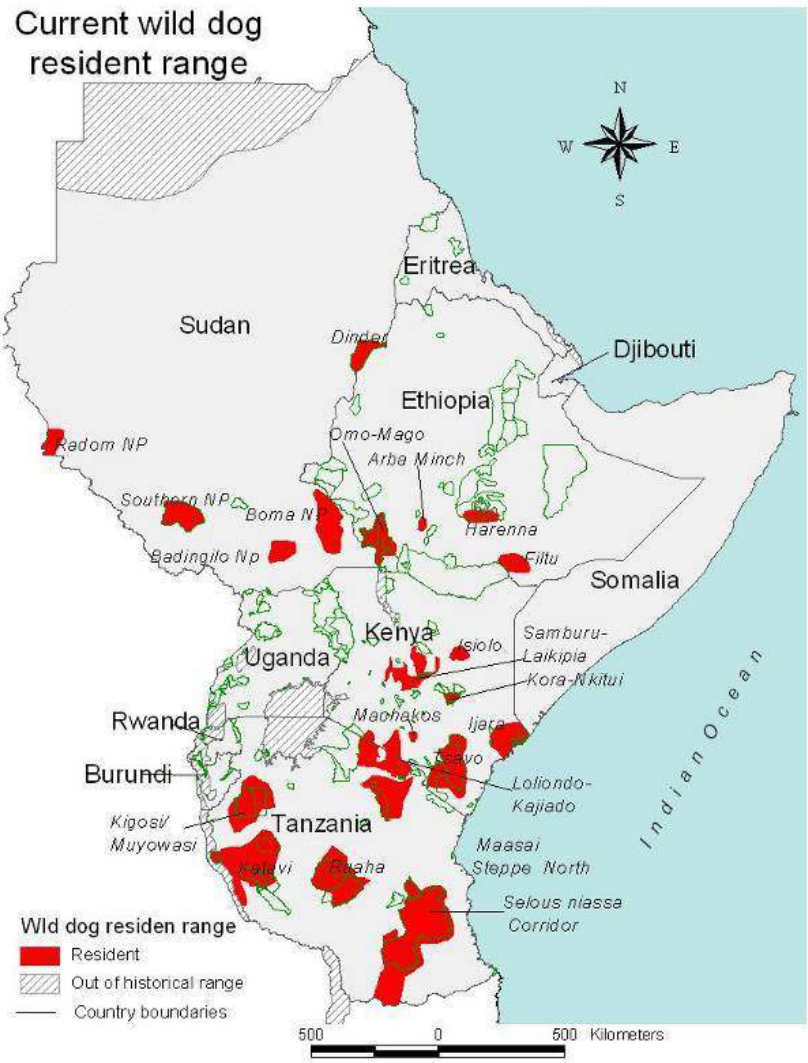


Figure 4.6 *Areas of resident wild dog range in eastern Africa, as identified by workshop participants.*

Table 4.3 *Occurrence of areas known or suspected to be important for wild dog conservation in IUCN Category I-IV protected areas. Percentages are calculated as the land area in each category falling inside protected areas, divided by the total land area in that range category.*

	Area (km²) and % of each range category falling inside protected areas							
	resident		*possible*		*recoverable*		*connecting*	
Country	km²	%	km²	%	km²	%	km²	%
Countries represented at workshop								
Ethiopia	15,822	55.7	89,728	37.6	0	–	0	–
Kenya	21,705	33.8	2,346	7.4	4,554	67.6	313	10.4
Sudan	35,237	65.7	2,381	17.1	0	–	0	–
Tanzania	92,035	47.0	7,555	5.4	17,156	86.4	186	0.5
Uganda	0	–	1,741	99.0	0	–	0	–
Sub-total	*164,799*	*48.1*	*103,751*	*24.4*	*21,709*	*81.6*	*499*	*1.3*
Countries not represented at workshop								
Burundi	0	–	0	–	0	–	0	–
Djibouti	0	–	0	–	0	–	0	–
Eritrea	0	–	0	–	0	–	0	–
Rwanda	0	–	0	–	0	–	0	–
Somalia	0	–	0	–	0	–	0	–
Sub-total	*0*	–	*0*	–	*0*	–	*0*	–
Grand total	**164,799**	**48.1**	**103,751**	**24.4**	**21,709**	**81.6**	**499**	**1.3**

4.2.6 Distribution across ecoregions

Figure 4.7 shows the locations of range polygons important for wild dog conservation (resident, possible, recoverable and connecting) across WWF's ecoregions (Olson *et al.*, 2001). Table 4.4 lists the numbers of resident and possible range polygons falling entirely or partly within each ecoregion; as for the analyses of cheetah distribution, to account for inaccurate estimation of the boundaries of each ecoregion and range polygon, and to ensure interpretation on a spatial scale relevant to wild dog ranging, this analysis excludes any part of a range polygon measuring <500km^2.

Table 4.4 and Figure 4.7 show that the major ecoregions occupied by wild dogs in eastern Africa are both Northern and Southern *Acacia-Commiphora* bushlands & thickets, Zambezian flooded grasslands, Central Zambezian Miombo woodlands, Serengeti volcanic grasslands and East African montane forests. The diversity of these ecoregions illustrates wild dogs' broad habitat preferences.

The data presented in Table 4.4 are of potential interest for targeting conservation activities. First, this analysis identifies two areas of resident wild dog range which fall within ecoregions not occupied by any other wild dog populations. The first of these is the Harenna Forest population in Ethiopia, which overlaps the Ethiopian montane forest ecoregion. This population (which is shown in Figure 4.1) is excluded from Table 4.4 because its area of occupancy is so small that it does not contain ≥500km^2 of any one ecoregion. However, as wild dog use of Ethiopian montane forest, an ecoregion not represented in Table 4.4, has been confirmed (Dutson *et al.*, 2005), this appears to be an ecologically unique population which is, by this criterion, of high conservation value.

A second wild dog population which appears to be ecologically unique is the Ijara-Lamu population, which is the only known resident population to inhabit the East African mangrove ecoregion. Once again, wild dog use of this unusual habitat type has been confirmed (see Figure 4.1). Given the small area of this ecoregion falling within the Ijara-Lamu range polygon (Table 4.4), it could be useful to conduct surveys in the adjoining area of Somalia, which shares the same ecoregion and may well support more wild dogs.

The areas identified as recoverable range all fall within ecoregions which are already reasonably well represented in number and geographical extent by polygons of resident range (Table 4.4). Hence, while wild dog recovery in areas such as the Serengeti ecosystem should be encouraged – to restore ecological functionality, to increase wild dog numbers, and to enhance tourism opportunities – such recovery is unlikely to greatly influence representation across ecoregions. In contrast, the distribution of possible range polygons across ecoregions is one way to help identify priority areas for surveys. Table 4.5 lists polygons of possible range that might be good targets for surveys as they include ecoregions which are poorly represented by resident range. Several polygons of possible range cover ecoregions not represented in the resident range; if these areas do, in fact, support wild dog populations they would be ecologically unique by this criterion. Other polygons cover ecoregions represented by just one or two polygons of resident range. In total there are 12 polygons of possible range which would make substantial contributions to representation of wild dog populations across ecoregions if they did, in fact, still support wild dogs. Of these 12 polygons, six are in Tanzania, four are in Sudan, one is in Ethiopia and the last spans the Ethiopia-Kenya border; their locations are shown in Figure 4.8.

Although Tanzania contains a greater area of resident range than any other country in the region (Table 4.1), it also contains the greatest number of survey sites likely to contribute to ecological representation, because it is a biodiverse country comprising a large number of ecoregions. While Sudan comprises a substantially smaller number of ecoregions (Figure 4.7), it contains a relatively

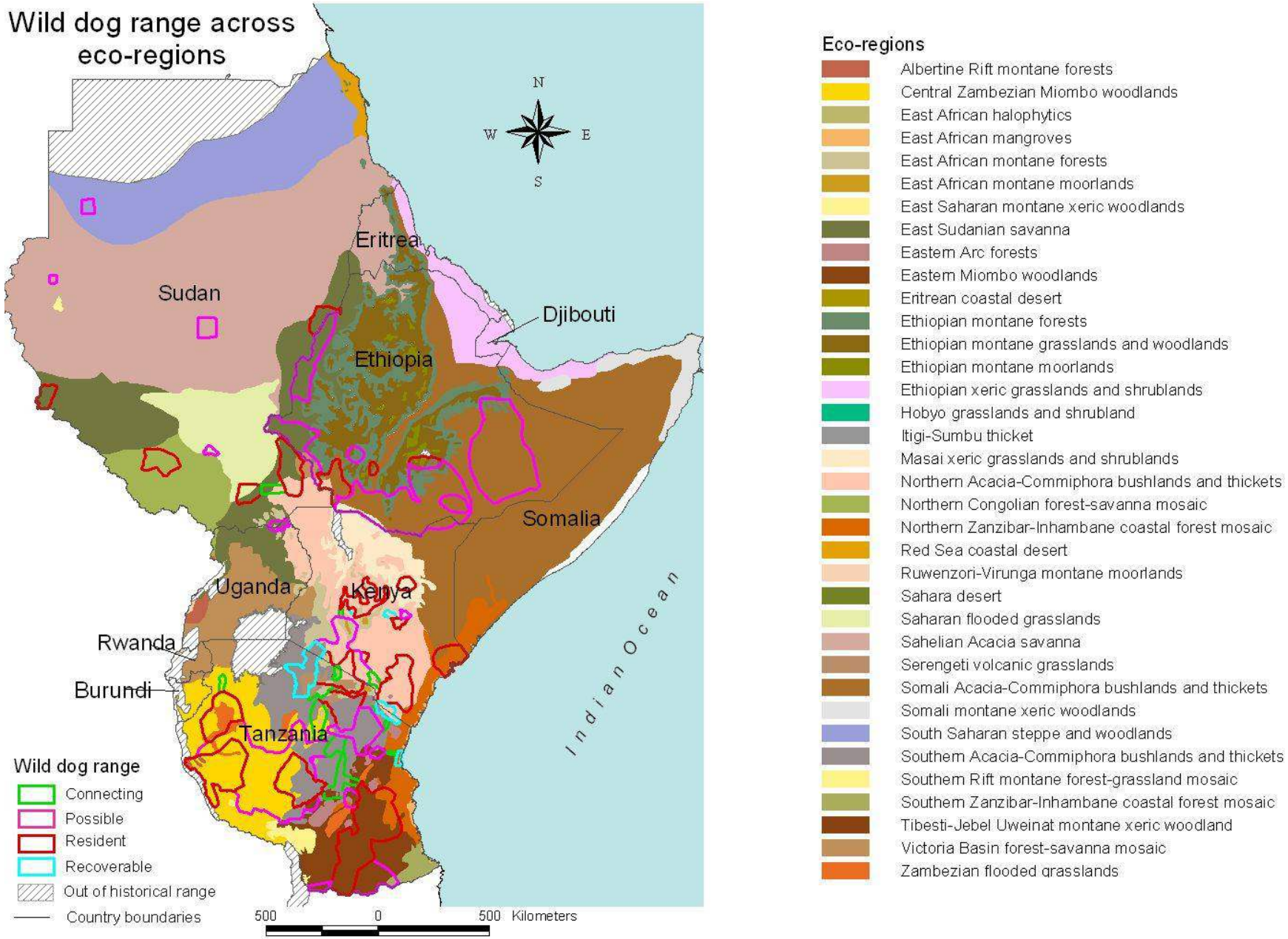


Figure 4.7 *Distribution of wild dog geographic range across WWF ecoregions*

Table 4.4 *Distribution of wild dog range across WWF ecoregions within eastern Africa. Data give the numbers of range polygons, and combined area of land, falling within each ecoregion. Land parcels ≤500km² are excluded, as are land parcels falling within the Albertine Rift montane forest, East African montane moorland and East African halophytics ecoregions as wild dog use of these habitat types has not been confirmed.*

	Resident range		**Possible range**		**Recoverable range**	
Ecoregion	*number*	*area (km²)*	*number*	*area (km²)*	*number*	*area (km²)*
Central Zambezian Miombo woodlands	3	18,715	2	5,959	0	0
East African mangroves	1	558	0	0	0	0
East African montane forests	4	19,807	2	2,449	0	0
East Sudanian savannah	4	11,009	2	3,176	0	0
Eastern Arc forests	2	12,545	2	7,349	0	0
Eastern Miombo woodlands	1	11,499	6	39,203	0	0
Itigi-Sumbu thicket	0	0	1	13,272	0	0
Masai xeric grasslands and shrublands	2	2,313	1	839	0	0
Northern *Acacia-Commiphora* bushlands & thickets	9	25,463	2	2,067	4	5,340
Northern Congolian forest-savannah mosaic	1	3,523	1	1,766	0	0
Northern Zanzibar-Inhambane coastal forest mosaic	3	16,960	1	16,148	1	1,248
Saharan flooded grasslands	2	7,482	2	2,665	0	0
Sahelian *Acacia* savannah	1	3,974	2	5,327	0	0
Serengeti volcanic grasslands	2	28,950	0	0	1	4,369
Somali *Acacia-Commiphora* bushlands & thickets	2	2,587	4	3,270	0	0
South Saharan steppe and woodlands	0	0	1	2,839	0	0
Southern *Acacia-Commiphora* bushlands & thickets	3	75,540	5	76,870	3	15,069
Southern Rift montane forest-grassland mosaic	0	0	1	70,266	0	0
Southern Zanzibar-Inhambane coastal forest mosaic	0	0	1	73,574	0	0
Victoria Basin forest-savannah mosaic	2	5,348	1	789	0	0
Zambezian flooded grasslands	2	70,927	1	89,056	0	0

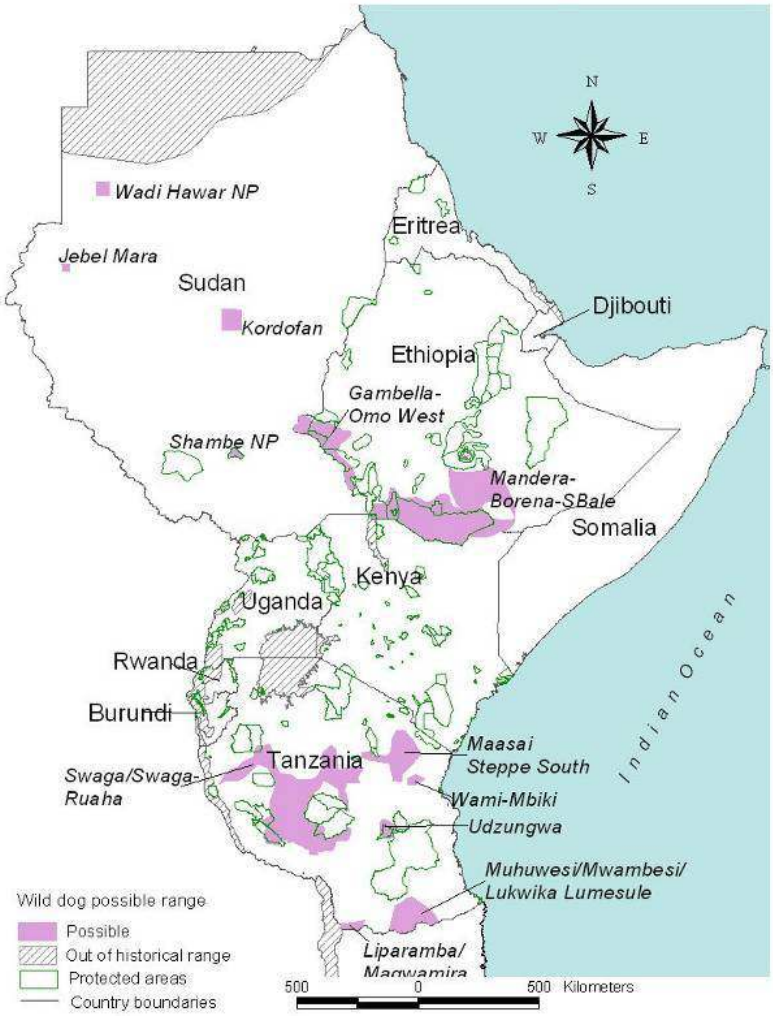


Figure 4.8 *– Areas of possible wild dog range which fall in ecoregions represented by fewer than three polygons of resident range*

large number of possible range polygons. These are potentially ecologically important, yet a lack of surveys and monitoring during the past protracted civil war mean that there are very few known resident populations.

4.3 Conclusions

The geographic range of wild dogs in eastern Africa has experienced a substantial contraction over the past one or two hundred years. From a historical distribution formerly covering over 5 million km^2, in 2007 less than 350,000km^2 – 7% of the total – still appears to support resident wild dog populations. In the 10 countries in the region, only 21 populations are known to remain, and of these only five are estimated to number ≥200 adults and yearlings. Most remaining resident populations rely on unprotected, as well as protected, lands for their survival, highlighting the need for conservation efforts outside parks and reserves. About 40% of wild dogs in the region live in populations which span international boundaries; conserving these is likely to require trans-boundary cooperation.

Although the number and geographical extent of known populations is small, there are much larger areas that may still support resident populations. Surveys in such areas would be of great value. Although the area of land to be surveyed is daunting, 12 areas (in four countries) identified as possibly supporting wild dogs cover ecoregions which are under-represented by the known resident populations, and surveys in these areas might be particularly valuable.

Only a comparatively small number of locations were identified where recovery of extirpated wild dog populations might be considered. Most of these adjoin areas that are currently occupied and natural recovery is thus fairly likely. Reintroduction is unlikely, therefore, to be necessary to conserve wild dogs in the region in the medium term.

Table 4.5 *Polygons of possible range which cover ecoregions poorly represented by the resident range (using ≤2 areas of resident range each ≥500km² as a definition of 'poor' representation). Surveys of these areas could be potentially valuable for expanding wild dog conservation efforts to better represent the ecoregions formerly inhabited by wild dogs. Site locations are shown in Figure 4.8.*

	Polygon of possible range name												
	Swaga Swaga-Ruaha, Tanzania	Wadi Hawar NP, Sudan	Muhuwesi-Mwambesi-Lukwika-Lumesule, Tanzania	Maasai Steppe South, Tanzania	Udzungwa, Tanzania	Wami-Mbiki, Tanzania	Liparamba-Magwamira, Tanzania	Shambe National Park, Sudan	Jebel Mara, Sudan	Kordofan, Sudan	Mandera-Borena-SBale, Kenya & Ethiopia	Gambella-Omo West, Ethiopia	Representation in resident range
Itigi-Sumbu thicket	X												0
South Saharan steppe and woodlands		X											0
Southern Rift montane forest-grassland mosaic	X												0
Southern Zanzibar-Inhambane coastal forest mosaic			X										0
Eastern miombo woodlands	X		X	X	X	X	X						1
Northern Congolian forest-savannah mosaic								X					1
Sahelian *Acacia* savannah									X	X			1
Eastern Arc forests					X	X							2
Masai xeric grasslands and shrublands											X		2
Saharan flooded grasslands								X				X	2
Victoria Basin forest-savannah mosaic												X	2
Zambezian flooded grasslands	X												2
Total ecoregions represented in polygon	**4**	**1**	**2**	**1**	**2**	**2**	**1**	**2**	**1**	**1**	**1**	**2**	**–**

- CHAPTER 5 -

THREATS TO WILD DOG AND CHEETAH POPULATIONS IN EASTERN AFRICA

5.1 Introduction

An evaluation of threats to wild dog and cheetah populations is a crucial component of strategic planning for the species' conservation. Understanding the nature of these threats is critical to identifying measures likely to mitigate the threats and hence achieve conservation objectives.

5.2 Proximate threats

Data on threats to known wild dog and cheetah populations were contributed by workshop participants. In addition to mapping known populations, participants were asked to list the factors most likely to threaten those populations, and to provide evidence that each factor represented a threat. This information was then reviewed and collated separately for wild dogs and cheetah (Figure 5.1). However, as the threats identified were almost identical for the two species (Figure 5.2), we shall discuss them together.

Figure 5.1 *(above) – Participants collated information on threats to particular populations to achieve an overview of threats to each species within the eastern Africa region.*

Figure 5.2 *(left) – The key threats to wild dogs (in pink), cheetah (in yellow), or both (in white) within eastern Africa, as identified by one of two working groups charged with considering this issue.*

5.2.1 Habitat loss and fragmentation (both species)

Loss and fragmentation of habitat together represent the over-arching threat to both cheetah and wild dogs, which contributes to several of the other proximate threats listed below. Because both species live at such low densities and range so widely, their populations require much larger areas of land to survive than do those of other carnivore species. For this reason, wild dogs and cheetah are more sensitive to habitat loss than are related species. Conserving viable populations of wild dogs and cheetah is likely to require land areas far in excess of 10,000km^2. Fortunately, both species have the ability to survive and breed in human-dominated landscapes under the right circumstances; hence such large areas may be

protected, unprotected, or a combination of the two. Both species also have excellent dispersal abilities, making it comparatively easy to maintain gene flow between populations, and to encourage recolonisation of suitable unoccupied habitat by conserving connecting habitat.

5.2.2 Conflict with livestock farmers (both species)

Both cheetah and wild dogs are threatened by conflict with livestock farmers in parts of their geographic range. While both species tend to prefer wild prey over livestock, both may kill livestock under some circumstances and are therefore killed by farmers. Such conflict may involve both subsistence pastoralists and commercial ranchers. As neither species regularly scavenges, they are less susceptible to poisoning than are other carnivores such as hyaenas and leopards, but may be shot or speared.

5.2.3 Prey loss (both species)

Both cheetah and wild dogs are highly efficient hunters, able to survive in areas of comparatively low prey density. Nevertheless, loss of prey from some areas, due to hunting, high livestock densities, or habitat conversion may directly impact cheetah and wild dog populations, essentially as a component of habitat loss. Prey loss can also have serious indirect effects, since predation on livestock may become more frequent where wild prey are depleted (Woodroffe *et al.*, 2005c), intensifying conflict with livestock farmers.

5.2.4 Accidental snaring (both species)

Although neither species is regularly targeted by snaring, both species may become captured accidentally in snares set for other species. Such accidental snaring is a major source of wild dog mortality in some areas (Woodroffe *et al.*, 2007a). While effects on cheetah populations are less well quantified, snared cheetah are reported occasionally and snaring may threaten some populations.

5.2.5 Road accidents (both species)

High speed roads represent a threat to both cheetah and wild dog populations. Wild dogs in particular use roads to travel and rest, and are therefore especially vulnerable to road accidents. This is a particular concern where paved roads cross or adjoin major wildlife areas, such as the Nairobi-Mombasa road which traverses Tsavo National Park in Kenya, and the Morogoro-Iringa road, which traverses Mikumi National Park (part of the greater Selous ecosystem) in Tanzania.

5.2.6 Poorly managed tourism (both species)

Unregulated tourism has the capacity to threaten both cheetah and wild dogs. In cheetah, negative effects of tourism mainly involve interference with hunting, scaring cheetah away from kills to which they are unlikely to return, and separation of mothers from cubs, due to the presence of large numbers of tourist vehicles. In wild dogs, most impacts arise from tourists visiting active dens on foot, causing packs to move dens or even abandon their pups. In contrast, well-regulated tourism can make substantial contributions to wild dog and cheetah conservation, both through the revenue it generates for conservation, and by raising awareness.

5.2.7 Infectious disease (mainly wild dogs)

Infectious disease can have major impacts on wild dog populations. Rabies contributed to the extinction of the wild dog population in the Serengeti-Mara ecosystem in 1991 (Gascoyne *et al.*, 1993; Kat *et al.*, 1995), and canine distemper decimated a captive population held in Mkomazi National Reserve (van de Bildt *et al.*, 2002), illustrating the capacity of both viruses to provoke major population

crashes. Both viruses are maintained within populations of domestic dogs (Cleaveland *et al.*, 2000; Cleaveland & Dye, 1995); hence disease risks are likely to be particularly high for wild dogs living outside protected areas. Although cheetah are occasionally affected by infectious disease (notably mange within the Serengeti-Mara ecosystem, Caro *et al.*, 1987b), disease is not known to threaten free-ranging cheetah populations in eastern Africa.

5.2.8 Hunting and live trade (mainly cheetah)

Cheetah are hunted in some areas for their fur, and also for cultural uses. Additionally, illegal trade in cheetah cubs to the Middle East has been reported in Ethiopia and is suspected in other areas.

5.3 Constraints on alleviating threats

Conserving cheetah and wild dog populations requires mitigating the threats listed above, on a very large spatial scale. Workshop participants therefore identified the barriers to achieving this outcome. These constraints were classified into four categories: political, economic, social and biological. Once again, results for cheetah and wild dogs were extremely similar (Figure 5.4). Political constraints included lack of land use planning, insecurity and political instability in some ecologically important areas, and lack of political will to foster cheetah and wild dog conservation. Economic constraints included lack of financial resources to support conservation, and lack of incentives for local people to conserve wildlife. Social constraints included negative perceptions of wild dogs and cheetah, lack of capacity to achieve conservation, lack of environmental awareness, rising human populations, and social changes leading to subdivision of land and consequent habitat fragmentation.

These potentially mutable human constraints contrast with several biological constraints which are characteristic of wild dogs and cheetah and cannot be changed: these included the species' wide ranging behaviour, their negative interactions with other large carnivores, and their susceptibility to infectious disease.

Figure 5.3 *(above) – Participants discuss proximate and ultimate threats.*

Figure 5.4 *(left) – Constraints on alleviating threats to cheetah and wild dog populations, as identified by one working group.*

This summary of the problems facing wild dog and cheetah conservation was used to inform a problem analysis which was critical for the development of the strategic plan (see Chapter 6). In recent years, tools have been developed to address

many of the proximate threats to wild dog and cheetah populations (e.g. Woodroffe *et al.*, 2005a), but the ultimate causes of these threats include problems such as human encroachment on wildlife areas, and lack of conservation capacity, which are common to many species in the region.

5.4 Conclusions

Both the proximate and ultimate threats faced by cheetah and wild dogs are very similar. Indeed, these threats are similar to those faced by all large carnivores in Africa; however wild dogs' and cheetah's extremely wide-ranging behaviour makes them acutely sensitive to these threats and means that the threats need to be addressed over extremely large areas. The similarity in threats faced by the two species also means that, with very few exceptions, conservation activities implemented for either species are likely to benefit both.

– CHAPTER 6 –

STRATEGIC PLAN FOR CHEETAH AND WILD DOG CONSERVATION IN EASTERN AFRICA

6.1 Background

The Eastern Africa Cheetah and Wild Dog Conservation Strategy was constructed during participatory planning exercises which were intermeshed with the review of distribution and status discussed in Chapters 3-5 (see Appendix 2). It was particularly critical that there was high-level governmental representation from the wildlife sector within cheetah and wild dog ranges during this part of the workshop (participants are listed in Appendix 1).

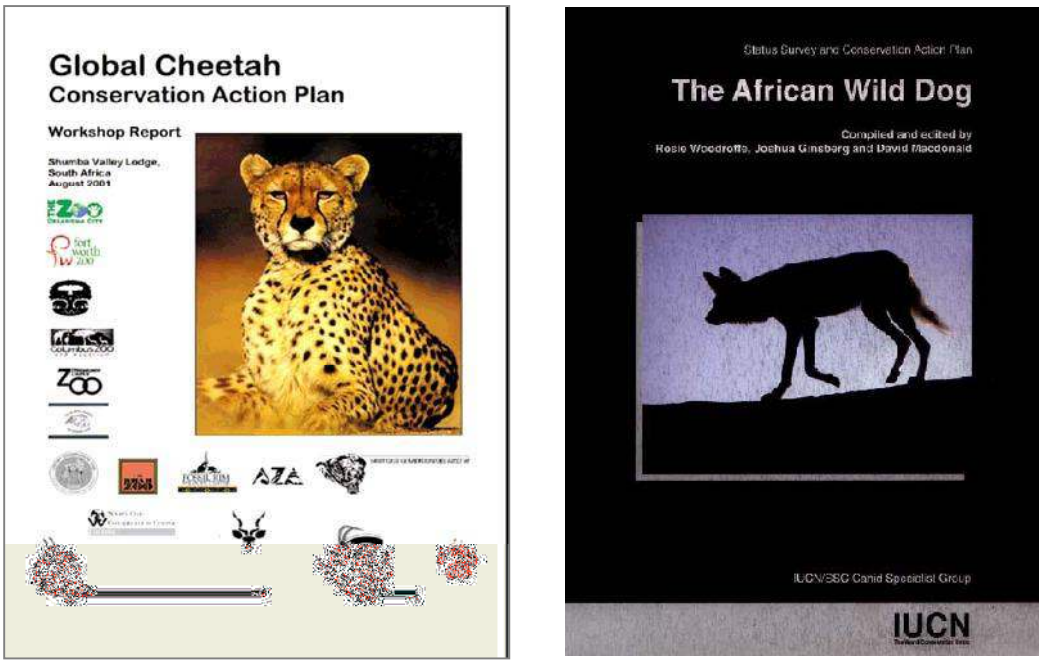


Figure 6.1 *Previous species action plans for cheetah and wild dogs (Bartels et al., 2001; Woodroffe, Ginsberg & Macdonald, 1997b).*

The structure and development of the strategic plan followed a process recently developed by IUCN, which is clearly illustrated by two recent species strategic plans in Africa: that for the West African Elephant (IUCN, 2005) and the African Lion (IUCN, 2006b). Information from previous action plans for cheetah and wild dogs – the Global Cheetah Conservation Action Plan (Bartels *et al.*, 2001, 2002) and the African Wild Dog Status Survey and Conservation Action Plans (Woodroffe *et al.*, 1997b; Woodroffe *et al.*, 2004) – were also critical to the process (Figure 6.1).

The workshop process used here included the following key components:

1. *Engagement of stakeholders*
   Key individuals and institutions best able to implement the plan – including government authorities, species specialists and relevant NGOs – were all involved in the strategic planning process
2. *Summary of knowledge*
   The mapping process within the workshop established up-to-date information on the status and distribution of both species (see Chapters 3-4). This

provided essential information for the development of the strategic plan. Additionally, prior work on conservation tools for mitigating threats (e.g. Woodroffe *et al.*, 2005a) and for population surveys and monitoring (e.g. Bashir *et al.*, 2004) were critical for developing the plan.

3. *Problem analysis*
   A problem analysis was conducted to identify threats, gaps and constraints impacting participants' ability to conserve cheetah and wild dogs. The problem analysis provided information critical for the development of the objectives of the strategic plan.
4. *Strategic plan*
   A cascading plan was constructed, starting at a vision, to a goal, to a series of objectives devised to meet the goal, and then a number of targets and activities to address each objective (Figure 6.2).

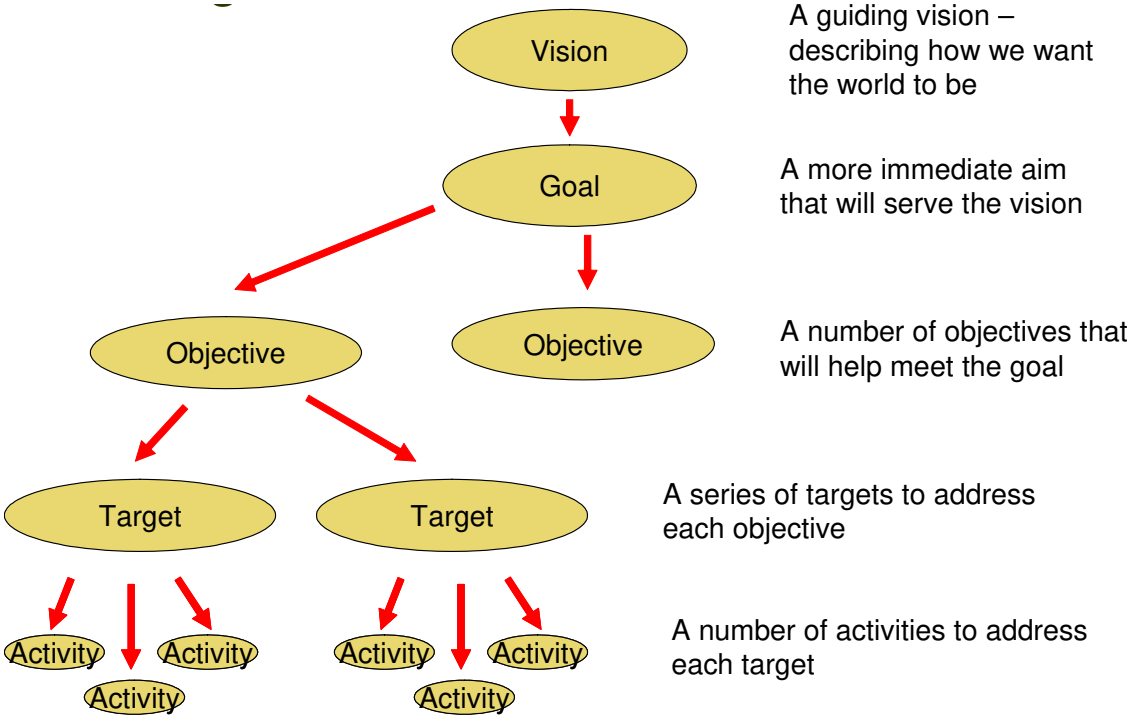


Figure 6.2 *The structure of a strategic plan.*

The strategic planning process was participatory and consensus driven, with all stakeholders engaged in the development of the plan. The process was conducted in this way to ensure that the expertise and knowledge of all participants informed the plan, and also to ensure that the plan was jointly owned by relevant institutions and individuals, facilitating its implementation. The plan was intended to be realistic and, because it was regional, to be sufficiently general to allow easy transferral to national level planning. The specifics of the strategic plan and its development are described below.

6.2 The strategic planning process

The planning process was made up of six key stages:

1. The development of a vision
2. The development of a goal
3. A problem analysis
4. The development of a number of objectives which address the problems identified by the problem analysis

5. The development of a number of targets to address each objective
6. The development of a number of activities to address each target

The development of the strategic plan was intermeshed with the mapping exercise to allow the information on the species' distribution, status and threats to influence formulation of the strategic plan. This approach had the added benefit that it provided the mapping team more time for digitising maps. At the beginning of the workshop, the emphasis was on the mapping, whilst the vision and goal were developed (see Appendix 2 for workshop agenda). Draft maps were thus available by the time the group conducted the problem analysis. In the final phase of the workshop, the emphasis was on developing the strategic plan.

6.2.1 The Vision

A long term vision was developed to form the guiding purpose for the strategic plan over the next 25-50 years. It was intended to reflect an optimistic, but realistic, view of the future of cheetah and wild dog conservation and to provide a source of inspiration.

The vision was developed by a separate working group (in parallel with the mapping exercise) which reported back in plenary to allow substantial discussion and debate. The draft vision was sent back to the working group twice for redrafting after discussion, and many individuals temporarily joined the drafting group when they were not needed in the mapping process. The final draft was then agreed in plenary.

The agreed vision was:

Vision:

To secure viable and ecologically functional cheetah and wild dog populations as valued components of development in eastern Africa

This vision was carefully worded to reflect the following points:

- 'Viable' populations implies both sustainable and relatively large populations that are able to persist in the long term.
- 'Ecologically functional' was chosen to indicate that the group agreed that it was important to conserve populations across representative natural ecosystems, to ensure that each species was exposed to as full a range as possible of ecological challenges to which they would have been subjected in their evolutionary history, including their natural predators, parasites and prey.
- 'Valued components of development' was phrased to indicate that cheetah and wild dogs should be considered as part of human development, while 'valued' was left deliberately ambiguous to reflect different types of value, including economic, cultural and ecological values.

6.2.2 The Goal

The goal was developed in a manner similar to that used for the vision, coincident with the mapping process. The goal was intended to reflect what the group wanted to accomplish in a shorter time period than that identified for the vision – around 10-20 years. The goal was thus intended to be realistic and achievable. It was also intended to be broadly measurable, so that it would be possible to know when it had been achieved. The goal therefore needed to be more clearly defined than the vision, although it should also support the vision statement. The goal was finalised as:

Goal:

To reverse declines and improve the status of cheetah and wild dog populations and their habitats across eastern Africa

As with the vision, the wording of the goal was carefully and deliberately developed to reflect the following:

- 'reverse declines' indicated that the group felt that populations of cheetah and wild dogs were now so low in the eastern African region that declines needed to be reversed, not just halted.
- 'improve the status' was kept deliberately ambiguous so that 'status' incorporated 'population status' (i.e. population viability, distribution and ecological functionality) as well as 'status' in terms of people's perceptions – which were thought to be often too negative.
- 'their habitats' was included to indicate that habitats were critical to the continued survival of free ranging cheetah and wild dog populations.

6.2.3 The problem analysis

The next major step in the strategic planning process was the development of the problem analysis. Participants were split into four working groups and asked to write out cards to define the main barriers to the conservation of each species. The first two groups identified the main *proximate threats* to the species, i.e. the drivers of extinction such as habitat fragmentation and conflict with livestock farmers. The other two groups identified the main *gaps* and *constraints* hindering mitigation of these threats, such as resource constraints, political frameworks, gaps in knowledge, and lack of capacity. The groups were asked to specify whether the threat, gap or constraint applied to either or both species by writing on a yellow card for a cheetah-specific problem, a pink card for a wild dog-specific problem, or a white card for a problem affecting both species (see Figures 5.2 and 5.4). The cards were then collected together and used to develop a problem tree (Figure 6.3).

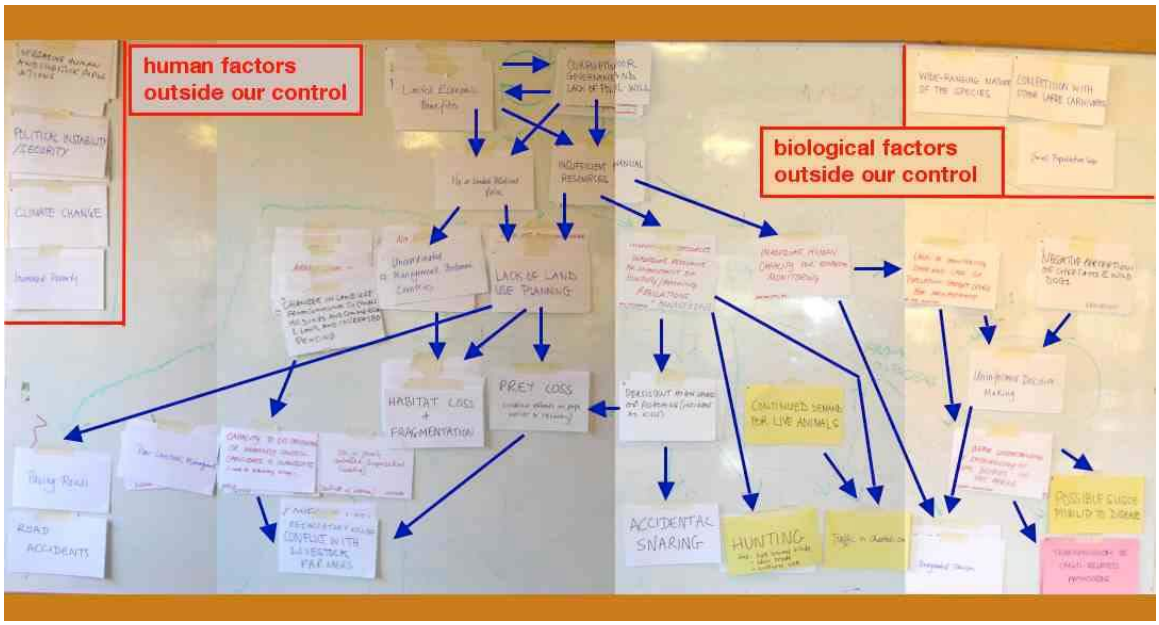


Figure 6.3 *The results of the problem analysis. These are provided again in a more readable format in Figure 6.4.*

Where there was overlap in problems (i.e., different cards described roughly the same problem), cards were superimposed on top of each other. Some anthropogenic problems, such as climate change and human population growth, were considered beyond the remit of the group's influence, although their importance was emphasised. Likewise, biological factors which influence threats to the species, such as their wide ranging behaviour and susceptibility to disease, were noted but considered immutable. Both these categories of issues were put to the side while the participants concentrated on issues which could be addressed directly or indirectly by the stakeholder group.

There were very few problems judged to be cheetah- or wild dog-specific (Figure 6.4). Disease was listed as a threat that could impact wild dog populations but which was not known to have serious impacts on wild cheetah populations. Likewise, the captive trade and hunting for skins for cultural use were listed as threats that could impact cheetah populations but which were not known to have any impact on wild dog populations within eastern Africa. Overall, the problem analysis clearly demonstrated that there were very few threats, gaps or constraints which applied to only one of the two species. For this reason, the group decided to develop a single strategy for both species rather than a separate strategy for each. The advantages of a single strategy include greater simplicity and higher conservation leverage due to increased conservation benefits for two species rather than one.

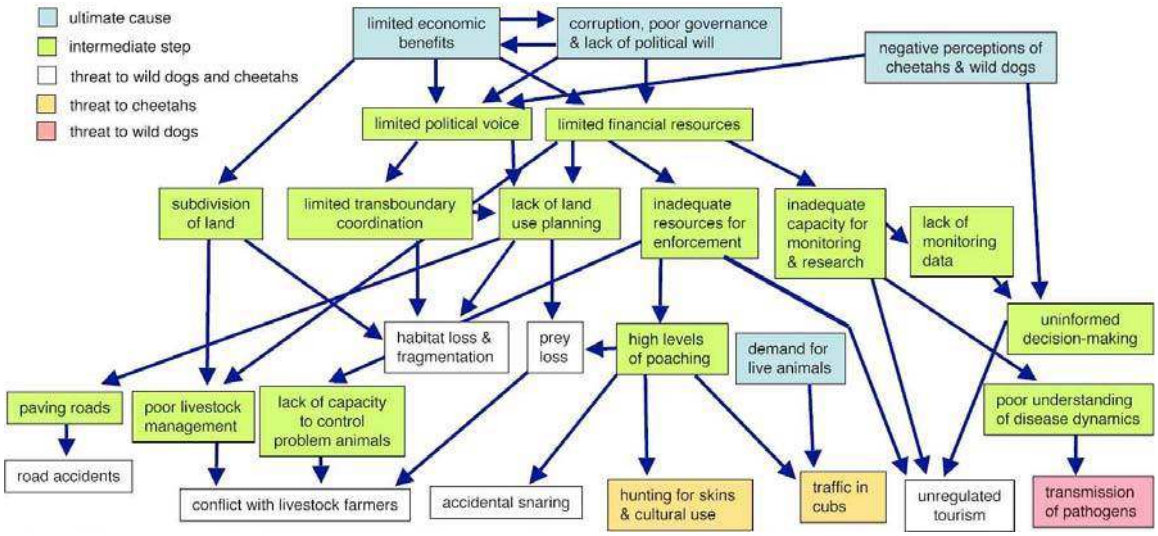


Figure 6.4 *A diagrammatic representation of the problem tree. This is summarised from the original tree shown in Figure 6.3, for greater readability.*

6.2.4 The objectives

The problem analysis was essential to developing the objectives of the strategic plan, as the problems identified could be inverted into solutions to those problems. The objectives fell into six themes, which encompassed all aspects of the problem tree:

Coexistence:

This theme covers problems relating to coexistence of people and domestic animals with cheetah, wild dogs, and their prey.

Objective 1:
Develop and implement strategies to promote coexistence of cheetah and wild dogs with people and domestic animals

Surveys and information

This theme addresses problems arising from a lack of information about cheetah and wild dogs, including information on range, population status, habitat and management.

Objective 2:
Provide relevant stakeholders and managers with scientific and timely information on the status of, and threats to, cheetah and wild dog populations

Capacity development

This theme concerns problems arising from insufficient capacity such as a lack of manpower, resources, training and equipment.

Objective 3:
Strengthen human, financial and information resources for conserving cheetah and wild dogs in collaboration with stakeholders

Policy and legislation

This theme addresses problems arising from a lack of, or inappropriate, policies and legal frameworks within and outside the wildlife sector and more widely.

Objective 4:
Review and harmonise existing legislation, and, where necessary, develop new legislation, for conservation across cheetah and wild dog range at national and international levels

Advocacy

This theme tackles problems arising from a low importance attached by the public and government to cheetah and wild dog conservation. This category largely addresses policy and legislation issues beyond the expertise of the group, *i.e.*, outside the remit of government wildlife sectors and wildlife NGOs, falling under ministries charged with responsibilities other than wildlife conservation and management. This theme includes critically important issues such as land use policy and economic development.

Objective 5:
Mainstream cheetah and wild dog conservation in land use planning and its implementation

National planning

This theme concerns problems arising from a lack of national strategies for cheetah and wild dog conservation. This was a relatively small, but nonetheless important, theme which covered the translation of the regional strategic plan into a series of national action plans and their subsequent implementation.

Objective 6:
Promote the development and implementation of national conservation programmes for cheetah and wild dogs, by government and other stakeholders

The objectives were developed carefully so that they were sufficient to encompass the problem analysis, *i.e.*, there were no problems that were not addressed by these six objectives. Furthermore, no objective addressed issues that were not identified by the problem analysis.

6.2.5 The targets

Once the objectives were in place, and their wording agreed, targets were developed to meet the objectives. Targets were more specific than objectives, and described how the objectives should be met. Each objective was associated with 1-6 targets, and the targets were devised to ensure that, if all targets under an objective were met, then that objective would be achieved. In other words, each target was necessary to meet the objective, and if all the targets were met then the objective would be achieved. Targets were carefully designed to be 'SMART', that is, they were specific, measurable, achievable, realistic and time-lined. There were a total of 17 targets developed for the final plan:

Coexistence:

Objective 1:
Develop and implement strategies to promote coexistence of cheetah and wild dogs with people and domestic animals
Targets:

1.1 Programmes to reduce indiscriminate hunting and illegal offtake of wild ungulates implemented in affected areas within three years
1.2 Sustainable tools to reduce wild dog and cheetah impacts on livestock developed and disseminated across the region within three years
1.3 Initiate and maintain programmes for local people to derive sustainable economic benefits from cheetah and wild dog presence and their prey in selected areas within three years
1.4 Awareness creation programmes relevant to cheetah and wild dog conservation developed in key areas within three years
1.5 Holistic canid disease management strategies developed in key areas within three years

Surveys and information:

Objective 2:
Provide relevant stakeholders and managers with scientific and timely information on the status of and threats to cheetah and wild dog populations
Targets:

2.1 Surveys and monitoring to evaluate presence, trends and threats in key cheetah and wild dog ranges initiated and maintained
2.2 Strategies for disseminating information relevant to cheetah and wild dog conservation to all key stakeholders across eastern Africa developed and implemented within one to three years

Capacity development:

Objective 3:
Strengthen human, financial and information resources for conserving cheetah and wild dogs in collaboration with stakeholders

Targets:

3.1 A cheetah and wild dog 'business plan' for each country developed within one to two years

3.2 Have extension, enforcement, and monitoring personnel trained and equipped to operate within 50% of the cheetah and wild dog populations' ranges within three to five years

Policy and legislation:

Objective 4:

Review and harmonise existing legislation, and, where necessary, develop new legislation, for conservation across cheetah and wild dog range at national and international levels

Targets:

4.1 Gaps in information on positive and negative effects of hunting on cheetah and wild dog conservation which can assist in policy evaluation and development are identified within one to three years

4.2 Information on the extent of illegal wildlife-related activities within cheetah and wild dog ranges for relevant authorities to strengthen policy/law enforcement and quality tourism provided within one to three years

4.3 Explicit information provided to the management authorities to support identification and prioritisation of corridor and dispersal areas for improved connectivity of cheetah and wild dog ranges within one to three years

4.4 A memorandum of understanding to co-ordinate eastern African country management and its enforcement relevant to cheetah and wild dog conservation developed within one to three years

Advocacy:

Objective 5:

Mainstream cheetah and wild dog conservation in land use planning and its implementation

Targets

5.1 Overseeing government authorities and local communities and other stakeholders within cheetah and wild dog resident and connecting ranges are made aware of the importance of cheetah and wild dog populations within two to three years

5.2 A land use plan for cheetah and wild dog resident and connecting range outside protected areas compatible with the species' conservation established within five years

5.3 Awareness is raised among relevant donors and civil society about cheetah and wild dog populations, the effects of land use on them, and the economic and conservation consequences within two to three years

National planning:

Objective 6:

Promote the development and implementation of national conservation programmes for cheetah and wild dogs, by government and other stakeholders

Targets:

6.1 National action plans for cheetah and wild dog conservation developed and endorsed by appropriate government authorities in all eastern African range states within three years

6.2.6 Activities

The activities formed the final step in the plan, and were even more specific than the targets, listing actions that needed to be carried out to meet each target. As with the targets and their respective objectives, each set of activities was designed to be necessary and sufficient to meet the associated target, and to be 'SMART'. However activities were also sufficiently general to cover the entire eastern African region so that they could be interpreted appropriately within national action planning workshops. A total of 56 activities were developed within the strategic plan; they are listed below.

Coexistence

1 Objective: Develop and implement strategies to promote coexistence of cheetah and wild dogs with people and domestic animals

1.1. Target: Programmes to reduce indiscriminate hunting and illegal offtake of wild ungulates implemented in affected areas within three years

- **1.1.1 Activity:** Identify areas where wild dog or cheetah populations are significantly threatened by accidental snaring
- **1.1.2 Activity:** Identify areas where prey loss contributes to conflict between livestock farmers and cheetah or wild dogs, or directly undermines the viability of wild dog or cheetah populations
- **1.1.3 Activity:** Support the implementation of measures to reduce indiscriminate hunting and/or illegal offtake in identified areas

1.2. Target: Sustainable tools to reduce wild dog and cheetah impacts on livestock developed and disseminated across the region within three years

- **1.2.1. Activity:** Identify areas where cheetah and wild dog populations are significantly threatened by conflict with livestock farmers
- **1.2.2. Activity:** Identify the circumstances that contribute to livestock depredation by cheetah and wild dogs in the identified areas
- **1.2.3. Activity:** Develop effective strategies for disseminating existing information on reducing cheetah and wild dog impacts on livestock to relevant parties across eastern Africa
- **1.2.4. Activity:** Work with communities in affected areas to develop and implement the most effective livestock husbandry strategies to reduce depredation by cheetah and wild dogs

1.3. Target: Initiate and maintain programmes for local people to derive sustainable economic benefits from cheetah and wild dog presence and their prey in selected areas within three years

- **1.3.1 Activity:** Identify areas across eastern Africa where ecotourism could effectively assist cheetah and wild dog conservation through sustainable economic benefits for local communities, and hence improving tolerance of both species
- **1.3.2 Activity:** Encourage sustainable ecotourism programmes and the distribution of their revenue to appropriate parties in cheetah and wild dog range
- **1.3.3 Activity:** In areas of eastern Africa where ecotourism is unlikely to provide sufficient benefits, investigate alternative options for generating revenue which encourage cheetah and wild dog conservation
- **1.3.4 Activity:** Develop and disseminate guidelines for responsible tourist viewing of cheetah and wild dogs

1.4. Target: Awareness creation programmes relevant to cheetah and wild dog conservation developed in key areas within three years

- **1.4.1 Activity:** Identify target areas and audiences best placed to influence cheetah and wild dog conservation
- **1.4.2 Activity:** Investigate local traditions, knowledge and cultural values relevant to cheetah and wild dogs and incorporate into outreach materials and strategies
- **1.4.3 Activity:** Tailor existing outreach materials for cheetah and wild dog conservation to local conditions in eastern Africa and disseminate

1.5. Target: Holistic canid disease management strategies developed in key areas within three years

- **1.5.1 Activity:** Identify areas where wild dog populations are significantly threatened by canid disease
- **1.5.2 Activity:** Work with livestock and/or veterinary departments to encourage domestic dog vaccination and husbandry within identified areas
- **1.5.3 Activity:** Evaluate existing disease management strategies for wild dogs and related species to assess their likely relevance to eastern Africa
- **1.5.4 Activity:** Identify circumstances where intervention may or may not be appropriate through continued research on the dynamics of canid disease in areas where domestic dogs coexist with wildlife
- **1.5.5 Activity:** Evaluate the conservation potential of vaccinating free ranging wild dogs against canid diseases

Surveys and information

2. Provide relevant stakeholders and managers with scientific and timely information on the status of and threats to cheetah and wild dog populations

2.1. Target: Surveys and monitoring to evaluate presence, trends and threats in key cheetah and wild dog ranges initiated and maintained

- **2.1.1 Activity:** Conduct surveys to determine presence in areas identified as unknown, possible and connected ranges in all the eastern African countries within two years
- **2.1.2 Activity:** Within known resident ranges, initiate and maintain monitoring activities to determine population trends and threats within the range
- **2.1.3 Activity:** Within known resident ranges, conduct research to establish demographic and threat status

2.2. Target: Strategies for disseminating information relevant to cheetah and wild dog conservation to all key stakeholders across eastern Africa developed and implemented within one to three years

- **2.2.1 Activity:** Each eastern African range state will use national workshops, publications, meetings and/or other media to disseminate information relevant to cheetah and wild dog conservation within one year
- **2.2.2 Activity:** Establish a standardised database format to facilitate the collection and sharing of data within one year
- **2.2.3 Activity:** Establish and update national and regional databases and disseminate resulting information within two years

Capacity Development

3 Strengthen human, financial and information resources for conserving cheetah and wild dogs in collaboration with stakeholders

3.1. Target: A cheetah and wild dog 'business plan' for each country developed within one to two years

- **3.1.1 Activity:** Identify individuals and institutions to undertake these activities in each country by end of regional workshop
- **3.1.2 Activity:** Review existing and possible revenue streams for cheetah and wild dog conservation within one year
- **3.1.3 Activity:** Produce and disseminate the cheetah and wild dog 'business plan' for each country within two years

3.2. Target: Have extension, enforcement, and monitoring personnel trained and equipped to operate within 50% of the cheetah and wild dog populations ranges within three to five years

- **3.2.1 Activity:** Immediately initiate activities to address urgent issues affecting cheetah and wild dog conservation (such as trafficking) wherever they are known to occur
- **3.2.2 Activity:** Strengthen collaboration in monitoring of resident and connecting range for cheetah and wild dogs within one year
- **3.2.3 Activity:** Initiate outreach and request information in unknown areas within one year
- **3.2.4 Activity:** Complete a Training and Resource Needs Assessment in each range country (this could happen within National Workshops) within one year
- **3.2.5 Activity:** Integrate Business Plan, Training Needs Assessment and Action plan within two years
- **3.2.6 Activity:** Employ or identify a full time cheetah and wild dog specialist (including community-scouts, parabiologists, community liaisons) in each target population within two years

Policy and management

4. Review and harmonise existing legislation, and, where necessary, develop new legislation, for conservation across cheetah and wild dog range at national and international levels

4.1. Target: Gaps in information on positive and negative effects of hunting on cheetah and wild dog conservation which can assist in policy evaluation and development are identified within one to three years

- **4.1.1 Activity:** Collect information pertaining to cheetah and wild dog population trends and known threats across regional and international areas under different types of hunting policies within one to three years
- **4.1.2 Activity:** Map areas of known legal hunting districts within identified resident and possible cheetah and wild dog ranges within the eastern African countries within one to three years
- **4.1.3 Activity:** Produce a review document on national protected species legislation within the region and its implications for cheetah and wild dog conservation within one year

4.2. Target: Information on the extent of illegal wildlife-related activities within cheetah and wild dog ranges for relevant authorities to strengthen policy/law enforcement and quality tourism provided within one to three years

- **4.2.1 Activity:** Develop standardised methodologies to collect information on illegal activities relevant to cheetah and wild dog conservation within resident range within one to three years
- **4.2.2 Activity:** Collect spatially explicit information on the magnitude of illegal activities relevant to cheetah and wild dog conservation within key resident range and include within national and regional databases in two years
- **4.2.3 Activity:** Quantify the impacts of insensitive tourism on cheetah and wild dogs inside and outside of protected areas and use to develop outreach materials to raise awareness about cheetah- and wild dog-friendly observation practices within one to three years

4.3. Target: Explicit information provided to the management authorities to support identification and prioritisation of corridor and dispersal areas for improved connectivity of cheetah and wild dog ranges within one to three years

- **4.3.1 Activity:** Determine the spatial extent of corridor and dispersal areas between resident, possible and unknown ranges within one to three years
- **4.3.2 Activity:** Determine threats, habitat quality, and the extent of suitable habitat in and surrounding corridors and dispersal areas within one to three years

4.4. Target: A memorandum of understanding to co-ordinate eastern African country management and its enforcement relevant to cheetah and wild dog conservation developed within one to three years

- **4.4.1 Activity:** Facilitate the formation of a representative team of species biologists and wildlife management authorities to draft a memorandum of understanding to represent interests of cheetah and wild dog in trans-boundary issues within one to three years
- **4.4.2 Activity:** Propose and support proposals for cheetah and wild dog to be listed within the Convention on Migratory Species within two years

Advocacy

5 Mainstream cheetah and wild dog conservation in land use planning and its implementation.

5.1. Target: Overseeing government authorities and local communities and other stakeholders within cheetah and wild dog resident and connecting ranges are made aware of the importance of cheetah and wild dog populations within two to three years

- **5.1.1 Activity:** Initiate and implement visiting programme to regional and local government offices, lodges and universities to present and distribute summary of cheetah and wild dog conservation issues, posters and this strategic plan within one year
- **5.1.2 Activity:** Convene a 'conservation-caucus' type body in each country (e.g. like the environmental conservation committee in Tanzania) within one year

5.2. Target: A land use plan for cheetah and wild dog resident and connecting range outside protected areas compatible with the species' conservation established within five years

- **5.2.1 Activity:** Identify priority areas to be incorporated into land use plans within six months
- **5.2.2 Activity:** Strongly encourage governments to strengthen the legal mandate for land use planning within one year
- **5.2.3 Activity:** Complete individual village (community or private land owner) land use plans within two years
- **5.2.4 Activity:** Integrate village and community plans into cross-sectoral (and species) plans such as conservancy or wildlife management areas within two years

5.3. Target: Awareness is raised among relevant donors and civil society about cheetah and wild dog populations, the effects of land use on them, and the economic and conservation consequences within two to three years

- **5.3.1 Activity:** Initiate poster campaigns to raise awareness of cheetah and wild dog conservation within their range, including possible and connecting areas within one year
- **5.3.2 Activity:** Promote representation of cheetah and wild dog conservation issues in mass media in range countries within one year
- **5.3.3 Activity:** Develop and maintain cheetah and wild dog literature and information repositories (e.g. online and in country) within one year

National planning

6 Promote the development and implementation of national conservation programmes for cheetah and wild dogs, by government and other stakeholders

6.1 Target: National action plans for cheetah and wild dog conservation developed and endorsed by appropriate government authorities in all eastern African range states within three years

- **6.1.1 Activity:** Identify focal person, group or office to lead national planning processes within each range state in eastern Africa within one month
- **6.1.2 Activity:** Prepare and organise stakeholder meeting(s) in every range state where this has not yet occurred to identify national priorities for wild dog and cheetah conservation within two years
- **6.1.3 Activity:** Draft, review, finalise and endorse national action plans for wild dog and cheetah conservation within every range state in eastern Africa within the context of a broader regional strategy within three years

6.3 Conclusions and national planning

The regional strategic plan was developed in a format that could be readily adapted for national implementation, through a national participatory workshop process engaging all national stakeholders including those who attended the regional strategic workshop. Such a workshop would be expected to take about two days. The principal steps in translating the regional strategy into a national strategy are as follows:

- Present the regional strategy, along with background information, and request the mandate to use the regional strategy as a template for a national strategy.
- Add comments on the national interpretation of the vision, goal and objectives.
- Within each objective, take each target and activity, and decide whether to adopt or drop it, bearing in mind that some targets and activities may not be relevant to all countries.
- If the target or activity is adopted, then the wording may need to be adjusted where appropriate.
- Timelines, actors and verifiable indicators should be added to each activity.

Great care was taken to ensure that the eastern Africa regional strategic plan was well structured, particularly in its vision, goal and objectives, to facilitate its use in developing national strategies. This regional strategic plan translated very well into the Kenya national strategy developed in a subsequent workshop (Kenya Wildlife Service, in prep), which suggests that the participants in the eastern Africa regional workshop did their ground-work well (Figure 6.5).

Figure 6.5 *The involvement of participants from Kenya in the eastern Africa regional conservation planning workshop ensured that the regional strategy could be readily translated into a Kenya national strategy at a subsequent workshop. Participants from all other key range states in the region were also present, and it is anticipated that they will be closely involved in developing a coordinated suite of national strategies across the eastern Africa region.*

– CHAPTER 7 –

IMPLEMENTATION OF THE REGIONAL STRATEGIC PLAN

Once the regional strategy was finalised, consideration was given towards how best to implement it. The national action planning process was seen as providing an important mechanism towards national implementation, and this process was incorporated into the plan itself. However, international mechanisms and agreements were also considered important, such as the identified need to seek listing of both species on the Convention on Migratory Species. Making use of synergies between cheetah, wild dogs and other species was also important. For example, Tanzania currently has a programme of mapping elephant corridors across the country, and many such corridors are also likely to be important for cheetah and wild dogs. Participants considered it critical that the plan should not sit on a shelf gathering dust but should be relevant and actively used to direct conservation action within eastern African cheetah and wild dog range states.

The following process was agreed:

- First draft to participants to review and comment
- Participants' comments incorporated
- Second draft to participants for final acceptance and request endorsement from relevant government ministries
- The first page of the report to be set aside to provide signatures and dates of government endorsement

Governmental representatives present at the regional workshop agreed to assist with the endorsement process and to provide details and addresses of the relevant government departments. The report would then be submitted to IUCN for formal endorsement.

Immediately after the regional workshop, a Kenya national action planning workshop for cheetah and wild dogs was held in Nairobi (Kenya Wildlife Service, in prep). This workshop demonstrated that the regional strategy could be effectively transferred to a national setting, and enabled the swift development of a national action plan with the full participation of a wide range of national delegates.

Implementing the plan will require some financial support. Where possible, this may be provided by national government, but where this is not possible it is envisaged that NGO, bilateral and multilateral donors will prioritise conservation activities undertaken as part of the strategic plan and assist with financial support.

Patrick Omondi closed the meeting on behalf of the Kenya Wildlife Service.

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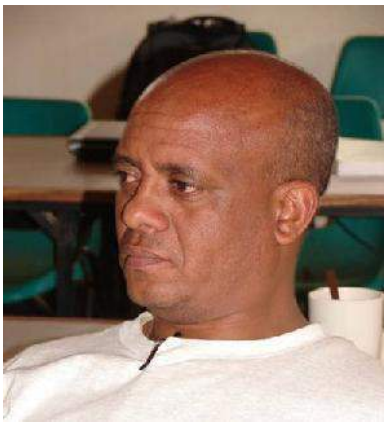
APPENDIX I: WORKSHOP DELEGATES

Ethiopia



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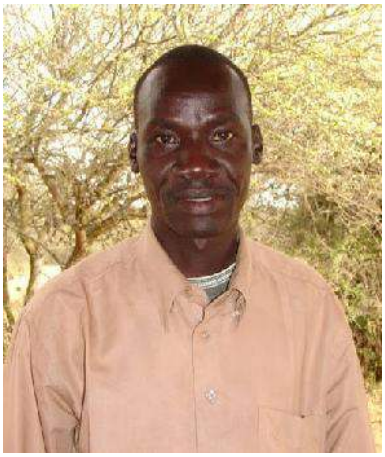

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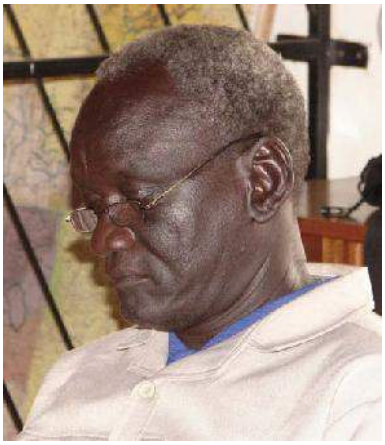

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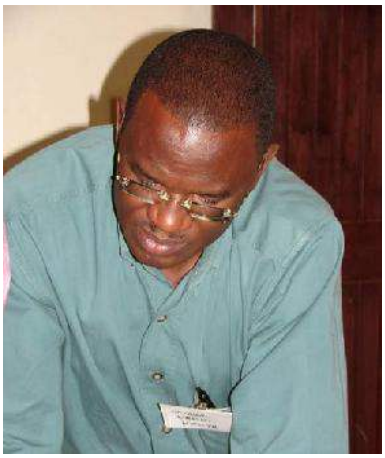

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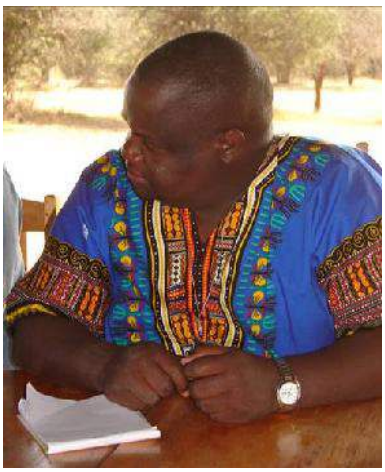

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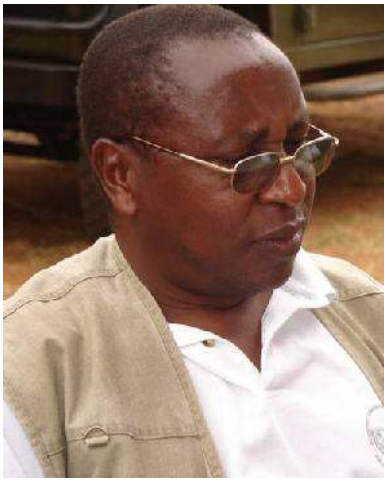

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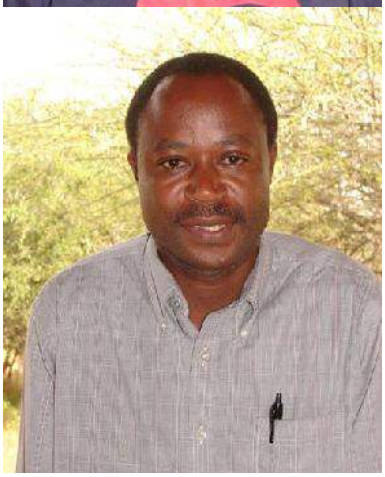

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APPENDIX 2: AGENDA

Wednesday, 31st January

Arrive Mpala Research Centre

18:00 Icebreaker: drinks followed by dinner
All participants

Thursday, 1st February

9:00 Official welcome
Patrick Omondi, Head of Species Conservation, Kenya Wildlife Service

9:05 Introductions
All participants

9:20 Biology and conservation of cheetah – an overview
Sarah Durant

9:40 Biology and conservation of African wild dogs – an overview
Rosie Woodroffe

10:00 Rangewide priority setting: how it has been applied to other species
Pete Coppolillo

10:15 Strategic planning for conservation: how it has been applied to other species
Sarah Durant

10:30 Presentation of the agenda, goals and outputs for this meeting
Sarah Durant and Rosie Woodroffe

10:45 COFFEE BREAK

11:15 Presentation of draft maps of cheetah and wild dog status and distribution, and how to go about revising them
Karen Minkowski

12:00 Discussion of vision and goal for cheetah and wild dog conservation in East Africa
All, facilitated by Sarah Durant, Rosie Woodroffe and Christine Breitenmoser

13:00 LUNCH

14:00 Three working groups:

Working Group 1	*Working Group 2*	*Working Group 3*
Refine vision and goals for regional conservation strategy	Revise information on distribution and status of cheetah	Revise information on distribution and status of wild dogs

17:30 BREAK for game drive/sundowners

19:30 DINNER

Friday, 2nd February

9:00 Presentation of revised vision and goal
Working Group 1

9:10 Discussion of revised vision and goal
All, facilitated by Sarah Durant and Christine Breitenmoser

9:30 Working groups reconvene

Working Group 1	*Working Group 2*	*Working Group 3*
Finalise statements of vision and goals	Continue mapping, synthesis of data, and review of maps for cheetah	Continue mapping, synthesis of data, and review of maps for wild dogs

10:45 COFFEE

11:15 Working groups reconvene

Working Group 1	*Working Group 2*	*Working Group 3*
Discuss and develop list of threats to cheetah and wild dogs drawing on threat data contributed by participants	Finalise mapping, synthesis of data, and review of maps for cheetah	Finalise mapping, synthesis of data, and review of maps for wild dogs

13:00 LUNCH

IN THE BACKGROUND - GIS experts (Karen & Margaret) continue mapping - calling in participants from plenary as necessary.

14:00 Presentation on threats to cheetah and wild dogs in East Africa
Working Group 1

14:15 Discussion of threats to cheetah and wild dogs in East Africa
All, facilitated by Rosie Woodroffe

15:00 Presentation of finalised goal and vision statements
Working Group 1

15:15 Problem analysis: what hinders us from achieving our goal
All, facilitated by Sarah Durant and Christine Breitenmoser

17:30 BREAK for game drive/sundowners

19:30 DINNER

IN THE BACKGROUND - strategy drafting team turns problem analysis into draft problem tree - consulting with individual contributors where necessary

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Saturday, 3rd February

09:00 Presentation and review of finalised distribution maps.
Discussion of distribution of cheetah and wild dog in relation to each other, ecoregions, international borders, and protected areas.
Karen Minkowski and Margaret Waweru

IN THE BACKGROUND - GIS team produce table of polygons of known range, possible range, and recoverable range, listed within ecoregions.

09:45 Presentation of problem tree and preliminary problem analysis for discussion and revision
All, facilitated by Sarah Durant and Christine Breitenmoser

IN THE BACKGROUND - Problem tree team revise problem tree

10:30 COFFEE

11:00 Identification of axes for population comparison, their attributes and scales of comparison (e.g. ecoregions, nations)
All participants, facilitated by Rosie Woodroffe

12:00 Score polygons of occupied range according to agreed attributes
Working Group 1:scorings Working Group 2: weightings

13:00 LUNCH

14:00 Presentation of final problem tree analysis and explanation of how to use the problem analysis to formulate objectives
All, facilitated by Sarah Durant and Christine Breitenmoser

15:30 TEA

16:00 Presentation of population comparison results, juxtaposition of results for cheetah and wild dogs, and discussion of how to proceed with comparison at rangewide and national scales. This could include identifying geographical units within which conservation effort may be focused.
All, facilitated by Rosie Woodroffe

17:30 BREAK for game drives/sundowners

19:30 DINNER

Sunday, 4th February

MORNING OFF
Game Drives, all-terrain croquet, visits to staff of Samburu-Laikipia Wild Dog Project

DRAFTING TEAM edit final set of objectives removing ambiguities and overlap

14:00 Presentation of second draft objectives
Strategy drafting team

14:10 Discussion and modification of draft objectives
All, facilitated by Sarah Durant and Christine Breitenmoser

14:20 Working group for each objective improves objective definition and develops list of objective targets
Working groups (one per objective)

15:40 Presentation of revised objectives and objective targets, and discussion
All, facilitated by Sarah Durant and Christine Breitenmoser

16:00 Working groups revise objective targets
Working groups (one per objective)

17:00 Presentation of revised objective targets
All, facilitated by Sarah Durant and Christine Breitenmoser

19:30 DINNER

Monday, 5th February

9:00 Identify and develop activities for each objective target in objective-based working groups
Working groups

10:20 COFFEE

12:00 Working groups present activities
All, facilitated by Sarah Durant and Christine Breitenmoser

13:00 LUNCH

14:00 Working groups revisit and redraft activities informed by discussion
Working groups (one per objective)

15:00 Working groups present final activities and provide list for strategy drafting team
All, facilitated by Sarah Durant and Christine Breitenmoser

15:30 Discussion of plans for moving forward
All, facilitated by Sarah Durant, Rosie Woodroffe and Christine Breitenmoser

16:00 Official close of regional meeting
Patrick Omondi, Head of Species Conservation, Kenya Wildlife Service

19:30 DINNER

IN THE BACKGROUND, logframe finalised for use in Kenya national workshop.

Tuesday, 6th February

8:00 Depart for Nairobi

APPENDIX 3: MAPPING METHODOLOGY

A3.1 Assessing the species' distribution and status

A3.1.1 Participants in the mapping process

Participants in the conservation planning process contributed data on the species' distribution and status, drawing upon their own and their colleagues' data and experience. Participants – some of whom were unable to attend the workshop in person – were contacted in advance of the workshop and asked to provide data from their own geographical area of expertise. The process involved participants from Ethiopia, Kenya, Sudan, Tanzania and Uganda. No participants were invited from Rwanda, Burundi, Eritrea or Djibouti as these countries were known or strongly suspected to support no populations of either species. No participant could be identified with appropriate information from Somalia.

A3.1.2 Point locations (mostly mapped before the workshop)

Point locations provided the primary data on which distribution maps were based. A point location is a site where wild dog or cheetah presence has been confirmed. Such records included sightings of live or dead animals, field signs such as tracks or scats, attacks on livestock, and telemetry locations. Data associated with each point location included the number of animals seen (if any), their age (adult or juvenile), and information on the experience of the person who made the observation (to allow accounting for data reliability). Participants were asked to map locations from the last 10 years, although older data were also informative for areas that had received little recent survey or monitoring effort, and to confirm historic range.

A3.1.3 Range polygons (mostly mapped before the workshop)

Point locations and other data were used to delineate geographic range polygons. All land formerly occupied by the species was considered to fall inside the historical range. For some areas, detailed historical data on distribution were available; elsewhere, historical distribution was estimated based on the species' broad habitat requirements.

Neither cheetah nor wild dogs still occupy all parts of their historical range. Hence, present-day data can be used to divide the historical range for each species into several range categories (Figure A3.1):

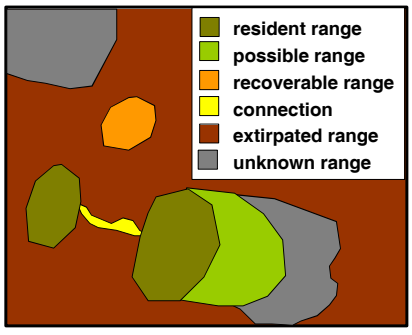

Figure A3.1 *Possible dispositions of different types of geographic range on an imaginary map*

- resident range: land where the species was known to be still resident. Because both cheetah and wild dogs have excellent dispersal abilities, not every point location indicates the presence of a resident population; some may indicate transient dispersing animals. Resident range was recognised by (i) regular detection of the species in an area, over a period of several years; (ii) evidence of breeding (e.g. young cheetah cubs sighted, or wild dog pups or dens recorded); and (iii) for wild dogs, sightings of complete packs (groups containing members of both sexes, usually >3 animals) rather than small groups (≤3 animals), or single-sex groups, which are likely to be dispersal groups.
- possible range: land where the species may still be resident, but where the species' residency had not been confirmed in the last 10 years. Usually these

would be areas which contain suitable habitat and prey, but which have had little or no ground-based surveying in recent years (aerial surveys are unlikely to detect either species). Some areas were considered to constitute possible range because only unconfirmed reports were available (e.g. reports from inexperienced observers) or for which there were only reports of transient individuals or groups.

- extirpated range: land where the species has been extirpated. This can be further divided into:
  - unrecoverable range: land where habitat has been so heavily modified (e.g. by cultivation or urbanisation) or fragmented as to be uninhabitable by resident animals for the foreseeable future.
  - recoverable range: land where habitat and prey remain over sufficiently large areas that either natural or assisted recovery of the species might be possible within the next 10 years if reasonable conservation action were to be taken. In designating areas of recoverable range, participants were asked to bear in mind that both species live at low densities and travel very widely, so would rarely be recoverable in small areas (<3,000km^2) unless very intensive management (e.g. predator-proof fencing and active population management) could be implemented.
- connecting range: land where the species may not be resident, but which dispersing animals may use to move between occupied areas, or to recolonise extirpated range. Such connections might take the form of 'corridors' of continuous habitat or 'stepping stones' of habitat fragments.
- unknown range: land where the species' status is currently unknown and cannot be inferred using knowledge of the local status of habitat and prey.

In principle, conservation activities for these species (e.g. management interventions, surveys, monitoring) might be conducted in any of these types of geographic range. Even in unrecoverable range, outreach and education activities may be vital for long-term conservation efforts in neighbouring lands.

In addition to mapping each range polygon, participants also provided information on land use within the polygon, the size and status of the cheetah or wild dog population it contained (if sufficient data were available), prey availability, and potential threats.

A3.1.4 Collating data from multiple participants (conducted 1st-2nd February)

Participants provided data on their geographic areas of expertise prior to the workshop; these were then collated into draft maps for the entire region. At the workshop itself, these maps were reviewed and modified through discussion among participants (Figure A3.2).

Figure A3.2 *Participants update distribution maps for different parts of eastern Africa.*

The process of collating data from multiple participants led, in some cases, to substantial changes in the range polygons. In particular, a number of polygons were merged when it became clear that populations mapped by participants from different areas (frequently in different countries) constituted single populations. In such cases, updated data on population size and status, land uses, and threats for the new (merged) polygon were agreed by participants.

By this process, participants produced a digital map of the two species' distribution and status within eastern Africa.

A3.1.5 Analyses of data on status and distribution (conducted 2nd-3rd February)

Once the distribution maps were finalised and agreed by participants, these were used to evaluate the proportions of each species' geographic range that fell inside *vs.* outside protected areas. This information helped to direct the strategic planning process by highlighting the importance of both protected and unprotected lands for the future conservation of both wild dogs and cheetah.

Distribution data were also compared with national boundaries and hence used to evaluate the likely importance of trans-boundary management; once again, this informed the development of the strategic plan.

Participants also used the data on likely threats to each wild dog or cheetah population to identify key threats to each species. To do this, working groups (one convened for cheetah, and one for wild dogs) discussed and evaluated the evidence that each nominated threat was truly having – or likely to have – an impact on the current or future viability of the population in question. They then collated this information across all populations in the region and identified key threats that affected multiple populations. Results from the two species-specific working groups were very similar and were therefore subsequently combined.

Range polygons were also compared with the WWF ecoregions identified within eastern Africa (Olson *et al.*, 2001). Following Sanderson et al. (2002), ecoregions were used as a measure of the 'ecological settings' within which wild dog or cheetah populations occur. Mapping the species' distribution across these ecoregions therefore provided one way for participants to pick out polygons that were potentially ecologically unique (and therefore arguably particularly valuable) because they fell within under-represented ecoregions.

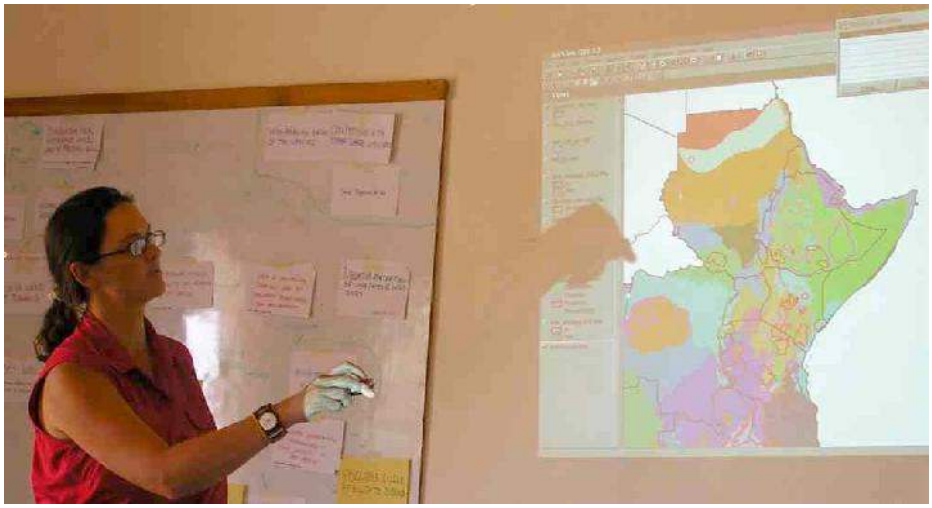

Figure A3.3 *Presenting the preliminary analysis of species distribution across WWF ecoregions*

There was discussion among participants about whether it would be valuable, for conservation planners and managers, to use the contributed data to compare and prioritise populations for conservation investment. To illustrate the possible

inputs to, and outputs from, such a process, the organisers conducted and presented a preliminary analysis comparing the seven resident wild dog populations (occupying seven polygons of resident range) within Kenya. This analysis scored each population according to its 'ecological value' (based upon its size, whether it occupied an under-represented ecoregion, and whether it formed part of an intact predator guild), and its threat status (based upon the number and apparent severity of threats faced). These scores were then plotted on orthogonal axes, and used to identify populations which appeared (by these measures) to be both ecologically important and highly threatened; such populations might be particularly important targets for conservation action.

In response to this presentation, government representatives expressed interest in seeing the results of such a prioritisation within national boundaries, as they felt that this could help them organise their own conservation efforts. Representatives of the two IUCN/SSC Specialist Groups, as well several of the species specialists, felt that such an exercise would be valuable at international levels to help direct international donor funding to areas particularly important for conservation of the two species; the latter would be similar to the WCS 'rangewide priority setting' exercises previously conducted for other species (e.g. Sanderson *et al.*, 2002). The whole group appreciated the potential complexity of conducting such an exercise, but the species biologists showed particular enthusiasm for developing the process, while managers were more concerned simply to see the results. It was therefore agreed that a small group of biologists would take this process forward after the workshop. This is likely to be most valuable if conducted once workshops have been completed for the species' entire geographic ranges, allowing a truly rangewide comparison of populations. Results will be communicated to, and discussed with, all workshop participants.

APPENDIX 4: STRATEGIC PLAN LOGICAL FRAMEWORK

Vision			
To secure viable and ecologically functioning cheetah and wild dog populations as valued components of development in eastern Africa.			
Goal			
To reverse declines and improve the status of cheetah and wild dog populations and their habitats across eastern Africa.			
Theme	**Objective**	**Target**	**Activity**
Coexistence	1. Develop and implement strategies to promote coexistence of cheetah and wild dogs with people and domestic animals	1.1 Programmes to reduce indiscriminate hunting and illegal offtake of wild ungulates implemented in affected areas within three years	1.1.1 Identify areas where wild dog or cheetah populations are significantly threatened by accidental snaring
			1.1.2 Identify areas where prey loss contributes to conflict between livestock farmers and cheetah or wild dogs, or directly undermines the viability of wild dog or cheetah populations
			1.1.3 Support the implementation of measures to reduce indiscriminate hunting and/or illegal offtake in identified areas
		1.2 Sustainable tools to reduce wild dog and cheetah impacts on livestock developed and disseminated across the region within three years	1.2.1 Identify areas where cheetah and wild dog populations are significantly threatened by conflict with livestock farmers
			1.2.2 Identify the circumstances that contribute to livestock depredation by cheetah and wild dogs in the identified areas
			1.2.3 Develop effective strategies for disseminating existing information on reducing cheetah and wild dog impacts on livestock to relevant parties across eastern Africa
			1.2.4 Work with communities in affected areas to develop and implement the most effective livestock husbandry strategies to reduce depredation by cheetah and wild dogs
		1.3 Initiate and maintain programmes for local people to derive sustainable economic benefits from cheetah and wild dog presence and their prey in selected areas within three years	1.3.1 Identify areas across eastern Africa where ecotourism could effectively assist cheetah and wild dog conservation through sustainable economic benefits for local communities, and hence improving tolerance of both species
			1.3.2 Encourage sustainable ecotourism programmes and the distribution of their revenue to appropriate parties in cheetah and wild dog range
			1.3.3 In areas of eastern Africa where ecotourism is unlikely to provide sufficient benefits, investigate alternative options for generating revenue which encourage cheetah and wild dog conservation
			1.3.4 Develop and disseminate guidelines for responsible tourist viewing of cheetah and wild dogs
		1.4 Awareness creation programmes relevant to cheetah and wild dog conservation developed in key areas within three years	1.4.1 Identify target areas and audiences best placed to influence cheetah and wild dog conservation
			1.4.2 Investigate local traditions, knowledge and cultural values relevant to cheetah and wild dogs and incorporate into outreach materials and strategies
			1.4.3 Tailor existing outreach materials for cheetah and wild dog conservation to local conditions in eastern Africa and disseminate

Theme	Objective	Target	Activity
1. Coexistence (cont)	1. Develop and implement strategies to promote coexistence of cheetah and wild dogs with people and domestic animals (cont)	1.5 Holistic canid disease management strategies developed in key areas within three years	1.5.1 Identify areas where wild dog populations are significantly threatened by canid disease
			1.5.2 Work with livestock and/or veterinary departments to encourage domestic dog vaccination and husbandry within identified areas
			1.5.3 Evaluate existing disease management strategies for wild dogs and related species to assess their likely relevance to eastern Africa
			1.5.4 Identify circumstances where intervention may or may not be appropriate through continued research on the dynamics of canid disease in areas where domestic dogs coexist with wildlife
			1.5.5 Evaluate the conservation potential of vaccinating free ranging wild dogs against canid diseases
2. Surveys and information	2. Provide relevant stakeholders and managers with scientific and timely information on the status of and threats to cheetah and wild dog populations	2.1 Surveys and monitoring to evaluate presence, trends and threats in key cheetah and wild dog ranges initiated and maintained.	2.1.1 Conduct surveys to determine presence in areas identified as unknown, possible and connected ranges in all the eastern African countries within two years
			2.1.2 Within known resident ranges, initiate and maintain monitoring activities to determine population trends and threats within the range. Continuous with annual review.
			2.1.3 Within known resident ranges, conduct research to establish demographic and threat status
		2.2 Strategies for disseminating information relevant to cheetah and wild dog conservation to all key stakeholders across eastern Africa developed and implemented within one to three years	2.2.1 Each eastern African range state will use national workshops, publications, meetings and/or other media to disseminate information relevant to cheetah and wild dog conservation within one year
			2.2.2 Establish a standardised database format to facilitate the collection and sharing of data within one year
			2.2.3 Establish and update national and regional databases and disseminate resulting information within two years
3. Capacity Development	3. Strengthen human, financial and information resources for conserving cheetah and wild dogs in collaboration with stakeholders	3.1 A Cheetah and Wild Dog 'business plan' for each country developed within one to two years	3.1.1 Identify individuals and institutions to undertake these activities in each country by end of regional workshop
			3.1.2 Review existing and possible revenue streams for cheetah and wild dog conservation within one year
			3.1.3 Produce and disseminate the cheetah and wild dog 'business plan' for each country within two years
		3.2 Have extension, enforcement, and monitoring personnel trained and equipped to operate within 50% of the cheetah and wild dog populations ranges within three to five years	3.2.1 Immediately initiate activities to address urgent issues affecting cheetah and wild dog conservation (such as trafficking) wherever they are known to occur
			3.2.2 Strengthen collaboration in monitoring of resident and connecting range for cheetah and wild dogs within one year
			3.2.3 Initiate outreach and request information in unknown areas within one year
			3.2.4 Complete a Training and Resource Needs Assessment in each range country (this could happen within National Workshops) within one year
			3.2.5 Integrate Business Plan, Training Needs Assessment and Action plan within two years
			3.2.6 Employ or identify a full time cheetah and wild dog specialist (including community-scouts, parabiologists, community liaisons) in each target population within two years

Theme	Objective	Target	Activity
4. Policy and legislation	4. Review and harmonise existing legislation, and, where necessary, develop new legislation, for conservation across cheetah and wild dog range at national and international levels	4.1. Gaps in information on positive and negative effects of hunting on cheetah and wild dog conservation which can assist in policy evaluation and development are identified within one to three years	4.1.1 Collect information pertaining to cheetah and wild dog population trends and known threats across regional and international areas under different types of hunting policies within one to three years
			4.1.2 Map areas of known legal hunting districts within identified resident and possible cheetah and wild dog ranges within the eastern African countries within one to three years
			4.1.3 Produce a review document on national protected species legislation within the region and its implications for cheetah and wild dog conservation within one year
		4.2. Information on the extent of illegal wildlife related activities within cheetah and wild dog ranges for relevant authorities to strengthen policy/law enforcement and quality tourism provided within one to three years	4.2.1 Develop standardised methodologies to collect information on illegal activities relevant to cheetah and wild dog conservation within resident range within one to three years
			4.2.2 Collect spatially explicit information on the magnitude of illegal activities relevant to cheetah and wild dog conservation within key resident range and include within national and regional databases in two years
			4.2.3 Quantify the impacts of insensitive tourism on cheetah and wild dogs inside and outside of protected areas and use to develop outreach materials to raise awareness about cheetah and wild dog friendly observation practices within one to three years
		4.3. Explicit information provided to the management authorities to support identification and prioritisation of corridor and dispersal areas for improved connectivity of cheetah and wild dog ranges within one to three years	4.3.1 Determine the spatial extent of corridor and dispersal areas between resident, possible and unknown ranges within one to three years
			4.3.2 Determine threats, habitat quality, and the extent of suitable habitat in and surrounding corridors and dispersal areas within one to three years
		4.4. A memorandum of understanding to co-ordinate eastern African country management and its enforcement relevant to cheetah and wild dog conservation developed within one to three years.	4.4.1 Facilitate the formation of a representative team of species biologists and wildlife management authorities to draft a memorandum of understanding to represent interests of cheetah and wild dogs in trans-boundary issues within one to three years
			4.4.2 Propose and support proposals for cheetah and wild dogs to be listed within the Convention on Migratory Species within two years

Theme	Objective	Target	Activity
5. Advocacy	5. Mainstream Cheetah and Wild Dog conservation in land use planning and its implementation	5.1. Overseeing government authorities and local communities and other stakeholders within cheetah and wild dog resident and connecting ranges are made aware of the importance of cheetah and wild dog populations within two to three years	5.1.1 Initiate and implement visiting programme to regional and local government offices, lodges and universities to present and distribute summary of cheetah and wild dog conservation issues, posters and this strategic plan within one year
			5.1.2 Convene a 'conservation-caucus' type body in each country (e.g. like the environmental conservation committee in Tanzania) within one year
		5.2. A land use plan for cheetah and wild dog resident and connecting range outside protected areas compatible with the species' conservation established within five years	5.2.1 Identify priority areas to be incorporated into land use plans within 6 months
			5.2.2 Strongly encourage governments to strengthen the legal mandate for land use planning within one year
			5.2.3 Complete individual village (community or private land owner) land use plans within two years
			5.2.4 Integrate village and community plans into cross-sectoral (and species) plans such as conservancy or wildlife management areas within two years
		5.3. Awareness is raised among relevant donors and civil society about cheetah and wild dog populations, the effects of land use on them, and the economic and conservation consequences within two to three years	5.3.1 Initiate poster campaigns to raise awareness of cheetah and wild dog conservation within their range, including possible and connecting areas within one year
			5.3.2 Promote representation of cheetah and wild dog conservation issues in mass media in range countries within one year
			5.3.3 Develop and maintain cheetah and wild dog literature and information repositories (e.g. online and in country) within one year
6. National planning	6. Promote the development and implementation of national conservation programmes for cheetah and wild dogs, by government and other stakeholders.	6.1 National action plans for cheetah and wild dog conservation developed and endorsed by appropriate government authorities in all eastern African range states within three years	6.1.1 Identify focal person, group or office to lead national planning processes within each range state in eastern Africa within one month
			6.1.2 Prepare and organise stakeholder meeting(s) in every range state where this has not yet occurred to identify national priorities for wild dog and cheetah conservation within two years
			6.1.3 Draft, review, finalise and endorse national action plans for wild dog and cheetah conservation within every range state in eastern Africa within the context of a broader regional strategy within three years

APPENDIX 5: ACKNOWLEDGEMENTS

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The mapping exercise benefited greatly from the insight and expertise of Dr Eric Sanderson, of WCS, who unfortunately was unable to attend the workshop itself due to an unforeseen strike by British Airways.

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Paul Peter Awol also thanks Alfred Akwoch Omoli and Paul Elkan for assistance in attending the workshop.

The workshop itself was punctuated by an unexpected and unprecedented strike at Mpala Research Centre where the meeting was being held. We particularly thank our cook, Peter, for feeding us so well during this difficult time. We are also deeply indebted to Amanda Lopez, Molly Fay and Kayna Chapman who stepped into the breach to continue feeding the delegates on strike days, and to the many Mpala researchers who interrupted their own work to help out with washing up and other tasks that helped the project continue working.