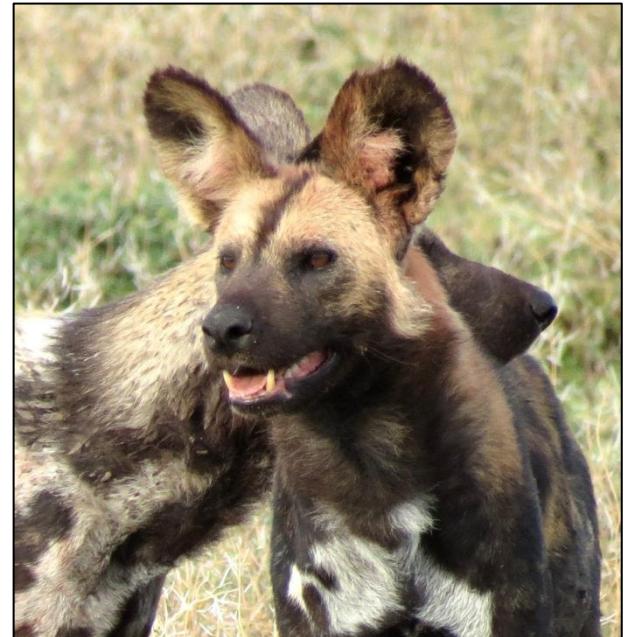




NATIONAL ACTION PLAN

FOR THE CONSERVATION OF CHEETAHS & AFRICAN WILD DOGS IN TANZANIA



2013

Ministry of Natural Resources and Tourism, Tanzania

NATIONAL ACTION PLAN FOR THE CONSERVATION OF CHEETAH AND AFRICAN WILD DOG IN TANZANIA

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Citation: Ministry of Natural Resources and Tourism, 2014, National Action Plan for the Conservation of Cheetahs and African Wild Dogs in Tanzania, Dar es Salaam, Tanzania.



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Preface

Preface / Foreword text by: Tarishi M. K, Permanent secretary, Ministry of Natural Resources and Tourism

NATIONAL ACTION PLAN FOR THE CONSERVATION OF CHEETAH AND AFRICAN WILD DOG IN TANZANIA

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CHAPTER 1

INTRODUCTION

1.1 Background

The cheetah (*Acinonyx jubatus*) and the African wild dog (*Lycaon pictus*) 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 & Ziegler, 2005). All large carnivores need large areas to survive; yet wild dogs and cheetahs 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 savannas, wild dogs and cheetahs – particularly susceptible to the destruction and fragmentation of habitat – are often the first species to disappear. Despite their globally threatened status (wild dogs are listed as endangered and cheetahs as vulnerable (IUCN, 2006a)), their ecological importance as top carnivores (Woodroffe & Ginsberg, 2005b), and their 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 conservation efforts on unprotected lands have been relatively limited. Three factors have hindered conservation activity for cheetahs and wild dogs:

- (1) The species' massive area requirements mean that conservation planning is needed on a daunting spatial scale, rarely seen before in terrestrial conservation.
- (2) Information is lacking on the species' distribution and status, and on the tools most likely to achieve effective conservation.
- (3) 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 cheetahs because the threats and conservation challenges are likely to be different.

In combination with Tanzania Wildlife Research Institute (TAWIRI), Tanzania National Parks Authority (TANAPA), and Ngorongoro Conservation Area Authority (NCAA), Wildlife Division (WD) is the government authority with overall responsibility for managing the nation's wildlife. Together they represent the appropriate authorities to oversee the implementation of this action plan, in partnership with other government departments, and a number of NGOs and independent actors.

This current national action plan for cheetah and African wild dog replaces the two existing conservation action plans that had been devised in two separate workshops in 2005 and which resulted in two parts of the combined carnivore conservation plan of 2005-06. Before conducting the new action planning process, an assessment of progress since the original plans was requested by TAWIRI. The report laid out the progress achieved in distribution mapping, disease monitoring, persecution assessment, habitat change, understanding ecological constraints, and the impacts of tourism on cheetah. It showed substantial progress had been made since that time but concluded that there was now a need for more targeted and directive identification of objectives, activities and actors.

Against this background, conservation issues associated with wild dogs and cheetahs are being addressed together because, despite being taxonomically quite different, the two species are ecologically very similar and hence face very similar threats.

1.2 Structure of this report

This National Action Plan report is designed to be short and readable without distracting from the action plan itself; the heart of this document lies in the logical framework, provided in tabular form at the back for easy reference in Appendix 3.

Chapter 2 of this report present details of the status and distribution of cheetahs and wild dogs, respectively, in Tanzania and neighbouring areas. The data provided here represent the state of current knowledge following amendments during the national workshop to the previously adopted expert-derived maps that were generated during the regional workshop. Chapter 3 describes the threats to both species while Chapter 4 describes the development of the national conservation action plan in the course of the national workshop. This national plan was developed by presenting the regional strategy to participants in the national workshop, and seeking their approval to use the regional strategy as a template for the national action plan. When this approach was agreed, national participants modified and expanded the regional strategy, adding details to produce a Tanzania-specific national action plan. A list of the workshop participants and the agenda for the workshop are provided in Appendices 1 and 2.

1.3 National planning within a rangewide context

This national action plan for the conservation of cheetahs and wild dogs in Tanzania was developed as part of a Rangewide Conservation Planning Process for these two species. Recognising the serious conservation issues facing cheetahs and wild dogs, 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 process to plan for the species' conservation across their combined geographic range. This process, conducted in close partnership with government conservation authorities, aims to develop a coordinated array of national conservation action plans for all range states, nested within broader regional strategies.

The Rangewide Conservation Planning Process has seven stated objectives:

- (1) To foster appreciation for the need to conserve wild dogs and cheetahs, 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 cheetahs, including corridors connecting important conservation areas.
- (4) To prepare specific global, regional and national conservation action plans for both cheetahs and wild dogs.
- (5) To encourage policy makers to incorporate wild dogs' and cheetahs' conservation requirements into land use planning at both national and regional scales.
- (6) To develop local capacity to conserve cheetahs and wild dogs by sharing knowledge on effective tools for planning and implementing conservation action.
- (7) To foster collaborative management and conservation of these species amongst range states, particularly in the case of transboundary populations.

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 conservation organizations. Close involvement of government representatives was considered absolutely critical since these are the organizations with the authority to implement any recommendations at the management and policy levels. While the process will eventually cover the entire geographic range of both species, the large number of range states involved means that productive discussion and interchange would be very difficult to achieve at a single workshop covering all regions. Workshops are therefore being conducted at the regional level, covering eastern, southern, and west-central Africa for cheetahs and wild dogs together, and North Africa and Asia for cheetahs only (wild dogs being absent from this last region).

Although the species' extensive area requirements demand conservation planning on a very large spatial scale, wildlife conservation policy is formulated, authorized and enforced at the national level. It is critical, therefore, that conservation planning be enacted at this level, and national workshops were considered a vital component of the rangewide process. Each regional workshop is therefore being followed immediately by a national workshop in the host country. Hence, the eastern Africa regional workshop was followed by a Kenya national workshop, southern Sudan national workshop, and the recently concluded Tanzania national workshop. This process will eventually lead to the development of national action plans for all range states in Africa.

1.4 The eastern Africa regional workshop

The eastern Africa regional workshop on conservation planning for cheetahs 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, Uganda, Kenya and Tanzania, and species specialists from Botswana, Namibia, Kenya, Tanzania, USA and UK (figure 1.1). Data were also contributed by a participant from northern Sudan. 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 fairly minor modifications, to develop national action plans for the species' conservation.



Figure 1.1 Delegates to the conservation planning workshop for cheetah and African wild dog in eastern Africa, held at Mpala Research Centre, Kenya in February 2007.

1.5 The Tanzania national action planning process

The 2013 national workshop for cheetah and African wild dogs represents a new action planning process for these species in Tanzania. In 2005 two separate workshops have been held for the conservation action planning for cheetah and African wild dogs, respectively. Those original plans focused mostly on the information needs regarding these two species and suggested possible methods by which knowledge might be acquired but did not systematically specify the objectives and activities required or identify the responsible parties and the timeframes. In the intervening period the Rangewide Conservation Programme for Cheetah and African Wild Dogs has developed a planning process that is more targeted to achieving identified outcomes.

The Tanzania national workshop on conservation planning for cheetah and wild dogs was held at the Snow Crest Hotel in Arusha between January 16th and 17th, 2013. It was attended by 30 participants with representation from government authorities, Wildlife Management Areas (WMAs), NGOs and species scientists. Officers from Wildlife Division (WD), Tanzanian National Parks Authority (TANAPA), Tanzania Wildlife Research Institute (TAWIRI) and Ngorongoro Conservation Area Authority (NCAA) included both headquarter staff and regional conservation officers. The full list of participants and their affiliations is given in Appendix 1.



Figure 1.2 Participants of the national action planning workshop for cheetah and African wild dog conservation in Tanzania, 2013.

The outcome of the national conservation planning workshop was:

- a) an increased and updated understanding of the current distribution and status of the two species,
- b) the development of a national action plan for the conservation of cheetah and African wild dogs by a cross-section of government and non-government stakeholders who will together be crucial to the implementation of any recommendations at the management and policy levels.

1.6 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 ungulate, particularly gazelles (*Gazella* spp.) but prey may range in size from hares (*Lepus* spp) and dik diks (*Madoqua* spp, Woodroffe et al., 2007c) to kudu (*Tragelaphus strepsiceros*) and even 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 (Girman et al., 1997a), but all pack members contribute 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 units of measuring wild dog population size.

Unlike most carnivore species (except cheetahs), wild dogs tend to avoid areas of high prey density (Mills & Gorman, 1997), apparently because larger carnivores prefer such areas (Creel & Creel, 1996). This avoidance is also observed in rich wildlife habitats like Kenya's Maasai Mara reserve. Lions (*Panthera leo*) and hyenas (*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 100km² (Fuller et al., 1992a) and home ranges average 600-800km² per pack in eastern Africa (Woodroffe & Ginsberg, 1998), with some packs ranging over areas in excess of 2,000km² (Fuller et al., 1992a). Wild dogs are recorded as having greater needs than cheetahs 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, often but not always in their second year (McNutt, 1996) having left their natal packs in same-sex dispersal groups, seeking 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 recolonize remote areas when opportunities arise.

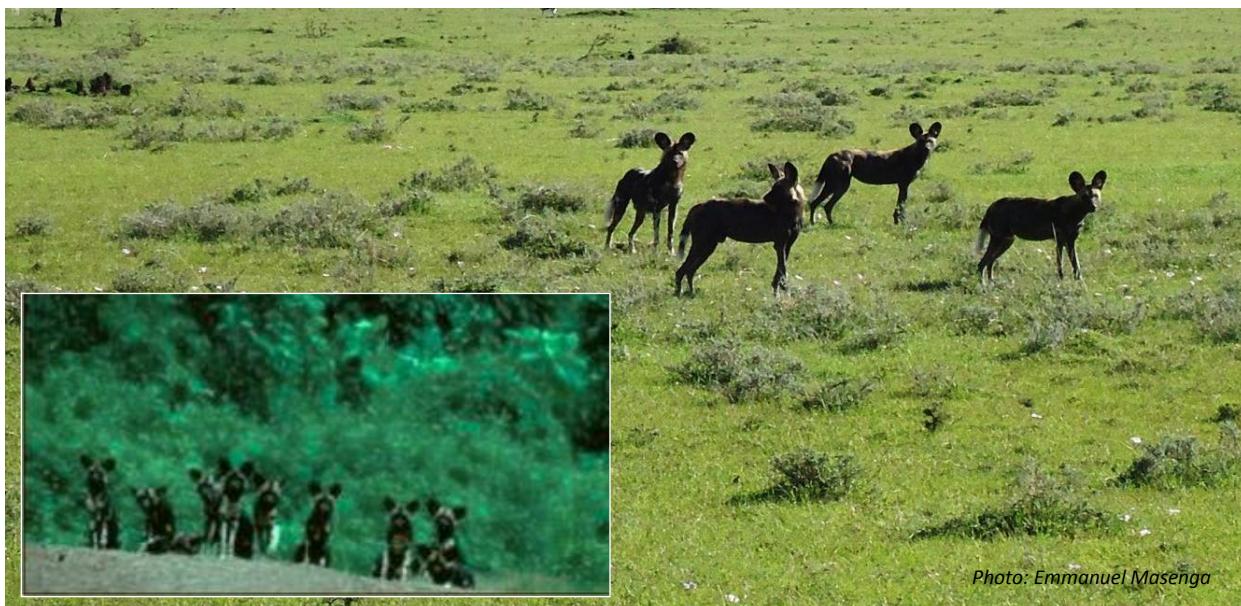


Photo: Emmanuel Masenga

Figure 1.3 Both wild dogs and cheetahs can be found in a wide range of habitats; here wild dogs are pictured in the grasslands of the Serengeti ecosystem, and (inset) in the montane Hareenna forest.

Wild dog populations in different regions of Africa are morphologically and genetically different, but no subspecies are recognised (Girman & Wayne, 1997b; 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. The first Africa-wide status survey for wild dogs was conducted in 1985-1998 (Frame & Fanshawe, 1990), and this was updated in 1997 (Woodroffe, Ginsberg & Macdonald, 1997b) 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 in comparison with most other species (cheetahs 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., 2007c). Wild dogs seldom kill livestock where wild prey remains 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).

1.7 Biology and conservation needs of cheetahs

The cheetah is one of the most unique and specialised members of the cat family. It can reach speeds of over 100km/hour (Sharp, 1997), making it the fastest creature on land. However, despite their specialised hunting strategy, cheetahs are habitat generalists, ranging across a wide variety of habitats; from desert through grassland savannahs to thick bush (Myers, 1975).

Cheetahs 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 animals, 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 then defend against male intruders (Caro & Collins, 1987). In the Serengeti ecosystem in northern Tanzania and south-western Kenya, male territories average 50km², whilst females and males without territories cover around 800km² 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). The discovery that multiple fathers are able to contribute their genes to a single litter (Gottelli et al., 2007) has helped to explain the importance of the far-ranging travels of female cheetahs that cover several male territories (Durant et al., 2007).

Cheetah females are able to give birth to their first litter at two years, 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 hyenas: 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 greatest 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 (S. Durant unpublished data). Demographic parameters are available for only a small number of populations: mean and variance of birth and survival have only been published from the long term study in the Serengeti National Park, Tanzania (Durant et al., 2004), whilst mean birth and survival rates are available from ranch lands in Namibia (Marker et al., 2003a).



Figure 1.4 Looking out across the grasslands of the Serengeti ecosystem; space is critical to both cheetah and wild dog survival.

Cheetahs are predominantly diurnal, although hunting at night is not uncommon (Caro, 1994). Cheetahs hunt by a stealthy stalk followed by a fast chase. Because of their unrivalled speed and acceleration, cheetahs 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*). Cheetahs 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.

Like wild dogs, but unlike most other large carnivore species, cheetahs tend to avoid areas of high prey density, probably because larger 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 also kill cubs and will steal kills from cheetahs. Cheetahs used to be widespread across Africa, and across Asia as far east as India. However, today there are no cheetahs 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 populations are concentrated in sub-Saharan Africa. The first status survey for cheetahs was conducted 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 current knowledge of global status was collated in 1998 (Marker, 1998). However accurate information on status and densities is 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 at small “hotspot” localities, making estimating numbers additionally problematic at the broader scale (Durant et al., 2007).

As in the case of African wild dogs, and probably because of similar tendencies to avoid larger predators, cheetahs live at low densities with recorded levels ranging between 0.3 and 3 adult cheetahs/100km² (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 that these estimates do not reflect true density, as individuals counted may roam outside the survey area (highlighting a general problem with surveying cheetah populations; see Bashir et al., 2004).

Home range has been recorded as ranging from 50km² for territorial males in the Serengeti (Caro, 1994) to over 1,000km² in Namibia (Marker et al., 2008). Like wild dog home ranges, cheetah ranges are much larger than would be predicted from their energy needs. Because they can range across such large areas, cheetah can also disperse widely, having been recorded as moving over more than one hundred kilometres (S. Durant unpublished data), and over two hundred km in Namibia (Marker 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 recolonize 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 according to IUCN red list criteria (IUCN, 2013). Although the published population size estimates do not suggest a decline, there is a consensus among the world’s cheetah experts that such a decline has occurred, either because the 1970’s figure was an underestimate, or because the later figure 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., 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 cheetahs for hunting (Divyabhanusinh, 1995). Today, lethal control, due to perceived or actual conflict with livestock or game ranching, also plays an important role in the decline of the species in sub-Saharan Africa (Marker et al., 2003b; Myers, 1975).

CHAPTER 2

2. DISTRIBUTION AND STATUS IN TANZANIA

2.1 The mapping process

2.1.1 Mapping during the national action planning workshop

During the national action planning workshop all the confirmed sightings of cheetah and African wild dog were displayed for the workshop participants. The points were mostly collected within the Tanzania mammals database although some of these that appeared to be of dubious reliability were eliminated for the purposes of national action planning. TANAPA, TAWIRI and WD representatives and other conservation project members brought GPS-located sightings of recent years and contributed them to the group mapping process. The points were overlaid on the existing distribution maps as originally generated for the regional strategy workshop (figure 2.1). Participants then discussed the displayed information and with their expert knowledge of the different regions of the country were able to amend the distribution maps by extending certain areas or adding new polygons; these were digitized in the GIS live within the workshop session.



Figure 2.1 Mapping the distribution of wild dogs in Tanzania, at the national action planning workshop.

The presence of sighting observations indicate that cheetahs or African wild dogs have definitely occurred in a particular area, but does not signify whether there is a resident breeding population or whether the sightings are of transient individuals. The presence of a cluster of sightings in one area, which are widely distributed across time, is more likely to indicate a resident population. The absence of sighting information in an area can mean one of two things: either there are none of these species in the area, or they are in the area but they have not been recorded. The latter explanation is likely to be the case in areas where there are few observers.

2.1.2 Categories of current geographical range

The mapping process recognised six categories of current geographical range (figure 2.2).

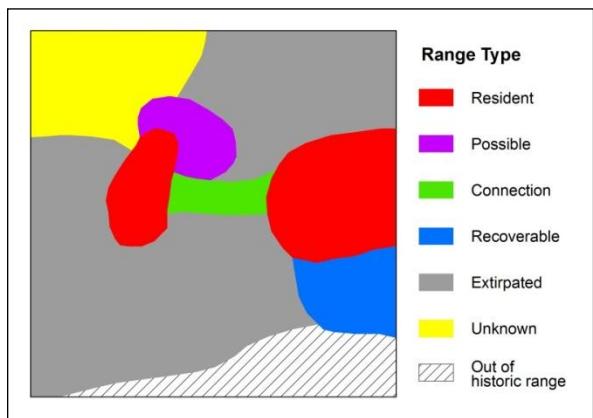


Figure 2.2 The distribution mapping colour scheme.

- 1) **Resident range:** land where cheetahs are known to be still resident
- 2) **Possible range:** land where cheetahs may still be resident, but where residency has not been confirmed in the last 10 years.
- 3) **Connecting range:** land where cheetahs 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) **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.

- 5) **Extirpated range:** land where the species has been extirpated. This could include both unrecoverable range and recoverable range but this latter distinction was not mapped within the national action planning workshop due to insufficient evidence.
- 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.

2.2 Distribution and status of cheetahs in Tanzania

2.2.1 Historical distribution

Cheetahs are habitat generalists, able to persist in a wide array of environmental conditions, provided that sufficient prey are available, ranging from desert to reasonably thick bush. The highest cheetah densities have been recorded in wooded savannah (Caro, 1994). The species tends to occur at low densities, partly because it comes into competition with other large carnivores, such as lions and spotted hyaenas (Durant, 1998). Because of this, cheetah densities in pristine wilderness that harbour large numbers of other large carnivores do not differ significantly from densities in relatively degraded habitat with sparse prey and higher human impact. This is because the best habitats attract the highest densities of competing carnivores.

The climate and terrain of the great majority of Tanzania is suitable for cheetah and historically they are likely to have been distributed across most of the country. However, they have probably always been absent from a coastal strip of up to 160 km wide and reaching southwards from the north-east of the country to just 40 km north of Lindi (see area denoted as being out of historic range in figure 2.3). A substantial area of the country is coloured grey to reflect the extent of known range from which the cheetah is now extirpated.

2.2.2 Current national distribution in the international context

The most recurrent cheetah sightings are in the Serengeti Ecosystem due to the operations of the Serengeti Cheetah Project and their Cheetah Watch Campaign. However, it is established that cheetah are resident across much of the north-western part of the country along large sections of the border with Kenya, and in the Maasai Steppe (figure 2.3). They are also resident within the Ruaha-Rungwa and Katavi-Ugalla areas.

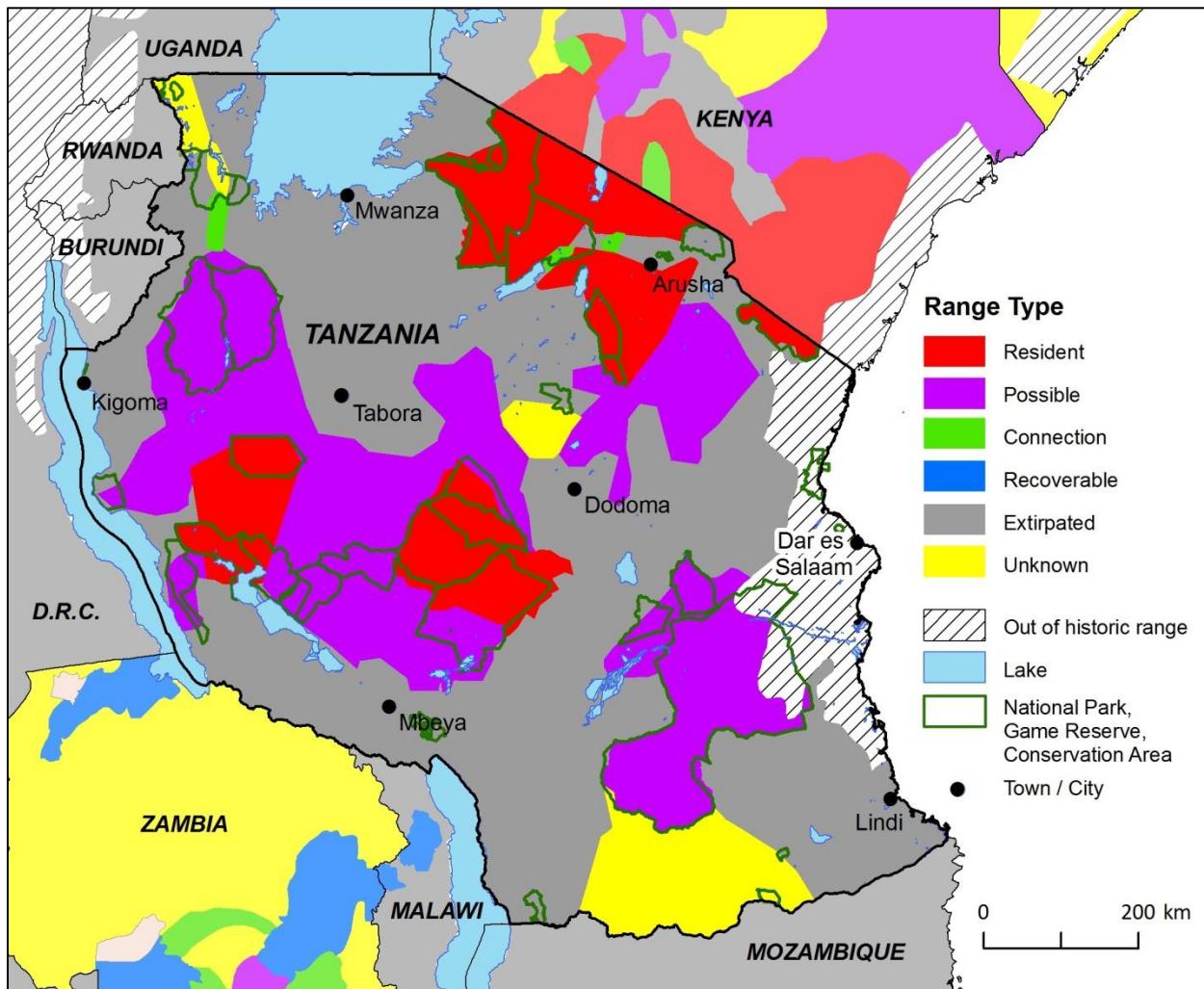


Figure 2.3 Cheetah distribution in Tanzania, as mapped during the national action planning workshop, 2013. The colours of neighbouring countries are muted.

Figure 2.4 provides a wider perspective regarding the cheetah range and shows that Tanzania is not bordered to either east or west by any countries with cheetah populations. Uganda to the north is similarly without potential links to cheetahs and a very considerable gap of 850km exists between the Tanzanian populations and the nearest known population to the south, that of Kafuwe in south-western Zambia. The absence of resident cheetah from Malawi, northern Mozambique and northern Zambia means that the southernmost known resident cheetahs of eastern African, i.e. those of the Ruaha-Rungwa area, are far adrift from the southern African populations.

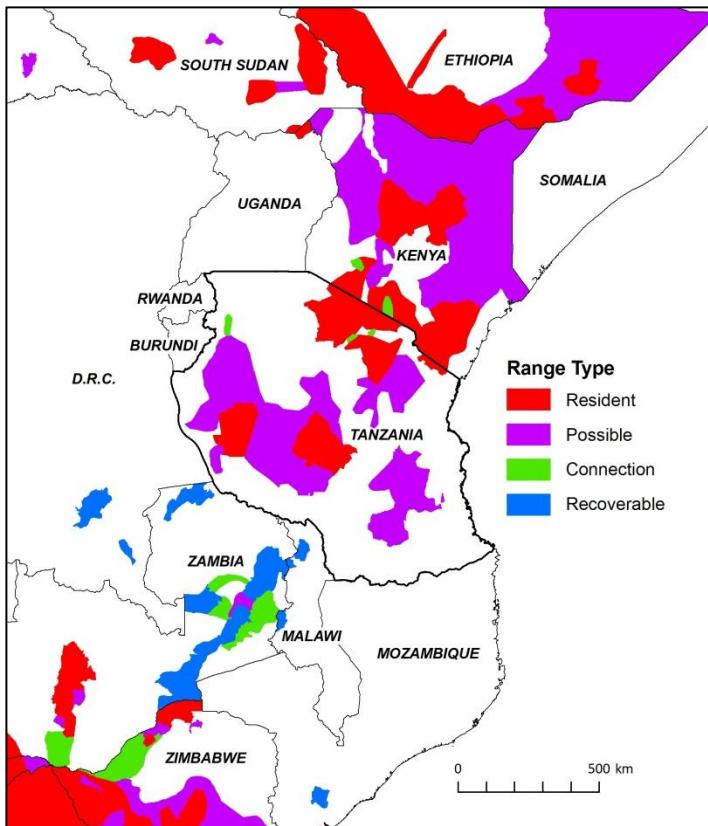


Figure 2.4 Tanzanian cheetah range within a regional context.

Table 2.1 Cheetah range areas in Tanzania, analysed per category by square kilometres and percentage (note that the other countries of eastern Africa include: Kenya, Uganda, Ethiopia, South Sudan, Sudan, Eritrea, Djibouti and Somalia.)

Range Category	Km ²	% of Tanzania	Average % of a nation's area amongst eastern African states except Tanzania	% of the distribution category that occurs within IUCN protected areas (class I-VI) in Tanzania
Resident	104,103	13.4	6.9	55.9
Possible	198,024	25.5	12.5	37.0
Connection	2,937	0.4	0.1	23.4
Recoverable	0	0.0	0.0	0.0
Extirpated	380,263	48.9	5.0	2.6
Unknown	44,261	5.7	65.9	4.7
Out of historic range	48,354	6.2	9.6	16.1
Totals	777,941	100.0	100.0	-

Table 2.1 shows that Tanzania has 104,103 km² of Resident cheetah range representing 13.4% of the country, about twice the average percentage across the other countries of eastern Africa (6.9%). The Possible range (25.5%) is similarly double the regional average. The proportion of the country that is Unknown is also impressive in being only 5.7% of the country while regionally the average is about two-thirds of the land area. However, the proportion of land identified as being Extirpated cheetah habitat and unrecoverable, is unusually high at 48.9%. These figures reflect an unusually high level of

It is therefore only Kenya that provides any significant connection to populations beyond the national border. It is via Kenya that the cheetah populations of Serengeti and Mkomazi are linked to each other and they represent eastern and western parts of the world-renowned Serengeti-Mara-Tsavo population. Effective transboundary communication and cooperation between the two countries is therefore of great importance to both cheetah conservation and to tourism in Tanzania.

It remains Unknown as to whether cheetahs occur within the Selous-Niassa corridor bordering Mozambique. A questionnaire survey by Clark & Begg (2010) indicated cheetah but the authors subsequently reinterpreted the evidence as likely to reflect the presence of serval. Considering the substantial gap between the Tanzanian cheetah and their southern counterparts, the corridor remains an area of interest for future survey work

knowledge concerning cheetah range and is testament to the considerable work that has occurred since the last cheetah conservation plan of 2005-06.

2.2.3 Distribution of cheetahs in relation to protected areas

As illustrated in Figure 2.3 and quantified in Table 2.1, more than half (55.9%) of all cheetah Resident range, and 37% of Possible range fall within protected areas. This shows the essential role of protected areas in the conservation of cheetah in Tanzania but, in mirror-image, the same figures also indicate that nearly 50% of Resident and more than 60% of Possible range lies outside such protection. This not only highlights the importance of conservation activities outside protected areas, but also reveals the need for a more detailed understanding of the extent of the resident populations in community lands and hunting concessions. One such Possible area lies between Ruaha-Rungwa and Katavi-Ugalla and represents a significant expanse of potential cheetah range and one of strategic importance considering its potential to connect the two resident populations.

Cheetahs are known to have been present in the Selous Game Reserve; however the last confirmed sighting there was in the late 1990s (pers. com. Ludwig Siege). The area has therefore been marked as 'Possible' on the distribution map although this possibility seems relatively remote. The small area of Unknown in the centre of the country, north of Dodoma, is intriguing due to its potential to link the southern and northern Tanzanian cheetah populations.



Figure 2.5 Perhaps the last cheetah in Selous Game Reserve; the last sighting was in the late 1990s (photo courtesy of Ludwig Siege).

There is relatively little land classed as Connecting range for cheetah in Tanzania but two small such areas appear to link the Maasai Steppe with Ngorongoro and with the Loliondo-Kajiado range. Maintaining these areas as viable connecting range is clearly important to the continued genetic exchange between these resident populations.

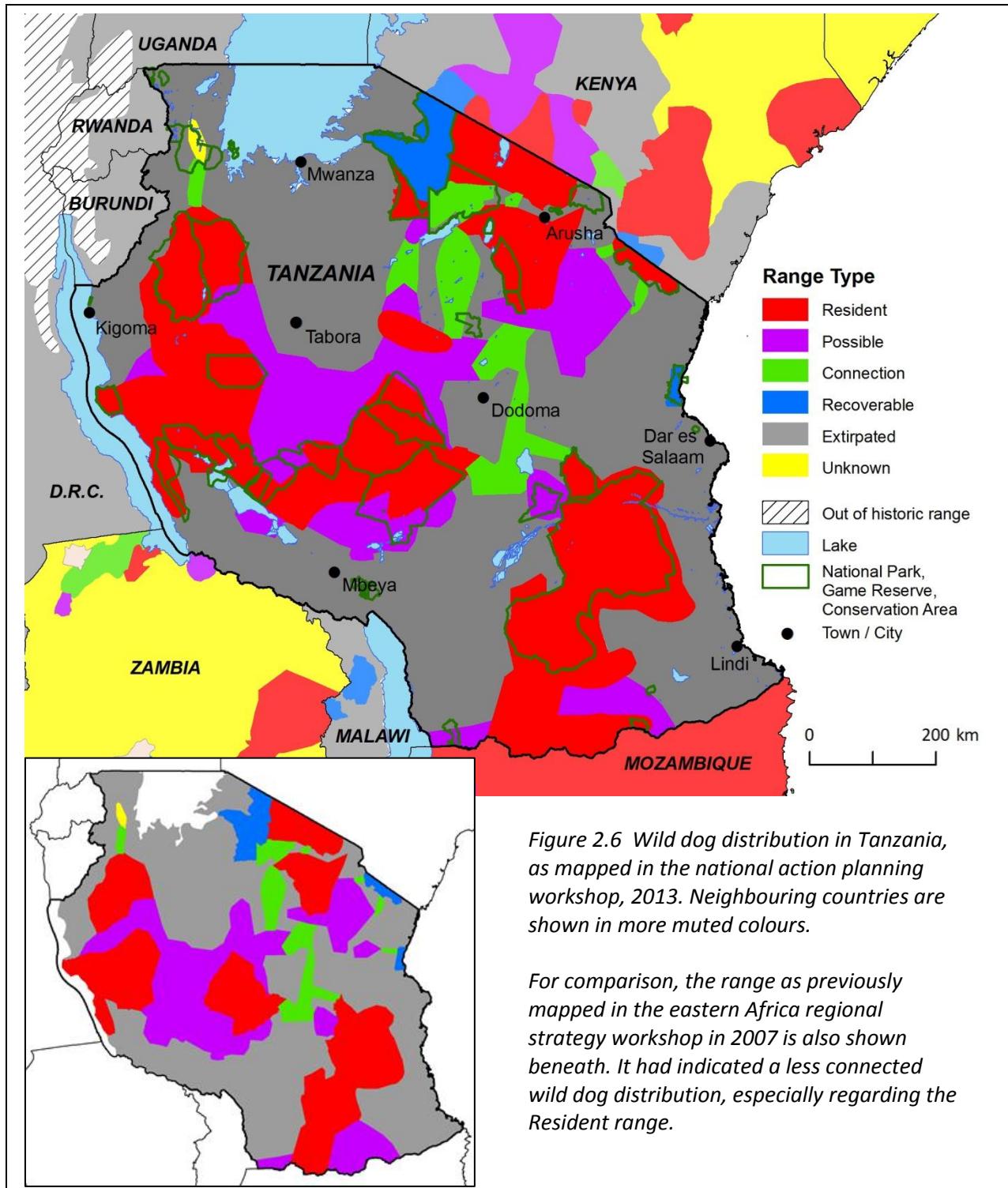
2.2.4 Cheetah distribution in Tanzania – Conclusions

Cheetahs are resident across the north-eastern border of the country and in two other areas in the west and centre of the country. Large tracts meanwhile remain defined as Possible. As in other parts of Africa, cheetahs in Tanzania appear to have experienced a marked contraction of their geographic range over the past one or two hundred years. The relative isolation of the Tanzanian resident cheetah populations within the context of neighbouring eastern and southern Africa serves to heighten the significance of their conservation in the country since areas could not readily be recolonized from beyond the national borders. Resident populations do persist and should be viable in the long term if appropriate conservation measures are enacted.

With 44% and 63% of the Resident and Possible ranges, respectively, falling outside protected areas the need for measures to promote co-existence of cheetah with the human population is clear. Given cheetahs' low population density, the populations inside protected areas are almost certainly dependent on adjoining unprotected lands for their long-term viability in terms of foraging grounds and dispersal corridors. Hence, conservation activities outside reserves are absolutely critical if populations are to be conserved, both inside and outside protected areas, in the long term.

There is a large area for which we can state that cheetahs are extirpated, but by contrast, there are few areas in Tanzania for which cheetah presence remains Unknown. Clarifying cheetah status in these areas would reveal whether there are further populations requiring targeted conservation efforts.

2.3 Distribution and status of African wild dogs in Tanzania



The mapping process during the National Action Planning workshop was able to extend the Resident range of the African wild dog in Tanzania, and brings even greater significance to a national population that was already considered globally important.

2.3.1 Historical distribution

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. Wild dogs have been recorded at the top of Kilimanjaro (Thesiger 1970), so even the top of Africa's highest mountain cannot be confidently excluded from their historic range. It follows that wild dog distribution in Tanzania is likely to be largely influenced by human population density and consequent modification of habitats. The species' known ranges as mapped during both the national and regional workshops, are shown in figure 2.6. 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 broad geographical distribution, wild dogs have probably never been abundant anywhere in Tanzania.

2.3.2 Current national distribution of wild dogs in Tanzania's international context

The map of current distribution for African wild dog in Tanzania, figure 2.6, shows there to be strong representation of resident populations across large parts of the country. The mapping process of the national action planning workshop in 2013 was able to expand the known Resident range to 242,769 km², an impressive 31.2% of the country (Table 2.2). This is reflected by the comparison in figure 2.6 between the current range map and that created in 2007. The changes have importantly recognized a link between the populations of the Ruaha-Rungwa and Rukwa-Katavi-Ugalla ranges.

The resident populations fall into three main areas in Tanzania, a southern population dominated by Selous Game Reserve, a western population encompassing Ruaha, Rungwa, Katavi and Ugalla, and a northern grouping that encompasses the Maasai Steppe, Mkomazi, Loliondo-Kajiado, and Maswa Game Reserve. However, there is Connecting Range or areas denoted as Possible Range linking almost all of these resident populations so it is conceivable that there is still connectivity between them. A relatively small

Table 2.2 African wild dog range areas in Tanzania, analysed per category by square kilometres and percentages (note that the other countries of eastern Africa include: Kenya, Uganda, Ethiopia, South Sudan, Sudan, Eritrea, Djibouti and Somalia.)

Range Category	Km2	% of Tanzania	Average % of a nation's area amongst eastern African states except Tanzania	% of the distribution category that occurs within IUCN protected areas (class I-VI) in Tanzania
Resident	242,769	31.2	3.8	47.2
Possible	104,894	13.5	5.6	9.1
Connection	36,592	4.7	0.1	14.2
Recoverable	13,594	1.7	0.1	94.8
Extirpated	378,797	48.7	15.2	2.3
Unknown	1,294	0.2	64.4	68.5
Out of historic range	0	0.0	10.8	0
Totals	777,941	100.0	100.0	-

area of Resident range has been identified north-west of Dodoma and brings further indication that the northern and western populations of the country may not be irrevocably isolated from each other.

As shown in Table 2.2, Tanzania retains a far greater percentage of its land area as Resident wild dog range (31.2%) than the other countries of eastern Africa. At 13.5%, the proportion of the country denoted as Possible range is also well above the regional average. Similarly, there is more Connecting (36,592 km²) and Recoverable (13,594 km²) range than found elsewhere and appears to reflect a positive outlook for the health of Tanzania's wild dog populations.

Figure 2.7 provides a wider perspective regarding the resident range of wild dogs and shows a considerable portion of the resident range occurs adjacent to international boundaries. A total of 350km of the Tanzanian border with Kenya is abutted by a resident wild dog population and similarly, 300km of the border to Mozambique; for part of the former and for the entire boundary with Mozambique corresponding wild dog populations have been mapped as resident across the border. These transboundary populations will require particular coordination and collaboration between countries for the most effective conservation.

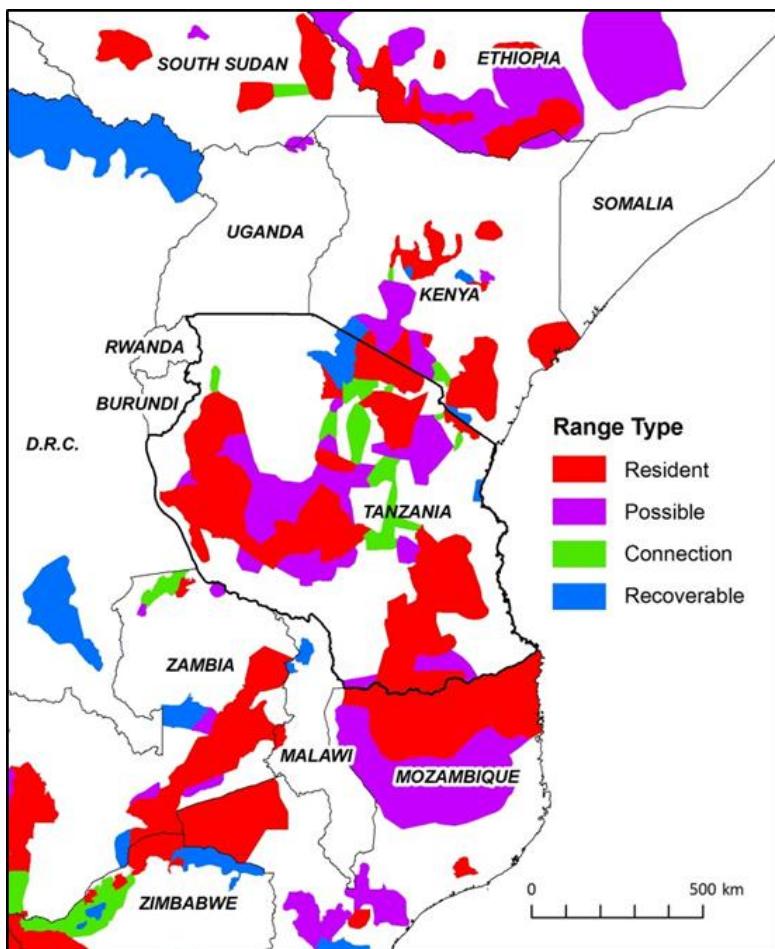


Figure 2.7 Tanzanian wild dog range within a regional context.

There is a very small proportion of the country that is classed as Unknown (1,294 km² or 0.2% of the country, see Table 2.2) but, as with cheetah, this also mirrors a relatively high proportion of the country (48.7%) for which the species is known to be already extirpated.

2.3.3 Distribution of wild dogs in relation to protected areas

Approximately 47.2% of wild dog Resident range and 9.1% of Possible range in Tanzania lies within protected areas (Table 2.2) but this leaves the majority of these ranges outside such protection. The Selous Game Reserve is especially renowned as a major stronghold of wild dogs and its entirety is mapped as Resident range. The western Resident range encompasses the protected areas around Ruaha and Rungwa near the centre of the country and stretches west through various game reserves and hunting concessions to include Katavi and Rukwa, and north to Ugalla, Moyowosi and Kigosi Game Reserves. In the north of the country, the Maasai Steppe and Loliondo-Kajiado Resident ranges persist largely without IUCN classified protected area status, with the exception of Tarangire and the northern part of Ngorongoro Conservation Area. Far to the south, the Niassa-Selous Wildlife Corridor (not classed as a category I-VI IUCN protected area) also plays an important strategic role due its location connecting the resident wild dog populations of the Selous Game Reserve with the Niassa National Reserve in Mozambique. It is therefore clear that while Tanzania's protected areas perform an essential role in wild dog conservation, the habitats between them are at least as important.

Serengeti National Park was the subject of speculation during the national action planning workshop in 2013 regarding the status of wild dogs that have been recently re-introduced there. It was concluded that they could not yet be confirmed as Resident considering the unpredictable movements of the species and their history of fluctuating presence within the Serengeti National Park. They were therefore recorded with the status of Recoverable.

2.3.4 Wild dog distribution in Tanzania - Conclusions

The known distribution of resident African wild dogs in Tanzania was significantly extended during the workshop and importantly some populations were re-mapped as being connected. In the context of the more fragmented wild dog ranges of other eastern African countries, the overall distribution reflects a fairly positive conservation situation. However, as in other parts of Africa, wild dogs in Tanzania have experienced a substantial contraction of their geographic range over the past one or two hundred years. This is probably as a result of expanding human settlement and agriculture. The remaining resident populations rely on both protected and unprotected lands for their survival; nearly 60% of the known resident range falls outside protected areas. Given wild dogs' vulnerability to extinction inside reserves (Woodroffe et al., 1998) this highlights the need for conservation efforts outside parks and reserves.

Further survey work could be very usefully conducted in the central part of the country to establish the true status of the Possible range that has clear implications for interpreting the connectivity between the northern and western resident populations. The relatively large and highly significant Connecting Range areas represent prime cases for which land use planning should be prioritized.

CHAPTER 3

THREATS TO WILD DOG AND CHEETAH POPULATIONS IN TANZANIA

3.1 Introduction

Global threats to wild dog and cheetah populations have been assessed previously (Bartels et al., 2001, 2002; Marker, 1998; Woodroffe et al., 2007a; Woodroffe et al., 1997a; Woodroffe et al., 2004). However, one conclusion of these assessments is that threats vary between regions and indeed this is true within the confines of Tanzania too. The threats are similar for the two species but with varying emphasis, as specified below.

3.2 Proximate threats

3.2.1 Habitat loss and fragmentation (both species)

Loss and fragmentation of habitat together represent the over-arching threat to both cheetah and wild dog populations, and it contributes to several of the other proximate threats listed below. Because both species live at such low population densities and range so widely, they require much larger areas of land than do other carnivore species, and are correspondingly more sensitive to habitat loss in the face of a growing human population. Conserving each viable population is likely to require land areas far in excess of 10,000km². Genetic studies have found strong ‘structuring’ of wild dog populations (Marsden et al. 2012) in eastern and southern Africa which was concluded by the authors to indicate the negative influence of extensive habitat fragmentation and loss of gene flow between habitat patches. 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 mosaic 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.

There remains a relative lack of understanding regarding the movements of both species between, for instance, areas of resident populations and different habitat patches, and a greater knowledge of corridors is undoubtedly of major significance to conservation in Tanzania.

In recognition of the great importance of habitat loss and fragmentation in the particular context of recent land and migration issues currently facing rural Tanzania, the topic of land use planning was emphasized within the national planning workshop.

3.2.2 Conflict with livestock farmers (both species)



Photo: Emmanuel Masenga

Both cheetahs 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 mostly involves pastoralist communities. They are liable to be shot or speared but as neither species regularly scavenges, they are less susceptible to

poisoning than are other carnivores such as hyaenas and leopards. However, the presentation of the Serengeti Wild Dog Conservation Project at the national planning workshop highlighted such conflicts in the Loliondo Game Controlled Area where communities have been known to poison with strychnine (pictured left; Masenga *et al.* 2013) and also to burn wild dogs at their den. Whether this conflict is a particularly strong feature of the Loliondo area or is relatively commonplace across Tanzania is not known; a suggestion was made at the workshop that further wild dog studies, e.g. around Selous, could be beneficial in this regard.

There is less understood of the threat to cheetahs posed by livestock owners but it is known that they are sometimes mistaken for leopards and blamed for attacks on livestock. The threat is understood to vary in intensity across the country and is believed to be of greater significance in the Ruaha region than in the Serengeti area (Dickman, 2005).

3.2.3 Prey loss (both species)



Photo: Helen O'Neill

Both cheetahs 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. Prey loss has been identified as a potential threat to all of the resident wild dog and cheetah populations.

3.2.4 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 Virus (CDV) killed 49 out of the 52 wild dogs comprising the semi-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 and hence disease risks are likely to be particularly high for wild dogs living outside protected areas. CDV was the attributed cause of death within a wild dog pack close to the north-eastern boundary of the Serengeti National Park in 2007; this was only the third confirmed case of fatal CDV infection in a free-ranging pack (Goller *et al.* 2010). They were infected with a CDV variant most closely related to those obtained in 1994 during a CDV epidemic in the Serengeti National Park and from semi-captive African wild dogs in the Mkomazi Game Reserve in 2000.

Although cheetahs are occasionally affected by infectious disease, notably mange (Caro *et al.*, 1987), disease is not widely known to threaten free ranging cheetah populations. The canine distemper epidemic that killed a third of Serengeti's lion population in 1994 had no such impact on the cheetah population (TAWIRI 2007). Chauvenet *et al.* 2011 have followed this with modelling to explore the impact on cheetah of vaccinations targeted at CDV in lions in the Serengeti. The most notable series of cheetah deaths from disease in the wild remain those due to an anthrax epidemic in Etosha in Namibia (Turnbull 2004). One cheetah and one serval death in 1998 were the only carnivore deaths attributed to anthrax in Serengeti ecosystem during a study period of 1996-2009 (Lembo *et al.* 2011). Cheetahs may

be more susceptible to anthrax than other carnivores due to a comparative lack of exposure since they do not scavenge, and their solitary hunting exposes them to fewer carcasses than group-hunting African wild dogs, lions and hyenas (Lembo et al. 2011).

3.2.5 Accidental snaring



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). The effects of snaring on cheetah populations are less well quantified but the absence of a scavenging habit in cheetahs no doubt contributes to their avoidance of snares while other carnivores can be attracted to prey caught in the traps. However, two cases of snared cheetahs have been published from western Serengeti (Campbell & Hofer 1995) and snaring may threaten some populations.

3.2.6 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 of particular concern where paved roads cross or adjoin major wildlife areas. Cheetah are only rarely reported to be the victims of such accidents, although one is reported on the road to Namanga in 2012. Wild dogs may be at greater risk since they use roads more commonly and have been reported to be killed on the main road in Mikumi National Park and one death is confirmed in the Kingupira area of Selous in 2013 (pers. comm. Dennis Ikanda).



3.2.7 Poorly managed tourism (both species)

Unregulated tourism has the capacity to threaten both cheetahs and wild dogs. In cheetahs, negative effects of tourism mainly involve interference with hunting, scaring cheetahs 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. This is of most concern in the Serengeti and should be managed to reduce the impacts in future and avoid the scenario across the Kenyan border in the Maasai Mara where the impacts of poorly managed tourism are most clearly apparent. However, 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.

3.2.8 Smuggling and live trade (mainly cheetahs)

The illegal trade in cheetah cubs to the Middle East has been recognized as a considerable threat to the wild populations of the Horn of Africa (CITES 2013). The trade is understood to focus on Somalia, Somaliland and Ethiopia, but a case was also reported in Tanzania in 2011 when three cheetah were found caged at a house in Arusha. While this was an isolated report it is unknown as to whether this represents a more common problem within the country. The increasing demand and high prices offered



Ongoing work there is generating data that contributes to our understanding of the relationship between lions and cheetah (e.g. Chauvenet et al. 2011). The lower density of lions outside reserves means that these areas are likely to be of high importance for the conservation of cheetah and wild dogs.

There has also been well-publicized concern in the past regarding the low levels of genetic diversity reported in cheetahs and that this could lead to disease susceptibility and in-breeding (e.g. O'Brien et al. 1986). However, those studies were conducted on captive cheetahs and this experience is not borne out in the wild. Research from the Serengeti has shown that a single cheetah litter can include representation from more than one father (Gottelli et al. 2007) and suggests that cheetahs may have the means to counter other factors conspiring to keep the species at low densities and which could otherwise reduce genetic diversity.

3.3 Challenges to cheetah and wild dog conservation

Conserving cheetah and wild dog populations requires mitigating the threats listed above, on a very large spatial scale. The constraints upon cheetah and wild dog conservation can be classified into four categories: political, economic, social and biological. The challenges posed by land use planning were debated in the national action planning workshop and represent one of the most notable political constraints in Tanzania. Economic constraints include the lack of financial resources to support conservation, and lack of incentives for local people to conserve wildlife. Social constraints include human population migration across Tanzania, social changes leading to subdivision of land and consequent habitat fragmentation, and negative perceptions of cheetahs and particularly of wild dogs.

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

3.4 Conclusions

Both the proximate and ultimate threats faced by cheetahs and wild dogs in Tanzania and across their entire range are very similar. Indeed, these threats are similar to those faced by all large carnivores in Africa; however wild dogs' and cheetahs' extremely wide-ranging behaviour makes them acutely sensitive to these threats which therefore 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.

for cheetah cubs in the Middle East continues to pose a threat to cheetah populations in Tanzania and the Horn of Africa region.

3.2.9 Ecological constraints to cheetah and wild dog conservation include interspecific competition. Lions and spotted hyenas are known to steal the kills of cheetahs, and to kill both cheetah cubs and wild dog pups and in Serengeti National Park predation by other carnivores has been shown to have an impact on overall population density of cheetah (Kelly & Durant 2000, Durant et al. 2004).

CHAPTER 4

ACTION PLAN FOR CHEETAH AND AFRICAN WILD DOG CONSERVATION IN TANZANIA

4.1 Background

The national action plans for wild dog and cheetah conservation are developed using a participatory and consensus driven process, involving as many stakeholders as was practicable. This approach is taken both to ensure that the expertise and knowledge of all participants informed the plan, and also to ensure that the plan would be jointly owned by relevant institutions and individuals, facilitating its implementation. As described in Chapter 1.3, the national action plan for wild dog and cheetah conservation in Tanzania was developed within a broader regional context. A strategic plan for the species' conservation in eastern Africa was developed first, by a team of participants from across the region, including representatives of governmental authorities, relevant NGOs, and species specialists.

Following strategic plans established for other species in Africa (IUCN, 2005, 2006b), the Tanzania national plan has five key components:

- (1) A long-term vision for the species' conservation
- (2) A medium-term goal for the strategic plan
- (3) A number of objectives which together address the proximate and ultimate threats to the species' conservation
- (4) Several targets to address each objective
- (5) A list of activities to address each target

4.2 Structure of the plan

4.2.1 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 reflect an optimistic, but realistic, view of the future of cheetah and wild dog conservation and should provide a useful guideline to direct conservation actions.

The vision developed for the regional strategy was "To secure viable and ecologically functioning cheetah and wild dog populations as valued components of development in Eastern Africa". This vision was carefully worded to reflect:

- (i) the need to conserve viable populations, that is, relatively large populations which are able to persist in the long term;
- (ii) the need to conserve ecologically functional populations, that is, populations 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, across a range of natural ecosystems;
- (iii) the need to conserve the species as valued components of development, that is, within a context of human development which acknowledges the economic, cultural and ecological value provided by cheetahs and wild dogs.

This vision was officially accepted by participants in the Tanzania national workshop. In particular, it was noted that:

- The workshop participants defined development in this context in Tanzania with reference to environmentally friendly and sustainable development, and includes tourism development. It was further noted that both cheetah and wild dogs have valuable contributions to make to sustainable development.

- It was also noted that Tanzania is a leader in conservation for these species and that the challenge is to maintain the populations at a viable scale. It was further emphasized that Tanzania should value cheetah and wild dogs as part of its natural heritage and biodiversity.

The vision of the national action plan is therefore:

Vision:

To secure viable and ecologically functioning cheetah and wild dog populations as valued components of development in Tanzania

4.2.2 The Goal

The goal was intended to reflect what the strategic plan should accomplish in a shorter time period than that identified for the vision – around 10-20 years. The goal should thus be realistic and achievable. It should also be broadly measurable, in that it should be possible to know when it has been achieved. The goal therefore needs to be more clearly defined than the vision, although it should support the vision statement. The goal agreed for the eastern Africa regional strategy was “To reverse declines and improve the status of cheetah and wild dog populations and their habitats across eastern Africa”.

Participants in the Tanzania national workshop agreed with this goal while stressing the following points of interpretation:

- That improving the ‘status’ here includes increasing the extent of geographical distribution;
- That Tanzania already holds good populations of cheetah and African wild dogs, including some of the largest populations of wild dog; Tanzania therefore aims to proudly secure these populations;
- That ‘habitat’ in this context necessarily includes areas both inside and outside protected areas;
- That maintaining habitat and population connectivity via strategic land use planning is key to conserving the cheetah and African wild dog in Tanzania.

The goal of the national action plan is therefore:

Goal:

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

4.2.3 Themes and Objectives

While developing the regional strategy a process of problem analysis was employed to develop objectives. The proximate and ultimate threats to the species’ persistence, and constraints on the species’ conservation, were grouped into six themes and at the national action planning workshop these were reviewed and interpreted and amended as set out below:

1) Coexistence: This theme covers problems relating to the coexistence of people and domestic animals with cheetahs, wild dogs and their prey.

2) Surveys and information: This theme concerns problems arising from a lack of information about cheetahs and wild dogs including information on range, population status, habitat and management.

3) Capacity development: This theme includes problems arising from insufficient capacity such as manpower, resources, training and equipment.

4) Policy and Legislation: This theme covers problems arising from a lack of or inappropriate policies and legal frameworks within the wildlife sector.

5) Land Use Planning: This theme was reinterpreted in the Tanzanian national action planning process as Land Use Planning from the theme title of Advocacy originally given during the regional planning process. At the regional level this theme was envisioned to encompass problems arising from a low public importance attached to cheetah and wild dog conservation. This category largely addresses policy and legislation issues outside the remit of government wildlife sectors, and hence falling under other ministries. This includes critically important issues such as land use policy and development and this was emphasised in the case of Tanzania at the national workshop. There was extended debate on the process of land use planning in Tanzania and the working group assigned to this theme was carefully pre-determined to include those workshop participants experienced in land use planning (e.g. from the Ministry of Land).

6) National planning: This theme addresses problems arising from a lack of national strategies for cheetah and wild dog conservation. This was a relatively small, but nonetheless important, category which covered the translation of the regional strategy into national action plans and subsequent implementation at the national level.



Figure 4.1 Participants networking at the national action planning workshop.

These themes were used to develop objectives for the regional strategy, ensuring that all issues identified in the problem analysis were addressed by the objectives, and that no objective addressed issues not identified by the problem analysis. During the national workshop the objectives developed for the regional strategy were adapted and / or adopted for Tanzania's national action plan thus:

Objective1: Develop and implement strategies to promote coexistence of cheetah and wild dogs with people and domestic animals

Under Objective 1, the participants noted that this was of high priority since there is considerable level of human-wildlife conflict that is widespread across Tanzania and which may be increasing.

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

Under Objective 2, the participants noted that information needs had been the main focus of the earlier conservation action plans for these two species. While in no way undermining the importance of this

objective, it was recognized that a great deal of progress had been made in this regard since those conservation action plans of 2005 and that close links between research community and managers already exist. It was agreed that this strong foundation should be built upon during the implementation of the current plan.

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

Under Objective 3, the participants added the word ‘physical’ to further add to the type of resources that require strengthening. This was in addition to recognising the need for further capacity building that would enable the greater practical interpretation and implementation of the scientific information provided under Objective 2.

Objective 4: Review and harmonise relevant policies and legislations; and develop strategies for conservation of cheetah and wild dogs across their range

Under Objective 4, the participants concluded that it was not necessary for the objective to state that new legislation would be developed (as captured in the regional strategy) as the basic notion was sufficiently covered within the concept of “review and harmonize”. It was also recognized that there is already a review of policy and legislation relating to carnivores being conducted across SADC countries, including Tanzania, by the Zimbabwean Environmental Law Association (ZELA) in conjunction with the Rangewide Program for Cheetah and African Wild Dogs (RWCP). Also noted within this Objective was that effective national implementation of the plan’s goal will also require transboundary cooperation and was; the CMS could provide a relevant framework for these species.

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

Under Objective 5, the participants noted that this was of very major importance to cheetah and wild dog conservation in Tanzania. It was stated that this was key to achieving the main goal of the national action plan given widespread difficulties currently experienced in the face of human population migration across the country and the consequent habitat loss and fragmentation faced by the two focal species. The transboundary nature of some of the cheetah and wild dog populations also adds a further factor to consider in planning of land use.



Figure 4.2 Working group discussing policy and legislation during the national action planning workshop.

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

Under Objective 6, it was noted that the task of national implementation would be greatly aided by the appointment of a national carnivore coordinator. Networking and collaboration within the country and with neighbouring countries was noted as being crucial to effective conservation.

4.2.4 Targets, Activities, Actors and Timelines

Once the objectives were agreed, targets were developed to meet the objectives, and again these echo the regional targets. Each objective was associated with a number of targets, each of which specified a way in which progress would be made towards achieving the objective, and on what time scale. Targets were devised to ensure that if all targets under an objective were met, then the objective would be met

Notable amendments during the Tanzanian national planning process was the addition of Target 1.5: Programmes to prevent/reduce deliberate killing of wild dogs and cheetah. This was inserted in recognition of the multiple cases of killing of wild dogs that have come to light recently in Loliondo,

although it is unknown as to whether this is also representative of other parts of Tanzania. Target 5.3 was also added: Identify and prioritise corridors, buffer zone and dispersal areas for improved connectivity of cheetah and wild dog ranges – this was inserted in recognition of the difficulties faced by land use planners in the face of increasing landscape fragmentation.

The targets set for the Tanzania national action plan were in turn, associated with a number of activities. Activities are highly specific and describe exactly what projects need to be completed to achieve the targets and thus, the objectives. Additionally, for each activity within the national strategy, the institutions best placed to perform the activity (actors) were specified and importantly, a lead actor was stated in order to focus responsibility and accountability on an identifiable institution, and a timeline was set.

CHAPTER 5

IMPLEMENTATION OF THE NATIONAL ACTION PLAN

While cheetahs and wild dogs are unique among African carnivores in their requirement for extremely large areas of contiguous wildlife-friendly habitat, it is clear that many of the activities recommended in this strategic plan will also benefit other species which face similar direct and indirect threats: this includes lions, leopards and hyaenas. These other species can be conserved in areas somewhat smaller than those needed by cheetahs and wild dogs (Woodroffe et al., 1998), but otherwise face similar threats. Hence, cheetahs and wild dogs are likely to act as good ‘umbrella species’ for planning the conservation of all the large carnivores, as a result of the spatial scale across which conservation activities must be implemented.

Implementing such a strategy will require a focus on lands both inside and outside protected areas, since much of the wild dog and cheetah range falls outside reserves. Some of Tanzania’s parks are simply too small to support these wide-ranging species and the country’s protected area system cannot alone shoulder the burden of protecting these species. Some of Tanzania’s important wild dog and cheetah populations occupy transboundary areas and long term conservation will depend upon activities occurring not only within Tanzania, but also in neighbouring countries. A major observation of the workshop was also to emphasize the role of effective land use planning for the conservation of cheetahs and African wild dogs due to particular human population and migration issues facing the country. The employment of a dedicated and trained national carnivore conservation coordinator (Activity 6.1.3) would be a major step to enabling the implementation of this national action plan. The Rangewide Conservation Programme for Cheetah and African Wild Dogs is currently seeking funding for training such individuals in each of the main range states of these species.

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APPENDIX 2 AGENDA FOR THE NATIONAL ACTION PLANNING WORKSHOP

Tanzanian National Action Planning Workshop for Cheetah & Wild Dog Conservation, Jan. 16-17 2013

Day 1

Introduction

08:30 - Official welcome (*Guest of Honour – Prof. Alexander Songorwa*)

08:45 - Introductions

09:00 - Background to the regional planning process and the importance of the national planning workshop (*Sarah Durant*)

09:15 - The conservation and ecology of cheetah (*Sarah Durant*)

09:25 - The conservation and ecology of wild dogs (*Rosie Woodroffe*)

09:35 - The status and distribution of cheetahs and wild dogs in the Eastern African region and main threats to survival (*Nick Mitchell*)

09:50 - The Serengeti Cheetah Project (*Helen O'Neill*)

10:05 - The Serengeti Wild Dog Conservation Project (*Emmanuel Masenga*)

10: 20 - TEA and COFFEE break & group photograph

11:10 - The Ruaha experience of cheetah and wild dogs (*Paul Banga*)

11:20 - The Selous experience of wild dog (*Mr. Kibonde*)

11:30 - The Maasai Steppe experience of cheetah and wild dogs (*Charles Trout*)

Revising the Tanzania range maps for cheetahs and wild dogs by all participants

11:40 - Opportunity for all participants to provide new information to revise the range maps for cheetah and wild dogs in Tanzania.

12: 30 – LUNCH

Developing a national action plan in line with the regional strategy

14:00 - The regional conservation strategy for cheetah and wild dogs in Eastern Africa

14:30 - Review the vision and goal of the regional strategy and interpret with relevance to the national strategy

15:00 - Review the objectives of the regional strategy, identify those relevant to the national strategy and any need for additional ones pertinent to Tanzania
- Determine objective-based working groups

15:30 - TEA and COFFEE break

16:00 - Working groups review objectives and targets

17: 00 - Groups present objectives and targets in plenary

18:00 - END of DAY 1

Day 2

08:30 - Update on progress and presentation on the next steps for the process

08:45 - Working groups review and revise existing activities under each target and, where necessary, identify new activities

10: 30 - TEA and COFFEE break

11: 00 - Working groups present and review activities in plenary

11: 30 - Working groups identify responsible parties, timeframes and indicators for each activity

12:30 - LUNCH

14:00 - (Continued work from before lunch) Working groups identify responsible parties, timeframes and indicators for each activity

15:30 - TEA and COFFEE break

15: 45 – Working groups present and review activity tables for each objective in plenary

16: 45 - Presentation of the log-frame of the national action plan and discussion of next steps

Closure of workshop

17: 00 - Vote of Thanks, offered by Mr. Kibonde

17:15 - END of DAY 2 / WORKSHOP

APPENDIX 3 NATIONAL ACTION PLAN LOGICAL FRAMEWORK

VISION: TO SECURE VIABLE AND ECOLOGICALLY FUNCTIONING CHEETAH AND WILD DOG POPULATIONS AS VALUED COMPONENTS OF DEVELOPMENT IN TANZANIA

GOAL: TO REVERSE DECLINES AND IMPROVE THE STATUS OF CHEETAH AND WILD DOG POPULATIONS AND THEIR HABITATS ACROSS TANZANIA

Theme 1. Coexistence			
Target	Activity	Actors	Timeline
1.1 Programmes to reduce illegal offtake of wild ungulates promoted and implemented in affected areas within three years	1.1.1 Identify areas where wild dogs or cheetah are killed as a consequence of illegal offtake of wild ungulates	TAWIRI (lead), WD, TANAPA, NCAA, LGAs & other stakeholders	1 year and ongoing
	1.1.2 Identify areas where prey loss undermines the viability of wild dog or cheetah populations	TAWIRI (lead), WD, TANAPA, NCAA, LGAs & other stakeholders	3 years and ongoing
	1.1.3 Support the implementation of new and existing measures to prevent illegal offtake of wild ungulates in identified areas	WD (lead), TANAPA, NCAA, other stakeholders	3 years and ongoing
1.2 Sustainable tools to reduce wild dog and cheetah conflict with livestock keepers developed and disseminated across Tanzania within five years	1.2.1 Identify areas where cheetah and wild dog populations are threatened by conflict with livestock keepers	TAWIRI (lead), research and training institutions, NGOs, Ministry of Livestock, scientists, LGAs & other stakeholders	2 years and ongoing
	1.2.2 Identify the circumstances that contribute to cheetah and wild dog conflict with livestock keepers in the identified areas	TAWIRI (lead), researchers, other stakeholders	3 years and ongoing
	1.2.3 Develop effective strategies for collecting and disseminating relevant information on preventing cheetah and wild dog conflict with livestock keepers to relevant parties in Tanzania and in transboundary areas	TAWIRI (lead), researchers, other stakeholders	4 years and ongoing
	1.2.4 Work with communities in affected areas to develop and implement the most effective tools to reduce and prevent cheetah and wild dog conflict with livestock keepers	WD (lead), TANAPA, NCAA, NGOs, LGAs & other stakeholders	5 years
1.3 Programmes for local people to derive sustainable economic benefits from cheetah, wild dogs and other wildlife developed and implemented within five years	1.3.1 Identify areas across Tanzania where tourism could effectively assist cheetah and/or wild dog conservation through sustainable economic benefits for local	WD (lead), TANAPA, NCAA, TAWIRI, TATO, TPHA, researchers, other stakeholders	2 years

	communities, and hence improve tolerance of both species		
	1.3.2 Encourage sustainable tourism programmes in cheetah and wild dog range and benefit sharing among appropriate parties	WD (lead), TANAPA, NCAA, TAWIRI, TATO, TPHA, NGOs, civil society, other stakeholders	2 years and ongoing
	1.3.3 In areas of Tanzania where tourism is unlikely to provide sufficient benefits, investigate alternative options for generating revenue which encourage cheetah and wild dog conservation	TAWIRI (lead), WD/MNRT, TANAPA, NCAA, NGOs, researchers, other stakeholders	5 years
	1.3.4 Develop, disseminate, and promote the implementation of guidelines for tourism in cheetah and wild dog range	MNRT (lead), WD, TAWIRI, TANAPA, NCAA, NGOs, researchers, other stakeholders	3 years
1.4 Awareness creation programmes relevant to cheetah and wild dog conservation developed within two years	1.4.1 Identify target areas and audiences best placed to influence cheetah and wild dog conservation	TAWIRI (lead), WD, TANAPA, NCAA, NGOs, researchers, other stakeholders	1 year
	1.4.2 Investigate local traditions, knowledge and cultural values relevant to cheetah and wild dogs and incorporate into outreach materials	TAWIRI (lead), WD, TANAPA, NCAA, NGOs, researchers, other stakeholders	2 years and ongoing
	1.4.3 Tailor outreach materials for cheetah and wild dog conservation to local conditions and disseminate to target areas and audiences	WD (lead), TANAPA, NCAA, TAWIRI, NGOs, other stakeholders	2 years and ongoing
1.5 Programmes to prevent/reduce deliberate killing of wild dogs and cheetah developed and implemented in affected areas within two years	1.5.1 Identify areas where deliberate killing of wild dogs and cheetah is currently a concern or has high potential to become a concern	TAWIRI (lead), WD, TANAPA, NCAA, NGOs, other stakeholders	2 years and ongoing
	1.5.2 Collect relevant information on the drivers of deliberate killing of wild dogs and cheetah using locally appropriate methods	TAWIRI (lead), WD, TANAPA, NCAA, NGOs, researchers, other stakeholders	2 years and ongoing
	1.5.3 Develop and implement locally appropriate solutions aimed at preventing deliberate killing of wild dogs and cheetah	WD (lead), TANAPA, NCAA, TAWIRI, NGOs, researchers, other stakeholders	2 years and ongoing
	1.5.4 Support existing frameworks aimed at preventing deliberate killing of wild dogs and cheetah	WD (lead), TANAPA, NCAA, TAWIRI, NGOs, other stakeholders	ongoing from now
1.6 Holistic canid disease management strategies developed in key areas within three years	1.6.1 Identify areas where wild dog populations are significantly threatened by infectious disease	TAWIRI (lead), WD, TANAPA, NCAA, Ministry of Livestock, NGOs, researchers, other stakeholders	2 years and ongoing

	1.6.2 Assess and evaluate potential and existing tools for disease management in wild dogs and related species relevant to Tanzania	TAWIRI (lead), TANAPA, NCAA, WD, researchers, NGOs, other stakeholders	2 years and ongoing
	1.6.3 Develop and implement locally appropriate canid disease management strategies in identified areas	TAWIRI (lead), TANAPA, NCAA, WD, researchers, NGOs, other stakeholders	3 years

Theme 2. 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			
2.1 Surveys and monitoring to evaluate presence, trends and threats in key cheetah and wild dog ranges conducted within five years	2.1.1 Conduct surveys to determine presence and habitat suitability in areas identified as unknown, possible and connecting ranges in Tanzania within five years	TAWIRI	5 years
	2.1.2 Identify important populations of wild dog and cheetah for long term monitoring and research in Tanzania ensuring adequate eco-region coverage	TAWIRI, Wildlife authorities (DW, NCAA, TANAPA) and higher learning institutions	1 year
	2.1.3 Within select priority sites, initiate and maintain monitoring and research activities to determine population trends, threats and demographic status at each site within three years	TAWIRI and higher learning institutions	3 years
2.2 Strategies for disseminating information relevant to cheetah and wild dog conservation to all relevant stakeholders developed and implemented within three years	2.2.1 Establish a standardised database format to facilitate the collection and sharing of data within one year.	TAWIRI	1 year
	2.2.2 Update the national database within one year	TAWIRI	1 year
	2.2.3 Use meetings, publications and other media such as radio and television to disseminate information relevant to cheetah and wild dog conservation as a continuous process	TAWIRI, DW, NCAA, TANAPA and Dept of Tourism	Continuous process initiated within one year

Theme 3. Capacity Development

Objective 3. Strengthen human, financial, information and physical resources for conserving cheetah and wild dogs in collaboration with stakeholders			
3.1 Develop a resource mobilisation plan for the conservation of cheetah and wild dogs in Tanzania within two years	3.1.1 Identify individuals and institutions to produce and disseminate a resource mobilisation plan within two years	WD	2 years
3.2 Have enforcement, extension and monitoring personnel trained and equipped to operate within 50% of the resident range	3.2.1 Complete a Training and Management Resource Needs Assessment for extension, enforcement and monitoring for cheetah and wild dog conservation within one year	TAWIRI, WD, NCAA, TANAPA and higher learning institutions	1 year
	3.2.2 Integrate Finance Plan, Training Needs Assessment and Action Plan within two	TAWIRI, WD, NCAA, TANAPA and higher learning	2 years

within five years	years	institutions	
	3.2.3 Train enforcement personnel to address urgent issues affecting cheetah and wild dog conservation, such as trafficking, wherever they are known to occur	WD, NCAA, TANAPA in collaboration with other wildlife stakeholders	Initiated within 1 year
	3.2.4 Recruit and train outreach officers to operate with a target of covering 50% of the cheetah and wild dog resident range within five years	WD, NCAA, TANAPA in collaboration with other wildlife stakeholders	5 years
Theme 4. Policy & legislation			
Objective 4. Review and harmonise relevant policies and legislations; and develop strategies for conservation of cheetah and wild dogs across their range			
4.1. Relevant policies and legislations for conservation of cheetah and wild dogs reviewed and harmonised within three years	4.1.1 Identify gaps in relevant policies and legislations for cheetah and wild dog conservation within one year	WD (lead) TANAPA,TAWIRI, NCAA,NGOs	1 year
	4.1.2 Collating and disseminating information to relevant policy makers on cheetah and wild dog population trends and known threats within cheetah and wild dog ranges within one year	TAWIRI (lead), WD, TANAPA, NCAA, NGOs, RESEARCH Institutions	1 year
	4.1.3 Conduct a stakeholders meeting to establish consensus on review and harmonization of relevant policies and legislation on the conservation of cheetah and wild dogs within two years	WD (lead), TAWIRI, TANAPA, NCAA, NGOs, Ministerial departments and Agencies (MDAs),CBOs, RESEARCH and Training Institutions	2 years
4.2. Develop a framework for implementation of relevant policies and legislations on conservation of cheetah and wild dogs within three years	4.2.1 Produce a review document on national protected species legislations within the country and its implications on cheetah and wild dog conservation within one year	WD (lead), TAWIRI, TANAPA, NCAA, NGOs	1 year
	4.2.2 Conduct stakeholders meeting to develop a framework for implementation of relevant policies and legislations on conservation of cheetah and wild dogs within two years	WD (lead), TAWIRI, TANAPA, NCAA, NGOs, CBOs	2 years
	4.2.3 Develop a timetable for implementation of framework for relevant policies and legislations on conservation of cheetah and wild dogs within two years	WD (lead), TAWIRI, TANAPA, NCAA, NGOs	2 years
4.3. Regional and international collaborations on cheetah and wild dog conservation improved within five years	4.3.1 Identify areas of cooperation on cheetah and wild dog conservation within one year	WD (lead), TAWIRI, TANAPA, NCAA	1 year
	4.3.2 Initiate a process for development of MoU with other member states (with possible reference to CMS) within one year	MEAC (lead), MNRT	1 year
Target	Activity		
Theme 5. Land Use Planning			

Objective 5. Mainstream cheetah and wild dog conservation in land use planning and its implementation			
5.1. Government officials, local communities and other stakeholders made aware on cheetah and wild dog conservation within three years	5.1.1 Initiate and implement conservation education visiting programme to local government authorities, CBO's and learning institutions	MNRT (WD - Lead), PMO-RALG, LGAs, universities & funders	3 years
	5.1.2 Prepare and distribute conservation educational materials (posters, flyers and leaflets)	WD (lead), Funders, NCAA, TAWIRI, TANAPA,	2 years
	5.1.3 Convene wildlife ecosystem zones and National meetings to raise awareness of cheetah and wild dog conservation key stakeholders	MNRT (lead), TANAPA, NCAA, TAWIRI, WD, Conservation NGO's	5 years
	5.1.4 Promote presentation of cheetah and wild dog conservation issues in mass media (newspapers, radio, TV)	MNRT (WD - Lead), Funders, TANAPA, NCAA, TAWIRI	5 years
	5.1.5 Develop and maintain cheetah and wild dog information, education and communication material	MNRT (WD - Lead), Funders, TANAPA, NCAA, TAWIRI, Conservation NGO's	5 years
5.2. Land use planning for areas of cheetah and wild dog resident and connecting ranges carried out within five years	5.2.1 Identify cheetah and wild dog conservation priority areas to be incorporated into land use plans	MNRT (WD – lead), Ministry of Lands, Housing and Human Settlements Development (NLUPC), LGAs	2 years
	5.2.2 Prepare village land use plans for priority areas for cheetah and wild dogs	MNRT (WD - Lead), NLUPC, LGAs, Funders, Conservation NGO's	2 years
	5.2.3 Incorporate cheetah and wild dog conservation needs in village(s) land use plans	MNRT (WD - Lead), LGAs, TAWIRI	2 years
5.3. Identify and priorities corridors, buffer zone and dispersal areas for improved connectivity of cheetah and wild dog ranges within 5 years	5.3.1 Determine the spatial extent of corridors and dispersal areas between resident, possible and unknown ranges	MNRT (WD - Lead), NLUPC, LGAs, Funders, TAWIRI	3 years
	5.3.2 Determine threats, habitat quality, and the extent of suitable habitat along corridors and around dispersal areas	MNRT (WD - Lead), LGAs, Funders, TAWIRI	4 years
	5.3.3 Develop and implement legislative and enforcement strategies for protection of corridors and dispersal areas	MNRT (WD - Lead), Funders	2 years
Theme 6. National planning			
Objective 6. Promote the development and implementation of national conservation programmes for cheetah and wild dogs, by government and other stakeholders			
6.1 This national action plan for cheetah and wild dog conservation endorsed and implemented by the appropriate authorities within five-ten years	6.1.1 Identify and collate all the wildlife conservation programme	MNRT (WD - Lead), TANAPA, NCAA, TAWIRI, Funders	1 year
	6.1.2 Incorporate wild dog and cheetah action plan into wildlife conservation programme	MNRT (WD - Lead), TANAPA, NCAA, TAWIRI, Funders	2 years
	6.1.3 Identify a focal person (e.g. a national coordinator) for follow-up endorsement processes	MNRT (WD - Lead), TAWIRI, Funders	1 year

APPENDIX 4 ABBREVIATIONS USED IN THIS DOCUMENT

The following abbreviations and acronyms are used in this document:

CMS – Convention on the Conservation of Migratory Species of Wild Animals
LGA – Local Government Authority
MEAC – Ministry Of East African Cooperation
MNRT – Ministry of Natural Resources and Tourism
MOU – Memorandum of Understanding
NCAA – Ngorongoro Conservation Area Authority
NGO – Non-Governmental Organisation
NLUPC – The National Land Use Planning Commission
MLHHSD – Ministry of Lands, Housing and Human Settlement Development
PMO-RALG – Prime Minister Office-Regional & Local Government Authority
SADC – Southern African Development Community
SSC – Species Survival Commission (part of IUCN)
TANAPA – Tanzania National Parks Authority
TAWIRI – Tanzania Wildlife Research Institute
WCS – Wildlife Conservation Society
WD – Wildlife Division
WMA – Wildlife Management Area
ZSL – Zoological Society of London

ACKNOWLEDGEMENTS

The Ministry of Natural Resources and Tourism of Tanzania is very grateful to the participants of the Tanzanian national action planning workshop for their invaluable contributions to this process.

The Ministry is also grateful to the Howard G. Buffett Foundation for providing the funding to make the planning workshop possible. The Rangewide Conservation Programme for Cheetahs and African Wild Dogs (a project of the Wildlife Conservation Society and the Zoological Society of London) is also acknowledged for their assistance in facilitating the workshop and for editing this report.