UN environment

CMS

CONVENTION ON MIGRATORY SPECIES

Distribution: General

UNEP/CMS/COP12/Doc.25.1.15
13 June 2017

Original: English

12th MEETING OF THE CONFERENCE OF THE PARTIES
Manila, Philippines, 23 - 28 October 2017
Agenda Item 25.1

PROPOSAL FOR THE INCLUSION OF FIVE VULTURE SPECIES OCCURING IN SUB-SAHARAN AFRICA ON APPENDIX I OF THE CONVENTION

Summary:

The Government of Kenya has submitted the attached proposal* for the inclusion of five vulture species occurring in sub-Saharan Africa, namely the White-headed Vulture *(Trigonoceps occipitalis)*, Hooded Vulture *(Necrosyrtes monachus),* White-backed Vulture *(Gyps africanus)*, Cape Vulture *(Gyps coprotheres)* and Rüppell's Vulture *(Gyps rueppelli)* on Appendix I of CMS.

PROPOSAL FOR THE INCLUSION OF FIVE VULTURE SPECIES OCCURING IN SUB-SAHARAN AFRICA ON APPENDIX I OF THE CONVENTION

A. PROPOSAL

Listing the entire populations of five sub-Saharan vulture species (Cape Vulture *Gyps coprotheres*, Hooded Vulture *Necrosyrtes monachus*, Rüppell's Vulture *Gyps rueppelli*, White-backed Vulture *Gyps africanus* and White-headed Vulture *Trigonoceps occipitalis*) on CMS Appendix I.

B. PROPONENT: Government of Kenya.

C. SUPPORTING STATEMENT[1]

1. Taxonomy

1.1 Class:	Aves				
1.2 Order:	Accipitriformes				
1.3 Family:	Accipitridae				
1.4 Genus, species or subspecies, including author and year:	*Gyps coprotheres* (Forster, 1798)	*Necrosyrtes monachus* (Temminck, 1823)	*Gyps rueppelli* (Brehm, 1852)	*Gyps africanus* (Salvadori, 1865)	*Trigonoceps occipitalis* (Burchell, 1824)
1.5 Scientific synonyms:	No scientific synonyms	No scientific synonyms	*Gyps rueppelli* (del Hoyo and Collar 2014) was previously listed as *G. rueppellii*	No scientific synonyms	No scientific synonyms
1.6 Common name(s), when applicable:	EN - Cape Vulture, Cape Griffon FR - Vautour chassefiente ES - Buitre de El Cabo	EN - Hooded Vulture FR - Vautour charognard ES - Alimoche sombrío, Buitre encapuchado	EN - Rüppell's Vulture Rueppell's Griffon, Rüppell's Griffon Vulture FR - Vautour de Rüppell ES - Buitre moteado	EN - White-backed Vulture African White-backed Vulture FR- Vautour africain ES - Buitre dorsiblanco africano	EN - White-headed Vulture FR - Vautour à tête blanche ES - Buitre cabeciblanco

2. Overview

The five African vulture species included in this proposal are all Critically Endangered or Endangered and were all moved to a higher category of extinction risk in the 2015 IUCN Red List assessment. Recently published data have revealed significant and rapid pan-African vulture declines precipitated by a variety of threats including intentional and unintentional poisoning, belief-based use and trade, reduction in food availability, collision/ electrocution on

1 Unless otherwise referenced, this proposal draws on information from BirdLife International (2016).

energy infrastructure and habitat loss/ degradation and disturbance (Ogada *et al.* 2016; Botha *et al.* 2012; Monadjem *et al.* 2012; Thiollay 2007; Rondeau & Thiollay 2004; Brown 1991). These declines are likely to continue into the future and suggest there may be a continental-scale problem, potentially comparable to the declines witnessed in vulture populations in Asia in the 1990s. Only one African vulture species – the Endangered Egyptian Vulture (*Neophron percnopterus)* currently benefits from CMS Appendix I listing.

The five African vulture species included in this proposal were added to the Raptors MOU Annex 1 (List of Species) on the basis of evidence of their migratory behaviour (according to CMS definition) and categorized in Annex 3 (Action Plan), Table 1 as Category 1 (globally threatened species) at Raptors MOU MOS2 (October 2015).

While many vulture species may not traditionally have been seen as migrants, it has become clear that the movements made by vulture species are consistent with the CMS definition of 'migratory species'. Research has revealed the very large size of their home ranges (often hundreds of thousands of km^2) and the scale and frequency of the movements they undertake (with single individuals passing through several countries in a year), as well as differences in movement pattern between seasons and among different age groups within the population.

International cooperation will be an essential ingredient in the recovery and long-term conservation of these wide-ranging species.

3. Migrations

3.1. Kinds of movement, distance, the cyclical and predictable nature of the migration

Vulture movement patterns are not generally well understood (Monadjem *et al.* 2012). However, our knowledge is expanding rapidly, particularly owing to increased use of satellite tracking technology. Many of the commonly held assumptions about the scale of vulture movements have been overturned by recent evidence from satellite tracking and marking. While still in its infancy, there has been a proliferation of satellite tracking studies, particularly of African vulture species, in recent years.

Vultures are necrophagous and individuals can travel vast distances in a short space of time as a response to a high degree of spatial and temporal variation in their food resources (Murn *et al.* 2013; Urios *et al.* 2010). Use of soaring flight allows vultures to maintain extremely large foraging ranges and there is increasing evidence that vultures may undertake predictable, cyclical seasonal movements; for example, clustering around migratory herds of ungulates during the dry season when herds experience highest mortality (Kendall *et al.* 2013). They may also display predictable seasonal changes in foraging range driven by food availability and detectability (Phipps *et al.* 2013; Schultz 2007; Cronje 2002;), as well as by seasonal changes in the availability of thermals to aid sustained soaring flight (Mundy *et al.* 1992; Boshoff *et al.* 1984,). In many vulture species different patterns of movement may be observed in adults during breeding versus non-breeding seasons, with movements of adults often being more constrained during the breeding season, not least by ties to the nest-site.

Vultures tend not to breed in their first three years and, partly because their foraging ranges are not restricted by ties to a nest site (Mundy *et al.* 1992; Houston 1976), in general immature birds tend to range over much larger areas than adults (Ogada 2014; Margalida *et al.* 2013; Phipps *et al.* 2013; Duriez *et al.* 2011; Bamford *et al.* 2007; Meyburg *et al.* 2004; Mundy *et al.* 1992). For example Bamford (2007) recorded average immature Cape Vulture home ranges to be an order of magnitude larger than those of adults. Similarly Ogada (2014) found that an immature Rüppell's Vulture had a home range more than three times the size of adults'. With satellite tracking of vultures a relatively recent advance, the indications are that adults of many vulture species are making movements which cross national boundaries, while immature individuals are making even wider-ranging movements such that it is common for them to cross not just one, but multiple national boundaries in a period of just a few months. This behaviour is likely to affect exposure of immature individuals to risk from various threats and have consequences for their survival prospects (Grande *et al.* 2009; Ortega *et al.* 2009). The threats

outlined in 5.3 affect both adult and immature vultures. The demographic consequences of high mortality among breeding adults along with high mortality of immatures and consequent reduction in recruitment to the breeding population are potentially significant.

3.1.1. Movements of Cape Vulture

Adult Cape Vultures may undertake more restricted movements during the breeding season when they are nesting (Boshoff *et al.* 2011), but during the non-breeding period they may make wide-ranging movements exhibiting partial migration in the Eastern Cape Province, South Africa, with an increase in vulture observations in the western areas outside of the breeding period (Boshoff *et al.* 2009, Boshoff *et al.* 2011). Bildstein (2006) lists this species as an irruptive and local migrant, but satellite tracking evidence suggests movements can be substantial. For example, Phipps *et al.* (2013) reported home ranges of 121,655 km² in five adults satellite tracked in Southern Africa and 492,300km² in four immature birds tracked from November 2009 to August 2011. The vultures travelled more than 1,000 km from the capture site (in South Africa) and long-distance cross-border movements were not unusual with a total of five countries (Namibia, Botswana, Zimbabwe, Lesotho, and South Africa) entered by different vultures. A Cape Vulture satellite-tracked in 2014 was recorded moving more than 1,000km between South Africa, Botswana, Zimbabwe and Mozambique (C. Hoogstad *in litt.* 2015). Bamford *et al.* (2007) recorded a mean home range of juveniles of 482,276 km², an order of magnitude larger than the mean home range of adults, which was 21,320 km². A single immature individual was recorded moving between Namibia, Botswana, Zambia and Angola during a six month period.

3.1.2. Movements of Hooded Vulture

Bildstein (2006) lists this species as an irruptive and local migrant. Regional movements occur in some parts of West Africa in response to seasonal rains (Ferguson-Lees and Christie 2001). It is a migrant in Djibouti and Swaziland and a vagrant in Morocco (Ferguson-Lees and Christie 2001, Ogada and Buij 2011). Satellite tracking underway in 2014 in South Africa (K.L. Bildstein *in litt.* 2015) demonstrates single individuals travelling several hundreds of kilometres from the capture site and moving between South Africa, Mozambique, and Zimbabwe. Bildstein (unpubl.) also has satellite tracking evidence of individuals which have moved between the Gambia and Senegal and South Africa and Zimbabwe, while Ethiopian tagged birds have so far remained in Ethiopia. Thiollay (1978) described numbers of this species increasing markedly in the northern Sahel during the short rains (July-August), with these birds returning to the southern Sahel during the drier months from September to December.

3.1.3. Movements of Rüppell's Vulture

Daily foraging movements of up to 150–200 km have been recorded (see Ferguson-Lees and Christie 2001) and in West Africa individuals regularly disperse several hundreds of kilometres north and south in response to seasonal rains (del Hoyo et al. 1994). Bildstein (2006) lists the species as an irruptive and local migrant. In the last 15 years, the species has been recorded far away from its breeding colonies, reaching the Iberian Peninsula and north-eastern South Africa (Ferguson-Lees and Christie 2001, De Juana 2006). Indeed, it has been suggested that the movement of Rüppell's Vulture, in associated with Griffon Vultures *Gyps fulvus*, across the Strait of Gibraltar into Europe may be a regular, annual, and considerably under-recorded phenomenon (De Juana 2006, Ramírez *et al.* 2011, Gutiérrez 2003). Ogada (2014) found that the home range size of a satellite tagged adult was 55,144 km², while that of an immature bird was 174,680 km². Kendall (unpubl.) has found the average home range of this species to be c.100,000 km² with individuals moving between Kenya and Tanzania.

3.1.4. Movements of White-backed Vulture

Bildstein (2006) lists the White-backed Vulture as a partial migrant and rains migrant. Ferguson-Lees and Christie (2001) report that individuals will wander over huge areas in search of food. Juveniles in particular disperse over vast areas, with six immature birds tracked from South Africa found to range across six countries (South Africa, Namibia, Angola, Zambia, Botswana, and Zimbabwe) and three noted to travel more than 900 km from their place of capture (Oschadleus 2002, Phipps *et al.* 2013) having a mean foraging range of 269,103 km².

Some populations are thought to shift their ranges in response to prey availability and seasonal rains (Ferguson-Lees and Christie 2001). Monadjem (2012) found that White-backed Vultures fitted with patagial tags in South Africa crossed into Zimbabwe and some were re-sighted more than 400km from the capture site. A single satellite tagged individual was recorded moving more than 1,000 km between South Africa, Botswana, Angola, Namibia, Zimbabwe, and Mozambique (Murn & Botha unpubl.), while another individual has travelled between South Africa, Zimbabwe, Zambia, and Botswana and a third between South Africa, Zimbabwe, Mozambique, and Swaziland. Kendall (unpubl.) has satellite tagged this species in Kenya and found an average home range size of c.50,000 km² and individual movements between Kenya and the United Republic of Tanzania, and Uganda and the Democratic Republic of Congo.

3.1.5. Movements of White-headed Vulture

Adults of White-headed Vulture are perhaps more sedentary than any other African vulture. However, there is evidence of seasonal movements in West Africa and immature individuals are more nomadic (del Hoyo *et al.* 1994, Ferguson-Lees and Christie 2001). Del Hoyo *et al.* (1994) considered that this species possibly migrates down the Rift Valley in Uganda in July. Ecological knowledge of the White-headed Vulture is generally low (Virani and Watson 1998; Monadjem 2004) and Murn and Holloway (2014) remarked that at that time there were no published data on the detailed movements of adult White-headed Vultures. More recently results from satellite tracked individuals in South Africa (C. Murn and A.J. Botha *in litt.* 2015) show individuals moving between South Africa and Mozambique, albeit with apparently rather smaller home-ranges than some of the other African vulture species.

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

While information is incomplete, for each of the five African vulture species being proposed (as outlined in 3.1) it is likely that the majority of adults make wide-ranging movements following a predictable seasonal pattern that would be consistent with the CMS definition of 'migratory'. It also appears that there are predictable differences in patterns of movement associated with different age groups with immature birds tending to make even more wide-ranging movements than adults (see 3.1). The evidence being amassed suggests that crossing of national boundaries is likely to be a relatively regular occurrence in adults and even more common among immatures. The logistics and current expense of satellite tracking mean that information can be gathered on relatively few individuals of each species, but there is no reason to believe the (in many cases very expansive) movements recorded are not representative of those taking place in the wider population. Overall, on the basis of available information it seems likely that the majority of the populations of each of the proposed vulture species is undertaking movements consistent with the CMS definition of migration at some, if not all stages of their life cycle.

4. Biological data (other than migration)

4.1. Distribution (current and historical)[2]

4.1.1. Cape Vulture distribution

This endemic species to southern Africa is found in South Africa where overall numbers were previously thought to be decreasing (Vernon 1999, Barnes 2000, Benson 2000) with a minimum of 630 pairs at 143 colonies, 2,000 individuals in the Eastern Cape, and 39 per cent of colonies recorded between 1987-1992 now inactive (Boshoff *et al.* 2009). Donnay (1990) reported c.552 pairs at c.47 colonies in Lesotho, with a continuing decline at some colonies; eastern and south-eastern Botswana were reported to support c.600 pairs (Borello and Borello 2002), and Mozambique 10-15 pairs near Swaziland (Parker 1999).

Historically, the Cape Vulture was a common and widespread vulture and it formerly bred in Swaziland (declined to extinction – currently considered as occasional visitor; Parker 1994, A. Monadjem *in litt.* 2016), central Zimbabwe (declined to extinction - an isolated roost of up to 150 non-breeding birds persists; Mundy *et al.* 1997), and Namibia (over 2,000 in the 1950s,

[2] Maps included in this proposal may be further modified as part of the Vulture MsAP review process (Botha *et al.* in prep.)

but now considered extinct as a breeding species). By 2000 there were only 6-12 birds in Namibia (Simmons *et al.* 1998, Diekmann and Strachan 2006), with 16 birds released in October 2005 (Diekmann and Strachan 2006).

Vagrants are occasionally recorded from the Democratic Republic of Congo and Zambia (BirdLife International 2016).

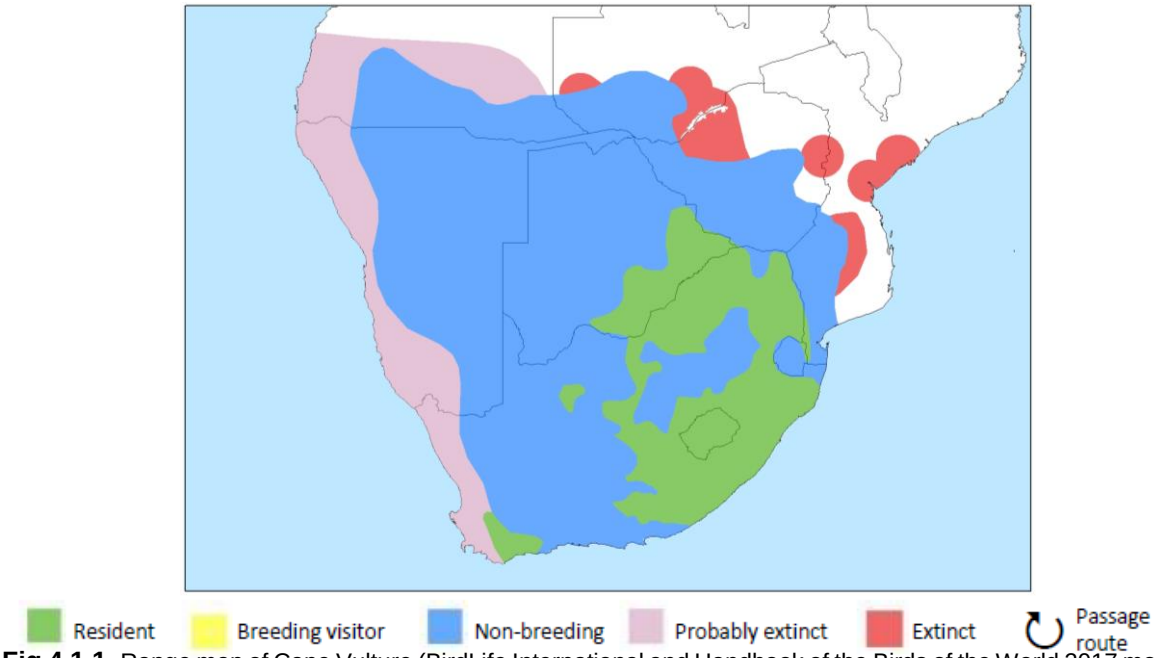

Fig 4.1.1. Range map of Cape Vulture (BirdLife International and Handbook of the Birds of the World 2017 modified with input from the Vulture MsAP review process including African Raptor DataBank and HabitatInfo 2017).

4.1.2. Hooded Vulture distribution

This species is widespread in sub-Saharan Africa; from Senegal and southern Mauritania east through southern Niger and Chad, to southern Sudan, South Sudan, Ethiopia, and western Somalia, southwards to northern Namibia and Botswana, and through Zimbabwe to southern Mozambique, and north-eastern South Africa (Ferguson-Lees and Christie 2001).

Vagrants are occasionally recorded from Morocco (BirdLife International 2016).

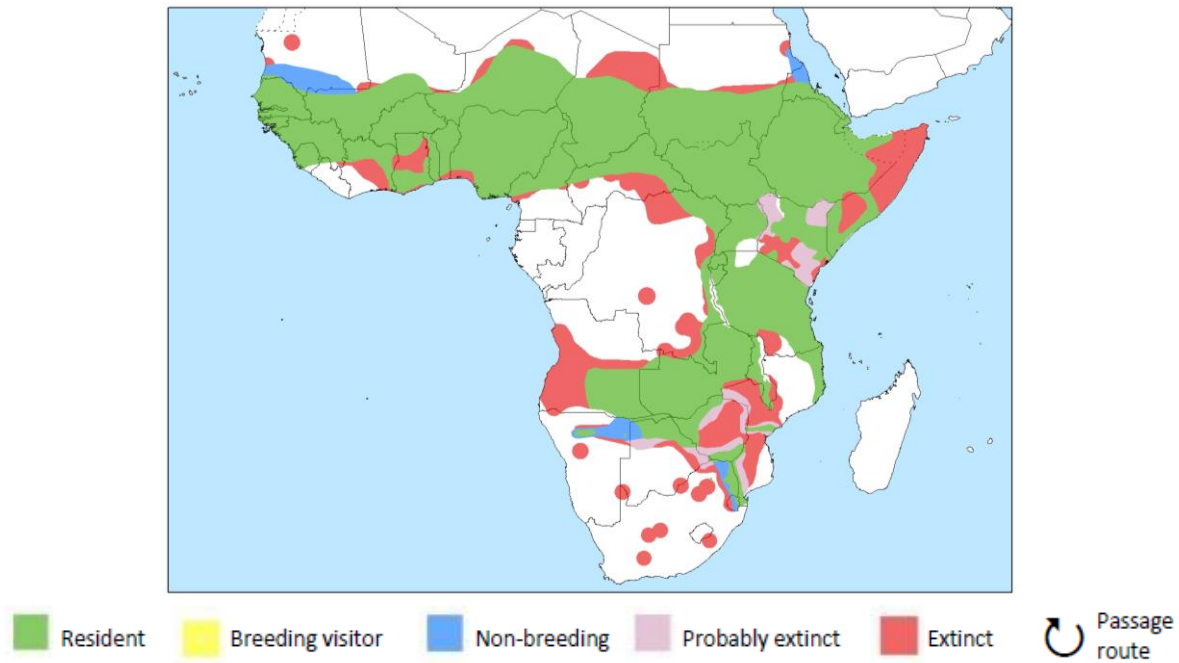

Fig 4.1.2. Range map of Hooded Vulture (BirdLife International and Handbook of the Birds of the World 2017 modified with input from the Vulture MsAP review process including African Raptor DataBank and HabitatInfo 2017).

4.1.3. Rüppell's Vulture distribution

The Rüppell's Vulture occurs throughout the Sahel region of Africa from Senegal, Gambia, and Mali in the west to Sudan, South Sudan, and Ethiopia in the east. Also south through the savanna regions of East Africa in Kenya, the United Republic of Tanzania, and Mozambique (BirdLife International 2016). It may no longer occur in Nigeria (no sightings in 2011 in the last stronghold of Yankari Game Reserve, nor anywhere else in the country, P. Hall *in litt.* 2011).

Since the 1990s there has been a series of records involving small numbers of vagrant individuals in Spain and Portugal; these are believed to have crossed the Strait of Gibraltar with migrating Griffon Vulture *G. fulvus*, but breeding is not yet known to have taken place in Iberia (BirdLife International 2016).

Vagrants are also occasionally recorded from the Democratic Republic of Congo, Egypt, Sierra Leone and Zambia (BirdLife International 2016).

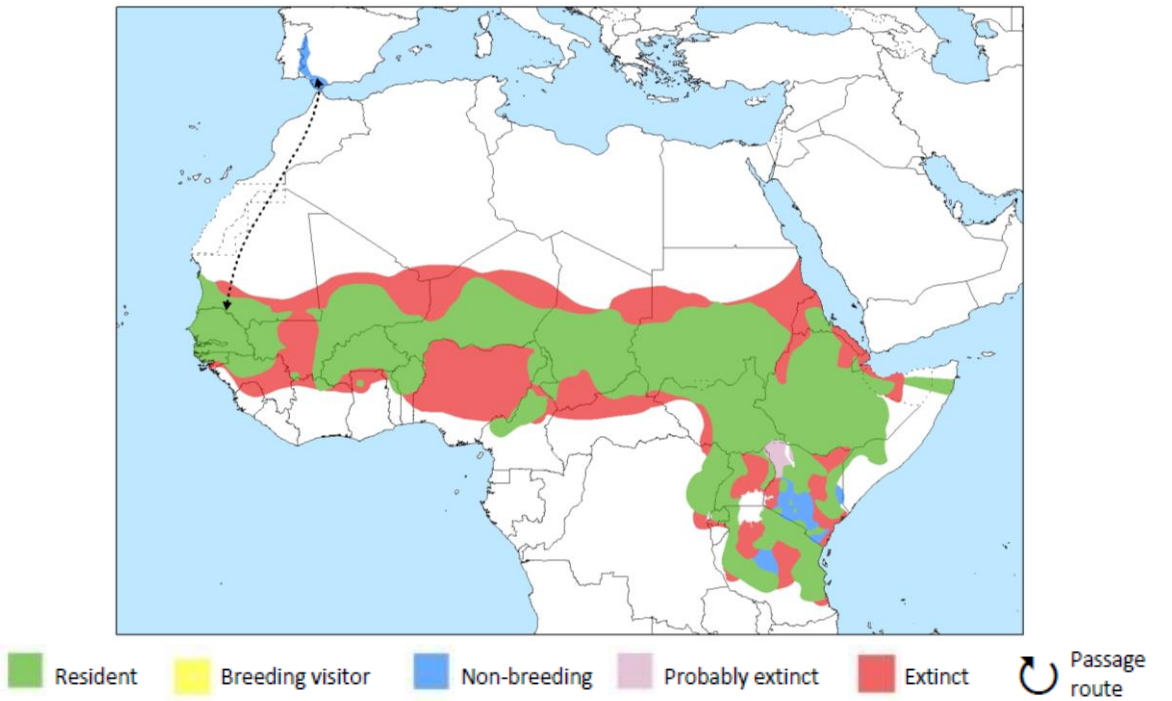

Fig 4.1.3. Range map of Rüppell's Vulture (BirdLife International and Handbook of the Birds of the World 2017 modified with input from the Vulture MsAP review process including African Raptor DataBank and HabitatInfo 2017).

4.1.4. White-backed Vulture distribution

The White-backed Vulture is the most widespread and common vulture in Africa, although it is now undergoing rapid declines. It occurs from Senegal, the Gambia, and Mali in the west, throughout the Sahel region to Ethiopia and Somalia in the east, through East Africa into Mozambique, Zimbabwe, Botswana, Namibia, and South Africa in the south (BirdLife International 2016).

Individuals are occasionally recorded from Liberia (BirdLife International 2016) and vagrants have been recorded in Morocco (MaghrebOrnitho 2014) and southern Spain (Dies *et al.* 2016).

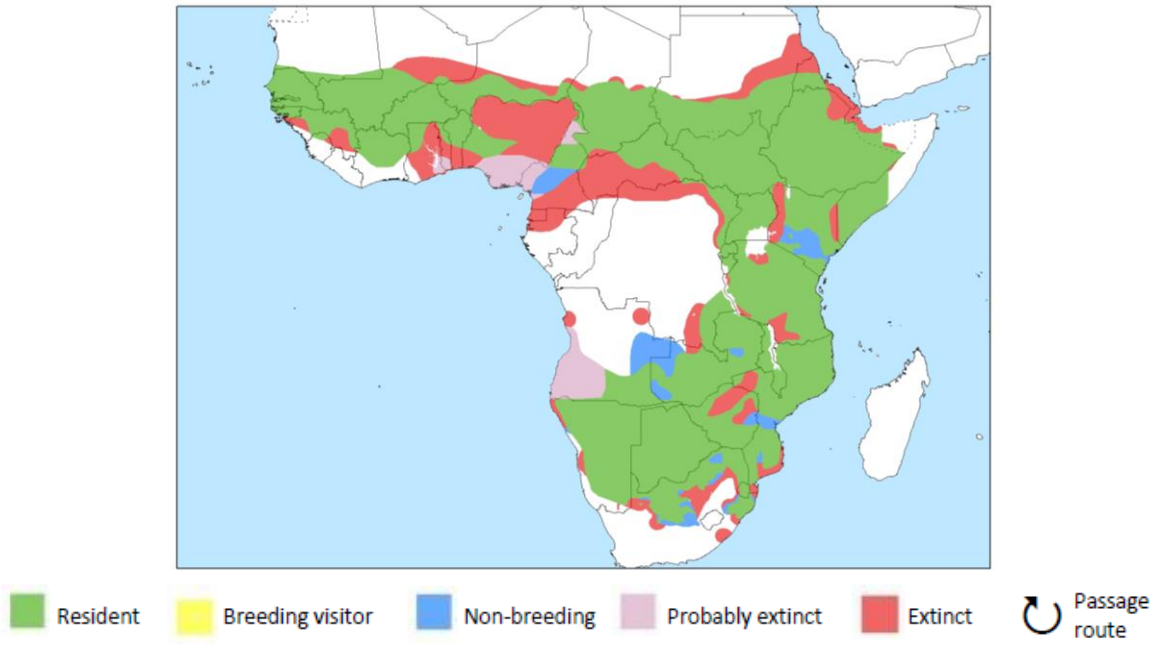

Fig 4.1.4. Range map of White-backed Vulture (BirdLife International and Handbook of the Birds of the World 2017 modified with input from the Vulture MsAP review process including *African Raptor DataBank and HabitatInfo 2017).*

4.1.5. White-headed Vulture distribution

The White-headed Vulture has an extremely large range in sub-Saharan Africa (from Senegal, Gambia, and Guinea-Bissau disjunctly east to Eritrea, Ethiopia, and Somalia, and south to easternmost South Africa and Swaziland), where it is uncommon to locally common, but generally widespread outside forested regions (Harrison *et al.* 1997). It has declined rapidly in parts of West Africa since the early 1940s (P. Hall *in litt.* 1999, J.M. Thiollay *in litt.* 2006, 2012), is declining in East Africa (Virani *et al.* 2011), and in southern Africa is now largely confined to protected areas (Murn *et al.* 2016).

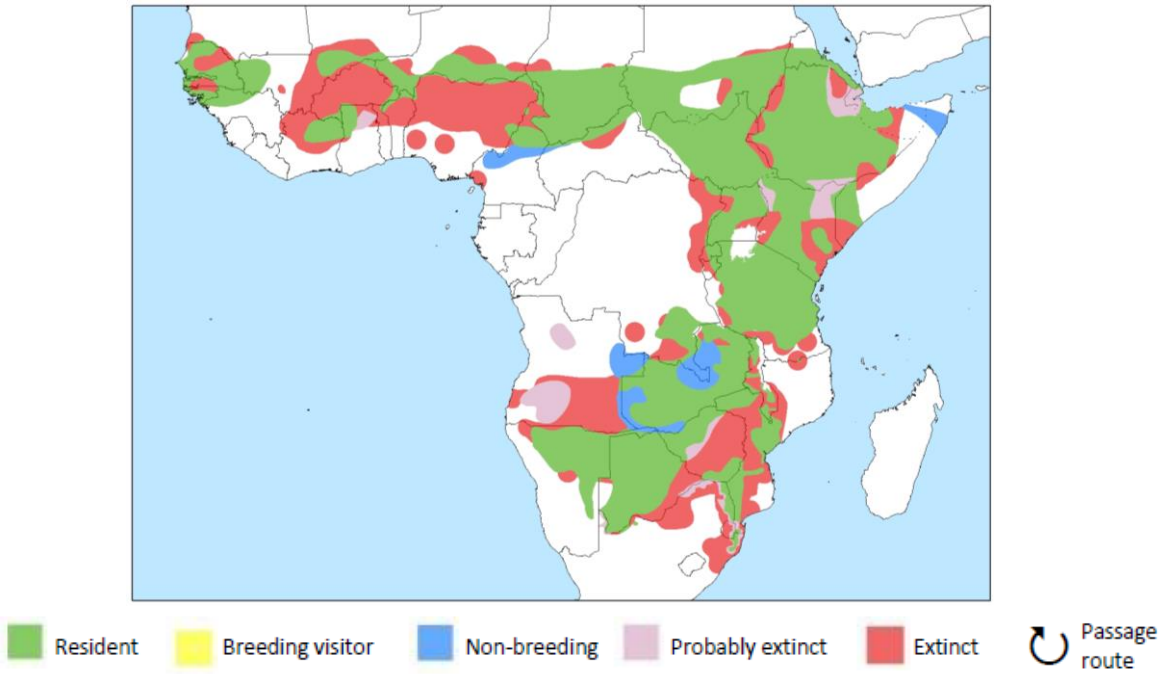

Fig 4.1.5. Range map of White-headed Vulture (BirdLife International and Handbook of the Birds of the World 2017 modified with input from the Vulture MsAP review process including African Raptor DataBank and HabitatInfo 2017).

4.2. Population (estimates and trends)

4.2.1. Cape Vulture population

The total population was estimated to be 4,400 pairs in 84 colonies in 1994 (Piper 1994), and was implied to have declined to c.4,000 pairs by 1999 (Barnes 2000). Eighteen 'core' colonies now hold 80 per cent of the Cape Vulture population (Boshoff and Anderson 2007). In 2006, the total population was estimated at 8,000-10,000 individuals (M. Diekmann *in litt.* 2006).

The global population estimate was revised in 2013 with an estimate of 4,700 pairs or 9,400 mature individuals (Taylor *et al.* 2015). The population is estimated to have declined by 10% between 1994 and 1999 (Barnes 2000), and over the period 1992-2007 the species declined by 60-70 per cent in eastern South Africa (McKean and Botha 2007). According to the 2015 Eskom Red Data Book of Birds (Taylor *et al.* 2015), declines in South Africa since the 1960s may be between 66 and 81 per cent . However populations in some areas are now thought to be increasing (Benson 2015).

4.2.2. Hooded Vulture population

Data and observations of varying coverage and quality from various parts of its range suggest that the species is undergoing a very rapid decline in its global population (Ogada and Buij 2011, Ogada *et al.* 2016). Recently published data shows that this species' population is declining rapidly with an estimated 83 per cent decline (range 64-93%) over three generations (53 years; Ogada *et al.* 2015b). Trends in Uganda are difficult to detect owing to strong annual variations (Pomeroy *et al.* 2012) whilst in coastal Gambia the species is reported to remain relatively abundant (Barlow and Fulford 2013).
Following evidence of declines across its range, the total population has been estimated at a maximum of 197,000 individuals (Ogada and Buij 2011).

4.2.3. Rüppell's Vulture population

Mundy *et al.* (1992) estimated a population perhaps of the order of 11,000 pairs, comprising 3,000 pairs in the United Republic of Tanzania, 2,000 in Kenya where 'up to thousands' concentrated at favoured sites, 2,000 in Ethiopia where it was said to be 'common to locally abundant', 2,000 in Sudan where it was the 'most common vulture in the North', and 2,000 for West Africa. This could indicate a population of 22,000 mature individuals and perhaps c.30,000 individuals at the start of the 1990s. Subsequent extremely rapid population declines mean that the population is now likely to be much lower (BirdLife International 2016).

Formerly abundant, new data suggests this species has experienced a very rapid population decline of 97 per cent (range: 94-99 per cent) over three generations (56 years; Ogada *et al.* 2015b). Extremely rapid declines have been reported in West Africa (Thiollay 2006; although in Gambia it appears to be stable). During vehicle-based transect surveys in the Sahel zone of Mali and Niger in 2006 the species was not recorded, despite being common during equivalent surveys in the early 1970s. Surveys of the Sudano-Sahelian savannas of Burkina Faso, Mali, and Niger, carried out in 1969-1973 and 2003-2004, indicate a drop in the species' abundance from 61.3 birds/100 km to 2.5 birds/100 km (Rondeau and Thiollay 2004). Significant declines appear to have occurred elsewhere in the range, including Cameroon (87 per cent decline 1973-2000, Thiollay 2001), Malawi (gone from Kasungu and Liwonde National Parks, where previously common; L. Roxburgh *in litt.* 2011), Somalia (A. Jama *in litt.* 2011), Sudan (Nikolaus 2006), Uganda (D. Pomeroy *in litt.* 2006), Kenya (M. Virani *in litt.* 2006, Virani *et al.* 2011), and Tanzania (J. Wolstencroft *in litt.* 2006), but it may be stable in Ethiopia (Nikolaus 2006).

Virani *et al.* (2011) documented an apparent decline of c.52 per cent over c.15 years in the numbers of *Gyps* vultures present during the ungulate migration season, while in central Kenya an apparent decline of 69 per cent was noted in the numbers of *Gyps* vultures between 2001 and 2003 (Ogada and Keesing 2010). As these are visiting individuals from a wide-ranging population, declines observed in the Masai Mara study may be representative of declines in *Gyps* populations ranging across East Africa from southern Ethiopia to southern Tanzania (C. Kendall *in litt.* 2012).

4.2.4. White-backed Vulture population

The global population of White-backed Vulture has been estimated at 270,000 individuals.

The most recently published data on this species' population suggests the species has declined extremely rapidly, with a median estimate of 90% (range: 75-95%) over three generations (55 years; Ogada *et al.* 2015b). In 2006 White-backed Vulture was reported to have declined by over 90 per cent in West Africa (J. M. Thiollay *in litt.*)and it had largely disappeared from Ghana apart from Mole National Park in 2011 (F. Dowsett-Lemaire *in litt.*), Niger with (no records away from W National Park since 1997, J. Brouwer *in litt.* 2012), and Nigeria (no sightings in 2011 in last stronghold of Yankari Game Reserve, nor anywhere else, and possibly extirpated from the country, P. Hall *in litt.* 2011). The species had also declined in Sudan and South Sudan (Nikolaus 2006), Somalia (A. Jama *in litt.* 2011), and Kenya (c.52 per cent declines in Masai Mara over c.15 years, M. Virani *in litt.* 2006, Virani *et al.* 2011), but was apparently more stable in Ethiopia (Nikolaus 2006), the United Republic of Tanzania (D. Peterson *in litt.* 2006), Uganda (short-term increases; Pomeroy *et al.* 2012), and across southern Africa where an estimated 40,000 individuals remained in 2006 (R. Simmons *in litt.*).

An ongoing study near Kimberley, South Africa, shows the number of breeding pairs has increased by 72 per cent in 22 years (from 50 to 86 breeding pairs; A. Anthony *in litt.* 2015). However McKean *et al.* (2013) suggest that if current levels of exploitation continue in South Africa, the species could become locally extinct by 2034 or sooner.

Virani *et al.* (2011) documented an apparent decline of c.52 per cent over c.15 years in the numbers of *Gyps* vultures present in the Masai Mara (Kenya) during the ungulate migration season, while in central Kenya an apparent decline of 69 per cent was noted in the numbers of *Gyps* vultures between 2001 and 2003 (Ogada and Keesing 2010). As these are visiting individuals from a wide-ranging population, declines observed in the Masai Mara study may be representative of declines in *Gyps* populations ranging across East Africa from Southern Ethiopia to southern Tanzania (C. Kendall *in litt.* 2012).

4.2.5. White-headed Vulture population

A recent estimate suggests the global population is much smaller than previously thought, consisting of just 5,500 individuals (Murn *et al*. 2016). This equates to just 3,685 mature individuals placed in the band 2,500-9,999 mature individuals (BirdLife International 2016). An earlier estimate of 7,000-12,500 mature individuals was extrapolated from a number of regional estimates (Mundy *et al.* 1992) and equated to 10,500-18,750 individuals in total. However recent data suggest the regional populations are now much smaller than was previously thought: 721 nests in East Africa; 548 nests in Central Africa; 468 nests in Southern Africa, and 156 nests in West Africa (Murn *et al.* 2016). In Botswana only four nests were located during gyrocopter surveys of three Important Bird Areas during 2008 and the species has the lowest relative abundance of the vulture species recorded (Hancock 2008), while in Niger there were only four records since 1995, all in the Gadabeji area (J. Brouwer *in litt.* 2012). The species has probably declined in central Mozambique, where the population was estimated in 2005 to be 200 pairs (Parker 2005).

The species is thought to be declining at an extremely rapid rate. Ogada *et al.* (2015b) estimate a median decline of 96 per cent (range: 73-98 per cent) over three generations (45 years). The species has shown severe declines throughout its West African range (F. Dowsett-Lemaire *in litt.* 2006, J.M. Thiollay *in litt.* 2006) and also across southern Africa (Ferguson-Lees and Christie 2001). The species is likely to disappear from South Africa in the near future should current levels of exploitation and other pressures continue (McKean *et al.* 2013).

4.3. Habitat (short description and trends)

Owing to their feeding ecology, vultures require open areas in order to locate carcasses. They therefore tend to occur in open habitats and are less common in areas of dense woodland/forest habitat.

4.3.1. Cape Vulture habitat

Cape Vulture occurs near the mountains, in open grassland, arid savannahs, and steppes. This species is less common in wooded areas. They breed and roost on cliffs (Mundy *et al.* 1992).

4.3.2. Hooded Vulture habitat

Hooded Vulture is often associated with human settlements, but is also found in open grassland, forest edge, wooded savanna, desert, and along coasts (Ferguson-Lees and Christie 2001). It occurs up to 4,000 m, but is most numerous below 1,800 m. It is an arboreal nester (BirdLife International 2016).

4.3.3. Rüppell's Vulture habitat

Rüppell's Vulture frequents open areas of Acacia woodland, grassland and montane regions, and it is gregarious, congregating at carrion, soaring together in flocks, and breeding mainly in colonies on cliff faces and escarpments at a broad range of elevations (BirdLife International 2016).

4.3.4. White-backed Vulture habitat

Primarily a lowland species of open wooded savanna, particularly areas of Acacia, White-backed Vultures require tall trees for nesting. However it has also been recorded nesting on electricity pylons in South Africa (de Swardt 2013). It is a gregarious species, congregating at carcasses, in thermals, and at roost sites. It nests in loose colonies (BirdLife International 2016).

4.3.5. White-headed Vulture habitat

White-headed Vulture prefers mixed, dry woodland at low altitudes, avoiding semi-arid thornbelt areas (Mundy *et al.* 1992). It also occurs up to 4,000 m in Ethiopia, and perhaps 3,000m in Kenya, and ranges across the thorny Acacia-dominated landscape of Botswana (Mundy *et al.* 1992). It generally avoids human habitation (Mundy *et al.* 1992). It nests and roosts in trees, most nests being in Acacia spp. or baobabs (Mundy *et al.* 1992).

4.4. Biological characteristics

Vulture life history is characterized by delayed maturity, low productivity (a maximum of one fledgling per pair per year), and relatively high adult survivorship (annual adult survival >0.9; del Hoyo *et al.* 1994). Vultures have some of the lowest reproductive rates among birds. These demographic traits make their population trends very sensitive to additional mortality of adults caused by non-natural factors.

Vultures' highly social feeding behaviour and use of cues from conspecifics and other scavenging species to find food sources mean that a single toxic food source can cause very high mortality (Kendall *et al.* 2012, Ogada *et al*. 2012a).

Although vultures have high visual acuity, their visual field and foraging ecology make them particularly vulnerable to collisions with power lines and wind turbines (de Lucas *et al.* 2012; Martin *et al.* 2012). Vulture visual fields contain a small binocular region and large blind areas above, below and behind the head, and whilst foraging, vultures adopt a slight downward in-flight head posture (Martin *et al.* 2012) making them susceptible to collision with man-made structures.

4.5. Role of the taxon in its ecosystem

Vultures are highly effective scavengers, and as keystone species, their declines have a range of socio-economic, as well as ecological, cultural and health impacts. There may be considerable economic costs of loss of vultures, not least, those associated with knock-on effects on human health (Markandya *et al.* 2008). Most notably, vultures dispose of carrion, reducing the spread of disease and protecting the health of humans, domesticated animals, and wildlife. The abundance of other scavengers, some of which are well-known disease

reservoirs, increases substantially at carcasses without vultures (Pain *et al.* 2003, Prakash *et al.* 2003, Ogada *et al.* 2012b). Scavenging of carcasses by vultures promotes the flow of energy through food webs (DeVault *et al.* 2003, Wilson and Wolkovich 2011), and vultures have been shown to facilitate African predators, such as lions and hyenas, in locating food resources (Schaller 1972, Houston 1974).

In Kenya, in the absence of vultures, carcass decomposition time nearly tripled, and both the number of scavenging mammals and the time they spent at carcasses increased threefold. Further, there was a nearly threefold increase in the number of contacts between mammalian scavengers at carcasses without vultures, suggesting that the demise of vultures could facilitate disease transmission at carcasses (Ogada *et al.* 2012b).

5. Conservation status and threats

5.1. IUCN Red List Assessment

The five vulture species were all moved to a higher category of extinction risk in the 2015 IUCN Red List assessment (BirdLife International 2016). See Section 4.2 for further information on population trends supporting Red List assessments.

Vulture species	Cape Vulture	Hooded Vulture	Rüppell's Vulture	White-backed Vulture	White-headed Vulture
IUCN Category	EN	CR	CR	CR	CR

EN = Endangered
CR = Critically Endangered

5.2. Equivalent information relevant to conservation status assessment

N/A

5.3. Threats to the population (factors, intensity)

These five African vulture species face similar threats, including non-target poisoning from poison bait laid for carnivores, targeted poisoning of vultures by poachers and killing of vultures for belief-based use.

Other threats include habitat loss and degradation, decreasing food availability, human disturbance and collision with or electrocution on energy infrastructure (Allan 1989, Thiollay 2006; Thiollay 2007; Virani *et al*. 2011; Monadjem *et al.* 2012; Phipps *et al.* 2013a and Ogada *et al.* 2015b).

Table 5.3 Threats affecting African Vultures and their overall severity across their range based on outcomes of MsAP regional workshops and questionnaires (Botha et al. in prep).

Threats	**Species and Level of Threat**					
	White-headed Vulture	**Hooded Vulture**	**White-backed Vulture**	**Cape Vulture**	**Rüppell's Vulture**	
Unintentional Poisoning						
Human-animal conflict						
Vermin control						
Poisoning from environmental contamination						
Lead from ammunition						
Industrial pollution						
Poisoning from pharmaceutical products						

Threats	Species and Level of Threat					
	White-headed Vulture	Hooded Vulture	White-backed Vulture	Cape Vulture	Rüppell's Vulture	
Veterinary drugs (NSAIDs, tranquilisation, livestock dips and euthanasia)						
Targeted vulture poisoning						
Belief-based use and bushmeat						
Sentinel poisoning						
Direct persecution						
Electrocution						
Powerlines						
Collisions with infrastructure & vehicles						
Powerlines						
Wind turbines						
Communication towers						
Vehicle collisions						
Aircraft collisions						
Decline of food availability						
Reduced availability of livestock carcasses						
Decline of wild ungulates						
Improved carcass disposal						
Improved sanitation						
Change in cultural practices						
Change in foraging patterns due to different spatial availability of food						
Habitat loss						
Loss of trees and cliffs						
Bush encroachment/ reforestation						
Human settlement expansion within historical foraging range						
Degradation of rangelands						
Disturbance from human activities						

Threats	Species and Level of Threat					
	White-headed Vulture	Hooded Vulture	White-backed Vulture	Cape Vulture	Rüppell's Vulture	
Recreation						
Construction of infrastructure						
Agricultural/forestry						
Research and monitoring						
Aviation						
Mining and blasting						
Diseases						
Diseases						
Climate change						
Climate change						
Other threats						
Drowning						
Illegal killing, taking and trade						
Sport hunting						
Indirect threat - missing or ineffective policies, laws and enforcement						
Lack of appropriate legislation						
Lack of or limitations to enforcement						

Threats are colour-coded as follows:

Critical	Very high	High	Medium	Low	Unknown

Ranking of threats is based on scope, severity and irreversibility. Based on outcomes from Regional Vulture MsAP Workshops and Questionnaires.

5.3.1. Poisoning

5.3.1.1 Unintentional (secondary) poisoning

Non-target poisoning is the unintentional killing or harming of vultures through consumption of contaminated carcasses or remains.

Human-wildlife conflict

In East Africa, unintentional secondary poisoning is an important, widespread issue which occurs primarily outside protected areas. Many farmers use poisons in response to human-wildlife conflict or as pest control, including use of strychnine for predator control and poisoned livestock baits to kill carnivores like jackals, lions, and hyenas (Ogada 2014). More recently synthetic pesticides like carbofuran have increased in use and contributed significantly to declines of vultures (Brown 1986; P. Hall *in litt.* 2000, Otieno *et al.* 2010, Ogada 2014).

The large range sizes of the White-backed Vulture and Rüppell's Vulture puts them at significant risk as it means they inevitably spend considerable time outside protected areas (Ogada and Keesing 2010, Otieno *et al.* 2010, Kendall and Virani 2012, Roxburgh and McDougall 2012). Recent evidence from wing-tagging and telemetry studies suggests that annual mortality, primarily from incidental poisoning, can be as high as 25% for the White-

backed Vulture (Kendall and Virani 2012).

Veterinary drugs

Diclofenac, one of a group of non-steroidal anti-inflammatory drug (NSAID) used to treat livestock (and then fatal to vultures feeding on livestock carcasses), has been identified as the key cause of decline in South Asian Gyps vulture species (Oaks, *et al.* 2004; Shultz, *et al*. 2004; Green, *et al.* 2004; Green, *et al.* 2006). Some other NSAIDs have since been found to be toxic to at least some other raptor species. It is not yet known whether all African Vultures species are also susceptible, but it seems likely. In 2007, Diclofenac was found to be on sale at a veterinary practice in Tanzania. It was also reported that in the United Republic of Tanzania, a Brazilian manufacturer has been aggressively marketing the drug for veterinary purposes (C. Bowden *in litt.* 2007) and exporting it to 15 African countries. Introduction of diclofenac or other NSAIDs may represent a potential future threat to vultures (BirdLife International 2016).

Lead poisoning

Lead poisoning through ingesting lead bullets and bullet fragments in carcasses is a further potential threat (Boshoff *et al.* 2009) and one that has been confirmed in other vulture species (Adaudi *et al.* 1990, Mateo *et al.* 1997, Platt *et al.* 1999, Miller *et al.* 2000, Clark and Scheuhammer 2003, Mateo *et al.* 2003, Garcia-Fernandez *et al.* 2005, Pattee *et al.* 2006). Lead (at average whole-blood lead concentrations were 56.58 6 11 ug/dl) has been shown to have negative ph*ysiolog*ical (osteodystrophy) and reproductive effects in the Cape Vulture (Naidoo *et al*. 2012).

5.3.1.2 Targeted vulture poisoning

Deliberate targeting of vultures with poisons can occur for a variety of reasons.

Sentinel poisoning

'Sentinel poisoning' or deliberate poisoning of vultures linked to poaching of elephants has increased rapidly since 2012 with significant effects on vulture populations (Hancock 2009, Roxburgh and McDougall 2012, Ogada *et al*. 2015a, Ogada *et al.* 2015b). Poachers lace carcasses of poached animals with poison after removing ivory and other trophies, to intentionally kill vultures whose circling flights above the carcass might otherwise alert the authorities (Ogada *et al*. 2015a). A single poisoned elephant carcass can kill over 500 vultures (Ogada *et al.* 2015a). Eleven known vulture poisoning incidents at elephant carcasses occurred across seven African countries between 2012 and 2014, killing over 2,000 vultures (Ogada *et al*. 2015a). At least 176 White-backed Vultures and 15 Lappet-faced-Vultures were killed in a single poisoning incident associated with elephant poaching in Gonarezhou National Park, Zimbabwe in 2012 (Groom *et al.* 2013). In Botswana 326 vultures (largely African White-backed Vultures, but also Lappet-faced Vultures and Hooded Vultures) were poisoned in association with the poaching of three elephants (McNutt and Bradley 2013).

When poisoning incidents occur during the breeding season, it is assumed the young of the poisoned vultures also die, thereby increasing the numbers killed (Pfeiffer. 2016).

Belief-based use and the bushmeat trade

The acquisition of vulture parts for belief-based use (including perceived 'traditional medicine') has been documented in West and southern Africa (Sodeinde and Soewu 1999, Nikolaus 2001, McKean 2004) and is suspected in parts of East Africa (N. Baker *in litt.* 2011). Poisoning, while not the only method employed, appears to be a commonly used method for obtaining vultures for belief-based use.

In Southern Africa, vultures are caught and consumed for perceived medicinal and psychological benefits (McKean and Botha 2007) through a practice known locally as 'Muthi', and the decline and possible extirpation in Nigeria has been attributed to the trade in vulture parts for belief-based 'juju' practices (P. Hall *in litt.* 2011). Offtake per annum in West Africa

was estimated to be 975-1,462 Hooded Vultures, 188-282 Rüppell's Vultures, and 154-231 White-backed Vultures. This represents a sizeable proportion of regional populations, suggesting that trade is likely to be contributing significantly to declines (Buij *et al.* 2015).

In eastern South Africa, it is estimated that 160 vultures are sold and that there are 59,000 vulture-part consumption events each year, involving an estimated 1,250 hunters, traders, and healers. At current levels of take, the populations of Cape Vultures in the Eastern Cape, KwaZulu-Natal, and Lesotho could become locally extinct within 44-53 years. Should the populations of White-backed Vultures *G. africanus* become depleted first, it has been suggested that the resultant increase in hunting pressure on Cape Vultures could cause a population collapse within the subsequent 12 years (McKean and Botha 2007). Extrapolation from a limited study of traditional healers in Maseru, Lesotho, suggests that, conservatively, nearly 7 per cent of the breeding population in the country would be lost annually for such use (Beilis and Esterhuizen 2005). A study in South Africa found that should current rates of exploitation for market trade continue then the populations in Lesotho, KwaZulu-Natal, and Eastern Cape could be exhausted within 54 years (McKean *et al.* 2013)
In Nigeria, a survey of medicinal traders found that Hooded Vulture was the most commonly traded species of vulture, with 90 per cent of all vulture parts traded belonging to the species (Saidu and Buij 2013). Furthermore, across West and Central Africa the species is one of the most heavily traded, with an estimated 5,850-8,772 individuals traded over a six-year period in West Africa (Buij *et al.* 2015).

The West African population of Rüppell's Vulture has been heavily exploited for trade, with birds commonly sold in fetish markets (Rondeau and Thiollay 2004, Nikolaus 2006, Buij *et al.* 2015). It is one of the most commonly traded vultures in West and Central African markets, with numbers traded (1,128-1,692 individuals over a six year period in West Africa; Buij *et al.* 2015). The Dogon of central Mali climb the Hombori cliffs to take eggs and chicks of this species (Rondeau and Thiollay 2004). The decline and possible extirpation in Nigeria appears to be entirely attributable to the trade in vulture parts for belief-based juju practices (P. Hall *in litt.* 2011).

In South Africa, the White-backed Vulture is one of the preferred vulture species in trade, according to a survey of traditional healers and traders (McKean *et al.* 2013). As a result of this and environmental pressures, it is predicted that the population in Zululand could become locally extinct in 26 years, unless taking rates have been underestimated, in which case local extinction could be 10-11 years away (McKean and Botha 2007).

In South Africa, the White-headed Vulture is captured for belief-based use (R.E. Simmons and C.J. Brown *in litt.* 2006) and in Zambia White-headed Vultures have apparently been intentionally killed for use in 'witchcraft' (Roxburgh and McDougall 2012).

New belief-based uses are emerging and adding to the toll on vultures, such as use of vulture parts to supposedly increase the user's chances of winning in betting and gambling (EWT)[3] .

Vultures, and in particular the Hooded Vulture, are hunted for food (e.g. bushmeat) in West Africa by some ethnic groups. Hooded Vulture meat is reportedly sold as chicken in some places, though the impact of this issue is unknown (Rondeau and Thiollay 2004). The bushmeat trade in vultures may be linked to belief-based use. Many species are sold for belief-based uses alongside those sold for their meat in the same markets, or are sold for either purpose. This suggests that belief-based use and bushmeat trades are probably integrated and to some extent interdependent (Saidu & Buij 2013, Williams *et al.* 2014, Buij *et al.* 2015).

5.3.2. Reduction of food availability

Lack of food – owing to overhunting, changes in livestock husbandry and habitat change affecting prey availability could have major impacts on vultures and is thought to have contributed to large scale vulture declines throughout their range (Mundy *et al.* 1992, P. Hall *in*

[3] http://projectvulture.org.za/wp-content/uploads/2014/02/Traditional-medicine.pdf

litt. 1999, Shimelis *et al.* 2005, R. Davies *in litt.* 2006, Craigie *et al.* 2010; Ogada *et al.* 2015b).

The ungulate wildlife populations on which vultures rely have declined precipitously throughout East Africa, even in protected areas (Western *et al.* 2009) and West Africa through habitat modification and over-hunting (Thiollay 2006, Rondeau and Thiollay 2004).

Declines of Hooded Vultures have also been attributed to land conversion through development and improvements to abattoir hygiene and rubbish disposal in some areas (Ogada and Buij 2011), with intensified cattle farming, sick or dying animals are now rarely abandoned (Thiollay 2006, Rondeau and Thiollay 2004).

National vaccination campaigns in West Africa have reduced illness in domestic livestock, and sick animals can now be sold, rather than abandoned, owing to the proliferation of markets and abattoirs (Rondeau and Thiollay 2004).

5.3.3. Habitat loss, degradation, and fragmentation

Habitat conversion is thought to have contributed to large-scale vulture declines throughout their range (Mundy *et al.* 1992, P. Hall *in litt.* 1999, R. Davies *in litt.* 2006, Ogada *et al.* 2015b). Habitat loss and degradation are suspected to have played roles in the dramatic declines (>98 per cent) of large vultures outside of protected areas in West Africa where human population growth has been very rapid (Thiollay 2006, 2007). The White-headed Vulture is highly sensitive to land-use and is highly concentrated in protected areas (Hancock 2008).

The ongoing urbanization in some parts of South Africa, has limited the extent of natural areas for foraging by vultures, perhaps resulting in their reliance in some places on supplementary food at vulture “restaurants” (Wolter *et al.* unpubl.). Poor grassland management in some areas has promoted bush encroachment, making finding carcasses more difficult for vultures (Schultz 2007). Degradation of habitat by intensive agriculture, cultivation, urbanization, roads, dams, mines, desertification, bush encroachment, afforestation and alien vegetation is thought likely to have affected vulture species, but needs further research (Botha *et al.* in prep).

5.3.4. Disturbance from human activities

Disturbance of nesting vultures by humans can have serious consequences (Ogada *et al.* 2015b). Breeding White-headed Vultures may readily desert nests in areas of high human disturbance (R.E. Simmons and C.J. Brown *in litt.* 2006). The White-backed Vulture is vulnerable to nest harvesting or disturbance by humans (Bamford *et al.* 2009); perhaps more so than Rüppell’s Vulture as it breeds in trees rather than on inaccessible cliffs (C. Kendall *in litt.* 2012).

Disturbance, especially from climbers, is a particular problem for Rüppell’s Vulture. In Mali, the Hombori and Dyounde massifs are dotted with at least 47 climbing routes, on which expeditions take place every year, mainly during the species' breeding season. However, the impact of these activities is not known (Rondeau and Thiollay 2004). Nest disturbance may be growing with an increase in forest settlements in Ethiopia (A. Shimelis *in litt.* 2007) and the increasing recreational use of off-road vehicles (Mundy *et al.* 1992). In Saudi Arabia, suitable nesting trees may be subject to the most intense human disturbance as shepherds also use the same large trees for shelter for themselves and their livestock (Shobrak 2011).

The collapse of a key colony of Cape Vulture in eastern Botswana has been attributed to human disturbance, especially insensitive tourism (Borello and Borello 2002). The ongoing urbanization around Hartbeespoort Dam and the Magaliesberg Mountains, South Africa, has limited the extent of natural areas for foraging by vultures, perhaps resulting in their reliance on supplementary food at vulture “restaurants” (Wolter *et al.* unpubl.). If such “restaurants” were closed, vultures might be exposed to unsafe carcasses (Wolter *et al.* unpubl.).

5.3.5. Electrical infrastructure

Vultures are frequent victims of electrical infrastructure. In Africa this is particularly evident in

Southern and North Africa, where there has been an increase in electrical infrastructure development from power lines and wind farms. “Green energy” initiatives such as wind farms can be detrimental to vultures, if bird-friendly designs and careful placement of turbines and power lines are not observed (Rushworth and Krüger 2014; Jenkins *et al.* 2010). Given the rapid increase in the development of “green” technology and electricity infrastructure worldwide, this threat is likely to increase in coming decades.

Electrocution and collision with power lines can cause significant levels of vulture mortality (Anderson and Kruger 1995, Janss 2000, van Rooyen 2000) and the recent proliferation of wind farms as a source of green energy production has also had adverse effects (Ogada and Buij 2011). In Magaliesberg a large number of fatalities have been associated with powerline collisions and electrocutions, and this is one of the main factors causing the ongoing decline of the Cape Vulture in South Africa (K. Wolter *in litt.* 2007). It is estimated that a minimum of 80 vultures are killed annually by collision with powerlines in Eastern Cape Province (Boshoff *et al.* 2011).Vulture use of perches in open landscapes and their large wingspan renders them vulnerable to electrocution (particularly on poorly designed power infrastructure), as does their attraction to carcasses of victims of electrocution or collision lying under energy infrastructure. However Phipps *et al.* (2013) suggested vultures may also, in some circumstances, derive benefits from their use of power infrastructure for nesting and roosting. Characteristics of their visual field, head carriage in flight and foraging ecology increase the susceptibility of vultures to collision (de Lucas *et al.* 2012; Martin *et al.* 2012).

Electrocution on powerline poles has been reported to be a problem for the White-backed Vulture (BirdLife International 2016) in part of its range. A controversial wind farm development in Maluti-Drakensberg, Lesotho, an important site for Cape Vulture, was given approval in 2014 (BirdLife South Africa 2014). Even relatively small-scale wind energy developments in the Lesotho Highlands pose a threat to the species (Rushworth and Krüger 2014).

5.3.6. Other threats

Although the main method of vulture persecution is poisoning, incidents of shooting do occasionally take place.

Exploitation for the international trade in raptors (N. Baker *in litt.* 2006) also poses a threat. In 2005, 30 individuals of Rüppell’s Vulture, 13 individuals of White-backed Vulture, and 30 individuals of White-headed Vulture that were being kept illegally in Italy were reportedly confiscated (F. Genero *in litt.* 2005).

The Hooded Vulture may also be threatened by avian influenza (H5N1), from which it appears to suffer some mortality and which it probably acquires from feeding on discarded dead poultry (Ducatez *et al.* 2007).

There are records of at least 120 Cape Vulture individuals (21 incidents) drowning in small farm reservoirs in Southern Africa between the early 1970s and late 1990s (Anderson *et al.* 1999), although modifications to many reservoirs have now been made (Boshoff *et al.* 2009). Raptors are thought to drown after attempting to bathe or drink, with mass vulture drownings probably due to the triggering of group behaviour by the actions of one bird (Anderson *et al.* 1999).

It is reported that a lack of adult females of Cape Vulture in the relict Namibian population may have led to four males breeding with White-backed Vultures, although this is not thought to be a problem across southern Africa (Diekmann and Strachan 2006).

Patterns in the contraction of the Cape Vulture’s range since the 1950s imply that climate change could be an underlying factor driving its decline through changes in habitats and decreases in prey populations, though further research is required to confirm a link (Simmons and Jenkins 2007).

5.4. Threats connected especially with migrations

Vultures are more vulnerable to a number of the threats mentioned in 5.3 because of their wide-ranging movements. In relation to the poisoning threat described in 5.3.1, owing to their very wide-ranging movements, African Vultures, can come into contact with many food sources distributed over a very wide geographic area within a relatively short period. Modelling of *Gyps* vulture populations in Asia has indicated that that only a tiny proportion of carcasses encountered need be contaminated with substances toxic to vultures to have a population level effect. This is not least because vultures are slow-breeding, long-lived species (Mundy *et al.* 1992). Contamination of just 0.3–0.7 per cent of ungulate carcasses with a lethal level of diclofenac was shown to be sufficient to cause the population of the White-rumped Vulture in Asia to decline at a rate of about 50 per cent per year (Green *et al.* 2004). The most common type of toxin encountered in food sources in Africa may currently be carbofuran and other similar poisons rather than veterinary drugs, and lethal levels may differ. However there can be little doubt that the population level impacts of encountering even sparsely distributed toxic food sources are likely to be significant in these wide ranging species. A highly social feeding strategy and reliance on cues from conspecifics and other scavenging species to find food sources mean that large numbers of individuals of several vulture species can congregate at a single carcass (Kendall *et al*. 2012b). As a result, vultures can suffer particularly high mortality at poisoning incidents (Ogada *et al.* 2012a). The vast areas covered by individuals of many African vulture species during month to month foraging, and particularly during age-related and seasonal movements, increase the likelihood of encountering toxic food sources somewhere within their range. Many individuals will cross national boundaries on a regular basis, so there is a clear need for a consistent approach to addressing the issue of poisoning across all African range states.

In relation to belief-based use the wide ranging movements of vultures render many individuals susceptible to killing in several countries in any given year. In some countries national level trade in vultures has reduced populations to the extent that national demand is now satisfied through international trade with vultures being killed in neighbouring countries and brought into national markets. Countries therefore need to work together to address the issue of belief-based use, including stemming the flow of vultures and vulture parts across borders.

The extent of vulture movements means that in parts of their ranges their encounter rate with energy infrastructure is likely to be relatively high. Vultures' use of thermals and associated topographic features to maintain soaring flight means they may tend to coincide with areas of high wind potential where wind energy infrastructure is likely to be located. Proliferation of energy infrastructure within the ranges of vulture species is likely to exact an increasing toll on vulture populations.

5.5. National and international utilization

Vulture species are exploited for commercial trade (for belief-based use and bushmeat) in Sub-Saharan Africa (Buij *et al.* 2015 and see 5.3.1.2). They are also caught and used as pets/display animals (BirdLife International 2016).

6. Protection status and species management

6.1. National protection status

African vultures are not believed to be protected by law in all countries of their ranges and in some countries where they enjoy national protection by law, enforcement measures may be insufficient. A review of national protection status of vulture species would be beneficial.

6.2. International protection status

All migratory species within the Accipitridae Family are listed on CMS Appendix II. Since October 2015, the five African vulture species within this proposal have been listed on Raptors MOU Annex 1 and are categorized in Annex 3 (Action Plan), Table 1 as Category 1 (globally threatened or near-threatened species).

CMS and the Raptors MOU are key intergovernmental conservation mechanisms working with a coalition of national governments, organizations, and vulture experts to develop a Multi-species Action Plan to Conserve African-Eurasian Vultures (Botha *et al.* in prep.). This aims to provide a framework and to act as a vehicle for international cooperation to address threats to vultures and improve their conservation status.

6.3. Management measures

Several national scale conservation and research actions are already underway to address threats to African vultures (BirdLife International 2016):

- A press release was circulated in July 2007 to raise awareness of the impacts of harvesting for medicinal and cultural reasons in southern Africa (McKean and Botha 2007).
- In 2007, a survey began to establish the extent of diclofenac use for veterinary purposes in the United Republic of Tanzania (BirdLife International 2016).
- In 2008, an awareness-raising campaign at a conference of the World Organisation for Animal Health in Senegal led to a resolution being adopted unanimously by more than 160 delegates to "request Members to consider their national situation with the aim to seek measures to find solutions to the problems caused by the administration of diclofenac in livestock" (Woodford *et al.* 2008, C. Bowden *in litt.* 2008).
- BirdLife Botswana has launched a campaign to tackle illegal poisoning (Anon. 2013).
- In 2016 BirdLife International launched a project to tackle vulture poisoning through improved site management, policy and enforcement, and community engagement in three countries, Kenya, Botswana and Zimbabwe.
- In 2017 BirdLife international, the Peregrine Fund and Nature Kenya are piloting actions to prevent poisoning of vultures in the Masai Mara National Reserve and surrounding areas.
- In 2016 BirdWatch Zambia began a project to adapt and implement the Vulture Safe Zone concept at an IBA consisting of five privately owned farms in Zambia.
- In 2017 Nigerian Conservation Foundation have begun a survey of belief-based use markets for vultures and their parts and engaging with stakeholders to reduce the demand in vulture parts.
- At the 2014 Conference of the Parties of the Convention on Migratory Species, a set of guidelines to prevent poisoning of migratory birds was formally adopted.

More specifically for Cape Vulture:

- Non-governmental organizations have successfully raised awareness among farming communities in South Africa of the plight of this species (Barnes 2000).
- Supplementary feeding at vulture “restaurants” may have helped to slow declines in some areas (Barnes 2000). The establishment of a “restaurant” at Nooitgedacht, South Africa, is thought to have helped promote the recolonization of the former colony there, and another “restaurant” has possibly contributed the species' recovery in Magaliesberg (Wolter *et al*. unpubl.). Supplementary feeding is known to significantly increase the survival rate of first-year birds in the Western Cape Province of South Africa (Piper *et al.* 1999).
- Thirty-seven individuals were held in captivity in Namibia in 2011, with seven breeding pairs from which at least two chicks have been hatched (BirdLife International 2016).
- The VulPro project in South Africa holds over 80 non-releasable Cape Vultures in captivity, including 10 breeding pairs. The programme aims to release captive-hatched chicks into the wild to supplement wild populations (Wolter *et al*. 2014). In February 2015, seven birds from VulPro and three from the National Zoological Gardens of South Africa were released into an open-topped enclosure so that they could eventually disperse into the wild (Hirschauer 2015). In October 2005, 16 birds from South Africa were released in Namibia and, although at least two have perished (Diekmann and Strachan 2006).
- Data on flight patterns and breeding behaviour have been recorded from two birds that were fitted with satellite transmitters (Anon. 2006). By 2006, five birds had been fitted with satellite tracking collars (Diekmann and Strachan 2006, Bamford *et al.* 2007).

- In Namibia, both communal and commercial farmers have been educated about the benefits that vultures bring and thus the disadvantages of poisoning carcasses, whilst there is also an education centre and education programme for schools (Diekmann and Strachan 2006).
- A conservation workshop on the species was held in March 2006 and was attended by 19 individuals (Boshoff and Anderson 2007). The group reassessed the status of the species and the threats it faces, and decided on conservation actions. A task force was established and people were identified to manage conservation actions for each of the key colonies in southern Africa.
- In the East Cape, awareness programmes have led to modifications in cement reservoirs to prevent drownings as well as aiming to reduce indirect poisoning (Taylor *et al.* 2015).
- Rehabilitation and release of injured vultures has become an important conservation action (Taylor *et al.* 2015).
- A press release was circulated in July 2007 to raise awareness of the impacts of hunting for medicinal and cultural reasons in southern Africa (McKean and Botha 2007). The threat posed by anti-inflammatory drugs in southern Africa is under investigation (K. Wolter *in litt.* 2007).

6.4. Habitat conservation

The five African vultures species included in this proposal have been reported from many protected areas across their ranges. Presence of vultures has triggered the creation of Important Bird Areas (IBAs) in Africa (BirdLife International 2016):

- 31 IBAs for Cape Vulture
- 2 IBAs for Hooded Vulture
- 6 IBAs for Rüppell's Vulture
- 4 IBAs for White-backed Vulture
- 2 IBAs for White-headed Vulture

In 2016 BirdWatch Zambia began a project to adapt and implement the Vulture Safe Zone concept at an IBA consisting of five privately owned farms in Zambia.

6.5. Population monitoring

Despite the scale of the threats facing vultures in Africa, little coordinated and comprehensive monitoring of populations has so far taken place. According to Anderson (2004), very little monitoring of vultures in Africa had been undertaken until 2005, mainly due to a lack of qualified observers, limited funding, logistical challenges, and the lack of a standardized monitoring protocol for either cliff- or tree-nesting species that could be implemented by field workers. Although this situation has improved somewhat over the last five years with monitoring programmes being implemented in at least 15 African countries, there are still vast areas where vultures occur where no monitoring is taking place. In areas where monitoring has been implemented, considerable declines in vulture populations have been recorded. The Asian Vulture Crisis has unequivocally shown that without systematic monitoring of vultures a population crash can take place virtually undetected (Botha *et al.* 2012).

6.5.1. Cape Vulture monitoring

Many nestlings of Cape Vulture were colour-ringed in southern Africa in the 1970s and 1980s (Botha 2007). Cape Vultures are now tracked with patagial tagging and satellite/GSM tracking (VulPro, EWT, conservation agencies). Currently, a group of stakeholders, called the Cape Vulture Task Force (CVTF) regularly monitor Cape Vulture sites and perform annual counts at colonies. Threats to the species are monitored. Annual reports are completed to share this information with relevant stakeholders. The CVTF aims to complete ongoing and accurate monitoring for the species. Borello and Borello (2002) have monitored all breeding sites of the Cape Vulture colony in Botswana from 1992 to 1999.

6.5.2. Hooded Vulture monitoring

Raptors Botswana has monitored this species since 2014: applied research for practical use

in conservation management planning and prioritising, novel baseline data for Botswana to feed into international/national knowledge and strategies, quantification of key threats, information for population viability analysis, platforms for ongoing monitoring efforts (P. Hancock *in litt.* 2016)

In Ghana, an ongoing project ('Indigenous Vulture Monitoring Project-University of Cape Coast, IVMP-UCC') aims to contribute to capacity building in local people to support vulture conservation and monitoring efforts in Ghana and to establish a short-term nationwide baseline data on vulture population and decline trends (J. Deikhumah in litt. 2016).

In Guinea-Bissau, an ongoing project ('Vultures in Guinea-Bissau: developing monitoring tools, assessing conservation status, and raising awareness concerning their provision of ecosystem services') aims to establish the first baseline data on the country concerning vultures. It is expected that the project will help to launch basis for establishing vulture monitoring in the country in the near future, with a methodological protocol developed during the study (M. Henriques *in litt.* 2016).

In the United Republic of Tanzania, Wildlife Conservation Society and North Carolina Zoo are working to monitor and assess threats to vultures and have been working in and around Ruaha and Katavi National Park since 2013 (C. Kendall *in litt.* 2016).

6.5.3. Rüppell's Vulture monitoring

In Ethiopia, an ongoing project ('Vulture status, distributions, and ecology in Ethiopia') aims to document vulture populations, trends, threats, and ecology using road count surveys, point count surveys, nest colony surveys, threat questionnaires, foraging ecology, population trend research, etc. (E. Buechley *in litt.* 2016).

In Guinea-Bissau, an ongoing project ('Vultures in Guinea-Bissau: developing monitoring tools, assessing conservation status, and raising awareness concerning their provision of ecosystem services') aims to establish the first baseline data on the country concerning vultures. It is expected that the project helps to launch basis for establishing vulture monitoring in the country in the near future, with a methodological protocol developed during the study (M. Henriques *in litt.* 2016).

In Niger, monitoring activities are carried out by Sahara Conservation Fund in Termit and Tin Toumma National Nature Reserve in the framework of the transboundary Niger-Chad EU project (monitoring of breeding areas; T. Rabeil *in litt.* 2016).

6.5.4. White-backed Vulture monitoring

Raptors Botswana has monitored this species since 2014: applied research for practical use in conservation management planning and prioritizing, novel baseline data for Botswana to feed into international/national knowledge and strategies, quantification of key threats, information for population viability analysis, platforms for ongoing monitoring efforts (B. Hancock *in litt.* 2016).

In Guinea-Bissau, an ongoing project ('Vultures in Guinea-Bissau: developing monitoring tools, assessing conservation status, and raising awareness concerning their provision of ecosystem services') aims to establish the first baseline data on the country concerning vultures. It is expected that the project helps to launch basis for establishing vulture monitoring in the country in the near future, with a methodological protocol developed during the study (M. Henriques *in litt.* 2016).

In South Africa, White-backed Vultures have been monitored using patagial tagging and satellite/GSM tracking since 2000 (I. Rusworth *in litt.* 2016)

In the United Republic of Tanzania, Wildlife Conservation Society and North Carolina Zoo are working to monitor and assess threats to vultures and have been working in and around Ruaha

and Katavi National Park since 2013. White-backed Vulture have also been monitored using patagial tagging since 2015 (C. Kendall *in litt.* 2016).

In Zimbabwe, a vulture survey in Hwange National Park was carried out in 2014. A publication of the survey was submitted to the African Journal of Ecology by Josephine Mundava, Fadzai Matsvimbo, Peter Mundy and Tendai Wachi (F. Matsvimbo *in litt.* 2016).

6.5.5. White-headed Vulture monitoring

Raptors Botswana has monitored this species since 2014: applied research for practical use in conservation management planning and prioritizing, novel baseline data for Botswana to feed into international/national knowledge and strategies, quantification of key threats, information for population viability analysis, platforms for ongoing monitoring efforts (B. Hancock *in litt.* 2016).

In Guinea-Bissau, an ongoing project ('Vultures in Guinea-Bissau: developing monitoring tools, assessing conservation status, and raising awareness concerning their provision of ecosystem services') aims to establish the first baseline data on the country concerning vultures. It is expected that the project will help to launch basis for establishing vulture monitoring in the country in the near future, with a methodological protocol developed during the study (M. Henriques *in litt.* 2016).

Individuals of White-headed Vulture were marked with patagial tags in Fouta Djallon vulture sanctuary, Guinea, in 2007 to monitor movements and for a toxicological assessment of the vulture population of the park (Rondeau 2008).

In South Africa, Ezemvelo KwaZulu-Natal Wildlife has implemented a formal monitoring plan for this species in the province of KwaZulu-Natal to determine population trends and breeding success as well as to determine age specific mortality rates (T. Mashua *in litt.* 2016).

In the United Republic of Tanzania, Wildlife Conservation Society and North Carolina Zoo are working to monitor and assess threats to vultures and have been working in and around Ruaha and Katavi National Park since 2013. White-headed Vultures have also been monitored with patagial tagging since 2015 (C. Kendall *in litt.* 2016).

7. Effects of the proposed amendment

7.1. Anticipated benefits of the amendment

International recognition of the precarious conservation status of these African vulture species by countries which support remaining populations is an important step towards reversing population declines. National protection legislation does not cover vulture species in all relevant countries. The greatest threats facing African vultures are anthropogenic, so can be effectively addressed through government action. It is clear that international cooperation will be an essential ingredient in the recovery and long-term conservation of African vulture species. Most of the key threats thought to be driving declines in vulture populations are shared by many countries in Africa and trans-national conservation measures will be required to successfully tackle these issues (Phipps *et al.* 2013; Casey 2007). A Multi-species Action Plan to Conserve African-Eurasian Vultures (Vulture MsAP) is currently being developed under the framework of CMS, as a broad multi-stakeholder approach to increase and coordinate conservation efforts for these species (Botha *et al*. in prep). Listing Critically Endangered and Endangered African vultures on CMS Appendix I will support the effective implementation of the Vulture MsAP and assist in encouraging range state governments to engage in efforts to reduce threats and work together to restore vulture populations across the continent.

All of the African vulture species included in this proposal are listed on CITES Appendix II. Appendix II species require an export permit or re-export certificate to be traded internationally, but can be imported without an import permit (unless required by national law). Export permits are only granted if the export is not detrimental to species' survival, the species was not obtained illegally, and transportation is conducted appropriately. Authorisation of trade should

only be granted in highly exceptional situations. Listing these species on CMS Appendix I would reinforce the provisions already in place under CITES by prohibiting the taking of these species unless for scientific purposes, for the purpose of enhancing propagation or survival, to accommodate the needs of traditional subsistence users or if extraordinary circumstances so require.

7.2. Potential risks of the amendment

Despite the provisions under CMS Article III to avoid this, listing on Appendix I could unintentionally constrain (or increase the logistical/bureaucratic burden associated with) captive breeding/rearing/rehabilitation or moving vultures and their eggs between countries should this be a necessary conservation action. It could also unintentionally constrain (or increase the logistical/bureaucratic burden associated with) useful research activities such as capture, marking, tracking, health screening and research into impacts of toxic substances on vultures. All of the above activities can and do contribute greatly to increasing our understanding of these species and promoting their conservation. However, given the restrictions on export already in place by virtue of CITES Appendix II listing and the provision under CMS Article III for exceptions to prohibition of taking for scientific or enhanced propagation/survival, the conservation benefits of CMS Appendix I listing are likely to far outweigh the risks. The provision under CMS Article III for potential exception to prohibition of taking to accommodate the needs of traditional subsistence users is a potential risk. In the case of vultures traditional belief based use constitutes a significant threat to African vulture species in many countries of their range and addressing this threat is a key component of the Vulture MsAP. This kind of use is belief based rather than for subsistence and is highly unlikely therefore to meet the requirements for exception to prohibition of taking.

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

A regional agreement under CMS already exists which covers all five species of vulture included in this Listing Proposal. The Memorandum of Understanding on the Conservation of Migratory Birds of Prey in Africa and Eurasia (Raptors MOU) was concluded in 2008. It has so far attracted 57 Signatories (56 countries and the European Union). Kenya signed the Raptors MOU on 22 October 2008.

The proponent is actively engaged in development of the Vulture MsAP which will provide a framework for range states to engage and cooperate on a wide range of key activities to address threats and promote vulture conservation throughout the ranges of all five vulture species included in this Listing Proposal.

8. Range States

Country (*CMS parties)	**Cape Vulture**	**Hooded Vulture**	**Rüppell's Vulture**	**White-backed Vulture**	**White-headed Vulture**
Algeria*	-	-	Resident	-	-
Angola*	Non-breeding	Resident	-	Resident	Non-breeding
Benin	-	Resident	Resident	Resident	Resident
Botswana	Resident	Resident	-	Resident	Breeding
Burkina Faso*	-	Resident	Resident	Resident	Breeding
Burundi*	-	Resident	Resident	Resident	Non-breeding
Cameroon*	-	Resident	Resident	Resident	Resident
Central African Republic	-	Resident	Resident	Resident	Non-breeding
Chad*	-	Resident	Resident	Resident	Resident
Congo	-	-	-	Extinct	-

Country (*CMS parties)	**Cape Vulture**	**Hooded Vulture**	**Rüppell's Vulture**	**White-backed Vulture**	**White-headed Vulture**
(Brazzaville)*					
Côte d'Ivoire*	-	Resident	Resident	Resident	Breeding
Democratic Republic of the Congo, *	Vagrant	Resident	Vagrant	Resident	Breeding
Djibouti*	-	Resident	Resident	-	Breeding
Egypt*	-	-	Vagrant	-	-
Equatorial Guinea*	-	Resident	-	-	-
Eritrea*	-	Resident	Resident	Resident	Non-breeding
Ethiopia*	-	Resident	Resident	Resident	Breeding
Gabon*	-	-	-	-	Non-breeding
Gambia*	-	Resident	Resident	Resident	Breeding
Ghana*	-	Resident	Resident	Resident	Breeding
Guinea*	-	Resident	Resident	Resident	Non-breeding
Guinea-Bissau*	-	Resident	Resident	Resident	Non-breeding
Kenya*	-	Resident	Resident	Resident	Breeding
Lesotho	Resident	-	-	-	-
Liberia*	-	Resident	-	Vagrant	-
Malawi	-	Resident	-	Resident	Breeding
Mali*	-	Resident	Resident	Resident	Breeding
Mauritania*	-	Resident	Resident	Resident	Breeding
Morocco*	-	Vagrant	-	-	-
Mozambique*	Resident	Resident	-	Resident	Non-breeding
Namibia*	Non-breeding	Resident	-	Resident	Breeding
Niger*	-	Resident	Resident	Resident	Breeding
Nigeria*	-	Resident	Resident	Resident	Breeding
Portugal*	-	-	Vagrant	-	-
Rwanda*	-	Resident	Resident	Resident	Breeding
Senegal*	-	Resident	Resident	Resident	Breeding
Sierra Leone	-	Resident	Vagrant	Resident	-
Somalia*	-	Resident	Resident	Resident	Breeding
South Africa*	Resident	Resident	-	Resident	Breeding
South Sudan	-	Resident	Resident	Resident	Resident
Spain*	-	-	Vagrant	-	-
Sudan	-	Unknown	Resident	Unknown	Resident
Swaziland*	Non-breeding	Resident	-	Resident	Breeding
Togo*	-	Resident	Resident	Resident	Non-breeding
Uganda*	-	Resident	Resident	Resident	Breeding
United Republic of Tanzania *	-	Resident	Resident	Resident	Breeding
Zambia	Vagrant	Resident	Vagrant	Resident	Breeding
Zimbabwe*	Non - breeding	Resident	-	Resident	Breeding

-: non present in the country

9. Consultations

This Listing Proposal has been developed in close cooperation with the Coordinating Unit of the CMS Raptors MOU. An earlier draft was reviewed by the Technical Advisory Group of the CMS Raptors MOU and revised in light of the comments received from this group of specialists. At the request of the Government of Kenya, this final version was circulated by the Coordinating Unit to all Range States of the five vulture species covered by the Proposal, in advance of its submission to the CMS Secretariat.

10. Additional remarks

11. References

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