



**CONVENTION ON  
MIGRATORY  
SPECIES**

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Agenda Item 25.1

**PROPOSAL FOR THE INCLUSION OF  
THE CHIMPANZEE (*Pan troglodytes*)  
ON APPENDIX I AND II OF THE CONVENTION**

Summary:

The Governments of Congo and the United Republic of Tanzania have jointly submitted the attached proposal\* for the inclusion of the Chimpanzee (*Pan troglodytes*) on Appendix I and II of CMS.

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

**PROPOSAL FOR THE INCLUSION OF CHIMPANZEE (*Pan troglodytes*)  
ON APPENDICES I AND II OF THE CONVENTION ON THE CONSERVATION OF  
MIGRATORY SPECIES OF WILD ANIMALS**

**A: PROPOSAL**

Inclusion of *Pan troglodytes* in Appendix I and II of the Convention on the Conservation of Migratory Species of Wild Animals.

**B: PROPONENTS:** Congo and the United Republic of Tanzania

**C: SUPPORTING STATEMENT**

**1. Taxonomy**

1.1 Class: Mammalia

1.2 Order: Primates

1.3 Family: Hominidae

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

*Pan troglodytes* (Blumenbach 1775) (Wilson & Reeder 2005)

[Note: *Pan troglodytes* is understood in the sense of Wilson and Reeder (2005), the current reference for terrestrial mammals used by CMS). In the revised taxonomy accepted by the International Union for Conservation of Nature (IUCN) Species Survival Commission (SSC) Primate Specialist Group, four subspecies of chimpanzee are recognised, *P.t.troglodytes* the Central Chimpanzee of the western Congo Basin to Cameroon, *P.t.verus* the Western Chimpanzee of West Africa, *P.t.elliotti* (until 2009 known as *P.t.vellerosus*) the Nigeria-Cameroon Chimpanzee and *P.t.schweinfurthii* the Eastern Chimpanzee of eastern Congo Basin and East Africa.]

1.5 Scientific synonymes : *Simia satyrus* (Linnaeus 1758)

*Simia troglodytes* (Blumenbach 1775, 1799)

*Pan africanus* (Oken 1816)

[For detailed taxonomic history see Groves, 2001; for a full taxonomic hierarchy see [https://www.itis.gov/servlet/SingleRpt/SingleRpt?search\\_topic=TSN&search\\_value=573082#null](https://www.itis.gov/servlet/SingleRpt/SingleRpt?search_topic=TSN&search_value=573082#null) ]

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

English: CHIMPANZEE

French: CHIMPANZÉ

Spanish: CHIMPANCÉ

**2. Overview**

The 2016 IUCN Red List assessment of *Pan troglodytes* (Humble *et al* 2016) maintained the species classification as Endangered, as it has been since 1996. *Pan troglodytes ssp. elliotti* is classified as Endangered (Oates *et al.* 2016), *Pan troglodytes ssp. schweinfurthii* is classified as Endangered (Plumptre *et al.* 2016), *Pan troglodytes ssp. troglodytes* is classified as Endangered (Maisels *et al.* 2016) and *Pan troglodytes ssp. verus* as Critically Endangered (Humble *et al.* 2016a). The authors of the 2016 assessment estimated a likely species-level reduction in chimpanzee numbers for the period 1975-2050 (approximately three chimpanzee generations) to be in excess of 50% across the majority of its range. The threats to chimpanzees identified by the authors of the Red List assessment and chimpanzee Range States include habitat loss and conversion (in particular associated with expansion of industrial

agriculture), hunting for bushmeat, for traditional medicine and for the capture of live infants for the illegal wildlife trade; chimpanzees are also susceptible to outbreaks of disease, such as anthrax (Leendertz *et al.*, 2004), polio (Goodall, 1986) and especially Ebola virus disease (Walsh *et al.* 2005).

Chimpanzees are losing their habitat faster in the western and eastern parts of their historic range than in central Africa. Fragmentation of habitat has left scattered patches of forest in both West and East Africa, some with chimpanzee populations numbering in the low thousands, others down to a few hundred. Even small areas of forest are in some instances divided by international boundaries, and therefore need transboundary collaboration in their conservation.

Members of the species frequently and predictably cross national jurisdictional boundaries and, for similar reasons that both gorilla species were added to Appendix I and II of the Convention on the Conservation of Migratory Species of Wild Animals (CMS), there is a case for listing chimpanzees. Given that gorillas are sympatric with chimpanzees in 10 of the 21 chimpanzee Range States, the actions taken under the Gorilla Agreement are also likely to benefit chimpanzees in those areas. Listing *Pan troglodytes* on Appendix I would encourage additional collaborative conservation action in the other 11 range states as well as in the 10 covered by the Gorilla Agreement.

Participants at the First Intergovernmental Meeting on Great Apes organised by the UNEP/UNESCO Great Apes Survival Partnership (GRASP, 2005) recognized the need for transboundary cooperation and management systems in light of the high number of transboundary populations of great apes. The resulting Kinshasa Declaration on Great Apes (signatories to which include 17 of the 21 chimpanzee range states and other GRASP partners) made explicit reference to the role of the Convention on Migratory Species (CMS). In its first operative clause, the Kinshasa Declaration affirmed the Signatories' commitment to the Global Strategy for the Survival of Great Apes and their Habitat, which included trans-boundary cooperation in section 4.1.13:

“Liaising with, and developing cooperative efforts between, range States, in particular where:

- (i) Areas of ape habitat are contiguous with similar areas in neighbouring countries, where transboundary natural resource management conservation agreements can be implemented, for example within the framework of the Convention on the Conservation of Migratory Species;”

The species therefore qualifies for an Appendix I listing on CMS by virtue of being a migratory species which has an unfavourable conservation status and which requires increased international cooperation for its conservation and management, and the effective implementation of existing regional conservation strategies. The species would also benefit from an Appendix II listing to improve collaboration between the Range States by means of an agreement or implementation of existing regional action plans.

### 3. Migrations

#### 3.1 Kinds of movement, distance, the cyclical and predicible nature of the migration

The Convention defines “migratory species” as *the entire population or any geographically separate part of the population of any species or lower taxon of wild animals, a significant proportion of whose members cyclically and predictably cross one or more national jurisdictional boundaries* (CMS Article I (1)). Chimpanzees live in communities of about 35 individuals (up to 150) with a social system known as ‘fission-fusion’, where individuals and families meet and separate while feeding and socialising during the day. These communities move around a home range of 6.8 to 32km<sup>2</sup> in forest habitat and more than 65 km<sup>2</sup> in savannah woodlands of Senegal (Humble *et al.* 2013) with travel being influenced by seasonally fruiting trees and other resources. Individual chimpanzees on average travel 2-3 km per day, occasionally moving 10 km or more in one day. Consequently, in home ranges that straddle an international boundary, chimpanzees move freely across those borders wherever

neighbouring countries share trans-boundary contiguous habitat. Chimpanzee distribution maps show that this is the case for virtually every range state (Caldecott and Miles, eds. 2005), meaning that *trends in one country can impact the viability of the overall population, thus affecting conservation success in other countries*. Most of the study sites where research into chimpanzee ecology has been conducted happen to be situated away from international boundaries, and so direct observations of such trans-boundary migrations are limited. Nevertheless, observations of the movement of chimpanzees in long-term study sites provide a strong basis for concluding such movements must cross international boundaries where these boundaries pass through chimpanzee habitat.

For one former range state, Burkina Faso, this proposal comes too late. Chimpanzees were reported by Teleki and Baldwin (1979) to be still “migrating into Burkina Faso during the rainy season in the south-western part of the country near the border with Côte D’Ivoire” (Lee *et al.* 1988 and Brownell, 2003). Surveys in 2012 concluded that this has not occurred for a decade or more (Ginn *et al.* 2013). The catastrophic 90 per cent decline in chimpanzee numbers in Côte D’Ivoire (Campbell *et al.* 2008) suggests that this particular trans-boundary migration is unlikely to resume.

#### *Life cycles*

Chimpanzees are a long-lived species, thought to live for up to 50 years in the wild (and up to 60 or more in captivity). Dispersal (movement of individuals away from their birth site) is important for exogamy (gene flow to prevent in-breeding) and so is important for conservation biology as ecosystems become more fragmented. Female chimpanzees generally disperse from their natal group when they reach sexual maturity at around 7-8 years of age (Humble *et al.* 2013), which in trans-boundary populations may be to a neighbouring country. Male chimpanzees typically remain in their natal community, and once fully mature at around 15 years of age, join the gangs of males that patrol the edges of their community’s territory (Humble *et al.* 2013). In those territories that straddle an international boundary, these patrols can be considered migrations under the definition of CMS.

#### *Annual cycles*

Chimpanzees have the capacity to know thousands of individual fruit trees or other preferred food sources and carry a mental map of their location and time of fruiting (Humble *et al.* 2013). Their movements around their home range over the course of the year will, therefore, be driven by knowledge of where and when certain foods are available within their community’s home range. Where an international boundary divides community home ranges, this will lead to seasonal migration between neighbouring range states.

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

The following countries share contiguous habitat containing chimpanzee populations that are suspected to cross their national jurisdictional boundaries cyclically and predictably (based on distribution maps in Caldecott and Miles, 2005):

- Angola shares a chimpanzee population with Congo and the Democratic Republic of the Congo (DRC);
- Burundi shares chimpanzee populations with Rwanda and (at least until recently) Tanzania and DRC;
- Cameroon shares chimpanzee populations with Nigeria, Equatorial Guinea, Gabon, Congo and Central African Republic;
- Central African Republic also shares a chimpanzee population with Congo and South Sudan;
- Congo also shares a chimpanzee population with Gabon;
- Democratic Republic of the Congo also shares chimpanzee populations with South Sudan and Uganda;
- Equatorial Guinea also shares a chimpanzee population with Gabon;
- Guinea shares populations with Guinea Bissau, Senegal, Mali, Sierra Leone, Liberia and Côte D’Ivoire;
- Côte D’Ivoire also shares chimpanzee populations with Ghana and Liberia;

- Liberia also shares a chimpanzee population with Sierra Leone;
- South Sudan may still share a chimpanzee population with Uganda.

Therefore, a significant proportion of the continental chimpanzee population regularly crosses transnational borders and is therefore “migratory” under the terms of the CMS, meaning collaboration between neighbouring governments and communities for the preservation and continuity of habitat is essential. The fact that most chimpanzee research has been conducted away from national borders means that few direct observations of border crossings have been published. Where an international border happens to coincide with the forest edge, crop-raiding by animals from the forest presents clear evidence for trans-boundary migration. In the Madiakoko Mountains of Bas-Congo, DRC, for example, farmers report that gorillas and chimpanzees cross from Cabinda, Angola, into DRC to raid crops during the dry season when fruit is sparse in the forest (Redmond, 2006).

The Mondika research centre in northern Congo, near the border with the Central African Republic has recorded at least one community of chimpanzees moving back and forth across the border (Breuer, pers.comm.).

Given the transboundary nature of a proportion of chimpanzee communities, increasing threats to their survival, and the effect that different levels of conservation efforts in one country can have on populations in another, there is a critical need for improved cross-border protection for this species. Some prominent examples of existing transnational efforts (from the IUCN Regional Action plans listed in section 6.3, below) that have endeavoured to bring range states together in collaboration toward improved chimpanzee conservation include:

- Fouta Djallon of Guinea and Guinea Bissau (estimated 3,300 Western chimpanzees);
- Taí-Grebo-Sapo-Cestos of Côte d’Ivoire and Liberia (estimated 8,000 Western chimpanzees);
- Manding Plateau, including Niokola Koba National Park in Senegal, Bafing Biosphere Reserve in Mali and parts of northern Guinea (estimated 1,500 Western chimpanzees);
- Nimba Mountains of Guinea, Cote d’Ivoire and Liberia (estimated 450 Western chimpanzees);
- Outamba-Kilimi National Park of Sierra Leone and Guinea Border (estimated 600-700 Western chimpanzees)
- Western Ghana-Eastern Cote d’Ivoire (estimated 600-700 Western chimpanzees);
- Gashaka Mambilla of Nigeria and Cameroon (estimated 1,750 *P.t.elliotti* chimpanzees);
- Takamanda-Okwango of Cameroon and Nigeria (estimated >500 *P.t.elliotti* chimpanzees);
- Oban-Korup of Nigeria and Cameroon (estimated 800 *P.t.elliotti* chimpanzees);
- Sangha Trinational complex, consisting of Nouabalé-Ndoki National Park in Congo, Lobéké National Park in Cameroon and Dzanga-Ndoki National Park in Central African Republic (exceptionally important population of Central chimpanzees);
- Rio Campo/Campo Ma’an complex of Equatorial Guinea and Cameroon (important population of Central chimpanzees);
- Conkouati/Mayumba complex of Congo and Gabon (important population of Central chimpanzees);
- Maiombe Forest Transboundary Initiative of Congo, Angola (Cabinda) and DRC (priority area to be surveyed for Central chimpanzees);
- Nyungwe National Park of Rwanda and Kibira National Park of Burundi (estimated 500-1,000 Eastern chimpanzees);
- Ruwenzori-Semuliki-Hoyo of DRC and Uganda (estimated 500-1,000 Eastern chimpanzees).

#### **4. Biological data (other than migration)**

##### **4.1 Distribution (current and historical)**

- Chimpanzees were once found in across Africa, in the belt of rainforest and savannah woodland that stretched unbroken from Senegal to Tanzania. They inhabited a variety

of habitats, which included dry, rocky woodland in the Sahel to dense humid rainforest in the Congo Basin.

- Today chimpanzees survive in remnant patches of forest surrounded by agricultural landscapes in West and East Africa, and in the (as yet) less fragmented Congo Basin forest north, east and west of the curve of the River Congo.
- In sub-Saharan Africa, scattered subpopulations now occur in Angola, Cameroon, the Central African Republic, the Democratic Republic of the Congo, Nigeria, Rwanda, Senegal, South Sudan, United Republic of Tanzania and Uganda. Certain areas are classified as “possibly extinct” due to absence of recent data to confirm presence of chimpanzees.

According to the latest IUCN assessment, the extant chimpanzee range is 2.6 million km<sup>2</sup>, making the species the most widespread of the great apes, but facing increasing pressure from hunting, habitat degradation and conversion to agriculture across its range. Sometimes the presence of chimpanzee nests can be misleading; the behaviour of chimpanzees under pressure from hunting and human disturbance has been observed to change. Instead of exuberant calls when feeding or contacting distant neighbours, which make them easy for hunters to find, furtive individuals “are likely to remain silent and may survive in heavily disturbed habitat. The presence of such relic populations can easily give the illusion of “populations” of chimpanzees still remaining in an area.” (Gagneux, 1997) but these few long-lived, wary individuals do not amount to a viable population.

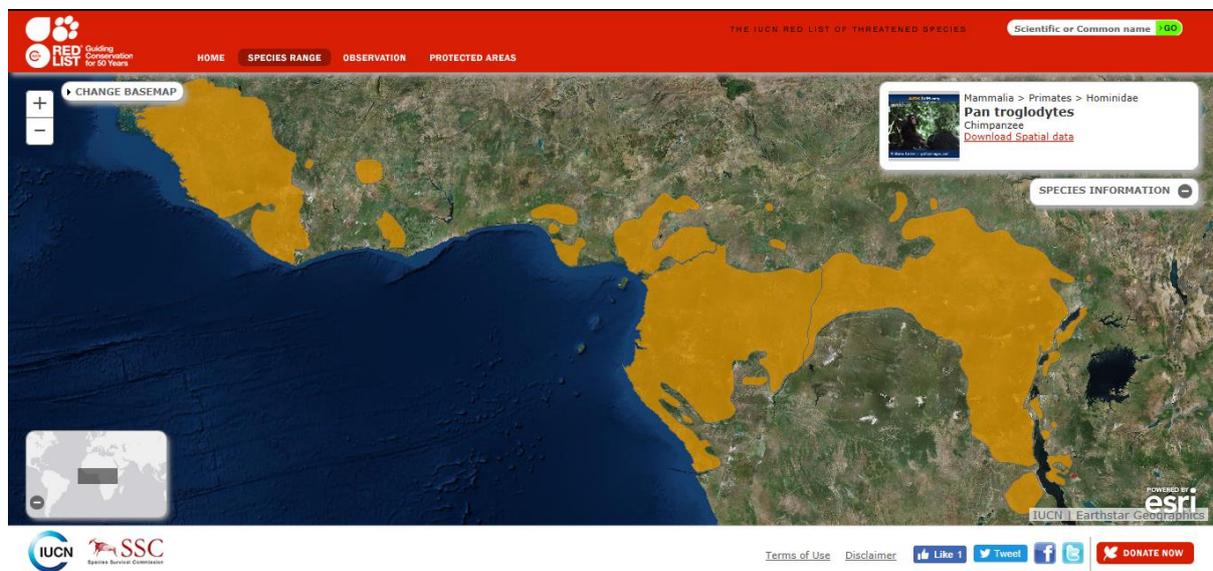


Figure 1: Current range of *Pan troglodytes*.

#### 4.2 Population (estimates and trends)

The 2016 IUCN *Pan troglodytes* Red List assessment cited the continental estimate compiled by Butynski (2003) as between 172,700 and 299,700. The wide confidence limits are indicative of the difficulty in counting elusive chimpanzees in remote forests and woodland, but between 2003 and 2016 more surveys were carried out and previously uncounted populations were added to the total. The 2016 estimate for each sub-species is:

*Pan troglodytes* ssp. *elliotti*: 6,000 – 9,000 and decreasing (Oates *et al.* 2016),  
*Pan troglodytes* ssp. *schweinfurthii*: 181,000 – 256,000 and decreasing (Plumptre *et al.* 2016),  
*Pan troglodytes* ssp. *troglodytes*: 140,000 and decreasing (Maisels *et al.* 2016),  
*Pan troglodytes* ssp. *verus*: 18,000 – 65,000 and decreasing (Humble *et al.* 2016a).

This puts the 2016 continental total at somewhere between 345,000 and 470,000. It must be stressed that these figures do not represent an increase in the chimpanzee population since 2003 but a correction to previous under-estimated figures now known to be based on insufficient data. The key fact is that all populations are reported to be decreasing.

#### 4.3 Habitat (short description and trends)

Chimpanzees are the most adaptable non-human great ape, being found in a wide variety of habitats from sea-level up to an altitude of 2,790 m. These include “mature, moist closed-canopy lowland, sub-montane, montane, secondary, swamp and gallery forests. They inhabit dry forest, and savannah-woodland mosaic habitats in the drier extremes of their distribution.” (Humble *et al.* 2013)

#### 4.4 Biological characteristics

Chimpanzees are – along with the closely related bonobos *Pan paniscus* – our closest living relatives in the animal kingdom, sharing 98.76 per cent of their DNA with humans (Chen and Li, 2001). They are sexually dimorphic – males weigh 28-70kg, females 20-50kg – and live in a complex multi-generational society where knowledge and traditions are passed down to new generations during a long period of maternal dependency. They are mostly quadrupedal, walking on the soles of their feet and knuckles of their hands when on the ground, and climb well to feed and nest in the canopy (Goodall, 1986; Humble *et al.* 2013). The long generation time of 25 years, and the fact that females give birth to a single infant (rarely twins) makes them particularly vulnerable to high levels of mortality, whether due to hunting or disease, because recovery from population decline is very slow.

#### 4.5 Role of the taxon in its ecosystem

Great apes are considered keystone species in their ecosystems. Chimpanzees are omnivores and prey on monkeys, duiker and other small animals. Fruit makes up about 50 per cent of their diet. As large-bodied frugivores, they disperse the seeds of a wide range of trees, vines and other plants over considerable distances. They build nests in trees, the building of which creates light gaps in the canopy, beneath which seeds in their dung germinate. The importance of their seed dispersal has led ecologists to refer to apes as ‘gardeners of the forest’ (Redmond, 2008).

The chimpanzee is therefore critical to ecosystem stability in the species’ natural habitat. Further declines or loss of this important seed dispersal agent would have widespread impacts on the ecology of forests and woodlands throughout its range, which in turn would impact on climate stability both locally and globally.

### 5. Conservation status and threats

#### 5.1 IUCN Red List Assessment

The 2016 IUCN Red List assessment of *Pan troglodytes* maintained its categorisation of Endangered which has been consistently applied to the species since 1996 (Humble *et al.* 2016). The species is therefore considered to be facing a high risk of extinction in the wild (IUCN 2012). This categorisation has been arrived at on the basis that the species fulfils the IUCN Red List criteria for Endangered A4bcde, i.e. an observed, estimated, inferred or suspected population size reduction of  $\geq 50\%$  over the last 10 years or three generations, whichever is the longer, where the reduction or its causes may not have ceased OR may not be understood OR may not be reversible, based on: (b) an index of abundance appropriate to the taxon; (c) a decline in area of occupancy, extent of occurrence and/or quality of habitat; (d) actual or potential levels of exploitation; and (e) the effects of introduced taxa, hybridization, pathogens, pollutants, competitors or parasites. (IUCN 2012).

The 2016 IUCN Red List assessment concluded that the chimpanzee population is inferred to face a reduction of approximately 50% over 75 years (approximately three chimpanzee generations, 1975-2050) (Humble *et al.* 2016). The inferred decline was based on the likelihood of hunting and habitat loss continuing in the coming decades.

The authors estimated extant chimpanzee range at 2.6 million km<sup>2</sup> and decreasing.

The 2016 Red List assessment recognises that chimpanzees have been recently extirpated in three countries, Benin, Burkina Faso and Togo (Humble *et al.* 2016) and unconfirmed reports

indicate that within living memory the species was once found, but is now extinct, in Gambia and northern Zambia around the southern tip of Lake Tanganyika (Redmond, 2005).

In addition to the Red List categorisation for the species as a whole, the IUCN has categorised *Pan troglodytes ssp. verus* as Critically Endangered (Humble *et al.* 2016a).

## 5.2 Equivalent information relevant to conservation status assessment

The State of the Apes is a series of publications by the Arcus Foundation highlighting the impact of human activities on apes. The first, Extractive Industries and Ape Conservation (Rainer *et al.* 2014) gives a detailed account of how industrial logging, mining, oil and gas industries affect apes and their habitat. The second, Industrial Agriculture and Ape Conservation (Rainer *et al.* 2015) covers the impact of the rapid expansion of plantations (especially palm-oil, wood pulp) which result in the destruction of ape habitat. These publications provide up to date information for policy-makers and industry leaders, but carry the clear message that in most instances ape numbers suffer catastrophic declines when industrial activities arrive in their habitat. The impact is both direct, due to conversion and fragmentation of habitat to plantations and mines, and indirect because “previously unexploited regions can be opened up to hunters by the extensive road networks and other infrastructure developed by extractive industries.”

A series of Rapid Response Assessment reports by the UN GRASP Project summarise threats to chimpanzees and other apes; those of particular relevance to chimpanzees include Stolen Apes – The Illicit Trade in Chimpanzees, Gorillas, Bonobos and Orangutans (Stiles *et al.* 2013), The Last Stand of the Gorilla – Environmental Crime and Conflict in the Congo Basin (Nelleman *et al.* 2010), Palm Oil Paradox: Sustainable Solutions to Save the Great Apes (Ancrenaz *et al.* 2016) and a public information document Ebola & Great Apes (GRASP, 2016).

## 5.3 Threats to the population (factors, intensity)

Three main threats are identified in the 2016 Red List assessment (Humble *et al.* 2016): 1. Poaching, 2. Habitat loss and degradation, 3. Disease.

### 1. Poaching.

It is illegal to hunt chimpanzees in all the 21 Range States, so by definition hunting them is poaching whether inside or outside a protected area. Hunting of chimpanzees has, however, a long history among some tribal cultures in Africa, while others have an equally long tradition of respecting chimpanzees as forest neighbours because of their similarity to humans, or because of a traditional taboo against eating apes. Alarm at the growing scale of hunting – particularly associated with the expansion of industrial logging – began to become widespread during the 1990s (Kano and Asato, 1994; WSPA, 1996; Ape Alliance, 1998).

Despite the efforts of law enforcement agencies in the 21 chimpanzee Range States and the support of many donor countries, NGOs and IGOs, hunting still presents a serious threat (e.g. Redmond *et al.* 2006; Hicks *et al.* 2010) and is responsible for many of the reported declines - in some countries, even in supposedly protected areas.

As well as intended hunting of chimpanzees, snares set for antelope and bushpig also kill and maim indiscriminately many other species, including chimpanzees (Quiatt *et al.* 2002).

Poverty is recognised as a key factor in the decline of great ape populations and many conservation efforts take this into account by working to provide alternative livelihoods to hunting and unsustainable use of resources in ape habitat (Sandbrook and Roe, 2010).

### 2. Habitat loss and degradation

The 2016 IUCN Red List assessment concluded that chimpanzee habitat has four categories of threat (Humble *et al.* 2016):

- a. Subsistence/slash and burn agriculture; conversion of forest to farms is most advanced in West and East Africa, where much chimpanzee habitat is reduced to surviving pockets of forest. More than 80 per cent of West Africa's forest had been lost by the beginning of the 21<sup>st</sup> century (Kormos *et al.* 2003).
- b. Extractive industries (logging, mining and oil); as well as the direct damage, degradation and fragmentation of habitat caused by these industries, workers in logging camps and mines increase the demand for bushmeat and have the money to buy it, attracting commercial hunters to meet the demand (Ape Alliance, 1998; Hicks *et al.* 2010; Rainer *et al.* 2014).
- c. Industrial agriculture (rubber, cocoa, plantation forestry and increasingly oil palm plantations); the decline in orangutan numbers in recent decades is largely attributed to expansion of oil palm and wood-pulp plantations; as available land in S.E. Asia for further expansion is limited, many companies are turning to Africa (where the oil palm originated). This has led to fears that chimpanzee habitat will face similar pressures (Wich *et al.* 2014) – and indeed forest clearance for new plantations is already under way in a number of chimpanzee range states (Rainer *et al.* 2015).
- d. Major transportation infrastructure; new roads and railways are seen as key to Africa's development, particularly in conjunction with extractive industries. In 2002, the GRASP report *Great Apes: the Road Ahead* used a computer model to plot infrastructural development in previous decades and run it forward to 2030. The prediction was that by 2030 only 10 per cent of great ape habitat in Africa would be free from human impact associated with infrastructure. The rate of building roads and railways suggests that this will be the case unless strong conservation measures are enacted. Fragmentation of previously intact forest blocks will lead to increases in poaching and clearance for agriculture (Laurance *et al.* 2015).

### 3. Disease.

Chimpanzees suffer from a range of tropical diseases, many of them the same or closely related to those that afflict humans, e.g. malaria. The most significant in terms of threats to the species is Ebola Virus Disease (EVD), which has a high mortality rate and can spread rapidly through a population. In northeast Gabon and northwest Congo EVD caused a series of massive die-offs of gorillas and chimpanzees (Walsh *et al.* 2003; Maisels *et al.* 2004, 2013).

Anthrax was identified as being responsible for “an unusually high number of sudden deaths observed over nine months in three communities of wild chimpanzees (*Pan troglodytes verus*) in the Tai National Park, Ivory Coast.” (Leendertz *et al.*, 2004).

A new disease threat is that posed by the risk of infection in habituated groups visited by tourists and researchers. Strict rules are applied to minimise this risk, but cases of respiratory disease and anthrax have caused deaths in several habituated chimpanzees (Gilardi *et al.* 2015).

#### 5.4 Threats connected especially with migrations

One potential threat connected with migration is the possibility that chimpanzees habituated to researchers or tourists in one country might cross an international border to be faced with poachers or farmers unused to apes who do not flee, who might kill them. This hypothetical situation has not been reported to have occurred.

#### 5.5 National and international utilization

##### *Trade in chimpanzee meat, bones and other parts and products*

Chimpanzee bushmeat was found to constitute 1-3 per cent of bushmeat on sale in urban markets in Côte D'Ivoire (Caspary *et al.* 2001) and was associated with unregulated artisanal mining in northern DRC (Hicks *et al.* 2010). See also 5.3.1, above.

Traditional African medicine attributes properties to the meat or burnt and powdered bones of apes – gorilla is prescribed to give strength, chimpanzee is prescribed to give intelligence and

cunning. As a result, chimpanzee skulls, mummified heads, hands and other body parts are often seen openly for sale in traditional medicine markets across West and Central Africa (Redmond, 1989, Stiles *et al.* 2013). According to the UN-GRASP Ape Seizures Database, the seizure of great ape skulls and body parts remains high; in 2015 there were 69 chimpanzee skulls seized, and 33 seized in 2016 (GRASP 2017).

#### *Trade in chimpanzee infants*

Often seen as a by-product of killing chimpanzees for meat (Humble *et al.* 2016), infant chimpanzees are reported by some investigators to be captured on demand when organised criminal gangs of illegal wildlife traders receive an order (Ammann, 2011, Haslett, 2015, Stiles, 2017). The recent reports by BBC News illustrate the level of sophistication in the illegal trade in chimpanzees (Shukman and Piranty, 2017). According to the UN-GRASP Ape Seizures Database (GRASP 2017), the seizure numbers for chimpanzees from 2014-16 are: in 2014 (23), in 2015 (22) and in 2016 (22). These seizures occurred in 15 different countries, including range States (Sierra Leone, Guinea, Cameroon, DRC, Congo, Cote d'Ivoire, Liberia, Rwanda and Gabon) and also non-range States (Qatar, Spain, Egypt, Lebanon and India).

## 6. Protection status and species management

### 6.1 National protection status

Regarding national legislation, there are 21 countries in the 2016 Red List assessment that currently have native populations of chimpanzees (Humble *et al.* 2016); the species is legally protected in all of them but enforcement levels vary considerably across the species range.

### 6.2 International protection status

Chimpanzees *Pan troglodytes* have been listed on Appendix I of CITES since the Convention came into force in 1975. At the 13<sup>th</sup> Conference of the Parties to CITES in 2004, Resolution Conf. 13.4 Conservation of and trade in great apes was passed in response to the role of trade in the decline in great apes. Reports of chimpanzees in trade suggest that the problem persists (Stiles *et al.* 2013, Shukman and Piranty, 2017).

Beyond CITES, few international legal instruments protect chimpanzees. World Heritage Sites provide additional funding for some protected areas that include chimpanzee habitat but not one legally binding agreement calls for habitat protection and restoration in the manner supported by CMS. The non-legally binding Kinshasa Agreement on Great Apes calls for such measures, and listing chimpanzees on Appendix I and II of CMS would help the Parties achieve their stated aim.

### 6.3 Management measures

At the national level, the UN-GRASP has assisted several countries to develop National Great Ape Survival Plans, most of which have been adopted as government policy, though few have achieved full implementation.

In addition to National Biodiversity Strategy and Action Plans prepared under the Convention on Biological Diversity, which perforce must include chimpanzees and their habitat, five chimpanzee range states have published National Great Apes Survival Plans with assistance from UN-GRASP:

- a.  Cameroon [[Français](#)]
- b.  Congo [[English](#)] [[Français](#)]
- c.  Democratic Republic of the Congo [[English](#)] [[Français](#)]
- d.  Guinea [[Français](#)]
- e.  Rwanda [[English](#)] [[Français](#)]

The work of formulating Regional Action Plans (plus activities in Tanzania) has been led by the IUCN SSC Primate Specialist Group's Section on Great Apes leading to the publication of a set of IUCN Regional Action Plans and conservation strategies. These include:

Regional Action Plan for Western Chimpanzees (2003)  
 Western Chimpanzee: Status Survey and Action Plan (2003)  
 Regional Action Plan for Chimpanzees and Gorillas in Western Equatorial Africa (2005)  
 Eastern Chimpanzee: Status Survey and Action Plan 2010-2020  
 Regional Action Plan for the Conservation of the Nigeria-Cameroon Chimpanzee (2011)  
 Chimpanzee Conservation Action Plan for Tanzania (2012) Workshop Report  
 Western Chimpanzee PHVA for Sierra Leone (2012)  
 Grauer's Gorillas and Eastern Chimpanzees (2012)  
 Revised Regional Action Plan for the Conservation of the Cross River Gorilla (2014)  
 Regional Action Plan for Western Lowland Gorillas and Central Chimpanzees 2015–2025  
 Chimpanzee Conservation Action Plan for Gombe-Mahale Ecosystem Tanzania (2015)

#### 6.4 Habitat conservation

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

**Table 1:** Percent of total land area in terrestrial protected areas

Country Name	Terrestrial protected areas (% of total land area) 1990	Terrestrial protected areas (% of total land area) 2000	Terrestrial protected areas (% of total land area) 2014
Angola	6.97	6.97	6.98
Benin	23.81	25.01	28.07
Burkina Faso	13.96	14.13	15.47
Burundi	3.84	4.85	6.89
Cameroon	5.88	7.64	10.86
Central African Republic	17.65	17.9	18.09
Congo	1.68	5.25	35.24
Dem. Rep. of the Congo	10.11	10.18	12.08
Equatorial Guinea	7.19	19.21	25.04
Gabon	5.36	6.43	20.49
Ghana	14.62	15.05	15.05
Guinea	6.79	7.24	29.2
Guinea-Bissau	8.32	16.11	16.37
Côte D'Ivoire	22.62	22.69	22.9
Liberia	1.63	1.63	2.51
Mali	3.82	3.82	8.38
Nigeria	11.57	12.91	14.18
Rwanda	8.78	8.78	9.43
Senegal	25.18	25.19	25.2
South Sudan	12.83	12.83	20.8
Tanzania	27.01	28.29	32.02
Togo	11.12	11.41	25.04
Uganda	12.27	12.95	16

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

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

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

#### 6.5 Population monitoring

Chimpanzees are difficult to count, especially where they are hunted and so flee from human observers. Except in research and tourism sites, where they become habituated and named individuals are monitored regularly, population estimates are based on nest counts along line transects (Plumptre, 2000). Except for infants who share their mother's nest, each chimpanzee builds a new nest every night. The rate of nest decay (observed or estimated) is then used to calculate the number of chimpanzees necessary to result in the number of nests counted. In areas where chimpanzees are sympatric with gorillas, it can be difficult to be certain which species of ape is responsible for a nest without DNA testing of faeces (Sanz, *et al.*, 2007).

In summary, while great ape monitoring efforts are improving there is still much that must be done to ensure reliable surveying takes place throughout the chimpanzee's decreasing range.

### 7. Effects of the proposed amendment

#### 7.1 Anticipated benefits of the amendment

This proposal shows that while many efforts are under way to protect Africa's chimpanzees, the numbers continue to fall and there is still much work to be done to conserve the species. Listing chimpanzees under Appendix I of CMS would enhance the work already being undertaken by stimulating collaboration between countries sharing trans-boundary populations.

The classification of the species as Endangered by the 2016 IUCN assessment, and the classification of *Pan troglodytes verus* (West Africa Chimpanzee) as Critically Endangered, also reminds us that without an increase in conservation effort, the species faces extinction across most if not all of its range in the coming decades (Humlé *et al.* 2016).

#### 7.2 Potential risks of the amendment

No risks have been identified.

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

The example set by the Gorilla Agreement (involving 10 range states) could lead to a Chimpanzee Agreement (involving 21 range State, 10 of which are also gorilla range States), but consideration should be given to the idea of enlarging the scope of the Gorilla Agreement to include chimpanzees, and re-naming it the 'African Apes Agreement'. This could bring a legally binding treaty to bear on the implementation of existing national and regional action plans. Alternatively, the parties could urge the adoption and implementation of the IUCN Regional Action Plans listed in section 6.3, above.

### 8. Range States

The 2016 IUCN Red List assessment listed the following national status of *Pan troglodytes* (Humlé *et al.* 2016):

#### *Native:*

Angola (Cabinda only); Benin; Burkina Faso; Burundi; Cameroon; Central African Republic; Congo, Côte D'Ivoire, Democratic Republic of the Congo; Equatorial Guinea (mainland); Gabon; Ghana; Guinea; Guinea-Bissau; Liberia; Mali; Nigeria; Rwanda; Senegal; South Sudan; Togo; Uganda; United Republic of Tanzania.

#### *Possibly extinct:*

Benin; Burkina Faso; Togo.

**Note** - chimpanzees have been reported within living memory in Gambia (Carter, 2003) and Zambia but their historic presence has not been unequivocally confirmed (Redmond, 2005). Brownell (2003) described their historical presence in Togo, Benin and Burkina Faso. Surveys in southern Burkina Faso in 2012 led to the conclusion that the species has been extirpated there in recent decades (Ginn *et al.* 2013) and given that chimpanzee numbers in Côte D'Ivoire have declined by 90 per cent over the past two decades (Campbell *et al.* 2008), it seems unlikely that migration will resume.

## 9. Consultations

A draft proposal was circulated to the 21 Range States and three former Range States listed in section 8.

The following Parties indicated preliminary support for the proposal, though it should be noted that these are not necessarily final positions and no decision needs to be made until the subject has been fully discussed by the Scientific Council and the Conference of the Parties: Equatorial Guinea; Ghana; Guinea Bissau; Mali; Nigeria; Togo.

Parties that have responded without an indication of their position include Angola, Democratic Republic of the Congo and Uganda.

**Note:** Parties are able to express their views in writing after submission of the proposal until 60 days before the 12<sup>th</sup> meeting of the Conference of the Parties if they wish, and their comments will be compiled and included in the COP12 documentation.

## 10. Additional remarks

At a meeting of UN-GRASP's Europe-based partners in London on 23<sup>rd</sup> May 2017, views were exchanged on the level of infrastructural development across Africa (predicted in the GRASP 2002 Globio Report), the multi-billion dollar investments of the extractive industries, the rising demand for natural resources worldwide (of which Africa has a significant and largely untapped share) coupled with a growing human population in search of a better quality of life. Without a significant change in how the world deals with the resulting pressures on chimpanzee habitat, coupled with better enforcement of the laws protecting the species, many fear that chimpanzees (and many other species) will be extirpated from most of their range in the coming decades.

If we are not to be the generation that is responsible for the extinction of our zoological next of kin, there is an urgent need for a significant increase in conservation effort by all Range States, as well as concerted, collaborative action between Range States and other Parties, along with other UN-GRASP partners, to protect chimpanzees and their habitat. This proposal, and the measures arising from it if passed, can provide a framework for such action.

## 11. REFERENCES

- Ammann, K. 2011 The Cairo Connection Part II Ape Trafficking. With Pax Animalis, available from <http://www.karlamann.com/pdf/cairo-connection-2.pdf>
- Ancrenaz, M., E. Meijaard, S. Wich, J. Simery. 2016. Palm Oil Paradox: Sustainable Solutions to Save the Great Apes. 2nd edition. UNEP / GRASP.
- Ape Alliance 1998. The African Bushmeat Trade – A Recipe for Extinction. Available from [www.4apes.com/working-groups/bushmeat](http://www.4apes.com/working-groups/bushmeat)
- Brownell, A. 2003 Togo, Benin and Burkina Faso, in: Kormos, R., Boesch, C., Bakarr, M.I. and Butynski, T. (eds.) 2003 *West African Chimpanzees. Status Survey and Conservation Action Plan*. IUCN/SSC Primate Specialist Group. IUCN, Gland, Switzerland and Cambridge, UK.
- Butynski, T.M. 2003. The robust chimpanzee *Pan troglodytes*: Taxonomy, distribution, abundance, and conservation status. In: R. Kormos, C. Boesch, M.I. Bakarr, T.M. Butynski (eds). *West African Chimpanzees, Status Survey and Conservation Action Plan*, pp. 5-12. IUCN/SSC Primate Specialist Group, Gland, Switzerland and Cambridge, UK.
- Campbell, Geneviève , Hjalmar Kuehl, Paul N'Goran Kouamé and Christophe Boesch, 2008 Alarming

- decline of West African chimpanzees in Côte d'Ivoire. *Current Biology* 18 (19): pR903–R904
- Caspary, H.-U., Koné, I., Prouot, C., & de Pauw, M. 2001. La chasse et la filière viande de brousse dans l'espace Taï, Côte d'Ivoire. *Tropenbos - Côte d'Ivoire Série 2*.
- Chen, F.C. & Li, W.H. 2001. Genomic divergences between humans and other hominoids and the effective population size of the common ancestor of humans and chimpanzees. *American Journal of Human Genetics* 68: 444–456.
- Gagneux, Pascal 1997. Sampling Rapidly Dwindling Chimpanzee Populations. *Pan Africa News*, 4(2): 12-15.
- Gilardi, K.V., Gillespie, T.R., Leendertz, F.H., Macfie, E.J., Travis, D.A., Whittier, C.A. and Williamson, E.A. 2015. *Best Practice Guidelines for Health Monitoring and Disease Control in Great Ape Populations*. IUCN SSC Primate Specialist Group, Gland, Switzerland.
- Ginn, L. P., J. Robison, I. Redmond and K. A. I. Nekaris 2013 Strong evidence that the West African chimpanzee is extirpated from Burkina Faso. *Oryx* 47: 325–326.
- Goodall, Jane. 1986 *The Chimpanzees of Gombe: Patterns of Behaviour*. Belknap Press.
- GRASP 2002 Great Apes: the Road Ahead. A Globio report, available from <http://www.globio.info/downloads/249/Great+Apes++The+Road+Ahead.pdf>
- GRASP 2005 The Report of the First Intergovernmental Meeting on Great Apes and the Great Apes Survival Project (GRASP) and the First Meeting of the GRASP Council, Kinshasa, 5-9 September 2005. UN, UNEP and UNESCO.
- GRASP 2016 Ebola & Great Apes. [www.UN-GRASP.org](http://www.UN-GRASP.org)
- GRASP 2017 The Apes Seizure Database <https://database.un-grasp.org/>
- Groves, Colin P. 2001 *Primate taxonomy*. Smithsonian Institution Press, Washington and London.
- Haslett, C. 2015 CLICK TO LIKE THIS: IS INSTAGRAM A HUB FOR ILLEGAL APE DEALS? Available from <http://www.karlamann.com/pdf/online-ape-trade.pdf>
- Hicks, T.C., Darby, L., Hart, J., Swinkels, J., January, N. and Menken, S. 2010 Trade in Orphans and Bushmeat Threatens One of The Democratic Republic of the Congo's Most Important Populations of Eastern Chimpanzees (*Pan troglodytes schweinfurthii*). *African Primates* 7 (1): 1-18
- Humle, T., Williamson, E.A. and Richardson, M.C. 2013 Species accounts for the Family Hominidae, 5. Chimpanzee *Pan troglodytes*. Pp.852-853 in: Mittermeier, R.A., Rylands, A.B. & Wilson, D.E. (2013) *Handbook of the Mammals of the World*. Vol.3. Primates. Lynx Editions, Barcelona.
- Humle, T., Boesch, C., Campbell, G., Junker, J., Koops, K., Kuehl, H. & Sop, T. 2016. *Pan troglodytes ssp. verus*. (errata version published in 2016) The IUCN Red List of Threatened Species 2016: e.T15935A102327574. . Downloaded on 03 May 2017.
- Humle, T., Maisels, F., Oates, J.F., Plumptre, A. & Williamson, E.A. 2016. *Pan troglodytes*. (errata version published in 2016) The IUCN Red List of Threatened Species 2016: e.T15933A102326672. . Downloaded on 03 May 2017.
- IUCN. 2012. *IUCN Red List Categories and Criteria: Version 3.1. Second edition*. Gland, Switzerland and Cambridge, UK: IUCN. iv + 32pp.
- Kano, T. and Asato, R. 1994 Hunting Pressure on Chimpanzees and Gorillas in the Motaba River Area, North-eastern Congo. *African Study Monographs*, 15(3): 143-162.
- Laurance, W.F., Clements, G.R., Sloan, S., O'Connell, C.S., Mueller, N.D., Goosem, M., Venter, O., Edwards, D.P., Phalan, B., Balmford, A., Van Der Ree, R. and Arrea, I.B. 2014. A global strategy for road building. *Nature* 513: 229–232.
- Lee, P.C., Thornback, J. and Bennett, E.L. 1988 *Threatened Primates of Africa*. The IUCN Red Data Book, IUCN Gland, Switzerland and Cambridge, UK.
- Leendertz, Fabian H., Heinz Ellerbrok, Christophe Boesch, Emmanuel Couacy-Hymann, Kerstin Mätz-Rensing, Regine Hakenbeck, Carina Bergmann, Pola Abaza, Sandra Junglen, Yasmin Moebius, Linda Vigilant, Pierre Formenty and Georg Pauli 2004 Anthrax kills wild chimpanzees in a tropical rainforest. *Nature* 430, 451-452
- Maisels, F., Ella Akou, M., Douckaga, M. and Moundounga, A. 2004. Mwagne National Park, Gabon: large mammals and human impact. *WCS/WWF Gabon*.
- Maisels, F., Strindberg, S., Kiminou, F., Ndzai, C., Ngounga, R. et al. 2013. Wildlife and Human Impact Survey 2012, and monitoring [2005–2008–2012](#). Odzala-Kokoua National Park,

- Maisels, F., Strindberg, S., Greer, D., Jeffery, K., Morgan, D.L. & Sanz, C. 2016. *Pan troglodytes ssp. troglodytes*. (errata version published in 2016) The IUCN Red List of Threatened Species 2016: e.T15936A102332276. . Downloaded on 03 May 2017.
- Nellemann, C., I. Redmond, J. Refisch (eds). 2010. *The Last Stand of the Gorilla – Environmental Crime and Conflict in the Congo Basin*. A Rapid Response Assessment. United Nations Environment Programme, GRID-Arendal. [www.grida.no](http://www.grida.no)
- Oates, John F., Colin P. Groves, and Paulina D. Jenkins 2009 The type locality of *Pan troglodytes vellerosus* (Gray, 1862), and implications for the nomenclature of West African chimpanzees. *Primates*, 50 (1): 70-78
- Oates, J.F., Doumbe, O., Dunn, A., Gonder, M.K., Ikemeh, R., Imong, I., Morgan, B.J., Ogunjemite, B. & Sommer, V. 2016. *Pan troglodytes ssp. ellioti*. The IUCN Red List of Threatened Species 2016: e.T40014A17990330. <http://dx.doi.org/10.2305/IUCN.UK.2016-2.RLTS.T40014A17990330.en>. Downloaded on 03 May 2017.
- Ogawa, H., Kanamori, M. and Mukeni, S.H. 1997. The discovery of chimpanzees in the Lwazi River area, Tanzania: a new southern distribution limit. *Pan Africa News* 4:3.
- Plumptre, A.J. (2000). Monitoring mammal populations with line transect techniques in African forests. *Journal of Applied Ecology* 37, 356–368.
- Plumptre, A., Hart, J.A., Hicks, T.C., Nixon, S., Piel, A.K. & Pintea, L. 2016. *Pan troglodytes ssp. schweinfurthii*. (errata version published in 2016) The IUCN Red List of Threatened Species 2016: e.T15937A102329417. . Downloaded on 03 May 2017.
- Quiatt, D., Reynolds, V. and Stokes, E.J. 2002. Snare injuries to chimpanzees (*Pan troglodytes*) at 10 study sites in East and West Africa. *African Journal of Ecology* 40: 303–305.
- Rainer, H., White, A. and Lanjouw, A. 2014 *State of the Apes 2013 Extractive Industries and Ape Conservation*. Cambridge University Press and Arcus Foundation.
- Rainer, H., White, A. and Lanjouw, A. 2015 *State of the Apes 2015 Industrial Agriculture and Ape Conservation*. Cambridge University Press and Arcus Foundation.
- Redmond, I. 1989 Trade in gorillas and other primates in the People's Republic of Congo. An investigation for International Primate Protection League, 42pp plus appendices and photographs.
- Redmond, I. 2005 Where are the great apes and whose job is it to save them? In Caldecott, J. and Miles, L., eds *World Atlas of Great Apes and their Conservation*. UNEP-WCMC/University of California Press.
- Redmond, I. 2006 Presence of Great Apes in Bas-Congo. *Gorilla Journal*, 33: 10-12.
- Redmond, I. 2008 *The Primate Family Tree/Primates of the World*. Firefly, USA /New Holland, UK.
- Redmond, I., Aldred, T., Jedamzik, K. and Westwood, M. 2006 Recipes for Survival: Controlling the Bushmeat Trade. Ape Alliance/WSPA. Available from [www.4apes.com/working-groups/bushmeat](http://www.4apes.com/working-groups/bushmeat)
- Sandbrook, C. and Roe, D. 2010 Linking conservation and poverty alleviation: The case of Great Apes. An overview of current policy and practice in Africa. IIED/Arcus Foundation
- Sanz, C., Morgan, D., Strindberg, S. and Onononga, JR. 2007 [Distinguishing between the nests of sympatric chimpanzees and gorillas](#). *Journal of Applied Ecology*, 44(2): 263–272
- Shukman, D. and Piranty, Sam 2017 The Secret Trade in Baby Chimps. BBC News <http://www.bbc.co.uk/news/resources/idt-5e8c4bac-c236-4cd9-bacc-db96d733f6cf>
- Stiles, D., Redmond, I., Cress, D., Nellemann, C., Formo, R.K. (eds). 2013. *Stolen Apes – The Illicit Trade in Chimpanzees, Gorillas, Bonobos and Orangutans*. A Rapid Response Assessment. United Nations Environment Programme, GRID-Arendal. [www.grida.no](http://www.grida.no)
- Stiles, D. 2016 The Illegal Trade in Great Apes, report prepared for CITES CoP17. PEGAS, available from <https://freetheapes.files.wordpress.com/2014/11/cop17-report.pdf>
- Teleki, G. and Baldwin, L. 1979 Known and estimated distributions of extant chimpanzee populations (*Pan troglodytes* and *Pan paniscus*) in Equatorial Africa. Special Report to the IUCN/SSC Primate Specialist Group, June 1979.
- Walsh, P. D., Abernethy, K. A., Bermejo, M., Beyers, R., et al. 2003 Catastrophic ape decline in western equatorial Africa. *Nature*, 422: 611-614.
- Walsh, P.D., Biek, R. and Real, L.A. 2005 Wave-like spread of Ebola Zaire. *PLoS Biology*, 3 (11). e371. ISSN 1544-9173

- Wich, S.A., Garcia-Ulloa, J., Kühl, H.S., Humle, T., Lee, J.S. and Koh, L.P. 2014. Will oil palm's homecoming spell doom for Africa's great apes? *Current Biology* 24: 1659–1663.
- Wilson, D.E. & Reeder, D.M. (editors). 2005. *Mammal Species of the World, A Taxonomic and Geographic Reference* (3rd ed). Johns Hopkins University Press, 2,142 pp.