Great Apes Status Report  
(August 2018)

Great Apes Survival Partnership & International Union for Conservation of Nature

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1. Introduction

The 65th meeting of the Standing Committee of the Convention of International Trade in Endangered Species of Wild Fauna and Flora (CITES) mandated the CITES Secretariat (SC65, Doc37) to collaborate with the IUCN SSC Primate Specialist Group, the Great Apes Survival Partnership (GRASP) and other experts, to prepare a report on the status of great apes and the relative impact of illegal trade and other pressures on their status, for consideration by the Standing Committee. This report constitutes fulfilment of the mandate received from the CITES Secretariat and will address distribution and abundance trends related to all great ape species and subspecies, as well as threats to their conservation.

The great apes (bonobos, chimpanzees, eastern and western gorillas, Bornean, Sumatran and Tapanuli orangutans) face significant conservation threats and are listed as either Endangered or Critically Endangered by the IUCN Red List of Threatened Species (IUCN 2018) and on Appendix I of CITES (CITES 2017). All great apes have slow rates of reproduction due to their prolonged maturation and high investment in single (occasionally twin) offspring: age at first reproduction is late, their young take a long time to develop, and interbirth intervals are 4–9 years, depending on the species. Their populations are, therefore, highly vulnerable to even low levels of offtake, and unable to cope with significant and continued losses of individuals.

Great ape populations in Africa and Asia are threatened by the combined impacts of habitat loss, degradation and fragmentation, poaching, disease and illegal trade. It is illegal to kill or capture great apes and to trade live animals or their body parts in all great ape range States (IUCN 2018). However, despite legal protection, law enforcement remains a major challenge in many countries, and poaching, especially for the illegal domestic (and some international, albeit mostly regional, between neighbouring countries) trade in bushmeat, is the most significant threat to the survival of most great apes (see Section 4 and Table 10).

This report presents the current distribution of African and Asian great apes, as well as temporal population trends (changes over time) and the main threats to their survival. It also highlights current conservation challenges and provides a list of recommendations to the CITES Parties, the CITES Secretariat and other relevant stakeholders.

2. African great apes

2.1. Current distribution of African great apes

African great apes occur in 21 countries across Equatorial Africa (Figure 1). There are four species and nine taxa overall (Table 1).

Table 1. The African great apes

<table>
<thead>
<tr>
<th>Genus</th>
<th>Species</th>
<th>Subspecies</th>
</tr>
</thead>
</table>
| **Gorilla** | 2 species | east
er gorilla  
*Gorilla beringei*  
2 subspecies  
Grauer’s gorilla  
*Gorilla beringei graueri*  
mountain gorilla  
*Gorilla beringei beringei*  
wes
tern gorilla  
*Gorilla gorilla*  
2 subspecies  
Cross River gorilla  
*Gorilla gorilla diehli*  
wes
tern lowland gorilla  
*Gorilla gorilla gorilla*  |
| **Pan** | 2 species | centre
cal chimpanzee  
*Pan troglodytes troglodytes*  
east
er chimpanzee  
*Pan troglodytes schweinfurthii*  
Nigerian-Cameroon chimpanzee  
*Pan troglodytes elliottii*  
wes
tern chimpanzee  
*Pan troglodytes verus*  |
| bonobo | *Pan paniscus* | No subspecies currently recognized |
2.2. African great ape population sizes

The African great ape population estimates in this report are based on surveys conducted in the past 10 years. “Site” in this text refers to any area in which surveys were conducted in the last 10 years, including amongst others protected areas and their buffer zones, a logging concession or a group of concessions. Population estimates presented in this report are drawn from peer-reviewed publications, published or unpublished reports, data from research and conservation organizations, or are expert estimates. Estimating population size is complex, because great apes are difficult to observe. All great apes build a new nest to sleep in every night, and these can be used as proxies for independent nest-building animals. A software package (Distance) incorporates animal sign production (in this case night nests) and decay rate to calculate the density of animal sign and of population (Thomas et al. 2010). Because sample size can be small where ape density is low, the resulting estimates of abundance often show a great deal of variation in precision (see Kühl et al. 2008). At some sites, genetic censusing is used (e.g. Arandjelovic et al. 2011; Gray et al. 2013; Roy et al. 2014). An overview of survey methods can be found in Kühl et al. (2008).

2.2.1. Population size estimates per country

There is great disparity in population estimates from taxon to taxon depending on the survey method used and sampling effort. Chimpanzee, gorilla and bonobo population estimates per range State are presented in Table 2. The Democratic Republic of Congo (DRC) and Congo host the highest combined population sizes of great apes in Africa, followed by Cameroon, Guinea and Gabon. Countries with the lowest great ape population numbers include Burundi, Ghana, Rwanda, Mali and Senegal, which each hosts a few hundred great apes.

Table 2. African great ape population estimates by country. Except for mountain gorillas, estimates are based on the number of “nest builders”, thus excluding infants. Estimates are derived from both surveys and modelling approaches. This is the best information available. However, survey effort is often highest in protected areas, while other areas remain unsampled, thus can lead to low country estimates.

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1 Ape Populations, Environments and Surveys database (http://apesportal.eva.mpg.de/)
<table>
<thead>
<tr>
<th>Country</th>
<th>Taxon</th>
<th>Abundance</th>
<th>Survey period</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Angola</td>
<td>western lowland gorilla</td>
<td>1,652 (1,174–13,311)</td>
<td>2005–2013</td>
<td>Strindberg et al. (2018)*</td>
</tr>
<tr>
<td></td>
<td>central chimpanzee</td>
<td>1,705 (1,027–4,801)</td>
<td>2005–2013</td>
<td></td>
</tr>
<tr>
<td>Cameroon</td>
<td>Cross River gorilla</td>
<td>132–194</td>
<td>2014</td>
<td>Dunn et al. (2014)</td>
</tr>
<tr>
<td></td>
<td>Nigeria-Cameroon chimpanzee</td>
<td>3,000–7,060</td>
<td>2004–2006</td>
<td>Morgan et al. (2011); Mitchell et al. (2015); Oates et al. (2016)</td>
</tr>
<tr>
<td></td>
<td>central chimpanzee</td>
<td>2,843 (1,194–4,855)</td>
<td>2015</td>
<td>Strindberg et al. (2018)</td>
</tr>
<tr>
<td></td>
<td>eastern chimpanzee</td>
<td>910 (538–1,534)</td>
<td>2012–2016</td>
<td>Aebischer et al. (2017)</td>
</tr>
<tr>
<td></td>
<td>central chimpanzee</td>
<td>55,397 (42,433–64,824)</td>
<td>2005–2013</td>
<td></td>
</tr>
<tr>
<td>Democratic Republic of Congo</td>
<td>Grauer's gorilla</td>
<td>3,800</td>
<td>2011–2015</td>
<td>Plumptre et al. (2016a)</td>
</tr>
<tr>
<td></td>
<td>mountain gorilla</td>
<td>N/A†</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>central chimpanzee</td>
<td>present (population size unknown)</td>
<td>N/A</td>
<td>Inogwabini et al. (2007)</td>
</tr>
<tr>
<td></td>
<td>eastern chimpanzee</td>
<td>173,000–248,000</td>
<td>2010</td>
<td>Plumptre et al. (2010)</td>
</tr>
<tr>
<td></td>
<td>bonobo</td>
<td>15,000–20,000 minimum</td>
<td>2012</td>
<td>IUCN &amp; ICCN (2012)</td>
</tr>
<tr>
<td>Equatorial Guinea</td>
<td>western lowland gorilla</td>
<td>1,872 (1,082–3,165)</td>
<td>2005–2013</td>
<td>Strindberg et al. (2018)*</td>
</tr>
<tr>
<td></td>
<td>central chimpanzee</td>
<td>43,037 (36,869–60,476)</td>
<td>2005–2013</td>
<td></td>
</tr>
<tr>
<td>Ghana</td>
<td>western chimpanzee</td>
<td>264</td>
<td>2009</td>
<td>Danquah et al. (2012)</td>
</tr>
<tr>
<td>Guinea Bissau</td>
<td>western chimpanzee</td>
<td>1,000–1,500</td>
<td>2016</td>
<td>Chimbo Foundation (2017) unpubl. data</td>
</tr>
<tr>
<td>Mali</td>
<td>western chimpanzee</td>
<td>present (population size unknown)</td>
<td>2014</td>
<td>PanAf (2014) unpubl. data</td>
</tr>
</tbody>
</table>
Table 3. African great ape population estimates by taxon in descending order of abundance. Except for mountain gorillas, estimates are based on the number of “nest builders”, thus excluding infants. Estimates are derived from both surveys and modelling approaches. The IUCN Red List classification of most great ape taxa is based on the rate of decline over three generations (one generation time equating to 20–25 years, depending on the taxon).

<table>
<thead>
<tr>
<th>Taxon</th>
<th>Abundance</th>
<th>IUCN Status</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Gorilla g. gorilla</em></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>eastern chimpanzee</td>
<td>181,000–256,000</td>
<td>Endangered</td>
<td>Plumptre et al. (2010, 2016b)</td>
</tr>
<tr>
<td><em>Pan t. schweinfurthii</em></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Pan t. troglodytes</em></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>western chimpanzee</td>
<td>18,000–65,000</td>
<td>Critically Endangered</td>
<td>Humle et al. (2016); Kühl et al. (2017)</td>
</tr>
<tr>
<td><em>Pan t. verus</em></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>bonobo</td>
<td>15,000–20,000 minimum</td>
<td>Endangered</td>
<td>IUCN &amp; ICCN (2012)</td>
</tr>
<tr>
<td><em>Pan paniscus</em></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nigeria-Cameroon chimpanzee</td>
<td>4,400–9,345</td>
<td>Endangered</td>
<td>Morgan et al. (2011); Oates et al. (2016)</td>
</tr>
<tr>
<td><em>Pan t. ellioti</em></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Grauer's gorilla</td>
<td>3,800 (1,280–9,050)</td>
<td>Critically Endangered</td>
<td>Plumptre et al. (2015, 2016b)</td>
</tr>
<tr>
<td><em>Gorilla b. graueri</em></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>mountain gorilla</td>
<td>&gt;1,000</td>
<td>Critically Endangered</td>
<td>Roy et al. (2014); Granjon et al. (2020)</td>
</tr>
<tr>
<td><em>Gorilla b. beringei</em></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cross River gorilla</td>
<td>&lt;300</td>
<td>Critically Endangered</td>
<td>Dunn et al. (2014); Bergl et al. (2016); R. Bergl &amp; J. Oates pers. comm.</td>
</tr>
<tr>
<td><em>Gorilla g. diehli</em></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Estimated in 2013. At an annual rate of decline of 2.7%, the population will be ~316,000 by the end of 2018.

2.2.2. Population size estimates per taxon

Western lowland gorillas and eastern chimpanzees are the most numerous great ape taxa, while the Cross River gorilla has the smallest population size, with approximately 300 or fewer mature individuals remaining.
2.3. Temporal trends in African great ape populations

With the exception of the mountain gorillas, all African great ape taxa are facing an overall decline, some of them drastic. The extent of the decline, however, differs between taxa, with Grauer’s gorillas suffering the highest estimated losses over a short period of time (Table 4).2

**Grauer’s gorilla, *Gorilla beringei graueri***

In 1995, the Grauer’s gorilla population was estimated at 16,900 (Hall *et al.* 1998). By 2015, however, estimates placed their population at only 3,800 individuals, with an annual rate of decline of 7.2%. This represents a decline estimated at between 84–93% across the subspecies’ range. Comparing the 1994 data to that of 2011–2015, researchers found a 77% reduction in abundance. The subspecies is classified as Critically Endangered. Source: Plumptre *et al.* (2015, 2016a).

**Mountain gorilla, *Gorilla beringei beringei***

Whilst the mountain gorilla is the only great ape taxon increasing in numbers, it has been listed as Critically Endangered, with an estimated population of 880 individuals in the early 2010s, increasing to over 1,000 individuals in 2016. There are two small isolated populations, the Virunga and the Bwindi populations, both of which have been the subject of intense conservation, research and survey efforts over the last 40 years (e.g. Robbins *et al.* 2011). Numbers in the Virungas dwindled to an estimated 250 individuals in 1981, before the population was allowed to recover and almost doubled between 1989 and 2010. Between 2003 and 2010, the population increased by 26% at an annual rate of 3.7% (Gray *et al.* 2013).

**Cross River gorilla, *Gorilla gorilla diehli***

Cross River gorilla population changes are unknown. The subspecies is classified as Critically Endangered because of a small and highly fragmented population: each subpopulation is likely to number fewer than 50 mature individuals. Source: Bergl *et al.* (2016).

**Western lowland gorilla, *Gorilla gorilla gorilla***

The Critically Endangered western lowland gorilla population declined by 19.4% between 2005 and 2013, an annual loss of approximately 2.7% (Strindberg *et al.* 2018). Although their geographic range is large, they are threatened by bushmeat poaching, disease (including Ebola virus disease), and habitat loss and degradation.

**Central chimpanzee, *Pan troglodytes troglodytes***

This subspecies is classified as Endangered, having experienced a significant population reduction since the 1970s. The principal threats to this taxon, as for western lowland gorillas, are bushmeat poaching, disease, and habitat loss and degradation. An analysis of nest survey data collected between 2003 and 2013 across the entire geographic range did not detect a statistically significant decline (Strindberg *et al.* 2018). Unlike gorillas, where an adult male will confront danger, chimpanzees slip away stealthily, and more often escape being killed. However, the factors known to reduce chimpanzee populations (lack of forest guards, remoteness from roads, human population density, degree of forest intactness, etc.) were found to be significantly correlated with population density in the direction predicted (Strindberg *et al.* 2018). All of these factors are increasing in either extent or intensity, or both, so we predict that a decline will be statistically easier to detect in the future.

**Eastern chimpanzee, *Pan troglodytes schweinfurthii***

The Albertine Rift escarpment in DRC is a stronghold for eastern chimpanzees, but recent surveys indicate 80–98% declines at some key sites in just 20 years, contributing to the major population declines seen in recent decades. It is estimated that populations in eastern DRC declined significantly (range of estimated decline 22–45%) between 1994 and 2015. Eastern chimpanzees are listed as Endangered. Source: Plumptre *et al.* (2016b).

**Nigeria-Cameroon chimpanzee, *Pan troglodytes elliottii***

This taxon has the lowest estimated population size of any chimpanzee subspecies. Its range is limited to clearly defined areas in southern Nigeria and central-southwest Cameroon. Its Endangered listing is based on an inferred population size reduction of between 50–80% over a three-generation period from the mid-1980s to 2060. Source: Oates *et al.* (2016). Past presence of chimpanzees in Benin and Togo has been very poorly documented, but if chimpanzees were in those countries, it is probable that they belonged to this subspecies.

**Western chimpanzee, *Pan troglodytes verus***

This subspecies, *Pan troglodytes verus*, has recently been upgraded to Critically Endangered as it is expected to experience a decline exceeding 80% over the next 69 years, i.e. three generations (Humle *et al.* 2016). It is found in West Africa from Senegal to Ghana but has almost certainly become extinct in Burkina Faso in the 20th century (Ginn *et al.* 2013; Campbell & Houngbedji 2015). With a likelihood of probably more than 18,850

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2 Some text in Sections 2.3 and 3.3 is taken from the IUCN Red List assessments, as indicated by “Source”.
individuals, Guinea now hosts the largest remaining western chimpanzee population. Liberia and Sierra Leone are also strongholds for this subspecies (Kühl et al. 2017). Approximately 17,000 individuals (half of the total western chimpanzee population) live in the Fouta Djallon region of Guinea (Regnaut & Boesch 2012). Between 1990 and 2015, the Côte d’Ivoire population declined by 80% (Kühl et al. 2017); only a few hundred individuals remain in Taï and Comoé National Parks (Campbell et al. 2008). Between 2008 and 2011, the population in Lagoas de Cufadas National Park in Guinea-Bissau declined by more than 60% (Carvalho et al. 2013).

**Bonobo, Pan paniscus**

Endemic to the DRC, the *Pan paniscus* population is estimated to have declined sharply in the last 15–20 years. This decline is projected to exceed 50% over a 75-year period from 2003 to 2078. The species is listed as Endangered. Source: Fruth et al. (2016).

**Table 4.** African great ape population trends by taxon in descending order of abundance. *Except for mountain gorillas, estimates are based on the number of “nest builders”, thus excluding infants. Estimates are based on both surveys and modelled results.*

<table>
<thead>
<tr>
<th>Taxon</th>
<th>Abundance</th>
<th>Trend</th>
<th>Annual rate of change</th>
<th>Total estimated change</th>
<th>Period assessed</th>
<th>Source of trend</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>western lowland gorilla</strong></td>
<td><strong>Gorilla g. gorilla</strong></td>
<td>Declining</td>
<td>‡–2.7%</td>
<td>‡–19.4%</td>
<td>2005–2013</td>
<td>Strindberg et al. (2018)</td>
</tr>
<tr>
<td><strong>eastern chimpanzee</strong></td>
<td><em>Pan t. schweinfurthii</em></td>
<td>Declining</td>
<td>‡–5.1%</td>
<td>‡–22–45%‡</td>
<td>1994–2014</td>
<td>Plumptre et al. (2015, 2016b)</td>
</tr>
<tr>
<td><strong>central chimpanzee</strong></td>
<td><em>Pan t. troglodytes</em></td>
<td>Declining</td>
<td>‡&gt;–4.95%</td>
<td>‡&gt;–50%</td>
<td>2005–2013</td>
<td>Maisels et al. (2016b)</td>
</tr>
<tr>
<td><strong>western chimpanzee</strong></td>
<td><em>Pan t. verus</em></td>
<td>Declining</td>
<td>‡–6.43%</td>
<td>‡–80%</td>
<td>1990–2015</td>
<td>Kühl et al. (2017)</td>
</tr>
<tr>
<td><strong>bonobo</strong></td>
<td><em>Pan paniscus</em></td>
<td>Declining</td>
<td>‡–5.95%§</td>
<td>‡–54.9%</td>
<td>2003–2015</td>
<td>Fruth et al. (2016)</td>
</tr>
<tr>
<td><strong>Nigeria-Cameroon</strong></td>
<td><strong>chimpanzee</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td><em>Pan t. ellioti</em></td>
<td>Declining</td>
<td>‡–0.92–2.14%</td>
<td>‡–50–80%</td>
<td>1985–2060</td>
<td>Oates et al. (2016)</td>
</tr>
<tr>
<td><strong>Grauer’s gorilla</strong></td>
<td><em>Gorilla b. graueri</em></td>
<td>Declining</td>
<td>‡–7.2%</td>
<td>‡–94.2%</td>
<td>1994–2015</td>
<td>Plumptre et al. (2016a, 2016c)</td>
</tr>
<tr>
<td><strong>mountain gorilla</strong></td>
<td><em>Gorilla b. beringei</em></td>
<td>Increasing</td>
<td>+3.7%</td>
<td>+26%†</td>
<td>2003–2010</td>
<td>Gray et al. (2013); Roy et al. (2014); Granjon et al. (2020)</td>
</tr>
<tr>
<td><strong>Cross River gorilla</strong></td>
<td><em>Gorilla g. diehli</em></td>
<td>Declining</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>Dunn et al. (2014); R. Bergl &amp; J. Oates pers. comm.</td>
</tr>
</tbody>
</table>

* Surveys conducted in 2003–2013 in western equatorial Africa were used to estimate total population size
† 22–45% decline estimated for eastern DRC only, not for the entire geographic range
§ The confidence interval for this analysis is very large, suggesting an uncertainty in the data
¶ There is uncertainty surrounding the 5.95% annual decline; however, Fruth et al. (2016) state that an annual loss of 1% would still lead to >50% decline of the bonobo population by 2078
‡ Virunga population only. No estimate available for the Bwindi population due to changes in sampling method
2.4. Threats to African great apes

Threats are discussed in detail in Section 4. The most important threats to great apes in Africa are poaching for bushmeat, habitat loss and degradation, and infectious diseases. The term “poaching” is used as a synonym for illegal killing, but can have different motives, such as obtaining bushmeat or retaliation for crop foraging. Great apes may also become accidental victims of snares set for other species (see poaching categories in Table 10 of Section 4). Illegal trafficking of live infants is also an issue in some areas. The levels of these threats vary greatly between taxa (Table 5). Western lowland gorillas and central chimpanzees are treated together because their ranges overlap by 97% (Strindberg et al. 2018).

Grauer’s gorilla, Gorilla beringei graueri

Even though all killing, capture and consumption of great apes is illegal in the DRC, bushmeat poaching presents the most serious and immediate threat to Grauer’s gorillas. This concerns the entire geographic range with a high demand for bushmeat created by the growing human population and widespread artisanal mining in remote areas (Kirkby et al. 2015; Plumptre et al. 2015, 2016a). Miners working in Grauer’s gorilla habitat admit to poaching gorillas, considering them to be relatively easy to hunt with guns and providing large quantities of meat (Kirkby et al. 2015, Spira et al. 2019). Indiscriminate and conflict poaching also occur. Habitat loss and degradation, mainly driven by artisanal mining, farming (slash-and-burn agriculture) and livestock ranching to supply regional markets, also constitutes a major threat. There is currently no commercial logging within the Grauer’s range, although artisanal logging is widespread. As parts of DRC emerge from civil war, new concessions for timber, minerals and possibly petroleum will pose conservation challenges in the future. Another major threat to Grauer’s gorillas is civil unrest in eastern DRC, which has massively exacerbated the decline of this subspecies since the mid-1990s. Long-term conflict and insecurity resulted in rebel and civilian occupation of the forests, including protected areas, and severely restricted the ability of conservation organizations to monitor and protect gorillas, enforce hunting and protected area regulations, and address intensifying threats. Only 26% of the predicted range of Grauer’s gorillas overlaps with national parks and nature reserves. Source: Plumptre et al. (2016c).

Mountain gorilla, Gorilla beringei beringei

Mountain gorillas live in the Bwindi Impenetrable National Park in Uganda and the Virunga Massif, shared by DRC, Rwanda and Uganda. Mountain gorilla habitat is well protected and conservation measures, including long-term activities such as intensive law enforcement, research, tourism and veterinary care have been proven to lower the impact of the main threats, which are habitat loss, indiscriminate poaching, and mortality due to disease (Robbins et al. 2011). As a result of these conservation activities, population numbers have increased. Despite these positive results, challenges remain. Most poaching is indiscriminate (snares). There are occasional conflict killings and, in the past, mountain gorillas have been shot dead in both politically-motivated incidents and in crossfire (collateral). The mountain gorilla population is growing, but the habitat is surrounded by farms, limiting options for expansion. Another issue is climate change, which is likely to result in changes in food availability and habitat quality for the mountain gorillas, as well as the surrounding local communities, which could increase the challenges to conservation efforts. Source: Plumptre et al. (2016d).

Cross River gorilla, Gorilla gorilla diehli

Cross River gorillas occur in 13 small forest fragments totalling approximately 600 km² in a landscape of 13,000 km². These fragments are surrounded by densely populated human settlements. Many of the subspecies’ subpopulations are outside of protected areas and are at most risk from hunting and habitat loss. Although poachers do not specifically target gorillas, it is estimated that opportunistic bushmeat poaching removes 1–3 individuals from the population annually (though this may be an underestimate; Dunn et al. 2014). Cross River gorillas are also occasionally killed or injured in snares (indiscriminate poaching). Their habitat is also under threat. Much of the suitable habitat in Cameroon has no protected status and there is rapid, ongoing conversion of forest to agriculture and grazing. There is also some habitat loss even inside the protected areas, and corridors between subpopulations are particularly vulnerable. For example, the Okwangwo Division of Nigeria’s Cross River National Park and the adjacent Takamanda National Park in Cameroon contain enclaves of human settlements whose farmlands have spread beyond their legal boundaries. The small size of the Cross River population in general and its high level of fragmentation also make it more vulnerable to disease. The Ebola virus, which has caused significant mortality in Gorilla g. gorilla populations, has not been reported in Gorilla g. diehli populations. Nevertheless, their proximity to dense human populations and livestock heightens the risk of disease transmission (Dunn et al. 2014). Source: Bergl et al. (2016).

Western lowland gorilla, Gorilla gorilla gorilla and central chimpanzees, Pan troglodytes troglodytes

Poaching for bushmeat is the primary driver of decline in western lowland gorilla and central chimpanzee populations. Most of the terra firma forests outside the protected areas of their geographic range are now logging concessions (Global Forest Watch 2017). A network of new logging roads provides rapid access to poachers and traffickers into previously inaccessible forests. Consignments of bushmeat can be rapidly sent, according to
estimations, hundreds of kilometres out of the forests (Maisels et al. 2016a). Infectious disease, especially the Ebola virus, is the second major driver of their decline. Surveys carried out since the 1980s show that a series of large great ape die-offs have occurred in a large forest region that straddles the border between northeastern Gabon and northwestern Congo. Approximately 14% of the total range of these taxa is thought to have been affected by Ebola virus disease. At present, habitat loss (as opposed to habitat degradation) in the region is low, but this will change in the near future: 42% of the western lowland gorilla and central chimpanzee geographic range is considered suitable for oil palm, the progressive development of which could become a major threat to these taxa (Wich et al. 2014). Approximately 80% of these two great ape subspecies live outside formally protected areas (Strindberg et al. 2018), making them and their habitat vulnerable to habitat loss and bushmeat poaching. Sources: Maisels et al. (2016a, 2016b).

**Eastern chimpanzee, *Pan troglodytes schweinfurthii***

Bushmeat poaching is the greatest threat to great apes in eastern DRC, where large populations of eastern chimpanzees occur. Eastern chimpanzees are poached for bushmeat, especially around artisanal mining and logging camps, where bushmeat is often the main source of protein available. When adult chimpanzees are killed for bushmeat, their infants may end up in the ape trade as pets (Hicks et al. 2010). Bushmeat poaching is evidenced by ongoing confiscations, as well as the hundreds of eastern chimpanzees housed in sanctuaries in the DRC (Plumptre et al. 2015). In eastern DRC, armed groups involved in artisanal mining are responsible for much of the bushmeat poaching. In both eastern and northern DRC, poaching and illegal wildlife trafficking have been driven by insecurity over the past 20 years (Ondoua Ondoua et al. 2017). Another major threat is habitat loss and degradation due to smallholder and shifting agriculture. Industrial agriculture (e.g. oil palm plantations) poses a potential future threat as eastern DRC stabilizes (Plumptre et al. 2016b). Infectious diseases were identified as the major cause of death in chimpanzees at Gombe and Mahale in Tanzania (e.g. Goodall 1986; Nishida et al. 2003). The frequency of encounters between chimpanzees, humans and human waste is increasing as human populations expand, leading to higher risks of disease transmission. Source: Plumptre et al. (2016b).

**Nigeria-Cameroon chimpanzee, *Pan troglodytes ellioti***

The two main threats to the survival of Nigeria-Cameroon chimpanzees are human hunting (bushmeat poaching) and habitat loss (Morgan et al. 2011). These threats are exacerbated by the expansion of human populations in the subspecies’ geographic range, as well as economic growth in Cameroon and Nigeria. Poaching represents the greatest threat to the survival of this taxon, both supplying bushmeat trade and, to a lesser extent, providing body parts for traditional medicine (superstition poaching) (Oates et al. 2016). In 2002–2003, a six-month study in rural markets in southeastern Nigeria and southwestern Cameroon recorded 240 chimpanzee carcasses (Fa et al. 2006). Furthermore, a five-week survey of eight markets in the transboundary region of Cross River State in Nigeria recorded six chimpanzee carcasses in 2009 (Oates et al. 2016). Suitable habitat in Nigeria and Cameroon continues to be lost, degraded and fragmented by agriculture, logging, grazing and fire. In eastern Nigeria in particular, several forest reserves have been converted to farmland and to commercial oil palm and rubber plantations, while large areas of forest surrounding key protected areas, such as Okomu National Park, have already been converted to oil palm plantations. In Cameroon, extensive new oil palm developments are underway in both Littoral and Southwest Regions, and new logging concessions continue to be established. The combined impacts of habitat loss and poaching have gradually fragmented *Pan t. ellioti* populations, so that many of those remaining are small and isolated. They are therefore at increased risk of extinction from disease and other unpredictable events. Source: Oates et al. (2016).

**Western chimpanzee, *Pan troglodytes verus***

Half of western chimpanzees reside in the Fouta Djallon region of Guinea (Regnaut & Boesch 2012). This area is characterized by traditional small-scale farming practices, predominantly by Fulani people, who neither eat nor kill chimpanzees for cultural reasons (Ham 1998). The Fouta Djallon also contains the world’s largest bauxite deposits and it is likely that industrial mining will occur in much of the chimpanzee habitat within the next decade (Kormos et al. 2014). If mining proceeds at the scale planned, it will most certainly cause further population declines and thus threaten this stronghold of the subspecies (Kühl et al. 2017). Mines also need electricity for their operations, and there are plans for hydroroads throughout the Fouta Djallon region, which would accelerate habitat loss (R. Kormos, pers. comm.). Other causes of western chimpanzee decline include several types of poaching (bushmeat, indiscriminate, conflict, superstition), capture (and associated poaching and illegal trafficking), habitat loss, and infectious diseases (Humle et al. 2016). These threats and their underlying drivers have caused local extirpation of chimpanzee populations, especially in Ghana and Côte d’Ivoire. Population declines in Côte d’Ivoire have also been caused by large-scale deforestation inside and outside of protected areas and classified forests. Such deforestation is a result of rapid growth of the human population, massive immigration from the Sahel Belt and industrial-scale agricultural production of coffee, cacao, rubber and palm oil (Campbell et al. 2008; Kühl et al. 2017). The remaining strongholds of western chimpanzees are Guinea, Liberia and Sierra Leone. Most chimpanzees in Liberia and Sierra Leone, however, occur outside protected areas, where subsistence agriculture is a major driver of forest loss, and where coexistence with people
is strained because chimpanzees consume crops and compete over wild resources, such as the oil palm. Chimpanzees in Liberia are threatened by bushmeat poaching both inside and outside protected areas (Greengrass 2016), as well as by the rapidly developing mining, forestry and industrial-agricultural sectors (Junker et al. 2015; Tweh et al. 2015). Over 80% of the western chimpanzee’s geographic range in Liberia and Sierra Leone is outside protected areas and threatened by industrialised agriculture and oil palm developments (Wich et al. 2014) and associated infrastructure, such as roads and hydrodams.

**Bonobo, Pan paniscus**

The most significant threat to bonobos is bushmeat poaching, followed by habitat loss through deforestation and fragmentation. Disease is likely to pose a threat in the future, with increased exposure to human populations. A number of indirect threats exist, including the proliferation of weapons in the region, weak law enforcement, weak stakeholder commitment to conservation, expansion of slash-and-burn agriculture and industrial-scale commercial activities. Not only is there a massive demand for bushmeat stemming from the cities, but rebel factions and poorly-paid government soldiers add to that demand. Source: Fruth et al. (2016).

**Table 5.** Major threats affecting African great apes at taxon level. Some direct threats have a larger impact on great ape populations than others, but no quantitative comparisons are possible.

<table>
<thead>
<tr>
<th>Taxon</th>
<th>Main threats (direct)</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grauer’s gorilla <em>Gorilla b. graueri</em></td>
<td>Poaching (types: bushmeat, indiscriminate, conflict, superstition, collateral). N.B. Illegal trafficking of live orphans is a by-product of bushmeat trade</td>
<td>Plumptre et al. (2015, 2016c)</td>
</tr>
<tr>
<td></td>
<td>Habitat loss, fragmentation and degradation due to artisanal mining, shifting and commercial agriculture</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Disease</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Climate change</td>
<td></td>
</tr>
<tr>
<td>mountain gorilla <em>Gorilla b. beringei</em></td>
<td>Poaching (types: indiscriminate, conflict, politically-motivated)</td>
<td>Gray et al. (2010); Robbins et al. (2011); Roy et al. (2014)</td>
</tr>
<tr>
<td></td>
<td>Disease</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Climate change</td>
<td></td>
</tr>
<tr>
<td>Cross River gorilla <em>Gorilla g. diehli</em></td>
<td>Habitat loss, fragmentation and degradation due to shifting and commercial agriculture</td>
<td>Bergl et al. (2016)</td>
</tr>
<tr>
<td></td>
<td>Poaching (types: bushmeat, indiscriminate, conflict)</td>
<td></td>
</tr>
<tr>
<td>western lowland gorilla <em>Gorilla g. gorilla</em></td>
<td>Poaching (types: bushmeat, indiscriminate, conflict). N.B. Illegal trafficking of live orphans is a by-product of bushmeat trade</td>
<td>Maisels et al. (2016a)</td>
</tr>
<tr>
<td></td>
<td>Disease</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Habitat loss and degradation and degradation due to extractive industries, commercial agriculture and infrastructure development</td>
<td></td>
</tr>
<tr>
<td>western chimpanzee <em>Pan t. verus</em></td>
<td>Habitat loss, fragmentation and degradation due to shifting and commercial agriculture, extractive industries and infrastructure development</td>
<td>Humle et al. (2016); Kühl et al. (2017)</td>
</tr>
<tr>
<td></td>
<td>Poaching (types: bushmeat, indiscriminate, conflict, superstition, live capture)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Illegal trafficking of live animals</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Disease</td>
<td></td>
</tr>
<tr>
<td>Nigeria-Cameroon chimpanzee <em>Pan t. ellioti</em></td>
<td>Poaching (types: bushmeat, indiscriminate, conflict)</td>
<td>Oates et al. (2016)</td>
</tr>
<tr>
<td></td>
<td>Habitat loss fragmentation and degradation due to shifting and commercial agriculture</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Disease</td>
<td></td>
</tr>
<tr>
<td>central chimpanzee <em>Pan t. troglodytes</em></td>
<td>Poaching (types: bushmeat, indiscriminate). N.B. Illegal trafficking of live orphans is a by-product of bushmeat trade</td>
<td>Maisels et al. (2016b)</td>
</tr>
<tr>
<td></td>
<td>Disease</td>
<td></td>
</tr>
</tbody>
</table>
Habitat loss, fragmentation and degradation due to extractive industries, commercial agriculture and infrastructure development

Poaching (types: bushmeat, indiscriminate, conflict, superstition). N.B. Illegal trafficking of live orphans is a by-product of bushmeat trade

Habitat loss, fragmentation and degradation due to shifting and commercial agriculture, artisanal and industrial mining, and infrastructure development

Poaching (types: bushmeat, indiscriminate, superstition). N.B. Illegal trafficking of live orphans is a by-product of bushmeat trade

Habitat loss and degradation from shifting agriculture, mining and infrastructure development

Poaching (types: bushmeat, indiscriminate, superstition). N.B. Illegal trafficking of live orphans is a by-product of bushmeat trade

Disease

Disease

Disease

Plumptre et al. (2015, 2016b)

Fruth et al. (2016)

Sakamaki et al. (2009); IUCN & ICCN (2012)

3. Asian great apes

3.1. Current distribution of Asian great apes

Orangutans are the only great apes found in Asia and they exist solely on the islands of Sumatra and Borneo (Figure 2), in Indonesia and Malaysia (Wich et al. 2008). There are three species: the Bornean orangutan (*Pongo pygmaeus*), the Sumatran orangutan (*Pongo abelii*), and the recently described Tapanuli orangutan (*Pongo tapanuliensis*). Bornean orangutans are further divided into three subspecies: *Pongo pygmaeus pygmaeus*, *Pongo pygmaeus wurmbii* and *Pongo pygmaeus morio* (Table 6).

Table 6. The Asian great apes

<table>
<thead>
<tr>
<th>Genus</th>
<th>Species</th>
<th>Subspecies</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Pongo</em></td>
<td>Bornean orangutan</td>
<td>northwest Bornean orangutan</td>
</tr>
<tr>
<td>3 species</td>
<td><em>Pongo pygmaeus</em></td>
<td><em>Pongo pygmaeus pygmaeus</em></td>
</tr>
<tr>
<td></td>
<td>3 subspecies</td>
<td>southwest Bornean orangutan</td>
</tr>
<tr>
<td></td>
<td><em>Pongo pygmaeus wurmbii</em></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Sumatran orangutan</td>
<td>northeast Bornean orangutan</td>
</tr>
<tr>
<td></td>
<td><em>Pongo abelii</em></td>
<td><em>Pongo pygmaeus morio</em></td>
</tr>
<tr>
<td></td>
<td>Tapanuli orangutan</td>
<td>No subspecies currently recognized</td>
</tr>
<tr>
<td></td>
<td><em>Pongo tapanuliensis</em></td>
<td>No subspecies currently recognized</td>
</tr>
</tbody>
</table>

* New species described by Nater et al. (2017)
Figure 2. Geographic distribution of Asian great ape taxa (orangutans; IUCN SSC A.P.E.S. database 2017)

3.2. Asian great ape population sizes

3.2.1. Population size estimates per country

Table 7. All Asian great ape population estimates per country†

<table>
<thead>
<tr>
<th>Country</th>
<th>Taxon</th>
<th>Abundance*</th>
<th>IUCN status</th>
<th>Year of estimate</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><em>Pongo pygmaeus</em></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>southwest Bornean orangutan</td>
<td>97,000 (73,800–135,000)</td>
<td>Critically Endangered</td>
<td>2018</td>
<td>Calculated from Voigt et al. (2018)</td>
</tr>
<tr>
<td></td>
<td><em>Pongo wurmbii</em></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>northeast Bornean orangutan</td>
<td>24,800 (18,100–35,600)</td>
<td>Critically Endangered</td>
<td>2018</td>
<td>Calculated from Voigt et al. (2018)</td>
</tr>
<tr>
<td></td>
<td><em>Pongo morio</em></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Sumatran orangutan</td>
<td>13,900 (5,400–26,100)</td>
<td>Critically Endangered</td>
<td>2016</td>
<td>Wich et al. (2016)</td>
</tr>
<tr>
<td></td>
<td><em>Pongo abelii</em></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Tapanuli orangutan</td>
<td>800 (300–1,400)</td>
<td>Critically Endangered</td>
<td>2016</td>
<td>Wich et al. (2016)</td>
</tr>
<tr>
<td></td>
<td><em>Pongo tapanuliensis</em></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Malaysia</td>
<td>southwest Bornean orangutan</td>
<td>1,100 (800–1,600)</td>
<td>Critically Endangered</td>
<td>2018</td>
<td>Calculated from Voigt et al. (2018)</td>
</tr>
<tr>
<td></td>
<td><em>Pongo wurmbii</em></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>northeast Bornean orangutan</td>
<td>11,000 (8,000–18,000)</td>
<td>Critically Endangered</td>
<td>2005</td>
<td>Ancrenaz et al. (2005)</td>
</tr>
<tr>
<td></td>
<td><em>Pongo morio</em></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
3.2.2. Population size estimates per taxon

**Bornean orangutan, Pongo pygmaeus**
Abundance estimates for *P. pygmaeus pygmaeus, P. pygmaeus wurmbii* and *P. pygmaeus morio*, all listed as Critically Endangered, are presented in Table 8.

**Sumatran orangutan, Pongo abelii**
Previously estimated to number 6,600 (Wich et al. 2008), the most recent abundance estimate for the Sumatran orangutan is 13,900 individuals, in a total area of 16,775 km² of forest (Wich et al. 2016). This latest estimate does not reflect an increase in Sumatran orangutan numbers, but it is explained by much improved survey techniques and coverage, and hence more accurate data. Considering only populations that are potentially viable over the long term (i.e. > 250 individuals in each), there are effectively just 13,587 individuals remaining. The vast majority (95%) occurs in the Leuser ecosystem, while other populations are found in the Sidiangkat, Pakpak and Batang Toru forests (Singleton et al. 2017). The overall number continues to decline dramatically (Wich et al. 2016). The species is classified as Critically Endangered.

**Tapanuli orangutan, Pongo tapanuliensis**
This new species was first described in 2017 (Nater et al. 2017). The Nater et al. (2017) study showed that an isolated orangutan population found in the Batang Toru ecosystem of Sumatra, in the southernmost range of extant Sumatran orangutans, is distinct from other Sumatran and Bornean populations. With a total estimated population of fewer than 800 individuals (Wich et al. 2016), *Pongo tapanuliensis* is the great ape species with the lowest total number of individuals, and is Critically Endangered.

### 3.3. Temporal trends in Asian great ape populations

<table>
<thead>
<tr>
<th>Table 8. Asian great ape population decline by taxon</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Species</th>
<th>Subspecies</th>
<th>Abundance</th>
<th>Trend</th>
<th>Annual rate of change</th>
<th>Total estimated change</th>
<th>Period</th>
<th>Source of trend</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bornean orangutan</td>
<td>northwest</td>
<td>6,300</td>
<td>Declining</td>
<td>–4.71%</td>
<td>–53%</td>
<td>1999–2015</td>
<td>Calculated from Voigt et al. (2018)</td>
</tr>
<tr>
<td></td>
<td>Bornean orangutan</td>
<td>(4,700–8,600)</td>
<td></td>
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</tr>
<tr>
<td></td>
<td><em>Pongo p. pygmaeus</em></td>
<td></td>
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<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td></td>
<td>southwest</td>
<td>97,000</td>
<td>Declining</td>
<td>–4.71%</td>
<td>–53%</td>
<td>1999–2015</td>
<td>Calculated from Voigt et al. (2018)</td>
</tr>
<tr>
<td></td>
<td>Bornean orangutan</td>
<td>(73,800–135,000)</td>
<td></td>
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<td></td>
</tr>
<tr>
<td></td>
<td><em>Pongo p. wurmbii</em></td>
<td></td>
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</tr>
<tr>
<td></td>
<td>Bornean orangutan</td>
<td>(22,800–44,200)</td>
<td></td>
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<tr>
<td></td>
<td><em>Pongo p. morio</em></td>
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</tr>
<tr>
<td></td>
<td><em>Pongo abelii</em></td>
<td>(5,400–26,100)</td>
<td></td>
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</tr>
<tr>
<td></td>
<td><em>Pongo tapanuliensis</em></td>
<td>(300–1,400)</td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
</tbody>
</table>

*See temporal trends text for the Sumatran orangutan based on forest loss. Confidence intervals rounded to the nearest 100. 95% confidence intervals are in parentheses. Under the current land-use scenario, as many as 4,500 individuals could disappear by 2030. Other scenarios are mentioned in Wich et al. (2016).*

**Bornean orangutan, Pongo pygmaeus; subspecies: Pongo p. pygmaeus, Pongo p. wurmbii, Pongo p. morio**
Recent studies on the temporal trends of Bornean orangutans found declines of 25% over a 10-year period (2000–2010; Santitka et al. 2017) and approximately 50% for the period 1999–2015 (Voigt et al. 2018). Based on predicted land-cover change alone, a further 43,000 Bornean orangutans could be lost by 2050, which is

† A PHVA workshop took place in Indonesia in 2016. The report awaits final approval.
* Numbers rounded to the nearest 100. 95% confidence intervals in parentheses.
equivalent to 50–60% of the current estimated population (Voigt et al. 2018). Climate change and land-cover prediction models further show that, under a business as usual scenario, 68–81% of the Bornean orangutan habitat will be lost by 2080 (Wich et al. 2015).

**Sumatran orangutan, Pongo abelii**
The decline of the Sumatran orangutan to its current estimated population of 13,900 in 2016 (Wich et al. 2016) has not been systematically quantified. However, forest loss data indicate that the decline must have been large. Between 1985 and 2007, the Sumatran orangutan lost 60% of its key forest habitat (<500 m). Future predictions of forest loss indicate that a further 4,500 Sumatran orangutans, about one-third of the current population, could be lost by 2030 (Wich et al. 2016).

**Tapanuli orangutan, Pongo tapanuliensis**
A quantitative population viability analysis estimated that, in 1985, there would have been ~1,489 individuals of the Tapanuli orangutan, and that the population would decline to only 257 individuals over a 75-year period by 2060 (Nowak et al. 2017). If the key threats are not effectively reduced, an 83% decline over the course of three generations is predicted. Source: Nowak et al. (2017).

3.4. Threats to Asian great apes

**Bornean orangutan, Pongo pygmaeus; subspecies: Pongo p. pygmaeus, Pongo p. wurmbii, Pongo p. morio**
Widespread forest clearance for industrial plantations, cultivation for food, mining infrastructure and rural development, combined with illegal logging, fire and several types of poaching (bushmeat, conflict and live capture), are the main threats to this taxon and have dramatically reduced the number of Bornean orangutans (Wich et al. 2008, 2012b; Santika et al. 2017; Voigt et al. 2018). Data from the Global Forest Resources Assessment shows a 2.4% forest loss between 2000 and 2015 and a 0.7% loss between 2010 and 2015 for the whole of Borneo (FAO 2015). This translates to an annual rate of deforestation estimated at more than 3,000 km² per year between 2000 and 2010 (Gaveau et al. 2014). If this deforestation rate continues, it is predicted that 32,000 km² of forest could be lost by 2020, 129,000 km² by 2050 and 226,000 km² by 2080 (Wich et al. 2015). Most of this deforestation occurs in peatlands that generally harbour large orangutan populations. In 2010, 80% of the range in Kalimantan was located outside protected areas, consisting of commercial forest reserves exploited for timber and forest areas earmarked for conversion to agriculture. The situation is different in Malaysia, where currently more than 80% of orangutans are found in fully-protected forests. Besides forest loss, poaching is another major cause of Bornean orangutan decline (see poaching categories in Table 10 of Section 4). On average, an estimated 1,950–3,100 orangutans were were killed per year within the lifetime of survey respondents (Meijaard et al. 2011), principally for meat consumption (bushmeat poaching) or during human-orangutan conflict (conflict poaching) (Davis et al. 2013; Voigt et al. 2018). This means that habitat protection alone will not ensure the survival of orangutans and that effective reduction of orangutan killings is urgently needed (Ancrenaz et al. 2016). Other threats are fires that contribute to habitat loss and fragmentation, lack of environmental awareness and climate change (Ancrenaz et al. 2016; Santika et al. 2017; Voigt et al. 2018).

**Sumatran orangutan, Pongo abelii**
Habitat loss and fragmentation seriously threaten the survival of the Sumatran orangutan (Wich et al. 2011, 2016). Forests continue to be cleared on a large scale (hundreds of square kilometres) for oil palm plantations. On a smaller scale, logging for timber (both legal and illegal) remains a threat. In addition, the creation of new roads fragment populations and provide access for illegal settlement and further encroachment for agriculture and plantations (also frequently illegal) and to wildlife poachers (Singleton et al. 2017). Sumatran orangutans are often killed deliberately during human-wildlife conflict (conflict poaching), and surviving infants end up in the illegal pet trade (Nijman 2009; Singleton et al. 2017). A significant threat to the Sumatran orangutan comes from the 2013 Aceh province spatial land-use plan allowing large areas of the Leuser ecosystem, which hosts 90% of Sumatran orangutans, to be designated for oil palm plantations as well as timber and mining concessions (Wich et al. 2016). With the same Leuser ecosystem designated in 1997/98 as a National Strategic Area for its environmental function under Aceh’s special autonomy law, and it being the main stronghold of the Sumatran orangutan, revising the spatial land-use plan as a priority would have meaningful benefits for future orangutan populations.

**Tapanuli orangutan, Pongo tapanuliensis**
The Tapanuli orangutan is under considerable threat from high levels of habitat loss and fragmentation, as well as from bushmeat poaching, killing during conflicts over crops (conflict poaching), and illegal trade in young orangutans, fuelled by a human population influx from the west of Sumatra. A substantial section of the range is threatened by habitat conversion for small-scale agriculture, mining exploration and exploitation, a large-scale hydroelectric scheme and geothermal development (Nowak et al. 2017). Due to their slow reproduction rate, with a generation time of about 25 years (Wich et al. 2004, 2009), orangutans on Sumatra are unable to cope with significant and continued individual losses. The small population size and geographic isolation of Pongo
tapanuliensis may lead to inbreeding depression (Hedrick & Kalinowski 2000) and threaten population persistence (Allendorf et al. 2013).

**Table 9. Summary of threats facing Asian great apes per taxon**

<table>
<thead>
<tr>
<th>Species</th>
<th>Main threats</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bornean orangutan</td>
<td>Habitat loss, fragmentation and degradation due to agriculture, extractive</td>
<td>Ancrenaz et al. (2016); Voigt et al. (2018)</td>
</tr>
<tr>
<td><em>Pongo pygmaeus</em></td>
<td>industries and fire Poaching (types: bushmeat, conflict)</td>
<td></td>
</tr>
<tr>
<td>Sumatran orangutan</td>
<td>Habitat loss, fragmentation and degradation due to agriculture, extractive</td>
<td>Wich et al. (2012a, 2016); Singleton et al. (2017)</td>
</tr>
<tr>
<td><em>Pongo abelii</em></td>
<td>industries, and infrastructure (roads)* Poaching (type: roads)</td>
<td></td>
</tr>
<tr>
<td>Tapanuli orangutan</td>
<td>Habitat loss, fragmentation and degradation due to agriculture, extractive</td>
<td>Nowak et al. (2017)</td>
</tr>
<tr>
<td><em>Pongo tapanuliensis</em></td>
<td>industries and construction of large-scale infrastructure (e.g. hydroelectric</td>
<td></td>
</tr>
<tr>
<td></td>
<td>dam) Poaching (types: bushmeat, conflict)</td>
<td>Wich et al. (2012a)</td>
</tr>
</tbody>
</table>

*Cases of illegal trade as a by-product of habitat loss have been reported (Singleton et al. 2017), but in these cases trade is not a direct threat; the direct threat is habitat loss.*

4. Description of threats

The most important direct threats to great apes are habitat loss, degradation and fragmentation, infectious disease, bushmeat poaching, indiscriminate poaching, and deliberate killing due to conflicts over resources, usually cultivated foods. The relative importance of these threats varies by taxon and location. Areas with high human population densities tend to have the most degraded habitats and the lowest ape densities. Many range States are among the poorest countries in the world, with growing populations and development aspirations, including DRC, Guinea, Liberia, Rwanda and Uganda. Sub-Saharan African human population growth rates are among the highest in the world, at about 2.7% annually (World Bank 2018). This places ever-increasing pressure on land, natural resources and wildlife. Consequently, a thorough understanding of local circumstances is required to address the main threats to great apes, as they cannot be considered in isolation from each other.

**Habitat loss, degradation and fragmentation**

Great apes are dependent on forest ecosystems, but these are increasingly threatened by industrial and small-scale agriculture, resource extraction such as logging and mining, as well as infrastructure development (e.g. Ancrenaz et al. 2015). Mirroring the major role that oil palm has played in the loss of great ape habitats in Asia, the progressive development of plantations is a future threat to the African great apes (Wich et al. 2014). Once a forest habitat is lost, it is very difficult to restore and repopulate it. Laurance et al. (2015) describe the environmental costs of 33 planned or under-construction development corridors in Sub-Saharan Africa. It is important to note that some great ape taxa can survive in reduced-impact logging areas (gorillas and chimpanzees; Morgan et al. 2017; orangutans: Ancrenaz et al. 2010). However, survival in low impact logging areas is only possible when the logging is carefully controlled, does not lead to subsequent uncontrolled logging and further habitat deterioration, and when bushmeat poaching is not a threat (Morgan & Sanz 2007; Ancrenaz et al. 2010). Any progressive loss of forest resources (as opposed to rapid loss or habitat conversion) also necessitates high levels of tolerance from people in surrounding areas if great apes are to persist, especially if great apes turn to foraging on crops to supplement their diet, which is the case for orangutans in Asia and many chimpanzee populations in West and East Africa (Hockings & Humle 2009; Campbell-Smith et al. 2012; Bryson-Morrison et al. 2016; Garriga et al. 2018).

**Disease**

Great apes and humans are very closely related and are susceptible to the same deadly diseases (Gilardi et al. 2015). Such diseases include Ebola, anthrax, Marburg viruses and respiratory diseases, with transmission risks growing as human populations expand further into great ape habitat (Leendertz et al. 2006). Pathogen transfer goes both ways and bushmeat consumption can lead to infections in humans (Leendertz et al. 2017). The spread
of disease is facilitated by habitat fragmentation, close proximity between great ape populations and human settlements, and high frequencies of human-great ape interactions (Gilardi et al. 2015).

Poaching

The term “poaching” is used as a synonym for illegal killing, but can have different purposes (see Table 10). We categorize (but do not attempt to quantify) the key types of poaching according to motivation and/or the context in which killing takes place.

Table 10. Key categories of poaching (illegal killing)

<table>
<thead>
<tr>
<th>Type 1: Great apes are targeted and killing is intentional</th>
</tr>
</thead>
<tbody>
<tr>
<td>a  Bushmeat</td>
</tr>
<tr>
<td>b  Conflict</td>
</tr>
<tr>
<td>c  Superstition</td>
</tr>
<tr>
<td>d  Live</td>
</tr>
<tr>
<td>e  Politically-motivated</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Type 2: Great apes are not targeted or killing is not intentional</th>
</tr>
</thead>
<tbody>
<tr>
<td>a  Indiscriminate</td>
</tr>
<tr>
<td>b  Collateral</td>
</tr>
</tbody>
</table>

CITES, INTERPOL and World Customs Organization (WCO) databases (SC65, Doc. 37) only record international trade, thereby under-representing domestic trade. This highlights the need for domestic monitoring.

A) Domestic trade

Poaching is a key threat to all great ape taxa (Tables 5 and 9). Almost all wildlife species (mammals, birds, reptiles, amphibians and even insects) are eaten in much of West and Central Africa, and a huge bushmeat trade network has developed, where very large numbers of animals are hunted in remote forest areas and brought to industrial camps (logging, mining), towns and cities for profit, often over very long distances (e.g. Nasi et al. 2008; Fa & Brown 2009; Wilkie et al. 2011; Ziegler 2016). For example, animals are hunted in Salonga National Park in central DRC and their meat is smoked and then transported on foot and by bicycle, hundreds of kilometres south to the mining towns in Katanga, where the purchasing power of consumers is far greater than in the source villages (e.g. Colom 2006; Steel et al. 2008; Abernethy et al. 2010).

Great ape populations in West and Central Africa are highly threatened by the commercial bushmeat trade (e.g. Refisch & Koné 2005; Plumptre et al. 2010, 2015; Fruth et al. 2016; Maisels et al. 2016c). New roads into
remote forest areas facilitate expansion of the bushmeat trade. For example, in Congo, the road from Brazzaville to Ouesso opens access to remote landscapes and enables transport of bushmeat. Illegal and unsustainable killing has brought many species to the brink of extinction, causing the “empty forest” syndrome (Redford 1992; Wilkie et al. 2011). Although great apes are killed for their meat, they are not generally specifically targeted. There is evidence of deliberate hunting of Cross River gorillas for bushmeat in Cameroon (Dunn et al. 2014). The killing of a mother may enable opportunistic capture of infants, which may then be trafficked illegally (e.g. Plumptre et al. 2016b, 2016c; Singleton et al. 2017). Some communities, particularly in Africa, consider great apes to be their close relatives and hence the killing of them is a taboo (e.g. in some parts of West Africa; Kormos et al. 2003); or along the Congolese coast (Dowsett & Dowsett-Lemaire 1991). However, in Central Africa, taboos against eating western lowland gorillas and central chimpanzees only exist in approximately 1% and 5% of their geographic ranges, respectively (Strindberg et al. 2018). African apes are also killed for traditional medicine or witchcraft. For example, Sá et al. (2012) suggest that poaching for superstitious reasons threatens chimpanzee populations in Guinea-Bissau.

Poaching of orangutans for food occurs extensively in Borneo, especially in the Indonesian parts of the island (Davis et al. 2013), and to a lesser extent in the range of the Tapanuli orangutan on Sumatra (Wich et al. 2012b). It is not known how much trade in orangutan meat occurs, but orangutans have been killed to sell their meat to local communities (Davis et al. 2013). Sumatran and Tapanuli orangutans are similarly at risk from bushmeat poaching and killing as a result of habitat destruction or human-wildlife conflict (Nowak et al. 2017; Singleton et al. 2017).

Although funding has gone into providing alternative sources of protein, the impact of such investments has been marginal and, indeed, rarely quantified. Wicander & Coad (2015) investigated 64 projects in Central Africa that aimed to encourage the production of alternative protein sources and, in some cases, to increase revenue to the target communities. Unfortunately, very few of these projects monitored the impact of their efforts, so no conclusions could be reached as to whether they succeeded in their aims. Possibly because there were, in most cases, either no mechanisms for compliance, or no sanctions for noncompliance, or both, many participants were likely to adopt new protein sources as an additional activity, rather than an alternative activity. In other words, new activities were added to poaching and bushmeat trade rather than replacing them. In some cases, commercial hunters from outside the communities posed a far higher threat to wildlife or ecosystems than did the local communities themselves, rendering project activities ineffective in the face of external pressure. It is essential to build in and budget for the monitoring of project impacts, or it will be impossible to gauge success and failure in order to improve the effectiveness of future approaches.

B) International trade

Poaching for bushmeat poses particular challenges to enforcement, with species-specific identification of bushmeat being a key to addressing this threat. Numerous publications have investigated bushmeat issues in Africa and Asia (for examples see: Nasi et al. 2008; Fa & Brown 2009; Meijaard et al. 2011; Foerster et al. 2012; Coad et al. 2013; Wilkie et al. 2016; Ziegler 2016). However, the volume of bushmeat that crosses international borders – which is specifically relevant to CITES – is particularly difficult to estimate. The vast majority of transborder trade in great ape meat is not transcontinental, but rather across neighbouring country boundaries, where detection is weak. Smuggled goods, including great ape meat, can easily be transported in small boats across rivers, which form highly porous international boundaries. Across terrestrial borders, trafficked goods often travel undiscovered in bush taxis, minibuses and on motorcycles, or even on foot through unpatrolled forests. The vast majority of gorillas, for example, live in Gabon and Congo and their meat is trafficked mostly within those two countries and across borders to the cities of neighbouring countries. Kinshasa in DRC, Yaoundé and Douala in Cameroon, and Bata in Equatorial Guinea are major destinations for all types of bushmeat, including that of great apes, which is trafficked from the more wildlife-rich parts of the region. Intercontinental illegal trade does occur, but is completely dwarfed by the subregional illegal trade. Only two studies at airports in Europe have been carried out, but these indicate that there is an active international bushmeat trade from West and Central Africa to Paris, Geneva and Zurich, which could be transit points to other European countries (Chaber et al. 2010; Wood et al. 2014). However, more research is required to determine how much great ape meat is involved in this trade (Chaber et al. 2010).

Illegal live trade

The illegal trade in live great apes has been recognized as a threat to their survival since the 1980s (e.g. SC66 Doc. 48.2); however, the current scale of this trafficking is unknown. Indications of ongoing live trade include records from the United Nations Office on Drugs and Crime (UNODC) of 208 live apes seized since 2000 (UNODC 2016). In 2017 alone, 20 great ape traffickers were arrested, and 12 live chimpanzees were seized in three African great ape range States, Cameroon, Gabon and Guinea (EAGLE Network 2017). In most cases of illegal live ape capture and trafficking, adults must be killed to obtain infants (see, for example, Plumptre et al. 2015; Humle et al. 2016; Singleton et al. 2017). Evidence indicates that illegal trade in live great apes is a secondary effect of habitat loss and poaching or conflict-related killing. Great apes are often captured and traded
opportunistically, as opposed to poachers entering the forest to deliberately capture infants (e.g., Nijman 2009; Davis et al. 2013; Plumptre et al. 2016b, 2016c; Humle et al. 2016; Singleton et al. 2017).

Known instances of great apes being targeted for capture and subsequent trade include Guinea, where highly organised syndicates have used fraudulent CITES papers to trade chimpanzees with China (CITES mission to Guinea in 2011).

Figure 3. Main international routes for the illegal trade of live great apes (Stiles et al. 2013)

Combined impacts of economic development
Many great ape range States are rich in natural resources, for example, Guinea, DRC and Indonesia. The expanding extractives sector is one of the key drivers collectively accelerating the threats faced by great apes. This poses new challenges for great ape conservation, due to the difficulties in reconciling conservation priorities with urgently needed economic development. Alongside the direct impact of habitat loss caused by mines, logging concessions, roads and other infrastructure (e.g., transmission lines or dams), new development attracts huge numbers of people from far away in search of new opportunities (Rainer et al. 2014). This often leads to uncontrolled additional development, including artisanal mining and farming, and the associated threat of bushmeat poaching. For example, Poulsen and Clark (2010) described poaching for bushmeat inside logging concessions, and Spira et al. (2019) discuss the increase in bushmeat poaching of gorillas and chimpanzees around mines.

5. International agreements specific to great ape range States

The Agreement on the Conservation of Gorillas and Their Habitats (or Gorilla Agreement) was developed under the auspices of Convention on the Conservation of Migratory Species of Wild Animals (CMS) and has been in force since November 2008. At the 12th CMS Conference of the Parties, in 2017, chimpanzees were listed as a migratory species under CMS.

The Gorilla Agreement is an important international legal instrument, as it is a Multilateral Environmental Agreement covering all 10 gorilla range States. The agreement provides governments, IGOs, NGOs, scientists, local people and the international community at large with a legally-binding framework to maintain and rehabilitate gorilla populations and their habitats. The Agreement is administered by the CMS Secretariat, which works closely with GRASP and benefits from partnerships with other organizations, including CITES and the
As many great ape habitats extend beyond political state borders, land-use planning and protected areas management require cross-border cooperation. However, transboundary conservation efforts can easily become complex. To be successful, they require high-level political commitment, sustained financial and technical support, cross-sectorial collaboration, strong institutional coordination and inclusion of all impacted stakeholders in the decision-making process. Examples of particularly encouraging initiatives include transboundary collaboration between DRC, Rwanda and Uganda in the Greater Virunga Landscape (Refisch & Jenson 2016); the Sangha Trinational, which involves Cameroon, Central African Republic and Congo; the Transboundary Peace Park for Sierra Leone and Liberia, which unites the Rainforest National Park in Sierra Leone and Gola Forest National Park in Liberia; the Mayombe Transboundary Initiative encompassing Luki Reserve in DRC, Dimonika Reserve in Congo and Maiombe National Park in Cabinda, Angola (Ron & Refisch 2013); and the Heart of Borneo Initiative unifying the interior regions of Indonesian and Malaysian Borneo and Brunei Darussalam.

6. Challenges and solutions

Almost all great ape populations are in decline in both Africa and Asia, some so drastically that the population viability is in doubt. Following similar developments in Southeast Asia, the African landscape will soon experience a dramatic change through large-scale investments in extractive industries, transport infrastructure and commercial agriculture (Edwards et al. 2014; Wich et al. 2014; Laurance et al. 2015; Rainer et al. 2015; Sloan et al. 2016). While these industries can help lift people out of poverty, operations must be sensitive to the biodiversity values and ecosystem services on which local communities and wildlife heavily rely. Hence, inclusive and integrated land-use planning processes and implementation of biodiversity-friendly business practices are required if such economic activities are to be accommodated sustainably in great ape habitats. The most sensitive ecosystems and biologically-rich great ape habitats should be protected, ideally through designation as off-limits to habitat modification. In this respect, a number of initiatives seek to minimize the negative impacts of industrial activities (agriculture and extractives) on biodiversity. These efforts include the Forestry Stewardship Council (FSC) for sustainable logging, the Roundtable for Sustainable Palm Oil (RSPO), the Business and Biodiversity Offsets Programme (BBOP) and associated standards (BBOP Standard on Biodiversity Offsets), the International Finance Cooperation (IFC) Performance Standard 6, the Equator Principles, the Global Oil and Gas Industry Association for Environmental and Social issues (IPIECA), and the International Council on Mining and Metals (ICMM). The description of each initiative and its potential benefit for the conservation of great apes and their habitats goes beyond the purpose of this report.

Law enforcement alone is insufficient to halt illegal trafficking of live great apes or their body parts. Arrests and convictions for holding or selling great apes (or bushmeat of any kind, including ape meat) rarely occur (Nijman 2005). Stiles et al. (2013) reported just 27 arrests for great ape trade between 2005 and 2011 – one quarter of which were never prosecuted. Peer-reviewed studies found that weak enforcement and lenient sentencing were inadequate deterrents of crime, recording only one prosecution for orangutan trading between 2006 and 2016 in two provinces of West Kalimantan, Indonesia (Freund et al. 2017; Nijman 2017). Freund et al. (2017) found that not one of 145 orangutan cases reported and 133 rescues/confiscations resulted in prosecution or charges. Nijman (2017) found that at least 440 formal confiscations and surrenders of orangutans to law enforcement agencies across Indonesia between 1993 and 2016 resulted in only seven successful convictions. Reported convictions have been criticized for light sentences, which are unlikely to deter further crime. For example, four oil palm plantation workers were sentenced to 8–10 months in prison for killing two orangutans, and four people were sentenced to only eight months in prison for killing 20 orangutans (Jakarta Post 2012). In addition, corruption can render wildlife law enforcement ineffectual, as deterence becomes difficult to achieve (Bennett 2015). Many of the world’s great ape range States score poorly on the Corruption Perceptions Index (Transparency International 2018). In many cases, convicted and incarcerated criminals have been able to bribe their way to liberty (Martini 2013; WWF & TRAFFIC 2015; Wyatt & Ngoc Cao 2015). Without convictions and effective deterrence, it will not be possible to reduce the rates of illegal killing that threaten great apes. In this context, understanding the whole chain of actors involved in the bushmeat trade is necessary in order to address the threat. Caspary et al. (2001) described the entire bushmeat network around the Tai National Park in Côte d’Ivoire, including urban bushmeat markets and restaurants.

Improvements in law enforcement efforts are underway in several countries. The EAGLE network, which started in Cameroon, has now been replicated in Benin, Congo, Côte d’Ivoire, Gabon, Guinea, Madagascar, Senegal, Togo and Uganda, with increasingly visible success (EAGLE Network 2018). Partnerships between EAGLE members and national governments result in environmental crimes being detected, followed up and brought to
justice. Their focus is usually ivory, as well as on great ape meat and live trade. For example, efforts by the EAGLE network member LAGA, in collaboration with the government in Cameroon, resulted in a record number of eight court judgments against 13 wildlife traffickers in 2017, with two traffickers receiving maximum penalties of three years imprisonment (EAGLE Network 2017). In Indonesia in 2016, three orangutan smugglers were sentenced to up to 2.5 years in prison (Tempo 2016), and in 2017, an orangutan killer was given a sentence of two years and nine months in prison (Robin des Bois 2016; the organisation produces a quarterly newsletter of wildlife illegal trade records across the world). More work is needed to build on these efforts and establish deterrence against further illegal capture, killing, holding or sale of great apes across all range States.

In the context of the CITES mandate, more research is required to understand the scale of illegal cross-border trade in live great apes and their body parts. As detailed above, bushmeat crosses borders with little or no control. It is often difficult to identify body parts to species level (meat can be smoked and/or cut into sections), or by country of origin.

Both illegal meat and live trade are facilitated by corruption, lack of law enforcement, and in some range States, impunity. High profit margins and low risks to wildlife criminals have meant that people engaged in other types of crime (e.g. trafficking of drugs) have added wildlife crime to their activities. Furthermore, e-commerce has given suppliers and smugglers unprecedented access to new markets (Estrada et al. 2017). The development of social media outlets as venues for wildlife trade is responsible for an explosion of illegal trade in numerous species that are now sold illicitly via the Internet (CITES CoP17 Doc. 29; Harrison et al. 2016). CITES Decisions 17.92-17.96 direct Parties, the CITES Secretariat and the CITES Standing Committee to review and develop measures to combat this wildlife cybercrime (CITES CoP17 Decisions 2016). The online trade is stimulated by the countless photos on social media of people holding wild animals taken in various situations (e.g. rescue facilities, zoos). Such images can influence the perceptions people have of those species’ status and promote the idea of possessing them as pets (e.g. Ross et al. 2008; Leighty et al. 2015). Great apes are highly symbolic in the global illegal wildlife trade. The media is increasingly covering this topic and regular reports give cause for continued concern (e.g. Shukman 2017). However, until recently, there has been a significant lack of verified quantitative and qualitative data on the trade in great apes, including the circumstances surrounding confiscations, making it hard to define longer-term strategies to combat this high-profile issue. To address this gap, GRASP, together with its technical partner, the UNEP-World Conservation Monitoring Centre (UNEP-WCMC), has developed the first phase of the Apes Seizure database (https://database.un-grasp.org/). This database includes data on live ape trade and the illegal trade in great ape parts and carcasses. The application was launched at the 17th CITES Conference of the Parties, in October 2016, in Johannesburg, and is currently undergoing a data validation process. It is anticipated that the database will provide analytics on illegal trade for a Status Report to the CITES CoP18 in 2019.

Further development of the Apes Seizure database can work hand-in-hand with the application of new advances in genetic recognition technology. According to CITES regulations, when possible, live victims of illegal wildlife trade should be repatriated to their countries of origin. However, when a great ape is confiscated, it carries little identification other than its DNA. Substantial genetic data collected to date on many wild great ape populations are a good starting point for a genetic recognition resource (e.g. Goldberg 1997; Hvilsom et al. 2013). Additional reference samples will be required, with particular attention paid to populations less well-documented by existing research projects. In cases of illegally-trafficked great apes or great ape meat, DNA can be analysed to inform decisions on repatriation of live individuals to their country of origin, and to identify the source population, thus better directing future law enforcement efforts. Progress has been made in the development of mobile DNA sequencers (e.g. Minion from Oxford Nanopore Technologies). Providing sequencing units to law enforcement and customs officers, along with the necessary training, would enable genetic sampling on the spot and improve the identification of bushmeat or the origin of live animals.

In 2016, CITES introduced a new annual report format for illegal trade, but only a very small number of records of illegal trade in great apes have been included in the reports submitted so far.

Given the wide range of different threats and their complex interlinkages, it is reasonable to assume that addressing any one of these threats alone will not be enough to achieve conservation goals. Great ape habitats continue to be degraded because developmental spatial planning does not take conservation into account, spatial land-use planning is rarely done at a national scale, and law enforcement is weak, or a combination of these factors. Human populations continue to grow rapidly (especially in Sub-Saharan Africa, doubling every 30 years, and in Indonesia where the population will double in about 70 years; World Bank 2018), putting ever-increasing pressure on land and natural resources. Therefore, great ape meat and live apes will thus continue to appear in the illegal wildlife trade. A holistic approach is required to tackle these challenges effectively, with strong political commitment and coordination between the various actors involved in law enforcement and conservation, including cross-border collaboration. Responses to address the drivers of illegal bushmeat trade and of international illegal live ape by criminal cartels are required.
One approach to addressing the complex interlinkages is coordination among different law enforcement stakeholders at national and regional levels, which remains a challenge. The International Consortium on Combatting Wildlife Crime (ICCWC) is one example where main law enforcement actors strive to coordinate and pool efforts. Within this Consortium, CITES, UNODC, INTERPOL and WCO partner to strengthen criminal justice systems and provide coordinated support at national, regional and international levels to combat wildlife and forest crime (https://cites.org/eng/prog/iccwc.php).

Often proposed as an opportunity, tourism with great apes is seen as a means of generating revenue to fund conservation efforts and to protect great apes and their habitats, or as a way for local communities to participate in, and benefit from, conservation activities. The success of mountain gorilla tourism has shown that conservation-based great ape tourism has considerable potential; however, it will not be possible to replicate this success at many other sites. The number of significant risks to great apes that can arise from tourism require a cautious approach. If great ape tourism is not based on sound conservation principles, economic objectives are likely to take precedence, the consequences of which could be detrimental to the great apes and their habitat. See IUCN Best Practice Guidelines for Great Ape Tourism (Macfie & Williamson 2010).

7. Recommendations

This report recommends the following actions directed to CITES Parties, recognizing that effective steps to protect great apes involve both great ape range States and the countries that import, or act as trade conduits for, live great apes, great ape meat, other body parts and derivatives, as well as other natural resources extracted from great ape habitats:

1. Recognizing that some CITES Parties may have already undertaken this analysis, all Parties are recommended to review relevant national and regional level legislation, policies and sanctions to ensure adequate protection of great apes through improved legal frameworks, with support from independent legal experts and with reference to the International Consortium in Combating Wildlife Crime (ICCWC)’s Wildlife and Forest Crime Analytic Toolkit and USAID’s Measuring Efforts to Combat Wildlife Crime: A Toolkit for Improving Action and Accountability;

2. Recognizing that many CITES Parties are already undertaking relevant actions in this regard, all Parties are recommended to increase law enforcement efforts by ensuring that existing laws are effectively applied and appropriate judicial processes are adhered to, with reference to the ICCWC and USAID toolkits mentioned above. This can be attained by corruption mitigation strategies, and better training of local practitioners and rangers in law enforcement, prosecution evidence gathering, and modern forensic methods, as well as training of customs agents to profile suspect shipments and identify animal species to combat cross-border illegal trade;

3. All Parties are recommended to oblige, by national law, all private actors in the energy, extractives and agricultural sectors to comply with national and international laws and with IUCN and industry best practices in minimising impact on great ape populations and habitat, and should enforce clear penalties for cases of non-compliance. Of particular benefit would be the inclusion of great apes as Species at Risk (SAR) in the FSC standards;

4. Great ape conservation partners are encouraged to contribute to, further develop and use the GRASP Apes Seizure database. These partners include the national law enforcement agencies and wildlife departments likely to hold data on seizures of trafficked bushmeat and live animals, relevant conservation NGOs involved in supporting law enforcement and compliance, researchers and wildlife sanctuaries;

5. All Parties are encouraged to accumulate all data at their disposal (e.g. protected area and conservation NGO reports, police reports, judiciary outcomes, etc.) in order to more consistently report illegal trade data to CITES in a timely manner in accordance with the annual illegal trade report format, and should

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3 Industry best practices bodies are, for forestry: Forestry Stewardship Council (FSC), and IUCN guidelines on reduced impact logging and great apes (Morgan & Sanz, 2007), and on great apes and FSC standards (Morgan et al. 2013); for industry in general: the Business and Biodiversity Offsets Program (BBOP) and BBOP Standard on Biodiversity Offsets, International Finance Corporation (IFC) Performance Standard 6, Equator Principles, IPIECA (global oil and gas industry association for environmental and social issues), and the International Council on Mining and Metals (ICMM).

4 https://cites.org/sites/default/files/reports/E-Guidelines-IllegalTR.pdf
share data on illegal trade in great apes and great ape parts with GRASP for inclusion in the GRASP Apes Seizure database;

6. All Parties are recommended to use existing DNA sequence databases to establish the origin of confiscated great apes, and/or to support the potential repatriation of live animals;

7. All range State Parties are encouraged to consolidate data from protected area authorities, research and conservation organizations, commercial partners or other relevant stakeholders, in order to contribute great ape survey data and other relevant information to the IUCN SSC A.P.E.S. database by contacting Dr. Tenekwetch Sop (tenekwetch_sop@eva.mpg.de);

8. All Parties that have not already done so are encouraged to ratify and fully implement the UN Convention against Transnational Organized Crime;

9. Recognizing the negative impact that corruption plays at all levels in support of the illegal capture and trade in great apes, all Parties that have not already done so are encouraged to ratify and fully implement the UN Convention against Corruption, and to solicit the support of national and international NGOs which specialize in combatting corruption, to enhance efforts to eradicate corruption and ensure appropriate judiciary process as it pertains to wildlife law enforcement;

10. All Parties are encouraged to study dietary alternatives to bushmeat, and to monitor the implementation and impacts of projects piloting bushmeat alternatives, in order to determine their efficacy;

11. All range State Parties are encouraged to adopt legally binding transboundary agreements and foster collaborative judiciary proceedings with respect to evidence exchange, sentencing and extradition to enhance enforcement of illegal cross border trade in live apes, ape parts and bushmeat;

12. All Parties are encouraged to reject any applications for trade in potentially wild caught great apes (permits with source codes “W”, “U” or “I”). Given the rarity of these taxa and the large numbers of captive-bred great apes currently held in zoos and other ex-situ collections, wild-caught great apes are not acceptable for trade among zoos, safari parks or other educational or scientific institutions except under extraordinary circumstances.

The following recommendation is directed to the CITES Secretariat:

13. The Secretariat, in collaboration with other funders and partners such as UNODC where appropriate, is encouraged to provide technical and financial assistance to range States to further strengthen their criminal justice responses to wildlife crime, including tracing and recovering the proceeds of crime and clamping down on corruption.

The following recommendation is directed to private and public donors:

14. All private and public donors are encouraged to provide financial support to enable these recommendations to be implemented.

8. Main sources of information

Information on great ape population estimates and change over time has been derived from the IUCN SSC A.P.E.S. database. However, data from the more recent publications has not been entered yet. In these cases, we used information from the IUCN Red List to ensure that the information presented in this report is as up-to-date as possible.

9. Acknowledgements

We thank the members of the GRASP secretariat, namely, in alphabetical order, Milena Beekmann, Vinita Ganesh, Amelia Holmes, Dylan Jones, Emily Massingham, Tess Nicholls and Pauliina Upla for their contribution to this document and support throughout the process. Special thanks go to Milena Beekmann for her coordination efforts and her role in the peer-review process. For their contributions to the IUCN Red List assessment texts used in this report, we also thank Claudine André, Anna Behm Masozera, Christophe Boesch, Thomas Breuer, Damien Caillaud, Genevieve Campbell, Osiris Doumbé, Andrew Dunn, Andrew Fowler, Gabriella Fredriksson, Barbara Fruth, Takeshi Furuichi, Mary Gonder, Melvin Gumal, Jefferson Hall, John Hart,
10. References


### Annex I. Acronyms

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<thead>
<tr>
<th>Acronym</th>
<th>Full Form</th>
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<tbody>
<tr>
<td>A.P.E.S. database</td>
<td>Ape Populations, Environments and Surveys database</td>
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<td>CITES CoP</td>
<td>CITES Conference of the Parties</td>
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<td>CMS</td>
<td>Convention on the Conservation of Migratory Species of Wild Animals</td>
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<td>DNA</td>
<td>Deoxyribonucleic acid</td>
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<td>GRASP</td>
<td>Great Apes Survival Partnership</td>
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<td>ICCN</td>
<td>Institut Congolais pour la Conservation de la Nature</td>
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<td>IGO</td>
<td>Intergovernmental organisation</td>
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<td>INTERPOL</td>
<td>International Criminal Police Organisation</td>
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<td>IUCN</td>
<td>International Union for Conservation of Nature</td>
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<td>JGI</td>
<td>Jane Goodall Institute</td>
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<td>NGO</td>
<td>Non-governmental organisation</td>
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<td>LAGA</td>
<td>The Last Great Ape Organisation Cameroon</td>
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<td>The Pan African Programme</td>
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<td>PSG</td>
<td>Primate Specialist Group</td>
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<td>SGA</td>
<td>Section on Great Apes</td>
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<td>Species Survival Commission</td>
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<td>TRAFFIC</td>
<td>The Wildlife Trade Monitoring Network</td>
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<td>UNEP</td>
<td>United Nations Environment Programme</td>
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<td>United States Agency for International Development</td>
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