

Abundance Annex

Ape Population Abundance Estimates

This annex presents ape abundance estimates at the site level. The term “site” refers to a protected area and its buffer zone, a logging concession or group of concessions, or any discrete area where a survey has taken place in the past two decades, although this annex also lists a few sites that were last surveyed in the 1970s and 1980s.

Most of the estimates are drawn from peer-reviewed publications and gray literature; some have been reconfirmed by experts in the field. Since records of absolute ape numbers are rarely available, this annex uses abundance classes to indicate population ranges. Abundance classes are defined in Table 1.

TABLE 1

Abundance class definitions

Abundance class	Class definition
<50	Fewer than 50 individuals
50–100	51–100 individuals
100–300	101–300 individuals
300–500	301–500 individuals
500–1,000	501–1,000 individuals
1,000–5,000	1,001–5,000 individuals
5,000–10,000	5,001–10,000 individuals
10,000–20,000	10,001–20,000 individuals
20,000–50,000	20,001–50,000 individuals
50,000–100,000	50,001–100,000 individuals
>100,000	More than 100,000 individuals
Present	Confirmed presence; population size unknown
Extirpated	Apes extirpated locally
Possibly extinct	Apes are “possibly extinct” nationwide (IUCN, 2015)
Extinct	Apes are “regionally extinct” (IUCN, 2015)

In the following tables, asterisks in the abundance columns indicate which ape populations are stable (*) or increasing (**). Most ape populations, however, are in decline or the population trend is unknown.

Site names in **bold** are recognized as priority sites for African ape conservation by the Primate Specialist Group of the International Union for Conservation of Nature (IUCN) Species Survival Commission (SSC). Priority sites for orangutans and gibbons have not yet been identified.

Abbreviations used in this annex are listed at the end of this annex.

Notes on Tables 5 and 9: Gorillas are often sympatric with chimpanzees, meaning that they occupy the same geographic range. Biologists who survey great apes usually count their nests as proxies for the apes themselves; in areas where gorilla and chimpanzee ranges overlap, it is not always possible to determine which species made each nest.¹ An additional column lists the number of species represented in each abundance estimate, showing a value of “1” (gorillas in Table 5, chimpanzees in Table 9) or “2” (gorillas and chimpanzees counted together as “apes”).

¹ A statistical tool developed in 2007 can sometimes be applied *post hoc* to distinguish between nests built by sympatric gorillas and chimpanzees. See Sanz *et al.* (2007) and Stokes *et al.* (2010).

The list of sites in these tables is not exhaustive as abundance estimates are not available for all ape populations. To inform us of any errors or omissions, please contact the A.P.E.S. database manager (e-mail: apes@eva.mpg.de). Updates will be made available in digital form via the A.P.E.S. Portal (<http://apesportal.eva.mpg.de>) and in each subsequent edition of *State of the Apes*.

TABLE 2**Mountain gorilla (*Gorilla beringei beringei*) abundance estimates**

Country	Site name	Abundance	Survey year	Source
DRC	Virunga NP	**200	2010	Gray <i>et al.</i> (2013)
Rwanda	Volcanoes NP	**230	2010	Gray <i>et al.</i> (2013)
Uganda	Bwindi Impenetrable NP	**400	2011	Roy <i>et al.</i> (2014)
	Mgahinga Gorilla NP	**50	2010	Gray <i>et al.</i> (2013)

Note: Two asterisks (**) indicate that an ape population is growing.

TABLE 3**Grauer's gorilla (*Gorilla beringei graueri*) abundance estimates**

Country	Site name	Abundance class	Survey year	Source
DRC	Itombwe	500–1,000	2008	Plumptre <i>et al.</i> (2009)
	Kahuzi-Biega NP highlands	100–300	2010	Nixon <i>et al.</i> (2012)
	Kahuzi-Biega NP lowlands	1,000–5,000	2010	Nixon <i>et al.</i> (2012)
	Kasese	500–1,000	2012	Nixon <i>et al.</i> (2012)
	Kisimba-Ikoba	100–300	2003–10	Nixon <i>et al.</i> (2012)
	Lubero–Alimbongo–Luofu	Extirpated	2000–12	Nixon <i>et al.</i> (2012)
	Lowa–Oso	<50	2010–15	C. Kaghoma and M. Vyalengerera, unpublished data, 2015
	Maiko NP north	300–500	1989	Nixon <i>et al.</i> (2012)
	Maiko NP south	500–1,000	2010	Nixon <i>et al.</i> (2012)
	Masisi	Extirpated	2001–12	Nixon <i>et al.</i> (2012)
	North Lowa	<50	2015	C. Kaghoma and M. Vyalengerera, unpublished data, 2015
	Tayna Gorilla Reserve	100–300	2006	Nixon <i>et al.</i> (2012)
	Usala	300–500	2007	Nixon, Kaghoma and Vyalengerera (2015)
	Virunga NP (Mt. Tshiaberimu)	6 individuals	2015	Sikubwabo (2015)
	Walikale	500–1,000	2010	Nixon <i>et al.</i> (2012)

Note: Site names that appear in bold are identified as priority sites in Maldonado *et al.* (2012).

TABLE 4Cross River gorilla (*Gorilla gorilla diehli*) abundance estimates

Country	Site name	Abundance class	Survey year	Source
Cameroon	Ebo proposed NP	<50	2007	Morgan (2010)
	Kagwene Gorilla Sanctuary	<50	2012	De Vere <i>et al.</i> (2011)
	Mbulu Forest	<50	2008	Warren and Bila (2008)
	Mone River FR east	<50	2008	Warren <i>et al.</i> (2008)
	Takamanda NP	<50	2013	Kuchambi and Ikfuingei (2014)
	Tofala Hills	<50	2012	Dunn <i>et al.</i> (2014)
Nigeria	Afi Mountain Wildlife Sanctuary	<50	2012	Dunn <i>et al.</i> (2014)
	Cross River NP Boshi Extension	<50	2009	Imong, Mengnjo and Okeke (2009)
	Cross River NP Okwangwo Division	<50	2012	Dunn <i>et al.</i> (2014)
	Mbe Mountains	<50	2012	Dunn <i>et al.</i> (2014)

Note: Site names that appear in bold are identified as priority sites in Dunn *et al.* (2014).

TABLE 5Western lowland gorilla (*Gorilla gorilla gorilla*) abundance estimates

Country	Site name	Abundance class	No. spp.	Survey year	Source
Angola	Maiombe (Cabinda)	Present	2	None	IUCN (2014)
Cameroon	Boumba-Bek NP	1,000–5,000	1	2012	Maisels <i>et al.</i> (2014)
	Campo Ma'an NP	500–1,000	1	2008	Etoga and Foguekem (2008)
	Deng Deng FMU 10-065	*300–500	1	2012	Maisels <i>et al.</i> (2013a)
	Deng Deng NP	*100–300	1	2012	Maisels <i>et al.</i> (2013a)
	Dja Biosphere (or Faunal) Reserve (partial)	1,000–5,000	2	2009	Latour (2010)
	Lobéké NP	*1,000–5,000	1	2009	Blake, Strindberg and Princée (2012)
	Mengamé Gorilla Sanctuary	1,000–5,000	1	2003	Halford <i>et al.</i> (2003)
	Nanga-Eboko forest	Present	1	2002	Fotso, Eno Nku and Groves (2002)
	Ngoila Mintom	20,000–50,000	1	2011	Blake <i>et al.</i> (2012)
	Nki NP	10,000–20,000	1	2004	Blake <i>et al.</i> (2012)

Country	Site name	Abundance class	No. spp.	Survey year	Source
Cameroon	Sanaga-Yong	Present	1	2002	Fotso <i>et al.</i> (2002)
	FMU 09-024	Present	1	2008	Etoga (2008)
	FMU 10-013	1,000–5,000	1	2003	Blake <i>et al.</i> (2012)
	FMU 10-038	1,000–5,000	1	2001	Etoga (2001)
	FMU 10-039	Present	1	2001	Etoga (2002)
	FMU 10-047a	300–500	1	2007	Bombome (2007)
	FMU 10-064	1,000–5,000	1	2004	Blake <i>et al.</i> (2012)
	FMU 10-08/09/10/12	5,000–10,000	1	2005	Blake <i>et al.</i> (2012)
	ZICGC 9	Present	1	2007	Mahop (2007)
CAR	Dzanga NP	300–500	1	2011–12	Princée (2013)
	Dzanga Special Reserve	500–1,000	1	2012	Princée (2013)
	Ndoki NP	1,000–5,000	1	2012	Princée (2013)
Congo	Bailly Swamps	10,000–20,000	1	2010	Maisels <i>et al.</i> (2012)
	Batanga	*1,000–5,000	1	2012	Iyenguet <i>et al.</i> (2012)
	Batéké Forest	500–1,000	1	2012	Tolisano <i>et al.</i> (2013)
	Conkouati-Douli NP	1,000–5,000	2	2013	Vanleeuwe (2014)
	Dimonika Biosphere Reserve	100–300	1	2009	Pintea <i>et al.</i> (2012)
	Impfondo	Present	1	2008	Iyenguet <i>et al.</i> (2008)
	Kabo	*5,000–10,000	1	2010	Maisels <i>et al.</i> (2012)
	Lac Télé Community Reserve	*10,000–20,000	1	2011	Maisels <i>et al.</i> (2012)
	Lossi Gorilla Sanctuary	Present	1	2006	Bassouama <i>et al.</i> (2006)
	Loundougou	5,000–10,000	1	2010	Maisels <i>et al.</i> (2012)
	Messok-Dja	1,000–5,000	2	2013	Moukala Mantsila, Mbani and Mahoungou (2013)
	Mokabi	300–500	1	2006	Stokes <i>et al.</i> (2010)
	Ngombe	*50,000–100,000	1	2014	Maisels <i>et al.</i> (2015)
	Nouabalé-Ndoki NP	*1,000–5,000	1	2010	Maisels <i>et al.</i> (2012)
	Ntokou-Pikounda NP	5,000–10,000	1	2014	Maisels <i>et al.</i> (2015)
	Odzala-Koukoua NP	20,000–50,000	1	2012	Maisels <i>et al.</i> (2013b)
	Pokola	*10,000–20,000	1	2010	Maisels <i>et al.</i> (2012)
	Tanga	1,000–5,000	2	2009	Malanda, Iyenguet and Madzoke (2010)
DRC	Maiombe	Extirpated	1	None	IUCN (2015)

Country	Site name	Abundance class	No. spp.	Survey year	Source
Equatorial Guinea	Nationwide	1,000–5,000	1	2011	Murai <i>et al.</i> (2013)
Gabon	Bambidie	100–300	1	2012	Haurez <i>et al.</i> (2014)
	Batéké Plateau NP	Present	2	2005–6	Bout (2006)
	Birougou NP	500–1,000	2	2006–7	Aba'a and Bezangoye (2007)
	Evaro	Present	2	2005	Latour (2005)
	Ivindo concessions	500–1,000	2	2010	Motsaba and Maisels (2010)
	Ivindo NP	1,000–5,000	2	2009	Motsaba <i>et al.</i> (2009)
	Loango NP	300–500	2	2006	Maisels (2009)
	Lopé NP	1,000–5,000	2	2008–9	Bezangoye and Maisels (2010)
	Lopé-Waka corridor	1,000–5,000	2	2007	Maisels, Abitsi and Bezangoye (2008)
	Mayombe	1,000–5,000	2	2011	Aba'a <i>et al.</i> (2011)
	Mayumba NP	*Present	2	2006–11	Makaya (2010)
	Minkébé NP	**Present	2	2012–13	ANPN (2013)
	Monts de Cristal NP	Present	2	2005	Aba'a (2006)
	Moukalaba Doudou NP	Present	2	2010	Nakashima <i>et al.</i> (2013)
	Mwagna NP	**Present	2	2012	Maisels and Ella Akou (2013)
	Waka NP	Present	2	2005–6	Abitsi (2006)
	Wonga Wongué	Present	2	2011	Motsaba and Aba'a (2011)

Notes: One asterisk (*) indicates that an ape population is stable; two asterisks (**) indicate that an ape population is growing. The “number of species” (No. spp.) column indicates whether the abundance estimate refers to gorillas only (1) or to gorillas and chimpanzees together (2). Site names that appear in bold are identified as priority sites in IUCN (2014).

TABLE 6

Bonobo (*Pan paniscus*) abundance estimates

Country	Site name	Abundance class	Survey year	Source
DRC	Lac Tumba Bolobo	50–100	Unknown	IUCN and ICCN (2012)
	Lac Tumba Bolombo-Losombo	Present	2005	Inogwabini <i>et al.</i> (2007)
	Lac Tumba Botwali-Ilombe	Present	2005	Inogwabini <i>et al.</i> (2007)
	Lac Tumba Botwali	50–100	2004	IUCN and ICCN (2012)
	Lac Tumba Lediima Reserve	50–100	2004	IUCN and ICCN (2012)

Country	Site name	Abundance class	Survey year	Source
DRC	Lac Tumba Malebo	1,000–5,000	2005	Inogwabini <i>et al.</i> (2007)
	Lac Tumba Mbala-Donkese	<50	2005	Inogwabini <i>et al.</i> (2007)
	Lac Tumba Mbie Mokele	50–100	2006	IUCN and ICCN (2012)
	Lac Tumba Monieke-Bokote	Present	2006	IUCN and ICCN (2012)
	Lac Tumba Mpoka	Present	2009	IUCN and ICCN (2012)
	Lac Tumba Ngombe-Botuali	100–300	2005	Inogwabini <i>et al.</i> (2007)
	Lac Tumba Nkosso	Present	2006	IUCN and ICCN (2012)
	Lubefu	Present	2010	IUCN and ICCN (2012)
	Maringa-Lopori-Wamba landscape Bilya-Iyondje	Present	2009	IUCN and ICCN (2012)
	Maringa-Lopori-Wamba landscape Boseka-Bokungu	50–100	2008	IUCN and ICCN (2012)
	Maringa-Lopori-Wamba landscape Cadjobe	300–500	2009	Reinartz and Guislain (2010)
	Maringa-Lopori-Wamba landscape Iyondji	Present	2009	IUCN and ICCN (2012)
	Maringa-Lopori-Wamba landscape K7	Present	2010	IUCN and ICCN (2012)
	Maringa-Lopori-Wamba landscape Kokolopori	300–500	2004–5	IUCN and ICCN (2012)
	Maringa-Lopori-Wamba landscape Lingomo	50–100	2008	IUCN and ICCN (2012)
	Maringa-Lopori-Wamba landscape Lomako-Yokokala	500–1,000	2010	IUCN and ICCN (2012)
	Maringa-Lopori-Wamba landscape Lonua	Present	2006	IUCN and ICCN (2012)
	Maringa-Lopori-Wamba landscape Luo	50–100	2003–5	IUCN and ICCN (2012)
	Maringa-Lopori-Wamba landscape Mompono-Bekumolokole	50–100	2008	IUCN and ICCN (2012)
	Maringa-Lopori-Wamba landscape Mompono-Yaama	50–100	2008	IUCN and ICCN (2012)
	Maringa-Lopori-Wamba landscape Samba	50–100	2007	IUCN and ICCN (2012)
	Salonga landscape corridor	Present	2007–8	Maisels <i>et al.</i> (2009)
	Salonga landscape Ikela-Bokungu	Present	2008	IUCN and ICCN (2012)
	Salonga landscape Lokoro-Lukenie	Present	2006–7	IUCN and ICCN (2012)

Country	Site name	Abundance class	Survey year	Source
DRC	Salonga landscape Lotoi-Lokoro	Present	2006–7	IUCN and ICCN (2012)
	Salonga landscape LuiKotale-Bompusa	<50	2012	IUCN and ICCN (2012)
	Salonga landscape Lukenie-Sankuru	Present	2006–7	IUCN and ICCN (2012)
	Salonga landscape Lukuru	50–100	1994–5	IUCN and ICCN (2012)
	Salonga landscape Yetsi-Ikela	50–100	2008	IUCN and ICCN (2012)
	Salonga NP Beminyo	100–300	2000–2	Reinartz <i>et al.</i> (2006)
	Salonga NP Bonima	Present	2000–2	Reinartz <i>et al.</i> (2006)
	Salonga NP east	Present	2007–8	Maisels <i>et al.</i> (2010)
	Salonga NP Estate core	<50	2006–9	Guislain and Reinartz (2010–11)
	Salonga NP Estate extension	500–1,000	2006–9	Guislain and Reinartz (2010–11)
	Salonga NP Ikolo	<50	2005	Guislain and Reinartz (2010–11)
	Salonga NP Isanga	<50	2000–2	Reinartz <i>et al.</i> (2006)
	Salonga NP Iyaelima	1,000–5,000	2005–6	Grossmann <i>et al.</i> (2008)
	Salonga NP Lokofa	1,000–5,000	2015	WCS DRC, unpublished data, 2015
	Salonga NP Lomela	1,000–5,000	2006	Grossmann <i>et al.</i> (2008)
	Salonga NP Lotulo	<50	2000–2	Reinartz <i>et al.</i> (2006)
	Salonga NP north	5,000–10,000	2003–6	Grossmann <i>et al.</i> (2008)
	Salonga NP south	5,000–10,000	2003–6	Grossmann <i>et al.</i> (2008)
	Salonga NP Yongo	<50	2000–2	Reinartz <i>et al.</i> (2006)
	Sankuru NR	Present	2009	Liengola <i>et al.</i> (2009)
	Tshuapa-Lomami-Lualaba	5,000–10,000	2008–10	IUCN and ICCN (2012)

Note: Site names that appear in bold are identified as priority sites in IUCN and ICCN (2012).

TABLE 7

Nigeria–Cameroon chimpanzee (*Pan troglodytes ellioti*) abundance estimates

Country	Site name	Abundance class	Survey year	Source
Cameroon	Ako-Mbembe FR	Present	2005	Morgan <i>et al.</i> (2011)
	Assaka Forest	Present	2006	Ekinde and Ashu (2006)
	Bafut-Ngemba FR	Extirpated	2011	Elliott.org (n.d.)
	Bakossi NP	Present	2009	Fonkwo, Angwafo and Mbida (2011)

Country	Site name	Abundance class	Survey year	Source
Cameroon	Banyang-Mbo Wildlife Sanctuary	500–1,000	2006–7	Greengrass and Maisels (2007)
	Ebo proposed NP	500–1,000	2011	Morgan <i>et al.</i> (2011)
	Ejagham FR	Present	2003	Eno Nku (2003a)
	Etinde Wildlife Reserve	50–100	2003	Eno Nku (2004b)
	FMU 00-004	50–100	2007	Ellioti.org (n.d.)
	FMU 11-002	Extirpated	2003	Eno Nku (2003b)
	Fungom FR	Present	2004	Ekinde, Ashu and Sunderland-Groves (2005)
	Kom-Wum FR	<50	2011	Ellioti.org (n.d.)
	Korup NP	50–100	2015	M. Waltert, A. Binczik and K.S. Bobo, unpublished data, 2015
	Lake Barombi Mbo FR	Present	2004	Morgan <i>et al.</i> (2011)
	Mak-Betefou-Nkingkuoe	50–100	2011	Ellioti.org (n.d.)
	Makombe Forest	Present	2011	WWF (2003)
	Manb'ra	Present	1997	Ellioti.org (n.d.)
	Mbam et Djerem NP	300–500	2008–9	Maisels <i>et al.</i> (2009)
	Mbulu Forest	Present	2008	Warren and Bila (2008)
	Mone River FR	100–300	2007	Warren and Ekinde (2008)
	Mpen & Njim NP	Present	2011	Ellioti.org (n.d.)
	Mt. Cameroon NP	Present	2007	Eno Nku and Ekobo (2007)
	Mt. Kupe	Present	2009	Fonkwo <i>et al.</i> (2011)
	Mt. Nlonako Wildlife Reserve	50–100	2005	Ellioti.org (n.d.)
	Nkwende Hills	Extirpated	2002	Bobo, Ntumwel and Aghomo (2013)
	Nta Ali FR	Present	2005	Morgan <i>et al.</i> (2011)
	Rumpi Hills	Present	2005	Morgan <i>et al.</i> (2011)
	South Bakundu FR	Extirpated	2004	Eno Nku (2004a)
	Takamanda NP	Present	2013	Kuchambi and Ikfuingei (2014)
	Tofala Hills	100–300	2008	Ekinde and Khumbah (2006)
	Tubah-Awing Forest	<50	2011	Ellioti.org (n.d.)
	Vome Forest	Present	2008	Ellioti.org (n.d.)

Country	Site name	Abundance class	Survey year	Source
Nigeria	Afi Mountain Wildlife Sanctuary	Present	2009	Imong, Wood and Okeke (2009)
	Afi River FR	Present	2009	Imong, Wood and Okeke (2009)
	Ago-Owu FR	Present	2005	Ogunjemite <i>et al.</i> (2006)
	Akure-Ofosu FR	Present	2012	Ikemeh (2013)
	Ala FR	Extirpated	2006	Greengrass (2006)
	Cross River NP Oban Division	100–300	None	A. Dunn and I. Imong, personal communication, 2015
	Cross River NP Okwangwo Division	100–300	None	A. Dunn and I. Imong, personal communication, 2015
	Eba FR	Present	2004–5	Ogunjemite (2011)
	Eti-Oni FR	Present	2004–5	Ogunjemite (2011)
	Gashaka-Gumti NP	500–1,000	2005	Adanu, Sommer and Fowler (2011)
	Idanre FR	50–100	2013	Ikemeh (2013)
	Ifon FR	Present	2011	Greengrass (2006)
	Ila FR	Present	2011	Ogunjemite (2011)
	Ise FR	<50	2012	Ikemeh (2013)
	Mbe Mountains	Present	2009	Imong and Okeke (2009)
	Oba Hills FR	Extirpated	2006	Greengrass (2006)
	Ogbesse FR	Extirpated	2006	Greengrass (2006)
	Ogotun FR	Present	2006	Greengrass (2006)
	Okeluse FR	Present	2004	Ogunjemite (2011)
	Okomu NP	Present	2006	Greengrass (2006)
	Ologbo FR	Present	2006	Greengrass (2006)
	Oluwa FR	Present	2012	Olaniyi, Ogunjemite and Dansu (2014)
	Omo FR	Present	2006	Greengrass (2006)
	Onisere FR	Present	2004–5	Ogunjemite (2011)
	Owo FR	Present	2004–5	Ogunjemite (2011)
	Shasha FR	Present	2006	Greengrass (2006)

Note: Site names that appear in bold are identified as priority sites in Morgan *et al.* (2011).

TABLE 8Eastern chimpanzee (*Pan troglodytes schweinfurthii*) abundance estimates

Country	Site name	Abundance class	Survey year	Source
Burundi	Bururi FR	<50	2006–7	Barakabuye <i>et al.</i> (2007)
	Kibira NP	300–500	2011–13	Hakizimana and Huynen (2013)
	Rumonge FR	<50	1989	Anonymous (1989)
	Vyanda FR	<50	1989	Anonymous (1989)
CAR	Bangassou	Extirpated	2004	Williamson <i>et al.</i> (2004)
	Chinko NR	100–300	2015	T. Aebischer, personal communication, 2015
	Zemongo Faunal Reserve	500–1,000	2009	Plumptre <i>et al.</i> (2010)
DRC	Bili-Uere	20,000–50,000	2009	Plumptre <i>et al.</i> (2010)
	Greater Virunga Semuliki	1,000–5,000	2007	Plumptre, Kujirakwinja and Matunguru (2008a)
	Itombwe	5,000–10,000	2009	Plumptre <i>et al.</i> (2010)
	Ituri landscape Mai-Tatu (partial)	500–1,000	2015	WCS DRC, unpublished data, 2015
	Ituri Okapi Faunal Reserve	5,000–10,000	2010–11	Vosper, Masselink and Maisels (2013)
	Kahuzi-Biega NP highlands	500–1,000	2009	Plumptre <i>et al.</i> (2010)
	Kahuzi-Biega NP lowlands	500–1,000	2009	Plumptre <i>et al.</i> (2010)
	Maganja Hills	100–300	2009	Plumptre <i>et al.</i> (2010)
	Maiko NP	500–1,000	2009	Plumptre <i>et al.</i> (2010)
	Misotshi-Kabogo	500–1,000	2007	Plumptre <i>et al.</i> (2008b)
	Rubi-Tele	500–1,000	2009	Plumptre <i>et al.</i> (2010)
	Tayna Gorilla Reserve	1,000–5,000	2009	Plumptre <i>et al.</i> (2010)
	Usala	100–300	2009	Plumptre <i>et al.</i> (2010)
	Virunga NP Rwenzori	500–1,000	2009	Plumptre <i>et al.</i> (2010)
	Watalinga	500–1,000	2009	Plumptre <i>et al.</i> (2010)
Rwanda	Gishwati FR	<50	2009–10	Chancellor <i>et al.</i> (2012)
	Nyungwe NP	300–500	2014	WCS Rwanda, unpublished data, 2014
South Sudan	Nationwide	Present		Plumptre <i>et al.</i> (2010)
Tanzania	Greater Gombe Ecosystem	110	2011–12	Piel <i>et al.</i> (2013)

Country	Site name	Abundance class	Survey year	Source
Tanzania	Greater Mahale Ecosystem , including Masito-Ugalla	1,000–5,000	2011–12	Piel <i>et al.</i> (2013)
	Loasi FR	50–100	2008	Davenport <i>et al.</i> (2010)
	Masito-Ugalla Ecosystem	300–500	2014	Piel <i>et al.</i> (2015)
Uganda	Budongo NP	500–1,000	1999–2002	Plumptre, Cox and Mugume (2003)
	Bugoma FR	500–1000	1999–2002	Plumptre <i>et al.</i> (2003)
	Bugoma–Budongo Corridor	50–100	1999–2002	Plumptre <i>et al.</i> (2003)
	Bulindi	<50	2014	McLennan (2013)
	Bwindi Impenetrable NP	100–300	1999–2002	Plumptre <i>et al.</i> (2003)
	Echuya FR	Extirpated	1999–2002	Plumptre <i>et al.</i> (2003)
	Ibambaro FR	Extirpated	1999–2002	Plumptre <i>et al.</i> (2003)
	Itwara FR	100–300	1999–2002	Plumptre <i>et al.</i> (2003)
	Kagombe FR	100–300	1999–2002	Plumptre <i>et al.</i> (2003)
	Kagorra region	<50	1999–2002	Plumptre <i>et al.</i> (2003)
	Kalinzu FR	100–300	2006	Plumptre <i>et al.</i> (2008c)
	Kasato FR	<50	1999–2002	Plumptre <i>et al.</i> (2003)
	Kasyoha–Kitomi FR	300–500	2006	Plumptre <i>et al.</i> (2008c)
	Kibale NP	500–1,000	2015	K. Langergraber and L. Vigilant, personal communication, 2015
	Kibego FR	<50	1999–2002	Plumptre <i>et al.</i> (2003)
	Kitechura FR	Extirpated	1999–2002	Plumptre <i>et al.</i> (2003)
	Kyambura Wildlife Reserve	50–100	1999–2002	Plumptre <i>et al.</i> (2003)
	Maramagambo	100–300	1999–2002	Plumptre <i>et al.</i> (2003)
	Matiri FR	Extirpated	1999–2002	Plumptre <i>et al.</i> (2003)
	Muhangi FR	<50	1999–2002	Plumptre <i>et al.</i> (2003)
	Otzi FR	<50	1999–2002	Plumptre <i>et al.</i> (2003)
	Rwenzori Mountains NP	300–500	1999–2002	Plumptre <i>et al.</i> (2003)
	South Bugoma	<50	1999–2002	Plumptre <i>et al.</i> (2003)
	Toro–Semliki Wildlife Reserve	50–100	2010–2011	Samson and Hunt (2012)
	Wambabya FR	100–300	1999–2002	Plumptre <i>et al.</i> (2003)

Note: Site names that appear in bold are identified as priority sites in Plumptre *et al.* (2010).

TABLE 9Central chimpanzee (*Pan troglodytes troglodytes*) abundance estimates

Country	Site name	Abundance class	No. spp.	Survey year	Source
Angola	Maiombe (Cabinda)	Present	2	None	IUCN (2014)
Cameroon	Boumba-Bek NP	500–1,000	1	2012	Maisels <i>et al.</i> (2014)
	Campo Ma'an NP	500–1,000	1	2008	Etoga and Foguekem (2008)
	Deng Deng FMU 10-065	Present	1	2012	Maisels <i>et al.</i> (2013a)
	Deng Deng NP	Present	1	2012	Maisels <i>et al.</i> (2013a)
	Dja Biosphere (or Faunal) Reserve (partial)	300–500	1	2009	Latour (2010)
	Lobéké NP	100–300	1	2009	Blake <i>et al.</i> (2012)
	Mengamé Gorilla Sanctuary	100–300	1	2003	Halford <i>et al.</i> (2003)
	Nanga-Eboko	Present	1	2002	Fotso <i>et al.</i> (2002)
	Ngoyla Mintom	5,000–10,000	1	2011	Blake <i>et al.</i> (2012)
	Nki NP	500–1,000	1	2004	Blake <i>et al.</i> (2012)
	Sanaga-Yong	Present	1	2002	Fotso <i>et al.</i> (2002)
	FMU 00-004	Present	1	2007	Ekobo (2007)
	FMU 09-024	100–300	1	2003	Etoga (2008)
	FMU 10-013	Present	1	2003	Blake <i>et al.</i> (2012)
	FMU 10-038	Present	1	2001	Etoga (2001)
	FMU 10-047a	300–500	1	2007	Bombome (2007)
	FMU 10-064	Present	1	2004	Blake <i>et al.</i> (2012)
	FMU 10-08/09/10/12	Present	1	2005	Blake <i>et al.</i> (2012)
	ZICGC 9	Present	1	2007	Mahop (2007)
CAR	Dzanga NP	<50	1	2011–12	Princée (2013)
	Dzanga Special Reserve	100–300	1	2012	Princée (2013)
	Ndoki NP	50–100	1	2012	Princée (2013)
Congo	Bailly Swamps	500–1,000	1	2011	Maisels <i>et al.</i> (2012)
	Batanga	100–300	1	2012	Iyenguet <i>et al.</i> (2012)
	Batéké Forest	300–500	1	2012	Tolisano <i>et al.</i> (2013)
	Conkouati-Douli NP	5,000–10,000	2	2013	Vanleeuwe (2014)
	Dimonika Biosphere Reserve	Present	1	2009	Pintea <i>et al.</i> (2012)

Country	Site name	Abundance class	No. spp.	Survey year	Source
Congo	Impfondo	500–1,000	1	2008	Iyenguet <i>et al.</i> (2008)
	Kabo	1,000–5,000	1	2010	Maisels <i>et al.</i> (2012)
	Lac Télé Community Reserve	500–1,000	1	2011	Maisels <i>et al.</i> (2012)
	Lossi Gorilla Sanctuary	Present	1	2004–5	Bermejo <i>et al.</i> (2006)
	Loundougou	1,000–5,000	1	2010–11	Maisels <i>et al.</i> (2012)
	Messok-Dja	1,000–5,000	2	2013	Moukala Mantsila <i>et al.</i> (2013)
	Mokabi	100–300	1	2006	Stokes <i>et al.</i> (2010)
	Ngombe	5,000–10,000	1	2014	Maisels <i>et al.</i> (2015)
	Nouabalé-Ndoki NP	1,000–5,000	1	2010–11	Maisels <i>et al.</i> (2012)
	Ntokou-Pikounda NP	1,000–5,000	1	2014	Maisels <i>et al.</i> (2015)
	Odzala-Koukoua NP	1,000–5,000	1	2012	Maisels <i>et al.</i> (2013b)
	Pokola	1,000–5,000	1	2010	Maisels <i>et al.</i> (2012)
	Tanga	<50	1	2009	Malanda <i>et al.</i> (2010)
DRC	Lac Tumba	Present	1	2007–10	Inogwabini <i>et al.</i> (2012)
	Maiombe	Present	1	None	IUCN (2015)
Equatorial Guinea	Nationwide	5,000–10,000	1	2012	Murai <i>et al.</i> (2013)
Gabon	Bambidie	Present	1	2012	Haurez <i>et al.</i> (2014)
	Batéké Plateau NP	Present	2	2005–6	Bout (2006)
	Birougou NP	500–1,000	2	2006–7	Aba'a and Bezangoye (2007)
	Evaro	Present	2	2005	Latour (2005)
	Ivindo concessions	500–1,000	2	2010	Motsaba and Maisels (2010)
	Ivindo NP	1,000–5,000	2	2009	Motsaba <i>et al.</i> (2009)
	Loango NP	300–500	2	2006	Maisels (2009)
	Lopé NP	1,000–5,000	2	2008–9	Bezangoye and Maisels (2010)
	Lopé–Waka corridor	1,000–5,000	2	2007	Maisels <i>et al.</i> (2008)
	Mayombe	1,000–5,000	2	2011	Aba'a <i>et al.</i> (2011)
	Mayumba NP	*Present	2	2006–11	Makaya (2010)

Country	Site name	Abundance class	No. spp.	Survey year	Source
Gabon	Minkébé NP	**Present	2	2012–13	ANPN (2013)
	Monts de Cristal NP	Present	2	2005	Aba'a (2006)
	Moukalaba Doudou NP	Present	2	2010	Nakashima <i>et al.</i> (2013)
	Mwagna NP	**Present	2	2012	Maisels and Ella Akou (2013)
	Pongara NP	Present	1	2006	Latour (2006)
	Waka NP	Present	2	2005–6	Abitsi (2006)
	Wonga Wongué	Present	2	2011	Motsaba and Aba'a (2011)

Notes: One asterisk (*) indicates that an ape population is stable; two asterisks (**) indicate that an ape population is increasing. The “number of species” (No. spp.) column indicates whether the abundance estimate refers to chimpanzees only (1) or to chimpanzees and gorillas together (2). Site names that appear in bold are identified as priority sites in IUCN (2014).

TABLE 10

Western chimpanzee (*Pan troglodytes verus*) abundance estimates

Country	Site name	Abundance class	Survey year	Source
Benin	Nationwide	Possibly extinct	2013–14	Campbell and Hounbedji (2015)
Burkina Faso	Nationwide	Possibly extinct	2012	Ginn <i>et al.</i> (2013)
Gambia	Nationwide	Extinct		IUCN (2015)
Ghana	Atewa FR	Present	2007	McCullough <i>et al.</i> (2007)
	Bia-Goaso	100–300	2009	Danquah <i>et al.</i> (2012)
	Boi-Tano FR	Present	2006	Oates (2006)
	Cape Three Points FR	Extirpated	2009	Gatti (2009)
	Draw River FR	Present	2003	McCullough <i>et al.</i> (2007)
	Subri River FR	Present	2011	Buzzard and Parker (2012)
Guinea	Bafing River area	1,000–5,000	2013–14	WCF (2014b)
	Diecke Classified Forest	50–100	2011	WCF (2012)
	Foutah Djallon	10,000–20,000	2011–12	WCF (2012)
	Gadha Woundou Classified Forest	<50	2011	WCF (2012)
	Haut Niger NP Kouya core area	100–300	2011	WCF (2012)

Country	Site name	Abundance class	Survey year	Source
Guinea	Haut Niger NP Mafou core area	100–300	2011	WCF (2012)
	Kankan Faunal Reserve	Present	2010–11	WCF (2012)
	Koumbia	100–300	2010	WCF (2012)
	Mt. Nimba Strict NR	100–300	2009	WCF (2012)
	Oure Kaba Classified Forest	50–100	2009	WCF (2012)
	Pic de Fon Classified Forest	50–100	2002	Herbinger and Tounkara (2002)
	Sangaredi Alumina Project	100–300	2014	WCF (2014a)
	Ziama Strict NR	<50	2010–11	WCF (2012)
Guinea-Bissau	Cantanhez NP	Present	2007	Sousa <i>et al.</i> (2014)
	Lagoas de Cufada Natural Park	100–300	2011	Carvalho, Marques and Vicente (2013)
Ivory Coast	Azagny NP	<50	2007	Herbinger (2007)
	Banco NP	Present	2006–8	Dowd, Herbinger and N'Goran (2008)
	Bossematie Classified Forest	Present	2007	Campbell <i>et al.</i> (2008)
	Cavally Classified Forest	50–100	2010	Normand, Singo and Boesch (2010)
	Comoé NP	Present	2009	WCF (2009)
	Dassiekro Classified Forest	Extirpated	2007	Campbell <i>et al.</i> (2008)
	Duekoue Classified Forest	Extirpated	2007	Campbell <i>et al.</i> (2008)
	Gobodienou Classified Forest	Extirpated	2007	Campbell <i>et al.</i> (2008)
	Goin-Débé Classified Forest	<50	2009	Normand <i>et al.</i> (2010)
	Haute Dodo	Present	2002	Sanderson <i>et al.</i> (2005)
	Mabi Classified Forest	Present	2007	Campbell <i>et al.</i> (2008)
	Marahoué NP	<50	2006	N'Goran (2007)
	Monogaga Classified Forest	Extirpated	2007	Campbell <i>et al.</i> (2008)
	Mt. Kope	Present	2007	Campbell <i>et al.</i> (2008)
	Mt. Nimba Strict NR	<50	2010–11	Granier <i>et al.</i> (2014)
	Mt. Peko NP	300–500	2001	Herbinger and Lia (2001a)
	Mt. Sangbe NP	100–300	2001	Herbinger and Lia (2001b)

Country	Site name	Abundance class	Survey year	Source
Ivory Coast	Niouniourou Classified Forest	Extirpated	2007	Campbell <i>et al.</i> (2008)
	Nizoro Classified Forest	Extirpated	2007	Campbell <i>et al.</i> (2008)
	Okromodou Classified Forest	Extirpated	2007	Campbell <i>et al.</i> (2008)
	Port Gauthier Classified Forest	Extirpated	2007	Campbell <i>et al.</i> (2008)
	Tai NP	100–300	2014	Tiédoué <i>et al.</i> (2014)
	Tamin Classified Forest	Extirpated	2007	Campbell <i>et al.</i> (2008)
Liberia	Nationwide	5,000–10,000	2011–12	Tweh <i>et al.</i> (2014)
Mali	Bafing Biosphere Reserve	<50	2014	PanAf, unpublished data, 2015
Senegal	Fongoli	<50	2006	Pruetz and Bertolani (2007)
	Nathia	Present	2010	Gašperšič and Pruetz (2011)
	Niokolo Koba NP	<50	2000	Pruetz <i>et al.</i> (2002)
Sierra Leone	Nationwide	5,000–10,000	2009	Brncic, Amarasekaran and McKenna (2010)
Togo	Nationwide	Possibly extinct	2013–14	Campbell and Hounbedji (2015)

Note: Site names that appear in bold are identified as priority sites in Kormos and Boesch (2003).

TABLE 11

Sumatran orangutan (*Pongo abelii*) abundance estimates

Country	Site name	Abundance class	Survey year	Source
Indonesia	East Leuser Ecosystem	1,000–5,000	2004	Wich <i>et al.</i> (2008)
	East Middle Aceh Ecosystem	300–500	2004	Wich <i>et al.</i> (2008)
	East Sarulla	100–300	2004	Wich <i>et al.</i> (2008)
	East Singkil swamps	°Extirpated	2004	Wich <i>et al.</i> (2008)
	Sidiangkat	100–300	2004	Wich <i>et al.</i> (2008)
	Tripa swamp	100–300	2004	Wich <i>et al.</i> (2008)
	Trumon-Singkil	1,000–5,000	2004	Wich <i>et al.</i> (2008)
	West Batang Toru	300–500	2004	Wich <i>et al.</i> (2008)
	West Leuser Ecosystem	1,000–5,000	2004	Wich <i>et al.</i> (2008)
	West Middle Aceh Ecosystem	100–300	2004	Wich <i>et al.</i> (2008)

Note: ° Satellite data indicate that this area is almost completely deforested.

TABLE 12

Northeast Bornean orangutan (*Pongo pygmaeus morio*) abundance estimates

Country	Site name	Abundance class	Survey year	Source
Indonesia	Kelai watershed	1,000–5,000	2004	Wich <i>et al.</i> (2008)
	Kutai NP	500–1,000	2004	Wich <i>et al.</i> (2008)
	Lesan watershed	300–500	2004	Wich <i>et al.</i> (2008)
	Samarinda, Muara Badak, Marang Kayu	100–300	2004	Wich <i>et al.</i> (2008)
	Sangatta-Bengalon and Muara Wahau	100–300	2004	Wich <i>et al.</i> (2008)
	Sangkulirang–Mangkaliat karst area	500–1,000	2004	Wich <i>et al.</i> (2008)
	Sebuku–Sembakung swamps	100–300	2004	Wich <i>et al.</i> (2008)
	Segah watershed	100–300	2004	Wich <i>et al.</i> (2008)
Malaysia	Bongaya FR	100–300	2004	Ancrenaz <i>et al.</i> (2005)
	Crocker Range NP	*100–300	2004	Ancrenaz <i>et al.</i> (2005)
	Keningau	Extirpated	2015	M. Ancrenaz, personal communication, 2015
	Kinabalu	*<50	2004	Payne (1987)
	Kinabatangan	500–1,000	2004	Ancrenaz <i>et al.</i> (2005)
	Kuamut	300–500	2004	Ancrenaz <i>et al.</i> (2005)
	Kulamba Wildlife Reserve	*300–500	2004	Ancrenaz <i>et al.</i> (2005)
	Lingkabau FR	*100–300	2004	Ancrenaz <i>et al.</i> (2005)
	North Sabah (Pitas, Kudat)	Extirpated	2015	M. Ancrenaz, personal communication, 2015
	Pinangah	100–300	2004	Ancrenaz <i>et al.</i> (2005)
	Segama	*1,000–5,000	2004	Ancrenaz <i>et al.</i> (2005)
	Sepilok	*100–300	2004	Ancrenaz <i>et al.</i> (2005)
	Tabin	1,000–5,000	2004	Ancrenaz <i>et al.</i> (2005)
	Tenom	Extirpated	2015	M. Ancrenaz, personal communication, 2015
	Trus Madi forests	100–300	2004	Ancrenaz <i>et al.</i> (2005)
	Ulu Kalumpang FR	*100–300	2004	Ancrenaz <i>et al.</i> (2005)
	Upper Kinabatangan	*1,000–5,000	2004	Ancrenaz <i>et al.</i> (2005)

Note: An asterisk (*) indicates that an ape population is stable.

TABLE 13Northwest Bornean orangutan (*Pongo pygmaeus pygmaeus*) abundance estimates

Country	Site name	Abundance class	Survey year	Source
Indonesia	Betung Kerihun	1,000–5,000	2002–3	Wich <i>et al.</i> (2008)
	Danau Sentarum	300–500	2008	Wich <i>et al.</i> (2008)
	Upper Kapuas swamps	Present	2008	Wich <i>et al.</i> (2008)
Malaysia	Batang Ai (Sarawak)	300–500	2008	Wich <i>et al.</i> (2008)
	Lanjak Entimau (Sarawak)	1,000–5,000	2008	Wich <i>et al.</i> (2008)

TABLE 14Southwest Bornean orangutan (*Pongo pygmaeus wurmbii*) abundance estimates

Country	Site name	Abundance class	Survey year	Source
Indonesia	Arut Belantikan	5,000–10,000	2008	Wich <i>et al.</i> (2008)
	Bukit Baka	100–300	2008	Wich <i>et al.</i> (2008)
	Bukit Raya	300–500	2008	Wich <i>et al.</i> (2008)
	Bukit Rongga and Parai	500–1,000	2008	Wich <i>et al.</i> (2008)
	Cagar Alam B. Spt	500–1,000	2008	Wich <i>et al.</i> (2008)
	Cagar Alam Pararaum	500–1,000	2008	Wich <i>et al.</i> (2008)
	Gunung Palung	1,000–5,000	2008	Wich <i>et al.</i> (2008)
	Kahayan Kapuas	100–300	2008	Wich <i>et al.</i> (2008)
	Ketingan	1,000–5,000	2008	Wich <i>et al.</i> (2008)
	Lamandau	1,000–5,000	2008	Wich <i>et al.</i> (2008)
	Mawas	1,000–5,000	2008	Wich <i>et al.</i> (2008)
	Rungan Kahayan	500–1,000	2008	Wich <i>et al.</i> (2008)
	Sabangau NP	5,000–10,000	2008	Wich <i>et al.</i> (2008)
	Sabangau Kahayan	500–1,000	2008	Wich <i>et al.</i> (2008)
	Sei Kahayan and Sei Sambah	500–1,000	2008	Wich <i>et al.</i> (2008)
	Sei Sambah and Sei Katingan	300–500	2008	Wich <i>et al.</i> (2008)
	Seruyan	500–1,000	2008	Wich <i>et al.</i> (2008)
	Tanjung Keluang	100–300	2008	Wich <i>et al.</i> (2008)
	Tanjung Puting NP	5,000–10,000	2008	Wich <i>et al.</i> (2008)

TABLE 15**Western hoolock (*Hoolock hoolock*) abundance estimates**

Country	Site name	Abundance class	Survey year	Source
Bangladesh	Kalachara Forest Beat	<50	2009	Akers, Islan and Nijman (2013)
	Lawachara and Chunutati	Present	1989–90	Ahsan (2001)
		Present	1990–1	Islam and Feeroz (1992)
India	Assam	1,000–5,000	1994–2004	Das <i>et al.</i> (2005)
	Barail and Langting-Mupa Reserve Forests (North Cachar Hills), Hollongapar Reserve Forest (Jorhat District), Innerline Reserve Forest (Cachar)	Present	1986–8	Choudhury (2000)
	Dampa Tiger Reserve	<50	2011	Pachau <i>et al.</i> (2013)
	Hollongapur FR	Present	1971–3	Tilson (1979)
	Lower Dibang Valley, Arunachal Pradesh	1,000–5,000	2007–10	Kumar <i>et al.</i> (2013)
	Mehao Wildlife Sanctuary, Arunachal Pradesh	300–500	2008–9	Chetry and Chetry (2010)
	Sadiya sub Division, Assam	50–100	2010	Chetry and Chetry (2010)
Myanmar	Chaung Tha (Rakhine)	10,000–20,000	2008	Geissmann <i>et al.</i> (2013)
	Do Kwe Chaung (Rakhine)	10,000–20,000	2008	Geissmann <i>et al.</i> (2013)
	Gaba Gaso (Sagaing)	>100,000	2009	Geissmann <i>et al.</i> (2013)
	Goatsiyo (Magwe)	Present	2009	Geissmann <i>et al.</i> (2013)
	Kyaukpyar Kyaw (Magwe)	Present	2009	Geissmann <i>et al.</i> (2013)
	Naga (Kachin)	50,000–100,000	2006	Geissmann <i>et al.</i> (2013)
	Natyekan (Magwe)	Present	2009	Geissmann <i>et al.</i> (2013)
	Paik Chaung (Magwe)	Present	2009	Geissmann <i>et al.</i> (2013)
	Yaw Par Mi (Sagaing)	>100,000	2009	Geissmann <i>et al.</i> (2013)
	Ye Paw Gyi (Rakhine)	10,000–20,000	2008	Geissmann <i>et al.</i> (2013)

Note: For Myanmar, abundance estimates relate to the state named in parentheses, not the site.

TABLE 16**Eastern hoolock (*Hoolock leuconedys*) abundance estimates**

Country	Site name	Abundance class	Survey year	Source
Myanmar	Gata Bum (Kachin)	>100,000	2009	Geissmann <i>et al.</i> (2013)
	Gato (Kachin)	>100,000	2009	Geissmann <i>et al.</i> (2013)
	Hopom (Kachin)	>100,000	2010	Geissmann <i>et al.</i> (2013)
	Hpongun Razi (Kachin)	>100,000	2009	Geissmann <i>et al.</i> (2013)
	Htee Khaw Lay Ko (Kayin)	10,000–20,000	2010	Geissmann <i>et al.</i> (2013)
	Htee Ler Kee (Kayin)	10,000–20,000	2010	Geissmann <i>et al.</i> (2013)
	Kyi Nort (Kachin)	>100,000	2009	Geissmann <i>et al.</i> (2013)
	Lwan Khong (Kachin)	>100,000	2009	Geissmann <i>et al.</i> (2013)
	Mahamyaing (Sagaing)	>100,000	2004	Geissmann <i>et al.</i> (2013)
	Mine Naung (Kachin)	>100,000	2010	Geissmann <i>et al.</i> (2013)
	Nam Pagon (Sagaing)	>100,000	2009	Geissmann <i>et al.</i> (2013)
	Nam Pilin (Sagaing)	>100,000	2009	Geissmann <i>et al.</i> (2013)
	Nant Nint (Kachin)	>100,000	2010	Geissmann <i>et al.</i> (2013)
	Ohnyan (Kachin)	>100,000	2010	Geissmann <i>et al.</i> (2013)
	Plo Doh Kee (Kayin)	10,000–20,000	2010	Geissmann <i>et al.</i> (2013)
	Salin (Kachin)	>100,000	2010	Geissmann <i>et al.</i> (2013)
	Su Bum (Kachin)	>100,000	2009	Geissmann <i>et al.</i> (2013)

Notes: Abundance estimates relate to the state named in parentheses, not the site. No population information could be found for this species in China.

TABLE 17**Abbott's gray gibbon (*Hylobates abbotti*)**

No population information could be found for this species.

TABLE 18**Agile gibbon (*Hylobates agilis*) abundance estimates**

Country	Site name	Abundance class	Survey year	Source
Indonesia	Air Tarusan Reserve	Present	2015	Chanee, unpublished data, 2015
	Kerinci Seblat NP	Present	1994	A. Yannuar, personal communication, 2012

Note: No population information could be found for this species in Malaysia.

TABLE 19**Bornean white-bearded gibbon (*Hylobates albibarbis*) abundance estimates**

Country	Site name	Abundance class	Survey year	Source
Indonesia	Bawan	20,000–50,000	2010	Harrison <i>et al.</i> (2012)
	Block C Ex-Mega Rice Project	5,000–10,000	2011	Cheyne (2011)
	Bukit Baka Bukit Raya NP	10,000–20,000	2003	S. Cheyne, unpublished data, 2003
	Gunung Palung NP	5,000–10,000	2014	Marshall, Beaudrot and Wittmer (2014)
	Mungku Baru	1,000–5,000	2010	Harrison <i>et al.</i> (2010)
	Pararawen Reserve	500–1,000	2014	Chanee, unpublished data, 2015
	Sabangau catchment	**10,000–20,000	2007	Cheyne <i>et al.</i> (2007)

Note: Two asterisks (**) indicate that ape population is growing.

TABLE 20**Bornean gray gibbon (*Hylobates funereus*) abundance estimates**

Country	Site name	Abundance class	Survey year	Source
Indonesia	Betung Kerihun NP	Present	None	None
	Danau Sentarum–Betung Kerihun	Present	None	None
	Kayan Menterang NP	10,000–20,000	2008	Nijman and Menken (2005)
	Kutai NP	Present	None	None
	Sankulirang karst area	Present	None	None
	Wehea Protection Forest	1,000–5,000	2014	S. Cheyne, personal communication, 2015
Malaysia	Crocker Range NP	Present	None	None
	Danum Valley	Present	None	None
	Imbak Canyon Conservation Area	Present	None	None
	Kinabatangan	Present	None	None
	Malinau Basin	Present	None	None

Note: No population information could be found for this species in Brunei.

TABLE 21Kloss's gibbon (*Hylobates klossii*) abundance estimates

Country	Site name	Abundance class	Survey year	Source
Indonesia	Saraboa and Sikakap	Present	1970	Tenaza and Hamilton III (1971)
	Siberut Island NP	10,000–20,000	2012	Quinten <i>et al.</i> (2014)

TABLE 22Lar gibbon (*Hylobates lar*) abundance estimates

Country	Site name	Abundance class	Survey year	Source
China	Nangunhe NR, southwest Yunnan	Extirpated	2007	Grueter <i>et al.</i> (2009)
Indonesia	Ketambe Research Station	Present	1985–7	Palombit (1995)
Thailand	Khao Yai NP	Present	1992–6	Reichard and Sommer (1997)
	Mo Singto, Khao Yai NP	Present	1994–5	Bartlett (2009)

Note: No population information could be found for this species in Lao People's Democratic Republic (Lao PDR), Malaysia or Myanmar.

TABLE 23Moloch gibbon (*Hylobates moloch*) abundance estimates

Country	Site name	Abundance class	Survey year	Source
Indonesia	Bojongpicung	<50	1994–2001	Nijman (2004)
	Cisolok	<50	1994–2001	Nijman (2004)
	Gede Pangrango	100–300	2007	Iskandar (2007)
	Gunung Halimun Reserve	Present	2011	Setiawan <i>et al.</i> (2012)
	Lengkong	<50	1994–2001	Nijman (2004)
	Leuweung Sancang	<50	2003	Nijman (2004)
	Mt. Burangrang–Tangkuban Perahu	50–100	1994–2001	Nijman (2004)
	Mt. Ciremai	Present	1994–2001	Nijman (2004)
	Mt. Halu	<50	1994–2001	Nijman (2004)
	Mt. Jayanti-Tangkuban Perahu	<50	1994–2001	Nijman (2004)
	Mt. Lawet/Cupu-Simembut/Jaran	50–100	1994	Nijman (2004)
	Mt. Malang	<50	1994–2001	Nijman (2004)

Country	Site name	Abundance class	Survey year	Source
Indonesia	Mt. Dieng and Mt. Pegunungan Dieng	500–1,000	2003	Nijman (2004)
	Mt. Halimun Salak NP	1,000–5,000	2007	Iskandar (2007)
	Mt. Manglayang	<50	1994–2001	Nijman (2004)
	Mt. Masegit-Kareumbi	<50	1994–2001	Nijman (2004)
	Mt. Papandayan	100–300	1994–2001	Nijman (2004)
	Mt. Pongkor	<50	1994–2001	Nijman (2004)
	Mt. Porang	<50	1994–2001	Nijman (2004)
	Mt. Sawal	Present	1994–2001	Nijman (2004)
	Mt. Segara	50–100	1994	Nijman (2004)
	Mt. Simpang	500–1,000	1994–2001	Nijman (2004)
	Mt. Slamet	50–100	2009–10	Setiawan <i>et al.</i> (2012)
	Mt. Tilu	50–100	1994–2001	Nijman (2004)
	Mt. Wayang	100–300	1994–2001	Nijman (2004)
	Pasir Susuru	<50	1994–2001	Nijman (2004)
	Sanggabuana	50–100	1994–2001	Nijman (2004)
	Takokak	<50	2003	Nijman (2004)
	Telaga Warna	Present	2000	Nijman (2004)
	Telaga Warna–Megamendung	50–100	2001	Nijman (2004)
	Ujung Kulon (Honje–Tereleng)	500–1,000	2001	Nijman (2004)
	Ujung Kulon–Gunung Honje NR	Present	2011	Setiawan <i>et al.</i> (2012)

TABLE 24

Müller's gibbon (*Hylobates muelleri*) abundance estimates

Country	Site name	Abundance class	Survey year	Source
Indonesia	Gunung Lumut Reserve (Hutan Lindung)	5,000–10,000	2011	Chanee, unpublished data, 2015
	Sungai Wain Protection Forest	**1,000–5,000	2012	Gilhooly, Rayadin and Cheyne (2015)
	Uut Murung (mixed community and unprotected)	50,000–100,000	2011	Cheyne <i>et al.</i> (2012)

Note: Two asterisks (**) indicate that a population is growing.

TABLE 25**Pileated gibbon (*Hylobates pileatus*) abundance estimates**

Country	Site name	Abundance class	Survey year	Source
Cambodia	Bokor NP	1,000–5,000	2005	Traeholt <i>et al.</i> (2005)
	Botum Sakor NP	5,000–10,000	2005	Traeholt <i>et al.</i> (2005)
	Central Cardamoms Protected Forest	10,000–20,000	2005	Traeholt <i>et al.</i> (2005)
	Kirirom NP	1,000–5,000	2005	Traeholt <i>et al.</i> (2005)
	Kulen Promtep Wildlife Sanctuary	1,000–5,000	2005	Traeholt <i>et al.</i> (2005)
	Phnom Aural Wildlife Sanctuary	1,000–5,000	2005	Traeholt <i>et al.</i> (2005)
	Phnom Samkos Wildlife Sanctuary	5,000–10,000	2005	Traeholt <i>et al.</i> (2005)
	Prey Long	1,000–5,000	2005	Traeholt <i>et al.</i> (2005)
	Samling concession	1,000–5,000	2005	Traeholt <i>et al.</i> (2005)
	Southern Cardamom Mountains	10,000–20,000	2005	Traeholt <i>et al.</i> (2005)
Thailand	Khao Ang Rue Nai Wildlife Sanctuary	1,000–5,000	2011	Phoonjampa <i>et al.</i> (2011)
	Khao Soi Dao Wildlife Sanctuary	1,000–5,000	2004–5	Phoonjampa and Brockelman (2008)
	Khao Yai NP	1,000–5,000	2004–5	Phoonjampa and Brockelman (2008)
	Pang Sida and Tab Lan NPs	1,000–5,000	2004–5	Phoonjampa and Brockelman (2008)

Note: No population information could be found for this species in Lao PDR.

TABLE 26**Northern yellow-cheeked crested gibbon (*Nomascus annamensis*) abundance estimates**

Country	Site name	Abundance class	Survey year	Source
Lao PDR	Bolaven Northeast	Present	1995	Duckworth (2008)
	Bolaven Southwest	Present	1995	Duckworth (2008)
	Dakchung plateau	Present	1994	Duckworth (2008)
	Dong Ampham NPA	Present	2007	Duckworth (2008)
	Dong Hua Sao NPA	Present	2008	Duckworth (2008)
	Dong Kapho Production Forest	Present	2005	Duckworth (2008)

Country	Site name	Abundance class	Survey year	Source
Lao PDR	Dong Nathat conservation area	Present	Pre-1990	Duckworth (2008)
	Dong Phou Vieng NPA	Present	2008	Duckworth (2008)
	Dong Sithouan production forest	Present	2005	Duckworth (2008)
	Laongam production forest	Present	2002	Duckworth (2008)
	Muang Kaleum	Present	2008	Duckworth (2008)
	Muang Lamam	Present	2008	Duckworth (2008)
	Muang Nong	Present	2007	Duckworth (2008)
	Muang Paksong	Present	2007	Duckworth (2008)
	Muang Pathoumphon	Present	2005	Duckworth (2008)
	Muang Samakhixai	Present	2007	Duckworth (2008)
	Muang Sanamxai	Present	2007	Duckworth (2008)
	Muang Somoy	Present	2008	Duckworth (2008)
	Muang Taoy	Present	2007	Duckworth (2008)
	Nam Ghong Provincial Protected Area	Present	2007	Duckworth (2008)
	Phou Ahyon	Present	1996	Duckworth (2008)
	Phou Khathong proposed NPA	Present	2008	Duckworth (2008)
	Phou Talava production forest	Present	2005	Duckworth (2008)
	Phou Theung proposed NPA	Present	2006	Duckworth (2008)
	Phou Xiang Thong NPA	Present	2008	Duckworth (2008)
	Silivangveun production forest	Present	2002	Duckworth (2008)
	Thateng	Present	1989	Duckworth (2008)
	Xe Bang-Nouan NPA	Present	2008	Duckworth (2008)
	Xe Khampho proposed NPA	Present	1995	Duckworth (2008)
	Xe Kong Pine Forest	Present	1992	Duckworth (2008)
	Xe Pian NPA	Present	2008	Duckworth (2008)
	Xe Sap NPA	Present	2008	Duckworth (2008)
	Xonbuly Eld's Deer Sanctuary	Present	2008	Duckworth (2008)

Country	Site name	Abundance class	Survey year	Source
Viet Nam	A Luoi Watershed	<50	2008	Rawson <i>et al.</i> (2011)
	Ba Na-Nui Chua NR	Present	2006	Rawson <i>et al.</i> (2011)
	Ba Nam Commune, Ba To District	<50	2011	Rawson <i>et al.</i> (2011)
	Bach Ma NP	Extirpated	2010	Rawson <i>et al.</i> (2011)
	Chu Mom Ray NP	<50	2007	Rawson <i>et al.</i> (2011)
	Dak Rong NR	50–100	2010	Rawson <i>et al.</i> (2011)
	Dakroong and Tam Lap SFEs	<50	2008	Rawson <i>et al.</i> (2011)
	Kon Cha Rang NR	<50	2010	Rawson <i>et al.</i> (2011)
	Kon Ka Kinh NP	<50	2010	Rawson <i>et al.</i> (2011)
	Kon Plong SFE	<50	2009	Rawson <i>et al.</i> (2011)
	Nam Dong Watershed Forest	<50	2007	Rawson <i>et al.</i> (2011)
	Ngoc Linh NR	Present	2006	Rawson <i>et al.</i> (2011)
	Ngoc Linh proposed NR	Extirpated	2005	Rawson <i>et al.</i> (2011)
	Phong Dien NR	<50	2010	Rawson <i>et al.</i> (2011)
	Quang Nam Saola NR	Present	2005	Rawson <i>et al.</i> (2011)
	Que Son proposed Species and Habitat Conservation Area (SHCA)	Present	2009	Rawson <i>et al.</i> (2011)
	Song Thanh NR	<50	2004	Rawson <i>et al.</i> (2011)
	Thua Thien Hue Saola NR	Extirpated	2010	Rawson <i>et al.</i> (2011)

Note: No population information could be found for this species in Cambodia.

TABLE 27

Western black-crested gibbon (*Nomascus concolor*) abundance estimates

Country	Site name	Abundance class	Survey year	Source
China	Mt. Ailao, Xinping, Yunnan	300–500	2009–10	Li <i>et al.</i> (2011)
	Mt. Ailao and Mt. Wuliang	Present	1989–90	Lan and Sheeran (1995)
	Mt. Ailao and Mt. Wuliang NPA	Present	1989	Bleisch and Chen Nan (1990)
	Wuliang Reserve	Present	2005–6	Fan Peng-Fei, Jiang Xue-Long and Tian Chang-Cheng (2009)
	Wuliangshan, Ailaoshan, Yongde Daxueshan NR	1,000–5,000	2012	Fan Peng-Fei <i>et al.</i> (2013)

Country	Site name	Abundance class	Survey year	Source
Lao PDR	Houay Nam Loi	Present	1991	Duckworth (2008)
	Louang-Namtha	Present	2006	Duckworth (2008)
	Nam Ha NPA	Present	2007	Duckworth (2008)
	Nam Kan NPA	Present	2008	Duckworth (2008)
	Nam Kong Provincial Protected Area	100–300	1997	Duckworth (2008)
Viet Nam	Hoang Lien NR and vicinity	Present	2009	Rawson <i>et al.</i> (2011)
	Hoang Lien-Van Ban NR	<50	2009	Rawson <i>et al.</i> (2011)
	Mu Cang Chai SHCA	<50	2010	Rawson <i>et al.</i> (2011)
	Muong La Watershed Protection Forest	<50	2010	Rawson <i>et al.</i> (2011)
	Pan Village, Muong Do Commune, Phu Yen District	Extirpated	2005	Rawson <i>et al.</i> (2011)
	Tram Tau	Extirpated	2005	Rawson <i>et al.</i> (2011)
	Xuan Son NR	Extirpated	2005	Rawson <i>et al.</i> (2011)

TABLE 28

Southern yellow-cheeked crested gibbon (*Nomascus gabriellae*) abundance estimates

Country	Site name	Abundance class	Survey year	Source
Cambodia	Seima Biodiversity Conservation Area	Present	2015	WCS Cambodia, unpublished data, 2015
Viet Nam	Bi Dup-Nui Ba NR	<50	2010	Rawson <i>et al.</i> (2011)
	Bu Gia Map NP	100–300	2010	Rawson <i>et al.</i> (2011)
	Cat Tien NP	300–500	2010	Rawson <i>et al.</i> (2011)
	Chu Yang Sin NP	<50	2009	Rawson <i>et al.</i> (2011)
	Cu Jut District	Present	2007	Rawson <i>et al.</i> (2011)
	Dong Nai NR	<50	2010	Rawson <i>et al.</i> (2011)
	Ea So NR	Present	2006	Rawson <i>et al.</i> (2011)
	Ea Sup/Ea H'leo District	Present	1998	Rawson <i>et al.</i> (2011)
	Ea Trang Commune, M'drak	Present	1998	Rawson <i>et al.</i> (2011)
	Hon Ba NR	Present	2005	Rawson <i>et al.</i> (2011)
	Khanh Hoa SFE and Tram Huong Forestry Company	Present	2009	Rawson <i>et al.</i> (2011)

Country	Site name	Abundance class	Survey year	Source
Viet Nam	Krong No District	Present	1998	Rawson <i>et al.</i> (2011)
	Loc Bac SFE	<50	2004	Rawson <i>et al.</i> (2011)
	Nam Bai cat Tien NP	Present	1993	Kenyon (2007)
	Nam Nung NR	<50	2010	Rawson <i>et al.</i> (2011)
	Ninh Son SFE	<50	2007	Rawson <i>et al.</i> (2011)
	Nui Ong NR	Extirpated	2010	Rawson <i>et al.</i> (2011)
	Phuoc Binh NP	<50	2009	Rawson <i>et al.</i> (2011)
	Quang Truc Commune, Dak Rlap District	Present	2010	Rawson <i>et al.</i> (2011)
	Ta Dung NR	50–100	2010	Rawson <i>et al.</i> (2011)
	Yok Don NP	Present	2007	Rawson <i>et al.</i> (2011)
	Yun Pa proposed NR	Present	2000	Rawson <i>et al.</i> (2011)

Note: No population information could be found for this species in Lao PDR.

TABLE 29

Hainan gibbon (*Nomascus hainanus*) abundance estimates

Country	Site name	Abundance class	Survey year	Source
China	Bawangling National Natural Reserve	<50	2012	Bryant (2014)

TABLE 30

Northern white-cheeked crested gibbon (*Nomascus leucogenys*) abundance estimates

Country	Site name	Abundance class	Survey year	Source
Lao PDR	Muang Bolikhan	Present	2006	Duckworth (2008)
	Muang Feuang	Present	1999	Duckworth (2008)
	Muang Hinheup	Present	1999	Duckworth (2008)
	Muang Houamouang	Present	2006	Duckworth (2008)
	Muang Kasi	Present	1999	Duckworth (2008)
	Muang Met	Present	1999	Duckworth (2008)
	Muang Sangthong	Present	1996	Duckworth (2008)
	Muang Vangviang	Present	1999	Duckworth (2008)

Country	Site name	Abundance class	Survey year	Source
Lao PDR	Muang Viangthong	Present	2008	Duckworth (2008)
	Muang Xanakhom	Present	2003	Duckworth (2008)
	Muang Xiangkho	Present	2008	Duckworth (2008)
	Nam Et-Phou Louey NPA	Present	2008	Duckworth (2008)
	Nam Gniap catchment	Present	2008	Duckworth (2008)
	Nam Kading NPA	Present	2010	Thinh <i>et al.</i> (2010)
	Nam Xam NPA	Present	2000	Duckworth (2008)
	Northern Xiangkhouang	Present	2008	Duckworth (2008)
	Phou Dendin NPA	Present	2005	Duckworth (2008)
	Phou Khaokhoay NPA	Present	2007	Duckworth (2008)
	Phou Phanang NPA	Present	1983	Duckworth (2008)
	Southern Xiangkhouang	Present	1996	Duckworth (2008)
Viet Nam	Ben En NR	Extirpated	1998	Rawson <i>et al.</i> (2011)
	Hang Kia-Pa Co NR	Extirpated	2009	Rawson <i>et al.</i> (2011)
	Huong Son Forest	<50	2011	Rawson <i>et al.</i> (2011)
	Ke Go NR	<50	2010	Rawson <i>et al.</i> (2011)
	Khe Ve proposed NR	Extirpated	2004	Rawson <i>et al.</i> (2011)
	Long Luong Commune	Extirpated	2011	Rawson <i>et al.</i> (2011)
	Muong Nhe NR	<50	2010	Rawson <i>et al.</i> (2011)
	Ngoc Son-Ngo Luong	Extirpated	2007	Rawson <i>et al.</i> (2011)
	Pu Hoat NR	Extirpated	2010	Rawson <i>et al.</i> (2011)
	Pu Hu NR	Extirpated	2003	Rawson <i>et al.</i> (2011)
	Pu Huong NR	Extirpated	2009	Rawson <i>et al.</i> (2011)
	Pu Luong NR	Extirpated	2008	Rawson <i>et al.</i> (2011)
	Pu Mat NP	<50	2011	Rawson <i>et al.</i> (2011)
	Sop Cop NR	<50	2011	Rawson <i>et al.</i> (2011)
	Thach Tuong Commune	Extirpated	Post-2000	Rawson <i>et al.</i> (2011)
	Vu Quang NR	<50	2011	Rawson <i>et al.</i> (2011)
	Xuan Lien NR	<50	2007	Rawson <i>et al.</i> (2011)
	Xuan Nha NR	Extirpated	2011	Rawson <i>et al.</i> (2011)

TABLE 31**Cao Vit gibbon (*Nomascus nasutus*) abundance estimates**

Country	Site name	Abundance class	Survey year	Source
China	Bangliang Gibbon NR	50–100	2012	Fan Peng-Fei <i>et al.</i> (2013)
Viet Nam	Cao Vit Gibbon Conservation Area, Trung Khanh	100–300	2011	Rawson <i>et al.</i> (2011)
	Kim Hy NR	Extirpated	2009	Rawson <i>et al.</i> (2011)
	Lung Ri	Extirpated	2009	Rawson <i>et al.</i> (2011)
	Than Sa-Phuong Hoang NR	Extirpated	2010	Rawson <i>et al.</i> (2011)
	Thanh Hen Lake	Extirpated	2011	Rawson <i>et al.</i> (2011)

TABLE 32**Southern white-cheeked crested gibbon (*Nomascus siki*) abundance estimates**

Country	Site name	Abundance class	Survey year	Source
Lao PDR	Dong Phousoi production forest	Present	2005	Duckworth (2008)
	Hin Namno NPA	Present	2008	Duckworth (2008)
	Muang Boulapha	Present	1998	Duckworth (2008)
	Nakai plateau	Present	2008	Duckworth (2008)
	Nakai-Nam Theun NPA	Present	2014	Coudrat and Nanthavong (2014)
	Nam Kading NPA	Present	2010	Thinh <i>et al.</i> (2010)
	Nam Theun Corridor	Present	2004	Duckworth (2008)
	Nam Theun Extension	Present	2007	Duckworth (2008)
	Nongkapat production forest	Present	2005	Duckworth (2008)
	Phou Hinpoun	Present	2008	Duckworth (2008)
	Xe Bang Fai headwaters	Present	1998	Duckworth (2008)
Viet Nam	Bac Huong Hoa NR	<50	2009	Rawson <i>et al.</i> (2011)
	Giang Man proposed NR	Extirpated	2004	Rawson <i>et al.</i> (2011)
	Khe Giua SFE	Extirpated	2006	Rawson <i>et al.</i> (2011)
	Khe Net proposed NR	Extirpated	2010	Rawson <i>et al.</i> (2011)
	Phong Nha–Ke Bang NP	50–100	2009	Rawson <i>et al.</i> (2011)
	Truong Son SFE	<50	2009	Rawson <i>et al.</i> (2011)

TABLE 33**Siamang (*Symphalangus syndactylus*) abundance estimates**

Country	Site name	Abundance class	Survey year	Source
Indonesia	Air Tarusan Reserve	Present	2012	Chanee, unpublished data, 2014
		Present	2014	Chanee, unpublished data, 2014
	Bukit Barisan Selatan NP	20,000–50,000	1998–2002	O'Brien <i>et al.</i> (2003)
	Kalaweit Supayang Reserve	Present	2014	Chanee, unpublished data, 2014
Malaysia	Ulu Sempam and Krau Game Reserve, Gunong Benom	Present	1969–73	Chivers (1974)

Note: No population information could be found for this species in Thailand.

Acknowledgments

Principal authors: Tenekwetché Sop, Susan M. Cheyne, Fiona Maisels, Serge Wich and Elizabeth A. Williamson

Contributors: Marc Ancrenaz, Hedwige Boesch, Chanee, Loki Du Toit, Mark Grindley, Hjalmar Kuehl, Erik Meijaard, Vincent Nijman, Stuart Nixon, Emmanuel Normand and Ian Singleton

Author acknowledgments: The authors gratefully acknowledge the A.P.E.S. staff at the Max Planck Institute for Evolutionary Anthropology, and thank all organizations and individuals who have contributed to the IUCN SSC A.P.E.S. database, and whose publications and survey reports served as sources for the ape abundance estimates presented in this annex.

List of Abbreviations

CAR	Central African Republic
Congo	Republic of Congo
DRC	Democratic Republic of Congo
FMU	forest management unit
FR	forest reserve
IUCN	International Union for Conservation of Nature
Lao PDR	Lao People's Democratic Republic
No. spp.	number of species
NP	national park
NPA	national protected area
NR	nature reserve
PanAf	Pan African Programme
SSC	Species Survival Commission
SFE	state forest enterprise
SHCA	species and habitat conservation area
WCS	Wildlife Conservation Society
ZICGC	zone d'intérêt cynégétique à gestion communautaire (community-managed hunting zone)

References

- Aba'a, R. (2006). *Abondance relative des grands mammifères et des activités humaines au Parc National des Monts de Cristal et sa peripherie*. Libreville, Gabon: Wildlife Conservation Society (WCS). Unpublished report.
- Aba'a, R. and Bezangoye, A. (2007). *Estimation de la densité, de l'abondance et de la distribution relative des grands mammifères et l'impact des humains au Parc National des Monts Birougou et ses environs: établissement d'une ligne de base pour le monitoring*. Libreville, Gabon: Wildlife Conservation Society (WCS). Unpublished report.
- Aba'a, R., Maisels, F., Starkey, M. and Memiaghe, H.R. (2011). *Inventaire des grands mammifères et l'impact humaine dans le Mayombe. Activité 3.1b part 1: rapport final*. Libreville, Gabon: Wildlife Conservation Society (WCS). Unpublished report.
- Abitsi, G. (2006). *Inventaires de reconnaissance des grands mammifères et de l'impact des activités anthropiques. Parc National de Waka, Gabon, Décembre, 2005–Juillet, 2006*. Libreville, Gabon: Wildlife Conservation Society (WCS). Unpublished report.
- Adanu, J., Sommer, V. and Fowler, A. (2011). Hunters, fire, cattle: conservation challenges in eastern Nigeria, with special reference to chimpanzees. In *Primates of Gashaka. Developments in Primatology: Progress and Prospects*, ed. V. Sommer and C. Ross. Berlin, Germany: Springer, pp. 55–99. DOI: 10.1007/978-1-4419-7403-7_3.
- Ahsan, M.F. (2001). *Socio-ecology of the hoolock gibbon (Hylobates hoolock) in two forests of Bangladesh*. Presented at: The Apes: Challenges for the 21st Century, May 10–13, 2000, Brookfield Zoo, Brookfield, IL. Chicago Zoological Society.
- Akers, A.A., Islam, M.A. and Nijman, V. (2013). Habitat characterization of western hoolock gibbons *Hoolock hoolock* by examining home range microhabitat use. *Primates*, **54**, 341–8.
- Ancrenaz, M., Gimenez, O., Ambu, L., et al. (2005). Aerial surveys give new estimates for orangutans in Sabah, Malaysia. *PLoS Biol*, **3**, e3.
- Anonymous (1989). In Barakabuye et al. (2007) *Conservation of chimpanzees in the Congo-Nile Divide forests of Rwanda and Burundi*. Kigali, Rwanda: Wildlife Conservation Society (WCS). Unpublished report.
- ANPN (2013). *Wildlife and poaching assessment in northeast Gabon: results of the pilot study. Final report*. Libreville, Gabon: Agence Nationale des Parcs Nationaux (ANPN)/Wildlife Conservation Society (WCS)/World Wide Fund for Nature (WWF). Unpublished report.
- Barakabuye, N., Mulindahabi, F., Plumptre, A.J., et al. (2007). *Conservation of chimpanzees in the Congo-Nile Divide forests of Rwanda and Burundi*. Kigali, Rwanda: Wildlife Conservation Society (WCS). Unpublished report.
- Bartlett, T.Q. (2009). *The Gibbons of Khao Yai: Seasonal Variation in Behavior and Ecology*. Upper Saddle River, NJ: Pearson.
- Bassouama, A., Bongui, A.S., Ibata, S. and Mahamadou, M. (2006). *Rapport d'inventaire faune et bois commercial dans la zone ETIC, sud-ouest du Parc National d'Odzala-Kokoua, 2006*. Brazzaville, Congo: Ministère de l'Economie Forestière et de l'Environnement/Parc National d'Odzala-Koukoua/World Wide Fund For Nature (WWF). Unpublished report.
- Bermejo, M., Rodriguez-Teijeiro, J.D., Illera, G., et al. (2006). Ebola outbreak killed 5000 gorillas. *Science*, **314**, 1564.
- Bezangoye, A. and Maisels, F. (2010). *Great ape and human impact monitoring in the Lopé-Waka Exceptional Priority Area, Gabon. Part 1: Lopé National Park*. Libreville, Gabon: Wildlife Conservation Society (WCS). Unpublished report.
- Blake, S., Strindberg, S. and Princée, F. (2012). *Evaluation of the CARPO/GHOA Biological Monitoring Programme. Reporting on Consultancy Contract No. WWF CARPO/AFGAP/FY12/CC/030 and Project Activity No. 9Fo865.01*. Morges, Switzerland: World Wide Fund for Nature (WWF).
- Bleisch, W. and Chen, N. (1990). Conservation of the black-crested gibbon in China. *Oryx*, **24**, 147–56.
- Bobo, K., Ntumwel, B.C. and Aghomo, F.F.M. (2013). Local perception on wildlife uses and related loss of cultural values around the Nkwende Hills Forest Reserve, South-West Cameroon. *Life Sciences Leaflets*, **5**, 1–8.
- Bombome, K. (2007). *Evaluation du potentiel faunique mammalien dans l'UFA 10-047a concession forestière 1057. Diversité biologique, densité, activités humaines et distribution spatiale de la faune sauvage*. Yaoundé, Cameroon: Horizon Vert Groupement d'Intérêt Économique (GIE). Unpublished report.

- Bout, N. (2006). *Parc National des Plateaux Batéké suivi écologique des grands mammifères et de la pression humaine. Rapport final*. Libreville, Gabon: Wildlife Conservation Society (WCS) and John Aspinall Foundation. Unpublished report.
- Brncic, T.M., Amarasekaran, B. and McKenna, A. (2010). *Final Report of the Sierra Leone National Chimpanzee Census Project*. Freetown, Sierra Leone: Tacugama Chimpanzee Sanctuary.
- Bryant, J.V. (2014). *Developing a conservation evidence-base for the critically endangered Hainan gibbon (Nomascus hainanus)*. PhD thesis. London, UK: University College London and Institute of Zoology (ZSL).
- Buzzard, P.J. and Parker, A.J.A. (2012). Surveys from the Subri River Forest Reserve, Ghana. *African Primates*, 7, 175–83.
- Campbell, G. and Hounbedji, M. (2015). *Conservation status of the West African chimpanzee (Pan troglodytes verus) in Togo and Benin*. Arlington, VA: Primate Action Fund. Unpublished report.
- Campbell, G., Kuehl, H., N'Goran Kouamé, P. and Boesch, C. (2008). Alarming decline of West African chimpanzees in Côte d'Ivoire. *Current Biology*, 18, 903–4.
- Carvalho, J.S., Marques, T.A. and Vicente, L. (2013). Population status of *Pan troglodytes verus* in Lagoas de Cufada Natural Park, Guinea-Bissau. *PLoS One*, 8, e71527.
- Chancellor, R.L., Langergraber, K., Ramirez, S., Rundus, A.S. and Vigilant, L. (2012). Genetic sampling of unhabituated chimpanzees (*Pan troglodytes schweinfurthii*) in Gishwati Forest Reserve, an isolated forest fragment in western Rwanda. *International Journal of Primatology*, 33, 479–88.
- Chetry, R. and Chetry, D. (2010). First record of eastern hoolock gibbon in Assam, India. *Primate Conservation*, 25, 95–7.
- Cheyne, S.M. (2011). *Orangutan Tropical Peatland Project Report Ex-Mega Rice Project Gibbon Density and Comparisson with Other Sites*. Palangka Raya: Orangutan Tropical Peatland Project (OuTROP).
- Cheyne, S.M., Thompson, C.J.H., Phillips, A.C., Hill, R.M.C. and Limin, S.H. (2007). Density and population estimate of gibbons (*Hylobates albibarbis*) in the Sabangau Catchment, Central Kalimantan, Indonesia. *Primates*, 49, 50–6.
- Cheyne, S.M., Zrust, M., Hoeing, A., et al. (2012). *Barito River Initiative for Nature Conservation and Communities (BRINCC) Preliminary Report*. Palangka Raya, Indonesia: BRINCC Expedition.
- Chivers, D.J. (1974). *The Siamang in Malaya: A Field Study of a Primate in Tropical Rainforest. Volume 4*. Basel, Switzerland: Karger.
- Choudhury, A.U. (2000). A survey of hoolock gibbon (*Hylobates hoolock*) in Dibru-Saik-Howa National Park, Assam, India. *Primate Report*, 56, 61–6.
- Coudrat, C.N.Z. and Nanthavong, C. (2014). *Gibbon survey and taxonomical status in Nakai-Nam Theun National Protected Area, Laos reveals one of the largest remaining populations of white-cheeked gibbons: implications for their long-term conservation*. Presented at: XXV Congress of the International Primatological Society (IPS), Hanoi, Vietnam.
- Danquah, E., Oppong, S.K., Akom, E. and Sam, M. (2012). Preliminary survey of chimpanzees and threatened monkeys in the Bia-Goaso forest block in southwestern Ghana. *African Primates*, 7, 163–74.
- Das, J., Bhattacharjee, P.C., Biswas, J. and Chetry, D. (2005). *Western Hoolock Gibbon: Socioecology, Threats and Conservation Action Plan*. Guwahati, India: Department of Zoology, Gauhati University, and Primate Research Centre, Northeast Centre.
- Davenport, T.R.B., Mpunga, N., Philips, G.P., et al. (2010). *The conservation status of the chimpanzee (Pan troglodytes schweinfurthii) in southern Tanganyika*. Tanzania: Wildlife Conservation Society (WCS). Unpublished report.
- De Vere, R.A., Warren, Y., Nicholas, A., Mackenzie, M.E. and Higham, J.P. (2011). Nest site ecology of the Cross River gorilla at the Kagwene Gorilla Sanctuary, Cameroon, with special reference to anthropogenic influence. *American Journal of Primatology*, 73, 253–61.
- Dowd, D., Herbinger, I. and N'Goran, K.P. (2008). *Suivi écologique de 2006 à 2008 au Parc National du Banco: synthèse des résultats*. Abidjan, Ivory Coast: Wild Chimpanzee Foundation (WCF) and l'Office Ivoirien des Parcs et Reserves. Unpublished report.
- Duckworth, J.W. (2008). *Preliminary gibbon status review for Lao PDR 2008*. Hanoi, Vietnam: Fauna & Flora International. Unpublished report.

- Dunn, A., Bergl, R., Byler, D., et al. (2014). *Revised Regional Action Plan for the Conservation of the Cross River Gorilla (Gorilla gorilla diehli) 2014–2019*. New York, NY: International Union for Conservation of Nature Species Survival Commission (IUCN SSC) Primate Specialist Group and Wildlife Conservation Society (WCS).
- Ekinde, A. and Ashu, M. (2006). *Preliminary survey of apes around the Assaka forest, Akwaya Subdivision, South West Province, Cameroon*. Limbe, Cameroon: Wildlife Conservation Society (WCS). Unpublished report.
- Ekinde, A., Ashu, M. and Sunderland-Groves, J. (2005). *Preliminary ape surveys around the Fungom Forest Reserve and Furu-Awa Subdivision, North West Province, Cameroon*. Limbe, Cameroon: Wildlife Conservation Society (WCS). Unpublished report.
- Ekinde, A. and Khumbah, P.A. (2006). *Cross River gorilla surveys in south-east UFA 11-002 and search for genetic samples in the Besali-Bechati-Fossimondi forests*. Limbe, Cameroon: Wildlife Conservation Society (WCS) and Environment and Rural Development Foundation (ERuDeF). Unpublished report.
- Ekobo, A. (2007). *Etude sur les potentialites fauniques de l'UFA 00-004 Province du Littoral, Cameroon*. Yaoundé, Cameroon: World Wide Fund for Nature (WWF). Unpublished report.
- Ellioti.org (n.d.). *Numbers Spreadsheet*. Ellioti.org. Available at: <http://www.elliotti.org/numbers.xls>.
- Eno Nku, M. (2003a). *Rapid large mammal assessment of Ejagham Forest Reserve, South West Province, Cameroon*. Limbe, Cameroon: Wildlife Conservation Society (WCS). Unpublished report.
- Eno Nku, M. (2003b). *Rapid large mammal assessment of Nkwende Hills forest concession (UFA 11-001) and Upper Banyang forest concession (UFA 11-002), South West Province, Cameroon*. Limbe, Cameroon: Wildlife Conservation Society (WCS). Unpublished report.
- Eno Nku, M. (2004a). *Large mammal reconnaissance surveys of Lake Barombi Mbo and Southern Bakundu Forest Reserves, SW Province Cameroon*. Limbe, Cameroon: Wildlife Conservation Society (WCS). Unpublished report.
- Eno Nku, M. (2004b). *Large mammal reconnaissance surveys of Mt Etinde Forest Reserve, SW Province, Cameroon*. Limbe, Cameroon: Wildlife Conservation Society (WCS). Unpublished report.
- Eno Nku, M. and Ekobo, A. (2007). *Large mammal surveys of the proposed Mount Cameroon National Park*. Yaoundé, Cameroon: World Wide Fund for Nature (WWF). Unpublished report.
- Etoga, G. (2001). *Étude sur les potentialités fauniques de l'UFA 10038*. Yaoundé, Cameroon: World Wide Fund for Nature (WWF). Unpublished report.
- Etoga, G. (2002). *Étude sur les potentialités fauniques de l'UFA 10-039*. Rapport pour RP Pallisco. Yaoundé, Cameroon: World Wide Fund for Nature (WWF). Unpublished report.
- Etoga, G. (2008). *Étude sur les potentialités fauniques de l'UFA 09-024, Sud Cameroun*. Yaoundé, Cameroon: World Wide Fund for Nature (WWF). Unpublished report.
- Etoga, G.P. and Foguekem, D. (2008). *Large mammals surveys in the Campo-Ma'an National Park (Cameroon): an assessment of great apes population status and anthropogenic threats*. Yaoundé, Cameroon: World Wide Fund for Nature (WWF). Unpublished report.
- Fan Peng-Fei, Jiang Xue-Long and Tian Chang-Cheng (2009). The critically endangered black crested gibbon *Nomascus concolor* on Wuliang Mountain, Yunnan, China: the role of forest types in the species conservation. *Oryx*, **43**, 1–6.
- Fan Peng-Fei, Ren Guo-Peng, Wang Wei, et al. (2013). Habitat evaluation and population viability analysis of the last population of cao vit gibbon (*Nomascus nasutus*): implications for conservation. *Biological Conservation*, **161**, 39–47.
- Fonkwo, N.S., Angwafo, T.E. and Mbida, M. (2011). Abundance and distribution of large mammals in the Bakossi landscape area, Cameroon. *Journal of Soil Science and Environmental Management*, **2**, 43–8.
- Fotso, R., Eno Nku, M. and Groves, J. (2002). *Distribution and conservation status of gorilla population in the forests around Belabo, Eastern Province, Cameroon. Report to Cameroon Oil Transportation Company (COTCO)*. Limbe, Cameroon: Wildlife Conservation Society (WCS). Unpublished report.
- Gašperšič, M. and Pruetz, J.D. (2011). Chimpanzees in Bandafassi arrondissement, southeastern Senegal: field surveys as a basis for the sustainable community-based conservation. *Pan Africa News*, **18**, 23–5.
- Gatti, S. (2009). *Status of Primate Populations in Protected Areas Targeted by the Community Forest Biodiversity Project*. Heidelberg, Germany: West African Primate Conservation Action (WAPCA).

- Geissmann, T., Grindley, M.E., Ngwe, L., *et al.* (2013). *The Conservation Status of Hoolock Gibbons in Myanmar*. Zurich, Switzerland: Gibbon Conservation Alliance.
- Gilhooly, L.J., Rayadin, Y. and Cheyne, S.M. (2015). A comparison of hylobatid survey methods using triangulation on Müller's gibbon (*Hylobates muelleri*) in Sungai Wain Protection Forest, East Kalimantan, Indonesia. *International Journal of Primatology*, **36**, 567–82.
- Ginn, L.P., Robison, J., Redmond, I. and Nekaris, K.A.I. (2013). Strong evidence that the West African chimpanzee is extirpated from Burkina Faso. *Oryx*, **47**, 325–6.
- Granier, N., Hambuckers, A., Matsuzawa, T. and Huynen, M.-C. (2014). Density estimates and nesting-site selection in chimpanzees of the Nimba Mountains, Côte d'Ivoire, and Guinea. *American Journal of Primatology*, **76**, 999–1010.
- Gray, M., Roy, J., Vigilant, L., *et al.* (2013). Genetic census reveals increased but uneven growth of a critically endangered mountain gorilla population. *Biological Conservation*, **158**, 230–8.
- Greengrass, E.J. (2006). *A survey of chimpanzees in south-west Nigeria*. Lekki, Nigeria: Nigerian Conservation Foundation and Wildlife Conservation Society (WCS). Unpublished report.
- Greengrass, E.J. and Maisels, F. (2007). *Conservation of the Nigeria-Cameroon chimpanzee P. t. vellerosus (and other mammals) in and around the Banyang-Mbo Wildlife Sanctuary, South-West Province, Cameroon*. Limbe, Cameroon: Wildlife Conservation Society (WCS). Unpublished report.
- Grossmann, F., Hart, J., Vosper, A. and Ilambu, O. (2008). Range occupation and population estimates of bonobos in the Salonga National Park: application to large-scale surveys of bonobos in the Democratic Republic of Congo. In *The Bonobos: Behaviour, Ecology and Conservation*, ed. T. Furuichi and J. Thompson. New York, NY: Springer Publishing, pp. 189–216.
- Grueter, C.C., Jiang, X., Konrad, R., *et al.* (2009). Are *Hylobates lar* extirpated from China? *International Journal of Primatology*, **30**, 553–67.
- Guislain, P. and Reinartz, G.E. (2010–11). *Means of verification report of wildlife indicators to CARPE. CBFP SLS landscape no. 8*. Milwaukee, WI: Zoological Society of Milwaukee. Unpublished report to US Agency for International Development (USAID) Central Africa Regional Program for the Environment (CARPE).
- Hakizimana, D. and Huynen, M.-C. (2013). Chimpanzee (*Pan troglodytes schweinfurthii*) population density and abundance in Kibira National Park, Burundi. *Pan Africa News*, **20**, 16–9.
- Halford, T., Ekodeck, H., Sock, B., Dame, M. and Auzel, P. (2003). *Statut des populations de gorilles (Gorilla gorilla gorilla) et de chimpanzés (Pan troglodytes troglodytes) dans le sanctuaire à gorilles de Mengamé, Province du Sud, Cameroun: densité, distribution, pressions et conservation*. Yaoundé, Cameroon: Ministry of Environment and Forestry (MINEF) and Jane Goodall Institute. Unpublished report.
- Harrison, M.E., Cheyne, S.M., Husson, S.J., *et al.* (2012). *Preliminary Assessment of the Biodiversity and Conservation Value of the Bawan Forest, Central Kalimantan, Indonesia*. Palangka Raya, Indonesia: Orangutan Tropical Peatland Project (OuTROP).
- Harrison, M.E., Hendri, Dragiewicz, M.L., *et al.* (2010). *Biodiversity of the Mungku Baru Ulin Forest, Central Kalimantan, Indonesia. Report Produced by the Orangutan Tropical Peatland Project (OuTrop) for International Animal Rescue*. Palangka Raya, Indonesia: OuTrop/International Animal Rescue (IAR).
- Haurez, B., Petre, C.-A., Vermeulen, C., Tagg, N. and Doucet, J.-L. (2014). Western lowland gorilla density and nesting behavior in a Gabonese forest logged for 25 years: implications for gorilla conservation. *Biodiversity and Conservation*, **23**, 2669–87.
- Herbinger, I. (2007). *Chimpanzee survey in Azagny National Park*. Abidjan, Ivory Coast: Wild Chimpanzee Foundation (WCF). Unpublished report.
- Herbinger, I. and Lia, D. (2001a). *Rapport de recensement de la population de chimpanzés au Mont Peko*. Abidjan, Ivory Coast: Wild Chimpanzee Foundation (WCF). Unpublished report.
- Herbinger, I. and Lia, D. (2001b). *Rapport de recensement de la population de chimpanzés au Mont Sangbe*. Abidjan, Ivory Coast: Wild Chimpanzee Foundation (WCF). Unpublished report.
- Herbinger, I. and Tounkara, E.O. (2002). *A rapid survey of primates in the Simandou Range, Pic de Fon, Guinea*. Abidjan, Ivory Coast: Wild Chimpanzee Foundation (WCF). Unpublished report.

- Ikemeh, R.A. (2013). Population survey of Nigeria-Cameroon chimpanzees (*Pan troglodytes ellioti*) in southwestern Nigerian priority sites: Idanre forest cluster and Ise Forest Reserve. *African Primates*, **8**, 39–50.
- Imong, S., Mengnjo, C. and Okeke, F. (2009). *Gorilla census of Boshi Extension and Okwa Hills, Cross River National Park, Nigeria, December, 2009*. Nigeria: Cross River National Park and Wildlife Conservation Society (WCS). Unpublished report.
- Imong, S. and Okeke, F. (2009). *Gorilla census of the Mbe Mountains Community Wildlife Sanctuary, Cross River State, Nigeria, September, 2009*. Nigeria: Wildlife Conservation Society (WCS), Conservation Association of Mbe Mountains and Cross River State Forestry Commission. Unpublished report.
- Imong, S., Wood, K. and Okeke, F. (2009). *Great ape and drill survey of the Afi mountain wildlife sanctuary, Cross River State, Nigeria*. Nigeria: Wildlife Conservation Society (WCS), Pandrillus and Cross River State Forestry Commission. Unpublished report.
- Inogwabini, B.-I., Abokome, M., Kamenge, T., Mbende, L. and Mboka, L. (2012). Preliminary bonobo and chimpanzee nesting by habitat type in the northern Lac Tumba landscape, Democratic Republic of Congo. *African Journal of Ecology*, **50**, 285–98.
- Inogwabini, B.-I., Matungila, B., Mbende, L., Abokome, M. and wa Tshimanga, T. (2007). Great apes in the Lake Tumba landscape, Democratic Republic of Congo: newly described populations. *Oryx*, **41**, 532–8.
- Iskandar, E. (2007). *Habitat dan Populasi Owa Jawa (Hylobates moloch Audebert, 1797) di Taman Nasional Gunung Halimun-Salak Jawa Barat*. PhD thesis. Bogor, Indonesia: Institut Pertanian Bogor.
- Islam, M.A. and Feeroz, M.M. (1992). Ecology of hoolock gibbon of Bangladesh. *Primates*, **33**, 451–64.
- IUCN (2014). *Regional Action Plan for the Conservation of Western Lowland Gorillas and Central Chimpanzees 2015–2025*. Gland, Switzerland: International Union for Conservation of Nature Species Survival Commission (IUCN SSC) Primate Specialist Group. DOI: 10.2305/IUCN.CH.2005.SSC-RAP.1.en
- IUCN (2015). *The IUCN Red List of Threatened Species. Version 2015.2*. Gland, Switzerland: International Union for Conservation of Nature (IUCN).
- IUCN and ICCN (2012). *Bonobo (Pan paniscus): Conservation Strategy 2012–2022*. Gland, Switzerland: International Union for Conservation of Nature Species Survival Commission (IUCN SSC) Primate Specialist Group and Institut Congolais pour la Conservation de la Nature.
- Iyenguet, F.C., Madzoke, B., Twagirashyaka, F., et al. (2012). *Inventaire des grands mammifères et activités humaines dans la Batanga, périphérie est de la réserve communautaire du Lac Télé, République du Congo*. Brazzaville, Congo: Wildlife Conservation Society (WCS). Unpublished report.
- Iyenguet, F.C., Malanda, G.F., Madzoke, B. and Twagirashyaka, F. (2008). *Recensement et distribution des grands mammifères et activités humaines dans la zone Impfondo*. Brazzaville, Congo: Wildlife Conservation Society (WCS). Unpublished report.
- Kenyon, M. (2007). *Behavioural ecology of golden-cheeked gibbons (Nomascus gabriellae)*. PhD thesis. Cambridge, UK: University of Cambridge.
- Kormos, R. and Boesch, C. (2003). *Regional Action Plan for the Conservation of Chimpanzees in West Africa* [Published in English and French]. Washington DC: International Union for Conservation of Nature Species Survival Commission (IUCN SSC) Primate Specialist Group and Conservation International.
- Kuchambi, E. and Ikfuingei, R. (2014). *The Takamanda National Park: large mammal survey, May–July, 2013*. Limbe, Cameroon: Wildlife Conservation Society (WCS). Unpublished report.
- Kumar, A., Sarma, K., Krishna, M., and Devi, A. (2013). The eastern hoolock gibbon (*Hoolock leuconedys*) in Eastern Arunachal Pradesh, India. *Primate Conservation*, **27**, 115–23.
- Lan, D.Y. and Sheeran, L.K. (1995). The status of black gibbons (*Hylobates concolor jingdongensis*) at Xiaobahe, Wuliang Mountains, Yunnan Province, China. *Asian Primates Journal*, **5**, 1–4.
- Latour, S. (2005). *Inventaire de faune autour des lacs du delta de l'Ogooué*. Libreville, Gabon: Wildlife Conservation Society (WCS). Unpublished report.
- Latour, S. (2006). *Recensement des éléphants et de grands singes dans la région du Parc National de Pongara (Gabon)*. Libreville, Gabon: Wildlife Conservation Society (WCS). Unpublished report.

- Latour, S. (2010). *Réserve de Faune du Dja: évaluation du statut des grands singes*. France: Groupement BRL Ingénierie SECA/GFA/DFS. Unpublished report
- Li, G.S., Yang, X.M., Zhang, H.Y. and Li, W. (2011). Population and distribution of western black crested gibbon (*Nomascus concolor*) at Ailao Mountain, Xinping, Yunnan. *Zoological Research*, **32**, 675–83.
- Liengola, I., Vosper, A., Maisels, F., Bonyenge, A. and Nkumu, P. (2009). *Conserving bonobos in the last unexplored forest of the Democratic Republic of Congo: the Tshuapa-Lomami-Lualaba landscape*. Kinshasa, DRC: Wildlife Conservation Society (WCS). Unpublished report.
- Mahop, J.P. (2007). *Densité, abondance et distribution spatio-temporelle des grands et moyens mammifères diurnes dans la ZICGCS 9*. Yaoundé, Cameroon: World Wide Fund for Nature (WWF) and Deutsche Gesellschaft für Technische Zusammenarbeit (GTZ) GmbH (German Technical Cooperation). Unpublished report.
- Maisels, F. (2009). *Densities of great apes and elephants, Loango National Park, Gabon*. Libreville, Gabon: Wildlife Conservation Society (WCS). Unpublished report.
- Maisels, F., Abitsi, G. and Bezangoye, A. (2008). *Great ape and human impact monitoring in the Lopé-Waka Exceptional Priority Area, Gabon. Part 2: the Lopé-Waka corridor*. Libreville, Gabon: Wildlife Conservation Society (WCS). Unpublished report.
- Maisels, F., Ambahe, E., Ambassa, R., Nvemgah Yara, C. and Fosso, B. (2009). *Great ape and human impact monitoring in the Mbam et Djerem National Park, Cameroon*. Yaoundé, Cameroon: Wildlife Conservation Society (WCS). Unpublished report.
- Maisels, F. and Ella Akou, M. (2013). *Mwagna National Park: report on WWF survey 2012*. Libreville, Gabon: Agence Nationale des Parcs Nationaux (ANPN)/Wildlife Conservation Society (WCS)/World Wide Fund for Nature (WWF). Unpublished report.
- Maisels, F., Nishihara, T., Strindberg, S., et al. (2012). *Great ape and human impact monitoring training, surveys, and protection in the Ndoki-Likouala landscape, Republic of Congo*. Brazzaville, Congo: Wildlife Conservation Society (WCS). Unpublished report.
- Maisels, F., Nkumu, P., Bonyenge, A. and Naky, P. (2010). *Salonga National Park, Democratic Republic of Congo: terrestrial wildlife and human impact monitoring programme. Survey report: eastern sector of park*. Kinshasa, DRC: Wildlife Conservation Society (WCS). Unpublished report.
- Maisels, F., Strindberg, S., Ambahe, R., et al. (2013a). *Deng Deng National Park and UFA 10-065, Republic of Cameroon. Wildlife and human impact survey 2012*. Yaoundé, Cameroon: Wildlife Conservation Society (WCS). Unpublished report.
- Maisels, F., Strindberg, S., Bechem, M., et al. (2014). *Boumba Bek National Park, Republic of Cameroon: wildlife and human impact survey 2012*. Nairobi, Kenya: Convention on International Trade in Endangered Species (CITES)–Monitoring the Illegal Killing of Elephants (MIKE). Unpublished report.
- Maisels, F., Strindberg, S., Kiminou, F., et al. (2013b). *Wildlife and human impact survey 2012, and monitoring 2005–2008–2012*. Brazzaville, Congo: Fondation Odzala-Kokoua and Wildlife Conservation Society (WCS). Unpublished report.
- Maisels, F., Strindberg, S., Rayden, T., et al. (2015). *Wildlife and human impact survey of the Ngombé Ntoukou-Pikounda forest landscape, Republic of Congo, Feb–Oct, 2014*. Brazzaville, Congo: Wildlife Conservation Society (WCS). Unpublished report.
- Makaya, Q.P. (2010). *Monitoring écologique des grands mammifères terrestres et l'impact anthropique dans le Parc National de Mayumba, Gabon: rapport final*. Libreville, Gabon: Wildlife Conservation Survey (WCS). Unpublished report.
- Malanda, G., Iyenguet, F. and Madzoke, B. (2010). *Inventaire et distribution des grands mammifères et activités humaines dans la zone Tanga*. Brazzaville, Congo: Wildlife Conservation Society (WCS). Unpublished report.
- Maldonado, O., Aveling, C., Cox, D., et al. (2012). *Grauer's Gorillas and Chimpanzees in Eastern Democratic Republic of Congo (Kahuzi-Biega, Maiko, Tayna and Itombwe Landscape): Conservation Action Plan 2012–2022*. Gland, Switzerland: International Union for Conservation of Nature Species Survival Commission (IUCN SSC) Primate Specialist Group/Ministry of Environment, Nature Conservation and Tourism, Institut Congolais pour la Conservation de la Nature (ICCN)/Jane Goodall Institute (JGI).

- Marshall, A.J., Beaudrot, L. and Wittmer, H.U. (2014). Responses of primates and other frugivorous vertebrates to plant resource variability over space and time at Gunung Palung National Park. *International Journal of Primatology*, **35**, 1178–201.
- McCullough, J., Alonso, L.E., Naskrecki, P., Wright, H.E. and Osei-Owusu, Y. (2007). *A Rapid Biological Assessment of the Atewa Range Forest Reserve, Eastern Ghana*. RAP Bulletin of Biological Assessment 47. Arlington, VA: Conservation International (CI).
- McLennan, M. (2013). Diet and feeding ecology of chimpanzees (*Pan troglodytes*) in Bulindi, Uganda: foraging strategies at the forest-farm interface. *International Journal of Primatology*, **34**, 585–614.
- Morgan, B. (2010). The gorillas of the Ebo forest, Cameroon. *Gorilla Journal*, **40**, 16–18.
- Morgan, B., Adeleke, A., Bassey, T., et al. (2011). *Regional Action Plan for the Conservation of the Nigeria-Cameroon Chimpanzee* (*Pan troglodytes ellioti*). San Diego, CA: International Union for Conservation of Nature Species Survival Commission (IUCN SSC) Primate Specialist Group and Zoological Society of San Diego.
- Motsaba, P. and Aba'a, R. (2011). *Inventaire préliminaire de grands mammifères et des activités anthropiques à la Réserve Présidentielle de Wonga-Wongué*. Libreville, Gabon: Wildlife Conservation Society (WCS)/Projet GEF PARCS Composante 2. Unpublished report.
- Motsaba, P. and Maisels, F. (2010). *Recensement de grands mammifères et des impacts humains dans les concessions forestières situées dans la périphérie sud et sud-ouest du Parc National d'Ivindo*. Libreville, Gabon: Wildlife Conservation Society (WCS). Unpublished report.
- Motsaba, P., Tezi, J.P., Aba'a, R. and Maisels, F. (2009). *Recensement des grands mammifères et des impacts humains au Parc National d'Ivindo. Cycle de monitoring II*. Libreville, Gabon: Parcs Gabon and Wildlife Conservation Society (WCS). Unpublished report.
- Moukala Mantsila, G., Mbani, O. and Mahoungou, S. (2013). *Recensement et distribution des grands mammifères de la forêt Messok-Dja (Sembe, Nord Congo)*. Brazzaville, Congo: World Wide Fund for Nature (WWF). Unpublished report.
- Murai, M., Ruffler, H., Berlemont, A., et al. (2013). Priority areas for large mammal conservation in Equatorial Guinea. *PLoS One*, **8**, e75024.
- N'Goran, P.K. (2007). *Quelques résultats de la première phase du biomonitoring au Parc National de la Marahoué (Mai 2006-Décembre 2006)*. Abidjan, Ivory Coast: Wild Chimpanzee Foundation (WCF) and l'Office Ivoirien des Parcs et Réserves. Unpublished report.
- Nakashima, A., Iwata, Y., Ando, C., et al. (2013). Assessment of landscape-scale distribution of sympatric great apes in African rainforests: concurrent use of nest and camera-trap surveys. *American Journal of Primatology*, **75**, 1220–30.
- Nijman, V. (2004). Conservation of the Javan gibbon *Hylobates moloch*: population estimates, local extinctions and conservation priorities. *Raffles Bulletin of Zoology*, **51**, 271–80.
- Nijman, V. and Menken, S.B.J. (2005). Assessment of census techniques for estimating density and biomass of gibbons (Primates: Hylobatidae). *Raffles Bulletin of Zoology*, **53**, 169–79.
- Nixon, S., Kaghoma, C. and Vyalengerera, M. (2015). The status of Grauer's gorilla in the Usala forest. *Gorilla Journal*, **50**, 4–7.
- Nixon, S., Plumptre, A.J., Pintea, L., et al. (2012). *The forgotten gorilla: historical perspectives and future challenges for conserving Grauer's gorilla (abstract)*. Presented at: XXIV Congress of the International Primatological Society (IPS), Cancún, Mexico.
- Normand, E., Singo, B. and Boesch, C. (2010). *Rapport de suivi écologique dans les forêts classées de Goin-Débé et de Cavally (2007–2010)*. Abidjan, Ivory Coast: Wild Chimpanzee Foundation (WCF). Unpublished report.
- Oates, J. (2006). *Primate conservation in the forests of Western Ghana: recommendations for a conservation strategy*. Accra, Ghana: Wildlife Division, Forestry Commission. Unpublished report.
- O'Brien, T.G., Kinnaird, M.F., Nurcahyo, A., Prasetyaningrum, M. and Iqbal, M. (2003). Fire, demography and the persistence of siamang (*Symphalangus syndactylus*: Hylobatidae) in a Sumatran rainforest. *Animal Conservation*, **6**, 115–21.
- Ogunjemite, B.G. (2011). Chimpanzee (*Pan troglodytes*) populations in southwestern Nigeria. *Journal of Sustainable Development in Africa*, **13**, 60–73.

- Ogunjemite, B.G., Afolayan, T.A., Agbelusi, E.A. and Onadeko, S.A. (2006). Status survey of chimpanzee in the forest zone of southwestern Nigeria. *Acta Zoologica Sinica*, **52**, 1009–14.
- Olaniyi, O.E., Ogunjemite, B.G. and Dansu, E.J. (2014). Relationship between anthropogenic activities and occurrence of the chimpanzees (*Pan troglodytes*) in Oluwa Forest Reserve, Nigeria. *Ethiopian Journal of Environmental Studies and Management*, **7**, 402–10.
- Pachau, S.V., Qureshi, Q., Habib, B. and Nijman, V. (2013). Habitat use and documentation of a historic decline of western hoolock gibbon (*Hoolock hoolock*) in Dampa Tiger Reserve, Mizoram, India. *Primate Conservation*, **27**, 85–90.
- Palombit, R.A. (1995). Longitudinal patterns of reproduction in wild siamang (*H. syndactylus*) and white-handed gibbons (*H. lar*). *International Journal of Primatology*, **16**, 739–60.
- Payne, J. (1987). Surveying orang-utan populations by counting nests from a helicopter: a pilot survey in Sabah. *Primate Conservation*, **8**, 92–103.
- Phoonjampa, R. and Brockelman, W.Y. (2008). Survey of pileated gibbon *Hylobates pileatus* in Thailand: populations threatened by hunting and habitat degradation. *Oryx*, **42**, 600–6.
- Phoonjampa, R., Koenig, K., Brockelman, W.Y., et al. (2011). Pileated gibbon density in relation to habitat characteristics and post-logging. *Biotropica*, **43**, 619–27.
- Piel, A.K., Cohen, N., Ndimuligo, S.A., Pintea, L. and Stewart, F.A. (2015). Population status of chimpanzees in the Masito-Ugalla Ecosystem, Tanzania. *American Journal of Primatology*, **77**, 1027–35.
- Piel, A.K., Stewart, F.A., Pintea, L., et al. (2013). The Malagarasi River does not form an absolute barrier to chimpanzee movement in western Tanzania. *PLoS One*, **8**, e58965.
- Pintea, L., Latour, S., Hanni, D.C., et al. (2012). *Biological surveys and geospatial analysis to support great ape conservation in Dimonika Biosphere and Tchimpounga Natural Reserves, Republic of Congo (abstract)*. Presented at: XXIV Congress of the International Primatological Society (IPS), Cancún, Mexico.
- Plumptre, A.J., Amsini, F., Kujirakwinja, D., et al. (2009). *Itombwe Massif conservation project: delimitation and zoning of the Itombwe Natural Reserve for protection of great apes*. Kampala, Uganda: Wildlife Conservation Society (WCS). Unpublished report.
- Plumptre, A.J., Cox, D. and Mugume, S. (2003). *The Status of Chimpanzees in Uganda*. Kampala, Uganda: Wildlife Conservation Society (WCS) and Jane Goodall Institute (JGI).
- Plumptre, A.J., Kujirakwinja, D. and Matunguru, J. (2008a). *Survey of Chimpanzees in the Virunga Park and an Assessment of a Potential Corridor to Mt Hoyo. Albertine Rift Technical Reports Series*. Kampala, Uganda: Wildlife Conservation Society (WCS) and Institut Congolais pour la Conservation de la Nature (ICCN).
- Plumptre, A.J., Kujirakwinja, D., Matunguru, J., et al. (2008b). *Biodiversity Surveys in the Misotshi-Kabogo and Marungu Regions of Eastern Democratic Republic of Congo with a Focus on Chimpanzees*. Kampala, Uganda: Wildlife Conservation Society (WCS).
- Plumptre, A.J., Nampindo, S., Mutungire, N., Gonya, M. and Akuguzibwe, T. (2008c). *Surveys of Chimpanzees and Other Large Mammals in Uganda's Forest Reserves in the Greater Virunga Landscape*. Kampala, Uganda: Wildlife Conservation Society (WCS).
- Plumptre, A.J., Rose, R., Nangendo, G., et al. (2010). *Eastern Chimpanzee (Pan troglodytes schweinfurthii): Status Survey and Conservation Action Plan 2010–2020*. Gland, Switzerland: International Union for Conservation of Nature Species Survival Commission (IUCN SSC) Primate Specialist Group.
- Princée, F.P.G. (2013). *Biomonitoring survey 2011–2012 in Dzanga-Sangha Protected Areas*. Bayanga, Central African Republic: World Wide Fund for Nature (WWF). Unpublished report.
- Pruetz, J.D. and Bertolini, P. (2007). Savanna chimpanzees, *Pan troglodytes verus*, hunt with tools. *Current Biology*, **17**, 412–7.
- Pruetz, J.D., Marchant, L.F., Arno, J. and McGrew, W.C. (2002). Survey of savanna chimpanzees (*Pan troglodytes verus*) in southeastern Senegal. *American Journal of Primatology*, **58**, 35–43.
- Quinten, M., Stirling, F., Schwarze, S., Dinata, Y. and Hodges, K. (2014). Knowledge, attitudes and practices of local people on Siberut Island (west-Sumatra, Indonesia) towards primate hunting and conservation. *Journal of Threatened Taxa*, **6**, 6389–98.

- Rawson, B.M., Insua-Cao, P., Ha, N.M., *et al.* (2011). *The Conservation Status of Gibbons in Vietnam*. Hanoi, Vietnam: Fauna & Flora International and Conservation International.
- Reichard, U. and Sommer, V. (1997). Group encounters in wild gibbons (*H. lar*): agonism, affiliation and the concept of infanticide. *Behaviour*, **134**, 1135–74.
- Reinartz, G.E. and Guislain, P. (2010). *Assessment of bonobo distribution and development of bio-monitoring capacity in the MLW CARPE landscape, DR Congo*. Milwaukee, WI: Zoological Society of Milwaukee. Unpublished report.
- Reinartz, G.E., Inogwabini, B.-I., Ngamankosi, M. and Wema Wema, L. (2006). Effects of forest type and human presence on bonobo (*Pan paniscus*) density in the Salonga National Park. *International Journal of Primatology*, **27**, 603–34.
- Roy, J., Vigilant, L., Gray, M., *et al.* (2014). Challenges in the use of genetic mark–recapture to estimate the population size of Bwindi mountain gorillas (*Gorilla beringei beringei*). *Biological Conservation*, **180**, 249–61.
- Samson, D.R. and Hunt, K.D. (2012). A thermodynamic comparison of arboreal and terrestrial sleeping sites for dry-habitat chimpanzees (*Pan troglodytes schweinfurthii*) at the Toro-Semliki Wildlife Reserve, Uganda. *American Journal of Primatology*, **74**, 811–8.
- Sanderson, J., Barrie, A., Coleman, J.E., *et al.* (2005). A rapid survey of mammals from the Haute Dodo and Cavally Forests, Côte d'Ivoire. In *A Rapid Biological Assessment of Two Classified Forests in South-Western Côte d'Ivoire*. RAP Bulletin of Biological Assessment 34, ed. L.E. Alonso, F. Lauginie and G. Rondeau. Washington DC: Conservation International, pp. 118–24.
- Sanz, C., Morgan, D., Strindberg, S. and Onononga, J.R. (2007). Distinguishing between the nests of sympatric chimpanzees and gorillas. *Journal of Applied Ecology*, **44**, 263–72.
- Setiawan, A., Nugroho, T.S., Wibisono, Y., Ikawati, V. and Sugardjito, J. (2012). Population density and distribution of Javan gibbon (*Hylobates moloch*) in Central Java, Indonesia. *Biodiversitas*, **13**, 23–32.
- Sikubwabo, C.K. (2015). Can the gorillas of Mt Tshiaberimu survive? *Gorilla Journal*, **50**, 3–4.
- Sousa, J., Vicente, L., Gippoliti, S., Casanova, C. and Sousa, C. (2014). Local knowledge and perceptions of chimpanzees in Cantanhez National Park, Guinea-Bissau. *American Journal of Primatology*, **76**, 122–34.
- Stokes, E.J., Strindberg, S., Bakabana, P.C., *et al.* (2010). Monitoring great ape and elephant abundance at large spatial scales: measuring effectiveness of a conservation landscape. *PLoS One*, **5**, e10294.
- Tenaza, R.R. and Hamilton III, W.J. (1971). Preliminary observations of the Mentawai Islands gibbon, *Hylobates klossii*. *Folia Primatologica*, **15**, 201–11.
- Thinh, V.N., Rawson, B.M., Hallam, C., *et al.* (2010). Phylogeny and distribution of crested gibbons (genus *Nomascus*) based on mitochondrial cytochrome b gene sequence data. *American Journal of Primatology*, **72**, 1047–54.
- Tiédoúé, M.R., Kouakou, Y.C., Normand, E., *et al.* (2014). *Etat de conservation du Parc National de Taï: rapport de suivi-écologique – phase 9 (Octobre, 2013-Avril, 2014)*. Abidjan, Ivory Coast: Wild Chimpanzee Foundation (WCF) and l'Office Ivoirien des Parcs et Reserves. Unpublished report.
- Tilson, R.L. (1979). Behaviour of hoolock gibbon (*Hylobates hoolock*) during different seasons in Assam, India. *Journal of the Bombay Natural History Society*, **76**, 1–16.
- Tolisano, J., Vosper, A., Inkamba-Nkulu, C., *et al.* (2013). *Revised sensitivity analysis, Zanaga Mine: pre-feasibility phase*. Brazzaville, Congo: Wildlife Conservation Society (WCS). Unpublished report.
- Traeholt, C., Bonthoeun, R., Rawson, B., *et al.* (2005). *Status Review of Pileated Gibbon, Hylobates pileatus, and Yellow-Cheeked Crested Gibbon, Nomascus gabriellae, in Cambodia*. Phnom, Penh, Cambodia: Fauna & Flora International.
- Tweh, C.G., Lormie, M.M., Kouakou, C.Y., *et al.* (2014). Conservation status of chimpanzees *Pan troglodytes verus* and other large mammals in Liberia: a nationwide survey. *Oryx*, **49**, 710–18.
- Vanleeuwe, H. (2014). *Ecological surveys 2005, 2008, 2010 and 2013 at Konkouati-Douli National Park, Republic of Congo. Projet d'Appui à la Gestion (PAG) du Parc National Konkouati-Douli (PNCD)*. Brazzaville, Congo: Wildlife Conservation Society (WCS). Unpublished report.
- Vosper, A., Masselink, J. and Maisels, F. (2013). *WCS RFO program: great ape and human impact monitoring in Okapi Faunal Reserve, Democratic Republic of Congo*. Kinshasa, DRC: Wildlife Conservation Society (WCS). Unpublished report.

- Warren, Y. and Bila, S.E. (2008). *Mbulu survey*. Limbe, Cameroon: Wildlife Conservation Society (WCS). Unpublished report.
- Warren, Y. and Ekinde, A. (2008). *Large mammal recce survey of the Mone Forest Reserve*. Limbe, Cameroon: Wildlife Conservation Society (WCS). Unpublished report.
- Warren, Y., Stott, A., Ekinde, A.E., Khumbah, P. and Nicholas, A. (2008). *Cross River gorilla inter-population nuclei distribution survey*. Limbe, Cameroon: Wildlife Conservation Society (WCS). Unpublished report.
- WCF (2009). *Rapport préliminaire sur le recensement des chimpanzés dans le Parc National de la Comoé, Côte d'Ivoire*. Abidjan, Ivory Coast: Wild Chimpanzee Foundation (WCF). Unpublished report.
- WCF (2011). *Biomonitoring and surveys: Global Alumina project, Sangaredi*. Conakry, Guinea: Wild Chimpanzee Foundation (WCF). Unpublished report.
- WCF (2012). *Etat de la faune et des menaces dans les aires protégées terrestres et principales zones de forte biodiversité de République de Guinée*. Conakry, Guinea: Wild Chimpanzee Foundation (WCF). Unpublished report.
- WCF (2014a). *Biomonitoring in the Guinea Alumina Corporation concession, Prefecture of Boke*. Conakry, Guinea: Wild Chimpanzee Foundation (WCF). Unpublished report.
- WCF (2014b). *Study of a key area for the preservation of chimpanzee in West Africa: inventory along the Bafing River, Republic of Guinea*. Conakry, Guinea: Wild Chimpanzee Foundation (WCF). Unpublished report.
- Wich, S.A., Meijaard, E., Marshall, A.J., *et al.* (2008). Distribution and conservation status of the orang-utan (*Pongo* spp.) on Borneo and Sumatra: how many remain? *Oryx*, **42**, 329–39.
- Williamson, E.A., Bayogo, R., Guimiyessi, G., *et al.* (2004). *Survey of elephants, Bangassou, Central African Republic: conservation status and human impacts May–June, 2004*. New York, NY: Wildlife Conservation Society (WCS)/Convention on International Trade in Endangered Species (CITES)–Monitoring the Illegal Killing of Elephants (MIKE). Unpublished report.
- WWF (2003). *Large mammals survey in the Mt Nlonako, Makombe and Ebo proposed protected areas*. Yaoundé, Cameroon: World Wide Fund for Nature (WWF). Unpublished report.