

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/or 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. 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 who have access to material that is not in the public domain (such as raw data and documents for third parties that may not be shared in their entirety without permission). Some of the tables specify the “survey year,” indicating when data were collected in the field; others use the “year of estimate,” identifying when a prediction was modelled. Since records of absolute ape numbers are rarely available, this annex uses abundance classes of population ranges, as defined in Table 1. For the small apes, available density estimates are provided.

Table 1 Abundance Class Definitions

Abundance class	Class definition
≤50	Up to 50 individuals
51–100	51–100 individuals
101–300	101–300 individuals
301–500	301–500 individuals
501–1,000	501–1,000 individuals
1,001–5,000	1,001–5,000 individuals
5,001–10,000	5,001–10,000 individuals
10,001–20,000	10,001–20,000 individuals
20,001–50,000	20,001–50,000 individuals
50,001–100,000	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
Extinct	Apes are regionally extinct

Note: If only a population range is available, the mean is used to determine the abundance class. Population size may also be extrapolated from density estimates and then allocated to an appropriate abundance class.

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). While this prioritization is based on the most comprehensive available data, the authors recognize that data may be incomplete for some areas. Priority sites for orangutans and gibbons have not yet been identified.

Abbreviations, acronyms and references 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” for a single species (gorillas in Table 5, chimpanzees in Table 9) or “2” for both gorillas and chimpanzees, counted together as “apes”.

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 subsequent volumes of *State of the Apes*.

<a>Great Ape Abundance Estimates

Table 2 Mountain Gorilla (*Gorilla beringei beringei*) Abundance Estimates

Country	Site name	Abundance class	Survey year(s)	Source
Democratic Republic of Congo (DRC)	Virunga National Park (NP)	**501–1,000	2015–16	Granjon <i>et al.</i> (2020)
Rwanda	Volcanoes NP			
Uganda	Mgahinga Gorilla NP			
	Bwindi Impenetrable NP	301–500	2018	Hickey <i>et al.</i> (2019)

Notes: The Virunga Massif covers the three national parks grouped together in the table. As the gorillas move freely across international boundaries, the total number of mountain gorillas cannot be broken down by park or country.

Table 3 Grauer’s Gorilla (*Gorilla beringei graueri*) Abundance Estimates

Country	Site name	Abundance class	Survey year(s)	Source
DRC	Balala	Extinct	2013	Plumptre <i>et al.</i> (2016)
	Forêt pour le Développement Intégral (FODI)	≤50	2011–15	Plumptre <i>et al.</i> (2016)
	Itombwe	51–100	2013–14	Plumptre <i>et al.</i> (2016)
	Kahuzi-Biega Itebero	501–1,000	2017	Kirkby <i>et al.</i> (2019)
	Kahuzi-Biega Kasese	101–300	2015	Kirkby <i>et al.</i> (2019)
	Kahuzi-Biega Nzovu	101–300	2013–15	Kirkby <i>et al.</i> (2019)
	Kahuzi-Biega Tshivanga	301–500	2015	Kirkby <i>et al.</i> (2019)
	Kisimba-Ikobo	501–1,000	2013	Plumptre <i>et al.</i> (2016)
	Maiko (including Lubutu and Angumu)	101–300	2011–17	Fauna & Flora International and Institut Congolais pour

¹ A statistical tool developed in 2007 can be applied to the data collected, to distinguish between nests built by sympatric gorillas and chimpanzees, if the appropriate covariables are collected for each nest (Sanz *et al.*, 2007).

				la Conservation de la Nature, unpublished data (2016–17)
	Oku Community Reserve East	1,001–5,000	2016–17	Kirkby <i>et al.</i> (2019)
	Oku Community Reserve North	501–1,000	2016–17	Kirkby <i>et al.</i> (2019)
	Réserve de Gorilles de Mukingiti et Kingombe (REGOMUKI)	101–300	2013	Plumptre <i>et al.</i> (2016)
	Tayna Gorilla Reserve	101–300	2013	Plumptre <i>et al.</i> (2016)
	Usala	501–1,000	2010–13	Plumptre <i>et al.</i> (2016)
	Virunga NP (Mt. Tshiaberimu)	≤50	2015	Sikubwabo (2015)
	Walikale	501–1,000	2010	Nixon <i>et al.</i> (2012)
	Nationwide	1,001–5,000	2011–15	Plumptre <i>et al.</i> (2016)

Table 4 Cross River Gorilla (*Gorilla gorilla diehli*) Abundance Estimates

Country	Site name	Abundance class	Survey year(s)	Source
Cameroon	Ebo proposed NP	≤50	2019	B. Morgan, personal communication (2019)
	Kagwene Gorilla Sanctuary	≤50	2006–08	De Vere <i>et al.</i> (2011)
	Mbulu Forest	≤50	2008	Warren and Bila (2008)
	Mone River Forest Reserve (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)

Table 5 Western Lowland Gorilla (*Gorilla gorilla gorilla*) Abundance Estimates

Country	Site name	Abundance class	No. spp.	Survey year(s)	Source
Angola	Maiombe (Cabinda)	1,001–5,000	1	n/a	Strindberg <i>et al.</i> (2018)
Cameroon	Boumba-Bek NP	1,001–5,000	1	2015	Nzooch <i>et al.</i> (2016b)
	Boumba-Bek NP (northern forest management units (FMUs): 10-020 to 10-023, 10-029 and 10-030)	1,001–5,000	1	2015	Nzooch <i>et al.</i> (2016b)
	Campo Ma'an (Dipikar Island)	301–500	1	2014	Nzooch <i>et al.</i> (2015)
	Campo Ma'an NP (North)	301–500	1	2014	Nzooch <i>et al.</i> (2015)

	Campo Ma'an – Operational Technical Unit (total for all strata of the landscape)	501–1,000	1	2014	Nzooch <i>et al.</i> (2015)
	Deng Deng FMU 10-065	*301–500	1	2012	Maisels <i>et al.</i> (2013)
	Deng Deng NP	301–500	2	2016	Benavides <i>et al.</i> (2016)
	Dja Biosphere (or Faunal) Reserve	1,001–5,000	1	2018	Bruce <i>et al.</i> (2018)
	FMU 09-021	51–100	1	2014	Nzooch <i>et al.</i> (2015)
	FMU 09-024	≤50	1	2014	Nzooch <i>et al.</i> (2015)
	FMU 09-025	51–100	1	2014	Nzooch <i>et al.</i> (2015)
	FMU 10-007, ZIC 28	1,001–5,000	2	2014–15	Nzooch <i>et al.</i> (2016a)
	FMUs 10-009 and 10-010, ZIC 29	1,001–5,000	2	2014–15	Nzooch <i>et al.</i> (2016a)
	FMU 10-011, ZICGC 1	1,001–5,000	2	2014–15	Nzooch <i>et al.</i> (2016a)
	FMU 10-012, ZIC 30	1,001–5,000	2	2014–15	Nzooch <i>et al.</i> (2016a)
	FMU 10-013, ZICGC 2	1,001–5,000	2	2014–15	Nzooch <i>et al.</i> (2016a)
	FMU 10-015	1,001–5,000	1	2015	Nzooch <i>et al.</i> (2016b)
	FMUs 10-027 and 10-028	501–1,000	1	2015	Nzooch <i>et al.</i> (2016b)
	FMUs 10-032 and 10-067	1,001– 5,000	1	2015	Nzooch <i>et al.</i> (2016b)
	FMU 10-038	1,001–5,000	1	2001	Etoga (2001)
	FMU 10-039	Present	1	2001	Etoga (2002)
	FMU 10-047a	301–500	1	2007	Bombome (2007)
	FMU 10-063, ZICGC 3	1,001–5,000	1	2014–15	Nzooch <i>et al.</i> (2016a)
	FMU 10-064, ZIC 31	1,001–5,000	1	2014–15	Nzooch <i>et al.</i> (2016a)
	Lobéké NP	1,001–5,000	1	2014–15	Nzooch <i>et al.</i> (2016a)
	Mengamé Gorilla Sanctuary	1,001–5,000	1	2006	Ekobo (2006)
	Nanga-Eboko forest	Present	1	2002	Fotso, Eno Nku and Groves (2002)
	Ngoyla Mintom Complex	5,001–10,000	1	2015	Nzooch <i>et al.</i> (2016b)
	Nki NP	1,001–5,000	1	2015	Nzooch <i>et al.</i> (2016b)
	Sanaga-Yong	Present	1	2002	Fotso, Eno Nku and Groves (2002)
	ZICGC 9	Present	1	2007	Mahop (2007)
Central African Republic (CAR)	Dzanga NP	101–300	1	2015–16	N'Goran, Ndomba and Beukou (2016)
	Dzanga-Sangha Special Reserve	1,001–5,000	1	2015–16	N'Goran, Ndomba and Beukou (2016)
	Dzanga-Sangha landscape (total for all strata of the landscape)	1,001–5,000	1	2015–16	N'Goran, Ndomba and Beukou (2016)
	Ndoki NP	501–1,000	1	2015–16	N'Goran, Ndomba and Beukou (2016)
	SINFOCAM concessions	501–1,000	1	2015–16	N'Goran, Ndomba and Beukou (2016)
	Société de transformation de bois en Centrafrique (STBC) concession	501–1,000	1	2015–16	N'Goran, Ndomba and Beukou (2016)
	Bailly Swamps	1,001–5,000	1	2016	Brcic <i>et al.</i> (2018)

Congo, Republic of	Batanga	5,001–10,000	1	2017	Brcic <i>et al.</i> (2018)
	Batéké Forest	501–1,000	2	2017	Inkamba Nkulu <i>et al.</i> (2018)
	Conkouati-Douli NP	1,001–5,000	2	2013	Vanleeuwe (2014)
	Dimonika Biosphere Reserve	101–300	1	2009	Pintea <i>et al.</i> (2012)
	Djoua-Ivindo Forest	5,001–10,000	1	2014–15	Allam <i>et al.</i> (2016)
	Impfondo	Present	1	2008	Iyenguet <i>et al.</i> (2008)
	Kabo FMU	1,001–5,000	1	2016	Brcic <i>et al.</i> (2018)
	Lac Télé Community Reserve	5,001–10,000	1	2017	Brcic <i>et al.</i> (2018)
	Lossi Gorilla Sanctuary	Present	1	2006	Bassouama <i>et al.</i> (2006)
	Loundougou FMU	5,001–10,000	1	2016	Brcic <i>et al.</i> (2018)
	Loundougou swamp	1,001–5000	1	2016	Brcic <i>et al.</i> (2018)
	Messok-Dja	1,001– 5,000	1	2015–16	Allam <i>et al.</i> (2017)
	Mokabi FMU South	501–1,000	1	2017	Brcic <i>et al.</i> (2018)
	Ngombe FMU	*50,001– 100,000	1	2014	Maisels <i>et al.</i> (2015)
	Nouabalé-Ndoki NP	*1,001–5,000	1	2016	Brcic <i>et al.</i> (2018)
	Ntokou-Pikounda NP	5,001–10,000	1	2014	Maisels <i>et al.</i> (2015)
	Odzala-Koukoua NP	10,001–20,000	1	2016	Bohm (2018)
Pokola FMU	5,001–10,000	1	2016	Brcic <i>et al.</i> (2018)	
Tanga	1,001–5,000	2	2009	Malanda, Iyenguet and Madzoke (2010)	
DRC	Maiombe	Extirpated	1	n/a	Maisels <i>et al.</i> (2018)
Equatorial Guinea	Nationwide	1,001–5,000	1	2011	Murai <i>et al.</i> (2013)
Gabon	Bambidie	101–300	1	2012	Haurez <i>et al.</i> (2014)
	Batéké Plateau NP	Present	2	2005–06	Bout (2006)
	Birougou NP	501–1,000	2	2006–07	Aba'a and Bezangoye (2007)
	Djouah-Zadie	1,001–5,000	2	2016	Le-Duc Yeno and N'Goran (2016)
	Evaro	Present	2	2005	Latour (2005)
	Ivindo concessions	501–1,000	2	2010	Motsaba and Maisels (2010)
	Ivindo NP	1,001–5,000	2	2009	Motsaba <i>et al.</i> (2009)
	Loango NP	301–500	2	2007	Maisels (2009)
	Lopé NP	1,001–5,000	2	2008–09	Bezangoye and Maisels (2010)
	Lopé-Waka corridor	1,001–5,000	2	2007	Maisels, Abitsi and Bezangoye (2008)
	Mayombe	1,001–5,000	2	2011	Aba'a <i>et al.</i> (2011)
	Mayumba NP	*Present	2	2006–10	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	2005–06	Abitsi (2006)	

	Wonga Wongué	Present	2	2011	Motsaba and Aba'a (2011)
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Notes: One asterisk (*) indicates that an ape population is stable; two asterisks (**) show that an ape population is growing. The “number of species” (No. spp.) column specifies whether the abundance estimate refers to gorillas only (1) or to gorillas and chimpanzees together (2).

The abbreviations ZIC and ZICGC are used for hunting zones and community-managed hunting zones, respectively, based on the French terms “zone d'intérêt cynégétique” and “zone d'intérêt cynégétique à gestion communautaire.”

Table 6 Bonobo (*Pan paniscus*) Abundance Estimates

Country	Site name	Abundance class	Survey year(s)	Source
DRC	Lac Tumba Bolobo	51–100	NA	IUCN and ICCN (2012)
	Lac Tumba Bolombo-Losombo	Present	2005	Inogwabini <i>et al.</i> (2007)
	Lac Tumba Botuali-Ilombe	101–300	2005	Inogwabini <i>et al.</i> (2007)
	Lac Tumba Botwali	51–100	2004	IUCN and ICCN (2012)
	Lac Tumba Lediiima Reserve	Present	2014	Beudels-Jamar <i>et al.</i> (2015)
	Lac Tumba (Lokoso, Mankere, Mpelu and Nkala/Nkoo)	≤50	2011–13	Serckx (2014)
	Lac Tumba Malebo	1,001–5,000	2005	Inogwabini <i>et al.</i> (2007)
	Lac Tumba Mbala-Donkese	≤50	2005	Inogwabini <i>et al.</i> (2007)
	Lac Tumba Mbie Mokele	51–100	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	101–300	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	51–100	2008	IUCN and ICCN (2012)
	Maringa-Lopori-Wamba landscape Cadjobe	301–500	2009	Reinartz and Guislain (2010)
	Maringa-Lopori-Wamba landscape Iyondji Reserve	301–500	2012	Lushimba, Kasalevo and Fowler (2012)
	Maringa-Lopori-Wamba landscape K7	Present	2010	IUCN and ICCN (2012)
	Maringa-Lopori-Wamba landscape Kokolopori	301–500	2004–05	IUCN and ICCN (2012)
	Maringa-Lopori-Wamba landscape Lingomo	51–100	2008	IUCN and ICCN (2012)
	Maringa-Lopori-Wamba landscape Lomako-Yokakola Faunal Reserve	1,001–5,000	2015	Levo <i>et al.</i> (2015)
	Maringa-Lopori-Wamba landscape Lonua	Present	2006	IUCN and ICCN (2012)
	Maringa-Lopori-Wamba landscape Luo	51–100	2003–05	IUCN and ICCN (2012)
	Maringa-Lopori-Wamba landscape Mompono-Bekumolokole	51–100	2008	IUCN and ICCN (2012)
	Maringa-Lopori-Wamba landscape Mompono-Yaama	51–100	2008	IUCN and ICCN (2012)

	Maringa-Lopori-Wamba landscape Samba	51–100	2007	IUCN and ICCN (2012)
	Salonga landscape corridor	1,001–5,000	2017	Ikati <i>et al.</i> (2019)
	Salonga landscape Ikela-Bokungu	Present	2008	IUCN and ICCN (2012)
	Salonga landscape Lokoro-Lukenie	Present	2006–07	IUCN and ICCN (2012)
	Salonga landscape Lotoi-Lokoro	Present	2006–07	IUCN and ICCN (2012)
	Salonga landscape LuiKotale-Bompusa	≤50	2012	IUCN and ICCN (2012)
	Salonga landscape Lukenie-Sankuru	Present	2006–07	IUCN and ICCN (2012)
	Salonga landscape Lukuru	51–100	1994–95	IUCN and ICCN (2012)
	Salonga landscape Yetsi-Ikela	51–100	2008	IUCN and ICCN (2012)
	Salonga NP Beminyo	101–300	2000–02	Reinartz <i>et al.</i> (2006)
	Salonga NP Bonima	Present	2000–02	Reinartz <i>et al.</i> (2006)
	Salonga NP southeast	Present	2007–08	Maisels <i>et al.</i> (2010)
	Salonga NP Lokofa	1,001–5,000	2015	WCS (2015)
	Salonga NP Lomela	1,001–5,000	2016	Ikati <i>et al.</i> (2017)
	Salonga NP south	5,001–10,000	2003–06	Grossmann <i>et al.</i> (2008)
	Salonga NP Watsi-Kengo and Mondjoko sectors combined	5,001–10,000	2016–17	Reinartz <i>et al.</i> (2017)
	Sankuru Nature Reserve (NR)	Present	2009	Liengola <i>et al.</i> (2009)
	Tshuapa-Lomami-Lualaba	5,001–10,000	2008–10	IUCN and ICCN (2012)

Table 7 Nigeria–Cameroon Chimpanzee (*Pan troglodytes ellioti*) Abundance Estimates

Country	Site name	Abundance class	Survey year(s)	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	Ellioti.org (n.d.)
	Bakossi NP	Present	2009	Fonkwo, Angwafo and Mbida (2011)
	Banyang-Mbo Wildlife Sanctuary	501–1,000	2006–07	Greengrass and Maisels (2007)
	Ebo proposed NP	501–1,000	2011	Morgan <i>et al.</i> (2011)
	Ejagham FR	Present	2003	Eno Nku (2003a)
	Etinde Wildlife Reserve	51–100	2003	Eno Nku (2004b)
	FMU 00-004	51–100	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	2014	O. Ndoumbe, unpublished data (2017)
	Korup NP	51–100	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	51–100	2011	Ellioti.org (n.d.)
	Makombe Forest	Present	n/a	WWF (2003)
	Manb'ra	Present	1997	Ellioti.org (n.d.)
	Mbam et Djerem NP	501–1,000	2016–17	Kamgang <i>et al.</i> (2020)
Mbulu Forest	Present	2008	Warren and Bila (2008)	
Mone River FR	101–300	2007	Warren and Ekinde (2008)	

	Mpem & Njim NP	Present	2005	Ellioti.org (n.d.)
	Mt. Cameroon NP	301–500	2013	Eno Nku (2013)
	Mt. Kupe	Present	2009	Fonkwo, Angwafo and Mbida (2011)
	Mt. Nlonako Wildlife Reserve	51–100	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)
	Tubah-Awing Forest	≤50	2011	Ellioti.org (n.d.)
	Vome Forest	Present	2008	Ellioti.org (n.d.)
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	2012–13	Ikemeh (2013)
	Ala FR	Extirpated	2006	Greengrass (2006)
	Cross River NP Oban Division	101–300	n/a	A. Dunn and I. Imong, personal communication (2015)
	Cross River NP Okwangwo Division	101–300	n/a	A. Dunn and I. Imong, personal communication (2015)
	Eba FR	Present	2004–05	Ogunjemite <i>et al.</i> (2006)
	Eti-Oni FR	Present	2004–05	Ogunjemite <i>et al.</i> (2006)
	Gashaka-Gumti NP	501–1,000	2005	Adanu, Sommer and Fowler (2011)
	Idanre FR	51–100	2012–13	Ikemeh (2013)
	Ifon FR	Present	2006	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 <i>et al.</i> (2006)
	Okomu NP	Present	2006	Greengrass (2006)
	Ologbo FR	Present	2006	Greengrass (2006)
	Oluwa FR	Present	2011 and 2012	Olaniyi, Ogunjemite and Dansu (2014)
	Omo FR	Present	2006	Greengrass (2006)
	Onisere FR	Present	2004–05	Ogunjemite <i>et al.</i> (2006)
Owo FR	Present	2004–05	Ogunjemite <i>et al.</i> (2006)	
Shasha FR	Present	2006	Greengrass (2006)	

Table 8 Eastern Chimpanzee (*Pan troglodytes schweinfurthii*) Abundance Estimates

Country	Site name	Abundance class	Survey year(s)	Source
Burundi	Bururi FR	≤50	2006–07	Barakabuye <i>et al.</i> (2007)
	Kibira NP	101–300	2011–13	Hakizimana and Huynen (2013)

	Vyanda FR	≤50	1989	Anonymous (1989), cited in Barakabuye <i>et al.</i> (2007)
CAR	Bangassou	Extirpated	2004	Williamson <i>et al.</i> (2004)
	Chinko NR	501–1,000	2015	Aebischer <i>et al.</i> (2017)
	Zemongo Faunal Reserve	501–1,000	2010	Plumptre <i>et al.</i> (2010)
DRC	Balala	Extinct	2011–15	Plumptre <i>et al.</i> (2015)
	Bili-Uélé	20,001–50,000	2010	Plumptre <i>et al.</i> (2010)
	FODI	301–500	2011	Kirkby <i>et al.</i> (2019)
	Greater Virunga Semuliki	1,001–5,000	2008	Plumptre, Kujirakwinja and Matunguru (2008)
	Itombwe	1,001–5,000	2013–14	Plumptre <i>et al.</i> (2015)
	Ituri landscape Mai-Tatu (partial)	1,001–5,000	2015	Maisels <i>et al.</i> (2019)
	Ituri Okapi Faunal Reserve	5,001–10,000	2018	Madidi <i>et al.</i> (2019)
	Kahuzi-Biega Itebero	501–1,000	2017	Kirkby <i>et al.</i> (2019)
	Kahuzi-Biega Kasese	51–100	2015	Kirkby <i>et al.</i> (2019)
	Kahuzi-Biega Nzovu	501–1,000	2013–15	Kirkby <i>et al.</i> (2019)
	Kahuzi-Biega Tshivanga	101–300	2015	Kirkby <i>et al.</i> (2019)
	Lubutu	51–100	2011–15	Plumptre <i>et al.</i> (2015)
	Maganja Hills	101–300	2010	Plumptre <i>et al.</i> (2010)
	Maiko NP	51–100	2011–15	Plumptre <i>et al.</i> (2015)
	Misotshi-Kabogo	1,001–5,000	2007	Plumptre <i>et al.</i> (2008)
	Mt. Hoyo	101–300	2011–15	Plumptre <i>et al.</i> (2015)
	Oku Community Reserve East	301–500	2016–17	Kirkby <i>et al.</i> (2019)
	Oku Community Reserve North	501–1,000	2016–17	Kirkby <i>et al.</i> (2019)
	Réserve de Gorilles de Mukungiti et Kingombe (REGOMUKI)	101–300	2011–15	Plumptre <i>et al.</i> (2015)
	Rubi-Télé	501–1,000	2010	Plumptre <i>et al.</i> (2010)
	Tayna Gorilla Reserve	51–100	2011–15	Plumptre <i>et al.</i> (2015)
	Tayna-Kisimba-Ikobo	51–100	2011–15	Plumptre <i>et al.</i> (2015)
	Usala	51–100	2011–15	Plumptre <i>et al.</i> (2015)
Virunga NP Rwenzori	501–1,000	2010	Plumptre <i>et al.</i> (2010)	
Watalinga	501–1,000	2010	Plumptre <i>et al.</i> (2010)	
Rwanda	Gishwati FR	≤50	2008–10	Chancellor <i>et al.</i> (2012)
	Nyungwe NP	301–500	2014	Wildlife Conservation Society Rwanda, unpublished data (2014)
South Sudan	Nationwide	Present		Plumptre <i>et al.</i> (2010)
Tanzania	Greater Gombe Ecosystem	101–300	2011–12	Piel <i>et al.</i> (2013)
	Greater Mahale Ecosystem , including Masito-Ugalla	1,001–5,000	2011–12	Piel <i>et al.</i> (2013)
	Loasi FR	51–100	2008	Davenport <i>et al.</i> (2010)
	Masito-Ugalla Ecosystem	101–300	2014	Piel <i>et al.</i> (2015)
Uganda	Budongo NP	501–1,000	2010 (model)	Plumptre <i>et al.</i> (2010)
	Bugoma-Budongo Corridor	101–300	2011–14	McCarthy <i>et al.</i> (2015)

Bugoma FR	501–1,000	2010 (model)	Plumptre <i>et al.</i> (2010)
Bulindi	≤50	2007–08	McLennan (2013)
Bwindi Impenetrable NP	101–300	1999–2002	Plumptre, Cox and Mugume (2003)
Echuya FR	Extirpated	1999–2002	Plumptre, Cox and Mugume (2003)
Ibambaro FR	Extirpated	1999–2002	Plumptre, Cox and Mugume (2003)
Kagombe FR	51–100	1999–2002	Plumptre, Cox and Mugume (2003)
Kagorra region	≤50	1999–2002	Plumptre, Cox and Mugume (2003)
Kasato FR	≤50	1999–2002	Plumptre, Cox and Mugume (2003)
Kibale-Itwara	1,001–5,000	2010 (model)	Plumptre <i>et al.</i> (2010)
Kibego FR	≤50	1999–2002	Plumptre, Cox and Mugume (2003)
Kitechura FR	Extirpated	1999–2002	Plumptre, Cox and Mugume (2003)
Kyambura Wildlife Reserve	≤50	1999–2002	Plumptre, Cox and Mugume (2003)
Maramagambo-Kalinzu-Kashyoha-Kitomi landscape	1,001–5,000	2010 (model)	Plumptre <i>et al.</i> (2010)
Matiri FR	Extirpated	1999–2002	Plumptre, Cox and Mugume (2003)
Muhangi FR	≤50	1999–2002	Plumptre, Cox and Mugume (2003)
Otzi FR	≤50	1999–2002	Plumptre, Cox and Mugume (2003)
Rwenzori Mountains NP	301–500	1999–2002	Plumptre, Cox and Mugume (2003)
South Bugoma	≤50	1999–2002	Plumptre, Cox and Mugume (2003)
Toro-Semliki Wildlife Reserve	101–300	2010–11	Samson and Hunt (2012)
Wambabya FR	101–300	1999–2002	Plumptre, Cox and Mugume (2003)

Notes: In the column, “survey years”, ‘model’ means that these estimates are based on model predictions rather than field surveys.

Table 9 Central Chimpanzee (*Pan troglodytes troglodytes*) Abundance Estimates

Country	Site name	Abundance class	No. spp	Survey year(s)	Source
Angola	Maiombe (Cabinda)	1,001–5,000	1	n/a	Strindberg <i>et al.</i> (2018)
Cameroon	Boumba-Bek NP	501–1,000	1	2015	Nzooh <i>et al.</i> (2016b)
	Boumba-Bek NP (northern FMUs: 10-020 to 10-023, 10-029 and 10-030)	301–500	1	2015	Nzooh <i>et al.</i> (2016b)
	Campo Ma’an (Dipikar Island)	301–500	1	2014	Nzooh <i>et al.</i> (2015)

	Campo Ma'an NP (North)	301–500	1	2014	Nzooch <i>et al.</i> (2015)
	Campo Ma'an – Operational Technical Unit (total for all strata of the landscape)	1,001–5,000	1	2014	Nzooch <i>et al.</i> (2015)
	Deng Deng FMU 10-065	Present	1	2012	Maisels <i>et al.</i> (2013)
	Deng Deng NP	301–500	2	2016	Benavides <i>et al.</i> (2016)
	Dja Biosphere (or Faunal) Reserve	1,001–5,000	1	2018	Bruce <i>et al.</i> (2018)
	FMU 00-004	Present	1	2007	Ekobo (2007)
	FMU 09-021	51–100	1	2014	Nzooch <i>et al.</i> (2015)
	FMU 09-024	101–300	1	2014	Nzooch <i>et al.</i> (2015)
	FMU 09-025	51–100	1	2014	Nzooch <i>et al.</i> (2015)
	FMU 10-013	Present	1	2003	Blake, Strindberg and Princée (2012)
	FMU 10-015	301–500	1	2015	Nzooch <i>et al.</i> (2016b)
	FMU 10-027 and 10-028	301–500	1	2015	Nzooch <i>et al.</i> (2016b)
	FMU 10-032 and 10-067	501–1,000	1	2015	Nzooch <i>et al.</i> (2016b)
	FMU 10-038	Present	1	2001	Etoga (2001)
	FMU 10-047a	301–500	1	2007	Bombome (2007)
	FMU 10-064	Present	1	2004	Blake, Strindberg and Princée (2012)
	FMUs 10-08, 10-09, 10-010 and 10-012	Present	1	2005	Blake, Strindberg and Princée (2012)
	Lobéké NP	501–1,000	1	2015	Nzooch <i>et al.</i> (2016a)
	Mengamé Gorilla Sanctuary	Present	1	2006	Ekobo (2006)
	Nanga-Eboko	Present	1	2002	Fotso, Eno Nku and Groves (2002)
	Ngoyla Mintom complex	1,001–5,000	1	2015	Nzooch <i>et al.</i> (2016b)
	Nki NP	301–500	1	2015	Nzooch <i>et al.</i> (2016b)
	Sanaga-Yong	Present	1	2002	Fotso, Eno Nku and Groves (2002)
	ZICGC 9	Present	1	2007	Mahop (2007)
CAR	Dzanga NP	≤50	1	2015–16	N'Goran, Ndomba and Beukou (2016)
	Dzanga-Sangha landscape (total for all strata of the landscape)	301–500	1	2015–16	N'Goran, Ndomba and Beukou (2016)
	Dzanga-Sangha Special Reserve	101–300	1	2015–16	N'Goran, Ndomba and Beukou (2016)
	Ndoki NP	101–300	1	2015–16	N'Goran, Ndomba and Beukou (2016)
	SINFOCAM concessions	101–300	1	2015–16	N'Goran, Ndomba and Beukou (2016)
	STBC concession	51–100	1	2015–16	N'Goran, Ndomba and Beukou (2016)
Congo, Republic of	Bailly Swamps	1,001–5,000	1	2016	Brncic <i>et al.</i> (2018)
	Batanga	301–500	1	2017	Iyenguet <i>et al.</i> (2012)
	Batéké Forest	301–500	2	2017	Inkamba Nkulu <i>et al.</i> (2018)
	Conkouati-Douli NP	5,001–10,000	2	2013	Vanleeuwe (2014)
	Dimonika Biosphere Reserve	Present	1	2009	Pintea <i>et al.</i> (2012)

	Djoua-Ivindo Forest	5,001–1,000	1	2014–15	Allam <i>et al.</i> (2016)
	Impfondo	501–1,000	1	2008	Iyenguet <i>et al.</i> (2008)
	Kabo FMU	501–1,000	1	2016	Brncic <i>et al.</i> (2018)
	Lac Télé Community Reserve	501–1,000	1	2017	Brncic <i>et al.</i> (2018)
	Lossi Gorilla Sanctuary	Present	1	2004–05	Bermejo <i>et al.</i> (2006)
	Loundougou FMU	1,001–5,000	1	2016	Brncic <i>et al.</i> (2018)
	Loundougou swamp	501–1,000	1	2016	Brncic <i>et al.</i> (2018)
	Messok-Dja	552	1	2015–16	Allam <i>et al.</i> (2017)
	Mokabi FMU South	301–500	1	2017	Brncic <i>et al.</i> (2018)
	Ngombe FMU	5,001–10,000	1	2014	Maisels <i>et al.</i> (2015)
	Nouabalé-Ndoki NP	1,001–5,000	1	2016	Brncic <i>et al.</i> (2018)
	Ntokou-Pikounda NP	1,001–5,000	1	2014	Maisels <i>et al.</i> (2015)
	Odzala-Koukoua NP	1,001–5,000	1	2016	Bohm (2018)
	Pokola FMU	1,001–5,000	1	2016	Brncic <i>et al.</i> (2018)
Tanga	≤50	1	2009	Malanda, Iyenguet and Madzoke (2010)	
DRC	Lac Tumba	Present	1	2007–10	Inogwabini <i>et al.</i> (2012)
	Maiombe	Present	1	n/a	Maisels <i>et al.</i> (2016)
Equatorial Guinea	Nationwide	5,001–10,000	1	2012	Murai <i>et al.</i> (2013)
Gabon	Bambidie	Present	1	2012	Haurez <i>et al.</i> (2014)
	Batéké Plateau NP	Present	2	2005–06	Bout (2006)
	Birougou NP	501–1,000	2	2006–07	Aba'a and Bezangoye (2007)
	Evaro	Present	2	2005	Latour (2005)
	Djouah-Zadie	1,001–5,000	2	2016	Le-Duc Yeno and N'Goran (2016)
	Ivindo concessions	501–1,000	2	2010	Motsaba and Maisels (2010)
	Ivindo NP	1,001–5,000	2	2009	Motsaba <i>et al.</i> (2009)
	Loango NP	301–500	2	2006	Maisels (2009)
	Lopé NP	1,001–5,000	2	2008–09	Bezangoye and Maisels (2010)
	Lopé-Waka corridor	1,001–5,000	2	2007	Maisels, Abitsi and Bezangoye (2008)
	Mayombe	1,001–5,000	2	2011	Aba'a <i>et al.</i> (2011)
	Mayumba NP	*Present	2	2006–10	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)
	Pongara NP	Present	1	2006	Latour (2006)
	Waka NP	Present	2	2005–06	Abitsi (2006)
	Wonga Wongué	Present	2	2011	Motsaba and Aba'a (2011)

Notes: One asterisk (*) indicates that an ape population is stable; two asterisks (**) show that an ape population is increasing. The “number of species” (No. spp.) column specifies whether the abundance estimate refers to chimpanzees only (1) or to chimpanzees and gorillas together (2).

The abbreviation ZICGC is used for community-managed hunting zones, based on the French term “zone d'intérêt cynégétique à gestion communautaire.”

Table 10 Western Chimpanzee (*Pan troglodytes verus*) Abundance Estimates²

Country	Site name	Abundance class	Survey year(s)	Source
Benin	Nationwide	Possibly extinct	2013–14	Campbell and Hougbedji (2015)
Burkina Faso	Nationwide	Possibly extinct	2012	Ginn <i>et al.</i> (2013)
Ghana	Atewa FR	Present	2006	Granier and Awotwe-Pratt (2007)
	Bia-Goaso	101–300	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	Magnuson, Adu-Nsiah and Kpelle (2003)
	Subri River FR	Present	2011	Buzzard and Parker (2012)
Guinea	Bafing River area	1,001–5,000	2013–14	WCF (2014b)
	CBG-Halco concession	51–100	2015	WCF (2015)
	Diecke Classified Forest	51–100	2011	WCF (2012)
	Foutah Djallon	10,001–20,000	2011–12	WCF (2012)
	Gadha Woundou Classified Forest	≤50	2011	WCF (2012)
	Haut Niger NP Kouya core area	101–300	2011	WCF (2012)
	Haut Niger NP Mafou core area	101–300	2011	WCF (2012)
	Kankan Faunal Reserve	Present	2010–11	WCF (2012)
	Koumbia	101–300	2010	WCF (2012)
	Mt. Nimba Strict NR	101–300	2009	WCF (2012)
	Oure Kaba Classified Forest	51–100	2009	WCF (2012)
	Pic de Fon Classified Forest	51–100	2002	Herbinger and Tounkara (2002)
	Sangaredi Alumina Project	101–300	2014	WCF (2014a)
	Ziama Strict NR	≤50	2010–11	WCF (2012)
Guinea-Bissau	Boe area (including Boe NP)	1,001–5,000	2016	Chimbo Foundation, personal communication (2017)
	Cantanhez NP	Present	2007	Sousa <i>et al.</i> (2014)
	Lagoas de Cufada NP	101–300	2010–11	Carvalho, Marques and Vicente (2013)
Ivory Coast	Azagny NP	≤50	2007	Herbinger (2007)
	Banco NP	≤50	2015	E. Normand, personal communication (2016)

² Previous abundance annexes have included the Gambia; however, primatologists are now convinced that the country was not part of the western chimpanzee's range (E.A. Williamson, personal communication, 2019).

	Bossematie Classified Forest	Present	2007	Campbell (2008)
	Cavally Classified Forest	51–100	2010	Normand, Singo and Boesch (2010)
	Comoé NP	Present	2009	WCF (2009)
	Dassiekro Classified Forest	Extirpated	2007	Campbell (2008)
	Duekoue Classified Forest	Extirpated	2007	Campbell (2008)
	Gobodienou Classified Forest	Extirpated	2007	Campbell (2008)
	Goin-Débé Classified Forest	≤50	2009	Normand, Singo and Boesch (2010)
	Haute Dodo	Present	2002	Sanderson <i>et al.</i> (2005)
	Mabi Classified Forest	Present	2007	Campbell (2008)
	Marahoué NP	≤50	2006	N’Goran (2007)
	Monogaga Classified Forest	Extirpated	2007	Campbell (2008)
	Mt. Kope	Present	2007	Campbell (2008)
	Mt. Peko NP	Extirpated	2015	E. Normand, personal communication (2016)
	Mt. Sangbe NP	Present	2014	Wild Chimpanzee Foundation, unpublished data (2015)
	Nimba Mountains	≤50	2009–11	Granier <i>et al.</i> (2014)
	Niouniourou Classified Forest	Extirpated	2007	Campbell (2008)
	Nizoro Classified Forest	Extirpated	2007	Campbell (2008)
	Okromodou Classified Forest	Extirpated	2007	Campbell (2008)
	Port Gauthier Classified Forest	Extirpated	2007	Campbell (2008)
	Tai NP	501–1,000	2016–17	Tiédoué <i>et al.</i> (2018)
	Tamin Classified Forest	Extirpated	2007	Campbell (2008)
Liberia	Gola Forest NP	51–100	2017	WCF (2018)
	Grebo-Krahn NP	101–300	2015	Furnell <i>et al.</i> (2015a)
	Sapo-Grebo corridor	501–1,000	2015	Furnell <i>et al.</i> (2015b)
	Sapo NP	1,001–5,000	2016	Tweh <i>et al.</i> (2018)
	Nationwide	5,001–10,000	2011–12	Tweh <i>et al.</i> (2015)
Mali	Bafing Biosphere Reserve	≤50	2014	PanAf, unpublished data (2015)
Senegal	Fongoli	≤50	2005–06	Pruetz and Bertolani (2007)
	Nathia	Present	2010–11	Gašperšič and Pruetz (2011)
	Niokolo Koba NP	≤50	2000	Pruetz <i>et al.</i> (2002)
	Nationwide	501–1,000	2015	E. Wessling and J. Pruetz, unpublished data (2016)

Sierra Leone	Gola Rainforest NP	101–300	2015–16	B. Barca, personal communication (2017)
	Kambui FR	Present	2009–10	Brncic, Amarasekaran and McKenna (2010)
	Kangari FR	Present	2009–10	Brncic, Amarasekaran and McKenna (2010)
	Kilimi NP	51–100	2009–10	Brncic, Amarasekaran and McKenna (2010)
	Lake Sonfon proposed NP	Present	2009–10	Brncic, Amarasekaran and McKenna (2010)
	Loma FR	1,001–5,000	2009–10	Brncic, Amarasekaran and McKenna (2010)
	Moyamba	Present	2009–10	Brncic, Amarasekaran and McKenna (2010)
	Nimini FR	Present	2009–10	Brncic, Amarasekaran and McKenna (2010)
	Outamba NP	501–1,000	2009–10	Brncic, Amarasekaran and McKenna (2010)
	Tingi FR	51–100	2009–10	Brncic, Amarasekaran and McKenna (2010)
	Tonkoli FR	Present	2009–10	Brncic, Amarasekaran and McKenna (2010)
	Western Area Peninsula FR	51–100	2009–10	Brncic, Amarasekaran and McKenna (2010)
	Nationwide	5,001–10,000	2009–10	Brncic, Amarasekaran and McKenna (2010)
Togo	Nationwide	Possibly extinct	2013–14	Campbell and Hougbedji (2015)

Table 11 Sumatran Orangutan (*Pongo abelii*) Abundance Estimates

Country	Site name	Site name in previous volumes of <i>State of the Apes</i>	Abundance class	Year of estimate	Source
Indonesia	East Leuser	East Leuser Ecosystem, East Middle Aceh Ecosystem	5,001–10,000	2015	Wich <i>et al.</i> (2016)
	Sikulaping	Sidiangkat	101–300		
	Siranggas, Batu Ardan	Sidiangkat	51–100		
	Tripa Swamp	Tripa Swamp	101–300		
	Trumon-Singkil	Trumon Singkil	1,001–5,000		
	West Leuser	West Leuser Ecosystem, West Middle Aceh Ecosystem	5,001–10,000		

Note: The current and previous site names do not necessarily refer to identical areas. In some cases the new site name may encompass multiple sites that were previously listed separately. As a result, orangutan numbers are not directly comparable over time at the site level. The population sizes were recalculated based on Wich *et al.* (2016).

Table 12 Tapanuli Orangutan (*Pongo tapanuliensis*) Abundance Estimates

Country	Site name	Site name in previous volumes of <i>State of the Apes</i>	Abundance class	Year of estimate	Source
Indonesia	Dolok Sibual-buali NR		≤50	2015	Wich <i>et al.</i> (2019)
	East Batang Toru	East Sarulla	101–300		
	West Batang Toru	West Batang Toru	501–1,000		

Note: The Tapanuli orangutan was first described in November 2017 (Nater *et al.*, 2017). The distribution and population estimates provided here are based on earlier surveys in the area where the Tapanuli orangutan occurs. At the time of the surveys, these populations were still identified as Sumatran orangutans; therefore, the cited source makes no reference to the Tapanuli orangutan.

The current and previous site names do not necessarily refer to identical areas. In some cases the new site name may encompass multiple sites that were previously listed separately. As a result, orangutan numbers are not directly comparable over time at the site level

Table 13 Northeast Bornean Orangutan (*Pongo pygmaeus morio*) Abundance Estimates

Country	Site name	Site name in previous volumes of <i>State of the Apes</i>	Abundance class	Year of estimate	Source
Indonesia	Belayan landscape	n/a	51–100	2016	Utami-Atmoko <i>et al.</i> (2019)
	Bontang landscape	Kutai NP	51–100		
	Kutai landscape	Kutai NP and Sangatta-Bengalon and Muara Wahau	1,001–5,000		
	Lesan landscape	Lesan watershed	51–100		
	Sangkulirang landscape	Sangkulirang-Mangkalihat karst area	301–500		
	Senyur landscape	n/a	101–300		
	Wehea landscape	Kelai watershed	501–1,000		
Malaysia	Bonggaya landscape	Bonggaya FR	101–300	2016	Utami-Atmoko <i>et al.</i> (2019)
	Central Forest range landscape	Keningau, Kinabalu, Kuamut, Pinangah, Segama	5,001–10,000		
	Crocker range landscape	Crocker Range NP, Kinabalu	101–300		
	Lingkabau landscape	Lingkabau FR	101–300		
	Lower Kinabatangan range landscape	Kinabatangan, Kulamba Wildlife Reserve	1,001–5,000		
	North Kinabatangan range landscape and Ulu Tungud	Upper Kinabatangan	1,001–5,000		
	Sepilok	Sepilok	101–300		
	Tabin range landscape	Tabin	1,001–5,000		
	Trus madi landscape	Trus Madi forests	101–300		
	Ulu Kalumpang range landscape	Ulu Kalumpang FR	301–500		
	Ulu Tungud landscape	n/a	≤50		

Note: The current and previous site names do not necessarily refer to identical areas. In some cases the new site name may encompass multiple sites that were previously listed separately. As a result, orangutan numbers are not directly comparable over time at the site level. Since the site names reflect those used in previous *State of the Apes* reports, the population numbers may differ from those in Utami-Atmoko *et al.* (2019).

Table 14 Northwest Bornean Orangutan (*Pongo pygmaeus pygmaeus*) Abundance Estimates

Country	Site name	Site name in previous volumes of <i>State of the Apes</i>	Abundance class	Year of estimate	Source
Indonesia	Betung Kerihun NP and protection forest	Betung Kerihun, part of Upper Kapuas swamps	1,001–5,000	2016	Utami-Atmoko <i>et al.</i> (2019)
	Danau Sentarum and corridor	Danau Sentarum, part of Upper Kapuas swamps	501–1,000		
	Pygmaeus fragmented North	n/a	≤50		
	Pygmaeus fragmented South	n/a	≤50		
Indonesia/ Malaysia	Bungoh NP–Gunung Nyiut NR, Penrisen protection forest	n/a	51–100		
	Klingkang Range NP, Sintang Utara	n/a	51–100		
Malaysia (Sarawak)	Batang Ai-Lanjak Entimau landscape	Batang Ai, Lanjak Entimau	1,001–5,000		
	Ulu Sebuyau-Sedilu landscape	n/a	≤50		

Note: The current and previous site names do not necessarily refer to identical areas. In some cases the new site name may encompass multiple sites that were previously listed separately. As a result, orangutan numbers are not directly comparable over time at the site level.

Table 15 Southwest Bornean Orangutan (*Pongo pygmaeus wurmbii*) Abundance Estimates

Country	Site name	Site name in previous volumes of <i>State of the Apes</i>	Abundance class	Year of estimate	Source
Indonesia	Arabela Schwaner	Bukit Baka, Bukit Rongga and Perai, Arut Belantikan, Seruyan, Bukit Raya, Sei Kahayan-Sei Samba, Sei Samba-Sei Katingan, Cagar Alam B. Sapat Hawung	10,001–20,000	2016	Utami-Atmoko <i>et al.</i> (2019)
	Barito Timur	n/a	101–300		
	Gunung Palung-Sungai Putri	Gunung Palung	1,001–5,000		
	Kahayan-Kapuas	Kahayan Kapuas	1,001–5,000		
	Kapuas-Barito	Mawas, Cagar Alam Pararawen	1,001–5,000		
	Katingan	Katingan	1,001–5,000		

	Kendawangan-Jelai	n/a	≤50		
	Kotawaringin-Lama	Tanjung Keluang	501–1,000		
	Kubu Raya	n/a	1,001–5,000		
	Lamandau-Sukumara	Lamandau	501–1,000		
	Pematang Gadung	n/a	501–1,000		
	Rungan River landscape	Rungan Kahayan	1,001–5,000		
	Sebangau	Sebangau NP, Sebangau Kahayan	5,001–10,000		
	Seruyan-Sampit	n/a	101–300		
	Sungai Tengar	n/a	101–300		
	Tanjung Puting	Tanjung Puting NP	1,001–5,000		

Note: The current and previous site names do not necessarily refer to identical areas. In some cases the new site name may encompass multiple sites that were previously listed separately. As a result, orangutan numbers are not directly comparable over time at the site level.

<a>Gibbon Abundance and Density Estimates

The most effective measures for monitoring gibbon populations are density estimates, formulated as individuals or groups per square kilometer. Abundance classes may be obtained by extrapolating density estimates to larger areas. The following tables provide available density estimates alongside abundance estimates; in the absence of data, the word “present” is used to indicate that gibbons are known to occur.

Table 16 Gaoligong Hoolock Gibbon (*Hoolock tianxing*) Abundance Estimates

Country	Site name	Abundance class	Survey year(s)	Source
China	Mt. Gaoligong, Yunnan	101–300	2008–09	Fan <i>et al.</i> (2017)
Myanmar	Kachin state	Present	2009–10	Geissmann <i>et al.</i> (2013)
	Kayah and Kayin states	10,001–20,000	2010	Geissmann <i>et al.</i> (2013)
	Rakhine state	10,001–20,000	2008–09	Geissmann <i>et al.</i> (2013)
	Shan state	20,001–50,000	2010	Geissmann <i>et al.</i> (2013)

Notes: Populations in Myanmar are distributed on the east bank of the Irrawaddy River, and therefore are likely to represent *Hoolock tianxing* (Fan *et al.*, 2017), which had not been differentiated as a separate species when Geissmann *et al.* (2013) was published. The population in Myanmar’s Rakhine state was identified as Gaoligong hoolock, rather than western hoolock, in 2019 (Fan, Turvey and Bryant, 2020).

Table 17 Western Hoolock (*Hoolock hoolock*) Abundance Estimates

Country	Site name	Abundance class/density	Survey year(s)	Source
Bangladesh	Kalachara Forest Beat	≤50	2009	Akers, Islam and Nijman (2013)
	Lawachara and Chunutati	Present	1990–91	Feeroz and Islam (1992)
India	Assam	1,001–5,000	1994–2004	Das <i>et al.</i> (2005)
	Barail and Langting-Mupa Reserve Forests (North	Present	1986–88	Choudhury (2000)

	Cachar Hills), Hollongapar Reserve Forest (Jorhat district), Innerline Reserve Forest (Cachar)			
	Dampa Tiger Reserve	≤50	2010–11	Pachau et al. (2013)
	Hollongapur FR	Present	1971–73	Tilson (1979)
	Namdapha NP	1,001–5,000; 3.65 groups/km ²	2012	Ray et al. (2015)

Table 18 Eastern Hoolock (*Hoolock leuconedys*) Abundance Estimates

Country	Site name	Abundance class	Survey year	Source
China	Gaoligongshan National NR	≤50	2009	Fan et al. (2011)
	Yingjiang (county)	51–100	2009	Fan et al. (2011)
Myanmar	Magwe region	Present	2009	Geissmann et al. (2013)
	Sagaing region	10,001–20,000	2009	Geissmann et al. (2013)

Table 19 Abbott's Gray Gibbon (*Hylobates abbotti*)

There are no accurate population density estimates for Abbott's gray gibbon. Population estimates for the species in Indonesia and Malaysia are extrapolations based on data for related species. While a significant population probably exists outside protected areas, it remains to be assessed. The impact of plantations (especially oil palm plantations) on gibbon populations is unknown; more data are needed before an evaluation may be made.

Table 20 Agile Gibbon (*Hylobates agilis*) Abundance Estimates

Country	Site name	Density	Survey year(s)	Source
Indonesia	Air Tarusan Reserve	Present	2015	A.B. Chanee, unpublished data (2015)
	Batang Gadis NP	8.8–15.5 individuals/km ²	2008	Sultan, Mansjoer and Bismark (2009)
	Bukit Barisan Seletan	1.4–2.8 individuals/km ²	2001	O'Brien et al. (2004)
	Harapan Rainforest	6.3–13.4 individuals/km ²	2009–10	Lee, Powell and Lindsell (2015)
	Kerinci Seblat NP	6.0–11.4 individuals/km ²	1998	Yanuar (2009)
	Way Kambas	1.9 individuals/km ²	1992	Yanuar (2009)
Malaysia	Sungai Dal	5.5–18.9 individuals (2–5 groups)/km ²	1978	Gittins (1979)

Table 21 Bornean White-bearded Gibbon (*Hylobates albibarbis*) Abundance Estimates

Country	Site name	Abundance class	Density	Survey year(s)	Source
Indonesia	Bawan	20,001–50,000	4.78 groups/km ²	2010	Harrison et al. (2012)

	Block C Ex-Mega Rice Project	5,001–10,000	2.33 groups/km ²	2011	Cheyne (2011)
	Bukit Baka Bukit Raya NP	10,001–20,000	2.78 groups/km ²	2003	S. Cheyne, unpublished data (2003)
	Gunung Palung NP	5,001–10,000	n/a	2014	Marshall, Beaudrot and Wittmer (2014)
	Mungku Baru	1,001–5,000	2.26 groups/km ²	2010	Harrison <i>et al.</i> (2010)
	Pararawen Reserve	n/a	n/a	2014	A.B. Chanee, unpublished data (2015)
	Sabangau Forest Landscape	**10,001–20,000	2.65 groups/km ²	2007–16	Cheyne <i>et al.</i> (2016)

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

Table 22 Bornean Gray Gibbon (*Hylobates funereus*) Abundance Estimates

Country	Site name	Abundance class	Survey year	Source
Indonesia	Betung Kerihun NP	Present	n/a	S. Cheyne, unpublished data (2010)
	Danau Sentarum-Betung Kerihun	Present	n/a	S. Cheyne, unpublished data (2014)
	Kayan Menterang NP	10,001–20,000	2004	Nijman and Menken (2005)
	Kutai NP	Present	2014	S. Cheyne, unpublished data (2014)
	Sankulirang karst area	Present	2014	S. Cheyne, unpublished data (2014)
	Wehea Protection Forest	1,001–5,000	2013	Cheyne <i>et al.</i> (2016)
Malaysia	Crocker Range NP	Present	None	M. Ancrenaz, personal communication (2018)
	Danum Valley	Present	None	M. Ancrenaz, personal communication (2018)
	Imbak Canyon Conservation Area	Present	None	M. Ancrenaz, personal communication (2018)
	Kinabatangan	Present	None	M. Ancrenaz, personal communication (2018)
	Malinau Basin	Present	None	M. Ancrenaz, personal communication (2018)

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

Table 23 Kloss's Gibbon (*Hylobates klossii*) Abundance Estimates

Country	Site name	Abundance class	Survey year	Source
Indonesia	Saraboa and Sikakap	Present	1970	Tenaza and Hamilton (1971)
	Siberut Island NP	10,001–20,000	2012	Höing <i>et al.</i> (2013)

Table 24 Lar Gibbon (*Hylobates lar*) Abundance Estimates

Country	Site name	Abundance class	Survey year(s)	Source
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China	Nangunhe NR, southwest Yunnan	Extirpated	2007	Grueter <i>et al.</i> (2009)
Indonesia	Ketambe Research Station	Present	1991	Palombit (1995)
Lao People's Democratic Republic (PDR)	Nam Pouy National Protected Area (NPA)	Present	2010	Boonratana <i>et al.</i> (2011)
Thailand	Khao Yai NP	Present	1992–96	Sommer and Reichard (1997)
	Mo Singto, Khao Yai NP	Present	1994–95	Bartlett (2009)

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

Table 25 Moloch Gibbon (*Hylobates moloch*) Abundance Estimates

Country	Site name	Abundance class/density	Survey year(s)	Source
Indonesia	Bojongpicung	Present	1994–2002	Nijman (2004)
	Cisolok	Present	1994–2002	Nijman (2004)
	Gede Pangrango	101–300	2007	Iskandar (2007)
	Lengkong	Present	1994–2002	Nijman (2004)
	Leuweung Sancang	Present	1994–2002	Nijman (2004)
	Mt. Burangrang-Tangkuban Perahu	51–100	1994–2002	Nijman (2004)
	Mt. Ciremai	Present	1994–2001	Nijman (2004)
	Mt. Dieng	501–1,000	2003	Nijman (2004)
	Mt. Halimun Salak NP	1,001–5,000	2007	Iskandar (2007)
	Mt. Halu	Present	1994–2002	Nijman (2004)
	Mt. Jayanti-Tangkuban Perahu	Present	1994–2001	Nijman (2004)
	Mt. Lawet/Cupu-Simembut/Jaran	51–100	1994–2002	Nijman (2004)
	Mt. Malang	Present	1994–2002	Nijman (2004)
	Mt. Manglayang	Present	1994–2002	Nijman (2004)
	Mt. Masegit-Kareumbi	Present	1994–2002	Nijman (2004)
	Mt. Papandayan	101–300	1994	Nijman (2004)
	Mt. Pongkor	Present	1994–2002	Nijman (2004)
	Mt. Porang	Present	1994–2002	Nijman (2004)
	Mt. Sawal	Present	1994–2001	Nijman (2004)
	Mt. Segara	51–100	1994–2002	Nijman (2004)
	Mt. Simpang	501–1,000	1994	Nijman (2004)
	Mt. Slamet	51–100; 1.7 individuals/km ²	2009–10	Setiawan <i>et al.</i> (2012)
	Mt. Tilu	51–100	1994–2002	Nijman (2004)
	Mt. Wayang	101–300	1994	Nijman (2004)
	Pasir Susuru	≤50	1994–2002	Nijman (2004)
	Sanggabuana	51–100	1994–2002	Nijman (2004)
Takokak	≤50	1994–2002	Nijman (2004)	
Telaga Warna-Megamendung	51–100	1994–2002	Nijman (2004)	
Ujung Kulon (Honje-Tereleng)	501–1,000	1994–2002	Nijman (2004)	

Table 26 Müller's Gibbon (*Hylobates muelleri*) Abundance Estimates

Country	Site name	Abundance class	Survey year	Source
Indonesia	Gunung Lumut Reserve (Hutan Lindung)	5,001–10,000	2011	A.B. Chanee, unpublished data (2015)
	Sungai Wain Protection Forest	1,001–5,000	2012	Gilhooly, Rayadin and Cheyne (2015)
	Uut Murung (mixed community and unprotected)	50,001–100,000	2011	Cheyne <i>et al.</i> (2016)

Table 27 Pileated Gibbon (*Hylobates pileatus*) Abundance Estimates

Country	Site name	Abundance class	Density	Survey year(s)	Source
Cambodia	Bokor NP	1,001–5,000	0.62 groups/km ²	2003	Traeholt <i>et al.</i> (2005)
	Botum Sakor NP	5,001–10,000	1.55 groups/km ²	2003	Traeholt <i>et al.</i> (2005)
	Central Cardamoms NP	10,001–20,000	2.02 groups/km ²	2003	Traeholt <i>et al.</i> (2005)
	Kirirom NP	1,001–5,000	1.40 groups/km ²	2003	Traeholt <i>et al.</i> (2005)
	Kulen Promtep Wildlife Sanctuary	1,001–5,000	1.7 groups/km ²	2003	Traeholt <i>et al.</i> (2005)
	Phnom Aural Wildlife Sanctuary	1,001–5,000	1.32 groups/km ²	2003	Traeholt <i>et al.</i> (2005)
	Phnom Samkos Wildlife Sanctuary	5,001–10,000	1.32 groups/km ²	2003	Traeholt <i>et al.</i> (2005)
	Prey Long Wildlife Sanctuary	1,001–5,000	0.55 groups/km ²	2003	Traeholt <i>et al.</i> (2005)
	Samling concession	1,001–5,000	1.30 groups/km ²	2003	Traeholt <i>et al.</i> (2005)
	Southern Cardamom NP	10,001–20,000	1.19 groups/km ²	2003	Traeholt <i>et al.</i> (2005)
Thailand	Khao Ang Rue Nai Wildlife Sanctuary	1,001–5,000	1.02 groups/km ²	2007–08	Phoonjampa <i>et al.</i> (2011)
	Khao Soi Dao Wildlife Sanctuary	1,001–5,000	n/a	2004–05	Phoonjampa and Brockelman (2008)
	Khao Yai NP	1,001–5,000	n/a	2004–05	Phoonjampa and Brockelman (2008)
	Pang Sida and Tab Lan NPs	1,001–5,000	n/a	2004–05	Phoonjampa and Brockelman (2008)

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

Table 28 Northern Yellow-cheeked Crested Gibbon (*Nomascus annamensis*) Abundance Estimates

Country	Site name	Abundance class	Survey year	Source
Cambodia	Vensai Siempang NP	Present	2017	Conservation International Cambodia, unpublished data (2017)
	Virachey NP	Present	2017	General Directorate of the Administration for Nature Conservation

				and Protection, Ministry of Environment, Cambodia, unpublished data (2017)
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)
	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)	
Viet Nam	A Luoi Watershed	≤50	2008	Rawson <i>et al.</i> (2011)
	An Toan NR	101–300	2016	Duc, Bang and Covert (2017)
	Ba Na-Nui Chua NR	Present	2006	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	51–100	2010	Rawson <i>et al.</i> (2011)
	Dakroong and Tam Lap state forest enterprise (SFE)	≤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	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)
	Western Ba To proposed NR	101–300	2016	Duc, Bang and Covert (2017)

Table 29 Western Black-crested Gibbon (*Nomascus concolor*) Abundance Estimates

Country	Site name	Abundance class	Survey year(s)	Source
China	Ailaoshan National NR	101–300	2009–10	Li <i>et al.</i> (2011)
	Ailaoshan National NR and Xinping Ailaoshan County-level NR	301–500	2009–10	Li <i>et al.</i> (2011)
	Lanbanghe Provincial NR	Present	2011	Sun <i>et al.</i> (2012)
	Lancangjiang Provincial NR	Present	2011	Sun <i>et al.</i> (2012)
	Northern part of Nangunhe National NR	Present	2011	Sun <i>et al.</i> (2012)
	Wuliangshan National NR	1,001–5,000	2012	Guan <i>et al.</i> (2018)
	Yongdedaxueshan National NR	≤50	2011	Sun <i>et al.</i> (2012)
	Zhenyuan	≤50	2011	Luo (2011)
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	301–500	2013	Timmins and Duckworth (2013)
	Nam Kong Provincial Protected Area	Present	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 Species and Habitat Conservation Area	≤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	Present	2005	Rawson <i>et al.</i> (2011)
	Tram Tau	Present	2005	Rawson <i>et al.</i> (2011)
	Xuan Son NR	Present	2005	Rawson <i>et al.</i> (2011)

Table 30 Southern Yellow-cheeked Crested Gibbon (*Nomascus gabriellae*) Abundance Estimates

Country	Site name	Abundance class	Survey year	Source
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Cambodia	Phnom Prich Wildlife Sanctuary	501–1000	2008	Gray, Phan and Long (2010)
	Seima Biodiversity Conservation Area	Present	2015	Wildlife Conservation Society Cambodia, unpublished data (2015)
Viet Nam	Bi Dup-Nui Ba NR	≤50	2010	Rawson <i>et al.</i> (2011)
	Bu Gia Map NP	101–300	2010	Rawson <i>et al.</i> (2011)
	Cat Tien NP	301–500	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	101–300	2015	Duc, Bang and Covert (2015)
	Khanh Hoa SFE and Tram Huong Forestry Company	101–300	2015	Duc, Bang and Covert (2015)
	Krong No district	Present	1998	Rawson <i>et al.</i> (2011)
	Loc Bac SFE	≤50	2004	Rawson <i>et al.</i> (2011)
	Nam Nung NR	≤50	2010	Rawson <i>et al.</i> (2011)
	Ninh Son SFE	101–300	2015	Duc, Bang and Covert (2015)
	Nui Ong NR	Extirpated	2010	Rawson <i>et al.</i> (2011)
	Phuoc Binh NP	101–300	2015	Duc, Bang and Covert (2015)
	Quang Truc commune, Dak Rlap district	101–300	2013	Duc <i>et al.</i> (2014)
Ta Dung NR	51–100	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)	

Table 31 Hainan Gibbon (*Nomascus hainanus*) Abundance Estimates

Country	Site name	Abundance class	Survey year	Source
China	Bawangling National NR	≤50	2012	Bryant (2014)

Table 32 Northern White-cheeked Crested Gibbon (*Nomascus leucogenys*) Abundance Estimates

Country	Site name	Abundance class	Survey year(s)	Source
China	Huanglianshan National NR	Extirpated	2005	Ni and Ma (2006)
	Xishuangbanna National NR	Extirpated	2012	Fan, Fei and Luo (2014)
Lao PDR	Muang Feuung	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)
	Muang Viangthong	Present	2008	Duckworth (2008)
	Muang Xanakham	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	2007 and 2008	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 33 Cao Vit Gibbon (*Nomascus nasutus*) Abundance Estimates

Country	Site name	Abundance class	Survey year(s)	Reference
China	Ailaoshan National NR	51–100	2006 and 2010	Li and Lu (2010)
	Huanglianshan National NR	≤50	2003–04	Ni and Ma (2006)
	Xilongshan (in Fenshuiling National NR)	≤50	2003–04	Ni and Ma (2006)
China/Viet Nam	Bangliang Gibbon NR, China, and Cao Vit Gibbon Conservation Area, Trung Khanh, Viet Nam	101–300	2016	Hoàn, Dững and Truong (2016)
Viet Nam	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	2011	Rawson <i>et al.</i> (2011)
	Thanh Hen Forest	Extirpated	1999	Rawson <i>et al.</i> (2011)

Table 34 Southern White-cheeked Crested Gibbon (*Nomascus siki*) Abundance Estimates

Country	Site name	Abundance class	Survey year(s)	Source
Lao PDR	Dong Phousoi production forest	Present	2005	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	2007 and 2008	Thinh <i>et al.</i> (2010)

	Nam Theun Corridor	Present	2004	Duckworth (2008)
	Nam Theun Extension	Present	2007 and 2008	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	51–100	2009	Rawson <i>et al.</i> (2011)
	Truong Son SFE	≤50	2009	Rawson <i>et al.</i> (2011)

Note: In view of uncertainty about which species are represented in Lao PDR, many areas with possible gibbon populations are not listed here.

Table 35 Siamang (*Symphalangus syndactylus*) Abundance Estimates

Country	Site name	Abundance class	Survey year(s)	Source
Indonesia	Air Tarusan Reserve	Present	2012	A.B. Chanee, unpublished data (2014)
		Present	2014	A.B. Chanee, unpublished data (2014)
	Bukit Barisan Selatan NP	20,001–50,000	1998–2002	O’Brien <i>et al.</i> (2003)
	Kalaweit Supayang Reserve	Present	2014	A.B. 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.

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- Rufford Foundation
- Seneca Park Zoo
- Spain-United Nations Environment Programme LifeWeb
- Sumatran Orangutan Conservation Programme
- The Nature Conservancy
- Total Gabon
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- United Nations Educational, Scientific and Cultural Organization/Central Africa World Heritage Forest Initiative
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List of Abbreviations

CAR	Central African Republic
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
SFE	State forest enterprise
SSC	Species Survival Commission
STBC	Société de transformation de bois en Centrafrique

ZIC Zone d'intérêt cynégétique (hunting zone)
ZICGC Zone d'intérêt cynégétique à gestion communautaire (community-managed hunting zone)

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