

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). The “survey year” columns indicate when data were collected in the field; for estimates that are based on model predictions rather than field surveys, the years are followed by “(model).” For orangutan taxa, all estimates are based on model predictions (see Tables 11–15). Since records of absolute ape numbers are rarely available, this annex uses abundance classes of population ranges, as defined in Table 1. For gibbons, 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 extinct nationwide

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 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 in the field, but this can be done post hoc using appropriate covariates collected for each nest (Sanz *et al.*, 2007). 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”.

Notes on Tables 16–18: Since the discovery and identification of the Gaoligong hoolock (*Hoolock tianxing*), and further genetic studies on the western hoolock (*Hoolock hoolock*) and the eastern hoolock (*Hoolock leuconedys*), there have been new assessments of the density and distribution of these three species. The information available is rapidly changing and further updates will be published on the IUCN Red List.

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 datamanager through the A.P.E.S. Portal (<https://www.iucngreatapes.org/apes-database>). Updates will be made available in digital form via the A.P.E.S. Portal.

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)

Note: The Virunga Massif covers the three national parks: Mgahinga Gorilla NP, Virunga NP and Volcanoes NP. 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	Extirpated	2014	Plumptre <i>et al.</i> (2015)
	Forêt pour le Développement Intégral (FODI)	≤50	2011	Kirkby <i>et al.</i> (2019)
	Itombwe	51–100	2013–14	Plumptre <i>et al.</i> (2015)
	Kahuzi-Biega Itebero	301–500	2017	Plumptre <i>et al.</i> (2021)
	Kahuzi-Biega Kasese	101–300	2015	Plumptre <i>et al.</i> (2021)
	Kahuzi-Biega Nzovu	101–300	2013–15	Plumptre <i>et al.</i> (2021)
	Kahuzi-Biega Tshivanga (Highland sector)	301–500	2015	Plumptre <i>et al.</i> (2021)
	Kahuzi-Biega NP (whole park)	1,001–5,000	2017	Plumptre <i>et al.</i> (2021)
	Kisimba-Ikobo	501–1,000	2013	Plumptre <i>et al.</i> (2015)
	Maiko (including Lubutu and Angumu)	101–300	2011–17	Fauna & Flora International and Institut Congolais pour la Conservation de la Nature, unpublished data (2017)
	Oku Community Reserve	1,001–5,000	2016–19	Plumptre <i>et al.</i> (2021)
	Réserve de Gorilles de Mukungiti et Kingombe	101–300	2013	Plumptre <i>et al.</i> (2015)
	Tayna Nature Reserve	101–300	2013	Plumptre <i>et al.</i> (2015)
	Usala	501–1,000	2010–13	Plumptre <i>et al.</i> (2015)
	Virunga NP (Mt. Tshiaberimu)	≤50	2021	Iyer <i>et al.</i> (2023)
	Walikale	501–1,000	2010	Nixon <i>et al.</i> (2012), cited in Plumptre <i>et al.</i> (2015)
	Nationwide	5,001–10,000	2011–19	Plumptre <i>et al.</i> (2021)

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 (2021)
	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	Ikfuingei and Kuchambi (2013)
	Tofala Hills	≤50	2012	Dunn <i>et al.</i> (2014)
Nigeria	Afi Mountain Wildlife Sanctuary	≤50	2020	Ayang (2020)
	Cross River NP Boshi Extension	≤50	2009	Imong, Mengnjo and Okeke (2009)
	Cross River NP Okwangwo Division	Present	2021	Idowu <i>et al.</i> (2021)
	Mbe Mountains	≤50	2020	Eban (2020)

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	Unknown (model)	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)	≤50	1	2020	Beukou Tchoumbou <i>et al.</i> (2021)
	Campo Ma'an NP (North)	101–300	1	2020	Beukou Tchoumbou <i>et al.</i> (2021)
	Campo Ma'an – Operational Technical Unit (total for all strata of the landscape)	501–1,000	1	2020	Beukou Tchoumbou <i>et al.</i> (2021)
	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	2020	Beukou Tchoumbou <i>et al.</i> (2021)
	FMU 09-024	≤50	1	2020	Beukou Tchoumbou <i>et al.</i> (2021)
	FMU 09-025	101–300	1	2020	Beukou Tchoumbou <i>et al.</i> (2021)
	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	2018	Beukou <i>et al.</i> (2019)
	FMU 10-012, ZIC 30	1,001–5,000	2	2018	Beukou <i>et al.</i> (2019)
	FMU 10-013, ZICGC 2	1,001–5,000	2	2018	Beukou <i>et al.</i> (2019)
	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)

Country	Site name	Abundance class	No. spp.	Survey year(s)	Source
Cameroon cont.	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	2018	Beukou <i>et al.</i> (2019)
	FMU 10-064, ZIC 31	1,001–5,000	1	2018	Beukou <i>et al.</i> (2019)
	Lobéké NP	1,001–5,000	1	2018	Beukou <i>et al.</i> (2019)
	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)
Congo, Republic of	Bailly Swamps	1,001–5,000	1	2016	Brncic <i>et al.</i> (2018)
	Batanga	5,001–10,000	1	2017	Brncic <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	Brncic <i>et al.</i> (2018)
	Lac Télé Community Reserve	5,001–10,000	1	2017	Brncic <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	Brncic <i>et al.</i> (2018)
	Loundougou swamp	1,001–5,000	1	2016	Brncic <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	Brncic <i>et al.</i> (2018)

Country	Site name	Abundance class	No. spp.	Survey year(s)	Source
Congo, Republic of cont.	Ngombe FMU	*50,001–100,000	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	10,001–20,000	1	2019	N’Goran <i>et al.</i> (2020)
	Odzala-Koukoua NP	5,001–10,000	1	2020	Bohm (2020)
	Pokola FMU	5,001–10,000	1	2016	Brncic <i>et al.</i> (2018)
	Tala-Tala FMU	1,001–5,000		2018	N’Goran <i>et al.</i> (2019)
	Tanga	1,001–5,000	2	2009	Malanda, Iyenguet and Madzoke (2010)
DRC	Maiombe	Extirpated	1	n/a	F. Maisels, personal communication (2022)
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)
	Gamba	101–300	2	2017–18	Vanthomme and Nzamba (2018)
	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)
	Kivoro	301–500	2	2017–18	Vanthomme and Nzamba (2018)
	Loango NP	101–300	2	2017–18 (model)	Vanthomme and Nzamba (2018)
	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)
	Mandji	101–300	2	2017–18	Vanthomme and Nzamba (2018)
	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	301–500	2	2017–18	Vanthomme and Nzamba (2018)
	Mwagna NP	**Present	2	2012	Maisels and Ella Akou (2013)
	Rabi	101–300	2	2017–18	Vanthomme and Nzamba (2018)
	Waka NP	Present	2	2005–06	Abitsi (2006)
	Wonga Wongué	Present	2	2011	Motsaba and Aba’a (2011)

Note: 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). In the “survey years” column, “model” signifies that estimates are based on model predictions rather than field surveys. 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 Lediima 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-lyondje	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)

Country	Site name	Abundance class	Survey year(s)	Source
DRC cont.	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 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 south	5,001–10,000	2016–18	Bessone <i>et al.</i> (2020)
	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)

Country	Site name	Abundance class	Survey year(s)	Source
Cameroon cont.	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 core zone	301–500	2021	Ambahe <i>et al.</i> (2022)
	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	2011	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	Ikfuingei and Kuchambi (2013)
	Tubah-Awing Forest	≤50	2011	Ellioti.org (n.d.)
	Vome Forest	Present	2008	Ellioti.org (n.d.)
Nigeria	Afi Mountain Wildlife Sanctuary	Present	2020	Ayang (2020)
	Afi River FR	Present	2009	Imong, Mengnjo 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, 2009)
	Cross River NP Oban Division	Present	2021	Abanyam <i>et al.</i> (2021)
	Cross River NP Okwangwo Division	Present	2021	Idowu <i>et al.</i> (2021)
	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	2021	S. Nixon, personal communication (2021)
	Idanre FR	51–100	2012–13	Ikemeh (2013)
	Ifon FR	Present	2006	Greengrass (2006, 2009)
	Ila FR	Present	2011	Ogunjemite (2011)
	Ise FR	≤50	2012	Ikemeh (2013)

Country	Site name	Abundance class	Survey year(s)	Source
Nigeria cont.	Mbe Mountains	≤50	2020	Eban (2020)
	Oba Hills FR	Extirpated	2006	Greengrass (2006, 2009)
	Ogbesse FR	Extirpated	2006	Greengrass (2009)
	Ogotun FR	Present	2006	Ogunjemite <i>et al.</i> (2006)
	Okeluse FR	Present	2004	Ogunjemite <i>et al.</i> (2006)
	Okomu NP	Present	2006	Greengrass (2006, 2009)
	Ologbo FR	Present	2006	Greengrass (2006)
	Oluwa FR	Present	2011 and 2012	Olaniyi, Ogunjemite and Dansu (2014)
	Omo FR	Present	2006	Greengrass (2006, 2009)
	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, 2009)

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	Extirpated	2011–15	Plumptre <i>et al.</i> (2015)
	Bili-Uélé forest	1,001–5,000	2016–19	Nkono (2020)
	Forêt pour le Développement Intégral	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	Plumptre <i>et al.</i> (2021)
	Kahuzi-Biega Kasese	51–100	2015	Plumptre <i>et al.</i> (2021)
	Kahuzi-Biega Nzovu	501–1,000	2013–15	Plumptre <i>et al.</i> (2021)

Country	Site name	Abundance class	Survey year(s)	Source
DRC cont.	Kahuzi-Biega Tshivanga	301–500	2015	Plumptre <i>et al.</i> (2021)
	Kahuzi-Biega NP (whole Park)	1,001–5,000	2017	Plumptre <i>et al.</i> (2021)
	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	501–1,000	2016–19	Plumptre <i>et al.</i> (2021)
	Réserve de Gorilles de Mukingiti et Kingombe	101–300	2011–15	Plumptre <i>et al.</i> (2015)
	Rubi-Télé	501–1,000	2010	Plumptre <i>et al.</i> (2010)
	Tayna-Kisimba-Ikobo	51–100	2011–15	Plumptre <i>et al.</i> (2015)
	Tayna Nature Reserve	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	2020	Carvalho <i>et al.</i> (2022)
	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	2014–15	van Dijk, Cibot and McLennan (2021)
	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)

Country	Site name	Abundance class	Survey year(s)	Source
Uganda cont.	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)

Note: In the “survey years” column, “model” signifies that 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	2013 (model)	Strindberg <i>et al.</i> (2018)
Cameroon	Boumba-Bek NP	501–1,000	1	2015	Nzooch <i>et al.</i> (2016b)
	Boumba-Bek NP (northern FMUs: 10-020 to 10-023, 10-029 and 10-030)	301–500	1	2015	Nzooch <i>et al.</i> (2016b)
	Campo Ma'an (Dipikar Island)	51–100	1	2020	Beukou Tchoumbou <i>et al.</i> (2021)
	Campo Ma'an NP (North)	101–300	1	2020	Beukou Tchoumbou <i>et al.</i> (2021)
	Campo Ma'an – Operational Technical Unit (total for all strata of the landscape)	301–500	1	2020	Beukou Tchoumbou <i>et al.</i> (2021)

Country	Site name	Abundance class	No. spp.	Survey year(s)	Source
Cameroon cont.	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	≤50	1	2020	Beukou Tchoumbou <i>et al.</i> (2021)
	FMU 09-024	≤50	1	2020	Beukou Tchoumbou <i>et al.</i> (2021)
	FMU 09-025	≤50	1	2020	Beukou Tchoumbou <i>et al.</i> (2021)
	FMU 10-007, ZIC 28	1,001–5,000	2	2014–15	Nzooch <i>et al.</i> (2016a)
	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)
	FMUs 10-08	Present	1	2005	Blake, Strindberg and Princée (2012)
	FMU 10-09 and 10-010, ZICGC 29	1,001–5,000	2	2015	Nzooch <i>et al.</i> (2016a)
	FMU 10-011, ZICGC 1	1,001–5,000	2	2018	Beukou <i>et al.</i> (2019)
	FMU 10-012, ZIC 30	1,001–5,000	2	2018	Beukou <i>et al.</i> (2019)
	FMU 10-013, ZICGC 2	1,001–5,000	2	2018	Beukou <i>et al.</i> (2019)
	FMU 10-063, ZIC 3	1,001–5,000	1	2018	Beukou <i>et al.</i> (2019)
	FMU 10-064, ZIC 31	1,001–5,000	1	2018	Beukou <i>et al.</i> (2019)
	Lobéké NP	1,001–5,000	1	2018	Beukou <i>et al.</i> (2019)
	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)

Country	Site name	Abundance class	No. spp.	Survey year(s)	Source
CAR cont.	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	Brncic <i>et al.</i> (2018)
	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	5,001–10,000	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 Tété 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	501–1,000	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	5,001–10,000	1	2019	N’Goran <i>et al.</i> (2020)
	Odzala-Koukoua NP	501–1,000	1	2020	Bohm (2020)
	Pokola FMU	1,001–5,000	1	2016	Brncic <i>et al.</i> (2018)
	Tala-Tala FMU	501–1,000		2018	N’Goran <i>et al.</i> (2019)
	Tanga	≤50	1	2009	Malanda, Iyenguet and Madzoke (2010)
DRC	Lac Tumba	Present	1	2007–10	Inogwabini <i>et al.</i> (2012)
	Maiombe (Luki)	Present	1	n/a	WWF (2018)
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)
	Gamba	101–300	2	2017–18	Vanthomme and Nzamba (2018)

Country	Site name	Abundance class	No. spp.	Survey year(s)	Source
Gabon cont.	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)
	Kivoro	301–500	2	2017–18	Vanthomme and Nzamba (2018)
	Loango NP	101–300	2	2017–18 (model)	Vanthomme and Nzamba (2018)
	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)
	Mandji	101–300	2	2017–18	Vanthomme and Nzamba (2018)
	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	F. Maisels, personal communication (2022)
	Monts de Cristal NP	Present	2	2005	Aba'a (2006)
	Moukalaba Doudou NP	301–500	2	2017–18 (model)	Vanthomme and Nzamba (2018)
	Mwagna NP	**Present	2	2012	Maisels and Ella Akou (2013)
	Pongara NP	Present	1	2006	Latour (2006)
	Rabi	101–300	2	2017–18	Vanthomme and Nzamba (2018)
	Waka NP	Present	2	2005–06	Abitsi (2006)
	Wonga Wongué	Present	2	2011	Motsaba and Aba'a (2011)

Note: 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). In the “survey years” column, “model” signifies that estimates are based on model predictions rather than field surveys. 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 10

Western Chimpanzee (*Pan troglodytes verus*) Abundance Estimates¹

Country	Site name	Abundance class	Survey year(s)	Source
Benin	Nationwide	Possibly extinct	2013–14	Campbell and Hounbedji (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)

Country	Site name	Abundance class	Survey year(s)	Source
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	301–500	2013	Hockings and Sousa (2013)
	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)
	Bossematie Classified Forest	Present	2007	Campbell (2008)
	Cavally Classified Forest	51–100	2010	Normand, Singo and Boesch (2010)
	Comoé NP	101–300	2015–17	Lapiente <i>et al.</i> (2020)
	Dassiekro Classified Forest	Extirpated	2007	Campbell (2008)
	Dodo coastal forest	≤50	2018	Soiret <i>et al.</i> (2019)
	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)

Country	Site name	Abundance class	Survey year(s)	Source
Ivory Coast cont.	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	101–300*	2018	Tiédoúé <i>et al.</i> (2019)
	Tamin Classified Forest	Extirpated	2007	Campbell (2008)
Liberia	Foya proposed NP	Present	2019	Fauna & Flora International, unpublished data (2021)
	Gola Forest NP	51–100	2017	WCF (2018)
	Grebo-Krahn NP	101–300	2020	N. Cappelle and E. Normand, unpublished data (2021)
	Grebo-Sapo corridor	501–1,000	2015	Furnell <i>et al.</i> (2015)
	Sapo NP	1,001–5,000	2016	Tweh <i>et al.</i> (2018)
	Wologizi mountains	Present	2019	ELRECO (2020)
	Wonegizi mountains	Present	2018–19	ELRECO (2020)
	Nationwide	5,001–10,000	2011–12	Tweh <i>et al.</i> (2015)
Mali	Bafing Biosphere Reserve	≤50	2014	Pan African Programme: The Cultured Chimpanzee, 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)

Country	Site name	Abundance class	Survey year(s)	Source
Sierra Leone cont.	Loma Mountains NP	1,001–5,000	2019	Garriga (2019)
	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 Hounbedji (2015)

* Variation in the abundance estimate for Tai NP is attributed to changes in methodology, including the number of collectors on a transect, the type of transects, the layout of transect routes and sampling effort, not a decrease in the chimpanzee population.

TABLE 11

Sumatran Orangutan (*Pongo abelii*) Abundance Estimates

Country	Site name	Abundance class	Year of estimate	Source
Indonesia	East Leuser	1,001–5,000	2015	Wich <i>et al.</i> (2016, 2019), Hansen <i>et al.</i> (2013)
	Sikulaping	101–300		
	Siranggas, Batu Ardan	51–100		
	Tripa Swamp	51–100		
	Trumon-Singkil	1,001–5,000		
	West Leuser	1,001–5,000		

Note: Population sizes were recalculated based on Wich *et al.* (2016, 2019) and deforestation data from the Global Forest Watch (v1.7; Hansen *et al.*, 2013). The recalculation involved the removal of the percentage of forest lost between 2012 and 2019 per 1 km² and the same percentage was deducted from the number of individuals in that area, to correct for orangutan losses due to habitat loss. As the figures in this table do not cover any further losses related to killing or capture,² they are most probably overestimates. Information about the sites can be found in Utami-Atmoko *et al.* (2017). In some cases, a 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 12**Tapanuli Orangutan (*Pongo tapanuliensis*) Abundance Estimates**

Country	Site name	Abundance class	Year of estimate	Source
Indonesia	Dolok Sibual-buali NR	≤50	2015	Wich <i>et al.</i> (2016, 2019), Hansen <i>et al.</i> (2013)
	East Batang Toru	101–300		
	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. Population sizes were recalculated based on Wich *et al.* (2016, 2019) and deforestation data from the Global Forest Watch (v1.7; Hansen *et al.*, 2013). The recalculation involved the removal of the percentage of forest lost between 2012 and 2019 per 1 km² and the same percentage was deducted from the number of individuals in that area, to correct for orangutan losses due to habitat destruction. As the figures in this table do not cover any further losses related to killing or capture,³ they are most probably overestimates.

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

Country	Site name	Abundance class	Year of estimate	Source
Indonesia	Belayan Senyur landscape	101–300	2016	Voigt <i>et al.</i> (2018), Hansen <i>et al.</i> (2013)
	Bontang landscape	51–100		
	Kutai landscape	1,001–5,000		
	Lesan landscape	51–100		
	Sangkulirang landscape	301–500		
	Wehea landscape	501–1,000		
Malaysia	Bonggaya landscape	101–300	2016	Voigt <i>et al.</i> (2018), Hansen <i>et al.</i> (2013)
	Central Forest range landscape	5,001–10,000		
	Crocker range landscape	101–300		
	Lingkabau landscape	101–300		
	Lower Kinabatangan range landscape	1,001–5,000		
	North Kinabatangan range landscape and Ulu Tungud	1,001–5,000		
	Sepilok	101–300		
	Tabin range landscape	1,001–5,000		
	Trus madi landscape	101–300		
	Ulu Kalumpang range landscape	301–500		

Note: Population sizes were recalculated based on Voigt *et al.* (2018) and deforestation data from the Global Forest Watch (v1.7; Hansen *et al.*, 2013). The recalculation involved the removal of the percentage of forest lost between 2012 and 2019 per 1 km² and the same percentage was deducted from the number of individuals in that area, to correct for orangutan losses due to habitat destruction. As the figures in this table do not cover any further losses related to killing or capture,⁴ they are most probably overestimates. In some cases, a 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 14**Northwest Bornean Orangutan (*Pongo pygmaeus pygmaeus*) Abundance Estimates**

Country	Site name	Abundance class	Year of estimate	Source
Indonesia	Betung Kerihun NP and protection forest	1,001–5,000	2016	Voigt <i>et al.</i> (2018), Hansen <i>et al.</i> (2013)
	Danau Sentarum and corridor	501–1,000		
	Pygmaeus fragmented North	≤50		
	Pygmaeus fragmented South	≤50		
Indonesia/Malaysia	Bungoh NP–Gunung Nyiut NR, Penrisen protection forest	51–100	2016	Voigt <i>et al.</i> (2018), Hansen <i>et al.</i> (2013)
	Klingkang Range NP, Sintang Utara	51–100		
Malaysia (Sarawak)	Batang Ai-Lanjak Entimau landscape	1,001–5,000	2016	Voigt <i>et al.</i> (2018), Hansen <i>et al.</i> (2013)
	Ulu Sebuyau-Sedilu landscape	≤50		

Note: Population sizes were recalculated based on Voigt *et al.* (2018) and deforestation data from the Global Forest Watch (v1.7; Hansen *et al.*, 2013). The recalculation involved the removal of the percentage of forest lost between 2012 and 2019 per 1 km² and the same percentage was deducted from the number of individuals in that area, to correct for orangutan losses due to habitat destruction. As the figures in this table do not cover any further losses related to killing or capture,⁵ they are most probably overestimates. In some cases, a 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	Abundance class	Year of estimate	Source
Indonesia	Arabela Schwaner	10,001–20,000	2016	Voigt <i>et al.</i> (2018), Hansen <i>et al.</i> (2013)
	Barito Timur	101–300		
	Gunung Palung-Sungai Putri	1,001–5,000		
	Kahayan-Kapuas	1,001–5,000		
	Kapuas-Barito	1,001–5,000		
	Katingan (including Seruyan Sampit)	1,001–5,000		
	Kendawangan-Jelai	≤50		
	Kotawaringin-Lama	501–1,000		
	Kubu Raya	1,001–5,000		
	Lamandau-Sukumara	501–1,000		

Indonesia cont.	Pematang Gadung	501–1,000		
	Rungan River landscape	1,001–5,000		
	Sebangau	5,001–10,000		
	Sungai Tengar	101–300		
	Tanjung Puting	1,001–5,000		
	Tanjung Puting	1,001–5,000		

Note: Population sizes were recalculated based on Voigt *et al.* (2018) and deforestation data from the Global Forest Watch (v1.7; Hansen *et al.*, 2013). The recalculation involved the removal of the percentage of forest lost between 2012 and 2019 per 1 km² and the same percentage was deducted from the number of individuals in that area, to correct for orangutan losses due to habitat destruction. As the figures in this table do not cover any further losses related to killing or capture,⁶ they are most probably overestimates. In some cases, a 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.

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 (*Hoolock tianxing*) Abundance Estimates

Country	Site name	Abundance class/ density	Survey year(s)	Source
China	Baoshan	Present	2009	Fan <i>et al.</i> (2011)
	Mt. Gaoligong, Yunnan	101–300	2008–09	Chan <i>et al.</i> (2017)
	Yingjiang (county)	51–100	2009	Fan <i>et al.</i> (2011)
Myanmar	Bhamo east	Present	2010	Geissmann <i>et al.</i> (2013)
	Kachin state	Present	2022	Aung <i>et al.</i> (2023)
	Karen state	Present	2022	Aung <i>et al.</i> (2023)
	Kayah and Kayin states	10,001–20,000	2010	Geissmann <i>et al.</i> (2013)
	Maharmyaing	Present		Brockelman <i>et al.</i> (2009)
	Shan state	5,001–10,000	2022	Aung <i>et al.</i> (2023)
	Saw Law	2.05 groups/km ²	2009	Geissmann <i>et al.</i> (2013)

Note: Populations in Myanmar are distributed on the east bank of the Irrawaddy River and are thus likely to represent *Hoolock tianxing*, which had not yet been differentiated as a separate species when Fan *et al.* (2011) and Geissmann *et al.* (2013) were published (Fan *et al.*, 2017). The population in Myanmar’s Rakhine state has been identified as eastern hoolock (Fan, Turvey and Bryant, 2020).

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

Country	Site name	Abundance class/ density	Survey year(s)	Source
Bangladesh	Adampur	Present	2002	Islam <i>et al.</i> (2006)
	Alikadam	Present	2002	Islam <i>et al.</i> (2006)
	Bamu	Present	2002	Islam <i>et al.</i> (2006)
	Bangdepa	Present	2002	Islam <i>et al.</i> (2006)
	ChunatiWS	Present	2002	Islam <i>et al.</i> (2006)
	DopachariWS	Present	2002	Islam <i>et al.</i> (2006)
	Gazipur Tea Estate	Present	2002	Islam <i>et al.</i> (2006)
	HimchariNP	Present	2002	Islam <i>et al.</i> (2006)
	Horinchara	Present	2002	Islam <i>et al.</i> (2006)
	InaniNP	Present	2000	Islam <i>et al.</i> (2006)
	Kalachara Forest Beat	≤50	2009	Akers, Islam and Nijman (2013)
	KaptaiNP	≤50	2002	Islam <i>et al.</i> (2006)
	Lathitila	Present	2002	Islam <i>et al.</i> (2006)
	Lawachara and Chunati	Present	1990–91	Feeroz and Islam (1992)
	LawacharaNP	Present	2003	Hasan and Feeroz (2011), Islam <i>et al.</i> (2006)
	Pablakhali_WS	Present	2002	Islam <i>et al.</i> (2006)
	Rajghat	Present	2002	Islam <i>et al.</i> (2006)
	Rema-KalengaWS	Present	2002	Islam <i>et al.</i> (2006)
	Satchari_NP	Present	2002	Islam <i>et al.</i> (2006)
	Sheikh Jamal Inani National Park	≤50	2020	Kabir <i>et al.</i> (2021)
	TeknafWS	Present	1997	Islam <i>et al.</i> (2006)
	Thanchi	Present	2002	Islam <i>et al.</i> (2006)
India	Assam	1,001–5,000	1994–2004	Das <i>et al.</i> (2005)
	Adj_Namdapha_NP	≤50	2006	Das <i>et al.</i> (2006)
	Balpakram_NP	51–100	2005	Choudhury (2006)
	Barail and Langting-Mupa Reserve Forests (North Cachar Hills), Hollongapar Reserve Forest (Jorhat district), Innerline Reserve Forest (Cachar)	Present	1986–88	Choudhury (2000)
	Borajan_RF	Present	2002	Kakati <i>et al.</i> (2009)
	Buridihing_RF	≤50	2002	Kakati <i>et al.</i> (2009)

India cont.	Dampa Tiger Reserve	≤50	2010–11	Pachau et al. (2013)
	DampaWS	Present	2011	Pachau et al. (2013)
	DehningEast_RF	≤50	2002	Kakati et al. (2009)
	DehningWest_RF	Present	2002	Kakati et al. (2009)
	Dirok_RF	Present	2002	Kakati et al. (2009)
	Doomdooma_RF	Present	2002	Kakati et al. (2009)
	FakimWS	≤50	2004	Choudhury (2006)
	Hallowgaon_RF	Present	2010	Chetry and Chetry (2010)
	Hatikhali_Cachar	Present	1920	GBIF.org (2020)
	Hollongapur FR	Present	1971–73	Tilson (1979)
	Inner-LineRF_adj	≤50	2011	Islam, Choudhury and Bhattacharjee (2013)
	IntankiNP	≤50	2004	Choudhury (2006)
	Jeypore_RF	≤50	2002	Kakati et al. (2009)
	Kakojan_RF	≤50	2002	Kakati et al. (2009)
	Kaziranga_NP	Present	2002	GBIF.org (2020)
	KhawnglungWS	≤50	2000	Choudhury (2006)
	Kukuramura	0.65 groups/km ²	2010	Chetry, Chetry and Bhattacharjee (2012)
	Kumsang_RF	Present	2002	Kakati et al. (2009)
	KundilKolia	0.65 groups/km ²	2010	Chetry, Chetry and Bhattacharjee (2012)
	LongaiRF	Present	2012	Deb, Rai and Bhattacharjee (2014)
	MahaoWSandAdj	101–300	2008	Chetry et al. (2010), Choudhury (2013)
	Margharita	Present	2002	GBIF.org (2020)
	Murlen_WS	≤50	2000	Choudhury (2006)
	Namdapha NP	1,001–5,000; 3.65 groups/km ²	2012	Ray et al. (2015)
	Namdapha_NP	2.4 groups/km ²	2006	Das et al. (2006), Ray et al. (2015)
	Ngengpui_WS	≤50	2000	Choudhury (2006)
	NokrekNP	≤50	2005	Choudhury (2006)
	Phawngpui_NP	≤50	2000	Choudhury (2006)
	SijuWS	≤50	2005	Choudhury (2006)
	Tarani_RF	Present	2002	Kakati et al. (2009)
	Tokowani_RF	Present	2002	Kakati et al. (2009)
	Yangoupokpi_WS	≤50	2001	Choudhury (2006)
	Zubza_Naga	Present	1940	GBIF.org (2020)

Myanmar	Ann	Present	2009	Geissmann <i>et al.</i> (2013)
	Kabawvalley	Present	1916	Jenkins (1990)
	Kamhti	Present	1935	Morris (1936)
	Karamati	1.27 groups/km ²	2009	Geissmann <i>et al.</i> (2013)
	Kyaukpandaung	0.32 groups/km ²	2010	Geissmann <i>et al.</i> (2013)
	Middel_RY	0.88 groups/km ²	2008	Geissmann <i>et al.</i> (2013)
	Naga Hills and West Chindwin Lowlands, Sagaing	3.03 groups/km ²	2005–6	Geissmann <i>et al.</i> (2013)
	Natmataung	0.32 groups/km ²	2010	Geissmann <i>et al.</i> (2013)
	Natyekan	1.04 groups/km ²	2013	Myers, Thway and Lin (2019)
	North_rakhine	3.14 groups/km ²	2009	Geissmann <i>et al.</i> (2013)
	Rakhine state	10,001–20,000	2008–09	Geissmann <i>et al.</i> (2013)
	South_HK	Present	1935	Morris (1936)
	South_RY	2.00 groups/km ²	2008	Geissmann <i>et al.</i> (2013)

Note: Global Biodiversity Information Facility (GBIF) data are used to obtain occurrence information from which presence is determined.

TABLE 18

Eastern Hoolock (*Hoolock leuconedys*) Abundance Estimates

Country	Site name	Abundance class/ density	Survey year	Source
India	Adj Namdapha NP	≤50	2006	Das <i>et al.</i> (2006)
	Hallowgaon_RF	Present	2010	Chetry and Chetry (2010)
	Kukuramura	0.65 groups/km ²	2010	Chetry, Chetry and Bhattacharjee (2012)
	KundiKolia	0.65 groups/km ²	2010	Chetry, Chetry and Bhattacharjee (2012)
	MahaoWSandAdj	101–300	2008	Chetry <i>et al.</i> (2010), Choudhury (2013)
	Namdapha NP	3.65 groups/km ²	2012	Ray <i>et al.</i> (2015)
Myanmar	Bhamo	Present	1879	Groves (1972)
	Central_Myanmar	Present	2000	Lynam (2003)
	Gangawtaung (Gantkawtaung)	2.07 groups/km ²	2010	Geissmann <i>et al.</i> (2013)
	Homalin	Present	1935	Morris (1936)
	Hpongan	1.3 groups/km ²	2009	Geissmann <i>et al.</i> (2013)
	Htamanthi	1.36 groups/km ²	2015	WCS (2015)
	Hukawng	1.46 groups/km ²	2000	Lynam (2003)
	Indawgyi	4.64 groups/km ²	2019	Lwin, Sukumal and Savini (2021)
	Kayin	0.6 groups/km ²	2010	Geissmann <i>et al.</i> (2013)
	Kyaikhtiyoe	Present	1980	Geissmann <i>et al.</i> (2013)

Myanmar cont.	N_KhinBum	Present	2012	FFI (2012)
	Naungmon	1.35 groups/km ²	2009	Geissmann <i>et al.</i> (2013)
	Paunglaung	Present	2000	Lynam (2003)
	Pitaung	Present	1937	Kingdon Ward (1949)
	Pyadalin	Present	2002	Geissmann <i>et al.</i> (2013)
	Pyaunggaung	Present	1913	Riley and Shortridge (1913)
	Sumprabum (Samparbum)	2.23 groups/km ²	2009	Geissmann <i>et al.</i> (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	Abundance class/ density	Survey year(s)	Source
Indonesia	Air Tarusan Reserve	Present	2015	A.B. Chanee, unpublished data (2015)
	Batang Gadis NP	9.9–15.5 individuals/km ²	2008	Sultan, Mansjoer and Bismark (2009)
	Bukit Barisan Seletan	1.4–2.8 individuals/km ²	2001	O'Brien <i>et al.</i> (2004)
	Harapan Rainforest	Present	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	19.0 individuals/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 <i>et al.</i> (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	Unknown	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	Unknown	Unknown	2014	A.B. Chanee, unpublished data (2015)
	Sebangau NP	**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	Density	Survey year(s)	Source
Indonesia	Betung Kerihun NP	Present	Unknown	Unknown	S. Cheyne, unpublished data (2010)
	Danau Sentarum-Betung Kerihun	Present	Unknown	Unknown	S. Cheyne, unpublished data (2014)
	Kayan Mentarang NP	10,001–20,000	2.1–2.9 groups/km ²	2004	Nijman and Menken (2005)
	Kutai NP	Present	Unknown	2014	S. Cheyne, unpublished data (2014)
	Sankulirang karst area	Present	Unknown	2014	S. Cheyne, unpublished data (2014)
	Wehea Protection Forest	1,001–5,000	1.3 groups/km ²	2013	Cheyne <i>et al.</i> (2016)
Malaysia	Crocker Range NP	Present	Unknown	None	M. Ancrenaz, personal communication (2018)
	Danum Valley	Present	Unknown	None	M. Ancrenaz, personal communication (2018)
	Imbak Canyon Conservation Area	Present	Unknown	None	M. Ancrenaz, personal communication (2018)
	Kinabatangan	Present	Unknown	None	M. Ancrenaz, personal communication (2018)
	Malinau Basin	Present	Unknown	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
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	Reichard and Sommer (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	1,001–5,000	2018–2021	Widyastuti <i>et al.</i> (2023)
	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	101–300; 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	Present	1994–2002	Nijman (2004)
	Sanggabuana	51–100	1994–2002	Nijman (2004)
	Takokak	Present	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	Unknown	2004–05	Phoonjampa and Brockelman (2008)
	Khao Yai NP	1,001–5,000	Unknown	2004–05	Phoonjampa and Brockelman (2008)
	Pang Sida and Tab Lan NPs	1,001–5,000	Unknown	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	Extirpated	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)

Country	Site name	Abundance class	Survey year	Source
Lao PDR cont.	Xe Kong Pine Forest	Present	1992	Duckworth (2008)
	Xe Pian NPA	Present	2008	Duckworth (2008)
	Xe Sap NPA	Present	2008	Duckworth (2008)
Viet Nam	A Luoi Watershed	≤50	2009	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	Present	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	101–300	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	Present	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)
	Yongdedaxueshan National NR	≤50	2011	Sun <i>et al.</i> (2012)
	Zhenyuan	≤50	2010	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	2000	Rawson <i>et al.</i> (2011)
	Tram Tau	Present	2000	Rawson <i>et al.</i> (2011)
	Xuan Son NR	Present	2000	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
Cambodia	Phnom Prich Wildlife Sanctuary	Present	2008	Gray, Phan and Long (2010)
	Seima Biodiversity Conservation Area	Present	2015	Wildlife Conservation Society Cambodia, unpublished data (2015)
Viet Nam	A Yun Pa proposed NR	Present	1998	Rawson <i>et al.</i> (2011)
	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)

Country	Site name	Abundance class	Survey year	Source
Viet Nam cont.	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	≤50	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)

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 Fu Ang	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)

Country	Site name	Abundance class	Survey year(s)	Source
Lao PDR cont.	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)
	Long Luong Commune	≤50	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	≤50	2010	Rawson <i>et al.</i> (2011)
	Pu Hu NR	Extirpated	2003	Rawson <i>et al.</i> (2011)
	Pu Huong NR	≤50	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)	Source
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 Tr'ò'ng (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 Lake	Extirpated	1998	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	≤50	2004	Rawson <i>et al.</i> (2011)
	Khe Giua SFE	≤50	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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- Tacugama Chimpanzee Sanctuary
- 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

CCAR	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)

Endnotes

- 1 Previous abundance annexes have included Gambia; however, primatologists are now convinced that the country was not part of the western chimpanzee's range (E.A. Williamson, personal communication, 2019).
- 2 The capture of an orangutan by government or sanctuary staff is sometimes referred to as a "rescue." This annex uses the term "capture" to indicate that, in many cases, the orangutans are healthy individuals who could have been given the opportunity to remain where they were while solutions were found for their coexistence with local communities and/or companies.
- 3 See note 2, above.
- 4 See note 2, above.
- 5 See note 2, above.
- 6 See note 2, above.
- 7 Department of Zoology, Senckenberg Museum of Natural History, Görlitz (www.senckenberg.de/en/institutes/museum-of-natural-history-goerlitz/zoology).
- 8 IUCN SSC Primate Specialist Group Section on Small Apes (<https://gibbons.asia>), Borneo Nature Foundation (www.borneonaturefoundation.org) and Oxford Brookes University (www.brookes.ac.uk).
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- 10 Wildlife Conservation Society (www.wcs.org) and Faculty of Natural Sciences, University of Stirling (www.stir.ac.uk).
- 11 Liverpool John Moores University (www.ljmu.ac.uk) and University of Amsterdam (<https://ibed.uva.nl>).
- 12 Faculty of Natural Sciences, University of Stirling (www.stir.ac.uk).
- 13 HUTAN–Kinabatangan Orang-utan Conservation Programme (www.hutan.org.my).
- 14 Wild Chimpanzee Foundation (www.wildchimps.org/index.html).
- 15 Kalawit Gibbon Rehabilitation Project (www.kalawit.org).
- 16 Fauna & Flora International Myanmar Programme (www.facebook.com/ffimyanmar).
- 17 Borneo Futures (www.borneofutures.org).
- 18 Oxford Brookes University (www.brookes.ac.uk).
- 19 Chester Zoo (www.chesterzoo.org).
- 20 Wild Chimpanzee Foundation (WCF) (www.wildchimps.org/index.html).
- 21 PanEco Foundation (<https://paneco.ch/en>).

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