

ONE NEST, ONE APE?

COUNTING NESTS TO MONITOR GREAT APE POPULATION TRENDS






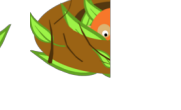
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Who builds nests? The great apes – bonobos, chimpanzees, gorillas and orang-utans – are all proficient nest builders, regularly constructing the structures to host bouts of resting, grooming, copulation, play, nursing and parturition (3). Nest building is a learned behaviour, and every weaned individual constructs his or her own nest at least once a day (see Table 1 for nest construction rates) (3, 6). Nursing individuals may practise nest building but only begin to sleep in their own structures once they are fully weaned.

Why count nests? Monitoring population trends is crucial for creating policy and ensuring the persistence of endangered apes (4). Nest surveys inform population estimates, and marked fluctuations in nest counts over time can indicate drastic changes to a local populations. There are two main methods to extrapolate population data from nest counts: the *standing crop nest count (SCNC)* and the *marked nest count (MNC)* (7).

TABLE 1. Construction Rates

An average number of nests made per individual per 24h, by great ape kind (6)

Gorilla(1.00)	
Chimpanzee(1.09)	
Bonobo(1.37)	 
Orang-utan(1.43)	 

One nest represents one weaned individual.



Methodology: Estimating Population from Nest Counts

The Standing Crop Nest Count and the Marked Next Count

- (D) Ape population density
- (N) Nest density
- (C) Nest construction rate
- (Y) Nest decay rate
- (I) Inter-survey period
- (S) New nest proportion
- (P) Proportion of nest builders in survey group

$$D = N/PCY$$

$$D = N/PCIS$$

SCNC can be done in one survey and counts all nests (old or new) in an area. **MNC** needs at least two surveys and only counts new nests, defined as those built during (I).

Nest-counting is suitable where habituation is ill-advised, such as for the critically endangered Cross River gorilla.

TABLES 2a, 2b. Is Counting Nests Effective?

Decay/construction rates vary by site and season (e.g., Table 2a). Nests surveys may yield divergent population estimates – even for the same group (e.g., Table 2b) – if the decay and construction rates used in the calculation do not accurately reflect local conditions.

Table 2a. Nest decay rates (in days) for *Gorilla gorilla* across West Africa (6)

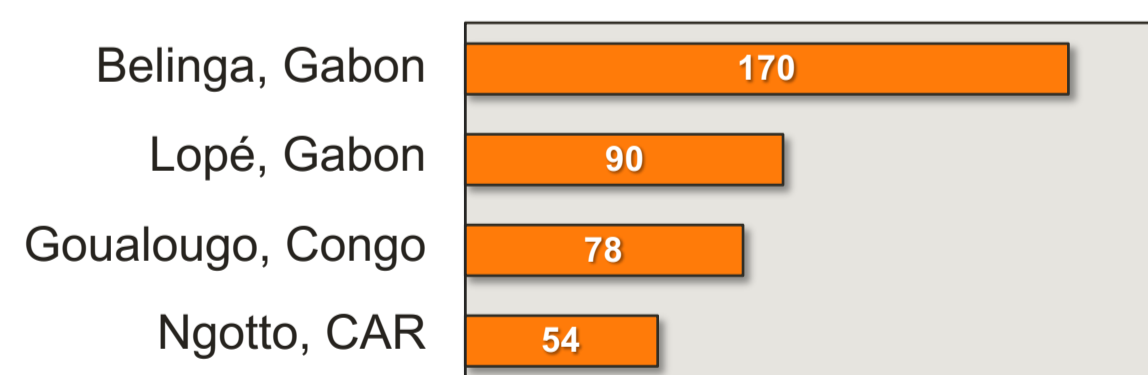
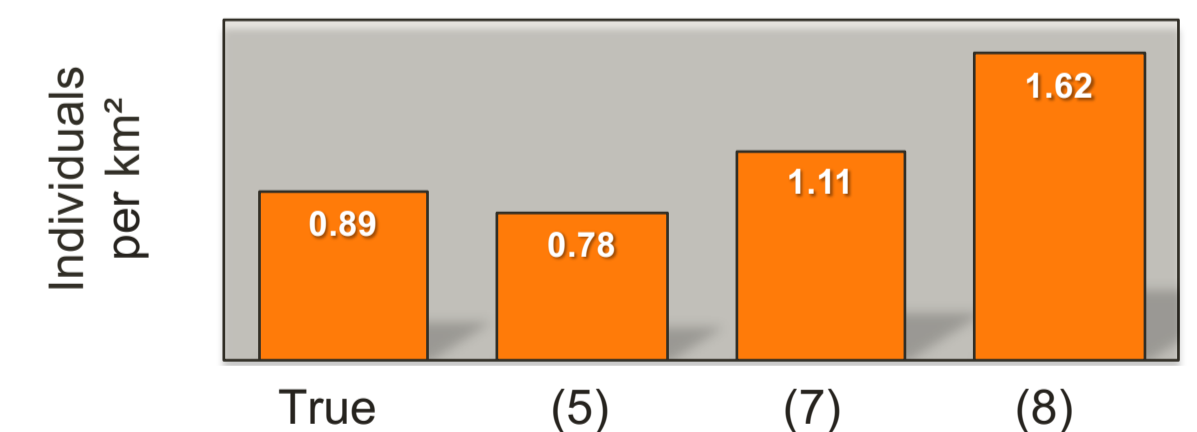


Table 2b. True and SCNC densities for one chimp group, by study



Discussion The utility of nest surveys should be assessed on a case-by-case basis.

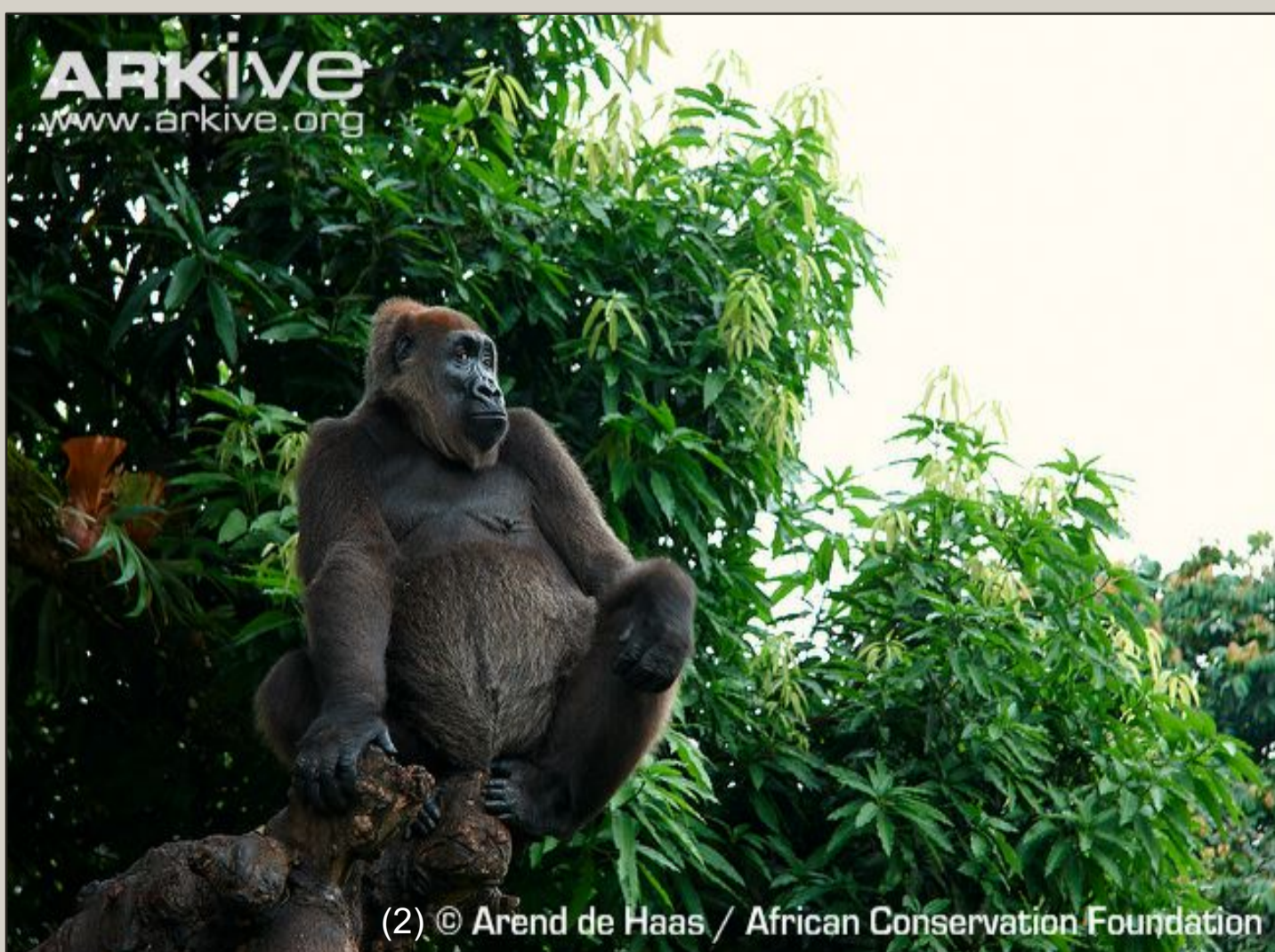
Pros

- Nests much easier to locate than apes
- Viable for sparse, far-flung groups
- Suitable where habituation is not
- Yield insights into cultural, ecological enquiries

Cons

- Missed, reused and interspecific nests can skew counts
- Rates are site-specific and non-transferrable
- Rates can take years to determine correctly

The unpredictable nature of nest construction and decay means that site- and time-specific rates (a) are imperative to avoid errors and (b) cannot be transferred between sites and seasons. Though variable, nest counting has nevertheless elucidated population trends in species unsuitable for habituation (10), especially those vulnerable to poaching pressures. Managing threatened ape species requires reliable population counts, and nests are plentiful artefacts rich in data. With proper assessment techniques, they can offer acute insights into population enquiries.



(1) Ferrero, Jean-Paul/www.ardea.com (n.d.) *Bornean orangutan juvenile in tree nest*. Arkive. Available from: <https://www.arkive.org/bornean-orangutan/pongo-pygmaeus/image-G4208.html> (2) de Haas, Arend/African Conservation Foundation (n.d.) *Female Cross River gorilla*. Arkive. Available from: <https://www.arkive.org/western-gorilla/gorilla-gorilla/image-G33045.html> (3) Fruth, B. et al. (2018) Sleep and nesting behavior in primates: A review. *Am Jour Phys Anthropol* 166, 499–509. <https://doi.org/10.1002/ajpa.23373> (4) IUCN (2018) The IUCN Red List of Threatened Species. *IUCN Red List of Threatened Species*. <https://www.iucnredlist.org/en> (accessed 10.26.18). (5) Kouakou, C.Y. et al. (2009) Estimating chimpanzee population size with nest counts: validating methods in Tai National Park. *Am J Primatol* 71, 447–457. DOI 10.1002/ajp.20673 (6) Kühl, H. et al. (2008) *Best Practice Guidelines for the Surveys and Monitoring of Great Ape Populations: Occasional Paper of the IUCN Species Survival Commission*. IUCN SSC Primate Specialist Group (PSG), Gland, Switzerland. (7) Marchesi, P. et al. (1995) Census and distribution of chimpanzees in Co'te-d'Ivoire. *Primates* 36, 591-607. (8) Plumtre, A.J., Reynolds, V. (1996) Censusing chimpanzees in the Budongo Forest, Uganda. *Int Jour Primatol* 17, 85-99. (10) De Vere, R.A.D. et al. (2011) Nest site ecology of the Cross River Gorilla at the Kagwene Gorilla Sanctuary, Cameroon, with special reference to anthropogenic influence. *Am Jour Primatol* 73, 253–261. <https://doi.org/10.1002/ajp.20886>