

Report on the estimate orangutan population for Deramakot & Tangkulap Forest Reserves (FMUs 19A & 17A)

Report prepared by
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INTRODUCTION

The Bornean orangutan (*Pongo pygmaeus*) is a critically endangered species based on the latest International Union for Conservation of Nature IUCN Red List of Threatened Species. The current forest management plan of Deramakot (FMU 19A) and Tangkulap-Sg. Talibu-Sg. Pinangah (FMU 17A) prescribes monitoring of the potential density of orangutan individuals at least once every two years since 1999 to evaluate their potential population status over time.

METHODOLOGY

The orangutan population was estimated through aerial nest counts using a helicopter, following standard protocols prescribed by Acrenaz et al. in 2003. The aerial inventory follows permanent transects with a total length of 123 km and 51 km in FMU 19 A and FMU 17A, respectively (Figure 1). With an estimated transect width of 300 m, the area samples are 7% and 3% of the total project area of FMU 19 A and FMU 17A, respectively. Hence, fluctuation values estimating the orangutan's density are expected due to their mobility and widespread dispersal of food resources in the project areas. Over time, the permanent sampling transect is an independent factor in monitoring population trends.

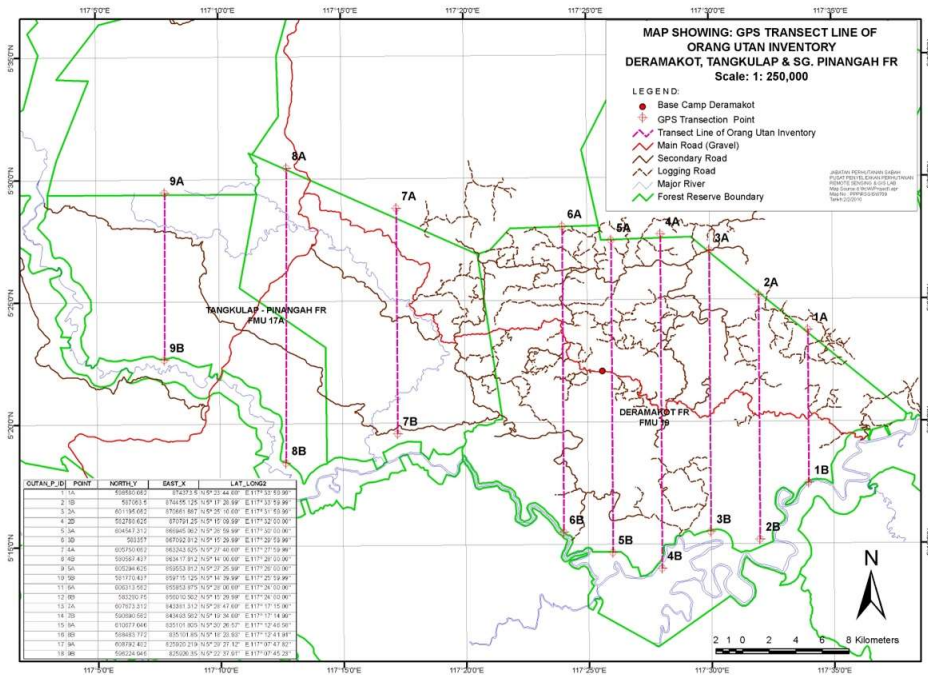


Figure 1. The distribution of transect lines and coordinates of orangutan aerial inventory in FMU 19A & FMU 17A, Sabah, Malaysia.

An example of the identification of an orangutan nest is depicted in Figure 2.



Figure 2. The example of orangutan nest identification and census for aerial inventory in FMU 19A & FMU 17A, Sabah, Malaysia (Source: Acrenaz, HUTAN, Kinabatangan Orangutan Conservation Programme).

ORANGUTAN DENSITY ESTIMATES

Deramakot FR (FMU 19A)

Throughout 22 years of monitoring nest count in Deramakot, the highest estimated density of orangutans is 3.78 individuals/km or 2084 total individuals, whilst the lowest is 0.72 individuals/km or 397 total individuals (Table 1). The average density of orangutans throughout the monitoring period is 1.9 individuals/km, slightly higher than the initially estimated 1.4 individuals/km in December 1999. Even with the fluctuation of values, Figure 3 depicted a fair relationship ($R^2 = 0.23$) over orangutan density over time, whereby an upward trend of the estimation is observed in the project area.

Table 1. The estimated density and the total number of orangutans from 1999 to 2021 in Deramakot FR (FMU 19A), Sabah, Malaysia.

Date of Census	Nos of Individuals/km²	Nos of Orangutan in DFR
Dec 1999	1.40	772
July 2002	1.78	981
Dec 2002	1.71	943
Dec 2003	1.65	910
Feb 2004	1.74	959
June 2005	1.64	904
Nov 2005	1.10	607

June 2006	1.23	678
Nov 2006	1.18	651
Aug 2007	1.50	827
Nov 2007	1.92	1,059
May 2008	0.80	441
Nov 2008	2.22	1,224
May 2009	0.87	480
Nov 2009	2.23	1,230
June 2010	1.45	800
Oct 2010	3.13	1,726
July 2011	0.87	480
Dec 2011	3.08	1,698
May 2012	1.41	777
Dec 2012	1.85	1,020
July 2013	0.72	397
Feb 2014	3.26	1,798
July 2014	2.91	1,605
April 2015	3.78	2,084
Sep 2015	1.77	976
Apr 2016	1.98	1,092
Jul 2017	2.15	1,185
Mac 2019	2.92	1,610
Oct 2021	2.74	1,511

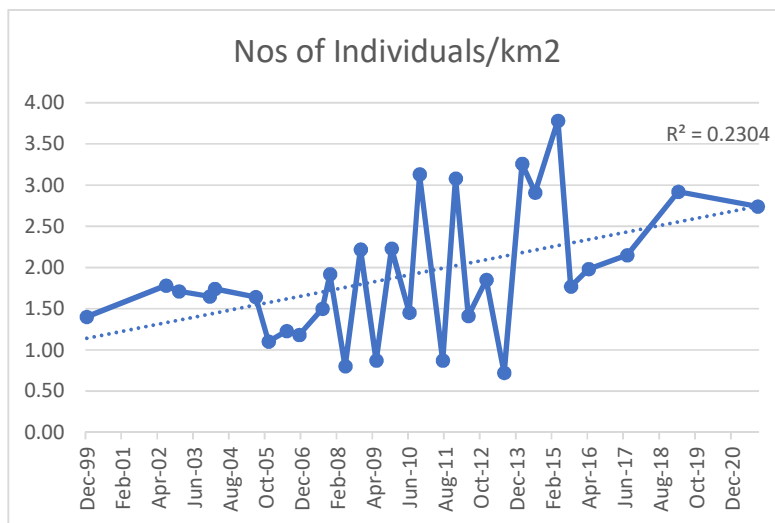


Figure 3. The estimated density of orangutans from 1999 to 2021 in Deramakot FR (FMU 19A), Sabah, Malaysia.

Tangkulap, Sg Pinangah & Sg Talibu FRs (FMU 17A)

Throughout 12 years of monitoring nest count in FMU 17A, the highest estimated density of orangutans is 2.11 individuals/km or 1,056 total individuals, whilst the lowest is 0.31 individuals/km or 155 total individuals (Table 1). The average density of orangutans throughout the monitoring period is 1.2 individuals/km, almost similar to the initially estimated 0.9 individuals/km in May 2009. Figure 4 depicted a fairly weak relationship ($R^2 = 0.1$) over orangutan density over time. This indicates the density or number of orangutans in the project area is relatively stable.

Table 2. The estimated density and the number of orangutans from 2009 to 2021 in Tangkulap-Sg. Talibu-Sg. Pinangah FR (FMU 19A), Sabah, Malaysia.

Date of Census	Nos of Individuals/km ²	Nos of Orang-utan in Tangkulap, Sg. Talibu & Sg. Pinangah FR
May-09	0.96	481
Nov-09	1.10	551
Jun-10	0.55	275
Oct-10	2.06	1031
Jul-11	0.31	155
Dec-11	1.44	721
May-12	1.06	531
Dec-12	0.69	345
Jul-13	0.48	240
Feb-14	1.55	776
Jul-14	1.76	881
Apr-15	2.11	1056
Sep-15	1.34	671
Apr-16	1.11	556
Jul-17	1.62	811
Mar-19	1.58	791
Oct-21	1.23	616

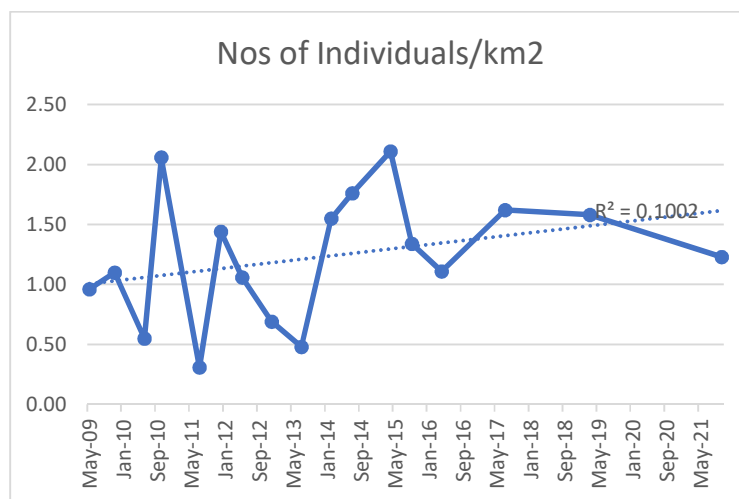


Figure 3. The estimated density of orangutans from 1999 to 2021 in Tangkulap-Sg. Talibu-Sg. Pinangah FR (FMU 17A), Sabah, Malaysia.

POTENTIAL THREATS

There are no recorded threats to the survival of orangutans in FMU 17A and FMU 19A.

MANAGEMENT AND OPERATION

The findings suggest that the management and operation implemented in both project areas throughout the monitoring period had no detrimental impact on orangutan density and population.

MONITORING

Adapted from Acrenaz (2018), the monitoring of orangutan density once every two years and at a similar monthly period should be continued for long-term observation purposes. Furthermore, the same team should carry the successive nest counts programme. All output of monitoring should be distributed to orangutan specialists for review.

CONCLUSION

The estimated orangutan density of both Deramakot (FMU 19A) and Tangkulap-Sg. Talibu-Sg. Pinangah (FMU 17A) throughout the monitoring programme is similar to or above their initial estimated counts. The Deramakot's orangutan population has shown an upward trend in the last 22 years. The management and operation implemented in both project areas may appear not to cause any detrimental impact on orangutan density and population.

REFERENCES

- Acrenaz, M. (2018) Aerial Orangutan Nest Census for Deramakot & Tangkulap Forest Reserves (FMUs 19A & 17A) – *Estimated Density & How They Are Faring*. Departmental Report
- Acrenaz, M., Gimenez, O., Ambu, L., Acrenaz, K., Andau, P., Goosens, B., Payne, J., Sawang, A., Tuuga, A. & Acrenaz, I. (2004) Aerial surveys give new estimates for orangutans in Sabah, Malaysia. *PLoS Biol* 3(1): e3