

Aerial Orangutan Nest Census for Deramakot &  
Tangkulap Forest Reserves (FMUs 19A & 17A) –  
*Estimated Density & How They Are Faring*

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Orangutan nest  
census using  
helicopter

Date of Census	# of Individuals/km <sup>2</sup> (Deramakot FR)
Dec., 1999	1.40
July 2002	1.78
Dec., 2002	1.71
Dec., 2003	1.65
Feb., 2004	1.74
June 2005	1.64
Nov., 2005	1.10
June 2006	1.23
Nov., 2006	1.18
Aug., 2007	1.50
Nov., 2007	1.92
May 2008	0.80
Nov., 2008	2.22
May 2009	0.87
Nov., 2009	2.23
June 2010	1.45
Oct., 2010	3.13
July 2011	0.87
Dec., 2011	3.08
May 2012	1.41
Dec., 2012	1.85
July 2013	0.72
Feb., 2014	3.26
July 2014	2.91
April 2015	3.78
Sept. 2015	1.77
April 2016	1.98
July 2017	2.15

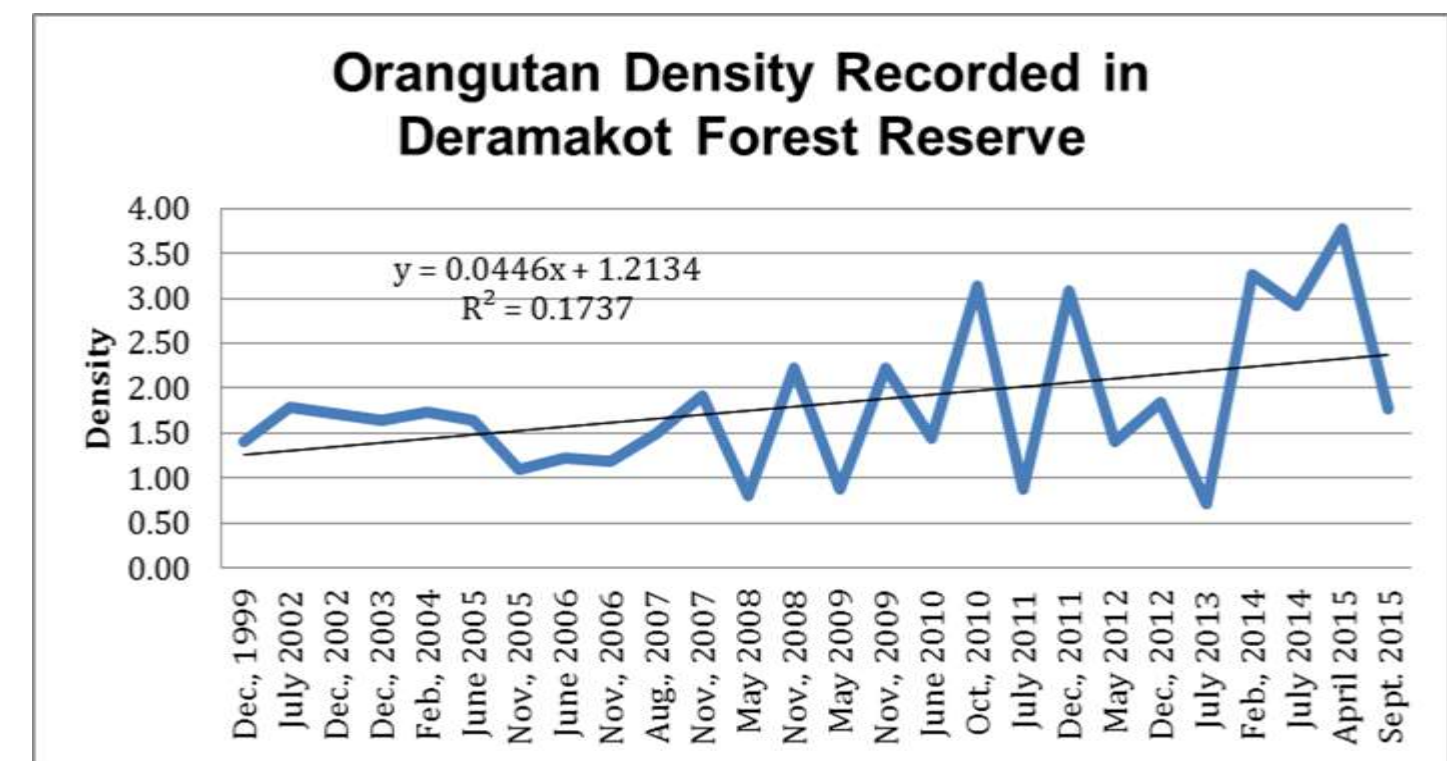
## 1. Situation in Deramakot

The graph shows the fluctuations of orangutan densities estimated during a 16 years period (Dec 1999-Sept 2015) in Deramakot FR. Data were derived from aerial nest counts conducted from a helicopter following permanent transects.

During the period 1999-2007, the densities were more or less stable, between 1.00 and 2.00 ind./km<sup>2</sup>, showing a stable orangutan population for Deramakot. From Nov 2007 till today, the results show significant fluctuations of orangutan densities ranging from 0.5 to 4 ind./km<sup>2</sup>. These fluctuations seem to occur every six months in average. Three major reasons could explain these fluctuations:

- Fluctuations due to high rates of recruitment and mortality within the population: *Highly unlikely*. Orangutans are a slow breeding species (average interbirth interval = 8 years; average generation time = 25 years). So these fluctuations (more than two fold up and down cannot be the result of an intra-population growth/decline.
- Consequences of the fluctuations of fruit availability in the forest: *Possible*. Orangutan densities are known to vary according to fruit seasonality and availability in the forest. However, such fluctuations would be mostly noticeable at a localized level and not over large areas (such as Deramakot).
- Bias due to the methodology: *Possible*. Aerial counts can provide reliable estimates of orangutan densities given that the same observers are used during repeated counts. Helicopter height and speed are also crucial parameters to consider when the results are interpreted. The fluctuation recorded during counts organized every six months could reflect a problem with the methodology: maybe the nest spotters are different people (with different detection ability); maybe the pilot of the helicopter is different (different flight skills); differences in weather when the flight is conducted (which would result in reduced visibility or length of transects in case of fog or rain); etc.

However, importantly these data show that no drastic decline of the orangutan population has occurred over a 15 years period in Deramakot. The average for the period 1999-2015 is 1.82 ind./km<sup>2</sup> (SD=0.80 ind./km<sup>2</sup>), which is quite close to the baseline data established in 2000 (1.50 ind./km<sup>2</sup>).



## 2. Situation in Tangkulap

The graph shows the fluctuation of orangutan densities at Tangkulap FR for a ten years period: (2005-2015). Overall, orangutan densities fluctuate between 0.5 and 3.00 ind/km<sup>2</sup> during the monitoring period.

The graph shows similar fluctuations than the graph recorded for Deramakot. Overall, it is not possible to conclude this population is increasing or not, but data show that the orangutan population size has been mostly stable over a ten years period at Tangkulap FR.

## 3. CONCLUSIONS AND RECOMMENDATIONS

Overall, the data collected over successive helicopter surveys show that orangutan in Deramakot and in Tangkulap FR have maintained their number over a 15 years period of time. It is still too early to assess if these two populations are viable on the long-term, and it is necessary to maintain a proper monitoring for the next few decades (see below).

We recommend to restore fruit trees in both forest to boost orangutan fruit production and to buffer seasonal variations of fruit availability in the forest. In addition, we **strongly advise that no major food sources (including climbers and vines) should be cut during silviculture treatment. Indeed, these pioneer plants are key to sustain orangutans in degraded and exploited forests.**

### Recommendations for future monitoring:

- For more precise statistical analysis, it is needed to give the confidence interval of the average orangutan density estimate (the formula is available in Ancrenaz et al., 2015);
- Aerial surveys could be carried out once every two years only at the same period during the year (dry season);
- The same team of surveyors should be used for successive nest counts;
- Results should be interpreted with caution and with input from orangutan specialists.

