Orangutan survey method

(nest survey)

Preperation
Survey design
"line transect"

Collecting data
Orangutan nest survey
19 – 31 July 2022

Data Analysis
Orangutan nest density

Data Analysis
Orangutan population density

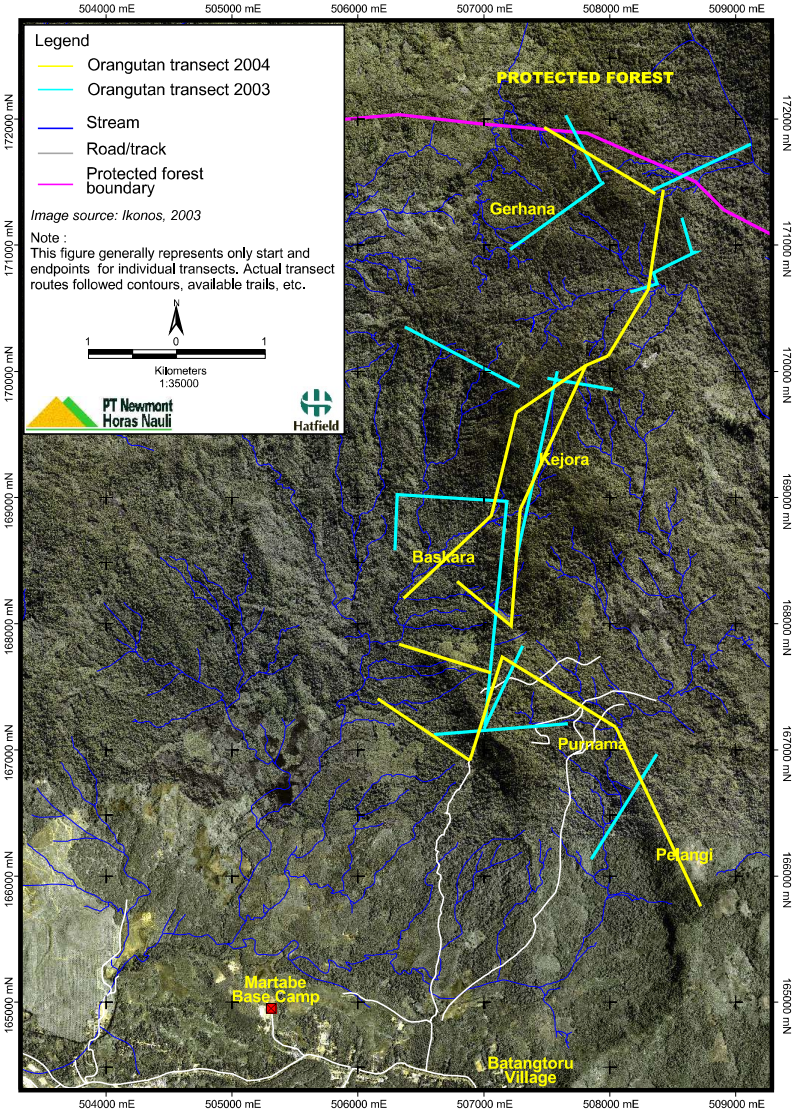
Orangutan population

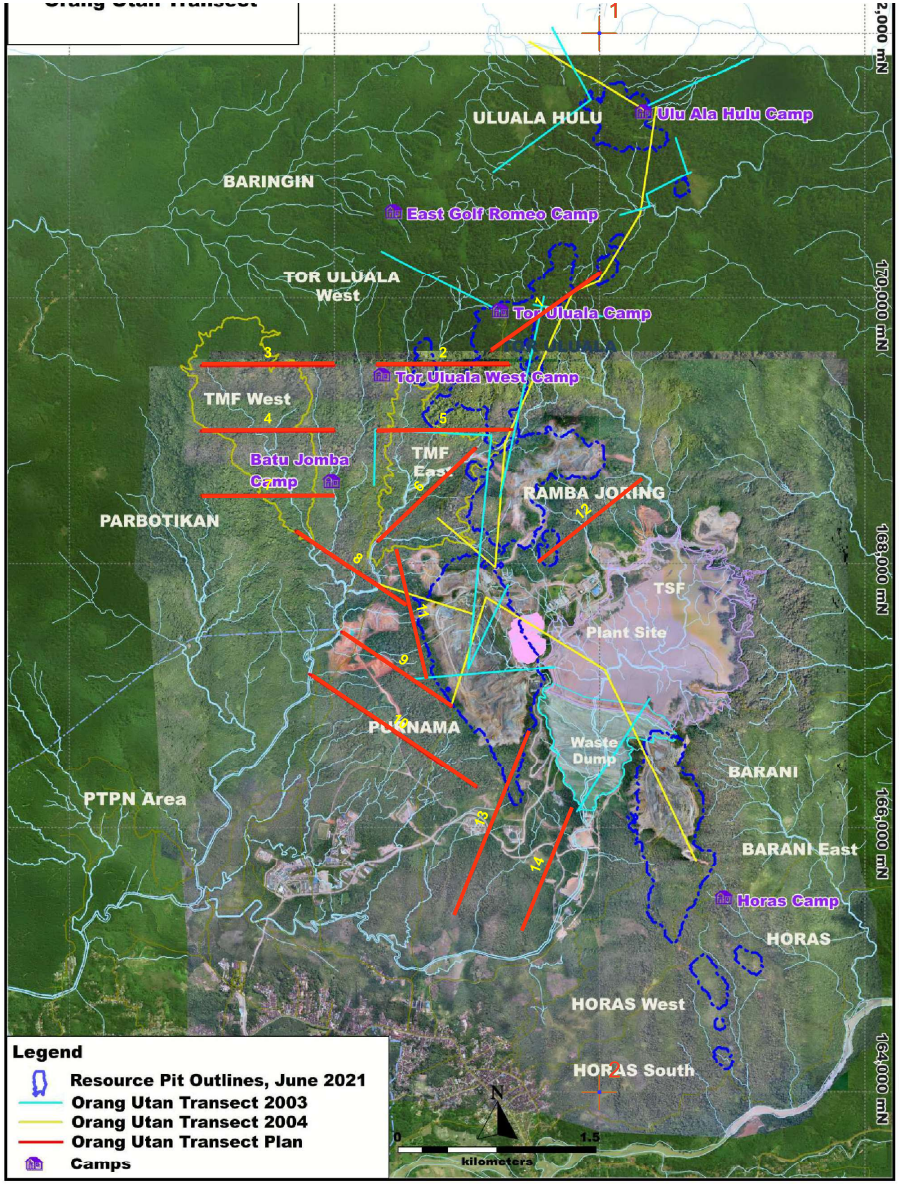
p = 0.9
r= 1.8
t= 502 days
(Wich etal, 2016)

Estimate scheme of Orangutan Population

"Line Transect"

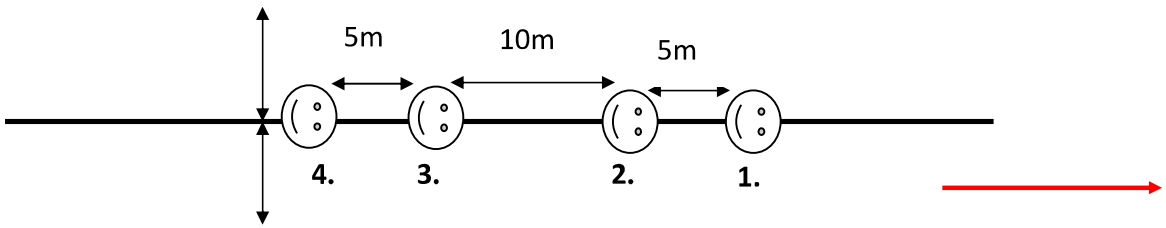
Figure 6 Orangutan transects, Martabe Project Area, North Sumatra, Indonesia, June - July 2003 and March 2004.



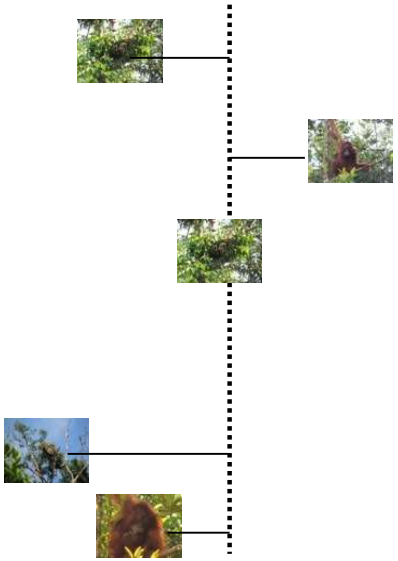


- To determine orangutan density nest counts are conducted and the data assessed using standard line transect methods (see Brockelman and Ali, 1987)
- to first estimate densities of nests and then convert these to densities of orangutans themselves (e.g. van Schaik et al., 1995; Buij et al., 2002; Buij et al., 2003; Wich et al. 2004, Marshall et al., 2006).
- This method uses the fact that orangutans, like all great apes, construct nests. These nests are used at night for resting and during the day nests can be constructed for resting or playing (van Schaik et al., 1995).
- Using nest counts instead of direct encounters with orangutans themselves is preferred due to the low density of orangutans, making any attempt to estimate density based on live encounters extremely time consuming.
- Transects located using stratified random approaches (space occupancy program). The resulting design can be seen in figure . Of the 14 transects (each 1-1.5 km line) so produced, 6 were within the TMF infrastructure block and 8 were surrounding. GPS records taken of: transects at 100m intervals; all relevant orangutan and nest observations.

- During nest counts 2-3 experienced observers slowly walk on straight line transects and record the perpendicular distances of all identified nests from the transect. Nests will be counted while walking the transect in both directions as this will usually lead to higher nest counts and therefore better results.



- Nest counts are converted into nest densities and then orangutan densities using the method developed by van Schaik et al. (1995) and refined and explained in detail by Buij et al. (2003), using the following formula:



$$d = N/(L * 2 * \mu * p * r * t)$$

in which :

d = orangutan density (individuals/km^2),
N = number of nests observed along the transect,
L = length of the transect covered (km),
μ = estimated width of the strip of habitat actually visually covered (km),
p = proportion of nest builders in the population,
r = rate at which nests are produced (n/day/individual), and
t = time during which a nest remains visible (in days).

- Estimating Strip Width (w)
  The *w* value was calculated using the computer programme Distance 7.3. in which several models can be used to estimate *w* (Thomas *et al.* 2001). To test whether the distributions of perpendicular distances were similar between the various locations Kolomogorov-Smirnov tests will be used.
- Parameters *p* and *r*
  In two orangutan populations that have been studied long-term in Sumatra it has been found that ca. 10% of the population are infants who do not construct nests (van Schaik et al. 1995) and for these two sites p was therefore set at 0.9. The number of nests built per individual per day is expressed as r. In two well-studied populations in Sumatra the number of nest build per day (r) was found to be approximately 1.7. We will assume similar values for the survey sites in this study.
- Nest decay (*t*)
  Because nest decay is the parameter that shows the largest variation it would ideally be measured anew at each survey location. This is, however, not financially or logistically practical as it takes several months (even years) to collect the necessary data (Mathewson et al. 2008). Therefore we will use the nest decay from Camp Mayang (Batang Toru) research area (502 days; Wich et al, 2016).
  Four classes will be use to indicate decay stages (van Schaik et al., 1995):

class 1 : fresh, new nest, all the leaf still green
class 2 : not fresh, all the leaf still on the nest, leaf color brown
class 3 : old, the leaf almost gone, nest have a hole
class 4 : leaf totally gone, there are branch and tick but nest structure almost destroyed

Ecological parameters

a. Ecological parameter used to estimate orangutan habitat quality is the percentage orangutan fruits/ soft pulp fruits (number of orangutan fruits/ total fruits * 100) along the nest count line transects (or **Fruit Trail**) (van Schaik et al 1995; Buij et al 2002). Therefore, known orangutan areas with a higher percentage of orangutan fruits/ soft pulp fruits are expected to have a higher orangutan density (cf. van Schaik et al 1995).

b. Large strangling fig trees provide an indication of food availability since these trees are a fall-back resource for sumatran orangutans in a period of lean fruit availability (van Schaik et al 1995; Utami et al 1997; Wich et al 2006). To determine **large fig tree density**: one observer will record strangling fig sightings by walking slowly along the transect line and recording the perpendicular distance from transect to the fig tree.

Other animal sighted during survey will be write it down on the note book (name of the animal, time of sighted, location, amount of the animal, activity), also animal indication such as fecal, foot print, nest, and animal trap.