

Density and population estimation of the Bornean elephant (*elephas maximus borneensis*) in Sabah

Abstract

Problem statement: In Asia, four elephant subspecies have been identified, *Elephas maximus maximus* from Sri Lanka, *Elephas maximus sumatranus* from Sumatra, *Elephas maximus borneensis* (based on recent DNA analysis) from Borneo and *Elephas maximus indicus*, from mainland Asia. The Bornean elephant has a limited distribution and is found only in the northeastern part of the island, (Malaysian Sabah and Indonesian Kalimantan). Previous estimations for the population in Sabah have ranged between 500-2000 elephants. These estimations have been carried out through a non-systematic approach, either via interview or from direct sightings or extrapolating population count data from limited sites. In order to prepare the conservation plan for this species in Sabah, there is a need to establish reliable information on their density and population size. The main objective of this study was to determine the elephant density and population size in five main elephant managed ranges in Sabah.

Approach: In this study, relative distribution and spatial density of the Bornean elephant was developed and established, using a systematic line transect survey and a long term monitoring of dung decay rates. We conducted the elephant population census in Sabah between July 2007 and December 2008. Using a line-transect dung-count methodology, we surveyed 216 line transects; with a total distance of 186.12 km, in five main elephant managed ranges. Namely (i) Tabin Wildlife Reserve, (ii) Lower Kinabatangan, (iii) Central Forest, (iv) North Kinabatangan and (v) Ulu Kalumpang.

Results: We presented the elephant density estimate using long term monitoring of dung decay rates. In each range, the elephant's density varied depending on the size of the suitable habitat. The size of the suitable habitat was derived from WWF's study report (WWF-Malaysia, 2008). Densities were analyzed following line-transect analysis guidelines and were computed using the software Distance v6.0.

Conclusion: Our survey indicated that approximately 2,040 (95% CI: 1,184-3,652) elephants remain in the five main ranges in Sabah, with the largest population being in the unprotected central forests. Elephant density was highest in ranges where habitat has been removed and elephants are concentrated in remaining forest areas. These results provide new baseline data for the elephant population in Sabah.