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**Short Communication**

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**The population size and distribution of Proboscis Monkeys (*Nasalis larvatus*) based on a brief study in Garama, Klias Peninsula, Sabah, Malaysia****Muhammad RIDZWANALI<sup>1</sup>, Henry BERNARD<sup>2</sup> and Goro HANYA<sup>3</sup>**<sup>1</sup>*Conservation Biology Program, School of Science & Technology, Universiti Malaysia Sabah, Locked Bag 2073, 88999, Kota Kinabalu, Sabah, Malaysia*<sup>2</sup>*Institute for Tropical Biology & Conservation, Universiti Malaysia Sabah, Locked Bag 2073, 88999, Kota Kinabalu, Sabah, Malaysia*<sup>3</sup>*Primate Research Institute, Kyoto University, Kanrin 41-2, Inuyama, Aichi, 484-8506, Japan*

**ABSTRACT.** A census survey on the proboscis monkey populations was carried out in and around the Padas Damit Forest Reserve located in Garama, central part of Klias Peninsula in the west of Sabah. The survey was conducted in September and December 2007 using boats going through 5.4 km along the Garama River within the study area. A total minimum population size of 10 groups and 76 individuals was found within the surveyed areas. The population density was estimated to be 1.85 groups/km<sup>2</sup> or 14.07 individuals/km<sup>2</sup>. Groups of proboscis monkey were frequently encountered along the Garama River located well within the Padas Damit Forest Reserve area, but animals were also encountered outside of this reserve in unprotected areas, especially on the upper parts of the Garama River in proximity of human habitations.

**INTRODUCTION**

Despite being regarded as an increasingly important ecotourism attraction in recent years in Sabah, the proboscis monkeys' habitats are increasingly threatened by human activities

(Sha *et al.*, 2008). Proboscis monkeys are large, sexually dimorphic, arboreal colobines endemic to the island of Borneo. The monkey is found largely restricted to waterlogged forests near coastal areas such as mangrove, riparian and swamp forest where it is closely associated with waterways, moving more than 1 km away from the river but always returning to their sleeping sites along river banks every evening (Payne *et al.*, 1985). The minimum population size of proboscis monkeys in Sabah was estimated to be close to 6,000 individuals with the stronghold of the monkey's populations located in the east coast along the lower parts of the Kinabatangan dan Segama regions (Sha *et al.*, 2008). Klias Peninsula contains the only remaining viable populations of proboscis monkey on the west coast of Sabah (Bernard & Zulhazman, 2006).

The proboscis monkeys populations in the Klias Peninsula have been surveyed several times during the last decade including areas at the Padas Damit Forest Reserve (PDFR) located in the central part of the Peninsular (Bernard, 1997; Bernard & Zulhazman, 2006; Sha *et al.*, 2008). The present survey was aimed at estimating the most recent population size and density, as well as mapping the distribution

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*Keywords:* Proboscis monkey, abundance, distribution, Garama, Sabah

pattern of the proboscis monkeys in this area. This survey formed part of a larger research project on the ecology and behavior of the proboscis monkey within the PDFR (Bernard, 2007).

## MATERIALS AND METHODS

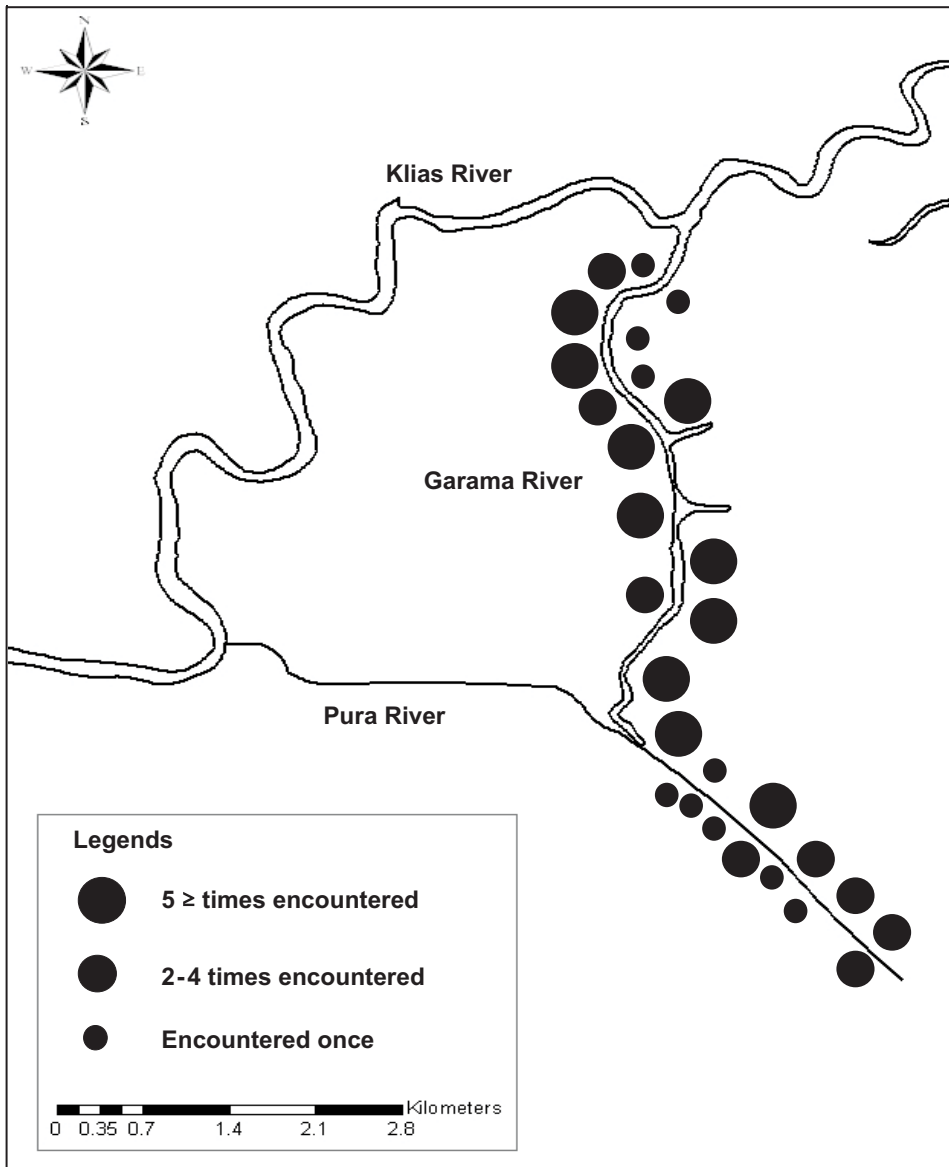
The survey was conducted over a ten day period in September and December 2007 along the Garama River starting from Kampung Garama to the intersection between Garama River and Klias River. A total of 5.4 km long of the Garama River is located within PDFR but parts of the river also flow outside of this reserve. Bennett's (1986) boat survey method was used to census the proboscis monkey populations. Searches for proboscis monkeys groups were made twice per day; i.e., once in the morning (0600-1000 hrs) and once in the evening (1600-1800hrs). Additional surveys in the afternoon (1000-1600 hrs) were occasionally conducted to see if the monkeys could be detected along the riverbanks in late morning and in the afternoon. Upon encounter, the observed number of animals was recorded. The approximate locations of all sightings of the proboscis monkey groups were also marked on an enlarged map of the study area in order to identify the distribution pattern of the monkey populations. In this study, a group of proboscis monkey was defined as all animals within 50 m of each other, with exception of animals on opposite sides of the river which were considered as separate groups. The approximate locations of proboscis monkeys groups were determined based on field signs such as the shape, bend, relative width of the river and distance from the starting point of the survey. The relative population density of the monkey was obtained by dividing the maximum number of individuals or groups observed by the area size, where the area size was taken as the length of the river surveyed multiply by 1km strip width (i.e. 500 m on both sides of the river bank).

It was assumed that there was no migration of proboscis monkey groups or individuals from the study site. Long distance movements of the monkeys are unlikely due to the highly fragmented nature of the forests in the study area. Moreover, long distance movement was not expected due to the short duration of the study period.

## RESULTS AND DISCUSSIONS

A maximum total of ten groups and 76 individuals of proboscis monkeys was detected during the survey. Proboscis monkeys population density in the surveyed area was estimated to be 1.85 groups/km<sup>2</sup> or 14.07 individuals/km<sup>2</sup>. The present density estimates are comparable with that of Bernard & Zulhazman's (2006) estimates in 2005 for the Garama area, thus indicating that the proboscis monkeys populations in Garama has remained relatively unchanged since 2005 to the present time.

A cumulative total sighting of 103 proboscis monkeys groups has been made over the total of ten days survey period. Groups were encountered in the forests along the banks of the entire length of the Garama river surveyed (Figure 1). However, groups were relatively more frequently encountered in the lower parts of the river in mangrove and mixed mangrove-riverine habitats. Fewer groups were encountered on the upper parts of the river which is mainly covered by riverine forest. This suggests that proboscis monkeys at the study area preferred mangrove and mixed mangrove-riverine to riverine habitats during the survey period. Observations elsewhere in Sabah generally showed that proboscis monkeys preferred riverine forest more to mangrove forest (Sha *et al.*, 2008). However, long term observations of the proboscis monkeys in PDFR showed that there was a localized movement of groups of proboscis monkeys from mangrove forest to riverine forest when fruit is abundant in the



**Figure 1.** Map of Garama showing the distribution of proboscis monkeys along Garama River. Solid darkened circles represent the frequency of encounter with groups of proboscis monkeys.

riverine forest (H. Bernard, per. obs.). Most of the trees in riverine forest were not in fruit at the time when the present survey was conducted (M. Ridzwan Ali, per. obs.). Riverine forest may, therefore, become more important than mangrove or mixed mangrove-riverine as a feeding site in PDFR during certain parts of the year. Seasonal shifts between habitats have been observed elsewhere in Borneo indicating that some habitats may be preferred and during some parts of the year where preferred food resources are scarce, the proboscis monkey may utilize other habitats for feeding (Bennett & Sebastian, 1988).

An important finding of the present study is that the range of distribution of the proboscis monkeys also included areas outside of the PDFR into unprotected areas in the proximity of human habitations. In the long term it is suggested that these areas including the entire PDFR are given equal protection status as that of a Class 1 forest reserve where logging is prohibited in order to allow a more secure and larger suitable habitats for the proboscis monkeys in Garama.

#### ACKNOWLEDGEMENTS

The authors would like to thank En. Awang Masis Ahmad and family for providing accommodation and field assistance during the field works. The work described in this paper has been financially supported by the Pro Natura Foundation-Japan, Nature Conservation Society of Japan and the Ministry of Higher Education of Malaysia through its Fundamental Research Grant Scheme (FRGS) No. FRG0085-BD-1/2006 awarded to Henry Bernard.

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