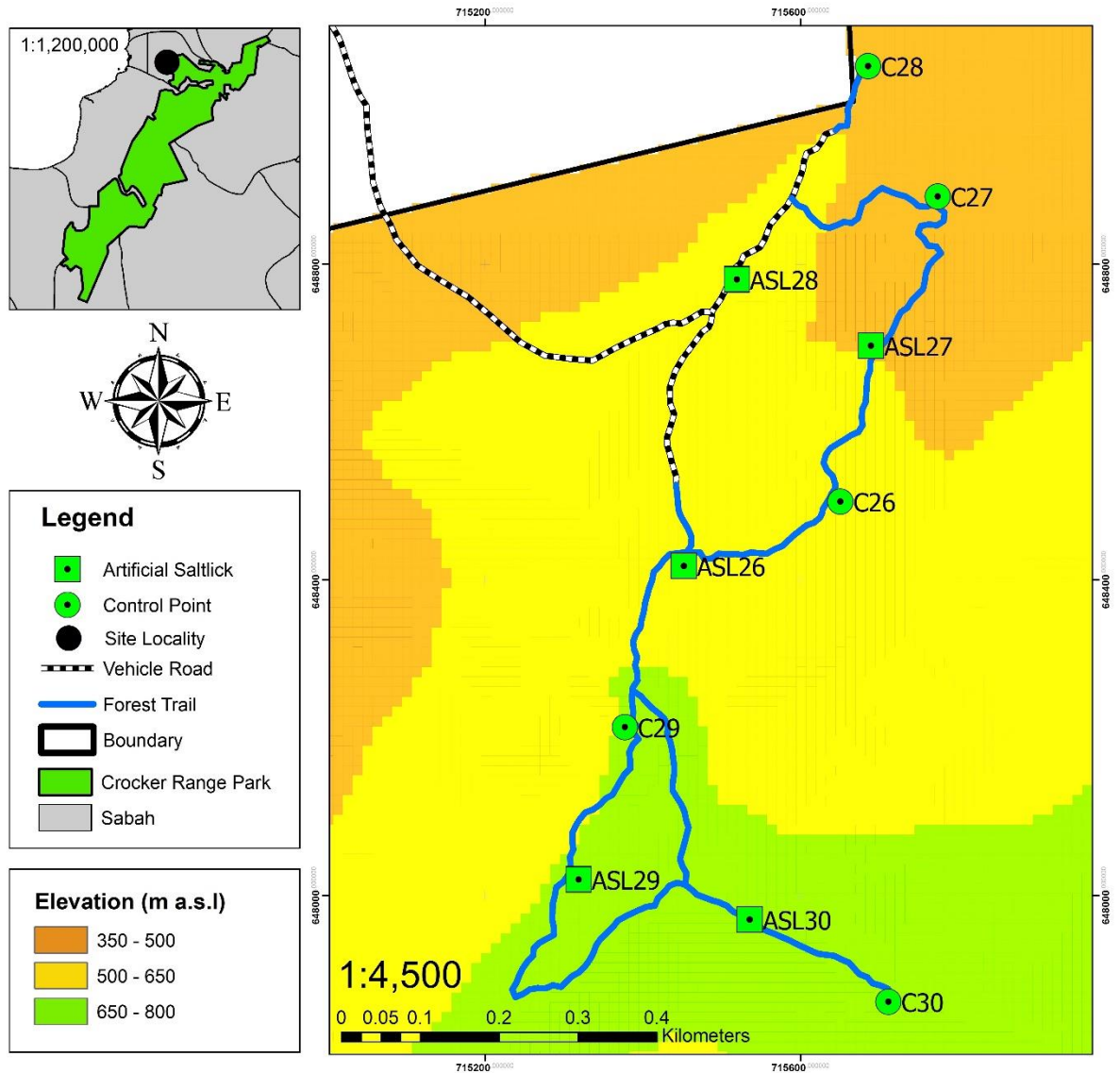


Project Update March 2024

The camera trapping survey conducted at the 20 sampling points established in the Kinarut Eco Forest Park (fourth study site) was completed on 5 December 2023. The camera trapping survey commenced at the fifth study site of this research, Inobong Substation of Crocker Range Park, starting from 17 January 2024 to the present day. To date, a total of 10 sampling points were established systematically along the existing local vehicle road and forest trails, where the given sampling points were placed at least 5 m away from the trail area, in this study site (**See Picture 1**). Consequently, a total of 21 different species of terrestrial mammals were successfully detected in this research. The recorded species included the yellow-throated marten (*Martes flavigula*), southern red muntjac (*Muntiacus muntjak*), moonrat (*Echinosorex gymnura*), large treeshrew (*Tupaia tana*), thick-spined porcupine (*Hystrix crassispinis*), pig-tailed macaque (*Macaca fascicularis*), Malay civet (*Viverra zibetha*), Sabah giant rat (*Leopoldamys sabanus*), long-tailed porcupine (*Trichys fasciculata*), Sunda stink-badger (*Mydaus javanensis*), leopard cat (*Prionailurus bengalensis*), long-tailed macaque (*Macaca fascicularis*), northern long-footed treeshrew (*Tupaia longipes*), Whitehead's Sundaic Maxomys (*Maxomys whiteheadi*), plantain squirrel (*Callosciurus notatus*), smooth-coated otter (*Lutrogale perspicillata*), Prevost's squirrel (*Callosciurus prevostii*), Bornean yellow muntjac (*Muntiacus atherodes*), banded civet (*Hemigalus derbyanus*), collared mongoose (*Herpestes semitorquatus*), and common palm civet (*Paradoxurus hermaphroditus*). The pictures of the 21 mammal species captured by the deployed camera traps in this study site are attached in this report, together with their respective common names (English and Malay versions), IUCN Red List Status, and scientific names. Finally, the preliminary findings of this study were employed in writing up a research article, which was ultimately published in a Q3 Scopus-indexed journal "HAYATI Journal of Biosciences" (**See Picture 2**). Moreover, the fact that this research project was funded by the Rufford Small Grant (33917-1) was mentioned at the acknowledgement section of this paper as well. Further information on this article can be found at <https://journal.ipb.ac.id/index.php/hayati/article/view/50691>.



Picture 1. This map shows the 10 sampling points (5 control points & 5 artificial saltlicks) that are established systematically along the accessible forest trails at the Inobong Substation of Crocker Range Park. This locality map is created by myself using ArcMap ver. 10.4, and then the base map is a digital elevation model that is downloaded from <https://asf.alaska.edu/>.



Bornean Yellow Muntjac/
Kijang Kuning (NT)
(*Muntiacus atherodes*)



Southern Red Muntjac/
Kijang India (LC)
(*Muntiacus muntjak*)



Yellow-throated Marten/**Mengkira** (LC)
(*Martes flavigula*)



Common Palm Civet/**Musang Pulut** (LC)
(*Paradoxurus hermaphroditus*)



Malay Civet/**Musang Tenggalung** (LC)
(*Viverra zangalunga*)



Moonrat/**Tikus Bulan** (LC)
(*Echinosorex gymnura*)



Pig-tailed Macaque/
Beruk (EN)
(*Macaca nemestrina*)



Long-tailed Porcupine/
Landak Padi (LC)
(*Trichys fasciculata*)



Thick-spined Porcupine/
Landak Chankas (LC)
(*Hystrix crassispinis*)



Sabah Giant Rat/
Tikus Mondok Ekor Panjang (LC)
(*Leopoldamys sabanus*)



Whitehead's Sundaic Maxomys/
Tikus Bangkung (VU)
(*Maxomys whiteheadi*)



Plantain Squirrel/
Tupai Pinang (LC)
(*Callosciurus notatus*)



Large Tree Shrew/**Tupai Tanah** (LC)
(*Tupaia Tana*)



Banded Civet/**Musang Belang** (NT)
(*Hemigalus derbyanus*)



Northern Long-footed Tree Shrew/
Tupai Muncung Kaki Panjang (LC)
(*Tupaia longipes*)



Prevost's Squirrel/
Tupai Tiga Warna (LC)
(*Callosciurus prevostii*)



Long-tailed Macaque/**Kera** (EN)
(*Macaca fascicularis*)



Sunda Stink-Badger/**Teledu** (LC)
(*Mydaus javanensis*)



Collared Mongoose/
Garangan Ekor Panjang (NT)
(*Herpestes semitorquatus*)



Smooth-coated Otter/
Memerang Licin (VU)
(*Lutrogale perspicillata*)



Leopard Cat/**Kucing Batu** (LC)
(*Prionailurus bengalensis*)

Viewable Terrestrial Mammals along the Nature Trails at the Lowland Tropical Forests of Western Sabah, Malaysia Borneo

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ABSTRACT

The information related to the species of terrestrial mammals that can be detected along the nature trails established in the lowland tropical forests of Western Sabah remains scarce at this moment. The camera trapping surveys were commenced at the Tenghilan Community Forest (TCF), Kawang Forest Reserve (KFR), and the urban forest of Universiti Malaysia Sabah (UMS) to investigate the terrestrial mammal species that could be observed along the local trails. A total of 20 terrestrial mammal species belonging to 13 different families were observed in 2,077 trap nights, where most of them were validated to be non-threatened ($n = 16$ or 80.0%) and omnivorous ($n = 13$ or 65.0%) species. Twelve species were found along the nature trails in TCF ($H' = 2.223$; $1-D = 0.8650$) and KFR ($H' = 1.730$; $1-D = 0.7078$), whereas seven species were detected along the trails in the urban forest of UMS ($H' = 1.217$; $1-D = 0.5567$). The differences in the mammalian composition, diversity richness, and distribution evenness between these three study sites were validated as significant ($p < 0.05$). The present findings emphasize that these three study sites are favorable habitats for four threatened species. Hence, conservation efforts are needed to protect these terrestrial mammal species from facing extinction risks in future.

1. Introduction

The establishment of a nature trail serves to increase the accessibility of a forested area and its resources to humans (Nair *et al.* 2018; Lim *et al.* 2019), and it tends to overlap with the existing pathways of the terrestrial mammals (Scholten *et al.* 2018; Ota *et al.* 2019). In Malaysia Borneo, Sabah houses more than 200 species of terrestrial mammals, yet only certain species can be found along the nature trails that are regularly used by humans (Phillipps and Phillipps 2018; Bernard *et al.* 2019). Much research has been conducted on the terrestrial mammals that inhabit the lowland tropical forest in Sabah, particularly those which are situated in the Divisions of Sandakan and Tawau (e.g., Wearn *et al.* 2017; Kee *et al.* 2018; Hearn *et al.* 2018; Bernard *et al.* 2019; Lim and Mojiol 2022), at this moment. On the contrary, the terrestrial mammals that can be detected along

the nature trails at the West Coast Division of Sabah (Western Sabah) are rarely being examined (Wells *et al.* 2014; Sompud *et al.* 2023) because the researchers focused majorly on the local bat and avian species instead (e.g., Gilbert *et al.* 2018; Lim and Mojiol 2019; Aloysius *et al.* 2021; Lok *et al.* 2021).

Humans can easily access the biological resources in the lowland tropical forests of Western Sabah through the established nature trails, the impact of human visitation concentrated on the trail regions (Nair *et al.* 2018; Lim and Mojiol 2019; Aloysius *et al.* 2021). Furthermore, the vegetation composition and structure of a forest landscape can be altered by humans, which can ultimately define the movement behaviors adopted by the local terrestrial mammals in moving within the given area (Wilting and Azlan 2010; Matsubayashi *et al.* 2011; Samejima *et al.* 2012; Scholten *et al.* 2018). Henceforth, the terrestrial mammal species that can be found along the trails are expected to be varied across the different forest landscapes at Western Sabah (Bernard *et al.* 2019; Ota *et al.* 2019; Bakri *et al.* 2020; Bookhari *et al.*

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Picture 2. The first page of a research article that reports the preliminary findings of this research project. This research article is published in the Q3 Scopus-indexed Journal "HAYATI Journal of Biosciences", and then the fact that this research project is funded by the Rufford Small Grant (33917-1) is mentioned at the acknowledgement section of this paper.