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HABITAT UTILIZATION OF A TRANSLOCATED MALAYAN TAPIR IN SENALING INAS FOREST RESERVE, NEGERI SEMBILAN

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Abstract: Study on habitat usepatterns of Malayan Tapir (*Tapirusindicus*) is one of wildlife management strategies employed by the Department of Wildlife and National Parks in Peninsular Malaysia (DWNP). Habitat utilization of an adult Malayan tapir was studied using wildlife tracking satellite collar from May to December 2016 in Senaling Inas Forest Reserve, Negeri Sembilan. This eight- month pilot study was carried out to monitor thehabitat use pattern and to assess the areas ofpreference of the tapir after it was translocated to a new environment.The most commonly used habitat by the tapir was in the rubber plantation areas (59.2%),followed by forest and oil palm estateareaswith 23.6% and 10.2% respectively. Meanwhile, the least used area by the tapir was in the mixed plantation area owned by the locals and abandoned area (3.6%) and 2% was spent on village or local roads.It was estimated that the observed tapir carried out its diurnal and nocturnal activities such as food hunting, browsing and roaming in major areas visited. Further researchon habitat utilization of tapir is required to understand the habitat patterns towards a comprehensive management application for Malayan Tapir's conservation in Malaysia.

Keywords: GIS Monitoring, home range, satellite collar, Malayan tapir, *Tapirus indicus*.

Introduction

Tapir population is widely distributed in Peninsular Malaysia's forestespecially in swamps and lowland forests, similar to the distribution of other big mammals such as elephant and tiger. Malayan Tapir (*Tapirusindicus*) is considered endangered throughout its range (Traeholt *et al.*, 2016). Recently, the population of tapir in Peninsular Malaysia has been estimated between 1100 to 1500 by the Department of Wildlife and National Park (DWNP) (PERHILITAN, 2012). The Tapir Conservation Unit in the Biodiversity Conservation Division, of DWNP is actively working to rescue and conserve this species. This includes translocation activities that involve satellite collaring to monitor post-translocation movement. Every year, about 15 tapirs were rescued and translocation activity carried out to save the animals from being threatened by human and other factors. The translocation activities had cost thousands of ringgit but it is worth saving this wildlife in the specific habitat. Translocation of an endangered species isan effective management strategy for conservation biology. It decreases the risk of extinction by increasing the range of a species or establishing new populations thus reducing the risk of extinction of selected species.

Since its independence in 1957, Peninsular Malaysia has converted large areas of lowland forest into oil palm and rubber plantations through government agricultural development schemes. This loss and fragmentation of lowland habitats have resulted in the declining of many large mammals, including the tapir. It was due to many factors such as road-kill and human-wildlife conflict (HWC).An average of 44 tapirs per year were killed or displaced during the 2012-2014 period (Salman *et al.*, 2014).One

of the road-kills reported by DWPM in 2012 was that two Malayan tapirs were found died when they were trying to cross a road at night in Pahang. These two fully grown animals died on the spot of their injuries while foraging for food near the highway. HWC also contributed to the decreasing number of tapir population in Malaysia. HWC is particularly common in reserve borders, where species that rely on extensive territories come into contact with human settlements. In effect, border zones of protected areas may be considered as population sinks or critical zones in which conflict is the major cause of mortality (Woodroffe & Ginsberg, 1998). Hence, the Malayan Tapir is now listed by the IUCN as an endangered species (Lynam *et al.* 2008) and this calls for rapid action to conserve this precious species which helps them cool off and regulate their body temperature during the hotter parts of the day (Eisenberg *et al.* 1990). They are known to be good swimmers and can cross rivers without difficulty. They can stay submerged for some time and it has been suggested that they can walk along the bottom of rivers. Most of DWNP's research in Krau Wildlife Reserve and elsewhere, suggest that Malayan tapirs are more frequently recorded in the vicinity of water or wetlands, than in the forest.

The integration between Geographical Information System (GIS) and remote sensing technology could help in mitigating the issues of tapir monitoring and management. The technology could record movement of wildlife such as tapirs and analyze it using specific software for wildlife habitat conservation purpose. This study aimed at describing habitat utilization of a translocated Malayan tapir using integration of GIS and remote sensing technology in Negeri Sembilan Forest area.

Materials and Methods

A male Malayan Tapir was rescued from a surface trap near Air Lerek, Negeri Sembilan. It was then translocated four kilometers away to the Senaling Inas Forest Reserve (SIFR), Negeri Sembilan. The total area of the SIRF is about 369,794 ha. The SIFR is located within latitude and longitude of 2°39'45"N and 102°12'57.23"E respectively. Figure 1 shows the location of SIFR which is located ~~at~~on the west of Bukit Liat, northeast of Bukit Lancak and northwest of Bukit Jeram. The maximum elevation of SIFR is estimated at 725 m above sea level (a.s.l.). The translocation activity was carried out so as to get a larger habitatfor the tapir and to help it survive in the future. Prior to the translocation process, the tapir was weighed and anesthetised using a combination of 0.1mg/kg Butorphanol tartrate (TORBUGESIC®) and 0.04mg/kg Detomidine hydrochloride (DORMOSEDAN®). While under sedation, a passive microchip (Datamars Ins, Switzerland) was implanted behind the left ear (Mahathir *et. al*., 2017). At the same time, a GPS Collar was fitted around the tapir's neck for monitoringmovement.

The collar was set to transfer the coordinate positions of the tapir hourly. The recorded coordinates were transferred to desktop for further analysis. Calculation of the frequency of the tapir's movement was analysed using Microsoft Excel and presented using bar graphs. A Geographical Information System (GIS) software named ArcGIS version 10.2 by ESRI™ was used to map the location of the tapir at every hour over seven months between 26th May and 26th December 2016. All tapir's stop points were then displayed on the map and overlaid with the basemap of land use and land cover(LULC) of the SIFR and its surroundings. Roaming area and habitat pattern of the tapir were analysed based on data overlaid between the position of the tapir at each hour and land use map. In estimating the area of home range of the tapir, minimum bounding geometry called minimum convex polygon (MCP) was used. This process was to create a feature class containing polygon which ~~is~~ represents the specific minimum area for each input feature and group input feature to calculate the home range area.

Results and Discussion

A total of 4900 GPS location points of the tapir were received and translated on the map in

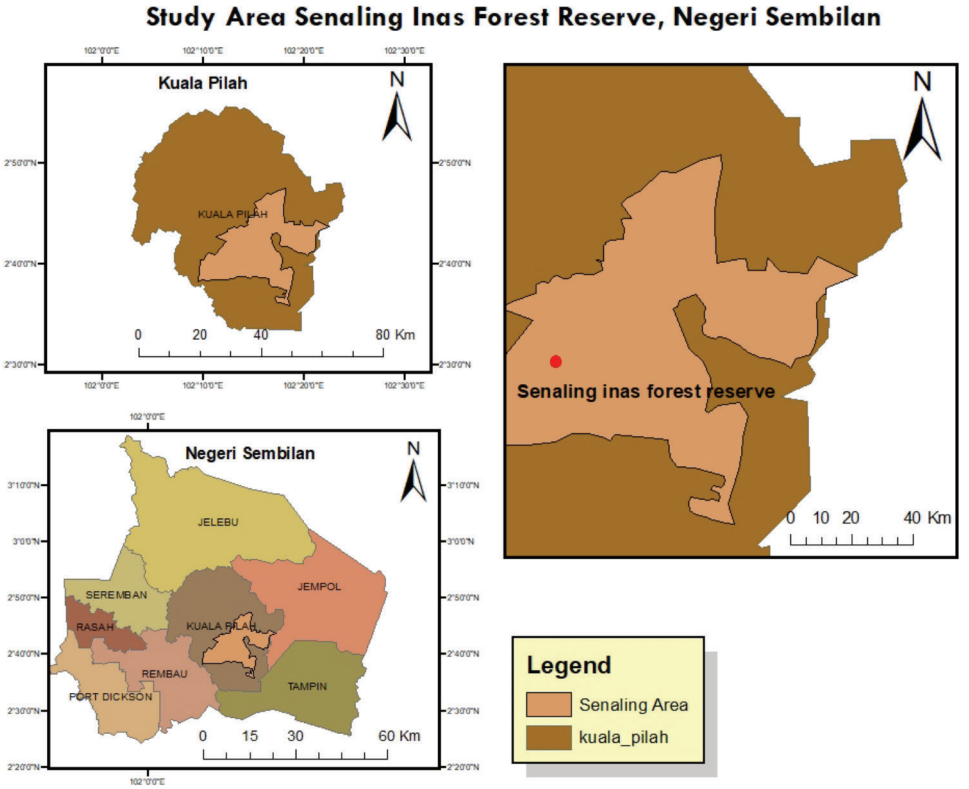

Figure 1: Location of the study area at SIFR, Negeri Sembilan

ArcGIS software. Results showed that the tapir travelled more than 446 km, within a 62 km^2 in and around SIFR. The tapir roamed more in open agricultural areas close to villages compared to forest areas. The location of the tapir's stopping points were overlaid with landusemap as shown in Figure 2. Within six months, the most visited places of this tapir werein the rubber plantation area. Figure 3 showed the frequency of preference area of the tapir during the study period. The most commonly used habitat by the tapir was in the rubber plantation areas (59.2%), followed by the forestand the oil palm estate area with 23.6% and 10.2% respectively. Meanwhile, the area leastutilized by the tapir was in a mixed plantation area owned by locals and an abandoned area (3.6%) and only 2% of the time was spent on localroad area. This result was supported by previous studies which stated that Malayan tapirs were mainly found living in tropical moist forests and various disturbed forests including forest fringes, agricultural areas, road-sides, logging concessions, oil palm and rubber plantations had been recorded (Kawanishi *et al.* 2002; Steinmetz *et al.* 2008; Lynam*et al.* 2012; Mohd. Khan 1997; Novarino*et al.* 2004; Mohamed & Traeholt, 2010; Williams 1978).

Every year, reports of displaced and rescued tapirs were increasing (Magintan *et al.*, 2012; Mahathir *et al.*, 2014) and up to June 2016, 101 rescue cases and translocation activities were conducted by the DWNP (DWNP, unpublished). Astapirs tend to feed at forest edges near human settlements where food availability is higher, (Mahathir *et al.*, 2014) contact with humans is also likely to increase. In addition, increasingly fragmented forests in Peninsular Malaysia, especially in forest reserves, may be one reason for an increase in the number of rescued tapirs. It was proven by Kawanishi*et al.*, (2002) that tapirs in isolated forests are more likely to

encounter less food and more threats from poachers. Apart from protected areas, forest reserves appear to be important habitats for tapirs in Peninsular Malaysia too (Clements *et al.*, 2012). However, the expansion of monoculture plantations in forest reserves (Aziz *et al.*, 2010) and construction of roads had (Clements *et al.*, 2014) threatened its survival.

Results of this study showed that the tapirwas active in July and was detectedinactive in May. The reason for being partially active in May was expected as the tapir was in periodadaptation. It was assumed that the tapir ~~is~~ felt insecure at a new place in a new environment. Figure 4 shows the movement frequency of the tapir within a six-month period of observation. The behaviour of the tapir had influenced the inhabitant and the roaming area of this mammal. Hence, changing environment of the translocated tapir, had resulted in the tendency to search for an area that was secure in terms of food resources and shelter.

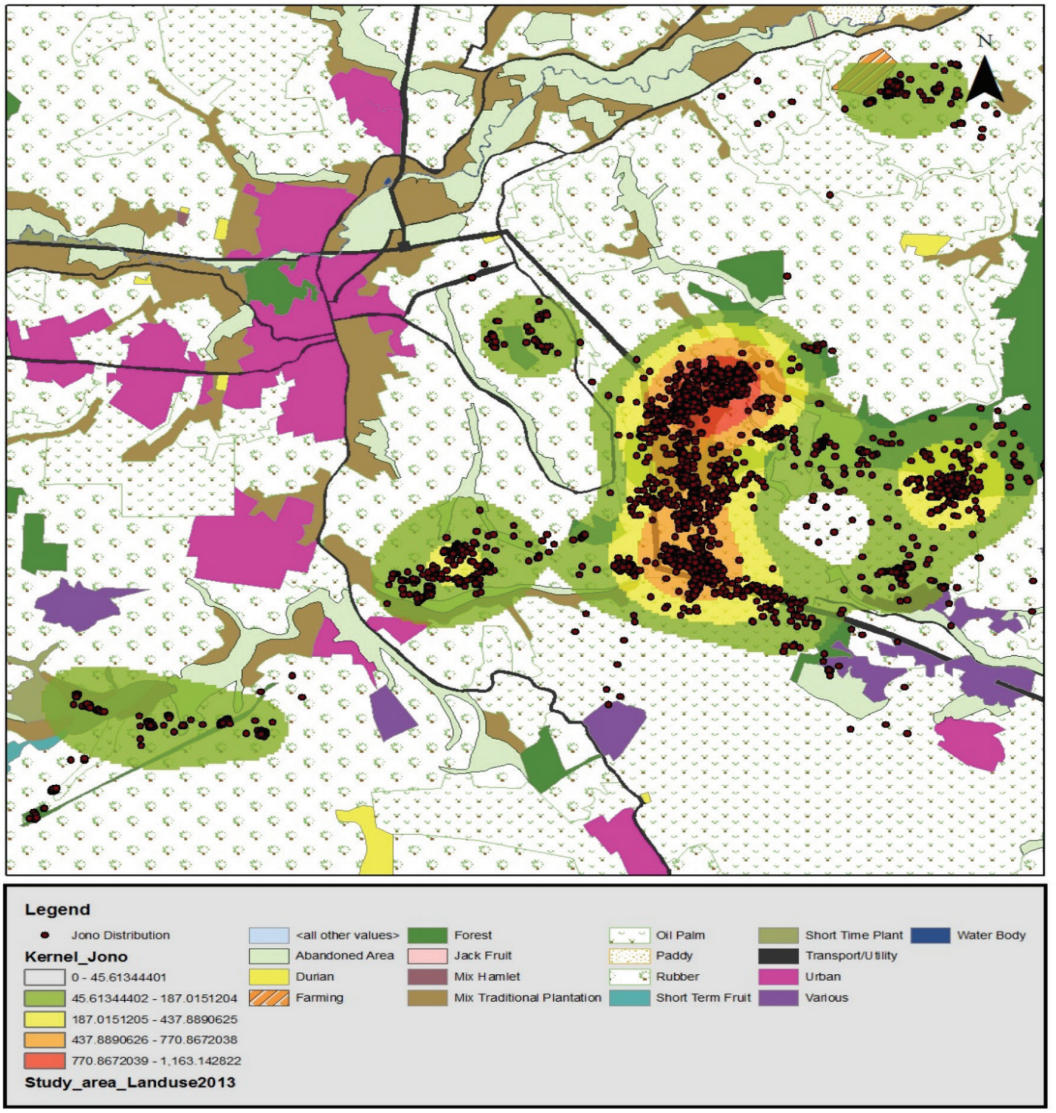

Figure 2: Landuse map with location of tapir

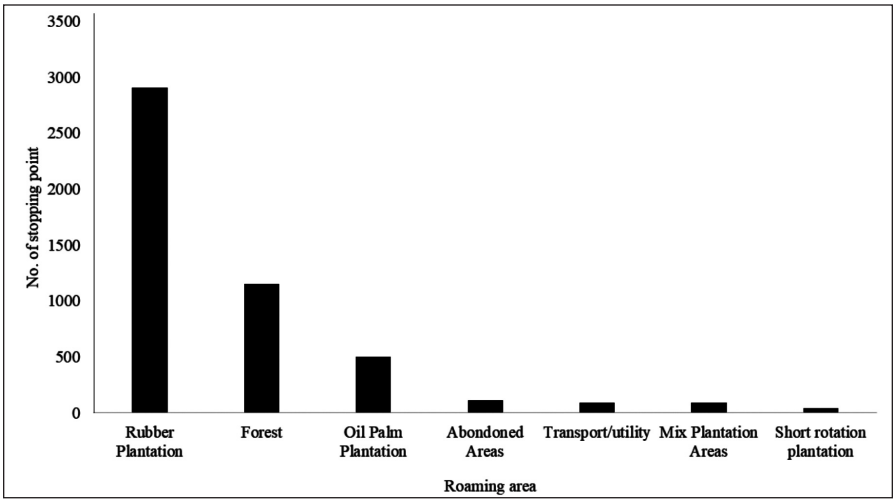

Figure 3: Distribution of area used by the translocated tapir in SIFR

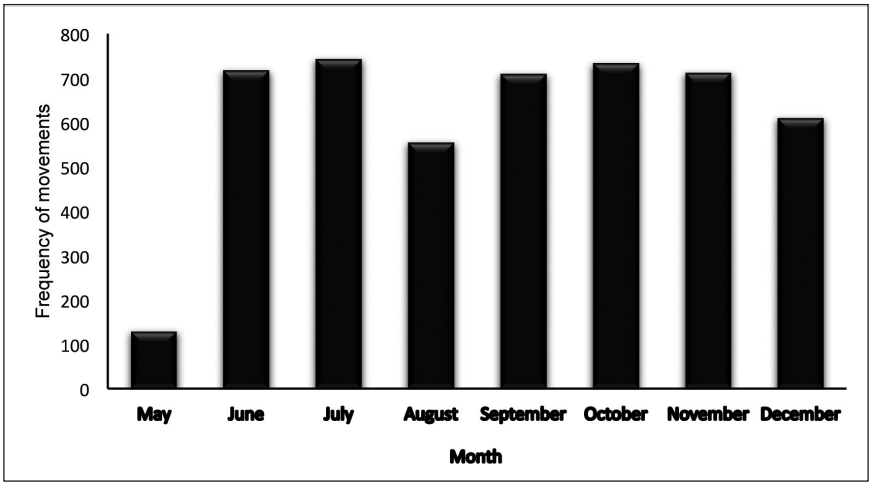

Figure 4: Frequency of movements by the tapir during the translocation period

Conclusion

This pilot study of habitat utilization of an adult Malayan Tapirobserved for eight months in SIFR, Negeri Sembilan showed that this tapir mainly occupied forest area, rubber plantation and oil palm estates. It is estimated that the observed tapir carried outits diurnal and nocturnal activities in these areas with specific intention for food hunting, browsing and roaming. Based on the result, it can be suggested that a comprehensive study is needed to understand the habitat patterns that can contribute to a wide-ranging management application for Malayan Tapir's conservation in Malaysia.

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