

# **Terrestrial wildlife species recorded by using camera traps in Sugut Forest Reserve**

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## **Summary**

Twenty eight camera traps were set up in Sugut Forest Reserves with the total effort of 2,706 trap-nights. Twenty three species of terrestrial (ground-living) wildlife were recorded by camera-traps which included 19 species of mammals and 4 species of birds. Two endangered species, namely, orang-utan and banteng were recorded. Three species – orang-utan, thick-spined porcupine and Bornean yellow muntjac only endemic to Borneo were recorded too. Clouded Leopard and Malayan sun bear, which were categorized as a totally protected species (Schedule 1) under the Sabah Wildlife Conservation Enactment 1997 were also recorded.

Species with highest abundance was bearded pig followed by sambar deer, lesser mouse-deer and pig-tailed macaque. Based on the species accumulation curve, total of 19 species of mammals were recorded in 132 trap-days. Four camera traps captured highest richness of species: CT22 captured 9 species, while camera traps set up at locations CT3, CT10 and CT17 had captured 7 species wild animals each.

Lowland mixed dipterocarp and kerangas forest harbour the highest richness of species photographed in camera traps with total of 14 species, followed by lowland freshwater swamp forest (12 species), beach forest (9 species), Mangrove forest (5 species) and lowland mixed dipterocarp forest with only 3 species.

## **Introduction**

Following WWF-Malaysia Sabah Terrestrial Conservation Programme's spatial conservation planning exercise, WWF-Malaysia (WWF-MY) identified Sugut Forest Reserve (FR) as a priority conservation area.

Sugut Forest Reserve (Class II) is located within the Beluran and the Paitan Forestry District, separated by the Sugut River. The area of interest is about 8,680 ha, located south of the Sugut River (117.58 – 117.73 E; 6.28 – 6.41 N) (hereafter referred to as Sugut FR). Access to Sugut FR can be made through the IJM Sabang road which connects to Jalan Sapi- Pitas (40km of gravel

road; 1.5 hours driving time), which is about 270km (1.5 hours) from the nearest town, Sandakan. An alternative option is to take a boat from the Beluran township jetty, which will take about 1.5 hours to reach Sungai Timbang in Sugut FR.

The Lower Sugut FR contains endangered forest types such as lowland dipterocarp, lowland kerangas, lowland peat swamp forest, lowland freshwater swamp and mangroves. Orang-utan signs have been reported occurring within Sugut FR. As reported in the Sabah Biodiversity Conservation Project (Identification of Potential Protected Areas; Payne, 1998) one of the most important features of Lower Sugut in relation to biodiversity is the diversity of forest types within a relatively small area. Past surveys have also shown that this area is rich in plant endemics and endangered ecosystems, which warrants Lower Sugut as a significant area for conservation (PAMOL, 1998; Reza, 1998).

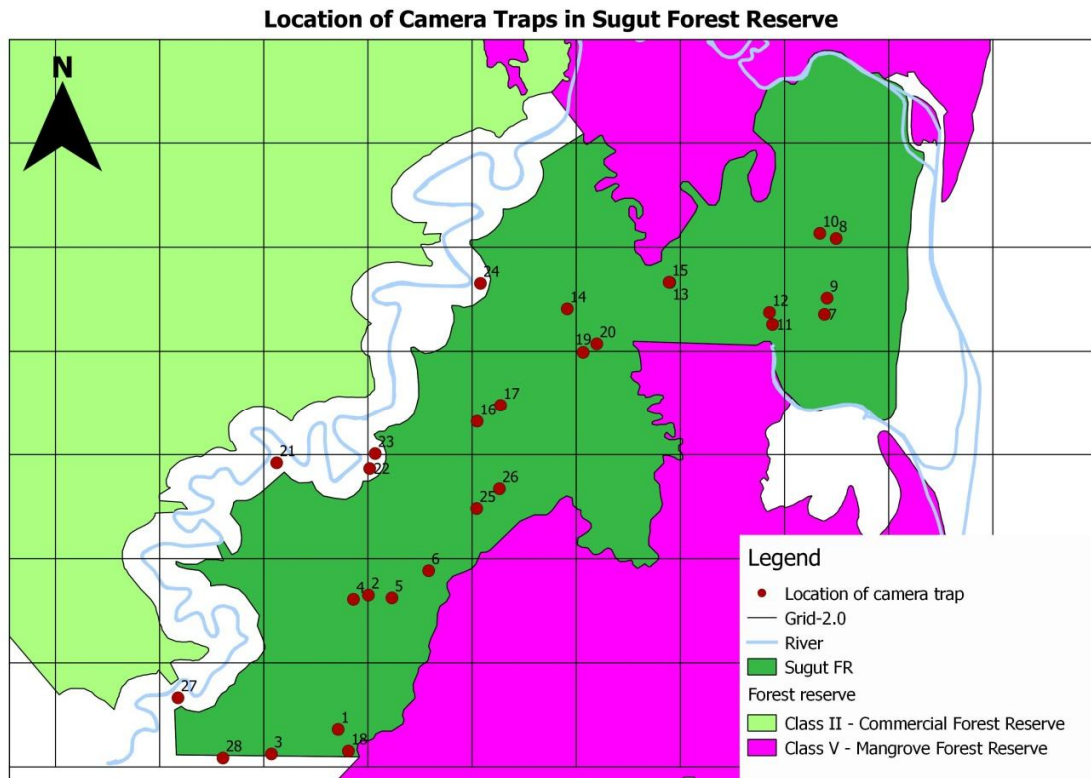
As such, in 2013, WWF-Malaysia approached Sabah Forestry Department to re-classify Sugut as a protection forest. Sabah Forestry Department agreed to the idea and WWF-MY was asked to assist in coming up with a management plan for Sugut FR, which will become a protected forest reserve (Class I). Sugut FR is currently a Class II FR (production forest). Logging started in the 1960s but have ceased in 2005 (Markus Salutan pers. comm). Currently there is no logging activity in Sugut FR.

Much data is needed to write the management plan. To obtain the data needed, several surveys were conducted in Sugut FR, amongst them were orang-utan survey, camera trapping to identify wildlife species found in the FR, fish survey, and river water quality monitoring. These surveys were carried out between April and September 2014. This report provides the results for camera trapping.

## **Method**

The survey was conducted by setting up camera-trap devices in the Class I Forest Reserve. The advantages of using camera-traps for such surveys are the increased probability of capture of nocturnal, rare and elusive species and the fewer disturbances caused to wildlife species.

Twenty-eight units of camera traps (“Reconyx” brands) were set up at the forest reserve and run from May 2014 to September 2014, for a period of 4 months. Location of the camera traps were shown in Figure 1.



**Figure 1** : Locations of camera traps in Sugut Forest Reserve.

## Results

Twenty three species of terrestrial (ground-living) wildlife were recorded by camera-traps which included 19 species of mammals and 4 species of birds (Table 1). Animals were identified using Payne & Francis (2007) and Francis (2007) and taxonomic nomenclatures follow Wilson and Reeder (2005). All the species recorded were classified according to their conservation status found in IUCN Red list of Threatened Species (2014) and Sabah Wildlife Conservation Enactment (1997). Two endangered species, namely, orang-utan and banteng were recorded. Three species – orang-utan, thick-spined porcupine and Bornean yellow muntjac only endemic to Borneo were recorded too. Clouded Leopard and Malayan sun bear, which were categorized as a totally protected species (Schedule 1) under the Sabah Wildlife Conservation Enactment 1997 were also recorded in the survey (Figure 2).

**Table 1:** Ground wildlife species recorded by camera-traps in Sugut Forest Reserve

Common Name	Species Zoological Name	Conservation / Legal Status	
		IUCN	Sabah Wildlife Conservation Enactment 1997
Mammals			
Orang-utan*	<i>Pongo pygmaeus</i>	Endangered	Schedule 1
Banteng	<i>Bos javanicus</i>	Endangered	Schedule 1
Clouded leopard	<i>Neofelis diardi</i>	Vulnerable	Schedule 1
Malayan sun bear	<i>Helarctos malayanus</i>	Vulnerable	Schedule 1
Pig-tailed macaque	<i>Macaca nemestrina</i>	Vulnerable	Schedule 2
Oriental small-clawed otter	<i>Aonyx cinerea</i>	Vulnerable	Schedule 2
Banded palm civet	<i>Hemigalus derbyanus</i>	Vulnerable	Schedule 2
Bearded pig	<i>Sus barbatus</i>	Vulnerable	Schedule 3
Sambar deer	<i>Rusa unicolor</i>	Vulnerable	Schedule 3
Long-tailed macaque	<i>Macaca fascicularis</i>	Least concern	Schedule 2
Short-tailed mongoose	<i>Herpestes brachyurus</i>	Least concern	Schedule 2
Yellow-throated marten	<i>Martes flavigula</i>	Least concern	Schedule 2
Malay badger	<i>Mydaus javanensis</i>	Least concern	Schedule 2
Thick-spined porcupine*	<i>Hystrix crassispinis</i>	Least concern	Schedule 2
Common palm civet	<i>Paradoxurus hermaphroditus</i>	Least concern	Schedule 2
Lesser mouse-deer	<i>Tragulus kanchil</i>	Least concern	Schedule 3
Greater mouse-deer	<i>Tragulus napu</i>	Least concern	Schedule 3
Bornean yellow muntjac*	<i>Muntiacus atherodes</i>	Least concern	Schedule 3
Bornean red muntjac	<i>Muntiacus muntjak</i>	Least concern	Schedule 3
Birds			
Storm's stock	<i>Ciconia stormi</i>	Endangered	Schedule 2
Lesser adjutant	<i>Leptoptilos javanicus</i>	Vulnerable	Schedule 2
Crested fireback	<i>Lophura ignita</i>	Near threatened	Schedule 2
Purple heron	<i>Ardea purpurea</i>	Least concern	Schedule 2

**Notes: Wildlife listed under Wildlife Conservation Enactment 1997**

1. **Schedule 1 – Totally protected species**
2. **Schedule 2 – Protected species**
3. **Schedule 3 – Protected species for which hunting license is required**

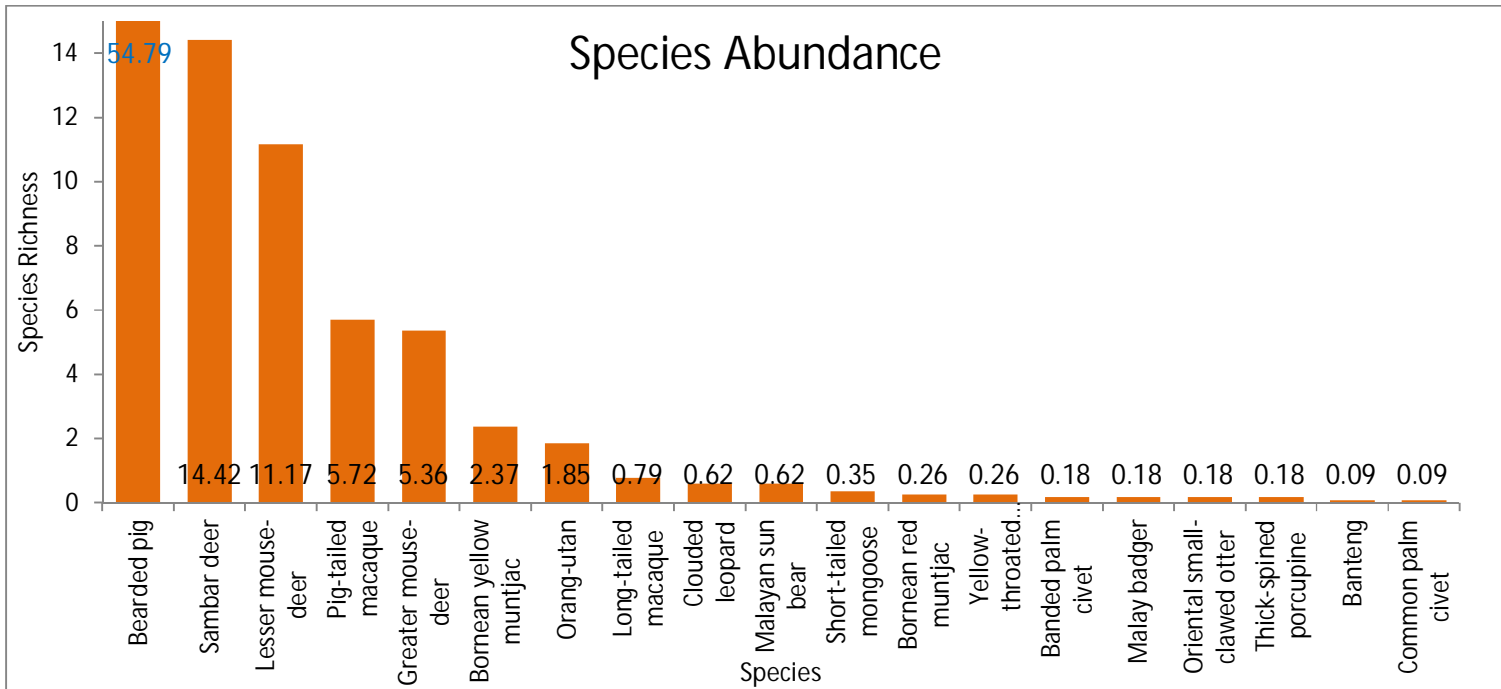
\* is for those endemic to Borneo.

**Locations of Totally Protected Wildlife under Wildlife Conservation Enactment 1997 photographed in Sugut Forest Reserve**

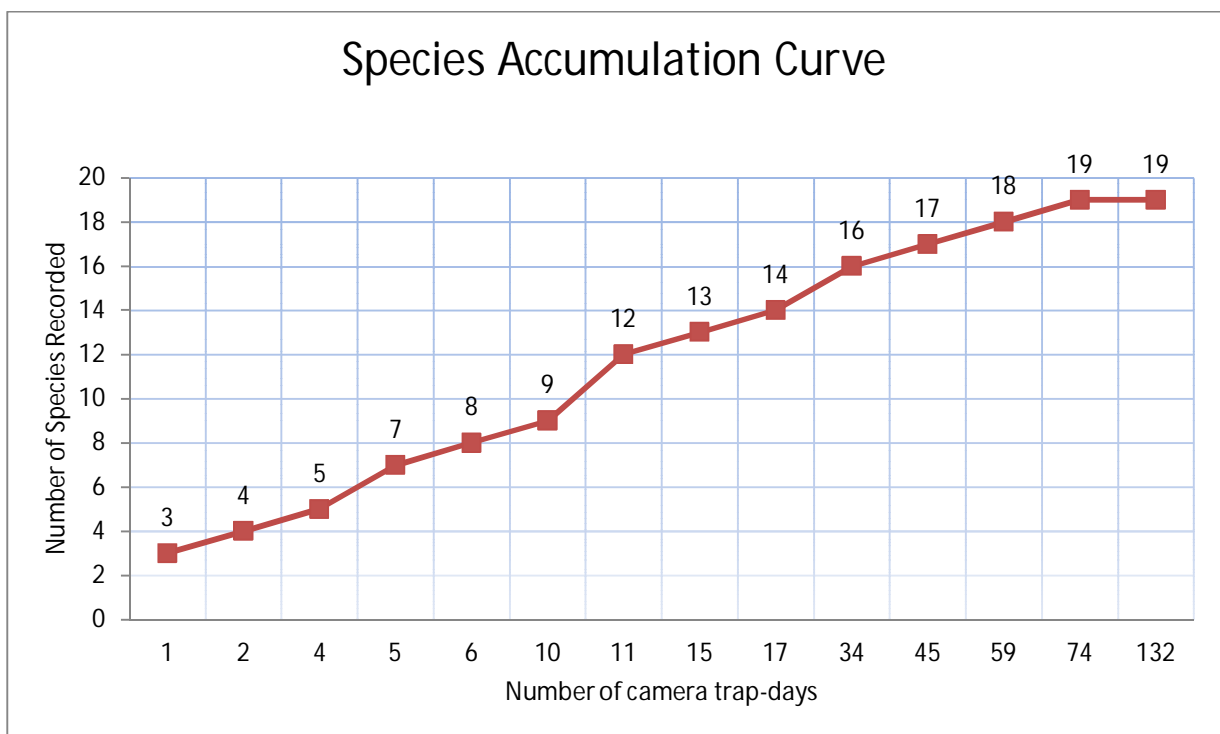


Figure 2 : Locations of totally protected wildlife recorded in camera traps.

Twenty eight camera traps were set up in Sugut Forest Reserves with the total effort of 2,706 trap-nights. Species with highest abundance was bearded pig followed by sambar deer, lesser mouse-deer and pig-tailed macaque (Figure 3). Based on the species accumulation curve (Figure 4 ), total of 19 species of mammals were recorded in 132 trap-days. The curve seems saturated and practically estimates the richness of wildlife in Sugut Forest Reserve. Even a few more species will be recorded over time but it might not be efficient to put on additional efforts in camera-trap-nights.

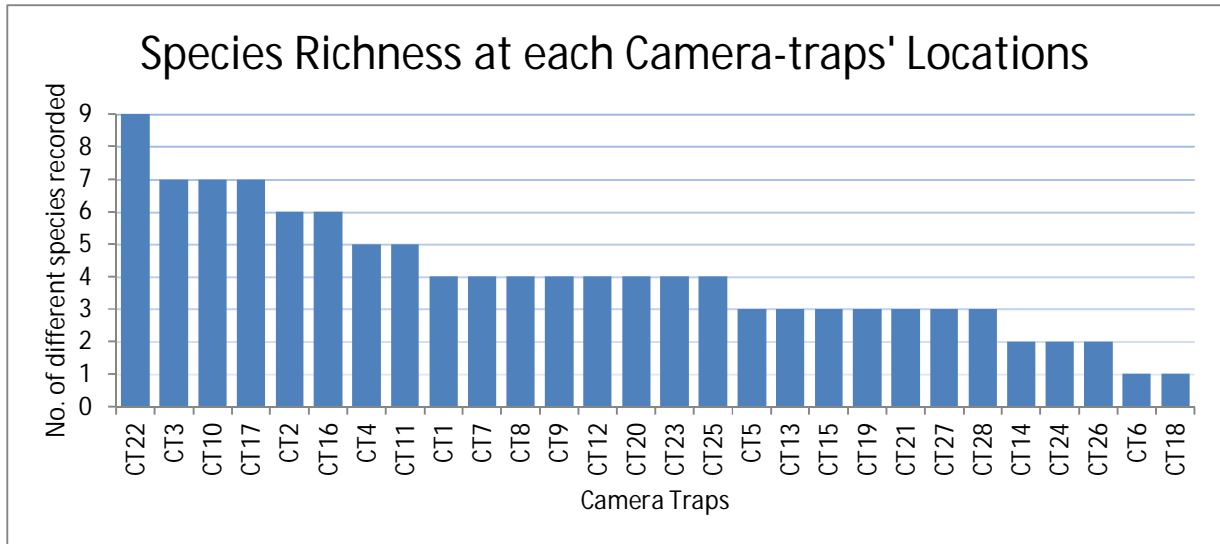


**Figure 3 :** Species abundance recorded in Sugut Forest Reserve



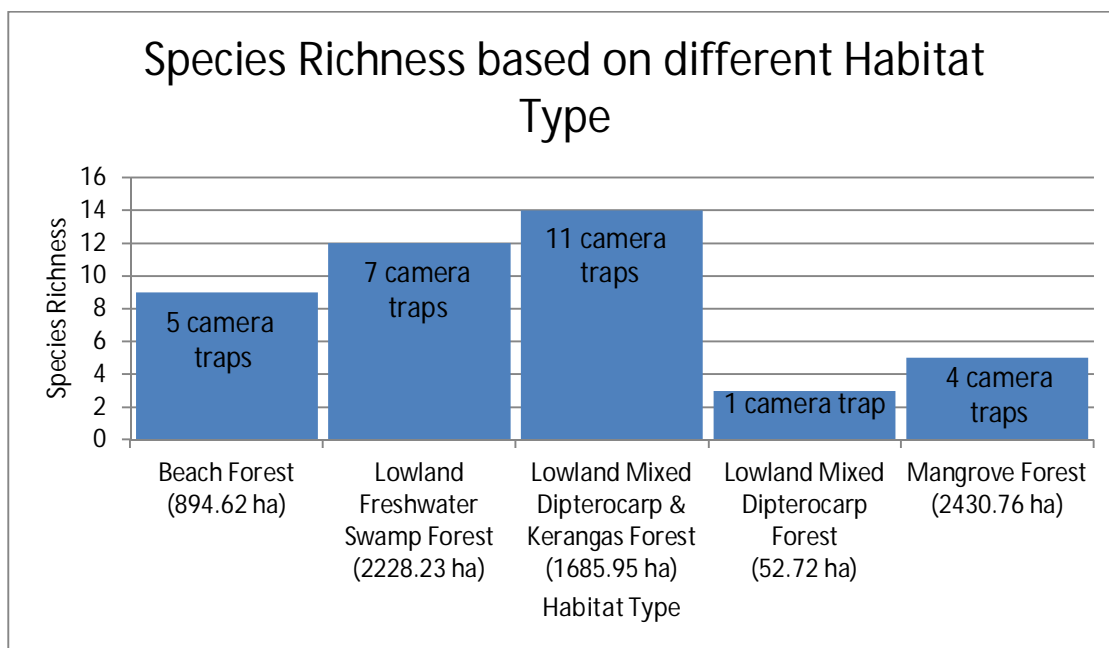
**Figure 4 :** Species accumulative curve

From among 28 camera trap locations, four captured highest richness of species: CT22 captured 9 species, while camera traps set up at locations CT3, CT10 and CT17 had captured 7 species wild animals each (Figure 5).



**Figure 5 :** Species richness recorded in each camera traps' locations.

Lowland mixed dipterocarp and kerangas forest harbour the highest richness of species photographed in camera traps with total of 14 species, followed by lowland freshwater swamp forest (12 species), beach forest (9 species), Mangrove forest (5 species) and lowland mixed dipterocarp forest with only 3 species (Figure 6). There are total 7 types of habitat in Sugut Forest Reserve (Table 2). We only set up our camera traps in 5 different habitat types (Figure 7).



**Figure 6 :** Species richness based on different habitat types.

**Table 2 :** Habitat types in Sugut Forest Reserve

Habitat Types	Hectare	Percentage
Beach Forest	894.62	10.73
Lowland Freshwater Swamp Forest	2228.23	26.72
Lowland Mixed Dipterocarp & Kerangas Forest	1685.95	20.21
Lowland Mixed Dipterocarp Forest	52.72	0.63
Lowland Peat Swamp Forest	15.36	0.18
Lowland Seasonal Freshwater Swamp Forest	1033.02	12.39
Mangrove Forest	2430.76	29.14
Total	8340.66	100



Species Richness in each camera trap locations on different types of Habitat in Sugut Forest Reserve

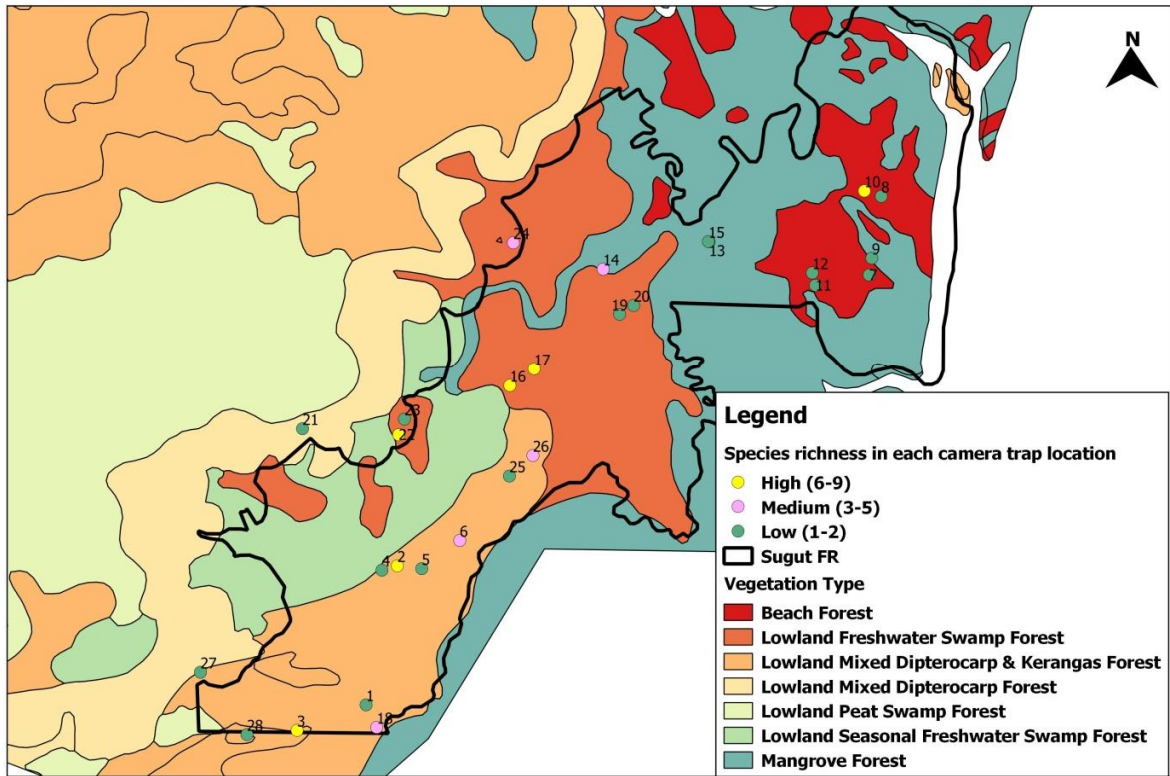


Figure 7 : Species richness in each camera trap's locations on different types of Habitat in Sugut Forest Reserve.

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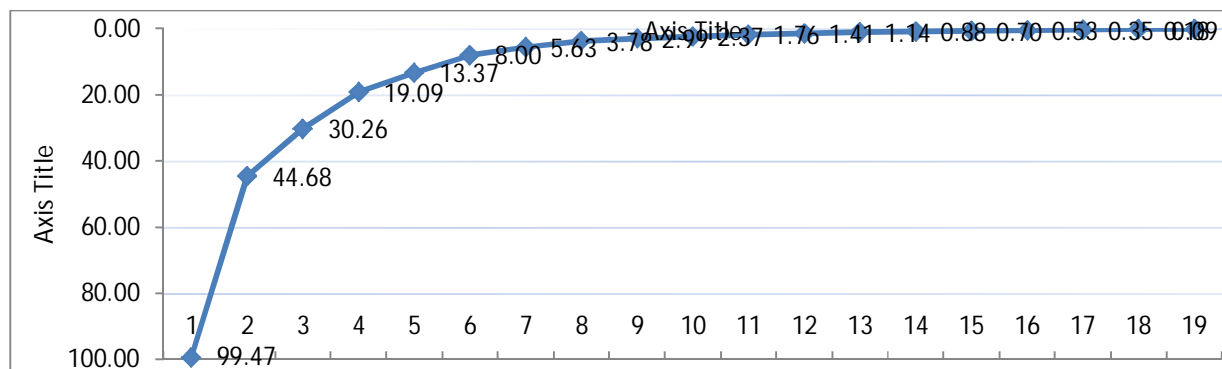
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## Appendix

**Table 2:** Species abundance recorded in Sugut Forest Reserve

Species	Number of independent events	Percentage of independent events
Bearded pig	623	54.79
Sambar deer	164	14.42
Lesser mouse-deer	127	11.17
Pig-tailed macaque	65	5.72
Greater mouse-deer	61	5.36
Bornean yellow muntjac	27	2.37
Orang-utan	21	1.85
Long-tailed macaque	9	0.79
Clouded leopard	7	0.62
Malayan sun bear	7	0.62
Short-tailed mongoose	4	0.35
Bornean red muntjac	3	0.26
Yellow-throated marten	3	0.26
Banded palm civet	2	0.18
Crested fireback	2	0.18
Malay badger	2	0.18
Oriental small-clawed otter	2	0.18
Purple heron	2	0.18
Thick-spined porcupine	2	0.18
Banteng	1	0.09
Common palm civet	1	0.09
Lesser adjutant	1	0.09
Storm's stock	1	0.09
Total	1137	100.00



**Species richness in each camera traps' locations on different habitat types.**

Habitat Types	Camera Trap ID	Species Richness
Beach Forest		
	CT10	7
	CT11	5
	CT7	4
	CT8	4
	CT12	4
Lowland Freshwater Swamp Forest		
	CT22	9
	CT17	7
	CT16	6
	CT23	4
	CT20	4
	CT19	3
	CT24	2
Lowland Mixed Dipterocarp & Kerangas Forest		
	CT3	7
	CT2	6
	CT4	5
	CT25	4
	CT1	4
	CT28	3
	CT5	3
	CT27	3
	CT26	2
	CT6	1
	CT18	1
Lowland Mixed Dipterocarp Forest		
	CT21	3
Mangrove Forest		
	CT9	4
	CT15	3
	CT13	3
	CT14	2

**Table showed that species richness at different habitat types in Sugut Forest Reserve**

Beach Forest	Lowland Freshwater Swamp Forest	Lowland Mixed Dipterocarp & Kerangas Forest	Lowland Mixed Dipterocarp Forest	Mangrove Forest
Bearded Pig	Bearded Pig	Banded Palm Civet	Bearded Pig	Bearded Pig
Common Palm Civet	Lesser Mouse-deer	Bearded Pig	Pig-tailed Macaque	Lesser Mouse-deer
Greater Mouse-deer	Long-tailed Macaque	Bornean Yellow Muntjac	Sambar Deer	Sambar Deer
Lesser Mouse-deer	Pig-tailed Macaque	Clouded Leopard		Orang-utan
Malay Badger	Oriental Small-clawed Otter	Orang-utan		Pig-tailed Macaque
Pig-tailed Macaque	Short-tailed Mongoose	Pig-tailed Macaque		
Sambar Deer	Sambar Deer	Yellow-throated Marten		
Sun Bear	Yellow-throated Marten	Lesser Mouse-deer		
Clouded Leopard	Greater Mouse-deer	Sambar Deer		
	Orang-utan	Thick-spined Porcupine		
	Sun Bear	Short-tailed Mongoose		
	Tembadau	Bornean Red Muntjac		
		Greater Mouse-deer		
		Long-tailed Macaque		



## Photos

