SUMATRAN RHINOCEROS AND WILDLIFE SURVEY EAST OF SEGAMA, DANUM VALLEY, SABAH, MALAYSIA

Mohd-Tajuddin Abdullah; Waidi Sinun; Daria Mathew; Sumbin Gadas;
Henry Bernard; Jerry Gumpil; L. Murray; Barnados Ola

INTRODUCTION

In 1987, it was estimated that about 5 to 8 individuals of Sumatran rhinoceros, including two juvenile, were found in the vicinity of the Danum Valley Field Centre (DVFC) (Ahmad 1987) and later the animals seemed to have disappeared from the area (Payne 1990). In another study, Abd-Hamid (1991) observed two rhinoceros around Palum Tambun area, south of the centre. In 1992, a survey team led by John Sale had found fresh tracks and signs of rhinoceros on the north and south of DVFC (Rabinowitz 1992).

The purpose of this survey which was conducted between 10 to 20 May 1995 was to assess the Sumatran rhinoceros population occurring around DVFC, on the eastern part of Sungai Segama, Sabah.

STUDY AREA

The DVFC study area is located about 85 km west of Lahad Datu. About 50% of the area remains unlogged. The primary rain forest is located on the south; secondary and logged over forest on the north and east of DVFC (Figure 1). Elevation in the area ranges from 170 m at DVFC to 700 m a.s.l on the south. The dissecting effect of the various dendritic stream networks has produced the high relief and undulating features in the study area (Waidi 1991).

METHOD

During the course of the survey in the Danum Valley, east of Sungai Segama, the survey team was based at DVFC. The team comprising of nine individuals was divided into two subteams to survey certain routes (Tables 1 and 2, Figure 1). In the morning, the subteams either walked a looping route or were dropped at certain point, traversed towards DVFC on a compass bearing, along ridges, game trail or marked footpath. Spot lighting were conducted in early morning (c.0400 - 0600 hours) and late evening (c.2000 - 2300 hours) along logging tracks using hand held 100 watt 12 volt lamp. Direct and indirect observations of wildlife were recorded in a standard survey data sheets (Appendix 1). Mammals were identified using Payne *et al* (1985) and birds using Smythies (1981).

RESULTS

The survey team covered an area of 76 km^2 and traversed 164 km survey routes within the 10-day period (Figure 1 and Table 2). A total of 75 man-day were spent in the field throughout the survey.

Sumatran rhinoceros

There was no direct sighting and fresh track of the Sumatran rhinoceros observed in the study area during the survey period. Two sets of old foot tracks were recorded in Palum Tambun area. The tracks measuring 23 cm and 22-23 cm respectively were recorded and tentatively suspected to be that of the Sumatran rhinoceros (Table 3). Old (> 5 years) evidences (e.g. wallows and twisted saplings) of rhino were found in the area.

Other wildlife

In total, the team recorded 20 species of mammals, 16 species of birds and two species of reptiles (Tables 4 and 5). The top five species of mammals with the highest number recorded were red leaf monkey, sambar deer, barking deer, bearded pig and Bornean gibbon (Table 5). The great argus, bushy crested hornbill, pied hornbill, rhinoceros hornbill and black hornbill were the birds species found to be most abundant in the area.

Hunting activity

A spent cartridge was found several meters from the skeletons of a young sambar deer and a wild pig on a logging track north of DVFC. New used cartridge was also reported by Dr Nick Chapell (visiting researcher) near a weather station in the 1989 coupe.

DISCUSSION

Direct sighting as well as other observations including footprints, nest, sound/calls, faeces etc were used as the basis in determining the number of animals. Problems arise particularly in the case of some species such as the mousedeer and orang utan. Some assumptions were made. For example, the presence of an orang utan nest indicates the presence of the animal. Each nest was assumed to be made by a single orang utan except in cases where more than one nest is found close to one another, in which it was assumed that all the nest were built by the same orang utan. In the case of the mousedeer, it was often difficult to distinguish between a lesser and greater mousedeer solely based on footprints. To avoid misleading interpretation of data, both species were categorised in general as mousedeer i.e. *Tragulus* species. When only animal calls were heard e.g. gibbons, argus pheasant etc but the actual animals not sighted, it was assumed that each call represents a single animal. Tracks of the same species of animal when located less than half an hour apart and heading towards the same direction e.g.; on logging trails were regarded to be made by the same single animal.

The Danum Valley area generally supports a diverse animal life. Rabinowitz (1992) had recorded a total of 41 species of mammals as well as 91 species of birds in the area. It was observed that the study area is diverse in avifauna and amphibian but due to lack of experienced ornithologist and herpetologist a number of species were not recorded. Thus the species recorded does not reflect an exhaustive list of animals found in the DVFC area.

In captivity, the measurements of adult rhino track width ranged between 18.5 to 20.9 cm while the middle toe ranging between 7.0 to 8.2 cm (Mohd-Tajuddin *et al* 1990 as cited by Abd-Hamid 1991). In 1991, two sets of rhino tracks were observed around Palum Tambun measuring 18.0 to 20.0 and 17.0 to 20.0 cm while the middle toe measured between 7.0 to 8.0 and 7.0 to 8.0 cm respectively (Table 3).

From this survey, the middle toe width measurements (12.0 to 12.1 cm) of Set 1 were not comparable with that of Abd-Hamid (1991) and Rabinowitz (1992). As for Set 2, the middle toe is comparable to that recorded by Robinowitz (1992) and slightly larger (by 5 mm) to the animal in Palum Tambun observed by Abd-Hamid (1991). Because the tracks found were relatively old, some of the fine details have been lost (eroded/filled up with water, debris, leaf litter etc.). It could be possible that some of the footprints which appeared larger resulted from overlapping tracks. Evidently absent, particularly within the immediate surroundings of the located tracks as well as throughout the entire survey, were supportive evidences such as rhino traditional trail, active wallow, faeces, active feeding site or fresh twisted food saplings. However, the tracks of mother and young elephants were observed to the north and south of DVFC, relatively near to the site where the footprints in question were recorded. Because of the proximity of the sites where both tracks (elephants and rhinoceros) were found, the possibility that the tracks of the two species have overlapped cannot be dismissed.

It is arguable to confirm these as being rhino tracks due to the fact that other supporting evidence were lacking and the presence of elephant tracks nearby. After taking into account all parameters, it cannot be verified with certainty that the tracks found were undoubtedly that of the Sumatran rhino. However, it could be speculated that the Set 1 tracks with 12.1 cm middle toe measurements could be that of an elephant and the Set 2 measurements was a rhinoceros. The old tracks indicated that the animal was in the area several months prior to the survey period and might have emigrated elsewhere in the other survey areas. Therefore it is necessary that a follow-up work in the DVFC area be conducted on a regular basis to confirm the findings and monitor the movement of the individual.

The experience on the rhinoceros in Sungai Dusun, Selangor and selandang in Taman Negara have shown that large mammals emigrate for unknown reasons but possibly due human activities. Disturbances such as the presence of active human activities (e.g. heavy visitation in the rhino habitat) around the centre could have affected the distribution of rhinos in the surrounding habitat.

Hunting activity, if not controlled will definitely jeopardise the long-term rhino conservation efforts in the greater Danum Valley. Regular patrolling or wildlife monitoring could help to

minimise poaching activities in the DVFC area.

RECOMMENDATIONS

1. A well-equipped and trained Wildlife Management Team (Appendix 2) should be established to conduct monthly patrol of the DVFC rhino habitat and to record wildlife data. Staff of the proposed Wildlife Management team should be adequately trained and exposed to the skills in identifying tracks, especially that of the Sumatran rhinoceros and elephant, banteng. The exercise could possibly be conducted at the Sepilok rhino captive breeding centre or with the wildlife management units (e.g. Rhino Unit, Elephant Unit, Seladang Unit etc) of the Department of Wildlife and National Parks (DWNP), Peninsula Malaysia.

2. Regular patrolling of the DVFC area to stop or at least minimise hunting. Areas requiring special attention are Coupe 93, Coupe 88 (Sapat Kalisun Catchment) and Coupe 89.

3. Follow-up surveys in the DVFC area is needed to confirm the presence and population of rhinoceros in this area. This could be a small scale exercise and conducted on a regular basis (refer Appendix 2).

4. In the future, it is also necessary to conduct similar training workshop on tracks identification for team coordinators, leaders and members prior to rhino and wildlife surveys. The training could be done *in situ* with known tracks or plaster casts of various species (rhino, elephant, banteng, deer species, pig, wild cats etc); track forms (single, overlapping & eroded) and age (fresh & old).

5. Casts of various animal footprints e.g. elephant, rhino, samba deer, barking deer, mouse deer, pig and wild cats should be displayed as educational and interpretative materials at the reception centre. This will encourage visitors to the centre to report and document their sightings of these footprints. In addition, this will contribute to further enhancing the understanding of faunal population in the area amongst visitors, particularly around the DVFC.

6. For future surveys, each survey team should be provided with an original and up-to-date topographical map of 1:50000 scale, altimeter and GPS for accurate recording of observation sites.

7. More local and foreign rhino experts could be invited for future surveys to impart their field experience and knowledge such as Dr Nico van Strien (Sumatran rhino; plaster cast track identification) and Dr Andrew Laurie (Indian rhino; photographic record and identification). DWNP's Rhino Management Unit could also be invited to share their

valuable knowledge with other field workers.

ACKNOWLEDGEMENTS

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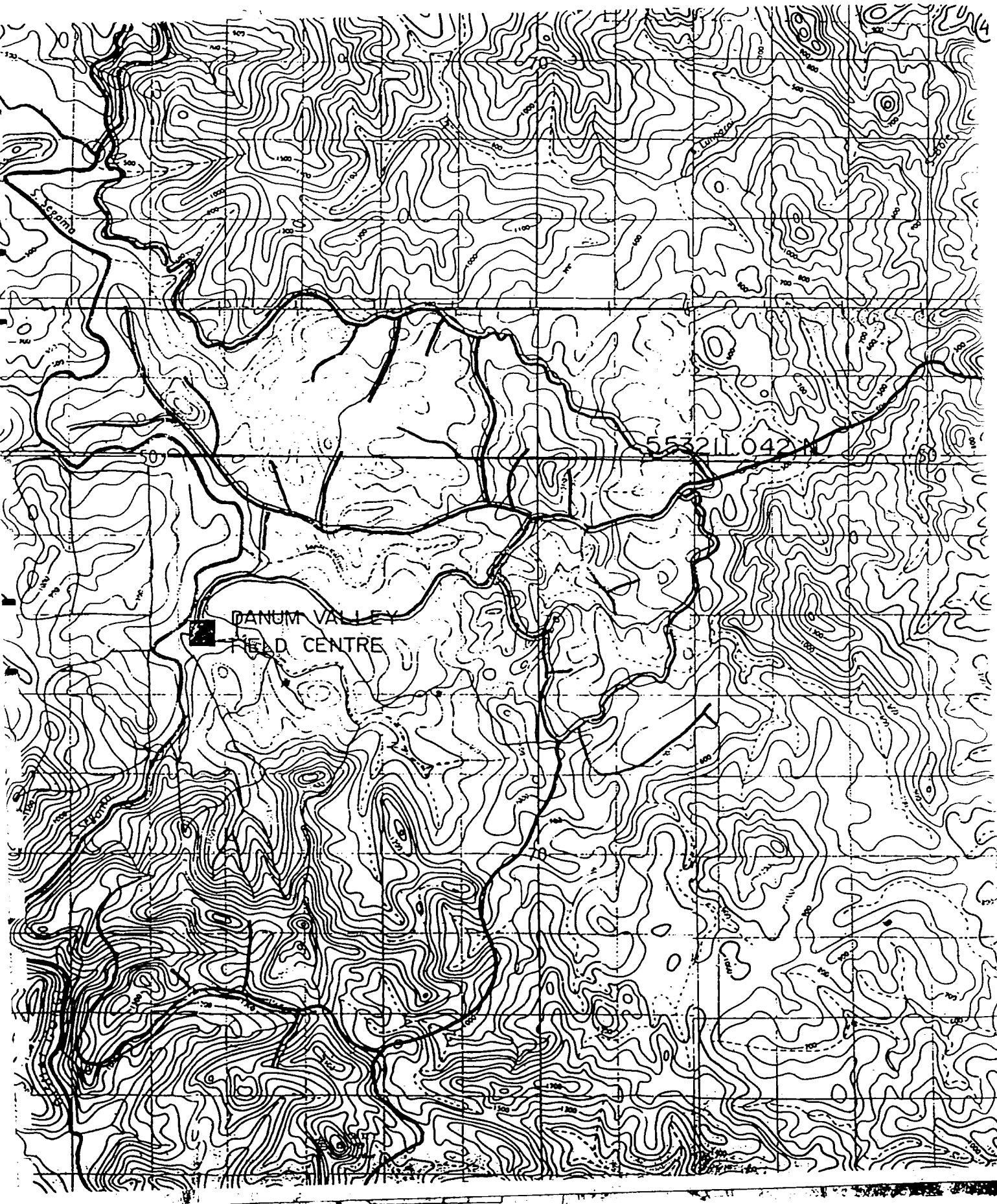
Table 1. Members of the survey Team 7

Name	Organisation
Mohd-Tajuddin Abdullah (MTA)	Coordinator Universiti Malaysia Sarawak; Member of the IUCN/SSC Asian Rhino Specialist Group
Sumbin Gadas (SG)	Team Leader Sabah Wildlife Department
Waidi Sinun (WS)	Yayasan Sabah
Syaaruddin Mohd (SM)	Yayasan Sabah
Henry Bernard (HB)	Sabah Wildlife Department
Jerry Gumpil (JG)	Sabah Wildlife Department
Daria Mathew (DM)	World Wide Fund for Nature Malaysia
Mike Barnados (MB)	Royal Society, UK
L. Murray (LM)	Volunteer & photographer

Table 2. Itinerary, area and estimated distance coverage of the rhino and wildlife survey

Date	Team, members & area coverage	Estimated Distance (km)
9 May 1995	Survey briefing at DVFC	
10 May 1995	Team 7a, MTA, SM, HB, MB, LM: DVFC-upper Rhino Ridge trail Team 7b, SG, WS, JG: DVFC-lower Rhino Ridge trail	10 7
11 May 1995	Team 7a, MTA, SM, HB, MB, LM: DVFC-N0W5 Team 7b, SG, WS, JG: Dismal Gorge	5 13
12 May 1995	Team 7a, MTA, SM, HB, MB, LM: Upper Palum Tambun-overnight camp (south-east) Team 7b, SG, WS, JG: Lower Palum Tambun (north-east)	10 8
13 May 1995	Team 7a, MTA, SM, HB, MB, LM: Camp site-Palum Tambun Team 7b, SG, WS, JG, DM: East part of DVFC-logging road (Coupe 88/FACE)	2.5 4
14 May 1995	Team 7a, MTA, WS, SM, HB: DVFC-waterfall-Sungai Tambling loop Team 7b, SG, JG, DM: DVFC-Lower Sungai Palum Tambun loop	3.5 3.5
15 May 1995	Team 7a, MTA, WS, HB, MB, LM: Logged over forest, north of DVFC (Sapat Kalisum catchment); east-west route Team 7b, SG, SM, JG, DM: Logged over forest, north of DVFC; north -south route	8 3.5
16 May 1995	MTA, SG, WS, SM, HB, JG, DM, LM, Route 1 at 0400 hr: DVFC-KM 57-BRL MTA, SG, WS, HB, SM, JG, DM, Route 2 at 2000 hr: Coupe 93 old logging road	25 23
17 May 1995	Team 7a: Elephant ridge Team 7b: Sapat Kalisum catchment	10 3.5
18 May 1995	MTA, SG, HB, SM, JG, DM: Retracking the Palum Tambun loop	6.5
19 May 1995	MTA, SG, WS, SM, JG: Coupe 93 old logging road to Sungai Beruang Compiling of survey data	18
20 May 1995	Drafting survey report	
21 May 1995	Presentation of survey results Farewell party	

Figure 1. Study area and survey routes around DVFC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DANUM VALLEY
FIELD CENTRE

Table 3. Measurement of foot tracks

Track set	Set 1	Set 2
Area	Upper Palum Tambun	Lower Palum Tambun
Middle toe width (cm)	12.0; 12.1; 12.1; 12.1	8.0; 8.5; 8.0
Track widest width (cm)	23.5; 24.0; 23.5; 24.0	22.0; 23.0; 23.0
Track age	2 to 3 weeks	2 to 3 months
Track ID	Middle toe measurements too large for rhino and not comparable with the standard (Table 6). Tracks could be that of an elephant.	Middle toe measurements comparable to the data by Abd-Hamid and Rabinowitz. However, the animal will not be counted as an observation for Palum Tambun due to the old track age and high possibility that the rhino had moved into other areas.

Table 4. List of animals recorded around DVFC study area between 10 - 19 May 1995 by survey Team 7

(1)	Order	: PRIMATES		
	Family	: Cercopithecidae		
		1.	Red Leaf Monkey	*Presbytis rubicunda*
		2.	Long-tailed macaque	*Macaca fascicularis*
		3.	Pig-tailed macaque	*Macaca nemesterina*
	Family	: Hylobatidae		
		4.	Bornean gibbon	*Hylobates muelleri*
	Family	: Pongidae		
		5.	Orang-Utan	*Pongo pygmaeus*
(2)	Order:	: RODENTIA		
	Family	: Sciuridae		
		1.	Giant squirrel	*Ratufa affinis*
		2.	Prevost's squirrel	*Callosciurus prevostii*
(3)	Order	: CARNIVORA		
	Family	: Ursidae		
		1.	Sun bear	*Helarctos malayanus*
	Family	: Mustelidae		
		2.	Yellow throated marten	*Martes flavigula*
		3.	Oriental small clawed otter	*Aonyx cinerea*
		4.	Malay badger	Mydaus javanensis
	Family	: Viverridae		
		4.	Malay civet	*Vierra tangalunga*
		5.	Common palm civet	*Paradoxurus hermaphroditus*
		6.	Bearcat	*Arctictis binturong*
		7.	Mongoose	Herpestes sp.
	Family	: Felidae		
		7.	Clouded leopard	*Neofelis nebulosa*
		8.	Marbled cat	*Felis marmorata*
(4)	Order	: PROBOSCIDEA		
	Family	: Elephantidae		
		1.	Asian elephant	*Elephas maximus*
(5)	Order	: PERISSODACTYLA		
	Family	: Rhinocerotidae		
		1.	Sumatran rhino	*Dicerorhinus sumatrensis*
(6)	Order	: ARTIODACTYLA		

	Family	: Suidae		
		1.	Bearded pig	*Sus barbatus*
	Family	: Tragulidae		
		2.	Lesser mousedeer	*Tragulus javanicus*
		3.	Greater mousedeer	*Tragulus napu*
	Family	: Cervidae		
		4.	Barking deer	*Muntiacus muntjak*
		5.	Sambar deer	*Cervus unicolor*
(7)	Order	: FALCONNIFORMES		
	Family	: Accipitridae		
		1.	Crested serpent eagle	*Spilornis cheela*
(8)	Order	: GALLIFORMES		
	Family	: Phasianidae		
		1.	Great argus pheasant	*Argusianus argus*
		2.	Crestless fireback	*Lophura erythrophalma*
		3.	Crested fireback	*Lophura ignita*
(9)	Order	: COLUMBIFORMES		
	Family	: Columbidae		
		1.	Emerald dove	*Chalcophaps indica indica*
(10)	Order	: CUCULIFORMES		
	Family	: Cuculidae		
		1.	Common (greater) coucal	*Centropus sinensis*
(11)	Order	: STRIGIFORMES		
	Family	: Strigidae		
		1.	Buffy fish owl	*Ketupa ketupu*
(12)	Order	: CAPRIMULGIFORMES		
	Family	: Caprimulgidae		
		1.	Nightjar (?)	*Caprimulgus sp*
(13)	Order	: CORACIIFORMES		
	Family	: Bucerotidae		
		1.	Bushy-crested hornbill	*Anorrhinus galeritus*
		2.	Black hornbill	*Anthracoceros malayanus*
		3.	Pied hornbill	*Anthrococeros coronatus convexus*
		4.	Rhinoceros hornbill	*Buceros rhinoceros borneonsis*
		5.	Helmeted hornbill	*Rhinoplax vigil*
(14)	Order	: PICIFORMES		

	Family	: Picidae		
		1.	Grey-capped woodpeckers	*Picoides canicapillus*
(15)	Order	: PASSERIFORMES		
	Family	: Pittidae		
		1.	Pitta (?)	*Pitta sp*
	Family	: Muscicapidae		
		2.	Asian paradise flycatcher	*Terpsiphone paradisi*
	Family	: Dicruridae		
		1.	Bronzed drongo	*Dicrurus aeneus*
(16)		REPTILES		
	Family	: Varanidae		
		1.	Common monitor lizard	*Varanus salvator*
(17)				
		2.	Snake - cobra (?)	*Najah* sp (?)

Table 5. Estimated number of animal recorded in the study area

Location / Species	Rhino Ridge	Dismal Gorge	Elephant Ridge	Palum Tambun	Coupe 88	Tambiling	Sapat Kalisun	DVFC-BRL road	Coupe 93	Total
MAMMAL										
1. Red Leaf Monkey	5	4	0	15	0	4	2	0	0	30
2. Long-tailed Macaque	3	0	0	0	0	0	0	0	0	3
3. Pig-tailed Macaque	3	0	0	0	0	0	0	0	0	3
4. Bornean Gibbon	2	0	10	1	0	0	0	0	0	13
5. Orang utan	1	3	2	1	0	1	1	0	0	9
6. Giant squirrel	0	0	1	0	0	0	0	0	0	1
7. Prevost's squirrel	2	0	0	0	0	0	0	0	0	2
8. Sun bear	0	1	1	0	0	0	0	0	0	2
9. Yellow-throated marten	0	1	0	0	0	0	1	0	0	1
10. Oriental small-clawed Otter	0	0	0	2	0	0	0	0	0	2
11. Mongoose sp.	1	0	0	0	0	0	0	0	0	1
12. Malay Badger	1	0	0	0	0	0	0	0	0	1
13. Malay civet	0	0	0	0	0	0	0	2	2	4
14. Common palm civet	1	0	0	0	0	0	0	2	0	3

15. Bearcat	4	0	0	0	0	0	0	0	0	4
16. Clouded leopard	0	0	0	0	0	0	1	0	0	1
17. Marbled cat	0	0	0	0	0	0	1	0	1	2
18. Asian elephant	1	1	3	1	0	0	0	0	0	6
19. Sumatran rhinoceros	0	0	0	1 (?)	0	0	0	0	0	1(?)
20. Bearded pig	6	0	0	2	3	0	4	0	1	16
21. Mouse-deer spp.	1	0	2	1	1	0	4	0	0	9
22. Barking deer	3	2	1	2	2	1	5	1	0	17
23. Sambar deer	4	4	1	1	2	0	5	2	2	21
BIRD										
24. Crested serpent eagle	0	0	0	0	0	0	1	0	0	1
25. Great argus pheasant	2	0	4	2	1	0	2	0	0	11
26. Crestless Fireback	2	0	0	0	0	0	0	0	0	2
27. Crested Fireback	0	0	1	0	0	0	0	0	0	1
28. Emerald dove	4	0	0	0	0	0	0	0	0	4
29. Greater coucal	0	0	0	0	0	0	1	0	0	1
30. Buffy fish owl	2	0	0	0	0	0	1	0	0	3
31. Nightjar sp.	0	0	0	0	0	0	0	1	0	1
32. Bushy-crested hornbill	10	0	0	0	0	0	0	0	0	10
33. Black hornbill	4	0	0	1	0	0	0	0	0	5

34. Pied hornbill	1	0	0	0	0	0	8	0	0	9
35. Rhinoceros hornbill	2	1	1	0	0	1	0	2	0	7
36. Helmeted hornbill	0	1	0	0	0	1	0	0	0	2
37. Grey-capped woodpecker	0	1	0	0	0	0	0	0	0	1
39. Pitta sp.	0	0	1	0	0	0	0	0	0	1
40. Asian paradise flycatcher	0	0	0	0	0	0	1	0	0	1
41. Bronzed drongo	0	5	0	0	0	0	0	0	0	5
REPTILE										
42. Common monitor lizard	0	0	0	0	0	0	1	0	0	1
43. Cobra sp.	0	0	0	1	0	0	0	0	0	1

Table 6. Comparative rhino track measurements observed by Abd-Hamid (1991), Robinowitz (1992) and Mohd-Tajuddin *et al* (1990 as cited in Abd-Hamid 1991)

Author	Abd-Hamid		Robinowitz		Mohd-Tajuddin	
Track set	Set 1	Set 2	Set 1	Set 2	Subadult	Adult
Study area	Palum Tambun, DVFC	Palum Tambun, DVFC	East Trail, DVFC	Segama, left bank, DVFC	Zoo Melaka, captivity	Zoo Melaka, captivity
Middle toe width (cm)	7.0; 8.0; 7.5; 7.5	7.5; 7.0; 7.5; 7.5; 7.5; 7.5; 7.5; 8.0	8.5	7.0	6.6 - 7.1	7.0 - 8.2
Track widest width (cm)	18.0; 20.0; 20.0; 19.5; 19.5; 20.0; 19.5; 19.0; 18.0; 20.0	19.0; 19.0; 19.5; 19.0; 19.0; 17.5; 19.5; 19.0; 19.5; 20.0	nil	29.0	19.0 - 20.7	19.5 - 20.9

APPENDIX 1: WILDLIFE DATA SHEET

GENERAL WILDLIFE DATA SHEET

OBSERVER(S): Sumpio, Wamoi & Jerry TEAM: 7 DATE: 10-5-95

WEATHER: ☼ TIME START: 8.00 AM TIME FINISH: 4.00 pm FOREST TYPE: Primary

LOCATION: DVFC

SPECIES	TIME	NUMBER	SIGN[1]	LOCATION/DIRECTION[2]	HABITAT[3]	MEASUREMENTS[4]	BEHAVIOR	REMARKS[5]
Rusa	9.30	1	Footprints	Slope S	Primary forest			
Elephant	9.36	1	"	" S	Primary forest			Footprints on the tr...
Rusa	11.00	1	"	Slope SW	Primary forest			
Wild Pig	11.10	?	"	hill slope SW	"			
Wild pig	11.15	?	Rub on tree	hill slope ~~SW~~	"			
Buffy Fish Owl	11.20	2	Seen ~~[illegible]~~					
Wild pig	11.22	1-2	Footprints	River bank				
Elephant	11.25	1	"	hill slope/W				
Red leaf Monkey	11.30	?	seen					
Long Tailed Macaque	3.00	2	Foot prints	River banks				

[1] 1=Visual;2=Vocalization;3=Feces;4=Scrapes;5=Den/Nest (Specify);6=Claw marks;7=Other(Specify)

[2] Location:R=ridgetop;V=valley;S=along slope/ Direction: North, South, West, East/ Elevation

[3] Examples: Salt lick, riverine forest, rock outcrop, open grassy area, scrubby second growth.

[4] Examples: Fecal length and diameters, scrape length, distance to sightings

[5] If more space is needed, go to back of page.

GENERAL WILDLIFE DATA SHEET

OBSERVER(S): Tajuddin Louise Murry; Bernadus TRAN: 7 DATE: 10 May 95

WEATHER: Sunny & dry TIME START: 0815 TIME FINISH: 1915 FOREST TYPE: LDF

LOCATION: _____

SPECIES	TIME	NUMBER	SIGN[1]	LOCATION/DIRECTION[2]	HABITAT[3]	MEASUREMENTS[4]	BEHAVIOR	REMARKS[5]
Wild pig	10:15	5	new track	X along slope	NE		Nesting, Wallowing Wetting	Game Trail
Deer (sambar)		2	new track	along slope	NE	baby; ind	Walking	Game trai
Elephant		1	old track	along slope	NE	Back feet 17.5 x 23 cm	Feed	
Elephant		1	old track	along slope	NE	24.5 x 35 cm	Defecation	Game tra
Elephant		1	old track	along slope	NE	mother: front	Feeding + defecation	Game tr
						Too old to be measured	"	"
Civet (?)		1	shit	ridge top	SW		Defecation	Rhino ridge trail
(Elephant)		2	new track				Walking Defecation	baby- mother
Walking deer	2:00	1	new shit	ridge top	SW		Defecation	♂
Barking deer	2:30	1	track	ridge one	SW		Walking	Saddle
Deer		1	track	saddle	SW	3 x 8 cm	Walking	
Herpestes ?		1	track	saddle	SW	length 5cm	walking	Louis took photos
	Huyam	4:00 pm	Rhino range					
	Kueng Raya	4:55 pm	Feather	along slope	E (X3)		UNK	
Rhino hornbill		6:15 pm	Vocalisation		NE (X4)	—	Vocalisation	—
Barking deer		6:30 pm	Vocalisation		NE (X4	—	Vocalisation	—
River		7:00 pm						
DVRC		7:15 pm						
		7:30 pm	Coke/Anchor time					
Gibbon		6:00 am	2 Vocalisation	DVRC				
Rhino hornbill		6:30 am	1 Sighted	DVC			Flying	
Civet? (?)		8.30 am	1 shit	Bridge			Defecation	

SELAMAT HARI RAYA AIDIL ADHA KPD WARGA DVC

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[1] 1=Visual; 2=Vocalization; 3=Feces; 4=Scrapes; 5=Den/Nest (Specify); 6=Claw marks; 7=Other (Specify)

[2] Location: R=ridgetop; V=valley; S=along slope/ Direction: North, South, West, East/ Elevation

[3] Examples: Salt lick, riverine forest, rock outcrop, open grassy area, scrubby second growth.

[4] Examples: Fecal length and diameters, scrape length, distance to sightings

[5] If more space is needed, go to back of page.

GENERAL WILDLIFE DATA SHEET

OBSERVER(S): HENRY BERNARD TEAM: 7 DATE: 10/05/1995

WEATHER: Sunny TIME START: 9.00am TIME FINISH: 7.30pm FOREST TYPE: [illegible] forest

LOCATION: Rhino Ridge

SPECIES	TIME	NUMBER	SIGN[1]	LOCATION/DIRECTION[2]		HABITAT[3]	MEASUREMENTS[4]	BEHAVIOR	REMARKS[5]
B. Deer	1.25pm	-	2	S	S/W		-	-	-
Pied Hornbill	2.00pm	1	1	R	S		100 m distance	Flying	-
Teledu	3.00pm	-	odour	S	-	-	-	-	-
Mousedeer	5.00pm	1	1	S	S	-	1 m distance	Running	-
Great Argus	1.00pm	-	feather	-	Sw	-	-	-	-
R/L monkey	?	>4	/	steep slope	Sw	-	?	resting	-

11/05/1995 am sunny / pm rain 8.25am - 2.30pm. { [illegible] }

SPECIES	TIME	NUMBER	SIGN[1]	LOCATION/DIRECTION[2]		HABITAT[3]	MEASUREMENTS[4]	BEHAVIOR	REMARKS[5]
Larger mdeer	8.35am	1	1	S	N	-	1 m distance	running	-
Gibbon	8.35am	-	2	S	N	-	8 m	feeding	-
Lesser mdeer	9.00am	1	1	S	N				-
Elephant dung	-		probably more than one month old	S	N	-	-	-	-
Partridge species not known crested [illegible]	9.00 am		1	S	N	-	-	-	-
Great Argus	10.00 am	-	feather		W	-	-	-	-
Sun Bear	12.55 am	-	claw marks on a tree		S	-	marks above 2 m from the ground	-	probably made in 1994
Sun Bear	1.00pm	-	"a (different tree)		S	-	-do-	-	-do-
Orang utan	1.15 pm		nest	S	S	-	-	-	newly made - probably 1 month ago.

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[2] Location:R=ridgetop;V=valley;S=along slope/ Direction: North, South, West, East/ Elevation

[3] Examples: Salt lick, riverine forest, rock outcrop, open grassy area, scrubby second growth.

[4] Examples: Fecal length and diameters, scrape length, distance to sightings

[5] If more space is needed, go to back of page.

11/5/95

GENERAL WILDLIFE DATA SHEET

OBSERVER(S): _____ TEAM: _____ DATE: _____

WEATHER: _____ TIME START: _____ TIME FINISH: _____ FOREST TYPE: _____

LOCATION: _____

SPECIES	TIME	NUMBER	SIGN[1]	LOCATION/DIRECTION[2]	HABITAT[3]	MEASUREMENTS[4]	BEHAVIOR	REMARKS[5]
Otter	10:24	1	Nest					
Bronze Orange	11:00	5	Seen					
Otter	11:05	3	Nest					About 2-3 weeks old.
Otter	11:30	1	Seen (*)	On the road/NE	Logged Forest		Walking on the road.	About 5-6 yrs. old.
Otter	11:55	1	Nest					
Malayan Sun Bear	2:45	1	Seen	Hill slope/S	Primary Forest		Fled nearby after encountered us.	About 2-3 yrs old.
Otter	6:00	1	Seen	River bank			Jump to the river.	

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[2]Location:R=ridgetop;V=valley;S=along slope/ Direction: North, South, West, East/ Elevation

[3]Examples: Salt lick, riverine forest, rock outcrop, open grassy area, scrubby second growth.

[4]Examples: Fecal length and diameters, scrape length, distance to sightings

[5]If more space is needed, go to back of page.

GENERAL WILDLIFE DATA SHEET

OBSERVER(S): Gumbin, Iwaidi, Jerry TEAM: I DATE: 11-5-95

WEATHER: Sunny (a.m.) Raining (p.m.) TIME START: 9.00 TIME FINISH: 6.30 FOREST TYPE: [illegible]

LOCATION: Old Logging Road to [illegible] Gorge, SG. Selama

SPECIES	TIME	NUMBER	SIGN[1]	LOCATION/DIRECTION[2]	HABITAT[3]	MEASUREMENTS[4]	BEHAVIOR	REMARKS[5]
S Deer	9.30	2	Foot print	On the road S/O	Second growth	L=8cm, W=6cm		Walking in old logging road.
Elephant	9.40	?	D	On the road ?				D... [illegible] month old
Barking Deer	9.45	1	Footprint	On the side of road N/O				Fresh [illegible]
Sambar Deer	9.47	2	Foot print	On the road NW				Two different size footprint
Civet	9.50	1	Feces	?		Feces 9cm long and 1cm in diameter		
Rhinoceros H/bill	9.55	1	Vocalization	? ?				
Helmeted H/bill	9.56	1	Seen	NW			Flying	
Grey capped W/pecker	9.57	1	Seen					
O/utan	10.10	1	Nest		Primary forest			About 3 weeks old. At the right side of the road
Red Leaf Monkey	10.15	4	Seen	On the tree/S/O	Second growth		Jumping from tree to the ground. Seen 70 m from the [illegible]	
Barking Deer	10.30	1	Footprint	On the road/W				
O/utan	10.35	2	Nest	About 20m from the ground.	Logged forest			Close to each other
O/utan	10.38	1	Nest		Logged forest			
O/utan	10.45	1	Nest					About 2 weeks old.
O/utan	10.50	4	Nest	About 25m high from ground				Close to each other

[1]1=Visual;2=Vocalization;3=Feces;4=Scrapes;5=Den/Nest (Specify);6=Claw marks;7=Other(Specify

[2]Location:R=ridgetop;V=valley;S=along slope/ Direction: North, South, West, East/ Elevation

[3]Examples: Salt lick, riverine forest, rock outcrop, open grassy area, scrubby second growth.

[4]Examples: Fecal length and diameters, scrape length, distance to sightings

[5]If more space is needed, go to back of page.

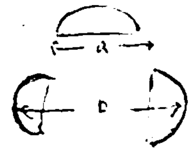
GENERAL WILDLIFE DATA SHEET

OBSERVER(S): Wahdi S. Sumbung G., Jerry G. TEAM: 7 DATE: 12-5-95

WEATHER: Mendung/Hujan TIME START: 9.00 am TIME FINISH: 4.00 pm FOREST TYPE: 1° forest

LOCATION: Antara jalan raya ke CVFC dan sungai Palum Tambun.

SPECIES	TIME	NUMBER	SIGN[1]	LOCATION/DIRECTION[2]	HABITAT[3]	MEASUREMENTS[4]	BEHAVIOR	REMARKS[5]
1. Babi Hutan	1.45	1	kesan tapak	Lereng bukit/W	1°F	L = 4 cm P = 5.0 cm	-	
2. Badak	4.10	1	kesan tapak	Lereng bukit/SW	1°F	① a = 12.0 cm b = 23.5 cm ② a = 12.1 cm b = 24.0 cm ③ a = 12.1 cm (b) 23.5 cm ④ a = 12.1 cm b = 24.0 cm		[illegible] antara 2 [illegible] yg lalu.
3. Monyet Merah	11.30	4	dilihat	Atas dahan (pada lereng bukit)/NE	1°F	-	Melompat menyelamatkan diri.	
4. Gajah	12.15	1-2	kesan tapak kaki	Atas permatang bukit/R.	1°F			Kesan tapak tidak [illegible].
5. Gajah	1.20	1	kesan tapak kaki	Pada semak [illegible]	1°F		Terdapat kesan geselan pada dinding lubang.	
6. Lesser mouse deer.	3.15	1	dilihat	Lereng bukit/SW	1°F		⇒ Melarikan diri apabila melihat pemerhati	
7. Monyet merah	3.20	4	dilihat	Lereng bukit/pada East Trail/SW	1°F		Melompat dari dahan ke dahan pokok apabila menyedari adanya manusia (pemerhati).	



[1]1=Visual;2=Vocalization;3=Feces;4=Scrapes;5=Den/Nest (Specify);6=Claw marks;7=Other(Specify)

[2]Location:R=ridgetop;V=valley;S=along slope/ Direction: North, South, West, East/ Elevation

[3]Examples: Salt lick, riverine forest, rock outcrop, open grassy area, scrubby second growth.

[4]Examples: Fecal length and diameters, scrape length, distance to sightings

[5]If more space is needed, go to back of page.

GENERAL WILDLIFE DATA SHEET

OBSERVER(S): HENRY BERNARD TEAM: 7 DATE: 12/05/1995

WEATHER: 22°C / 86% TIME START: 9.00 am TIME FINISH: 7.30 pm FOREST TYPE: 1° Fr.

LOCATION: DVFC

SPECIES	TIME	NUMBER	SIGN[1]	LOCATION/DIRECTION[2]	HABITAT[3]	MEASUREMENTS[4]	BEHAVIOR	REMARKS[5]
1. sambar deer	9.45 am		track marks/3 - scraping marks - urine odour - fresh fecal	steep slope / North	along road - no vegetation - few shrubs	9.7 cm x 3.5 cm 9.8 cm x 3.5 cm	-	-
2. wild pig	10.15 am	-	track marks	ridge top / North	shrubby 2° growth	-	-	-
3. Barking deer	10.20 am	- do -	fecal	steep slope / North	1° forest	-	-	-
4. Orang utan	1.45 pm	01 tail	visual / eating bark	Ridge top / North	1° forest	-	Feeding on Koompassia sp. bark	Seen during rain
5. R/leaf monkey	2.00 pm	8	visual	Ridge top	1° forest	-	resting	-

camp / near Sungai Palum Tambun about 2 km from DVFC.

[1]1=Visual;2=Vocalization;3=Feces;4=Scrapes;5=Den/Nest (Specify);6=Claw marks;7=Other(Specify)

[2]Location:R=ridgetop;V=valley;S=along slope/ Direction: North, South, West, East/ Elevation

[3]Examples: Salt lick, riverine forest, rock outcrop, open grassy area, scrubby second growth.

[4]Examples: Fecal length and diameters, scrape length, distance to sightings

[5]If more space is needed, go to back of page.

GENERAL WILDLIFE DATA SHEET

OBSERVER(S): Henry, Tajuddin, Syaaruddin TEAM: 7 DATE: 12 May 95

WEATHER: Sunny TIME START: 8:30 TIME FINISH: ____ FOREST TYPE: Wet soil

LOCATION: _____

SPECIES	TIME	NUMBER	SIGN[1]	LOCATION/DIRECTION[2]	HABITAT[3]	MEASUREMENTS[4]	BEHAVIOR	REMARKS[5]
1. Blk H/bill	9-15am	2	1	R N	-		Flying	-
2. B/deer		1	1	S E	-		Running	-

04°55.08'N
117°49.05E } GPS Ridgetop
653 m.

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[1]1=Visual;2=Vocalization;3=Feces;4=Scrapes;5=Den/Nest (Specify);6=Claw marks;7=Other(Specify)

[2]Location:R=ridgetop;V=valley;S=along slope/ Direction: North, South, West, East/ Elevation

[3]Examples: Salt lick, riverine forest, rock outcrop, open grassy area, scrubby second growth.

[4]Examples: Fecal length and diameters, scrape length, distance to sightings

[5]If more space is needed, go to back of page.

GENERAL WILDLIFE DATA SHEET

OBSERVER(S): HENRY BERNARD TEAM: 7 DATE: 13/08/1998

WEATHER: -O- TIME START: 7.00 am TIME FINISH: 11.30 am FOREST TYPE: DFS

LOCATION: DFC

SPECIES	TIME	NUMBER	SIGN[1]	LOCATION/DIRECTION[2]	HABITAT[3]	MEASUREMENTS[4]	BEHAVIOR	REMARKS[5]
1. Gibbon	7.30	-	vocal.	-	-	-	-	-
2. Rhino	8.00	-	old rhino wallow	Ridge top	-	± 2.5m x 3.5m	-	-
		-	rubbed by wild pigs					
3. Hornbill	10.00	-	vocal.	-	-	- flying overhead - loud swishing sound		sp. not known probably helmeted hornbill.
4. Great Argus	-	-	vocal.	East	-	-	-	-

[1]1=Visual;2=Vocalization;3=Feces;4=Scrapes;5=Den/Nest (Specify);6=Claw marks;7=Other(Specify)

[2]Location:R=ridgetop;V=valley;S=along slope/ Direction: North, South, West, East/ Elevation

[3]Examples: Salt lick, riverine forest, rock outcrop, open grassy area, scrubby second growth.

[4]Examples: Fecal length and diameters, scrape length, distance to sightings

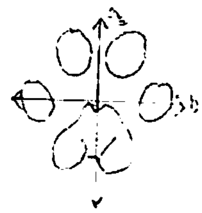
[5]If more space is needed, go to back of page.

GENERAL WILDLIFE DATA SHEET

OBSERVER(S): Waidi, Sumpin, Jerry & Daria TEAM: 7 DATE: 13-6-95

WEATHER: O TIME START: 8.40 TIME FINISH: 2.30 FOREST TYPE: Sec. forest

LOCATION: EAST PART OF DVFC. (Survey along old logging road)

SPECIES	TIME	NUMBER	SIGN[1]	LOCATION/DIRECTION[2]	HABITAT[3]	MEASUREMENTS[4]	BEHAVIOR	REMARKS[5]
Wild pig	9.10	1	Kesan tapak kaki	Lereng bukit (Atas jalan tayar)	Hutan sek. [illegible]	-		
Kucing [illegible]	9.15	1	Bunyi	- S -	"	-	-	-
Leopard cat (?)	9 7	1	Kesan tapak kaki	Atas jalan (Lereng bukit)	"	 (Bearing)	a = 2.5 cm b = 2.0 cm	
Mouse deer	9.20	1	"	"	"	-	-	-
Sambar Deer	9.35	1	"	"	"	P = 7.0 cm l = 6.0 cm		[illegible]
Kijang	11.20	2	"	"	"	(1) a = 2.5 cm (p) b = 2 cm (l)	(2) a = 3.0 cm (p) b = 3 cm (l)	
Babi Hutan	11.40	1	"	Lereng bukit	"	-	-	-
Babi hutan	11.50	1	"	Lereng bukit	"	-	-	-
Kijang	11.55	1	"	"	"	-	-	-
Rusa	12.05	1	"	Atas jalan tayar lama	"	-	-	-
Babi hutan	1.15	1	"	Lereng bukit (Atas jalan tayar)	"	-	-	-

[1] 1=Visual;2=Vocalization;3=Feces;4=Scrapes;5=Den/Nest (Specify);6=Claw marks;7=Other(Specify)

[2] Location:R=ridgetop;V=valley;S=along slope/ Direction: North, South, West, East/ Elevation

[3] Examples: Salt lick, riverine forest, rock outcrop, open grassy area, scrubby second growth.

[4] Examples: Fecal length and diameters, scrape length, distance to sightings

[5] If more space is needed, go to back of page.

GENERAL WILDLIFE DATA SHEET

OBSERVER(S): HENRY BERNARD TEAM: 7 DATE: 10/08/1998

WEATHER: 75°F / 40% TIME START: 8.00 am TIME FINISH: 4.00 pm FOREST TYPE: 1° Frst

LOCATION: DVFC.

SPECIES	TIME	NUMBER	SIGN[1]	LOCATION/DIRECTION[2]	HABITAT[3]	MEASUREMENTS[4]	BEHAVIOR	REMARKS[5]
1. R/leaf monkey	9.30	4	visual	Slope / East	1° Frst.	-	Feeding	-
2. Orang utan	11.45 am	-	nest	Steep Slope / west	1° Frst.	-	-	newly built
3. Helmeted hornbill	12.00 am	-	vocal.	Slope / west	1° Frst	-	-	-
4. Rhinoceros hornbill	12.30 am	-	Vocal	Ridge top / west	1° Frst	-	-	-

[1]1=Visual;2=Vocalization;3=Feces;4=Scrapes;5=Den/Nest (Specify);6=Claw marks;7=Other(Specify)

[2]Location:R=ridgetop;V=valley;S=along slope/ Direction: North, South, West, East/ Elevation

[3]Examples: Salt lick, riverine forest, rock outcrop, open grassy area, scrubby second growth.

[4]Examples: Fecal length and diameters, scrape length, distance to sightings

[5]If more space is needed, go to back of page.

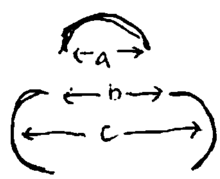
GENERAL WILDLIFE DATA SHEET

OBSERVER(S): Sumbin, Daria, Jerry TEAM: ________ DATE: 14-5-95

WEATHER: clear + sunny TIME START: 9.00 am TIME FINISH: 3.00 pm FOREST TYPE: Primary

LOCATION: DVFC

SPECIES	TIME	NUMBER	SIGN[1]	LOCATION/DIRECTION[2]	HABITAT[3]	MEASUREMENTS[4]	BEHAVIOR	REMARKS[5]
Great Argus	9.20		vocalization	N				
# 18								
Sumatran Rhino	11.15	1	Footprint	hillslope	Unlogged forest	1) (a) = Toe width = 8 cm (b) = 16.5 cm (c) = 22 cm (d) = 4 cm (between toes) (2) (a) = 8.5 cm (b) = 16 cm (c) = 23 cm (d) = 7 cm (3) (a) = 8 cm (b) = 16 cm (c) = 23 cm		Kesan tapak dianggarkan antara 2-3 h lamanya. Terdapat kesan atau bekas dimakan pada tumbuhan kelawit dan kopi hutan (makanan bad
Oriental Small Clawed Otter	1.15	2	Seen	River bank / N				
Red Leaf Monkey	1.30	2	Seen	(Cenun bukit) Atas pokok / NE			Melompat dari pokok sambil berbunyi.	
Red Leaf Monkey	2.30	5	dilihat	(Permatang) Atas pokok / SW			Melompat dari pokok (melarikan diri)	
Ular	2.35	1	dilihat	Cenun bukit / NE		+- 6 kaki panjang. Berwarna coklat kuning		



[1]1=Visual;2=Vocalization;3=Feces;4=Scrapes;5=Den/Nest (Specify);6=Claw marks;7=Other(Specify)

[2]Location:R=ridgetop;V=valley;S=along slope/ Direction: North, South, West, East/ Elevation

[3]Examples: Salt lick, riverine forest, rock outcrop, open grassy area, scrubby second growth.

[4]Examples: Fecal length and diameters, scrape length, distance to sightings

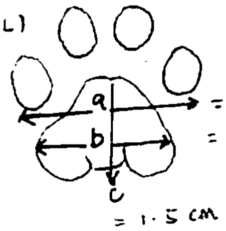
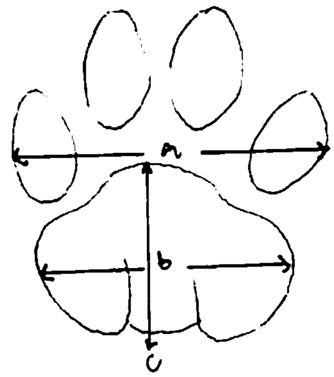
[5]If more space is needed, go to back of page.

GENERAL WILDLIFE DATA SHEET

OBSERVER(S): Sumbin Daria, Syamrudin & Jerry TEAM: 7 DATE: 16-5-95

WEATHER: -O- TIME START: 8.40 am TIME FINISH: 3.00 pm FOREST TYPE: Logged over forest

LOCATION: ALONG OLD LOGGING ROAD AT THE NORTH SIDE OF DVFC.

SPECIES	TIME	NUMBER	SIGN[1]	LOCATION/DIRECTION[2]	HABITAT[3]	MEASUREMENTS[4]	BEHAVIOR	REMARKS[5]
Marbled Cat (?)	9.40	1	Footprint	On the road (muddy). S.		(HL)  a = 4.0 cm, b = 1.8 cm, c = 1.5 cm	Walking.	- Footprints found in many area on the road
2. S. Deer	9.50	1	Kesan tapak kaki	Atas jalanraya kawasan lembut/S	Hutan muda (Al. dibalak)	P = 8.0 cm, L = 6.0 cm	Berjalan	- Dijumpai pada tanah yang lembut.
Clouded Leopard.	10.00	1	Kesan tapak kaki	Atas jalanraya di kawasan datar/S	Hutan yg. tlh dibalak	 (HL) a = 7 cm, b = 4 cm, c = 4 cm		- Dijumpai hanya satu di atas jalanraya
Kijang	10.10	1	Kesan tapak kaki	Atas jalanraya kawasan tanah lembut -S-	Hutan tlh. dibalak.			- Kesan tapak yang dijumpai menyeberang [illegible]
5. Orangutan	10.25	2	Sarang	Atas pokok, tepi kanan jalanraya. Kira-kira 20 m tinggi drp. tanah -W-	Hutan tlh. dibalak	-		- kira-kira 2-3 minggu lamanya.
6. S. Deer	10.40	1	Kesan tapak kaki	Atas jalan -S-	"	-		- Kesan tapak kaki sahaja dijumpai.
7. Biawak	10.50	1	dilihat	Atas jalanraya -S-	Kawasan hutan yang telah dibalak	± 5 kaki	Menyeberang atas jalan.	
8. Babi Hutan	11.00	2	Kesan tapak kaki	Atas jalanraya -S-	"	-	Berjalan	

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[2] Location: R=ridgetop; V=valley; S=along slope/ Direction: North, South, West, East/ Elevation

[3] Examples: Salt lick, riverine forest, rock outcrop, open grassy area, scrubby second growth.

[4] Examples: Fecal length and diameters, scrape length, distance to sightings

[5] If more space is needed, go to back of page.

GENERAL WILDLIFE DATA SHEET

OBSERVER(S): Tajuddin / HB / WS / Louise TEAM: 7 DATE: 15/05/1995

WEATHER: ☀ TIME START: 6.00 am TIME FINISH: 6.00 pm FOREST TYPE: 1°+2° F

LOCATION: DVFC

SPECIES	TIME	NUMBER	SIGN[1]	LOCATION/DIRECTION[2]		HABITAT[3]	MEASUREMENTS[4]	BEHAVIOR	REMARKS[5]
pied Hornbill	6.15 am	08	1	DV centre	North	1° Frst.	-	Gliding in the air	flying in group
greater coucal	6.30 am	01	1	DV centre	North	2° Frst	-	On the ground	-
paradise flycatcher	7.45 am	01	1	along main road approaching the DV centre	-	2° Frst	-	Flying across the road	-
Barking Deer	8.00 am		foot prints / Fecal samples		west	2° Frst.	-	-	imprata grass found in abundance along the deserted logging road
Barking deer	9.20 am	- do -		- do -		- do -	-	-	- do -
crested sep. eagle	9.05 am	-			north west	1°+2° Frst.	-	flying and then perching	-
Great argus	9.55 am		vocal.		South west	-	-	-	-
barking/deer	11.05 am		tracks		south west	2° Frst.	4.0 x 1.8 cm	-	-
Red leaf monkey.	11.10 am	02	01	-		2° Frst	-	-	-
Sambar deer	11.13 am		tracks		west	2° Frst	8.4 x 3.0 cm	-	along old logging road

{many other imprints of sambar deer observed along the logging road} — imprata grass abundant

SPECIES	TIME	NUMBER	SIGN[1]	LOCATION/DIRECTION[2]		HABITAT[3]	MEASUREMENTS[4]	BEHAVIOR	REMARKS[5]
mouse deer sp. not known/clear?	11.25 am		visual	01 tail		2° Frst.	-	-	bullet cartridge found

7. Bones of young sambar deer (<5 yr) 3:30 pm found in some shrubs / bushes →

[1]1=Visual;2=Vocalization;3=Feces;4=Scrapes;5=Den/Nest (Specify);6=Claw marks;7=Other(Specify)

[2]Location:R=ridgetop;V=valley;S=along slope/ Direction: North, South, West, East/ Elevation

[3]Examples: Salt lick, riverine forest, rock outcrop, open grassy area, scrubby second growth.

[4]Examples: Fecal length and diameters, scrape length, distance to sightings

[5]If more space is needed, go to back of page. — a few meters

GENERAL WILDLIFE DATA SHEET

OBSERVER(S): DM/TA/[illegible]/JG/[illegible]/Summa[illegible]/HB TEAM: 1 (DVFC) DATE: 16/5/1995 (Tuesday)

WEATHER: Clear (Full moon) TIME START: 4.15 a.m. (Spot lighting) TIME FINISH: 5.30 a.m. FOREST TYPE: 2° + 1°

LOCATION: Route 1 DVFC (km 69) → Junction km. 57 / Route 2 : Junction km 57 → BRL (km 81)

Route 3 : Coupe 93. Road.

SPECIES	TIME	NUMBER	SIGN[1]	LOCATION/DIRECTION[2]	HABITAT[3]	MEASUREMENTS[4]	BEHAVIOR	REMARKS[5]
Route 1								
Sambar Deer (Cervus unicolor)	4.15 a.m.	2	(1)	Bushes / 2° Forest ↔ along roadside			walking	Spotlighting (SL)
Common Palm civet	4.35 a.m.	1	(1)	roadside	Bushes / 2° F.		walking	SL
Common Palm civet	4.30 a.m.	1	(1)					SL
Malay civet	4.50 a.m.	1	(1)	(near [illegible] position)	roadside			SL
Route 2								
Common Barking Deer (Muntiacus muntjac)	5.30 a.m.	1	(1)	roadside (c. 79 km / near BRL)	2° Forest		walking	SL
Nightjar	5.35 a.m.	1	(1)	on the road	2° Forest		standing on the ground (1)	SL
Malay civet	5.40 a.m.	1	(1)	roadside (c. 83.5 km near BRL)	2° Forest		walking	SL
Rhinoceros hornbill	6.30 a.m.	2 (1+2)		emergent tree (BRL canopy walkway)	2° Forest		flying / perching on tree branch	
Route 3 (8.00 pm – 10.00 p.m.).								
Malay civet	8.45 pm.	1	(1)	road side	logged over forest / 2° Forest.		walking	SL.
Malay civet	9.30 p.m.	1	(1)	"	"		"	SL

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[2]Location:R=ridgetop;V=valley;S=along slope/ Direction: North, South, West, East/ Elevation

[3]Examples: Salt lick, riverine forest, rock outcrop, open grassy area, scrubby second growth.

[4]Examples: Fecal length and diameters, scrape length, distance to sightings

[5]If more space is needed, go to back of page.

GENERAL WILDLIFE DATA SHEET

OBSERVER(S): [illegible] TEAM: 7 DATE: 17.5.95

WEATHER: fine then pm rain TIME START: 815 TIME FINISH: 930 FOREST TYPE: LDF

LOCATION: Waterfall trail WFC

SPECIES	TIME	NUMBER	SIGN[1]	LOCATION/DIRECTION[2]	HABITAT[3]	MEASUREMENTS[4]	BEHAVIOR	REMARKS[5]
Wild (?) chicken	0820	2	1	Nature trail SE	V	—	flying away	
Barking deer	0900	1	2	Wfall trail S	S		calling	
Barking deer	1005	1	2	" " SE	S		calling	
Gibbon	1015	1	2	" " SE	S		calling	
Rhinoceros hornbill	1043	1	1	" " "	"		flying	
Orang utan	1645	1	2	" " N	S		calling	

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[2]Location:R=ridgetop;V=valley;S=along slope/ Direction: North, South, West, East/ Elevation

[3]Examples: Salt lick, riverine forest, rock outcrop, open grassy area, scrubby second growth.

[4]Examples: Fecal length and diameters, scrape length, distance to sightings

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GENERAL WILDLIFE DATA SHEET

OBSERVER(S): HB /Tjd. /WD/ din. / Ed. TEAM: 7 DATE: 17/05/1998

WEATHER: [weather symbols] TIME START: 8:00 am TIME FINISH: 2.30 PM FOREST TYPE: 1° Frst

LOCATION: ______

	SPECIES	TIME	NUMBER	SIGN[1]	LOCATION/DIRECTION[2]		HABITAT[3]	MEASUREMENTS[4]	BEHAVIOR	REMARKS[5]
	Pitta (?)	8.10	01	vis.	slope	wst.	1° Frst.	–	perching	–
2.	G. Argus	8.25	–	voc.	slope	wst.	1° Frst	–	–	–
	Sun bear (?) (8.30 am)	?	–	tracks (2)	slope	wst.	1° Frst	6.0 x 3.0 cm	–	4 fingers only!
	Gibbon	8.50	03	vis.	Ridge	wst	1° Frst	–	swinging from one tree to another.	
	Rhino. hornbill	9.00	–	voc.	Ridge top.	wst	1° Frst.	–	–	–
	Gajah (women & calf)	9.15 am	–	tracks, dung	slope	wst.	1° Frst	–	–	–
7.	Great Argus	9.15 am	–	voc.	slope	wst.	1° Frst	–	–	–
8.	Gibbon	9.45 am	05	vis.	Ridgetop	wst	1° Frst.	–	?	–
9.	Barking deer	10.25 am	–	voc.	slope	North	1° Frst	–	–	–
	Great Argus	11.05 am	–	voc.	slope	North	1° Frst	–	–	–
	Orang utan	12.00 am	–	nest	slope	South	1° Frst.	–	–	quite old (2 months)
	Orang utan	12.45 am	–	nest	slope	South	1° Frst.	–	–	– do –
	Sambar deer	12.47 am	–	tracks	ridgetop	South	1° Frst.	9.6 x 3.2 cm	–	near wallow

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[3] Examples: Salt lick, riverine forest, rock outcrop, open grassy area, scrubby second growth.

[4] Examples: Fecal length and diameters, scrape length, distance to sightings

[5] If more space is needed, go to back of page.

<u>GENERAL WILDLIFE DATA SHEET</u>

[illegible]BSERVER(S): ______________________ TEAM: ______ DATE: __________

[illegible]EATHER: __________ TIME START: ______ TIME FINISH: ____ FOREST TYPE: ______

LOCATION: ____

[illegible] 7 [illegible]

SPECIES	TIME	NUMBER	SIGN[1]	LOCATION/DIRECTION[2]	HABITAT[3]	MEASUREMENTS[4]	BEHAVIOR	REMARKS[5]
[illegible]	[illegible]					[illegible]		
[illegible]		[illegible]						
[illegible]		[illegible]						
[illegible]		[illegible]						
[illegible]								
[illegible]		[illegible]						
		[illegible]						
Common [illegible]		1						
Prevost squirrel		2						
Grey green imperial		4						
Pig tail macaque		3						
2 Great argus								

[1] 1=Visual;2=Vocalization;3=Feces;4=Scrapes;5=Den/Nest (Specify);6=Claw marks;7=Other(Specify)

[2] Location:R=ridgetop;V=valley;S=along slope/ Direction: North, South, West, East/ Elevation

[3] Examples: Salt lick, riverine forest, rock outcrop, open grassy area, scrubby second growth.

[4] Examples: Fecal length and diameters, scrape length, distance to sightings

GENERAL WILDLIFE DATA SHEET

OBSERVER(S): Gumban G, Daria M, Jerry G TEAM: 7 DATE: 17-5-95

WEATHER: Mendung/Hujan TIME START: 8.30 am TIME FINISH: 3.00 pm FOREST TYPE: 2° Frst

LOCATION: [illegible] / ke jalan [illegible] [illegible] [illegible]

SPECIES	TIME	NUMBER	SIGN[1]	LOCATION/DIRECTION[2]	HABITAT[3]	MEASUREMENTS[4]	BEHAVIOR	REMARKS[5]
Pelanduk	8.50	1	kesan tapak kaki	Cerun bukit/arah jalan raya / S	2° Frst	-	-	Tidak [illegible] [illegible] [illegible]
Kijang	8.55	1	kesan tapak kaki	Permatang / [illegible] [illegible] / S	2° Frst	-	Berjalan	
Babi hutan	8.59	1	"	"	"	-	"	kesan tapak kaki [illegible] [illegible]
4. Pelanduk	9.01	1	"	"	"	-	"	"
5. Rusa	9.05	1	Dilihat	Tempat rata / S	"	-	Berlari	[illegible]
6. Musang (Yellow Throated Marten?)	9.07	1	Dengar suara	[illegible] [illegible]	"	-	Bergerak	Tidak dapat dipastikan [illegible] [illegible] pada waktu.
Babi hutan	9.10	1	"	"	"	-	"	Banyak kesan tapak [illegible] jalan raya.
8. Kijang	9.20	1	"	"	"	-	"	-
9. Rusa	10.50	1-2	"	" / S	"	-	-	Banyak kesan tapak kaki [illegible] dan [illegible] [illegible]

PTO.

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[2]Location:R=ridgetop;V=valley;S=along slope/ Direction: North, South, West, East/ Elevation

[3]Examples: Salt lick, riverine forest, rock outcrop, open grassy area, scrubby second growth.

[4]Examples: Fecal length and diameters, scrape length, distance to sightings

[5]If more space is needed, go to back of page.

4

GENERAL WILDLIFE DATA SHEET

OBSERVER(S): Mike, Tajuddin, OHS TEAM: 7 DATE: 19 May 95

WEATHER: Sunny TIME START: 0820 TIME FINISH: 1430 FOREST TYPE: LDF

LOCATION: _____

SPECIES	TIME	NUMBER	SIGN[1]	LOCATION/DIRECTION[2]	HABITAT[3]	MEASUREMENTS[4]	BEHAVIOR	REMARKS[5]
Sun bear	10.10	1	Claw mark, 1yr old	Y, slight slope N	LDF	top claw mark 2.5m fr ground	opening tree for honey	2.5m int
~~Wild boar~~ deer		*						
Mouse deer	1415	1	animal/ visual	WSN10 slightslope S	LDF	none	running down track	in ra
~~Golden cat~~ Ayam?	1417	1	sighted	WSN10 slope S	LDF	none	running	heav rain

crossed Firebreak.

crossed Firebreak.

---

19 May 1995 ; MTA ; WS, SG, JG, SM ; Coupe 93 unused logging road east of Bismal Gerge

1.	10.00	Sambar deer	2	Tracks + feces	W	logging road	walking 1 month old	
2.	10:15	Orang utan	1	Nest	20m from	logging road		
3.	10:20	Felis marmorata	1	Tracks	W	logging road near water hole	drinking	Fresh
4.	10:20	Kijang	1	feces	W	logging road	walking	fresh
5.	10:20	Big	1	track	W	logging road	walking	fresh

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[1] 1=Visual; 2=Vocalization; 3=Feces; 4=Scrapes; 5=Den/Nest (Specify); 6=Claw marks; 7=Other (Specify)

[2] Location: R=ridgetop; V=valley; S=along slope/ Direction: North, South, West, East/ Elevation

[3] Examples: Salt lick, riverine forest, rock outcrop, open grassy area, scrubby second growth.

[4] Examples: Fecal length and diameters, scrape length, distance to sightings

[5] If more space is needed, go to back of page.

RHINO DATA SHEET

OBSERVER(S): SUMBIN, WAIDI, JERRY TEAM: 7

DATE: 12-5-1995 TIME: 11.10 AM

LOCATION: Refer Map SUBSTRATE: DRY SOIL / SAND / MUD / OTHER MOIST SOIL

WEATHER: Cloudy/ Raining FOREST TYPE: OLD LOGGED / NEW LOGGED / (VIRGIN) / OTHER ____

CIRCLE APPROPRIATE CATEGORY:

RHINO SIGN OBSERVED: (TRACK) / WALLOW / FECES / SCRAPES / URINE
CHEWED VEGETATION / OTHER ____

LOCATION OF RHINO SIGN: ALONG TRAIL / CROSSING TRAIL / AT SALT LICK / (IN FOREST)

LOCATION OF RHINO SIGN: ON RIDGETOP / ALONG WATERWAY / (ON SLOPE)

IF TRACK, SLOPE/DIRECTION: (UPSLOPE) / DOWNSLOPE: SLOPE FACING N / S / E / W

REMARKS AND/OR MEASUREMENTS: ____

TRACK MEASURMENTS: TRACK ID NUMBER ____

LEFT FOOT / RIGHT FOOT / (UNKNOWN)

FRONT FOOT / REAR FOOT / (UNKNOWN)

TRACK LENGTH (L_1-L_2): ____

TRACK LENGTH (l_1-l_2): ____

TRACK WIDTH (W_1-W_2): ____

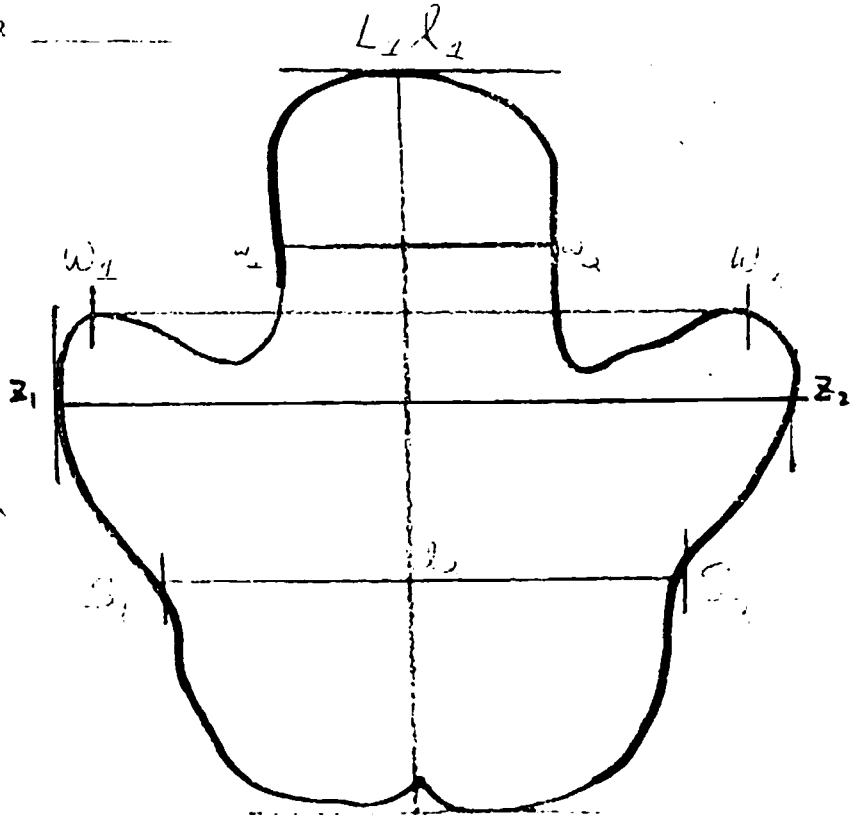
TRACK SPAN (S_1-S_2): ____

FRONT TOE WIDTH (w_1-w_2): 12.0

WIDEST TRACK WIDTH (Z_1-Z_2): 23.5

CAST OF FRONT TOE TAKEN: YES / (NO)

DISTINCTIVE MARKS ON TRACK
(Describe and draw on track)



RHINO DATA SHEET

OBSERVER(S): SUMBIN, DARIA, JERRY TEAM: 7

DATE: 14-5-95 TIME: 11.15 a.m

LOCATION: Refer map SUBSTRATE: DRY SOIL / SAND / MUD / OTHER MOIST SOIL

WEATHER: CLEAR/SUNNY FOREST TYPE: OLD LOGGED / NEW LOGGED / VIRGIN /OTHER VIRGIN

CIRCLE APPROPRIATE CATEGORY:

RHINO SIGN OBSERVED: TRACK / WALLOW / FECES / SCRAPES / URINE
CHEWED VEGETATION / OTHER TRACK

LOCATION OF RHINO SIGN: ALONG TRAIL / CROSSING TRAIL / AT SALT LICK / (IN FOREST)

LOCATION OF RHINO SIGN: ON RIDGETOP / ALONG WATERWAY / (ON SLOPE)

IF TRACK, SLOPE/DIRECTION: (UPSLOPE) / DOWNSLOPE: SLOPE FACING N / S / E / W

REMARKS AND/OR MEASUREMENTS: _____

TRACK MEASURMENTS: TRACK ID NUMBER SET 2.

LEFT FOOT / RIGHT FOOT / (UNKNOWN)

FRONT FOOT / REAR FOOT / (UNKNOWN)

TRACK LENGTH (L_1-L_2): ~~8.0 cm~~

TRACK LENGTH (l_1-l_2): _____

TRACK WIDTH (W_1-W_2): 16.5 cm

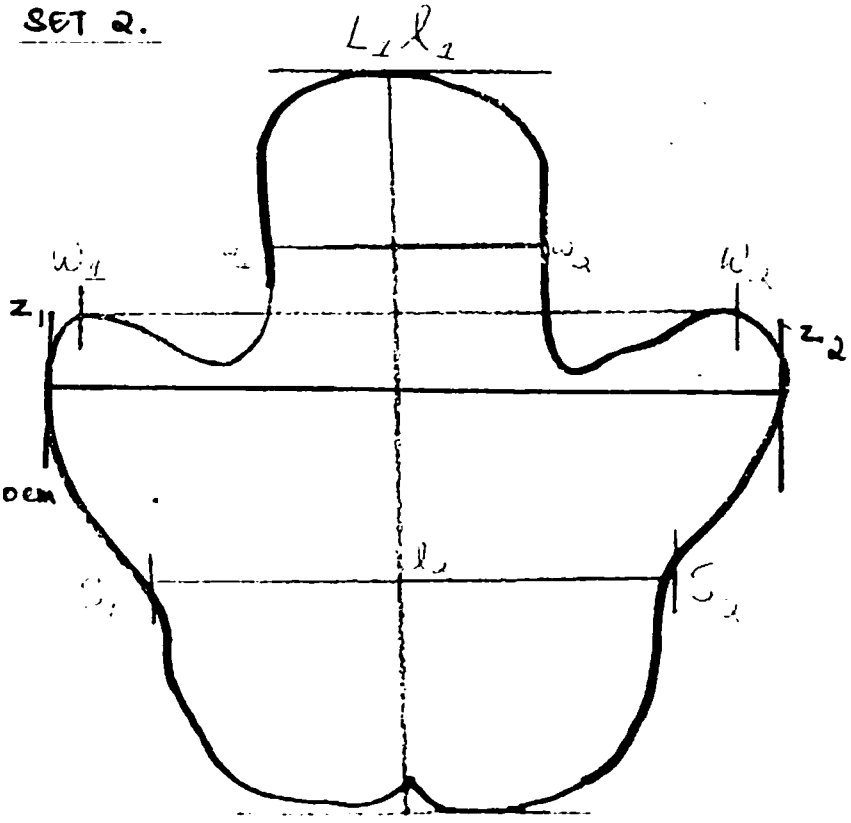
TRACK SPAN (S_1-S_2): _____

FRONT TOE WIDTH (w_1-w_2): 8.0cm

WIDEST TRACK WIDTH (z_1,z_2): 22.0cm

CAST OF FRONT TOE TAKEN: (YES) / NO

DISTINCTIVE MARKS ON TRACK
(Describe and draw on track)



APPENDIX 2: **PROPOSED DVFC WILDLIFE MANAGEMENT TEAM**

Objectives

- Promote *in situ* management by monitoring and updating information on the population, distribution and movemant pattern of endangered species.
- Provide protection, law enforcement and control on poaching of wildlife in the Danum Conservation Area

Tasks and Responsibilities

- Ideally, a four-man team with a leader who reports to the Manager of DVFC.
- Monitoring of the endangered wildlife species such as the Sumatran rhinoceros, tambadau and orang utan found in the Greater Danum Valley.
- Organise patrol, collect field data and prepare monthly report to the DVFC manager.
- Collaborate with the Sabah Wildlife Department in law enforcement by making surprise inspection in logging camps and ambush on hunting parties. A network of informants would be paid on case-by-case basis to supply the vital secrets of illegal hunting activities in the area.

Areas to be monitored

- Operation Raleigh Cabin
- Sungai Beatrice
- Sungai Katangen
- Sungai Danum
- Sungai Purut
- Borneo Rain Forest Lounge
- Dismal Gorge-Sungai Beruang
- Sungai Beruang-east of Segama
- DVFC-Palum Tambun
- other areas reported of rhino sighting
- logged over forest >5 years old

Vital field equipment

Pick-up truck with radio communication
Topographic maps 1:50,000; Sheet numbers 4/117/3 and 4/117/4
Suunto compass
GPS
Altimeter
Infra-red camera trap
All-weather note book and 0.3 technical pen

Field guides on birds, mammals, amphibians, reptiles, insects and vegetation
9'x 6' heavy duty canvass for each member
75 or 100 litre capacity Karrimor haversack
30 litre day pack racsack
Hammock
Sleeping bag
Ground sheet
Sleeping mat
Water bottle
Rain coat
Jungle boots
Leech socks
Parang
Cooking untisils
Mess tin
6 or 9-volt flashlight
Solid fuel and collapsible army-type stove
Plaster of Paris powder (gypsum)
First aid kit

Method of operation

- The team should be supported by the Danum Management Committee or other funding agencies (e.g. GEF) over a five-year project period.
- Every month within the project duration, the team leader with three other members will plan and organise a 14-day monitoring operation in the rhino and endangered animal habitats within the Greater Danum Conservation Area.
- The fully equipped team will move on foot from DVFC to the designated area.
- The team will traverse in the area either along river bank, ridges, contour or on a predetermined compass bearing. Animal trails, salt licks and saddles will be examined of potential evidences of rhinos, banteng and other wildlife.
- When animal tracks are found, the track measurements and habitat parameters will be recorded in data sheets.
- Plaster casts or photographs of the foot prints should be made for fresh and clear tracks. The exact locations of track of animals will be plotted on a topographic map.
- Infra-red camera traps could be placed on traditional trails and salt licks for photographic record of animals in the area.
- The team leader should compile daily records and submit a monthly progress report to the Manager of DVFC.
- For easy storage, retrieval, update and analysis, the field data should be transferred into data base files using PC program such as dBase, Foxpro or GIS.
- The follow-up monitoring should be carried out on the habitat adjacent to the last area surveyed.
- The DVFC Manager should review the progress of the field work in every twelve months and make the necessary recommendations to the relevant authorities (e.g.

Danum Management Committee, Sabah Wildlife Department and IUCN/SSC specialist groups).