

# WWF Project Technical Progress Report

## Asian Rhinoceros And Elephant Action Strategy (AREAS)

( Reporting Period : June 2001 – Dec 2001)



by

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PROJECT NO : 980737.03

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## WWF Project Summary Progress Report (Executive Summary of Technical Report)

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WWF International, Avenue du Mont-Blanc, 1196 Gland, Switzerland

<b>Country / Region</b>	Malaysia
<b>Project No. / Project Title</b>	Project Number : 9 S0737.03 Project Title : Asian Rhino and Elephant Action Strategy Programme (AREAS)
<b>Activity No. / Activity Title</b>	<ol style="list-style-type: none"><li>1. GIS and Database Development Update.</li><li>2. Socio-economic and elephant conflict survey in Tabin Wildlife Reserve</li><li>3. Elephant &amp; Rhino Survey in FMU 13 and FMU 25.</li><li>4. Rhino Protection Unit Training in Indonesia</li><li>5. Elephant &amp; Rhino Survey in Danum Valley</li><li>6. Abal Wetland Survey (Corridor between Ku'amba FR and LKWS).</li></ol>
<b>Activity Start - End Dates</b>	<ol style="list-style-type: none"><li>1. July - Dec 2001 (still on going process)</li><li>2. 1 August - 30 October 2001</li><li>3. 12 September - 17 September, 2001</li><li>4. 6 November - 17 November, 2001</li><li>5. 29 November - 12 December 2001</li><li>6. 27 November - 22 December, 2001</li></ol>
<b>Reporting Period</b>	July 01 - Dec 31, 2001
<b>Project Summary</b> (from WWF Project Database)  <i>Refer to current WWF List of Approved Projects for Project Background</i>	July 01 - Dec 31, 2001 is determined as the third six months of the project implementation, which was categorized in Phase 2 activities (Data Analysis and Elephant Conflict Mitigation Development). This report will cover the third six months period of the project.  Initially, WWF Malaysia has been working closely with the Sabah Wildlife Department to conduct a three-year study on elephants and rhinoceros conservation programme in Sabah.

The programme was aimed at contributing significantly towards conserving Asian elephants and Sumatran rhinoceroses in Borneo through the identification of appropriate conservation interventions that will address critical issues (geographical, biological, political, economical and sociological) pertaining to the conservation and management of both species.

Phase I of the AREAS programme (July 2000 – Jun 2001) was scheduled to conduct the data and information gathering of the elephant and rhinoceros issues (such as distribution, movement pattern, elephant conflict area and socio-economic study).

Phase II of the programme (July 2001 – Jun 2002) was scheduled to meet the development of elephant conflict mitigation and habitat suitability analyses. As elephants and rhinos are wide-ranging species and require extensive natural habitats to support viable populations, the crucial factors in the survival of both species is therefore, the availability of large enough areas that are appropriately and sustainably managed and at the same time to meet the socio-economic needs of the human population and the animals within.

However, since the required data for the habitat suitability analyses process is still insufficient, several data gathering and field survey are still carried out in the second phase of the programme.

This project proposes to get a handle on the major threats to elephants and rhinos by addressing the conservation issue through the recommendation of wildlife corridor or forest corridor (including buffer zone) between Sabah forest and Kalimantan forest. A GIS-based approach to landscape and habitat-use planning is used in order to assist the project in the identification process of an appropriate managed elephant range (MER) for southern Sabah and north east Kalimantan and the identification of core rhino areas for conservation and management.

These efforts will need the establishment of partnerships and collaboration with the relevant government agencies and important stakeholders. In term of human-elephant conflict issues, long term solutions or options for the state of Sabah in its endeavors to conserve elephants and rhinos need to be developed.

At the moment, the project is still in the process of developing the human-elephant conflict mitigation for the Lower Kinabatangan River and preparing for the habitat suitability analyses.

**Summary of Activity Objectives**

[from WWF Project Database]

*Refer to current WWF List of Approved Projects for detailed Project Objectives*

Activity No 1 - GIS and Database Development Update.

To complete a comprehensive GIS Database that can be used in spatial analyses such as modeling the Managed Elephant Range (MER) area, identification of the elephant and rhino core area, for better conservation and management in Sabah.

Activity No 2 - Socio-economic and Human-Elephant Conflict survey in Tabin Area (Oil Palm Developments).

The objective of the socio economic and elephant conflict survey in Tabin Wildlife Reserve (TWR) is to assess the status of elephant conflict faced by the oil palm developers. The perception of the oil palms on the elephant conservation issues in TWR was also analyzed. Having all the necessary information and feedback needed, AREAS will provide the result of this survey to Sabah Wildlife Department to enable them to proceed with further management options for elephant mitigation measures in TWR.

Activity No 3 - Elephant & Rhino Survey in FMU 13 and FMU 25.

As it is very limited information on elephants and rhinos along the boundary of Sabah and Kalimantan, field survey in the area (Sungai Agison and Sungai Sihuda) was conducted with the aims

- (i) To identify and map geographically all potential rhino, elephant, and orang utan habitat along Sabah-Kalimantan International Boundary and
- (ii) To provide strong evidence of elephant and rhino migration activities along the boundary of Sabah and Kalimantan which could be used to support the need of sufficient forest linkages/corridors in the central part of Sabah (between Danum Valley and Matus Basin) into Kalimantan area as to reduce human-Conflict in central part of Sabah.

Activity No 4 - Rhino Protection Unit Training in Indonesia.

The main objectives of the RPU training programme was to

- i) train SWD personnel in RPU Operation activities
- ii) assess the financial and manpower requirement in Tabin Wildlife Reserve (TWR), Lower Kinabatangan Wildlife Sanctuary (LKWS) and Central of Sabah
- iii) assess the practicality of RPU Implementation in Sabah.
- iv) model the RPU operation system in Sabah

Activity No 5 - Elephant & Rhino Survey in Danum Valley

The survey in DVC was conducted with the following objectives :

- (i) To re assess and update the survey record of rainforest elephants
- (ii) To determine the current density and distribution of elephants and rhinoceros
- (iii) To identify the elephant-human conflict areas

Activity No 6 - Abai Wetland Survey (Corridor between Kulamba FR and LKWS)

- (i) To identify the presence of wildlife species in the area especially elephant and rhinoceros.
- (ii) to assess the suitability of the area for corridor from Kulamba FR to LKWS
- (iii) to enable the preparation of proactive and answerable steps to any further land speculation in areas (Abai Wetland) outside of the proposed Sanctuary.

Overall Objectives of the Mentioned Activities.

To identify core elephant and rhino conservation areas and connecting corridors, and to identify a 'Managed Elephant Range' (MER) and 'Rhino Conservation Areas' (RCA) for Sabah.

To develop and implement a statewide human-elephant conflict management strategy to minimize negative impacts on elephants as a result of inappropriate conflict management.

Financial Summary [from WWF Project Database]	FY00 CHF	FY01 CHF	FY02 CHF
Recommended	127,000	255,000	205,000
Approved			

Contact(s) for further information:

Project Executant

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**1. List significant change(s) to objectives during the reporting period**

No significant changes have been made to the general objectives of the project during the reporting period.

**2. Targets attained / important developments during the half-year  
(include newsworthy information which can be used for publicity and fundraising purposes)**

1. Status of elephant conflict and rhinoceros pattern activities in TWR has been completed.
2. Strong evidences have been acquired to verify the possibility of elephant connectivity between Sabah and Kalimantan forest through Agleon River.
3. Strong commitment and working relationship were established between WWF Malaysia, and SOS Rhino, including Hutan (Orang Utan Project), especially in helping SWD to develop their skills in Rhino Protection Efforts.

**3. Targets not attained during the half-year and why**

1. Development of spatial modeling couldn't be completed, as several parameters need to be identified and added to the modeling system. Additional survey will be during the period of Jan 2002- June 2002, as to complete and fill any gaps or parameters used in elephant habitat suitability modeling.
2. Elephant-human conflict mitigation schema is not implemented yet. However, the development of these schemes is still in progress. Parameters such as the existing mitigation methods, level of willingness to cooperate in Joint Elephant Management (Oil Palm developer and local people) and level of conflict in each conflict area have been surveyed. Efforts to produce manual references for mitigating the elephant conflict still in process for educational purposes.

#### 4. Obstacles encountered, measures taken to address them, and lessons learned

##### Obstacles encountered

During the development process of HEC in Lower Kinabatangan, viable population of the elephant is one of the issues that were asked by several stakeholders especially the oil palm operators. Neither SWD nor WWF Malaysia has done any research or study about it. The increase of the population may increase the level of conflict in the area.

At the moment ARFAS's field staff together with Hutan (Kinabatangan Orang Utan Project) staff helping the local people to reduce the human and elephant conflict using the traditional way "Elephant Scaring Group"(ESC). However, the ESC was not really effective in larger area.

Modeling the elephant habitat need a complete literature search on the habitat requirements of elephant. This information could be used in determining the rules of decision making in GIS based analyses. Some literatures have been done on elephant by AREAS but need to be incorporated with the existing SWD's finding on elephant habitat requirement.

##### Measures taken

The development of Elephant Conflict mitigation measures in LKWS will be initiated by educating the local people and oil palm developers on the available mitigation options followed by the identification of AREAS/SWD action station in the area. More coordination with Kinabatangan Wildlife Officer (Mr. Peter Mallin) need to be established. Survey on Abal Wollard area was conducted to identify the possibility to connect the wildlife corridor between Kulamba FR and LKWS.

Development of the Elephant Habitat Modelling need to be developed in order to identify the viable area for the elephant. Co-ordination and Discussion with Peter Mallin (AREAS Director) need to be conducted in setting of the rules to identify places (Habitat Suitability Index Approach). Assistance from Martin Hartono (WWF GIS Consultant) would be needed during the development.

#### 5. Planned targets and expected developments for the next reporting period

1. Continuation of the modelling of a Habitat Suitability Map with SWD
2. Public awareness campaign through media (newspapers and television)
3. Continuation of Elephant control and Conflict Mitigation Scheme Development Lower Kinabatangan River region (as a model for other area).
4. Lobby for higher protection status of the identified core areas, corridors and the MER, (especially the establishment of central wildlife corridor, which connect Danum Valley FR, and Maliau basin FR.
5. Consult and assist SWD in the preparation of the RPU document for TWR.

*Thank you for providing this report to WWF*



## WWF Project Technical Progress Report

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by post, fax, or e-mail, to Asia/Pacific Regional Programme,  
WWF International, Avenue du Mont-Blanc, 1198 Gland, Switzerland

Project No. / Activity No.	9S0737.03
Project Title	ASIAN RHINO AND ELEPHANT ACTION STRATEGY (AREAS)
Activity Title (if different)	<ol style="list-style-type: none"><li>1. GIS and Database Development Update.</li><li>2. Socio-economic and elephant conflict survey in Tabin Wildlife Reserve</li><li>3. Elephant &amp; Rhino Survey in FMU 13 and FMU 25.</li><li>4. Rhino Protection Unit Training in Indonesia</li><li>5. Elephant &amp; Rhino Survey in Danum Valley</li><li>6. Abel Wolland Survey (Corridor between Kulamba FR and LKWS).</li></ol>
Reporting Period	June 2001 – Dec 2001

**1. Introduction.** Give a brief description of the topic, followed by a statement of the specific problem or requirement that led to the project's initiation

Populations of Asian Rhino and Elephant in Northern Borneo (Sabah) are currently facing two kinds of threats namely (i) industrial tree plantation scheme (ii) oil palm development. Industrial tree plantation scheme is the main threat for the Asian Rhino and Elephant as these activities will involve the removal of natural forest and replacement with monoculture tree plantation. These human activities will definitely revolutionise the forest corridor either between the protected/ conservation areas such as Maliau Basin and Danum Valley. These areas including Tabin Wildlife Reserve have been identified to have high density of large mammal especially elephant and rhino.

As timber exports are steadily declining due to limited area of forest that could provide high quality timber, tree plantation scheme for a pulp and mill industry would be the first choice to increase the state revenue. These large connected forest areas will soon be fragmented as economic-driven planned plantation schemes are carried out and thus will eliminate the contiguous forest linkages. Hence, forest fragmentation will soon be too small to contain viable populations

Large-scale conversion of secondary forests to oil palm plantations, which started 20 years ago, is expected to dramatically increase in the next few years. Palm oil is still considered as the main revenue earner in the state even though the price for oil palms has declined. Recently, research and development on the use of oil palm in the electro-hydro system has already started as to diversify the use of oil palm in the country.

Most elephant herds on the border of existing plantation schemes at this time cause little conflict. For instance, the Lower Kinabatangan River, and the Deramakot Forest Reserve much further to the west, are currently redeveloping into major conflict sites. Elephant herd size in this combined area may be up to 500 elephants.



In Lower Kinabatangan River region, the area's premier remaining elephant habitat, is rapidly being converted to oil palm plantations has reduced the habitat area for elephants. Elephant movements in this area are also limited as the last open habitat "bottle necks" are rapidly being brought up and fenced in by plantations. As plantation owners protect their crops with electric fences they can redirect the elephants' movements across the lands of villagers whose crops may be destroyed. There are occasional but persistent reports on killings of conflict elephants in the village areas and plantation area.

Conflict in other managed forest area also occurred during the forest rehabilitation process. The Deramakot Forest Reserve, Southeast Asia's only managed forest that produces significant quantities of certified timber, has experienced a surge in its elephant population. The surge is probably due (1) to an increase in elephant reproduction because of adjacent conversion to secondary forest, and (2) to immigration of elephants from areas that have recently been converted to plantations. The sustainably managed Deramakot Forest Reserve employs carefully designed forest rehabilitation schemes. Here conflict arises when elephants destroy enrichment plantings.

Sumatran Rhino (the Bornean form of the Asian two-horned rhinoceros - *Dicoryphus sumatrensis harlessoni*) has suffered a serious decline in distribution and numbers throughout northern Borneo since the conversion of forest into oil palm plantation (early 1980's). The creation of access road to the remaining forest has invited and introduced poachers into the wildlife habitat especially the rhino. This happened in several areas such as Tabin Wildlife Reserve and several areas adjacent to Danum Valley such as Kuamut FR, Malua FR and eastern part of Gunung Rara FR. Prolonged illegal hunting was identified as the major factor, which had led to the species' decline. Loss of forest habitat through conversion to permanent agriculture was also becoming a significant threat.

Only two areas in Sabah contain rhino populations with good prospects of long-term survival with adequate protection and management, namely Tabin and the Ulu Segama-Kuamut area. The Tabin rhino population was under pressure from forest loss and was awarded protection by the Sabah government in 1984 through the establishment of the 1,225 sq. km. Tabin Wildlife Reserve. The second population (the Ulu Segama-Kuamut area) is scattered through a vast area of several contiguous Forest Reserves, but probably centred within an area of less than 4,000 sq. km. in the catchment areas of the upper Segama and upper Kuamut Rivers. This latter area includes the Danum Valley and Maliau Basin Conservation areas in Sabah Foundation's 100-year logging concession. Two other areas known to contain rhinos may possibly prove to be important for the species' conservation: the Segaliud-Lokan/Deramakot/Tanjokulap Forest Reserves and the Muruk Miau area adjacent to the border with East Kalimantan. Loss of forest through conversion to permanent plantations has led to a significant loss of rhino habitat in parts of eastern Sabah during the past two decades or so. But, like logging, this possibly exerts lesser pressure to the species' survival when compared to statewide hunting pressure. The recent surge in the development of the oil palm industry may mean an even faster conversion of logged-over forests to monoculture plantations.

WWF Malaysia are now collaborating with the Sabah Wildlife Department to conduct a three year study on elephants and rhinoceros in Sabah in a strategic approach under the Asian Rhino Elephant Action Strategy (AREAS). The overall goal of the AREAS project in Sabah is to prevent and to minimise forest fragmentation by set aside for forest linkages of wildlife corridors. This will significantly contribute towards conserving Asian elephants and Sumatran rhinoceroses in Borneo through the identification of appropriate conservation interventions, well planned and executed actions on the ground. Critical issues (geographical, biological, political, economical and sociological) will be addressed pertaining to the conservation and management of both species rhinos in the contiguous forest landscape of Sabah and Kalimantan.

## 2. Objectives as per the project contract

1. To develop GIS information layers and database on topographic features, land use, land cover, elephant and rhino distribution, conflict area and other relevant information layers.
2. To identify core elephant/rhino conservation areas and 'Managed Elephant Range' (MER) in South Sabah/Northeast Kalimantan.
3. To develop a human-elephant conflict management strategy.

## 3. Progress. Give the status of implementation of the project, in particular in relation to the objectives

### 1. GIS and Database Development Update.

A GIS based system is being constructed to support the decision making process related to elephant habitation zoning in Sabah. The aim of the GIS development is to assist the assessment of elephant habitat zoning with related to the elephant habitat suitability area. The technical challenge of the GIS development is to identify rules for modelling the elephant zoning. However, the fundamental GIS parameters have been completed. As listed below, all the GIS was developed using the Borneo RSO projection to ensure that these data can be fitted in the slope and terrain modelling.

The GIS database directory has been created according to the AREAS technical support network guideline for establishing the GIS component. By following this format, the entire GIS database can be stored in one directory, which will aid in the distribution of the information.

Home directory structure for GIS database AREAS project

- Progress
- Project
- Shapefiles
  - admin
  - species
  - habitat
  - conflict
  - monitoring
  - others
- Grids
- Documents
- Database (attributes data)
- Others
- Output
- Export

In order to complete the elephant suitability modeling, future work of the GIS would cover the

- Development of current land cover
- Land Capability
- Setting of rules to identify places. (Habitat Suitability Index Approach) by identifying
  - Complete literature search on the habitat requirements of a species or
  - Statistical analyses of what environmental attributes occur where the elephants are found.

## 2. Socio-economic and Elephant conflict survey in Tabin

In Tabin Wildlife Reserve surrounding area, socio-economic and elephant conflict survey has been conducted in twelve oil palm plantation area. However, nine oil palm companies have participated in this survey. The survey aims to analyse the status of socio-economic and elephant conflict including the poaching pattern in TWR surrounding area. Generally, the survey covered the elephant conservation issues such as (i) Crop and property damage, (ii) Attitudes and Expectation, (iii) Level of Oil Palm Operators Participation, (iv) Level of SWD support, (v) Current and recommended mitigation measures.

The survey concludes that

- Based on the feedback obtained from local residents (via questionnaire) elephants disturbance normally transpire in a group of more than 40 elephants in Tabin Wildlife Reserve surrounding area.
- In terms of pattern of the elephant disturbances, it frequently occurs between the months of Feb – March, followed by the period between Jul - September, 2001. Majority of the respondents (75 %) stated that in one year the number of disturbances was between 1 - 6 times. The elephants stayed in the oil palm area within 2 - 4 weeks long, and the elephants prefer to enter the oil palm area during 6pm -12pm.
- Among the prevention methods that are always used are electrical fence, fire, elephant casing team and report to SWD.
- Based on the survey results, the service provided by the Wildlife Department, whenever elephants disturbances occur remains unsatisfactory by the oil palm.
- Most of the hunters or poachers have been using the oil palm roads as their access road to TWR. These roads include the federal road and Jeraco road.
- The main reasons why elephants raid crops in Tabin surrounding area were due to the conversion of the elephants' areas into agriculture areas. As mentioned before that the only portion of Tabin boundary left where elephants can move freely in and out of the reserve is in the northwestern corner where the Sogama River forms the boundary. Conversion of forest to agriculture plantation (oil palm) in TWR surrounding area in previous years, has resulting the elephants trapped inside TWR. Movement out of the reserve brings the elephants into conflict with the oil palm plantation; the level of conflict may increase if the populations of elephant in TWR increase from year to year.
- In term of developing tourism centre (elephant viewing site) in the oil palm, most of the oil palms are not really agree with the idea of transforming part of their area as a tourist site. However, they are willing to co-operate with SWD to implement any of the Elephant Control Schema, which organized and coordinated by SWD. In order to involve them in the Wildlife Department programme, it was strongly recommended that frequent meeting with the oil palm should be arranged to discuss the elephant conflict issues and hunting activities as well.

The results of this survey will be provided to SWD as a guide-line to develop an elephant mitigation and control schema including their protection efforts.

### 3. Elephant & Rhino Survey in FMU 13 and FMU 25.

Sabah shares with Kalimantan the only elephant population in Borneo. Co-operation between the authorities in both countries would enhance the future prospects of the elephants. At the moment, WWF Indonesia with financial support from USAID and GTZ is designing a new national park directly south of the Sabah/Kalimantan border. This park ideally should contain all of the elephant range in Kalimantan.

WWF Malaysia in Sabah, with financial support from WWF AREAS and collaborative work with Sabah Wildlife Department, is trying to identify primary elephant and rhino habitats in Southeast of Sabah to recommend corridors and other areas to the Malaysian government to be exempted from clear cutting schemes. The elephant and rhino survey which was carried out in FMU 13 and FMU 25 area is able to provide concrete evidence/argument into both conservation efforts.

The survey concludes that

- The presence of elephants along the Agison River and Sibuda River may indicate the connection to the elephants in the Kalimantan side.
- Most of the elephants were moving toward North and South (up and down) direction.
- As most of the dung observed was old (3-4 months old) and was found along the old logging road, it is believed that Agison River has been used by a single population. Another population potentially has been using the Sibuda River area as this area is separated from Agison River area by a hilly area as shown in the map.
- The average of the terrain elevation, where the elephant's sign was found, is at a range of 400 to 800 meters.
- Preferable slope (identified during the survey) by the elephant to enable their movement is below 35 meter. No elephant sign was recorded along the survey route, which is more than 35 of slope classification. The elephant groups prefer to follow the flat area (1 - 30 of slope) and heading to the river, where secondary forest vegetation (food) such as grass can be easily found. These were evidenced at several locations of elephant occurrences.
- Logging activities may not be the main threats for the wildlife especially elephant including rhino and orang utan at the moment, but hunting and poaching activities may considered as the main one. These area is located 28 km from the area where rhino was killed in the FMU 25. Hunting and poaching activities in this area couldn't be monitored due to the lack of enforcement in this remote area especially in the abandoned secondary forest area.
- In terms of training the basic data collection technique, the differences in data handling and collection in Agison River and Sibuda River (which emphasizes on the collection of elephant's data on movement direction and dung's size) could affect the result of elephant's presence and movement pattern analysis process.

### 4. Rhino Protection Unit Training in Indonesia.

Knowledge and experience on Rhino Protection Unit Operation were gained during the training session by SWD's rangers. It was learnt that the data collection and recording of rhinoceros sign is the same with the procedure employed Sabah Wildlife Department. This includes the identification process for the rhino's footprint and, identification of rhino's sign on tree and wallow. RPU operators do use a camera trap during the implementation of their activities. This is very important to identify area, which have been used by rhino at that moment. Other wildlife data such as tiger, elephant, deer, banteng and other wildlife are not recorded during the implementation of RPU.

Training on how to identify the presence of poachers and hunters were also included in the programme. Illegal poaching activities are identified from presence of human footprints following the rhino migratory routes. Other signs may also include wire traps are found around the area. To ensure the effectiveness of the RPU patrolling unit, they need to patrol at least 3 – 4 km inside the forest or National Park. Any found traps need to be destroyed. It has been identified that the poacher groups using the villagers' area as their access passageway to enter the National Park area. This kind of trend was observed similarly to Tabin Wildlife Reserve case, where poachers using the villages and oil palm road to enter the wildlife reserve.

The main challenge of RPU officers in Indonesia is to reduce the demand of Rhino's horn within the villagers' community. Most of the hunters or poachers use money to influence the villagers, in both way either (i) not giving any information regarding illegal hunting to the National Park Officer or (ii) giving information on rhino habitat at that moment. The worse scenario was when the villagers were paid to kill and to bring rhino's.

Comments from SWD (Mr. Cheni Jekim – one of the participants)

- The RPU training was well organised by WWF Malaysia and SOS Rhino in Indonesia. This training should be recommended and shared with other SWD's staff especially the officers who are in-charge of the law enforcement and poaching monitoring activities.
- Based on discussion with the National Park Officer, expedient study on the competency of the rhinoceros-breeding programme in Sepilok Station needs to be done. It is recommended to relocate the rhino-breeding project to other area, which is far away from any tourism activities or human activities, having a flat terrain and good forest cover. The extent of the rhinoceros habitat need to be increased at the range of 100 – 150 hectare.
- It is recommended to invite the RPU units in Indonesia to visit Sabah and learn how wildlife enforcement and monitoring are carried out by SWD. They may come with advantageous comments and advise on how to increase the effectiveness of any SWD's patrolling unit.

Recommendations (by AREAS Programme)

RPU need to be re-established in Sabah especially in Tabin Wildlife Reserve with the following immediate objectives

1. To enhance the capabilities of SWD to reverse the decline of rhinoceros due to poacher activities and habitat disturbance
2. To develop movement involvement by, as well as benefits and incentives for, the local human communities in the vicinity of the rhino habitat.

As learnt from the RPU training in Indonesia, the informer network system is very important to monitor and track any illegal poaching activities and illegal logging as well. In Tabin Wildlife Reserve, the local community and the oil palm developers need to be involved in the rhino conservation efforts. This intelligent operation could assist SWD in the apprehension of poachers, including collection and interpretation of rumours/stories. As more information becomes available, adaptation of conservation strategy and action plan could be carried out

RPU in TWR is very essential in Rhino conservation effort cause this unit could indirectly help SWD to have more accurate and reliable information on rhino distribution and numbers linked to a geographical information system, rather than the approximate estimation.

it is recommended that local community and local oil palm workers need to be recruited as one of the RPU's rangers. Local communities are preferred as to create the family-relationship informal network. By ensuring local people are involved in this effort, appreciation and pride on rhino will be developed among these communities as well as their standards of living, which will be enhanced by improved protection and management of the forest resources.

Fundamental assessment and action strategies need to be taken in order to assess the reliability and the practicality of RPU in TWR. Those fundamental assessment and action strategies could be described as follows.

#### Recommended Action Strategies (Jan 2002 – Jun 2002)

##### *Internal Training / Workshop In SWD (March 2002)*

It is recommended that internal training or workshop on RPU operation system need to be organised within the Sabah Wildlife Department.

Since DANCED is currently working on the Sabah Wildlife Department's Capacity Building. It is recommended that AREAS, WWFM will need to work closely with DANCED to arrange the internal training. Those trained officers from SWD will be responsible to deliver their knowledge and experience acquired during their training in Indonesia. This internal training will be scheduled in March 2002.

##### *Assessment On The Financial Requirement, Manpower and Practicality of the RPU. (January – March 2001)*

The financial requirement, manpower and the practicality of the RPU operation will be assessed based on the available manpower and allocated budget in Sabah. Since the cost of RPU implementation is higher in a bigger area of forest, the RPU operation area need to be classified into several zones as to enable the assessment of RPU cost in the specific area (i.e. TWR and LKWS). Three areas or zones need to be considered in terms of establishing the RPU, namely (i) Lower Kinabatangan River, (ii) Tabin Wildlife Reserve, (iii) Area within the Danum Valley and Maliau Basin Conservation area

Once the financial and manpower requirement for a year-one programme has been identified in any of the three areas, the implementation of the RPU based on the available fund allocated by the State Government could be implemented. By implementing RPU as one of SWD main activities in Sabah, it could be one of the effective efforts in Rhino Conservation in Wildlife Reserve and Sanctuary.

#### **5. Elephant & Rhino Survey in Danum Valley.**

This survey has covered an area of 135km<sup>2</sup> with a 90.5km survey trails within 8 days period. During the survey, there were roughly 15 elephants' dung piles, 23 elephants' footprints, one rhinoceros footprint have been observed and recorded from those 90.5 km of human-made trail line transect surveyed. While most of the dung piles were recorded near to the trails and rivers.

##### *Asian elephants*

There were no direct sighting and fresh track of elephant have observed in the survey areas, except the dung and tracks found along the gravel road, which located 4km from Borneo Rainforest Lodge. Those old tracks and dung were found at East trail, West trail, Kuala Tembeling trail, Sungai Purut trail, Sungai Purut, Sungai Langjom, BRL trail, and Tekala trail at BRL.

The population size of elephants in survey area was estimated as 39 individuals based on the combination amount of the tracks, dung and feeding site recorded. However, bear in mind that the two individuals' tracks could be belong to the same animal. This is due to some of the tracks were washed out during raining season and some of them being overlain with other animals' footprint such as wild pig, which eliminated or increased the outline of the footprint. Most of the footprints observed were solitary bulls or small herd that not more than 3 individuals. Elephants used to have migration season: base to the food availability and water sources. Therefore, the assumption of 39 individuals in the surveyed areas could be just at the range of 25-30 individuals. Elephants seem to have done some damages on human's properties in the forest, such as scientist's signboard.

#### *Sumatran rhinoceros*

Only one old footprint was recorded at Sungai Purul. The track measurement was 18cm and the middle toe width was 8cm. A large number of old wallows were found especially at Rhino Ridge Trail, Sungai Purul and Palun Tambun, but none of them are actively used by rhinoceros.

This kind of information could help the process identification the core area for elephant and rhinoceros in future modelling.

#### **6. Abai Wetland Survey (Corridor between Kulamba FR and LKWS).**

Survey was conducted in collaboration with ARLAS (Asian Rhino Elephant Action Strategy) and PFW (Partners for Wetlands), over a one month period. The sample sites were located within the wetlands to the west of Lots 1 and 2. The aims of the Abai Wetland Survey is to identify the presence of wildlife species in the area especially elephant and rhinoceros.

The preliminary results of the faunal survey of the community assemblage over the period, a species richness of 76 (not including sub-species) was sampled. The survey listed a the presence of 64 avifaunal species; of the sampled population six species are known to be migratory; namely the water birds, shoreline birds, Muginaki Flycatcher and Ashy Minivet.

Of the primates recorded within the sample sets, the Proboscis Monkey was the most frequented, however this could be a factor of the methodology applied to sample and estimate population sizes within the sample transects. Six (6) species of primates were recorded over the study period within the sample sites. The pig-tailed macaque, silvered langur, Bornean Gibbon, were infrequently observed within the sampled study area. During the course of the sampling period, observations of Orang utan indicates breeding within the sampled area, and adaptations to feed on the resources availability (tidal swamp forest, peat swamp forest, swamp forest, etc). Orang utan movement during the period, indicated a move towards the western portion of the sampling sites (above 1 of 1).

The bearded Pig (*Sus barbatus*) and the Sambar Deer, were frequently recorded within the Riparian forests of portion transects (apparent visitation to sources of water). Under estimations of the population counts for the above, is expected whereby a minimal representative sample number of tracks that were recorded within the riparian. However it was apparent within transects that wildlife movement corridors traversed frequently individual sample transects. To further, within areas of high levels of disturbance, whereby successional grassy communities have formed, tracks were impossible to locate (under waterlogged environment).

Rhinoceros footprint was found along the river levee at approximately 800m along transect 5 (Riparian Transect). There is no degree of conclusion, as a number of factors indicate the "footprint" shall remain in debate.

- The footprint is believed to be old. A estimated duration of the foot print to be in the region of a couple of weeks to a couple of months. Notably the area was experiencing fluctuation in the tidal range (50cm) which may at regular intervals inundate the river levee, during the period of the survey and prior to the survey. Hence it is anticipated that such a footprint shall have to be in the region of days, as the period leading up to the survey, experienced a period of rain, led by a dry spell, which subsequently lead to the rainy period over the duration of the survey.
- The footprint was conveyed to be not clear. Reasons as stated above, however more to the fact, that the soil structure/type is of fluvial alluvial hit, hence low in clayic content. Therefore prints over longer periods shall remain unclear, and quick to erode.
- The location of the foot-print raises the point, does Rhino's cross rivers? If such behavior is a trait of rhinos in the lower kinabatangan, the possibility of the ranges to forest extending outside of Lot 1 in to forests Recessus (localised raised beds). Or is there a separate population/individual present within the Mangrove Forest Reserve.
- The area in contention, is an area of relatively high usage by local residence of Kg. Ahai, as well as the trawlers. However, such activities, hence the disturbance period is only during day light hours.

However, based on AREAS study map on the elephant movement patterns of the Lower Kinabatangan River Region, the location of the footprint is found within the area, which considered the bottleneck area. Another finer point to convey, is the fact that a solitary elephant is believed roam within the area.

Further survey need to be carried on in this area especially near the Kulamba Forest Reserve (KFR) to verify the connectivity of elephant population between KFR and LKWS

### 3.1 Outputs this reporting period e.g. reports, policy documents, media articles

- GIS Maps
  - Result of the Recent Sabah & Kalimantan Survey.
  - Result of Danum Valley Elephant and Rhino Survey.
- Reports
  - Socio-economic and elephant conflict survey in Tabin Wildlife Reserve
  - Elephant & Rhino Survey in FMU 13 and FMU 25.
  - Rhino Protection Unit Training in Indonesia
  - Elephant & Rhino Survey in Danum Valley
  - Abai Wetland Survey (Corridor between Kulamba FR and LKWS).



### 3.2 Describe the targets attained and the important developments during the reporting period

1. Status of elephant conflict and rhinoceros poaching pattern activities in TWR has been completed.

Based on the feedback obtained from local residents (via questionnaire) elephants disturbance normally transpire in a group of more than 40 elephants in Tabin Wildlife Reserve surrounding area. In terms of pattern of the elephant disturbances, it frequently occurs between the months of Feb - March, followed by the period between Jul - September, 2004. Majority of the respondents (75 %) stated that in one year the number of disturbances was between 1 - 6 times. The elephants stayed in the oil palm area within 2 - 4 weeks long, and the elephant prefer to enter the oil palm area during 6pm -12pm.

Most of the hunters or poachers have been using the oil palm roads as their access road to TWR. These roads include the federal road and Jereco road.

2. Strong evidences have been acquired to verify the possibility of elephant connectivity between Sabah and Kalimantan forest through Agusan River.

The presence of elephants along the Agusan River and Sibuca River may indicate the connection to the elephants in the Kalimantan side. Most of the elephants were moving toward North and South (up and down) direction. As most of the dung observed was old (3-4 months old) and was found along the old logging road, it is believed that Agusan River has been used by a single population. Another population potentially has been using the Sibuda River area as this area is separated from Agusan River area by a hilly area.

3. Strong commitment and working relationship were established between WWF Malaysia, and SOS Rhino, including Hutan (Orang Utan Project), especially in helping SWD to develop their skills in Rhino Protection Efforts.

### 3.3 Targets not attained. Please note constraints and obstacles to the progress described

1. Development of spatial modeling couldn't be completed, as several parameters need to be identified and added to the modeling system. Additional survey will be during the period of Jan 2002- June 2002, as to complete and fill any gaps or parameters used in elephant habitat suitability modeling.
2. Elephant-human conflict mitigation scheme is not implemented yet. However, the development of these schemes is still in progress. Parameters such as the existing mitigation methods, level of willingness to cooperate in Joint Elephant Management (Oil Palm developer and local people) and level of conflict in each conflict area have been surveyed, efforts to produce manual references for mitigating the elephant conflict still in process for educational purposes.

### 3.4 Action(s) taken to overcome constraints and obstacles

- Additional survey will be organised in the period of Jan 2002 - June 2002, with the help of Iutan and SWD to complete and fill any gaps or parameters used in elephant suitability modeling. Map of elephant and rhino habitat suitability soon will be developed as soon as possible since this map is very useful in any of AREAS consultation activities. There is a need for AREAS programme in Sabah to cooperate with the FMU holders as to gather information and data related to elephant and rhino issues, and also to participate in their forest management system especially in developing the elephant mitigation scheme. However, General modelling for central Sabah will be developed based on the "Habitat Suitability Index Approach" (Developed by AREAS), and this map will be distributed to the I MU for further detailed assessment and verification with the FMUs.
- The development of Elephant Conflict mitigation measures in LKWS will soon be initiated by educating the local people and oil palm developers on the available mitigation options followed by the identification of AREAS/SWD action station in the area. More coordination with Kinabatangan Wildlife Officer (Mr. Peter Malim) need to be established. Survey on Abai Wetland area was conducted to identify the possibility to connect the wildlife corridor between Kulamba FR and LKWS.

### 3.5 Prospects for the accomplishment of the project's objectives

Accomplishment of objectives is expected to depend on the following main factors :-

- i) Improved working relationship with partners;
- ii) Greater work emphasis on relationship with oil palm developers and local people to derive mitigation schemes, extension services;
- iii) Influence on land use planning decisions

### 4. Lessons learned during the period under review include, if appropriate, an assessment of methods used

#### Elephant habitat suitability modelling

In the development of Habitat Suitability Index Approach, it is important to be able to extract data to develop coding of rules to identify elephant's places. Among the data that need to be analyzed during the survey activities are

- What kind of vegetation type
- Preferable slope,
- The availability of water
- Soil
- Elevation range (below 800 meters)

Beside statistical analyses of what environmental attributes occur where the elephants are found, Complete literature search on the habitat requirements of an elephant need to be done separated to support the Elephant Habitat Index.

### Elephant Conflict Mitigation Measures

It is very important to have the involvement of the local community in implementation of the elephant control activities such as "Elephant Scaring Group". However, they need to be educated in term of the availability of other elephant control options. In the period of Jan 2002 – June 2002, AREAS will concentrate not only helping the local people to protect their crops from elephant conflict, but also try to educate them on other elephant control options.

### **5. Planned targets and activities for the next reporting period**

- Develop a Habitat Suitability Map with SWD, cover the
  - Development of current land cover
  - Land Capability
  - Setting of rules to identify places. (Habitat Suitability Index Approach) by identifying
  - Complete literature search on the habitat requirements of a species or
  - Statistical analyses of what environmental attributes occur where the elephants are found.
- Public awareness campaign through media
- Continuation of Elephant control and Conflict Mitigation Scheme Development Lower Kinabatangan River region (as a model for other area).
- Lobby for higher protection status of the identified core areas, corridors and the MER. (especially the establishment of central wildlife corridor, which connect Danum Valley FR, and Maliau basin FR.
- Consult and assist SWD to prepare the RPU document for Tabin.

### **6. Other comments?**

None

**Acronyms.** Avoid the use of acronyms if possible, but list those used (e.g. WTO – World Trade Organization)

GIS - Geographical Information System, LKWS - Lower Kinabatangan Wildlife Sanctuary, MER-Managed Elephant Range, KOCP - Kinabatangan Orang Utan Conservation Project, SWD - Sabah Wildlife Department, FR - Forest Reserve, AREAS - Asian Rhinoceros and Elephant Action Strategy, HEC - Human-Elephant Conflict

### **Acknowledgements** as required

AREAS Programme Coordinator – Steve Osefsky and Christy William - for their advice and support  
Mr. Peter Malim (Sabah Wildlife Dept. HQ), Mr. Rashid Sahuri (Kinabatangan Wildlife Officer), Mr. Augustine Tunga (Tabin Wildlife Officer)  
Dr. Edwin Dasi – (Project Officer SOS Rhino)  
Drs. Isabelle and Marc Audrenaz – (Scientist KOCP)  
Mr. Hamzah Tanjok (Danum Valley Field Centre Project Manager)

*Thank you for providing this report to WWF*

# Report on the GIS & Database work progress.

Dec 2001

*Prepared by*  
*Raymond J. Alfred & Diana Anthony*  
*AREAS (Borneo) Programme*  
*WWF Malaysia*

A GIS based system is being constructed to support the decision making process related to elephant habitation zoning in Sabah. The aim of the GIS development is to assist the assessment of elephant habitat zoning with related to the elephant habitat suitability area.

The technical challenge of the GIS development is to identify rules for modelling the elephant zoning. However, the fundamental GIS parameters have been completed. As listed below, all the GIS was developed using the Borneo RSO projection to ensure that these data can be fitted in the slope and terrain modelling.

## Status to date

### Geographical Information System coverage

1. Sabah coastline and river system (1 : 500,000)
2. Southern Part of Sabah – river system and topography (1 : 50,000)
3. Detailed Sabah Road System
4. Topography contour (1 : 500,000)
5. Forest classification
6. Major Landuse
7. Geology & Soil
8. Location of Kampung/villages
9. District Boundary & FMTIs boundary
10. Found Elephant & Rhinoceros track and sign

### List of Map sheets :

#### 4/116

3 – Merapok, 4 – Gunung Ictung, 7 – Bandakho, 8 – Tainhulan, 11 – Sibua, 12 – Gunung Manat

#### 4/117

1 – Gunung Kuli, 2 – Gunung Ritok, 3 – Ulu Segama, 4 – Sg. Ulu Bele, 5 – Sg. Kalabakan, 6 – Sg. Tagau, 7 – Sg. Umas Umas, 8 – Sg. Tingkayu, 9 – Gunung Luis, 10 – Kalabakan, 11 – Sg. Siazan Dalam, 12 – Tawau North, 14 – Serudong, 15 – Pinau Sebatik

#### 5/116

8 – Tampias, 15 – Sg. Labau, 16 – Pinangah

#### 5/117

1 – Kiabau, 2 – Terusan Sapi, 3 – Kuala Labuk, 4 – Gum Gum, 5 – Telupid, 6 – Sg. Luan Pori, 7 – Sg. Lokan, 8 – Kuala Bole, 9 – Sg. Karamuak, 10 – Tangkulap, 11 – Pintasan, 12 – Lamag, 13 – Sg. Imhak, 14 – Kuamut, 15 – Sg. Malua, 16 – Sg. Bole

#### 5/118

5 – Suan I amba, 6 – Sukau, 7 – Kuala Kinabatangan, 9 – Bilit, 10 – Sg. Kretam Besar, 11 – Tenanggang

### Home directory for GIS Database ( GIS Database )

The GIS database directory has been created according to the AREAS technical support network: guideline for establishing the GIS component. By following this format, the entire GIS database can be stored in one directory, which will aid in the distribution of the information.

#### Home directory structure for GIS database AREAS project

- Progress
- Project
- Shapefiles
  - admin
  - species
  - habitat
  - conflict
  - monitoring
  - others
- Grids
- Documents
- Database (attributes data)
- Others
- Output
- Export

Several areas of Sabah database for further GIS analyses works have been developed.

- Lower Kinabatangan River region
- Deramakot Forest Reserve
- Tabin Wildlife Sanctuary
- Kalahakan Forest Reserve
- Sepulut Forest Reserve
- Danum Valley Forest Conservation Area
- Gunung Rara FR
- Kuamut FR
- Malua FR

In order to complete the elephant suitability modeling, future work of the GIS would cover the

- Development of current land cover
- Land Capability
- Setting of rules to identify places. (Habitat Suitability Index Approach) by identifying
  - (i) Complete literature search on the habitat requirements of a species or
  - (ii) Statistical analyses of what environmental attributes occur where the elephants are found.

# Report on The Human-Elephant Conflict in Tabin Wildlife Reserves

01 August – 30 October 2001

*Prepared by*  
*Raymond J. Alfred & Lee Shan Kee*  
*AIEAS (Borneo) Programme*  
*WWF Malaysia*

## Introduction

Tabin Wildlife Reserve is the largest protected area in Sabah with significant populations of the State's three largest mammals, viz Sumatran rhinoceros, elephant and tembadau or banteng. In addition, it has good populations of deer, orang utan and other primates as well as an impressive variety of carnivores, small mammals and birds. These populations undoubtedly suffer as the result of pressure from illegal hunters and others wishing to gain free access to the Reserve's resources.

Tabin is an important area for elephants. Based on dung count survey technique in 1992 by Dawson, the population of elephant was estimated to be about 200-300 individuals. They are concentrated in the lowland areas and near water sources, such as the Tabin River Valley in the north-central part of the reserve. The north-eastern and north western sides were also observed to be highly used by the elephant (Sale, 1994). Abandoned logging roads seem to be their favourite highway to travel from one area to another. Mud volcanoes at Lipad and Tabin VJR's are quiccofton visited by female elephants with their young.

The only portion of Tabin boundary left where elephants can move freely in and out of the reserve is in the northwestern corner where the Segama River forms the boundary. In other areas movement out of the reserve brings the elephants into conflict with the oil palm plantation and most of the larger plantations erect electrical fences to protect their crops. This report will outline the result of the human and elephant conflict survey in Tabin area. The survey was started early August and ended at the end of October 2001 (1 August – 30 October 2001).

## Survey background

Out of 12 oil palm estates, there were only 9 oil palm estates that had responded to the human-elephants conflict survey in the Tabin Wildlife Reserves (TWR) surrounding area. A total of 29,898.44 ha of the oil palm area have been covered. All of the surveyed estates are located less than 250 m distance from the nearest forest, which is either TWR or Kulamba Wildlife Reserves (KWR). All 9 oil palm estates were directly connected to the forest reserves and 7 from 9 surveyed estates were located at least 250m from the nearest water sources. The survey covered several issues with regard to elephant conflict and hunting activities such as elephant conflict pattern, crop and property damage, the oil palm operators' attitudes and opinions on elephant issues, current mitigation measures used, and hunting pattern in Tabin Wildlife Reserve area.

All of the surveyed estates indicate that the floods seasons normally occurs between November to March every year. The floods have damaged the oil palm trees ranging from the area of 250 ha up to 2500ha (mean 819.44±229.33ha) and the sum area flooded in the year 2001 was 7,375 ha with 318,900 trees damaged. The cost of damage was estimated at RM5, 584,980.00. 38 % of the estates claimed that their area is affected by flood in 4 times in a year; meanwhile





37% of the estates was affected once a year. 25 % of the estates owners claimed that they have been facing the flood problem twice a year. This occurrence of flood in the respective area of estate is dependent on the terrain elevation in the area.

### Crop damage

75% of the surveyed estates were facing crops raiding problems. Elephants, wild boars, monkeys, porcupines and moon rats were the major crop raiders in the Tabin area. Among these, elephants were responsible for 42% of the crop raiding (Fig 1). The extent of damage by wild boars (26%), monkeys (21%), porcupines (5%) and moon rats (5%) were relatively insignificant. 100% damage on crops by different wildlife was on oil palm only. 33% of wildlife-affected estate (6 oil palm companies) claimed that they lost about RM50 to RM200, and more than RM1000 respectively. However, for other estates, 17% lost around RM200 to RM500, and RM500 to RM1000 for each category respectively (Fig 2).

Fig 1: % Frequency of Crop Raiding in Tabin Wildlife Surrounding Area

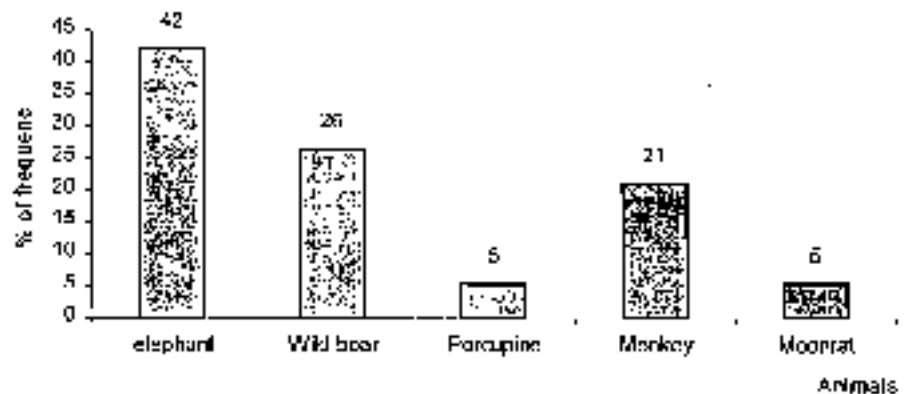
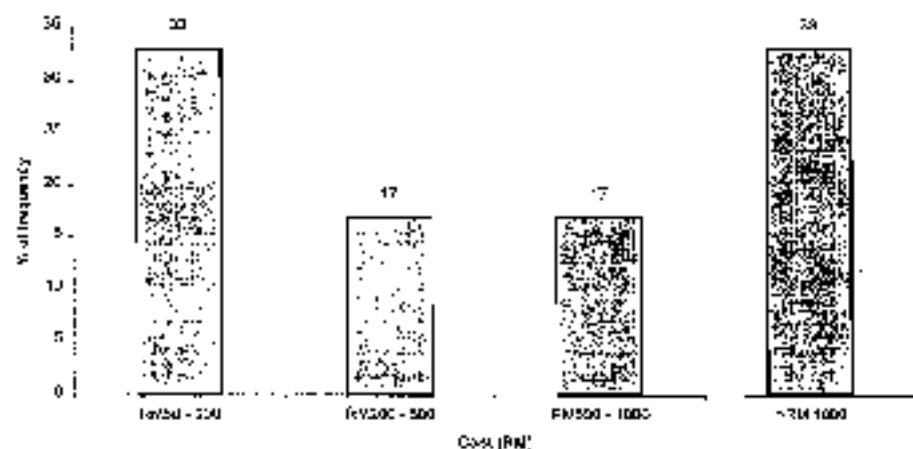
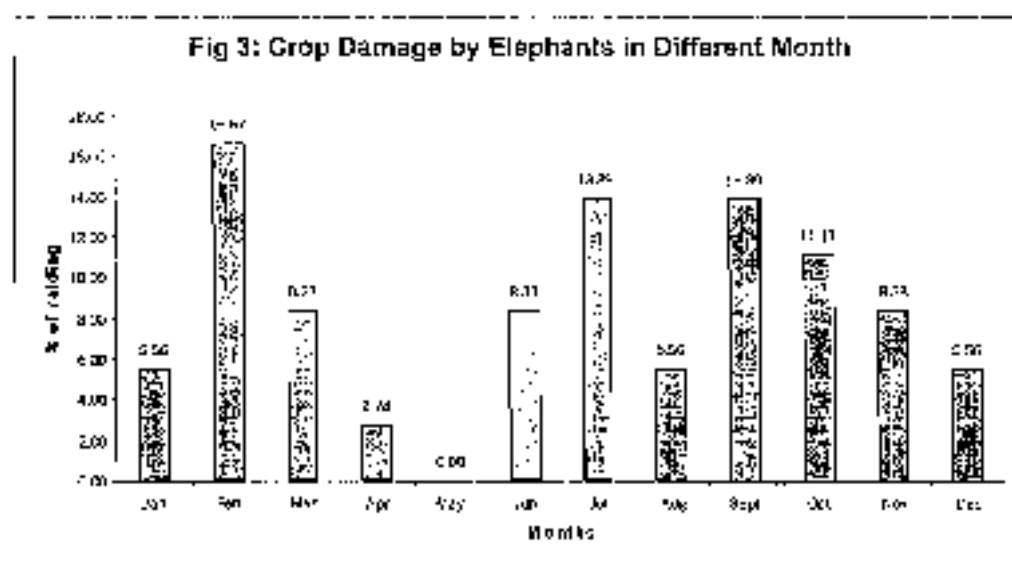


Fig 2: Cost of Damage

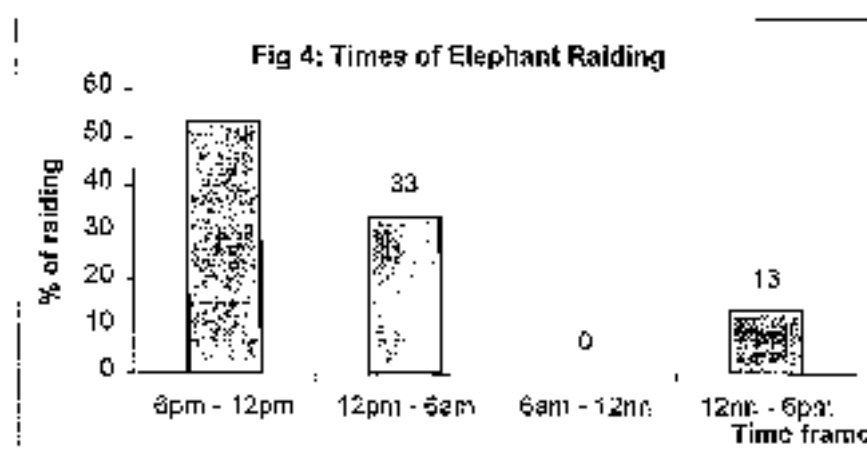


### Crops damaged by elephants

Crop raiding by the elephants were "seasonal" and inconsistently through out the year. Analyses on monthly distribution of raids indicated that 16.67% of crop raidings were in February and 13.89% in July and September respectively (Fig 3).

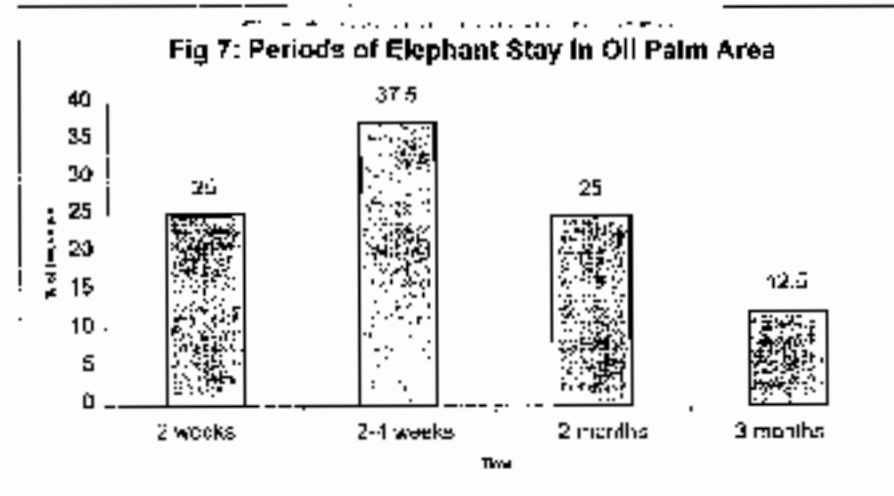
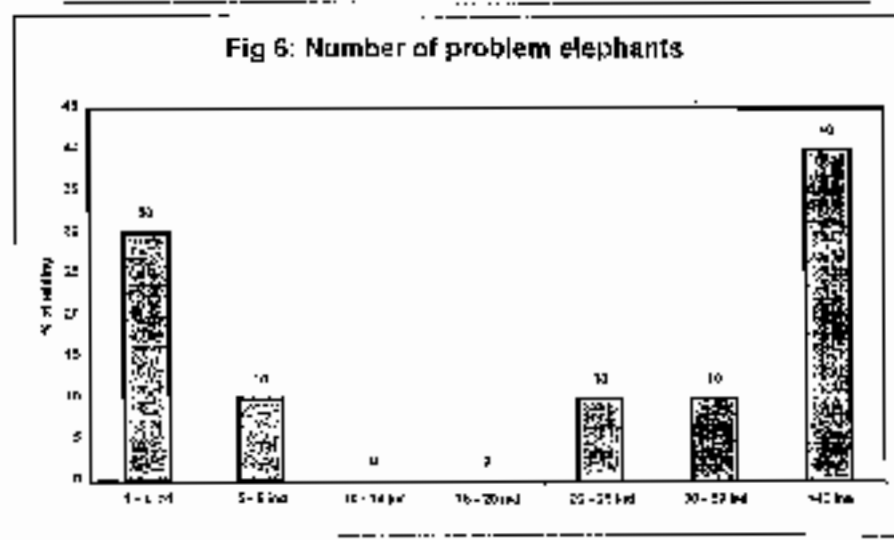
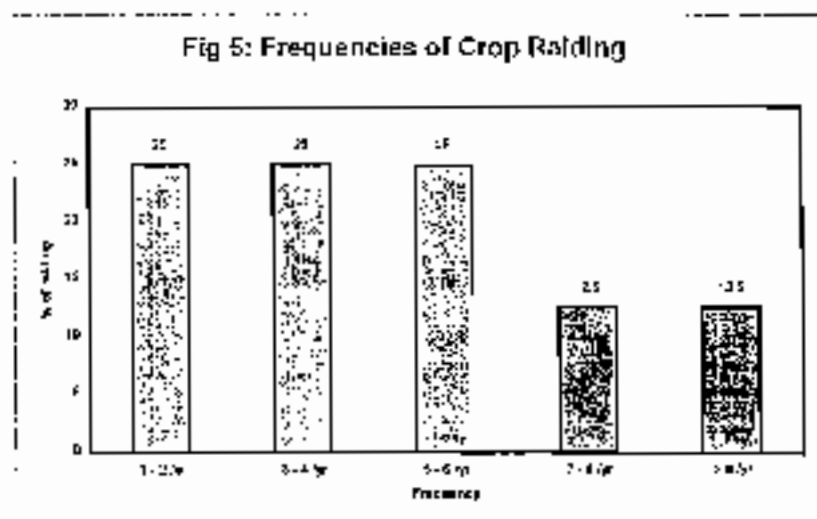


Incidences of crop raiding by elephant were also high in October (11.11%). 53% of the crops were raided actively during 6pm to 12pm (Fig 4), followed by at 12pm to 6am (33%). No crop raiding during daytime especially from 6 am to 12 pm. This is due to the elephants coming into the plantation area usually during evening time that is from 12 pm to 6 pm.

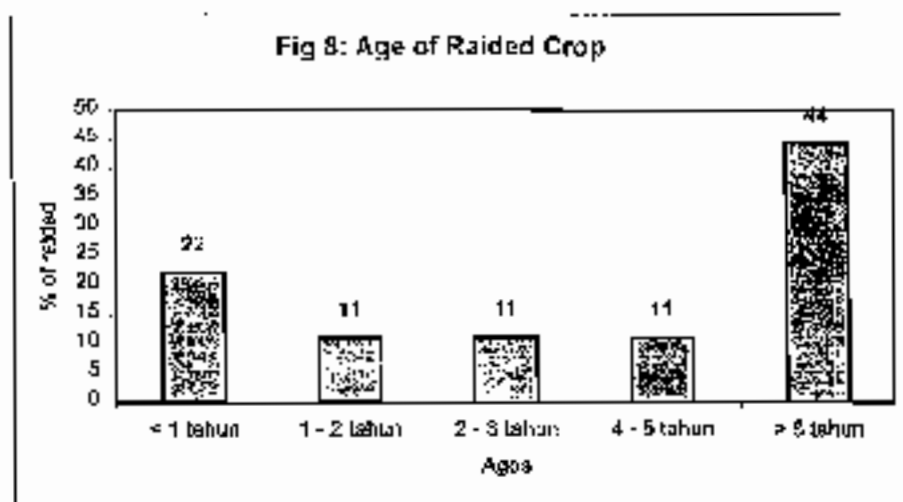


Not more than 6 incidences of crop raiding (75%) happened in a year for each affected-estate (Fig 5). Most of the affected estates claimed that, the crop raiding was caused by at least two group of elephants. The first group was a bigger group that consisted 40 or more individuals of elephant and, the second group consisted of a solitary bull or small group that was not more than four individuals (Fig 7).

Analysis showed that 37.5% of the problem elephants stayed around the estate for two to four weeks (Fig 8).



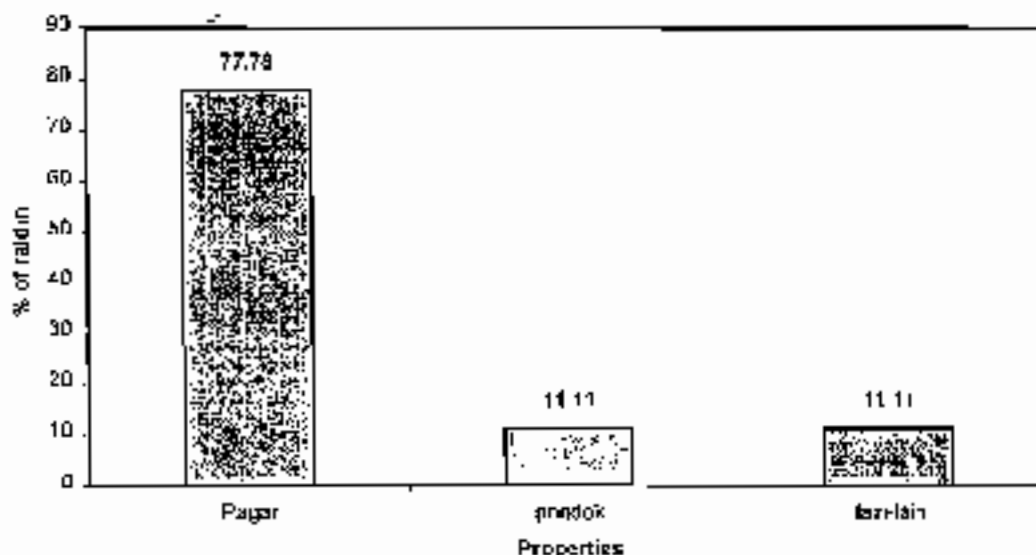
5-year-old palm is the main target as indicated by 44% of the oil palm operators, 22% indicates less than one year old. (Fig 8).



#### Properties damaged

No manslaughter incident occurred in the Tabin Area. However, in terms of property damage, the electrical fence and wood fence are often destroyed by the elephant during the raiding season, compared to other properties such as wood house. (Fig 9)

**Fig 9: Property Damage**



#### Attitudes and opinions

The main reasons why elephants raid crops in Tabin area have been identified. Half of the oil palm companies (50%) have agreed that the elephant raids in the Tabin area were due to the

conversion of the elephants' areas into agriculture areas. As mentioned before that the only portion of Tabin boundary left where elephants can move freely in and out of the reserve is in the northwestern corner where the Segama River forms the boundary. Conversion of forest to agriculture plantation (oil palm) in TWR surrounding area in previous years, has resulting the elephants trapped inside TWR. Movement out of the reserve brings the elephants into conflict with the oil palm plantation: the level of conflict may increase if the populations of elephant in TWR increase from year to year.

The most useful mitigation method used by the oil palm companies is electric fencing. However, most of the electrical fence in Tabin Wildlife is not effective due to lack of regular maintenance. The affected oil palm companies have suggested that conducting a regular meeting with Sabah Wildlife Department would help to coordinate the elephant control effectively.

57.2 % of the oil palm companies agreed that killing or eliminating elephants is not the option to reduce or to solve this human elephant conflict in Tabin. Because there are still other solutions such as translocation (42.9%), and because human should not kill elephants (14.3%). However, 42.9% of the respondents agreed that the problem elephants in Tabin area should be eliminated as to reduce the conflict and control their population as well.

28.6% of the respondents are willing to give out their area for elephant-tourism and 71.4% said no to tourism activities. There are only a small number of the respondents (14.3%) who are interested to take part in elephant-tourism business, while 85.7% are not interested in taking part in elephant-tourism business. However, in terms of the development of "Elephant Control Scheme" in Tabin area, 85.7% of the respondents agreed that this scheme should be developed in Tabin area. 62.5 % of the oil palm confirmed that they are willing to take part and to implement the "Elephant Control Scheme".

All the respondents are willing to allow their workers to take part in the scheme, where 50% of them are willing to send at least two persons, 33.3% are willing to provide 6-10 workers and 16.7% are willing to provide more than 10 workers. 75 % respondents agreed to contribute fund at a range of RM 100-1000 yearly to help the Elephant Control Scheme team and 25% respondents agreed to contribute only RM 10-100 yearly.

Only 12.5% of the respondents are willing to contribute to the community's electric fencing, especially for Kampung Tidong and Kampung Dagat, while the rest (87.5%) are not willing.

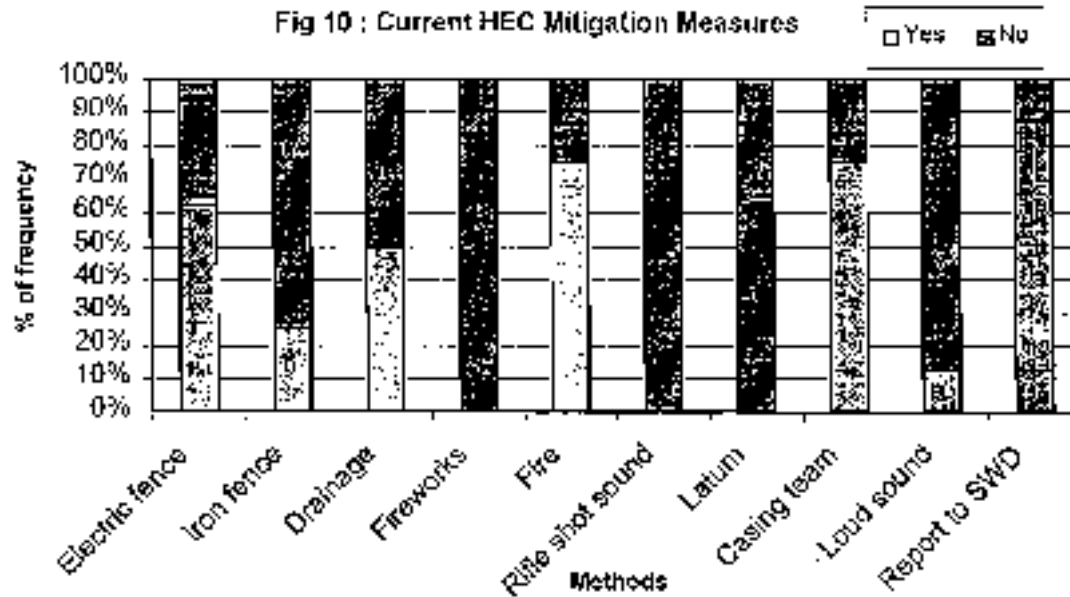
Since most of the forest area is located adjacent to the oil palm plantation area, access to the forest may possible using the exiting oil palm access road. Wildlife hunting activities have been experienced and happened using their oil palm access roads. 75% of the respondents claim that hunting activities often occurred around their estates, and no hunting occurrences in 25% respondents' estate area. Most of the hunters or poachers were identified to have been using four-wheel drive vehicle to get into the Tabin area. These hunters or poachers could be considered as the outsiders. 33% of the hunters walk into the Tabin forest, in which these groups of hunters are considered the oil palm's workers or local community from adjacent villages. 17 % of the poachers use motorcycle to enter the forest through the oil palm estates' gate and 8 % of the poachers use boat to enter into the Tabin Wildlife Reserve.

The main routes that are often used by the poachers to enter the Tabin forest for illegal hunting are as follows:

1. Main Government road
2. Jereco road
3. Boundary road

#### 4. River and Cleared Forest Boundary

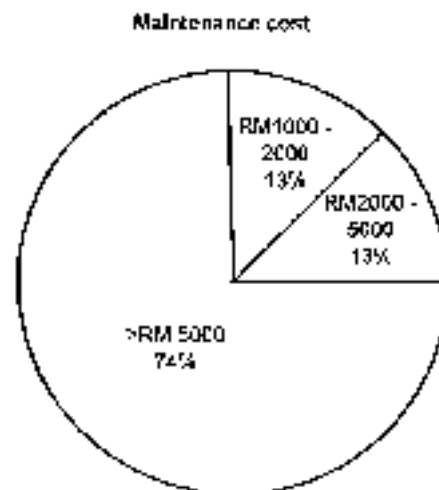
##### Mitigation methods used



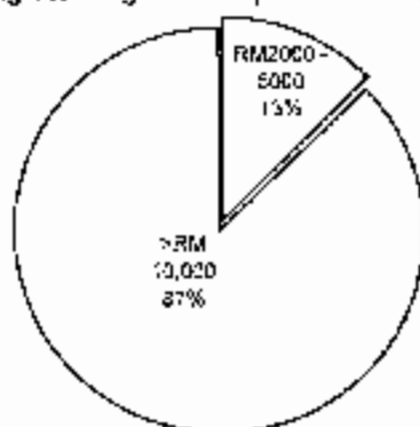
Most of the elephant raid cases were reported to Sabah Wildlife Department, which is located in Lahad Datu town. This is the main action employed by the respondents every time encroachment happened in their plantation. Other main mitigation measures used to control elephant encroachment are, (i) using fire such as burning tyre; (ii) using the electrical fencing along their plantation boundary and (iii) using elephant scaring group. They have also used large drainage, iron fences and loud sound to keep the elephants away from the oil palm plantation.

##### Cost of the Elephant Conflict Mitigation Method

87% of the respondents have spent more averagely than RM10,000 on the preparation of their elephant mitigation measures (Fig 11). The rest (13%) were spending at a range of RM2,000 – 5,000 for the preparation of any elephant mitigation measures. Yearly, 74% of the respondents spent more than RM5,000 for the maintenance and 26 % claimed that they have spent RM1,000 – 5,000. (Fig 12)



**Fig 11: Mitigation Preparation Cost**

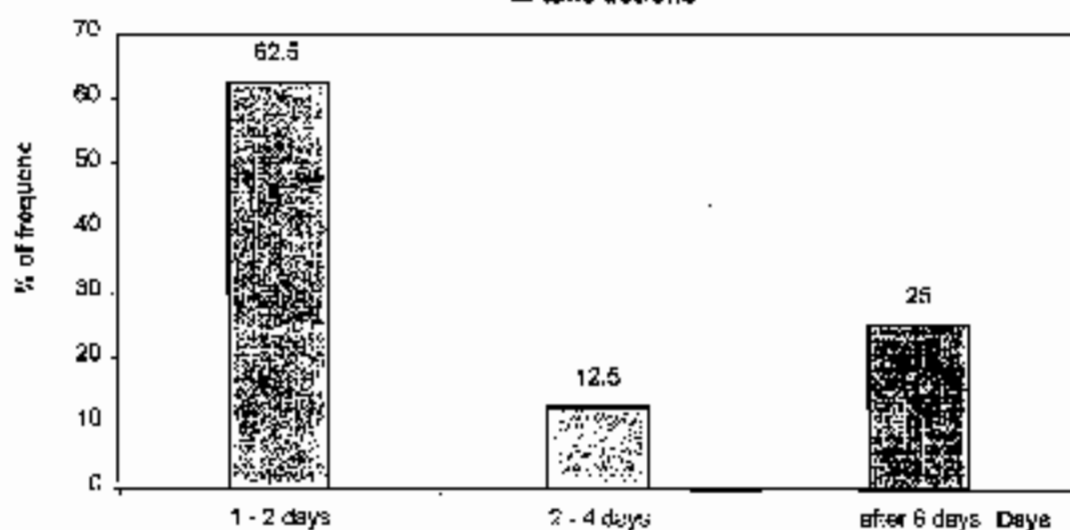


**Fig 12: maintenance Cost**

***Effectiveness of SWD's Action toward Elephant Control***

Out of the 75 % of the respondents which has been visited by Sabah Wildlife Department (SWD), 50 % of them claim that actions taken by SWD was not really effective and reduce the elephant conflict situation. 25 % of the oil palm companies complained that they never been visited by SWD even when they have submitted a conflict report. This may be due to the difficulties of the access road and also lack of manpower in SWD.

**Fig 13: Number of days taken by SWD to take actions**

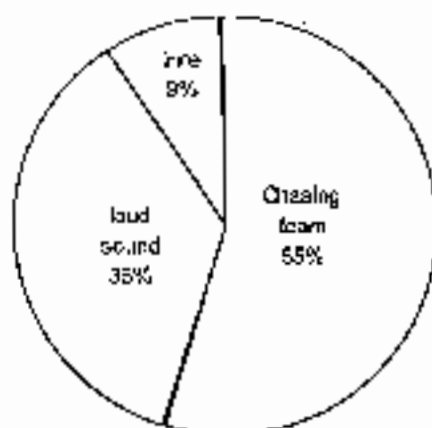


62.5% of the respondents claim that they need to wait at least 1 or 2 days, for the SWD to take action on the elephant encroachment. This happened in the oil palm plantation area where no electrical fences were used. 12.5% respondents claimed that it took 2 to 4 days. 25% of the respondents claim that normally no action was taken by SWD, until the 6<sup>th</sup> day (Fig 13).

**Fig 14: Mitigation Methods used by SWD**

**Fig 15: Effectiveness of SWD's action**

Actions from SWD (N=11)



Effectiveness of SWD (N=8)



Method of elephant controls that are still used by SWD, are as follows; (i) using the chasing team "Elephant Scaring Group"(55%), (ii) using loud sound (35%) and (iii) using fire (9%). 62% of the respondents claims that the existing mitigation methods, are still effective in certain area of oil palm plantation. Meanwhile 38% of the oil palm companies claimed that these ways of keeping the elephants away are not effective.

#### Electrical Fencing Structures

Fig 16: Fencing Structures

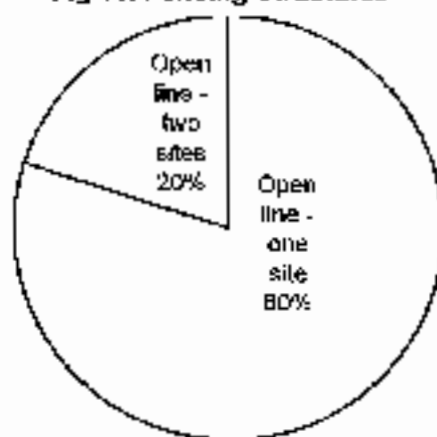
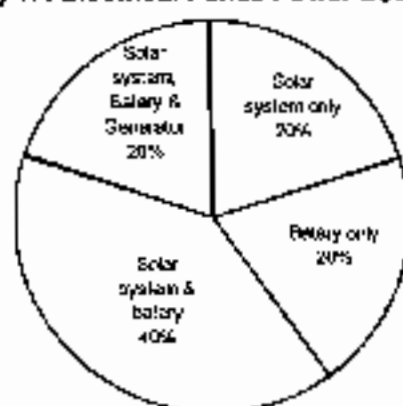


Fig 17: Electrical Fence Power Sources



80 % of the respondents were using "open line at one site" structure of electrical fences, while 20 % were using "open line at two sites". All the electrical fences used by the oil palm companies were constructed using two wires only as shown in plate no X.

Solar system and battery is the main electrical fence power sources used by 40 % of the oil palm companies. Meanwhile, the others are using battery only (20%), solar only (20%) and full set of solar system including battery and generator (20%).

Active hours (N=5)

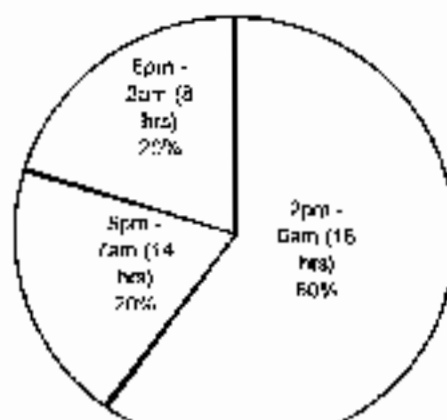




Fig 18: Pole covered by rolled wires.



Fig 19: Active Hours

The design of the electrical fences also could contribute to the effectiveness of the electrical fences. Most of the fences' pole were covered by a rolled of wires (60%) while the rest were not covered. 60% of the respondents claimed that their electrical fences were active starting from 2 pm to 6 am, as shown in Fig 19. 80 % respondents claimed that they did check their electrical fences once in 3 days, while 20% respondents claimed that they check their electrical fences everyday.

#### Conclusion

- Based on the feedback obtained from local residents (via questionnaire elephants disturbance normally transpire in a group of more than 40 elephants in Tabin Wildlife Reserve surrounding area.
- In terms of pattern of the elephant disturbances, it frequently occurs between the months of Feb - March , followed by the period between Jul - September, 2001. Majority of the respondents (75 %) stated that in one year the number of disturbances was between 1 - 6 times. The elephants stayed in the oil palm area within 2 - 4 weeks long, and the elephant prefer to enter the oil palm area during 6pm -12pm.
- Among the prevention methods that are always used are electrical fence, fire, elephant casing team and report to SWD.
- Based on the survey results, the service provided by the Wildlife Department, whenever elephants disturbances occur remains unsatisfactory by the oil palm.
- Most of the hunters or poachers have been using the oil palm roads as their access road to TWR. These roads include the federal road and Jereco road.
- The main reasons why elephants raid crops in Tabin surrounding area were due to the conversion of the elephants' areas into agriculture areas. As mentioned before that the only portion of Tabin boundary left where elephants can move freely in and out of the reserve is in the northwestern corner where the Segama River forms the boundary. Conversion of forest to agriculture plantation (oil palm) in TWR surrounding area in previous years, has resulting the elephants trapped inside TWR. Movement out of the reserve brings the elephants into conflict with the oil palm plantation; the level of conflict may increase if the populations of elephant in TWR increase from year to year.

- In terms of developing tourism centre (elephant viewing site) in the oil palm, most of the oil palms are not really agree with the idea of transforming part of their area as a tourist site. However, they are willing to co operate with SWD to implement any of the Elephant Control Scheme, which organized and coordinated by SWD. In order to involve them in the Wildlife Department programme, it was strongly recommended that frequent meeting with the oil palm should be arranged to discuss the elephant conflict issues and hunting activities as well.

# Report on the Reconnaissance Survey of Elephant and Rhinoceros in the Trans-Border Area of Sabah (FMU 13 and FMU 25)

11<sup>th</sup> September – 19<sup>th</sup> September 2001.

*Prepared by  
Raymond J. Alfred  
AREAS (Borneo) Programme  
WWF Malaysia*

## SUMMARY

During the GIS Session in the AREAS II Meeting, Vietnam, which was held on 8 – 12 June, 2001, the AREAS teams from WWF Malaysia in Sabah and WWF Indonesia in Kalimantan have agreed to organize a joint-venture survey along the Sabah & Kalimantan boundary area. The survey will concentrate on the areas that are located near Sungai Sibuda and Sungai Agison.

The agreement was based on the discussion made with reference to the merged GIS data/information (which was produced by WWF Malaysia) and surveyed elephant data distribution from both sides (Sabah and Kalimantan). The final survey needs to be designed and planned as to produce supporting document, which will be very useful in the process of preparing and recommending the Borneo's trans-frontier corridor for elephant and rhino. This report outlines the result of the survey carried out along the Sabah-Kalimantan boundary area located in Forest Management Unit 25 and 13, from 11<sup>th</sup> September to 19<sup>th</sup> September 2001.

## I. INTRODUCTION

### 1.1 Status of the Elephant in Sabah and Kalimantan

More than 55 % of Sabah's elephants have been estimated to live outside protected areas. About 30 % of Sabah's land area is considered suitable for permanent agriculture, such as oil palm and cocoa, yet less than 20 % is actually in use. (Fig 1) Forest clearance for agricultural plantations in the last 20 years has resulted in squeezing the population into several patches of forest. Killing of elephants, usually as a result of conflict with agriculture especially in the oil palm area's, but on a small scale. As the elephant habitat in many areas seems to overlap with the rhino and orang utan habitat, these species are also threatened by the proposed activities. Therefore, loss of habitat poses a much greater threat to these species than direct killing.

Borneo's elephants range from the mouth of the Kinabatangan River in Sabah, Malaysia up the whole Kinabatangan watershed across a ridge through Sibuda River and Agison River into the Sebuku Sembakung watershed in Northeast Kalimantan, Indonesia. A recent survey done by WWF Malaysia (AREAS programme) has indicated that the Kalabakan FR, Sapulut PR, Gunung Rara PR areas are parts of the main habitat for elephants and rhinos. Elephants range over these large connected forest areas and a few herds are isolated in large fragmented forest patches. They have been using this area as their migration path from Deramakot PR and Segaliud Lokan FR area into the Kalabakan FR area, and also as sources of food. The existence of Elephant's evidence in Northern Kalimantan area gave some presumption to the existence of elephant trans-boundary migration activities using the lowland area

along Sibuda River and Agisua River. Slope analysis for these areas also indicates that this area is accessible by elephants.

In Kalimantan, elephants occur only in the upper Sembakung river in the Tindung district. Today its refuge seems to be the proposed Sebuku Sembakung National Park in Northeast Kalimantan. This area is rich in wildlife that includes the orang utan, sun bear, and possibly the Sumatran Rhino. The number of elephants in Sebuku Sembakung area is not known. In Sabah, the total population of elephants is estimated to be between 900 – 1,000.

## 1.2 Conservation Problems

In Borneo, there are two major elephant conservation problems. First, saving those elephants displaced by habitat loss, and second, ensuring forest corridors for two core areas for elephants, Sumatran rhinos and orang utans - a contiguous chain of commercial Forest Reserves from the central part of Sabah to Sebuku Sembakung area.

In Sabah, the populations of Sumatran Rhino and Elephant are currently facing two kinds of threats namely industrial tree plantation scheme and oil palm development. Industrial tree plantation scheme is the main threat for these species, as the activities involve the removal of natural forest and replacement with monoculture tree plantation. These human activities will definitely revolutionise the forest corridor between the protected/conservation areas such as from Danum Valley to Maligu Basin Conservation Area, and Danum Valley or between Sabah forest and Kalimantan forest. These areas including Taain Wildlife Reserve have been identified to have high density of large mammal especially elephants, rhinos and orang utans.

The forest area along the Sabah-Kalimantan boundary is managed by FMUs holder no 13, 14 and 25. Biological elements in these areas need to be maintained as these areas link the central part of Sabah to the Sebuku-Sembakung area.

In Kalimantan, the forests contain some of the richest stands of commercially valuable timber species of the family Dipterocarpaceae. These resources have been and are being exploited extensively.

Borneo's contiguous forest landscape is a typical example of Southeast Asian rainforest and one of the last remaining frontier forests on the entire island of Borneo. Linking several protected areas and forest reserves, it is home to tremendous biodiversity, including strongholds for critically endangered species such as the Asian elephants, Sumatran rhinoceros, orang-utans, and proboscis monkeys. Borneo's contiguous forest landscape lies within both terrestrial and freshwater Global 200 ecoregions, prioritized for biodiversity of global significance. Losing the contiguous forest landscape would be an unacceptable failure for conservation efforts not only in Borneo, but also the whole of Asia.

Biologically, the most sensitive areas for Borneo's elephant population are the passes along the Kuamat/Kinabatangan to the Sebuku Sembakung watershed and vice versa. If these passes, identified as the the only existing corridor for biodiversity flow especially for large mammals (elephants, rhinos and orang utans ) were excised and thus "taken off" the elephant map, the Malaysian and Indonesian elephant populations would be permanently separated. The attached map shows the approximate boundaries of the watersheds that need to be surveyed.

### 1.3 Initial Conservation Measures/Action Need

Sabah shares with Kalimantan the only elephant population in Borneo. Co-operation between the authorities in both countries would enhance the future prospects of the elephants. At the moment, WWF Indonesia with financial support from USAID and GTZ is designing a new national park directly south of the Sabah/Kalimantan border. This park ideally should contain all of the elephant range in Kalimantan.

WWF Malaysia in Sabah, with financial support from WWF AREAS and collaborative work with Sabah Wildlife Department, is trying to identify primary elephant and rhino habitats in Southeast of Sabah to recommend corridors and other areas to the Malaysian government to be exempted from clear cutting schemes. WWF AREAS proposes joint surveys by WWF Malaysia in Sabah and WWF Indonesia team in Kalimantan, together with their respective government counterparts, as to provide concrete evidence/argument into both conservation efforts.

The attached map (Fig 2) shows the record of elephant distribution in both area (Sabah and Kalimantan) which is based on ground survey and Fig 3 shows the potential movement pattern of the elephant based on the slope analyses classification and Fig 4 shows the approximate area or boundaries of the area that need to be surveyed.

## 2.0 SURVEY BACKGROUND.

### 2.1 Objectives

The survey was planned for the period 12<sup>th</sup> to 17<sup>th</sup> September 2001. The team assembled on the 11<sup>th</sup> September 2001 at Tibow Forestry Office and on the 12<sup>th</sup> September the survey was started. The objectives of the field survey are as follows:

1. To identify and map geographically all potential rhino, elephant, and orang utan habitat along Sabah-Kalimantan International Boundary,
2. To bilaterally prepare a proposal for a Sabah-Kalimantan elephant and rhino trans-border reserve.
3. To provide strong evidence of elephant and rhino migration activities along the boundary of Sabah and Kalimantan which could be used to support the need of sufficient forest linkages/corridors in the central part of Sabah (between Danum Valley and Maliau Basin) into Kalimantan area as to reduce human-Conflict in central part of Sabah.

### 2.2 Areas of Survey and Participants.

Based on Map in Figure 4, three routes have been identified. The team was divided into three teams. The first team (Team A) covered Area 1 (area along the main Agison River) and the second team (Team B) covered Area 2 (area along Sibuda River). Area 3 was covered by Team C (Leader: Jitoh ).

Area ID	Forest Reserve	Length of Route (km)	Nearest Access Road
One	Sapulut	9.5	Tibow - Kg. Sasendukon
Two	Sapulut	9.5	Tibow - Kg. Sasendukon
Three	Sapulut	8	Tibow-Saliba Camp

### 2.3 Sabah Trans-frontier Survey Teams/Participants

To avoid any international affair problems or difficulties during the implementation of the field survey, the Sabah team covered the Sabah area (FMU 13 and FMU 25) and the Kalimantan team covered the Kalimantan area only.

Team	A	B	C
Leader	Raymond J. A. Field (WWF/M)	Christy William (WWF Nepal)	Jinoh Lajinir (SWD)
Team member(s)	Engelbert Dausin (WWF/M) Henry Ekou (WWF/M) Zulkarnain Bin Hesham (SWD)	Dr. Geoffrey Davison (WWF/M) Eugene Lee (WWF/US) William Datsip (WWF/M) Gau Nasib (SWD)	Murjahan Marjuki (SWD) Jaharus Mulu (WWF) Zulkiplic Haji Suhar (SWD) Jauwal Abd Gafar (SWD)
Vehicle	1	2	2

### 2.4 Survey Protocol and Methodology

As listed in the following, all relevant data on elephant, rhinoceros including access roads were compiled before the routes of the survey were designed. Geographical Information System (GIS) was used to assist the design of the survey including planning the logistics requirement, data analyses and report preparation.

#### Survey Protocol:

1. Acquisition of relevant information (elephant & rhino distribution from FMU 13, 14 and 25 including access road and copped pattern)
2. Preparation of GIS map (indicating priority surveys sites for rhino, elephant, and orang utan)
3. Field survey carried by each team at the respective surveyed block.
4. Update surveyed data in GIS
5. Determine the elephant movement pattern in southern Kalahakan and Sapulut Forest Reserves and in proposed Sebuku-Sembakung National Parks.

Considering the condition of the terrain and the forest in FMU 13 and FMU 25, it was not possible for the survey teams to conduct a straight line transects. Survey routes were plotted as to cover the areas of interest. Therefore, the survey teams (Team A and Team C) followed the abandoned logging road, as their survey route and Team B used the existing logging road in FMU 25. The survey areas were chosen based on the importance of the area to the survey and project's objectives, and information on access road and logistics.

Data was recorded at every location where elephants' sign were found. The data will include the location data (GPS reading) and habitat type (Appendix I: Survey Data Sheet) Elephant's dung, size and estimated individual of elephant were also recorded.

### 3.0 RESULTS AND DISCUSSION

The three survey teams surveyed using three routes, and the ground survey routes are given in Figure 5. Team A and Team C reached the survey site (area near the Agison River) on 13<sup>th</sup> September and carried out the survey from 14<sup>th</sup> – 16<sup>th</sup> September (three days) and travelled back on the 17 September. Team B reached the survey site, which is near the Sibuda River on 13<sup>th</sup> September and carried out the survey for three days. Data entry, preliminary analyses were prepared on 19<sup>th</sup> and 20<sup>th</sup> September 2001.

#### *Agison River*

The survey teams in the Agison River area followed the existing abandoned logging road and reached the border (Sabah and Kalimantan). The terrain elevation type of the area is classified under undulating area with a slope of below 30°. Hunting activities were recorded active in this area since several signs of camping were found along the old logging road especially near the Agison River. A total of 90 elephant occurrences were recorded and these included 77 dung piles. All the dung observed was old (3-4 months old) and most of the dung was found along the old logging road and natural trails. The length of the survey route is about 11.8 km (measured on the ground by GPS).

The main soil association found in this area is the Maliau Association, which is classified under Orthic Acrisol, Gleysol and Lithosol. It is a sandy and low fertility soil and derived mainly from the parent materials of sandstone, siltstone and mudstone. In this area, elephant tracks were difficult to be traced due to sandy and muddy type of soil and also due to the raining seasons, which have washed the elephant tracks. However, we managed to record 8 elephant tracks in this area and 15 elephant migratory routes, including 3 feeding sites.

Based on the gathered data, most of the elephants were moving toward North and South (up and down) direction. As recorded in the following table, 60% of the elephant dung were found along the old logging road, heading to Kalimantan side – eastern and southern direction. Meanwhile, 12.1 % of movements were recorded, crossing the logging road and heading to southeastern area. 8.6 % of the elephant movements were recorded to be crossing the logging road from North towards South direction (meaning to say that the elephants crossing the west-east-direction old logging road), heading to the tributary of Agison River. 8.6 % crossing movements were also recorded heading western area especially 5 km from the boundary since the location of the old logging road is at the eastern part of Agison river. 6.0 % of the movements were recorded to be heading to the southern area and 3.4 % heading to the east.

The overall summary of the movement pattern in the Agison River is likely moving towards North-South direction, and the elephant groups tend to keep their distance from the Agison river. This abandoned logging road area was used by the elephant at a medium level, since a density of 6.5 dung per km was identified along this logging road. This area is the only natural trails found across to the Kalimantan side and it is believed that other wildlife such as Pig-tailed Macaque (*Macaca nemestrina*), Bearded Pig (*Sus barbatus*) and Sambar Deer (*Cervus Unicolor*), are habituating in this area as these wildlife species were observed during the survey. Furthermore, based on the recorded data, 100 % of the area was covered by secondary data, which can provide an immense secondary vegetative food.

#### *Sibuda River*

In the Sibuda River area, the survey team used the existing logging road as their survey route. The team drove at 30-40 km per hour along the logging road and recorded any elephant's sign along the road.

The terrain elevation in the Sibuda River area is classified under undulating area with a slope of below 30°. No hunting activities were recorded in this area. A total of 20 elephant occurrences were recorded and these included 15 dung piles. Out of the 15 dung piles, 2 of them were fresh. Other observed dung was identified to be 2-3 months old and most of the dung was found along the existing logging road. 7 elephant tracks were also observed in this area and 2 of them are still fresh. Identification of elephant movement pattern in Sibuda River area cannot be identified due to the fact that (i) the survey team did not record any sign of movement direction or (ii) no elephant migratory route was found, during the survey.

#### 4.0 CONCLUSION

- The presence of elephants along the Agison River and Sibuda River may indicate the connection to the elephants in the Kalimantan side. A total of 90 elephant occurrences were recorded near the Agison River and these included 77 dung piles. Most of the dung was found along the old logging road and natural trails. In Sibuda River area, a total of 20 elephant occurrences were recorded and these included 15 dung piles. Out of the 15 dung piles, 2 of them were fresh.
- Most of the elephants were moving toward North and South (up and down) direction.
- As most of the dung observed was old (3-4 months old) and was found along the old logging road, it is believed that Agison River has been used by a single population. Another population potentially has been using the Sibuda River area as this area is separated from Agison River area by a hilly area as shown in the map.
- The average of the terrain elevation, where the elephant's sign was found, is at a range of 400 to 800 meters.
- Preferable slope (identified during the survey) by the elephant to enable their movement is below 35 meter. No elephant sign was recorded along the survey route, which is more than 35° of slope classification. The elephant groups prefer to follow the flat area (1° – 30° of slope) and heading to the river, where secondary forest vegetation (food) such as grass can be easily found. These were evidenced at several locations of elephant occurrences.
- Logging activities may not be the main threats for the wildlife especially elephant including rhino and orang utan at the moment, but hunting and poaching activities may considered as the main one. This area is located 28 km from the area where rhino was killed in the PMU 25. Hunting and poaching activities in this area couldn't be monitored due to the lack of enforcement in this remote area especially in the abandoned secondary forest area.
- In terms of training the basic data collection technique, the differences in data handling and collection in Agison River and Sibuda River (which emphasizes on the collection of elephant's data on movement direction and dung's size) could affect the result of elephant's presence and movement (pattern) analyses process.





**Fig 2 : Elephant Surveyed Distribution In Sabah & Kalimantan**



-  Hydrology System
-  Road System
-  Surveyed Pelebar Distribution (Sabah & Kalimantan)
-  Sabah & Kalimantan Boundary
- Approximate Range of Major Dryland Habitats**
- Conducive to Ultrasonic Roar**
-  Lower Montane Forest
-  Highland Dipterocarp Forest
-  Upland Dipterocarp Forest (Heath and Peat Heath Forest)
-  Lower Dipterocarp Forest (Riverine Forest & Limestone Vegetation)



## ELEPHANT, RHINO AND ORANG UYAN DATA SHEET

Date : 07.0.2001

Surveyor(s) : Raymond, Rest, Harry, Jint, Martujum, Zulkarnain

Data Sheet No: 1

Location : RMJ-3

Block/Area : E1 - E7 and 3' - 8'

GPS: E:

N:

No	Time	GPS		Spot	Obs	Signaling signs		Area Lsa	Hores: Type	Incline/ Slope	V.s. (m)	Sub	Activity	Remarks/ Notes
		East	North			Size (cm)	#							
1	07.00 am	116.66934	4.42677	F	D	15	1	Y	SF	U/I	1-5	M	UR	
2	07.53am	116.66996	4.42587	E	D	15	1	Y	SF	U/I	1-5	M	HIOLR	
3	08.02am	116.66951	4.42330	E	D	15	1	Y	SF	U/I	1-5	M	HIOLR	Photo -> 16
4	08.14am	116.67242	4.42184	E	D	18, 12.6	2	Y	SF	U/I	1-5	M	OLR	
5	08.19am	116.67152	4.42061	E	D	10, 12	2	Y	SF	U/I	1-5	M	HIOLR	Photo 17 & 18
6	08.23am	116.67132	4.41779	F	T/SH	-	1	Y	SF	U/I	1-5	M	HIOLR	Photo 19 from SE
7	08.35am	116.67042	4.41755	E	T/SH	-	1	Y	SF	U/I	1-5	M	HIOLR	From 5 & From N
8	08.51am	116.67074	4.41173	C	D	12	1	Y	SF	U/I	1-5	M	HIOLR	
9	08.57am	116.66932	4.41033	E	D	11	1	Y	SF	U/I	1-5	M	HIOLR	
10	09.02am	116.67003	4.40649	E	D	11	1	Y	SF	U/I	1-5	M	HIOLR	
11	09.13am	116.67232	4.40915	E	D	11	1	Y	SF	U/I	1-5	M	HIOLR	
12	09.14am	116.67236	4.40931	E	D	13	1	Y	SF	U/I	1-5	M	HIOLR	Forest Type 2.
13	09.20am	116.67867	4.40874	E	D	12	1	Y	SF	U/I	1-5	M	HIOLR	Track From NE
14	09.25am	116.67726	4.40845	F	D/T	14, 19	2	Y	SF	U/I	1-5	M	HIOLR	
15	09.29am	116.67766	4.40735	E	D	13	1	Y	SF	U/I	1-5	M	HIOLR	
16	09.31am	116.67753	4.40967	E	D	13	1	Y	SF	U/I	1-5	M	HIOLR	
17	10.05am	116.67296	4.40271	E	D	13	1	Y	SF	U/I	1-5	M	HIOLR	
18	10.15am	116.67237	4.40260	E	T/D	31	1	Y	SF	U/I	1-5	M	HIOLR	Track
19	10.05am	116.67304	4.40226	E	D	14, 12	2	Y	SF	U/I	1-5	M	HIOLR	
20	10.09am	116.67850	4.40227	E	D	14, 13	2	Y	SF	U/I	1-5	M	HIOLR	
21	10.17am	116.67962	4.40226	E	D	13	1	Y	SF	U/I	1-5	M	HIOLR	
22	10.19am	116.67985	4.40171	E	D	14	1	Y	SF	U/I	1-5	M	HIOLR	
23	10.22am	116.67907	4.40340	E	D	13	1	Y	SF	U/I	1-5	M	HIOLR	
24	10.22am	116.67971	4.39874	E	D	13	1	Y	SF	U/I	1-5	M	HIOLR	
25	10.26am	116.67987	4.39868	F	D	14	1	Y	SF	U/I	1-5	M	HIOLR	
26	10.32am	116.68107	4.39848	E	T/SH	-	1	Y	SF	U/I	1-5	M	HIOLR	From N
27	10.34am	116.68271	4.39802	E	D	12	1	Y	SF	U/I	1-5	M	HIOLR	
28	10.35am	116.68294	4.39558	F	D	13	1	Y	SF	U/I	1-5	M	HIOLR	
29	10.37am	116.68351	4.39437	E	D	11	1	Y	SF	U/I	1-5	M	HIOLR	
30	10.40am	116.68496	4.39420	F	D	14	1	Y	SF	U/I	1-5	M	HIOLR	

## ELEPHANT, RHINO AND ORANG UTAN DATA SHEET

Date : 17.09.01  
Location :Surveyor(s) : Raymond, Bert, Pasdy, Alloh, Marjulum, Zulkarnain  
Block/Area : E1 - E7 and B1 - B8Data Sheet No :  
GPS F :

2

N :

No	Time	GPS		Spp	Signaling / signs			Azies Use	Folies Type		Terraing Slope	Vis (m)	Sub	Human Activity	Remarks / Notes
		East	North		Cbs	F/O	ψ		Size (cm)	Use					
31	11.12am	118.68735	4.38839	E	D	0	1	3	Y	SF/HF	UM	1-5	M	H/O LR	
32	11.13am	118.68800	4.38816	E	D	0	1	3	Y	SF/HF	UM	1-5	M	H/O LR	
33	11.16am	118.68949	4.38840	E	D	0	1	4	Y	SF/HF	UM	1-5	M	H/O LR	
34	11.34am	118.69559	4.40155	E	D/EH	0	1	14	Y	SF/HF	UM	1-5	M	H/O LR	H/W from NW. P-21022
35	13.26pm	116.68613	4.41172	E	D	0	1	10 / 14	Y	SF/HF	UM	1-5	M	H/O LR	
36	13.50pm	116.68594	4.41140	F	D	0	1	13	Y	SF/HF	UM	1-5	M	H/O LR	
37	15.33pm	118.68809	4.38876	E	D	0	1	13	Y	SF/HF	UM	1-5	M	H/O LR	H. Way from N.
38	16.36pm	118.68819	4.38878	E	EH	F/O	1	-	Y	SF/HF	UM	1-5	M	H/O LR	H/Way from NW
39	16.39pm	118.68827	4.38830	E	D/EH	0	1	13	Y	SF/HF	UM	1-5	M	H/O LR	
40	17.34pm	118.68861	4.38951	E	D	0	1	13	Y	SF/HF	UM	1-5	M	H/O LR	
41	18.43pm	118.69780	4.38550	E	D	0	1	13	Y	SF/HF	UM	1-5	M	H/O LR	
42	19.45pm	118.69202	4.38555	E	D	0	1	11	Y	SF/HF	UM	1-5	M	H/O LR	
43	08.06am	118.72351	4.39140	F	F/H	0	1	-	Y	SF/HF	UM	1-5	M	H/O LR	From NE
44	08.08am	118.70383	4.38778	E	F/H	0	1	-	Y	SF/HF	UM	1-5	M	H/O LR	From NE. P - 21.28.29
45	08.21am	118.70456	4.38847	F	F	0	1	13	Y	SF/HF	UM	1-5	M	H/O LR	
46	08.24am	118.70342	4.38828	F	F	0	1	12	Y	SF/HF	UM	1-5	M	H/O LR	
47	08.27am	118.70333	4.38785	E	D	0	1	9	Y	SF/HF	UM	1-5	M	H/O LR	Photo - 32
48	08.29am	118.70309	4.38733	E	D	0	1	11	Y	SF/HF	UM	1-5	M	H/O LR	
49	08.30am	118.70343	4.38690	E	D	0	1	12	Y	SF/HF	UM	1-5	M	H/O LR	
50	08.33am	118.70380	4.38570	E	EH	0	1	-	Y	SF/HF	UM	1-5	M	H/O LR	From NE
51	08.37am	118.70396	4.38378	E	D	0	1	12	Y	SF/HF	UM	1-5	M	H/O LR	
52	08.37am	118.70385	4.38354	E	D	0	1	12	Y	SF/HF	UM	1-5	M	H/O LR	
53	08.35am	118.70380	4.38304	E	D	0	1	13	Y	SF/HF	UM	1-5	M	H/O LR	
54	08.42am	118.70376	4.38278	E	D	0	1	13	Y	SF/HF	UM	1-5	M	H/O LR	
55	08.54am	118.70415	4.38024	E	D	0	1	8, 13, 18	Y	SF/HF	UM	1-5	M	H/O LR	Photo 31/32
56	08.56am	118.70431	4.37818	F	D	0	1	13	Y	SF/HF	UM	1-5	M	H/O LR	
57	09.04am	118.70457	4.37775	E	D/H	0	1	13	Y	SF/HF	UM	1-5	M	H/O LR	
58	09.07am	118.70509	4.37894	E	D/H	0	1	11	Y	SF/HF	UM	1-5	M	H/O LR	H/W From N.
59	09.09am	118.70473	4.37808	E	D/H	0	1	13	Y	SF/HF	UM	1-5	M	H/O LR	H/W From NE.
60	09.11am	118.70481	4.37555	E	EH	0	1	-	Y	SF/HF	UM	1-5	M	H/O LR	H/W From West. P-33





# Report on the Rhino Protection Unit (RPU) Training In Indonesia for Sabah Wildlife Department.

November 6 – 17, 2001

Prepared by  
Raymond A. Alfred  
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## 1.0 Introduction

Sumatran Rhino (the Humean form of the Asian two-horned rhinoceros - *Dicerorhinus sumatrensis harrissoni*) has suffered a serious decline in distribution and numbers throughout northern Borneo since the conversion of forest into oil palm plantation (early 1980's.). The creation of access road to the remaining forest has invited and introduced poachers into the wildlife habitat especially the rhino. This happened in several areas such as Tabin Wildlife Reserve and several areas adjacent to Danum Valley such as Kuamut FR, Malua FR and eastern part of Gunung Rara FR. Prolonged illegal hunting was identified as the major factor, which had led to the species' decline. Loss of forest habitat through conversion to permanent agriculture was also becoming a significant threat.

Only two areas in Sabah contain rhino populations with good prospects of long-term survival with adequate protection and management, namely Tabin and the Ulu Segama-Kuamut area. The Tabin rhino population was under pressure from forest loss and was awarded protection by the Sabah government in 1984 through the establishment of the 1,225 sq. km. Tabin Wildlife Reserve (TWR). The second population (the Ulu Segama-Kuamut area) is scattered through a vast area of several contiguous Forest Reserves, but probably centred within an area of less than 4,000 sq. km. in the catchment areas of the upper Segama and upper Kuamut Rivers. This latter area includes the Danum Valley and Maliau Basin Conservation areas in Sabah Foundation's 100-year logging concession. Two other areas known to contain rhinos may possibly prove to be important for the species' conservation: (i) the Segalind-Lokan/Derumakot/Jangkalap Forest Reserves, (ii) Lot 1 in Lower Kinabatangan Wildlife Sanctuary and (iii) the Muruk Miau area adjacent to the border with East Kalimantan.

Loss of forest through conversion to permanent plantations has led to a significant loss of rhino habitat in parts of eastern Sabah during the past two decades or so. But, like logging, this possibly exerts lesser pressure to the species' survival when compared to statewide hunting pressure. The recent surge in the development of the oil palm industry may mean an even faster conversion of logged-over forests to monoculture plantations. There is a very urgent need to identify and to take appropriate control measures (prevent poaching activities and landuse planning) as to secure the areas that currently support (Tabin Wildlife Reserve and Danum Valley) and that may in future support viable rhino populations (Lower Kinabatangan River region – Lot 1).

WWF Malaysia are now collaborating with the Sabah Wildlife Department to conduct a three year programme on elephants and rhinoceros conservation in Sabah in a strategic approach under the Asian Rhino Elephant Action Strategy (AREAS). The overall goal of the AREAS project in Sabah is to significantly contribute towards conserving Asian elephants and Sumatran rhinoceroses in Borneo through the identification of appropriate conservation interventions, well planned and executed actions on the ground.

Rhino Protection Unit training is considered as one of the important component in the process of re-establishment of RPU in Sabah. This report will outline the training report that was jointly organized by WWF Malaysia and SOS Rhino on 6 – 17 November 2001 in Bogor, Indonesia.

## 2.0 RPU Training Programme

The main objectives of the RPU training programme was to

- i) train SWD personnel in RPU Operation activities
- ii) assess the financial and manpower requirement in Tabin Wildlife Reserve (TWR), Lower Kinabatangan Wildlife Sanctuary (LKWS) and Central of Sabah
- iii) assess the practicality of RPU implementation in Sabah
- iv) model the RPU operation system in Sabah

Programme Activities include

- i) Training Trip In Indonesia (6 November – 17 November, 2001)
- ii) Internal Training / Workshop In SWD (January 2002)
- iii) Assessment On The Financial And Manpower Requirement For The Establishment Of RPU In Lot 1 (LWS) and TWR (January 2002 - February 2002)
- iv) Assessment Of The Practicality Of RPU in Lot 1 (LWS) and in TWR (February 2002)
- v) Implementation of RPU in LKWS and TWR (funded by Sabah State Government)

RPU training was jointly organised by AREAS, WWF Malaysia and SOS Rhino in Indonesia. The training was scheduled from November 6, 2001 to November 17, 2001. (Table 1: RPU Training Schedule in Indonesia)

This RPU training covered three aspects of the Rhino Protection Unit operation, namely

- i) Operation management
- ii) Database management
- iii) Financial management

Seven personnel participated in the training, which consisted of two (2) SOS Rhino personnel, four (4) Sabah Wildlife Department personnel and one (1) AREAS representative.

- i) Chani Jaikira. (Wildlife Ranger, SWD)
- ii) Johnny Benignus. (Wildlife Ranger, SWD)
- iii) Jon Taraan. (Wildlife Ranger, SWD)
- iv) Hernan Stawin (Wildlife Ranger, SWD)
- v) Syed Philip (SOS Rhino)
- vi) Jennifer William (SOS Rhino)
- vii) Raymond J. Alfred (WWF/MAREAS)



Table 1: RPU TRAINING SCHEDULE IN INDONESIA  
November 6, 2001 – November 17, 2001

Date	Event
1 <sup>st</sup> day	- Arrive at Soekarno Hatta Airport Jakarta. Travel to Bogor - Dinner - overnight at Purnata Hotel Bogor (Jl. Pajajaran)
2 <sup>nd</sup> day	- Breakfast - observation and discussion in PKBI office Bogor (database and financial management) - lunch at restaurant Indonesia - leave Bogor for Way Kambas NP (TNWKA) - dinner, overnight at SRS, Way Kambas
3 <sup>rd</sup> day	- breakfast at SRS - observation of Sumatran rhino in SRS (Bina & Pengamba) - lunch - observation and dialogue with RPU Way Kambas - observation at PLG Elephant center & -dinner at SRS
4 <sup>th</sup> -6 <sup>th</sup> day	- breakfast at SRS - patrol to the forest with the RPU - personal use - meals and overnight in the forest - return to SRS afternoon on 7 <sup>th</sup> day
7 <sup>th</sup> day	- breakfast at SRS - observation in SRS and Way Kambas (Kuala Way Kanan if possible) - lunch at the SRS - leave for Bukit Barisan Selatan NP (TNBBS) - dinner at Kotaagung restaurant - overnight at Kotaagung
8 <sup>th</sup> -9 <sup>th</sup> day	- breakfast at the hotel - patrol with RPU to the forest around Pemerihan - meals and overnight in the forest - return to the hotel afternoon on 9 <sup>th</sup> day
10 <sup>th</sup> day	- breakfast at the hotel - leave Kotaagung to Bogor - lunch & -overnight at Purnata Hotel Bogor - dinner at the hotel or on the way
11 <sup>th</sup> day	- breakfast at the hotel - travel to Bogor, Jakarta (PHKA office, WWF office) - lunch in Jakarta and Return to Bogor - overnight at Purnata Hotel
12 <sup>th</sup> day	- breakfast at the hotel, -travel to Jakarta Soekarno Hatta Airport

### 3.0 RPU Structure in Indonesia

#### *Summary of RPU background in Indonesia*

In Indonesia, Rhino protection efforts and activities are not implemented by their government, but by the Rhino Protection Unit (RPU) Agencies. There are about 16 units of RPU in Indonesia which consist of 88 field rangers (not included office's staff). These 16 RPU units cover four National Parks as listed in the following table. Last several years, there was a programme called "Community Outreach Programme" in Indonesia. This programme was organised by the government with the aim to give assistance in protecting Rhinoceros from any illegal activities. However, this programme was terminated in 1999.

National Park	Area (Ha)	Range of Rhino(s) Population	Number of RPU(s)	Field Rangers
Way Kambas	130,000	15-24	4	21
Kerinci Sehelat	1,368,000	27-32	3	17
Bukit Barisan Selatan	356,000	30-43	6	30
Ujung Kulon	122,956	60	3	20

#### *RPU Field Work Procedure*

Initially, the task of works for the RPU units in Indonesia are based on the orders granted by the National Park Officer (NPO). All the RPU units will implement their patrolling in field at the same days. Tasks were divided into two, namely (i) Tracking Rhinoceros and (ii) Patrolling and Monitoring of Illegal Activities. At least 2 teams will be needed in tracking rhinoceros activities and 3 teams in patrolling activities.

In tracking rhinoceros activities, rhinoceros's data were recorded in standard data sheet whenever they have found the rhino's signs or tracks. For the patrolling units, they will be responsible to capture the poachers or hunters, and they will bring them to the National Park Office for further actions.

These RPU units will spend about one week in the forest for at least three times a month. Once they have identified the area where the rhino habituating at that moment, they will shift their patrolling units into this area and extra monitoring will be implemented more carefully.

#### *RPU's Jurisdiction*

In Indonesia, the National Park's rangers have the authority to capture or to prosecute any of the suspected illegal poachers. Since RPU units do not have the authority to capture any of the illegal poachers, it is very important to work closely with the National Park. Therefore, National Park's (NP's) rangers need to be included into the RPU units, as a leader. Furthermore, NP's rangers are allowed to bring firearms during the patrolling. As discussed with several staffs or officers of the National Park, the enactment of the laws of National Parks are considered very vexatious in Indonesia. Any of the captured poachers can be penalised up to 10 years jail or 10 million rupiah penalty or both. However none of the penalties have been implemented seriously. All the RPU's rangers who are involved in the capturing activities will need to be a witness during the trial day in court.

### ***RPU's Officers***

RPU's officers are recruited among the local communities within the age range of 18 – 40 years old. Once they have been selected, they need to undergo a three-month probation and the Indonesian Army's units will provide training. The skills that they need to acquire are as follows;

- Reading Compass
- Using Map
- Preparing Standard Report
- Self Defence
- Field Patrolling
- Fitness
- Time Punctuality - Discipline
- Intelligence Course
- Introduction to Rhinoceros and other endangered wildlife species

One-year contract will be offered to any of the qualified RPU's rangers. Once their contract ended, they need to apply to renew their contract as a new RPU's ranger with a three-month notice. The continuation of the contract will depend on the applicant's performance appraisal report from the Unit's leaders and co-ordinators

### ***Intelligent Units (IU)***

These units will operate at any time and a unit consists of 4 staffs. Motorcycles are the main transportation vehicles in these units, which are provided by RPU. These units play the main role in exploring and investigation of any illegal hunting activities in the forest adjacent to the National Parks. All the related information regarding hunting activities will be reported directly to the National Park Officer. It is necessary to have the people who are involved in the IU operation to have a family relationship with the targeted villages, in order to build a strong informer networks. Rewards will be given to any of the informers if the information is useful and the hunter captured together with the evident.

### ***RPU's Transportation***

Nine four-wheel drive vehicles were allocated for the Indonesian RPU operation. One is used in the RPU office in Bogor while others are used in 4 RPU operation districts/areas as follows.

<b>National Park</b>	<b>Number of Vehicle(s)</b>	<b>Field Rangers</b>
Way Kambas	2	21
Kerinci Sebelat	2	17
Bukit Barisan Selatan	2	30
Ujung Kulon	2	20

Two speedboats are allocated to Way Kambas National Park to ensure the RPU patrolling activities can be operated fastidiously.

The estimated cost for one unit of RPU to enable them to operate is about USD 250, and this amount exclude the salary payment of their rangers and staffs. This cost covers the foods for the rangers during field activities, transportation's fuel, camping equipment and other cost.

## 5.0 Financial Sources & Management

RPU operation in Indonesia is funded by the WWF and IRE, meanwhile Metro Rhino Foundation acts as a consultant. Funds will be allocated annually to the RPU and this allocation will be under the Treasurer and Programme Manager's supervision. The treasurer, according to the project proposed activities, would prepare a monthly financial report to the programme manager, while the programme manager will prepare a quarterly report to the Rhino Conservation Officer (RCO).

For the salary payment and operation fund purposes, RPU's treasurer will allocate fund to each of the RPU area or district in Way Kambus, Kerinci Sebelat, Bukit Barisan Selatan, and Ujung Kulon. The RPU Co-ordinator in each of the RPU district will be responsible to arrange the salary payment and any other expenditure with the help of the RPU clerks. Financial report need to be prepared monthly to the programme manager by each of the RPU district. Allowances for the RPU's rangers during fieldwork are not provided since foods are provided by the RPU.

Each of the RPU's ranger will be given an official set of attire every year as listed in the following.

- One pair of RPU long sleeve shirt
- One pair of RPU long pant
- 2 pairs of RPU jungle boot
- One pair of belt
- 2 pairs of RPU T-shirt

## 6.0 Database Management

Database management is handled by one person in the head office in Bogor. The data are acquired from monthly report prepared by each of the RPU district/area. This kind of database management system is very important for future reference and analyses.

## 7.0 Comments

Knowledge and experience on Rhino Protection Unit Operation were gained during the training session by SWD's rangers. It was learnt that the data collection and recording of rhinoceros sign is the same with the procedure employed Sabah Wildlife Department. This includes the identification process for the rhino's footprint and, identification of rhino's sign on tree and wallow. RPU operations do use a camera trap during the implementation of their activities. This is very important to identify area, which have been used by rhino at that moment. Other wildlife data such as tiger, elephant, deer, banteng and other wildlife are not recorded during the implementation of RPU.

Training on how to identify the presence of poachers and hunters were also included in the programme. Illegal poaching activities are identified from presence of human footprints following the rhino migratory routes. Other signs may also include wire traps are found around the area. To ensure the effectiveness of the RPU patrolling unit, they need to patrol at least 3 – 4 km inside the forest or National Park. Any found traps need to be destroyed. It has been identified that the poacher groups using the villagers' area as their access passageway to enter the National Park area. This kind of trend was observed similarly to Tabin Wildlife Reserve case, where poachers using the villages and oil palm road to enter the wildlife reserve.

The main challenge of RPU efforts in Indonesia is to reduce the demand of Rhino's horn within the villagers' community. Most of the hunters or poachers use money to influence the villagers, in

both way either (i) not giving any information regarding illegal hunting to the National Park Officer or (ii) giving information on rhino habitat at that moment. The worse scenario was when the villagers were paid to kill and to bring rhino's.

## Recommendations

( by SWD – Mr. Chani Jafkins)

- The RPU training was well organised by WWF Malaysia and SOS Rhino in Indonesia. This training should be recommended and shared with other SWD's staff especially the officers who are in-charge of the law enforcement and poaching monitoring activities.
- Based on discussion with the National Park Officer, expedient study on the competency of the rhinoceros-breeding programme in Sepilek Station needs to be done. It is recommended to relocate the rhino-breeding project to other area, which is far away from any tourism activities or human activities, having a flat terrain and good forest cover. The extent of the rhinoceros habitat need to be increased at the range of 100 – 150 hectar.
- It is recommended to invite the RPU units in Indonesia to visit Sabah and learn how wildlife enforcement and monitoring are carried out by SWD. They may come with advantageous comments and advise on how to increase the effectiveness of any SWD's patrolling unit.

## The Overall Recommendation (by AREAS Programme)

RPU need to be re-established in Sabah especially in Tabin Wildlife Reserve with the following immediate objectives

1. To enhance the capabilities of SWD to reverse the decline of rhinoceros due to poacher activities and habitat disturbance
2. To develop movement involvement by, as well as benefits and incentives for, the local human communities in the vicinity of the rhino habitat.

As learnt from the RPU training in Indonesia, the informer network system is very important to monitor and track any illegal poaching activities and illegal logging as well. In Tabin Wildlife Reserve, the local community and the oil palm developers need to be involved in the rhino conservation efforts. This intelligent operation could assist SWD in the apprehension of poachers, including collection and interpretation of rumors/stories. As more information becomes available, adaptation of conservation strategy and action plan could be carried out.

RPU in TWR is very essential in Rhino conservation effort cause this unit could indirectly help SWD to have more accurate and reliable information on rhino distribution and numbers linked to a geographical information system, rather than the approximate estimation.

It is recommended that local community and local oil palm workers need to be recruited as one of the RPU's rangers. Local communities are preferred us to create the family-relationship informer network. By ensuring local people are involved in this effort, appreciation and pride on rhino will be developed among these communities as well as their standards of living, which will be enhanced by improved protection and management of the forest resources.

Fundamental assessment and action strategies need to be taken in order to assess the reliability and the practicality of RPU in TWR. Those fundamental assessment and action strategies could be described as follows.

#### **Recommended Action Strategies (Jan 2002 – Jun 2002)**

##### *Internal Training / Workshop In SWD (March 2002)*

It is recommended that internal training or workshop on RPU operating system need to be organised within the Sabah Wildlife Department.

Since DANCED is currently working on the Sabah Wildlife Department's Capacity Building, it is recommended that AREAS, WWFM will need to work closely with DANCED to arrange the internal training. Those trained officers from SWD will be responsible to deliver their knowledge and experience acquired during their training in Indonesia. This internal training will be scheduled in March 2002.

##### *Assessment On The Financial Requirement, Manpower and Practicality of the RPU. (January - March 2001)*

The financial requirement, manpower and the practicality of the RPU operation will be assessed based on the available manpower and allocated budget in Sabah. Since the cost of RPU implementation is higher in a bigger area of forest, the RPU operation area need to be classified into several zones as to enable the assessment of RPU cost in the specific area (i.e. TWR and LKWS). Three areas or zones need to be considered in terms of establishing the RPU, namely

1. Lower Kinabatangan River
2. Tabin Wildlife Reserve
3. Area within the Danum Valley and Malian Basin Conservation area

Once the financial and manpower requirement for a year-one programme has been identified in any of the three areas, the implementation of the RPU based on the available fund allocated by the State Government could be implemented.

Budget will need to be allocated either from the state or federal government through scheduling the RPU activities in SWD yearly programme. By implementing RPU as one of SWD main activities in Sabah, it could be one of the effective efforts in Rhino Conservation in Wildlife Reserve and Sanctuary.

#### **EXPECTED OUTPUT (JUNE 2002)**

1. Financial and Manpower Requirement Report for the Establishment of RPU in (i) Tabin Wildlife Reserve or (ii) Lower Kinabatangan River Region (Lot 1)
2. RPU programme has been integrated into SWD's yearly programme.

# A Survey For Sumatran Rhinoceros And Asian Elephant In The Danum Valley Field Center, Sabah

29<sup>TH</sup> November – 11<sup>TH</sup> December 2001

Prepared by  
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## SUMMARY

The density estimates of animal populations and the animal's distributions are a prerequisite towards conservation efforts and for species conservation management (Boonratana, 1996). A statewide survey to determine the densities and distribution of Asian elephant (*Elephas maximus*) mainly and Sumatran rhinoceros (*Diceros rhinus sumatrensis*) is currently being carried out by AREAS throughout Sabah's area. This survey employing direct and also indirect methods is being carried out in large contiguous forested areas in and occasionally, isolated forested areas where the animals have been reported and suspected to occur in Sabah. This report outlines the results of a survey carried out in Danum Valley Field Centre (DVFC), Sabah from 29<sup>TH</sup> November to 11<sup>TH</sup> December 2001. The survey covered about one quarter of the DVFC area, in the northeastern section, and the estimated number of elephants in this area is at the range of 25 – 30 individuals.

## 1. INTRODUCTION

### 1.1 Background

It is difficult to conserve Sabah's large herbivores particularly Sumatran rhinoceros and Asian elephants because of their low population densities, large ranges, unique habitat needs, crops destruction tendencies and their value to poachers. One problem in conserving these large herbivores is conserving their geographical extent as well as the quality of wildlife habitat within their ranges. Their conservation efforts are necessary because these large herbivores directly or indirectly affect forest structure, regeneration, and consequently other animal species (Boonratana, 1996). However, during the past two decades, several major portions of the former range of elephants and rhinoceros have been lost in Borneo as a result of extermination or wholesale displacement by large-scale of agricultural schemes.

To date, faunal surveys (Davies & Payne, 1982) and surveys carried out for rhinoceros (Ahmad, 1987; Abd. Hamid, 1991; Rabinowitz, 1992; Lim, 1995; Boonratana, 1996) and for elephants (Andau & Payne, 1987; Dawson, 1993; Dawson, Malim, & Taraan, 1993; Kanapathipillai, 1994; Malim, Andau, & Anbu, 1998) in Sabah have provided much information on signs and distribution of these large herbivores. The present densities of these large herbivores in Sabah are still unknown because there has been little work done on trying to obtain their numbers in the wild and finding out what their requirements are.

However, density estimations are available for only a few areas within the state. We are still uncertain of the exact status of these species. Information regarding their densities and distribution is needed to be able to bring about an effective management plan. More surveys are needed to identify areas where these large herbivores can be found and extent of ranges of known populations. The proper density estimates, not guesstimates, are a prerequisite to species conservation and management planning.

Thus, a statewide survey of AREAS project is currently being carried out to determine the distribution and density of Sabah's large mammals. Data obtained will provide a baseline for in a long-term conservation effort especially creating corridor of these species in Sabah. This project aims at providing data on the status of large mammals to assist in species conservation management too.

## 1.2 Objectives

One of the AREAS's goals is to contribute significantly towards conserving Asian elephants and Sumatran rhinoceros in Borneo through the identification of appropriate conservation interventions, well planned and executed actions on the ground, that will address critical issues (geographical, biological, political, economical and sociological) pertaining to the conservation and management of both species.

For the survey in DVFC, the major objectives were as below:

- i. To re-assess and update the survey record of rhinoceros
- ii. To determine the current density and distribution of elephants and rhinoceros

## 2. STUDY AREA

The Danum Valley Conservation Area (438 km<sup>2</sup>) is located about 85km west of Lahad Datu. This conservation area was gazetted in May 1995 into a First Class Forest Reserve (Protected Forest Reserve), where hunting and logging of that particular area are prohibited (Marsh, 1995). About 50% of the DVCA remains unlogged. The primary rain forest is located in the Southern area of Danum Valley. Secondary and logged-over forest is located on the north and east of DVFC. Nevertheless, there has been no recent history of hunting around DVCA (Bennett, Nyail & Sumpud, 1995). This is largely a result of the active and permanently manned research center here, and the lack of any local indigenous community.

## 3. PREVIOUS SURVEYS

In 1987, it was estimated that about 5 to 8 individuals of Sumatran rhinoceros, including two juveniles, were found in the vicinity of DVFC (Alruad, 1987) but later the animals seemed to have disappeared from the area (Payne 1990). In another study, Abdul Hanid (1991) observed two rhinoceros around Palum Tambun area, south of the centre. In 1992, a survey team led by John Sale found fresh tracks and signs of rhinoceros on the north and south of DVFC (Rabinowitz, 1992). While in 1992, Rabinowitz also reported that a small population of about 9 to 16 individual rhinoceroses was present in an area of approximately 438 km<sup>2</sup> of primary forest and about 13 to 23 individuals were occurred in an approximately 1000 km<sup>2</sup> of DVCA, including both primary and secondary selectively logged forest. Rhino tracks were found in the location of Operation Raleigh Cabin, Danum Valley field center and Sungai Punut during the survey by Lim (1995) in DVCA, in which the same methods of Rabinowitz (1992) were used.

As for elephants in DVCA, dung and tracks were found almost everywhere at Sg. Punut area, which may suggest that the elephant density is high in that area (Lim, 1995). While Rabinowitz (1992) reported that elephants were found in all studied locations and



appeared relatively abundant throughout the DVCA. Nevertheless, no specific study on elephants has been carried out in DVCA before.

#### 4. METHODS

Based on the original plan, the DVCA site was classified into four specific blocks, which are block 1 (Danum Valley Research Center & Borneo Rainforest Lodge-BRL), block 2 (Sg. Ulu Hale), block 3 (Sg. Reatrice) and block 4 (Sg. Danum) (Map 1). Due to access problems and shortage of manpower, only block 1 was surveyed during this survey.

Line transect sampling technique was used for both species in the direct and indirect method. The transect length was measured by using a GPS and the transect was based on the ready used trails. Seven trail transects and one road transect have been surveyed within the survey periods (Map 2) and the schedule for surveys is shown in Appendix 1. Each transect trail was 6 to 7 km long and each 5 m wide both sides from the centerline. Every time an animal or track, dung, wallow, sound or broken sapling was seen, the following data were recorded in data sheet 1 (Appendix 2): Number in GPS, time, location of signs spotted, species, types of sign, number of animals observed (if any), size of area utilized, vegetation types, terrain/ slope, visibility distance (in meter), suitability of substrate to register & retain track, and human activities in that particular area. Signs of rhinoceros spotted were measured and recorded in separate prepared data sheets for further information.

As it is difficult to get direct sightings due to the low density of rhinoceros in the wild, indirect evidence was used to assess its presence. The best evidence to indicate that the animal was present is the presence of its tracks. The measurements of the width of the middle hoof, the width between the tip of the side hoofs and the widest width of the side hoofs of the rhinoceros hind footprints were taken in this survey. To enable the identification of the tracks to individual rhinoceros, plaster cast of the tracks located in this survey were also made. Other supportive evidence of rhinoceros presence such as the wallows and mud on trees from the rubbing of the flanks was also recorded. The same rhinoceros data sheets of Rabinowitz (1992) were used in this survey to minimize differences in data collection.

Because there were no local communities living in the area, therefore no survey on elephant-human conflicts was done. Nevertheless, there is one oil palm estate located near to the edge of the northern part of DVFC boundary, and elephant-human conflict questionnaire survey will be done later after this field survey.

#### 5. RESULTS

This survey covered an area of 135km<sup>2</sup> using a 90.5km survey trails within 8 days period. During the survey, there were roughly 15 elephants' dung piles, 23 elephants' footprints, one rhinoceros footprint have been observed and recorded from these 90.5 km of human-made trail line transect surveyed. Most of the dung piles were recorded near to the trails and rivers. All of the data collected are shown in Appendix 3. The exact location of the signs found in this survey are shown in GIS map 3 and map 4.

##### Asian elephants

There were no direct sighting and fresh track of elephant have observed in the survey areas, except the dung and tracks found along the gravel road, which located 4km from Borneo Rainforest Lodge (Photo 1). Those old tracks and dung were found at East trail, West trail, Kuala Tembalang trail, Sungai Purut trail, Sungai Purut, Sungai Langom, BRL trail, and Tekala trail at BRJ (Photo 2 & 3). The population size of elephants in survey area was estimated as 39 individuals based on the combination amount of the tracks, dung and feeding

site recorded. However, bear in mind that the two individuals' tracks could be belong to the same animal. This is due to some of the tracks were washed out during raining season and some of them being overlap with other animals' footprint such as wild pig, which eliminated or increased the outline of the footprint. Most of the footprints observed were solitary bulls or small herd that not more than 3 individuals. Elephants used to have migration season base to the food availability and water sources. Therefore, the assumption of 39 individuals in the surveyed areas could be just at the range of 25-30 individuals. Elephants seem to have done some damages on human's properties in the forest, such as scientist's signboard (Photo 8).

#### **Southern rhinoceros**

Only one old footprint was recorded at Sungai Purut. The track measurement was 18cm and the middle toe width was 8cm (Appendix 4). A large number of old wallows were found especially at Rhino Ridge Trail, Sungai Purut and Palua Tambun, but none of them are actively used by rhinoceros. (Photo 9, 10 & 11).

#### **Other Wildlife**

There was a proboscis monkey have been sighted at the location near to Horneo Rainforest Lodge, which consisted patches of riverine vegetation. Five orang utan's nests and live orang utans including two babies were recorded (Appendix 5). Other mammals that have been sighted during this survey are listed as below:

1. Maroon Langur (*Presbytis rubicunda*)
2. Long-tailed Macaque (*Macaca fascicularis*)
3. Pig-tailed Macaque (*Macaca nemestrina*)
4. Borneo Gibbon (*Hylabates muelleri*)
5. Giant Squirrel (*Ratufa affinis*)
6. Prevost's Squirrel (*Callosciurus prevostii*)
7. Low's Squirrel (*Sundasciurus lowii*)
8. Plain Pigmy Squirrel (*Exilisciurus exilis*)
9. Short-tailed Mongoose (*Herpestes brachyurus*)
10. Common Palm Civet (*Paradoxurus hermaphroditus*)
11. Bearded Pig (*Sus barbatus*)
12. Sambar Deer (*Cervus unicolor*)

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ASIAN RHINOCEROS & ELEPHANT'S ACTION STRATEGIES  
A R E A S

SURVEY FORM SHEET

INSTRUCTIONS

Surveyor(s) - Please Read The Following Instructions

TIME / GPS / VEGETATION / TERRAIN / VIS / SUB / NOTES (size of dung/track)  
(This data should be recorded regularly 500 m intervals and also at every sighting / sign of target species)

SPP: TARGET SPECIES  
(E = Elephant; K = Rhino; O = Orang Utan)

OBS: OBSERVATION TYPE  
(S = Direct Sighting; T = Track; D = Dung; N = Nest)  
Other important obs. Like Salt Lick, Wallows, Feeding Sites, etc should be recorded under remarks/notes

F/O: REFERS TO THE AGE OF THE SIGN  
(F = Fresh; O = Old)

# : ESTIMATION OF THE MINIMUM NUMBER OF ANIMALS BASED ON DISTINCT SIGNS.  
(Based On Track Sizes)

AREA USE: INTENSITY OF USE  
(L = Low Use; M = Medium Use; H = Heavy Use)

VEGETATION - TYPE OF LANDUSE OR LAND COVER  
(G = Grassland; L = Lowland Forest; S = Secondary Forest; M = Montaine Forest;  
H = Heath Forest; R = Riverine Forest; SW = Swamp Forest; M = Mangroves;  
MM = Man-Made Forest; V = Villages)

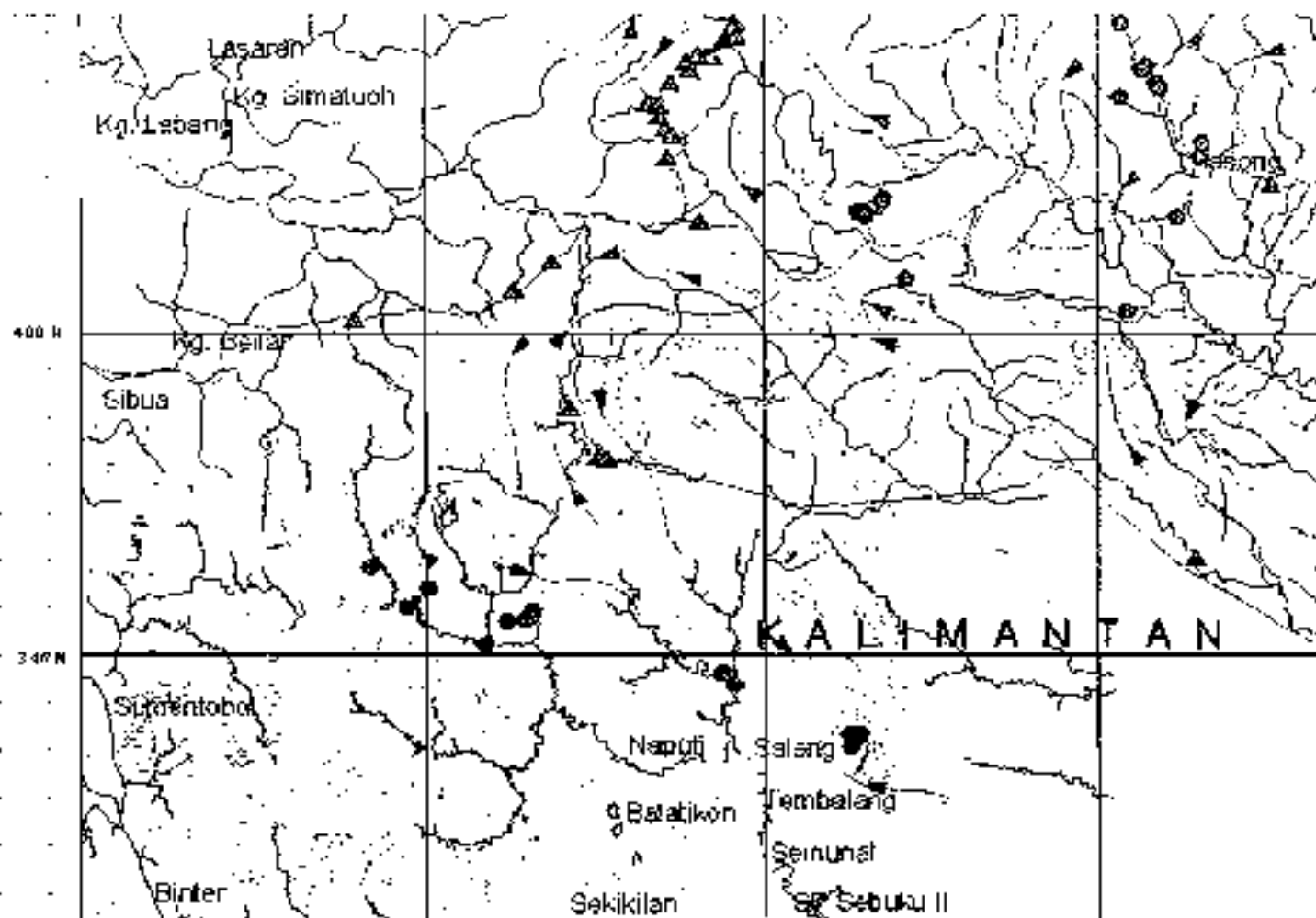
TERRAIN / SLOPE: GENERAL TERRAIN TYPE  
(F = Flat; U = Undulating; H = Hilly)  
(Class 1 = 0° - 30°, Class 2 = 30° - 45°, Class 3 = 45° +)

VIS -- RECORD THE MAXIMUM DISTANCE TO WHICH A DUNG PILE WOULD  
HAVE BEEN VISIBLE - LOOK IN ALL FOUR DIRECTIONS.  
(Average Distance in meters)

SUB SUITABILITY OF SUBSTRATE TO REGISTER & RETAIN TRACK.  
(P = (Poor) Hard Ground, M = (Medium) Dry ground but Soft;  
G = (Good) Soft Dusty Soil / Wet Soil)

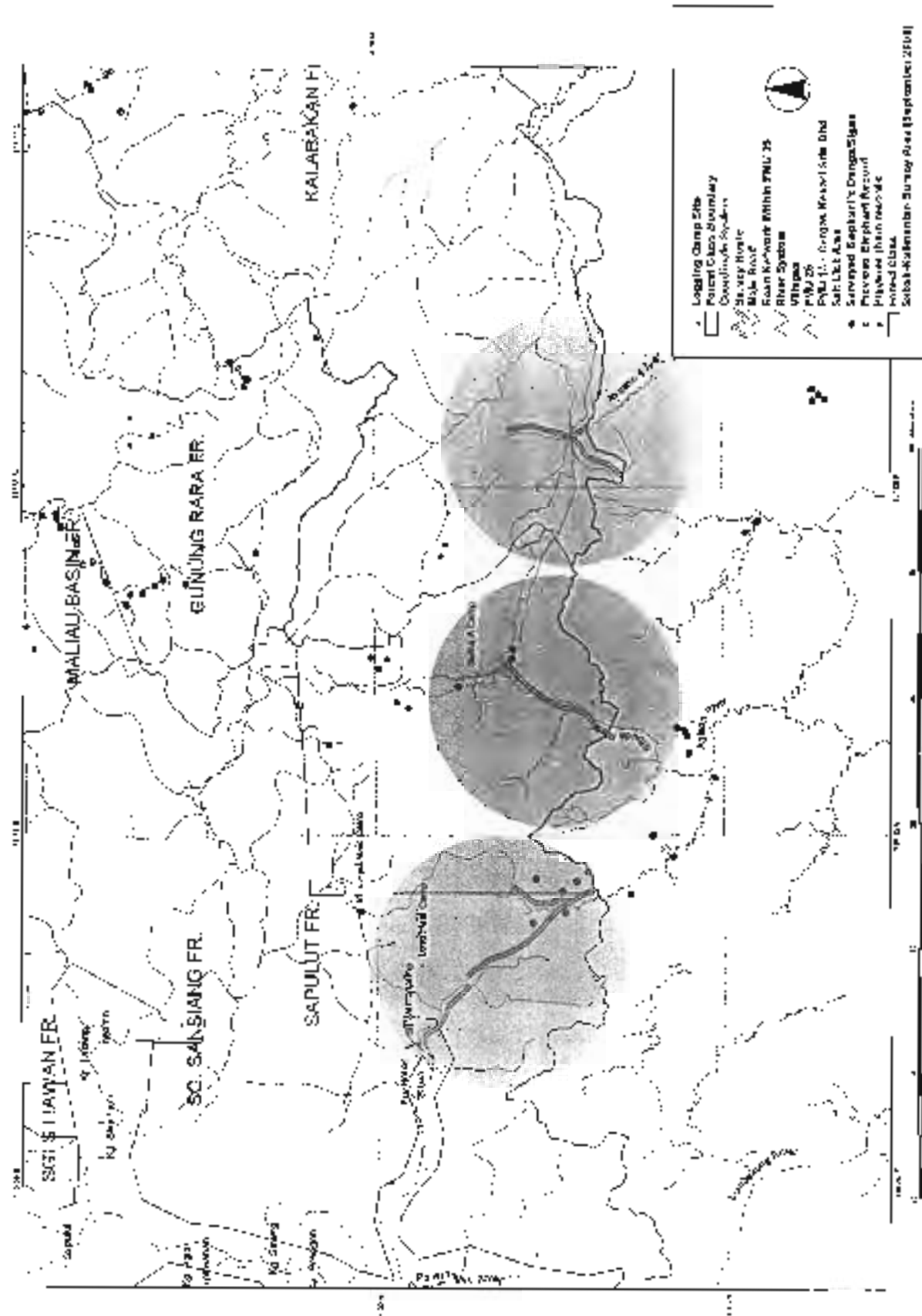
HUMAN ACT: RECORD HUMAN ACTIVITY  
(H = Hunting, HC = Hunting Cam, HH = Hunting Hide, TR = Trap, SB = Slash & Burn, S = Settlement, L = Logging Area, F = Fire)

Fig 3 : Elephant Movement Pattern (Based on Slope Modeling)



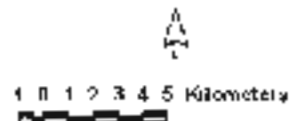
- ▲ Elephant Tracks/Footprints (Kalabakan and Sapulut FR, Sabah)
- Elephant Tracks/Footprints (Gunung Rara FR, Sabah)
- Elephant Tracks/Foot Prints (Kalimantan)
- Villages (Sabah)
- Villages (Kalimantan)
- ~ River System
- Coordinate System
- ▲ Elephant Migration Pattern
- International Boundary
- Elephant Migration Path

Fig 4 : Elephant and Rhino Survey Area

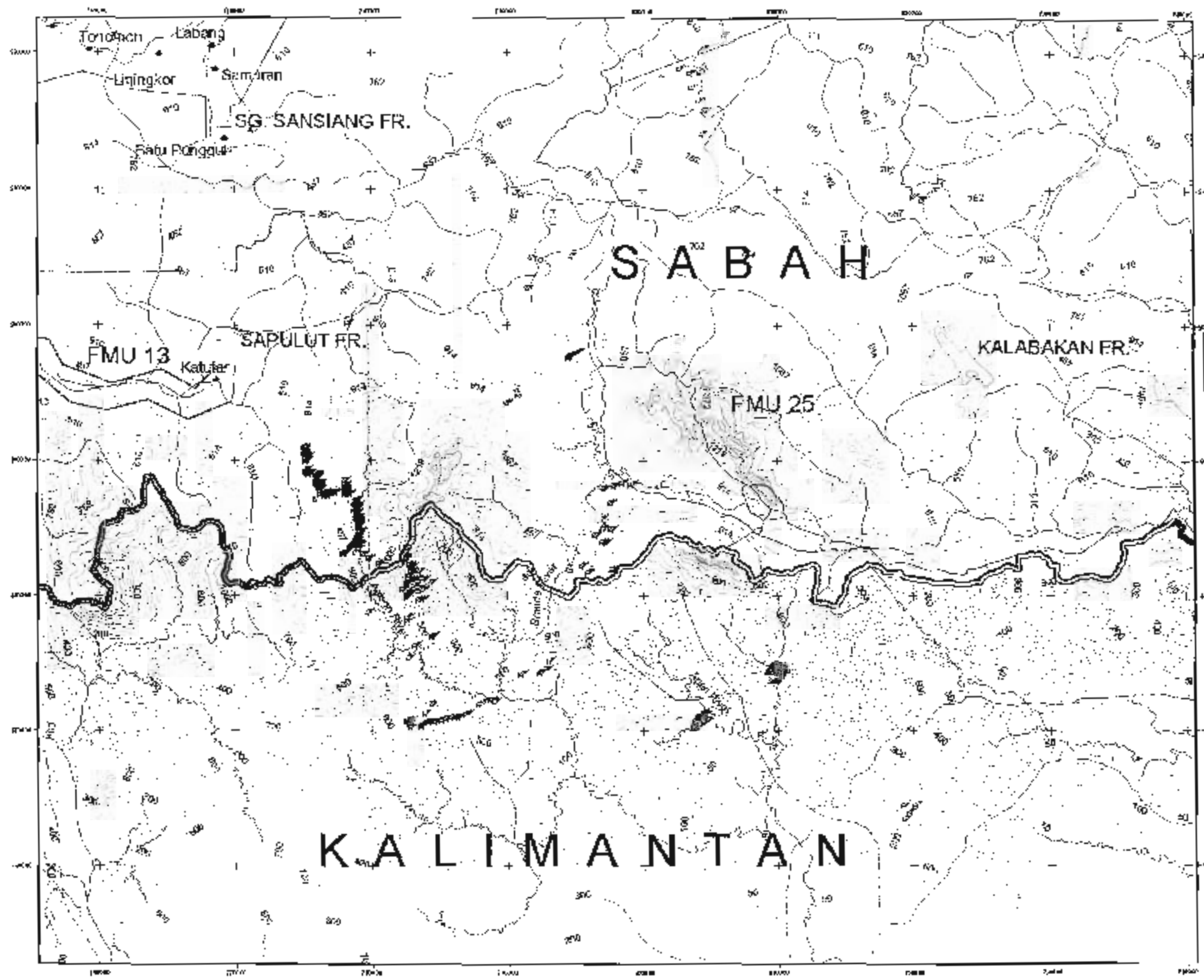


**Elephant Records  
Based on  
Transboundary Survey  
(Sabah & Kalimantan)**

Sept & Nov 2001



Projection: Roman Pacific Spheroidal  
Unit: Meter  
Datum: T720 Map (Sabah)



**LFGFND**

- ✓ Previous Elephant Record by WWF
- ✓ Elephant Record (April 2001) by WWF
- ✓ Elephant Record (Sept 2001) by WWF
- ✓ Previous Elephant Track by WWF
- Village
- Topography Contour
- Hydrology System
- FMU 25 Area
- FMU 13 Area
- Sabah-Kalimantan Boundary
- Sabah Road Network
- Kalimantan Road Network
- Forest Class

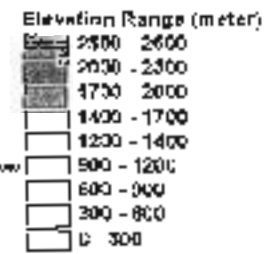




Photo 1: Elephant Migratory Routes

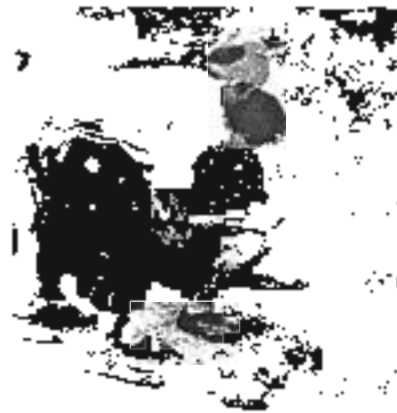


Photo 2 : Elephant's Dung  
along the trails

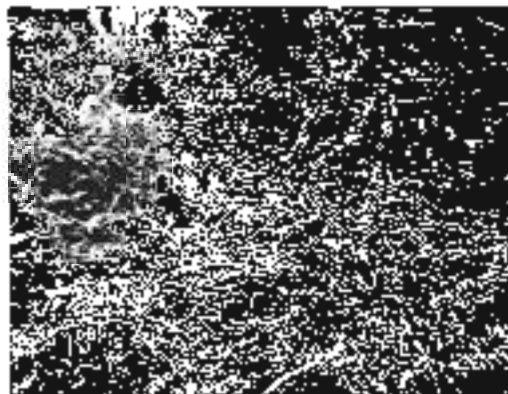


Photo 3 : Natural Wildlife Trails

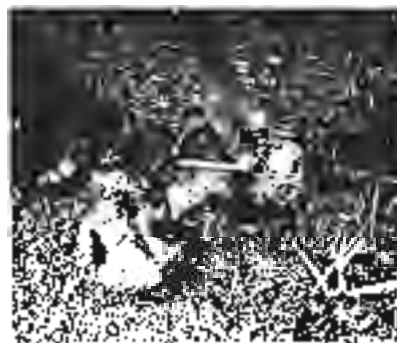


Photo 4 : Dung Measurement



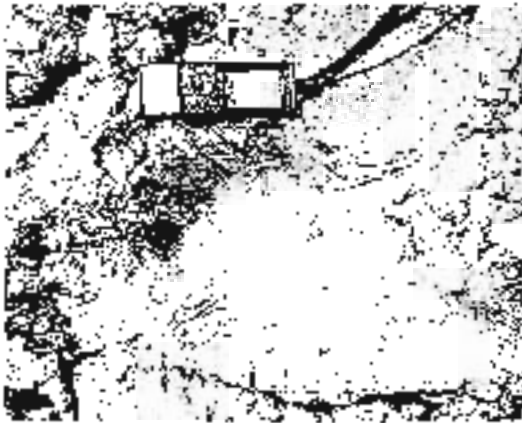


Photo 5: Small  
Elephant's  
Footprint

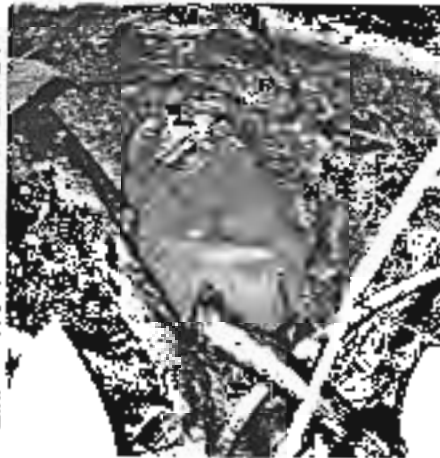


Photo 6: Washed  
Rhino Footprint



Photo 7:  
Washed Rhino  
Footprint



Photo 8 : Damaged  
Scientist's  
Signboard

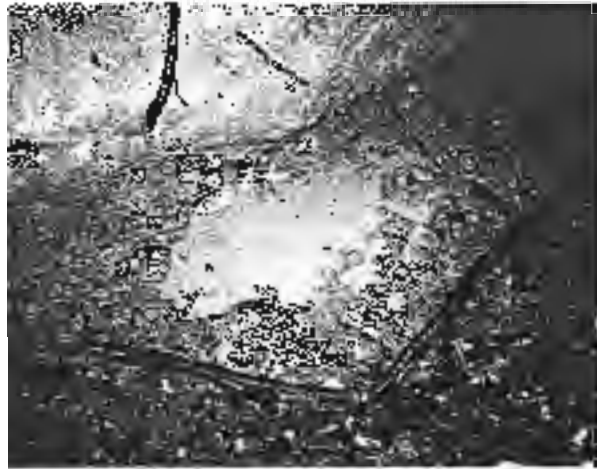


Photo 9 : Old Wallow 1



Photo 10 : Old Wallow 2



Photo 11 : Old Wallow 3

### Appendix 3

**Database for the survey of Sumatran rhinoceros and Asian elephants in Danum  
Valley Field Centre, 29<sup>th</sup> November – 11<sup>th</sup> December 2001**





**ELEPHANT, RHINO AND ORANG UTAN DATA SHEET (AREAS BORNEO PROGRAMME)**

Date : 02 Dec 2001

Surveyor(s) : BJ, HI, SK, DA

Data Sheet No : 01

Location : DVCA

Block/Area : Sg. Purut &

GPS - E : 117°45'46.2"

N : 4°57'29.9"

Main west trail

No GPS	Time	GPS		Spp	Sighting/signs		Area Use	Forest Type	Terrain/ Slope	Vis. (m)	Sub	Human Activity	Remarks/ Notes
		East	North		Obs	F/O #							
D3	0909	117°45'14.7"	4°57'1"	E	DT	0	L	P	1	5	G	-	To east (500m fr Sg. Purut Camp site)
D4	1020	117°45'46.1"	4°57'30.0"	E	D	0	L	P	1	5	G	-	To southwest (100m)
N2	1055	117°45'46.7"	4°57'31.4"	O	N	0	L	P	1	10	G	-	3 nests
R1	1125	117°45'43.0"	4°57'36.5"	R	T	0	L	P	1	5	G	-	To southeast
D5	1131	117°45'44.6"	4°57'41.7"	E	D	0	L	P	1	5	G	-	To southwest
F1	1145	117°45'38.4"	4°57'47.7"	E	F	0	L	P	1	10	G	-	
W1	1218	117°45'40.8"	4°58'0.1"	E	M	0	L	P	1	15	G	-	To east (300m)
T2	1445	117°46'8.5"	4°58'0"	E	T	0	L	P	1	5	G	-	Mud at tree
T3	1527	117°46'13.4"	4°57'57.9"	E	T	0	L	P	1	5	G	-	To east
T4	1536	117°46'26.8"	4°57'59.2"	E	T	0	L	P	1	5	G	-	To north













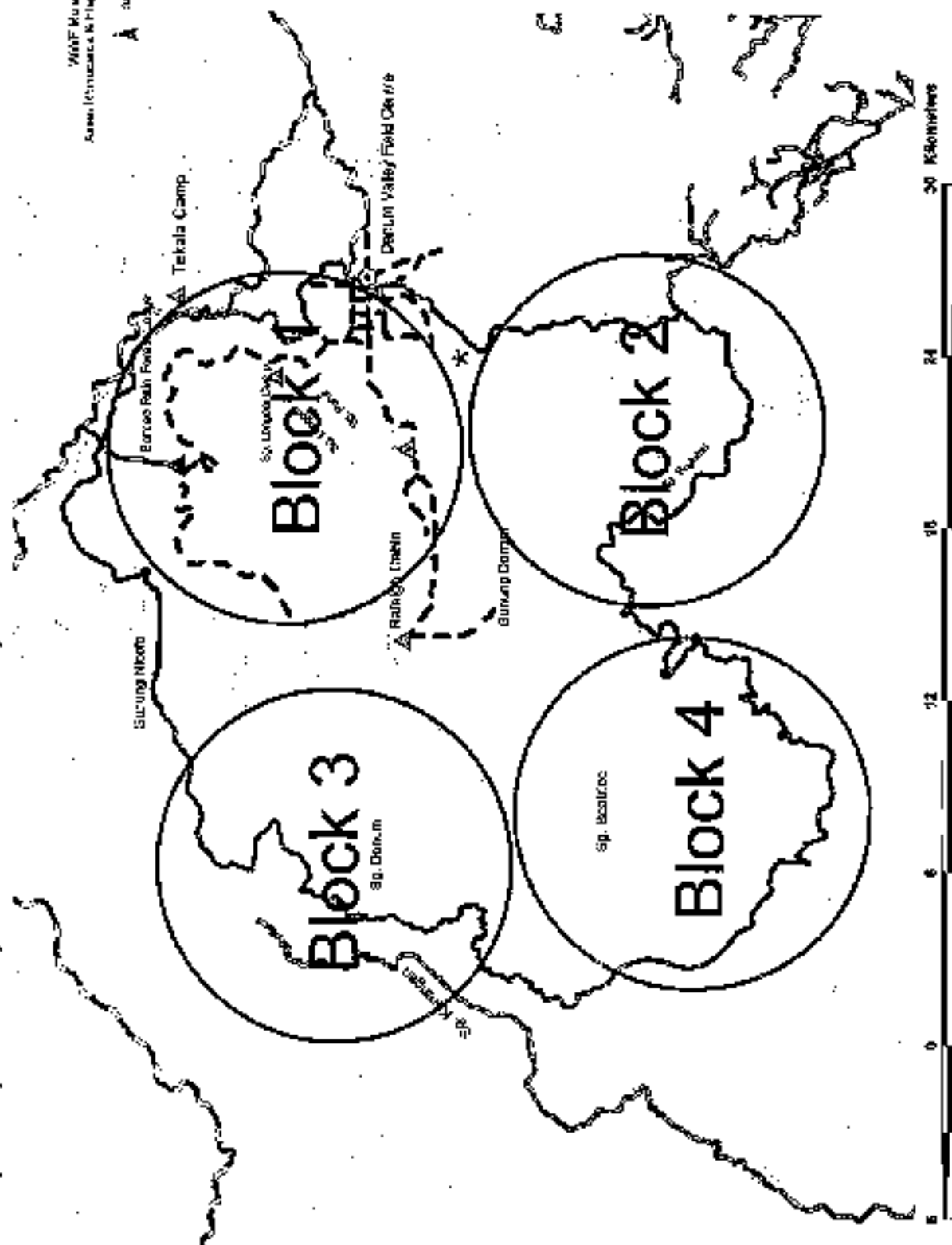


Map 1 : Proposed Survey Blocks In The Danum Valley Conservation Area



WWF Malaysia (Borneo Department)  
 Sarawak Structure & Functional Action Strategy (SAS/SS) Project

Scale 1 : 20000



- Survey Area
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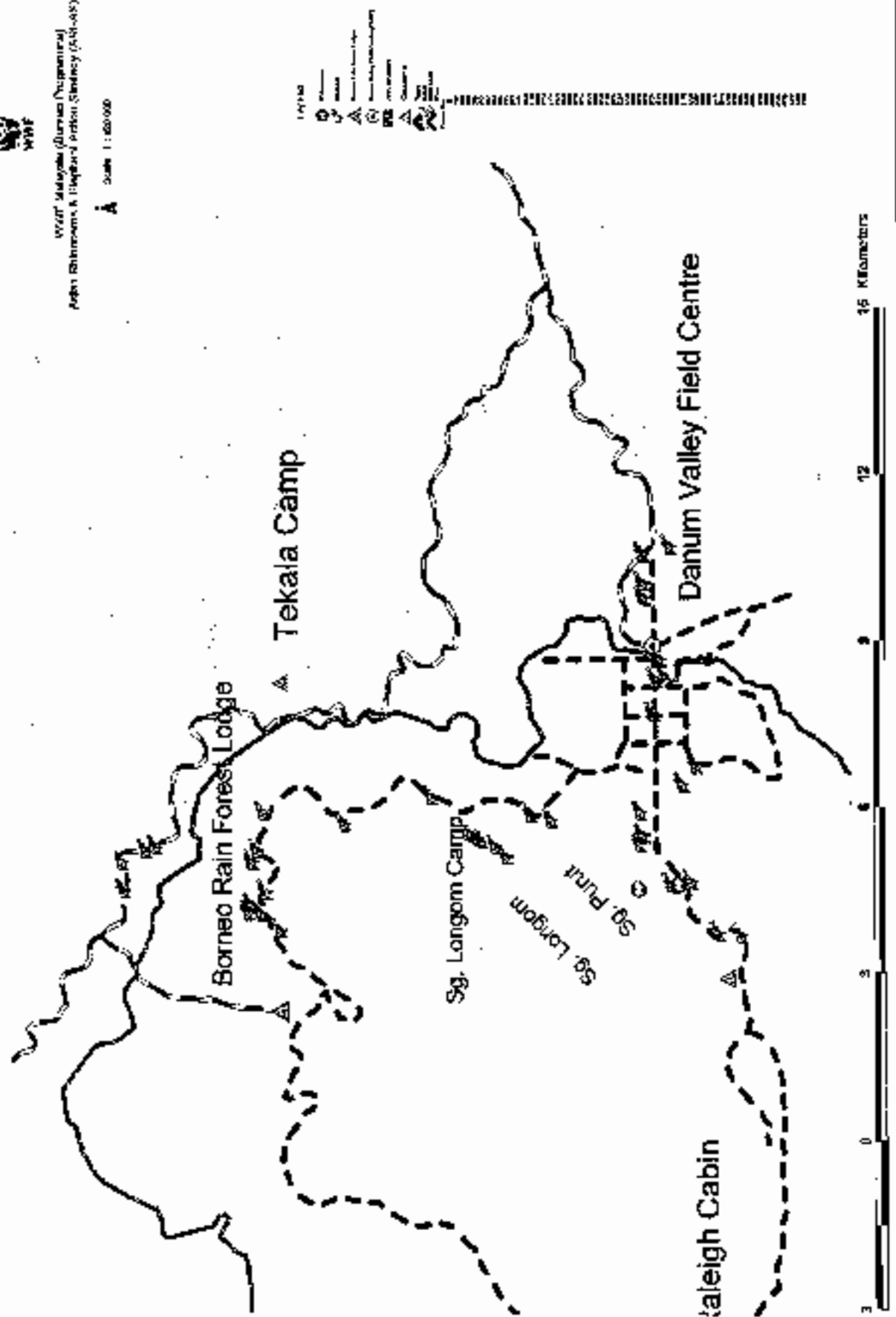


Map 3 : Distribution of Elephant & Rhino In The Danum Valley Conservation Area



WWF Malaysia (Borneo Programme)  
John Robinsons & Douglas Pickett (SINUS) Project

Scale 1 : 600,000

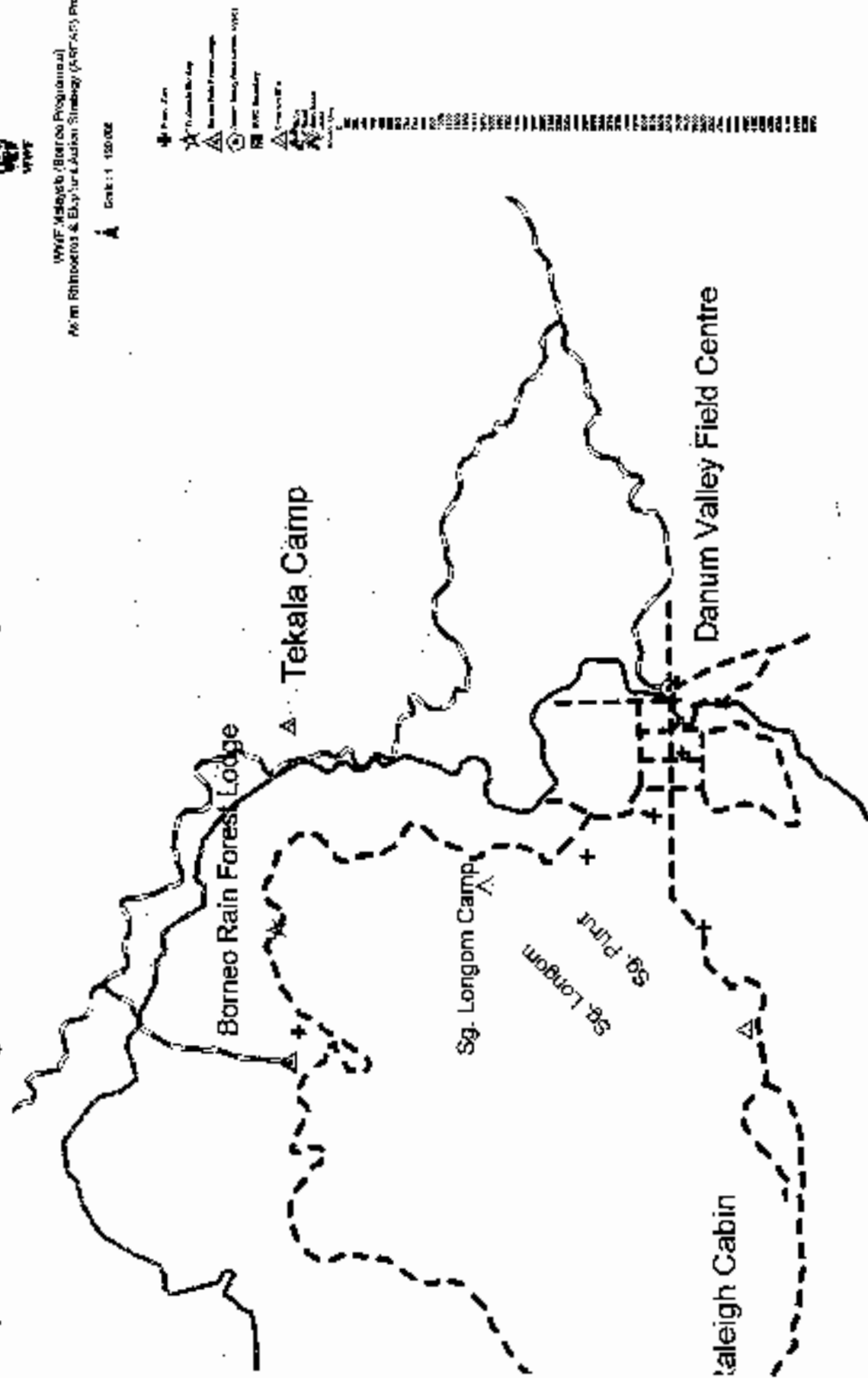


Map 4 : Distribution of Orang Utan & Proboscis In The Danum Valley Conservation Area



WWF Malaysia / Borneo Programme  
Asim Rintinotris & Ely Nur Aidan Simbing (MRCAS) Project

Scale : 1 : 150,000





## Appendix 5



Photo 12 Durian  
One of the feeding fruits of Orang utan in DVFC

# Report On Abai Wetland Survey

November 27 -- December 22 2001

## 1. INTRODUCTION

Abai Wetlands, situated north of Lots 1& 2, and south of the Mangrove Forest Reserves of the Dent Peninsula. This zone was not included into the original proposal of the Sanctuary as a means to reduce the necessary area proposed for conservation. Assumptions were made at the time on the basis that the area is within a zone unsuitable for aquaculture or agriculture. However, Pass (1999) suggests Lots 1 is suitable for the plantation of lowland rice. Hence, based on such assumptions, the relative closeness in locality the Lots 1 and the wetland site, the soil types found within this zone of stateland are relatively comparable.

Abai wetlands could be under treat from land speculations. Any further lose of land in the lower reaches of the Kinabatangan River, may influence the relative connectivity of forests over a fragmented landscape covering a variety of forest formations. The importance of such areas are not entirely clear, however such areas are presumed to provide resting areas for winter migratory birds, as well as serving the natural functions of the wetlands. Wildlife movements and populations inhabiting the zone are not entirely clear. An amalgamation of factors are need to be investigated to provide answers whenever necessary. The report outlines the result of a survey which was carried out in Abai Wetland area from November 27 to December 22, 2001.

## 2. SURVEY OBJECTIVES

Survey was conducted in collaboration with AREAS (Asian Rhino Elephant Action Strategy) and PFW (Partners for Wetlands), over a one month period. The sample sites where located within the wetlands to the west of Lots 1 and 2. The aims of the Abai Wetland Survey is to

- (i) To identify the presence of wildlife species in the area especially elephant and rhinoceros,
- (ii) to enable the preparation of proactive and answerable steps to any further land speculation in areas (Ahañ Wetland) outside of the proposed Sanctuary.

Data collection spanned a period of 10 days.

### 3. METHODOLOGY

Two sampling methods were conducted to serve the purposes of acquiring minimal information on diversity and population estimates.

The primary method, line transects were conducted, whereby one observer was needed to record presence, observed numbers and estimated numbers of observations. The second method, a river survey (*see attached Map*) was conducted using a boat to cover a relatively larger area, whereby sampled observations were located with the use of a hand held GPS unit.

The location of the 7 transects and the river survey are provided in the *attached map*.

### 4. RESULTS

The preliminary results of the faunal survey of the community assemblage over the period, a species richness of 76 (not including sub-species) was sampled (*see accompanied listings*). The survey listed the presence of 64 avifaunal species; of the sampled population six species are known to be migratory; namely the wader birds, shoreline birds, Mugimaki Flycatcher and Ashy Minivet.

Of the primates recorded within the sample sets, the Proboscis Monkey was the most frequented, however this could be a factor of the methodology applied to sample and estimate population sizes within the sample transects. Six (6) species of primates were recorded over the study period within the sample sites. The pig-tailed macaque, silvered

langur, Bornean Gibbon, were infrequently observed within the sampled study area. During the course of the sampling period, observations of Orang utan indicates breeding within the sampled area, and adaptations to feed on the resources availability (tidal swamp forest, peat swamp forest, swamp forest, etc). Orang utan movement during the period, indicated a move towards the western portion of the sampling sites (above Lot 1).

The bearded Pig (*Sus barbatus*) and the Sambar Deer, were frequently recorded within the Riparian forests of portion transects (apparent visitation to sources of water). Under estimations of the population counts for the above, is expected whereby a minimal representative sample number of tracks that were recorded within the riparian. However it was apparent within transects that wildlife movement corridors traversed frequently individual sample transects. To further, within areas of high levels of disturbance, whereby successional grassy communities has formed, tracks were impossible to locate (under waterlogged environment).

A speculative account of a Rhinoceros footprint was conveyed by the AREAS Research Assistants (Mr. Jubanus Muin and Mr. William Joseph), along the river levee at approximately 800m along transect 5 (Riparian Transect). There is no degree of conclusion, as a number of factors indicate the "footprint" shall remain in debate.

The footprint is believed to be old, a estimated duration of the foot print to be in the region of a couple of weeks to a couple of months. Notably the area was experiencing fluctuation in the tidal range (60cm) which may at regular intervals inundate the river levee, during the period of the survey and prior to the survey. Hence it is anticipated that such a footprint shall have to be in the region of days, as the period leading up to the survey, experienced a period of rain, led by a dry spell, which subsequently lead to the rainy period over the duration of the survey. There is a probability that such a print is that of the rhino, be it of the population within Lot 1. It could range between the Mangrove Forest Reserve (probably from the Kulamba Forest Reserve) through the area of stateland down the Sanctuary. A more conclusive survey of the area, notably the between raised

forested stands (swamp dipterocarp forests), could elucidate the possibility of such the presence of a separate population or individual within the mangrove forest reserve.

The area in contention, is an area of relatively high usage by local residence of Kg. Abai, as well as the trawlers. However, such activities, hence the disturbance period is only during day light hours.

Based on the elephant movement patterns study by AREAS in the lower kinabatangan, which footprints are found within the area indicates that a lone elephant is believed roam within the area.

List of Species Found in Abai Wetland Area

<b>Common Name</b>	<b>Scientific Name</b>	<b>Family</b>
1 Sambar Deer	<i>Cervus unicolor</i>	<i>Cervidae</i>
2 Asian Elephant	<i>Elephas maximus</i>	<i>Elephantidae</i>
3 Bearded Pig	<i>Sus barbatus</i>	<i>Suidae</i>
4 Orang Utan	<i>Pongo pygmaeus</i>	<i>Pongidae</i>
5 Plantain Squirrel	<i>Callosciurus natatus</i>	<i>Sciuridae</i>
6 Bornean Gibbon	<i>Hylabates muelleri</i>	<i>Hylodidae</i>
7 Prevost Squirrel	<i>Callosciurus prevostii</i>	<i>Sciuridae</i>
8 Proboscis Monkey	<i>Nasalis larvatus</i>	<i>Ceropithecidae</i>
9 Grey leaf Monkey	<i>Presbytis hosei</i>	<i>Ceropithecidae</i>

10 Low's Squirrel	<i>Sundasciurus lowi</i>	Sciuridae
11 Pig-bill Macaque	<i>Macaca nemestrina</i>	Ceropithecidae
12 Long-tail Macaque	<i>Macaca fascicularis</i>	Ceropithecidae
13 Shrew-faced Ground Squirrel	<i>Rhinoscturus laticaudatus</i>	Sciuridae
14 Water Monitor	<i>Varanus salvator</i>	Varanidae
15 Red Headed (Ashy) Tailorbird	<i>Orthotomus ruficeps</i>	Sylviidae
16 Striped Tit Babbler	<i>Macronous gularis</i>	Timaliidae
17 Pied Fantail	<i>Rhipidura javanica</i>	Muscicapidae
18 Raffles's Malkoha	<i>Phaenicophaeus chlorophaeus</i>	Cuculidae
19 Diard's Trogon	<i>Harpactes diardii</i>	Trogonidae
20 Black and Yellow Broadbill	<i>Eurylaimus ochromalus</i>	Eurylaimidae
21 Oriental Darter	<i>Anhinga melanogaster</i>	Phalacrocoracidae
22 Black-Backed Kingfisher	<i>Ceyx erithacus</i>	Alcedinidae
23 Common (Greater) Coucal	<i>Centropus sinensis</i>	Cuculidae
24 Spectacled Bulbul	<i>Pycnonotus erythrophthalmus</i>	Pycnonotidae
25 Red-Tailed Tailorbird	<i>Orthotomus sericeus</i>	Sylviidae
26 Little (Blue-eared) Barbet	<i>Megalaimis australis</i>	Capitonidae
27 Yellow-Rumped Flowerpecker	<i>Prionochilus xanthopygius</i>	Dicaeidae
28 Plain Sunbird	<i>Anthreptes simplex</i>	Nectariniidae
29 Cream-Vented Bulbul	<i>Pycnonotus simplex</i>	Pycnonotidae
30 Red-Eyed Bulbul	<i>Pycnonotus brameus</i>	Pycnonotidae
31 Pacific Swallow	<i>Hirundo tahitica</i>	Hirundinidae
32 Plain Flowerpecker	<i>Dicaeum concolor</i>	Dicaeidae
33 Brahminy Kite	<i>Haliastur indus</i>	Accipitridae
34 Slender-billed Crow	<i>Corvus enca</i>	Corvidae
35 Lesser Coucal	<i>Centropus bengalensis</i>	Cuculidae
36 Chestnut-Winged Babbler	<i>Stachyris erythroptera</i>	Timaliidae
37 Yellow-Vented Bulbul	<i>Pycnonotus goiavier</i>	Pycnonotidae
38 Mangrove Blue Flycatcher	<i>Cyornis rufigaster</i>	Muscicapidae
39 Magpie-Robin	<i>Copsychus saularis</i>	Turdidae
40 Broad-Billed Roller (Dollarbird)	<i>Eurystomus orientalis</i>	Coraciidae
41 Fluffy-Backed Babbler	<i>Macronous pilosus</i>	Timaliidae
42 Asian Paradise Flycatcher	<i>Torpisiphone paradisi</i>	Muscicapidae
43 Stork-Billed Kingfisher	<i>Pelargopsis copensis</i>	Alcedinidae
44 Mugimaki Flycatcher	<i>Ficedula mugimaki</i>	Muscicapidae
45 Picry Minivet	<i>Pericrocotus igneus</i>	Campephagidae
46 Brown-Throated Sunbird	<i>Anthreptes malacensis</i>	Nectariniidae
47 Little Spiderhunter	<i>Arachnothera longirostra</i>	Nectariniidae
48 Spotted Fantail	<i>Rhipidura perlata</i>	Muscicapidae
49 Green Imperial Pigeon	<i>Ducula aenea</i>	Columbidae
50 Rhinoceros Hornbill	<i>Buceros rhinoceros</i>	Bucerotidae
51 Common Iora	<i>Aegintha tiphia</i>	Chloropsidae
52 Yellow-Bellied Wren Warbler (Prinia)	<i>Prinia flaviventris</i>	Sylviidae
53 White-Rumped Sharma	<i>Copsychus malabaricus</i>	Turdidae
54 Plaintive Chickoo	<i>Cacomantis merulinus</i>	Cuculidae

55 White-Bellied Sea-Eagle	<i>Haliaeetus Leucogaster</i>	Accipitridae
56 Scaly-Breasted Partridge	<i>Arborophila charltoni</i>	Phasianidae
57 Little Green Pigeon	<i>Treron olax</i>	Columbidae
58 Hooded Pitta	<i>Pitta sordida</i>	Pittidae
59 Black Bellied Malkoha	<i>Phaenicophaeus dardi</i>	Cuculidae
60 Black-Headed Bulbul	<i>Pycnonotus atriceps</i>	Pycnonotidae
61 Ashy Minivet	<i>Pericrocotus divoricotus</i>	Campephagidae
62 Blue-Throated Bee-Eater	<i>Merops viridis</i>	Meropidae
63 Hill Myna	<i>Gracula religiosa</i>	Sturnidae
64 Lesser-Green Leafbird	<i>Chloropsis cyanopogon</i>	Chloropsetidae
65 Red-Billed Malkoha	<i>Phaenicophaeus javanicus</i>	Cuculidae
66 White-Breasted Waterhen	<i>Amaurornis phoenicurus</i>	Rallidae
67 Malay Lorikeet (Blue-Crowned Hanging Parrot)	<i>Loriculus gulyalus</i>	Psittacidae
68 Greater Racket-Tailed Drongo	<i>Dicrurus paradiseus</i>	Dicruridae
69 Pink-Necked Pigeon	<i>Treron vernans</i>	Columbidae
70 Pied Hornbill	<i>Antracoceros coronatus</i>	Bucerotidae
71 Dusky Munia	<i>Lonchura fuscans</i>	Plocidae
72 Spotted Dove	<i>Streptopelia chinensis</i>	Columbidae
73 Lesser Racket-Tailed Drongo	<i>Dicrurus remifer</i>	Dicruridae
74 Common Sandpiper	<i>Actitis hypoleucos</i>	Scotopaciidae
75 Little Egret	<i>Egretta garzetta</i>	Ardeidae
76 Chinese Egret	<i>Egretta cillophates</i>	Ardeidae
77 Intermediate Egret	<i>Egretta intermedia</i>	Ardeidae