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# **ASIAN ELEPHANT ACTION PLAN SABAH (MALAYSIA)**

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# **1 INTRODUCTION**

## **1.1 Geography**

Sabah is one of the 13 states that comprise the Federation of Malaysia. It is located in northern Borneo and has a land area of 73,371 sq. km. This represents about ten percent of the area of the entire island. Sabah's principal physical feature is the Crocker Range which includes Mount Kinabalu (4,094m), the highest mountain in South East Asia. The Kinabatangan River, the longest river in Sabah (560 km) originates in the Crocker Range and drains eastward into the Sulu Sea. Much of Eastern Sabah is less than 500 m above sea level.

Sabah has an equatorial climate. Temperatures rarely rise above 32°C (90°F) except on very hot days and, in the coastal areas, they rarely fall below 20°C (68°F) at night. Relative humidity is usually 85-95 percent. Rain falls throughout the year with the drier parts of the state usually receiving about 150 cm (60 inches) and the wetter parts over 450 cm (180 inches) per annum. In most parts of Sabah rainfall is most intense during the period of the north east monsoon (October to February). Weather conditions are usually drier during the south west monsoon (March to September) but often there is no really sharp division between the two.

Sabah has a human population of only 2.2 million people, with an annual rate of increase of about 3.8 percent. Most of the population is concentrated in the coastal region of the State, leaving the rest of Sabah sparsely inhabited.

## **1.2 Land use and Permanent Forest Cover**

In 1953 it was estimated that about 85 percent of Sabah was under some form of natural forest cover. By 2001 this had been reduced to approximately 58 percent including secondary growth. Forest clearing, usually associated with agricultural crop cultivation, has been the main agent for deforestation in the recent years (Figure 1). During this period Sabah's land use policy was to give priority to the planting of commercial crops such as oil palm and cocoa, to create employment and to generate income. The land that was cleared was identified as suitable for agriculture based on a major Land Capability Classification study (1976). This policy, however, may change as palm oil prices are not as high as previously and there are increased environmental awareness and conservation efforts.

The permanent forest estates of Sabah comprise of "protection forest" (including Protection Forest Reserves, Wildlife Reserves, Wildlife Sanctuaries and State Parks), "production forest" (natural forest, mainly Commercial Forest Reserves) and tree plantations. The Commercial Forest Reserves are for timber production and cover most of the forested area.

The forest reserves are combined into "forest management units", known as FMU's, which vary in extent from about 100,000 to nearly 1 million hectares.

About half of Sabah's elephant population lives mainly or entirely within Commercial Forest Reserves.

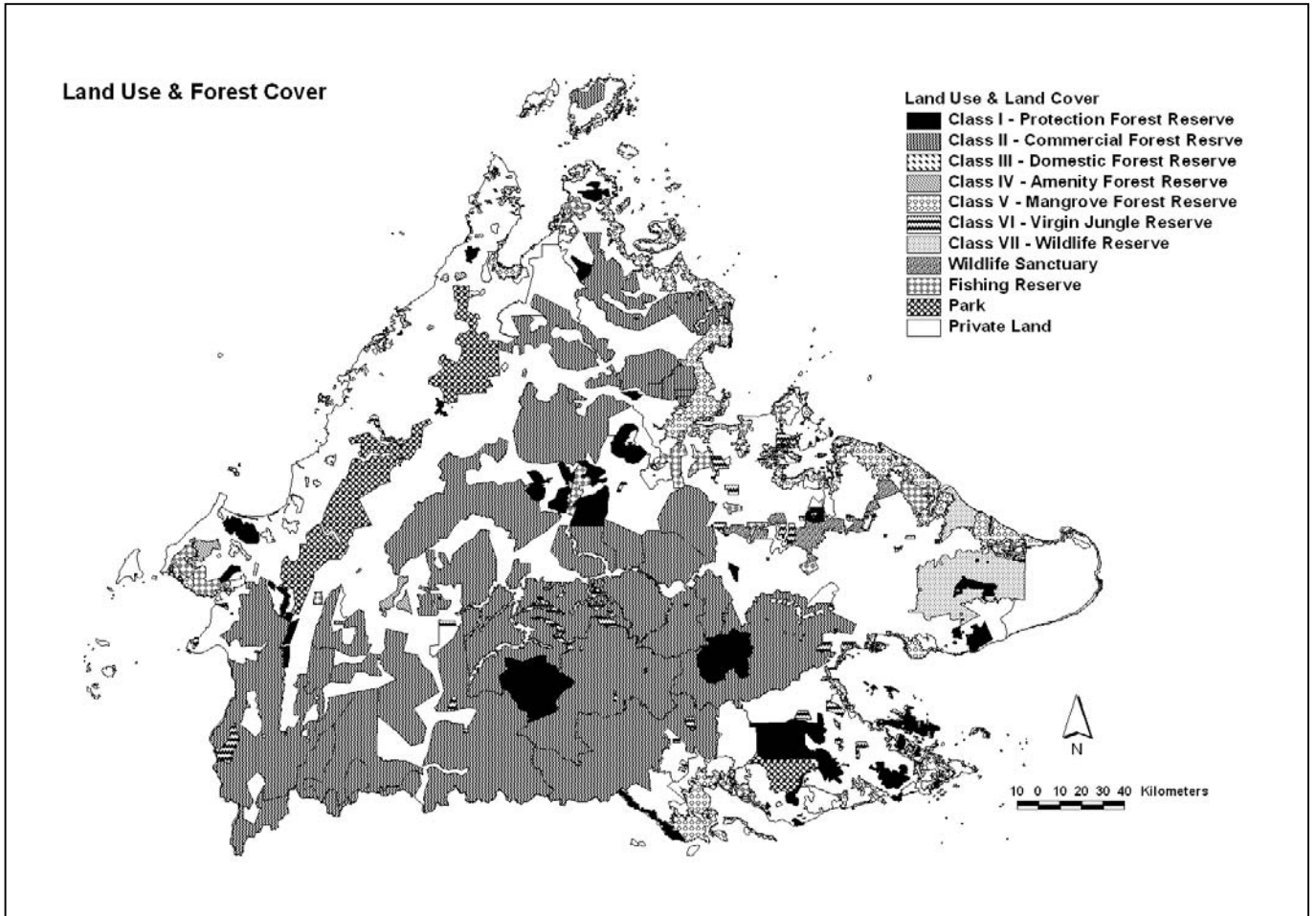


Figure 1. Map showing Land Use and Forest Cover

Classification of land	Area (hectares)	Percentage of the State's total land area
Permanent Forest Estate	3,589,000	49.0
Wildlife & Bird Sanctuary	27,800	0.4
State Parks	245,172	3.3
Municipal Water Catchments	10,098	0.1
Plantation Forests	81,000	1.1
State Land	291,414	4.0
<b>TOTAL</b>	<b>4,244,484</b>	<b>57.9</b>

\*Note: Total area of Sabah: 7,371,267 hectares

**Table 1: Forest cover in Sabah (2001)**

Source: Sabah Forestry Department, *in litt.*

Classification of forest	Area (hectares)	Percentage of the State's total land area
Commercial Forest Reserve	2,740,000	37.2
Domestic Forest Reserve	7,000	0.1
Protection Forest Reserve	283,000	3.8
Mangrove Forest Reserve	316,000	4.6
Virgin Jungle Reserve	90,000	1.2
Wildlife Forest Reserve	132,000	1.8
Amenity Forest Reserve	21,000	0.3
<b>TOTAL</b>	<b>3,589,000</b>	<b>49.0</b>

**Table 2. Forest Reserve Classification**

Source: Sabah Forestry Department, *in litt.*

## 1.2 Biodiversity

Most of the mammals and birds that occur in Borneo can be found in Sabah. There are 197 species of mammals in Borneo, and 167 of these have been recorded from Sabah. All of Borneo's ten primate species occur in Sabah. These include the Bornean orangutan (*Pongo pygmaeus pygmaeus*) and the proboscis monkey (*Nasalis larvatus*) which both are endemic to Borneo. Borneo's three mega-herbivores - the Asian elephant (*Elaphas maximus*), Sumatran rhinoceros (*Dicerorhinus sumatrensis harrisoni*) and banteng (*Bos banteng*) occur in various parts of Sabah. Other notable species present include the rare Malayan sunbear (*Helarctus malayanus*) and the clouded leopard (*Neofelis nebulosa*).

Borneo also has about 622 species of birds, of which 434 are known or thought to breed, and 39 are endemic. Of these, Sabah has about 526 well-documented species, of which about 395 are residents, 35 are Bornean endemics, and four are Sabah endemics. Another 51 species have been recorded in Sabah, but are unconfirmed. The Sabah endemics are the white-fronted falconet *Microhierax latifrons*, black-and-crimson pitta *Pitta ussheri*, white-crowned shama *Copsychus stricklandii* and friendly bush warbler *Bradypterus accentor*.

Most of Sabah's mammals and birds occur in forest habitats. Various forms of dipterocarp forest are predominant and cover 41.9 percent of Sabah's land area. Commercially important timber species of the family Dipterocarpaceae of which 155 of the 390 species in Asia are endemic to Borneo, are found in the first type (Collins et al, 1992). The rest of the area is montane forest (9.5%), mangrove forest (3.7%), swamp forest (2.3%), plantation forest (2%), brackish water forest/nipah forest (0.6%). The rest of the land area (39.7%) is basically agricultural land, urban areas etc.

## **2. STATUS AND DISTRIBUTION OF WILD ELEPHANTS IN SABAH**

### **2.1 Origins**

The origin of elephants in Borneo is not clear. Due to the limited distribution of the island's elephant population it has been hypothesized that the species is not native but has descended from imported domesticated elephants (Andau, 1985). Historical records show that in 1750 a gift of wild elephants given by the British East India Company to the Sultan of Sulu was released by his majesty, on the east coast of Sabah. Other records show that as late as the mid-1960's a number of tame timber elephants from Thailand were sent to the east coast of Sabah to assist in the logging industry (Corvanich, 1995). However, a record of a single fossil tooth identified from a cave in Brunei, the discovery of elephant bones at Banjar Masin, Kalimantan in 1988 (pers comm.) and sighting of domesticated Asian elephants in Borneo dating back to 1521 (De Silva, 1968), appear to suggest the indigenous origin of this animal. In this context, until fossil evidence is found and/or further DNA analysis is carried out, their origin will remain debatable.

### **2.2 Status and Distribution**

Wild elephants only occur in the northeastern part of the island of Borneo (Andau, 1997), astride the international boundary between Malaysian Sabah and Indonesian Kalimantan. In Sabah itself, they occur in forested areas in the south, centre and east of the State. They prefer low-lying areas where movement is relatively easy, and generally avoid steep slopes. Forests near rivers, with open areas for feeding as well as secluded areas where they can retreat during the day, are generally preferred.

The range of wild elephants in Sabah and Kalimantan seems to have expanded very little in the past 100 years despite access to suitable habitat elsewhere on Borneo. Borneo's soil tends to be young, leached and infertile, and there is speculation that the distribution of wild elephants on the island may be limited by the occurrence of natural mineral sources (Andau, 1987).

In the early 1980's Davies and Payne (1982) suggested that Sabah's wild elephant population numbered between 500 – 2000 animals. During the late 1980's and early 1990's the population probably decreased as large areas of prime elephant habitat were lost due to the conversion of forest to agriculture (Andau and Payne, 1990). More recently, population estimates have provided a more objective basis for calculating a total for Sabah which indicates a minimum of 1000 individuals. (Dawson, 1993; Sale and Andau, 1997). In many cases dung count method has been applied, while in remote and steep land forest areas walking along river valleys and abandoned logging roads has represented a more practical method of containing information on minimum numbers of the elephants present.

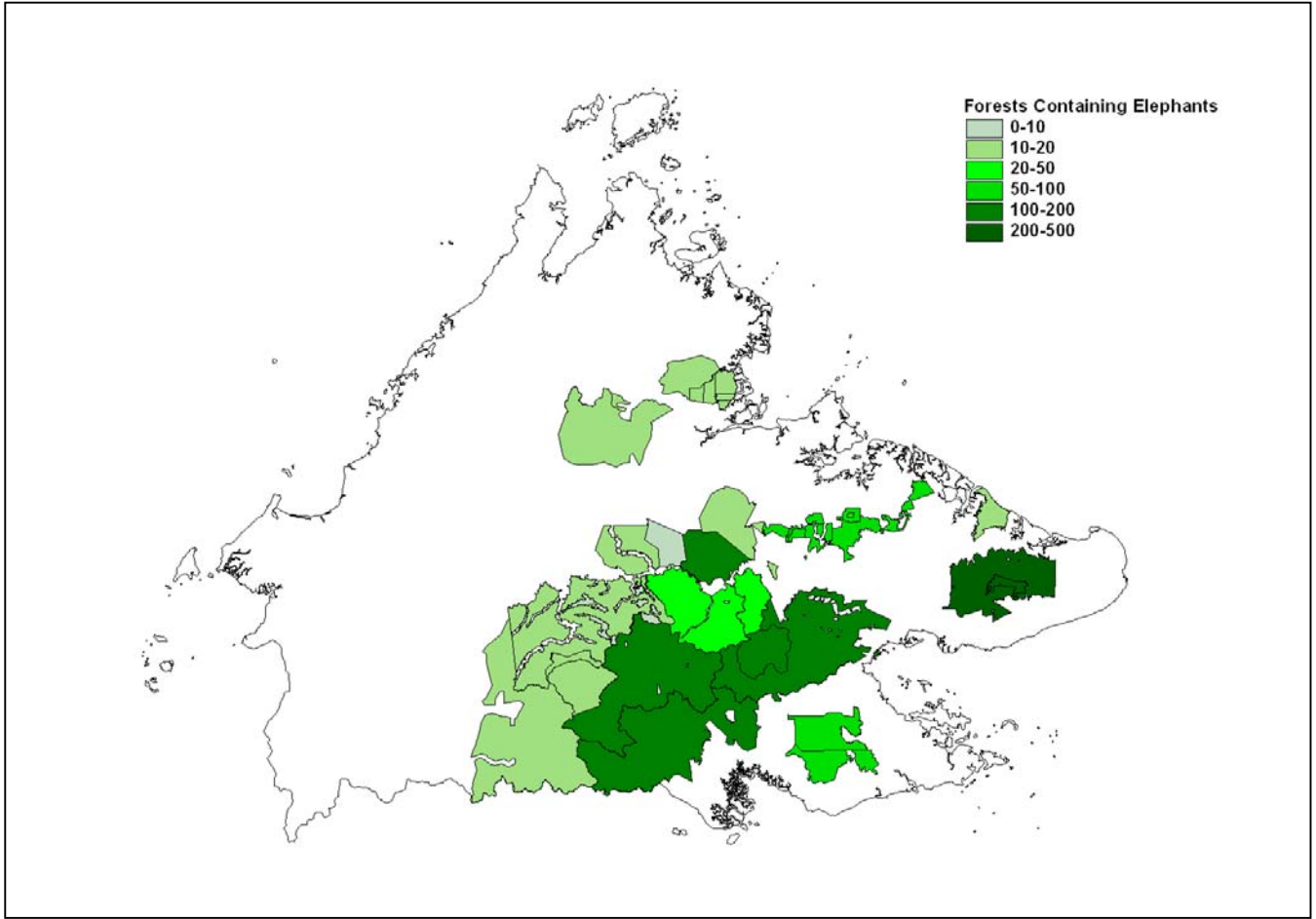


Figure 2. Map showing distribution of wild elephants in Sabah

The most recent estimates of the size of Sabah's wild elephant population have been produced by the Sabah Wildlife Department (SWD) and WWF under the Asian Rhinoceros and Elephant Action Strategy (AREAS). AREAS uses both SWD and WWF survey data that are based on direct counting methods, dung counts as well as information derived from village interviews. The most recent AREAS data (Alfred, 2002) is shown in Table 3. Current distribution of elephants in Sabah

No	Areas where elephants occur (arranged by Administrative District) and by names of Reserves and Sanctuaries	Elephant Numbers (min-max)	Land Area (based on GIS) (Ha)
<b>Kinabatangan District</b>			
1	Lower Kinabatangan River Region (Bodtai, Pangi, Pin Supu FR, Keruak FR and Kinabatangan Wildlife Sanctuary LKS, Borneo Samutra area)	95-115	58,809
2	Lamag FR	3-4	2,133
3	Kulamba Forest Reserve	18-20	20,383
4	Sungai Imbak Forest Reserve	5-7	16,556
5	Segaliud-Lokan Forest Reserve	9-12	57,255
6	Deramakot Forest Reserve	170-180	55,083
7	Tangkulap Forest Reserve	3-5	27,569
8	Pinangah Forest Reserve	10-15	189,167
9	Kuamut Forest Reserve & Malubuk FR	17-30	115,438
	<b>Subtotal</b>	<b>336-396</b>	<b>542,343</b>
<b>Sandakan District</b>			
10	Gomantong FR	9-10	5,114
	<b>Subtotal</b>	<b>9-10</b>	<b>5,114</b>
<b>Beluran District</b>			
11	Ulu Tungud Forest Reserve	7-15	126,868
12	Bonggaya Forest Reserve	8-15	61,516
	<b>Subtotal</b>	<b>15-30</b>	<b>188,384</b>
<b>Lahad Datu District</b>			
13	Tabin Wildlife Reserve	248-490	120,318
14	Malua Forest Reserve	26-30	33,970
15	Ulu Segama FR, Kawang Gibong FR & Danum Valley FR	135-215	247,809
	<b>Subtotal</b>	<b>409-735</b>	<b>402,097</b>
<b>Tawau District</b>			
16	Gunung Rara Forest Reserve (Including Batu Timbang FR, Ulu Sg. Napagon FR and Imbok FR)	120-150	218,102
17	Kalabakan Forest Reserve & Brantian Tantulit FR	160-180	226,195
18	Tawau Hills Park	9-18	28,056
19	Maliau Basin Forest Reserve	15-20	62,964
20	Ulu Kalumpang Forest Reserve	50-72	51,343
	<b>Subtotal</b>	<b>372-440</b>	<b>586,660</b>
<b>Pensiangan District</b>			
21	Sapulut Forest Reserve	10-20	241,934
	<b>Subtotal</b>	<b>10-20</b>	<b>241,934</b>
	<b>TOTAL</b>	<b>1,127-1,623</b>	<b>1,966,582</b>



Table 3 indicates there are 1,100 to 1,600 elephants in Sabah today. For the purpose of determining an historical trend we note that large areas of good elephant habitat have been lost over the last 25 years including the forests of the whole of the Semporna peninsula from Tawau eastwards, and all land now covered by oil palm plantations in the Dent peninsula, Sandakan, Kinabatangan and Lahad Datu areas. This makes it very difficult to assess whether changes in the population size in specific ranges are due to natural processes or rather the effects of squeezing elephants into smaller areas of available habitat.

Based on the current and likely future pattern and extent of forest land in Sabah, and on present elephant distribution, it is possible to identify four major Managed Elephant Ranges. Only forest areas exceeding 50,000 hectares, most of which is suitable elephant habitat and that currently supports more than 50 elephants are considered.

The elephants that occur in the four main Managed Elephant Ranges identified below represent over 90percent of the total population of wild elephants in Sabah. The remainder of the population occurs in much smaller, scattered and fragmented groupings of not more than 20 individuals each. The long-term viability of these small groupings is doubtful.

The characteristics of each of these four ranges are as follows:

### **1. Lower Kinabatangan Managed Elephant Range (58,809 ha)**

This range (corresponding to Areas 1 and 2 in Table 3) consists of forest remaining in the Kinabatangan River floodplain, with freshwater swamp forests, secondary dryland forest, limestone outcrops and lakes. Most of the original forest in this region has been converted to oil palm plantations. About 95 – 115 elephants exist in the area, and the remaining forest land currently used by elephants incorporates the Pin-Supu, Gomantong, Pangi and Keruak Forest Reserves, and the Kinabatangan Wildlife Sanctuary. This elephant range has been cut from the extensive forest blocks and elephant ranges further inland by plantations and by a public road and human settlements along the road. However, some prospects exist of regaining a corridor, perhaps through the development of timber plantations using a mixture of native tree species. Elephants may be observed near the villages of Sukau, Batu Puteh and Bilit, and have come to be a big tourism attraction. However, problems occur when elephants damage village farms. Many of the large plantations adjacent to the forest use electrified fencing to reduce elephant incursion.

### **2. Tabin Managed Elephant Range (140,601 ha)**

Tabin Elephant Range consists of Tabin and Kulamba Wildlife Reserve (corresponding to Areas 13 and 3 in Table 3), is situated in the middle of the Dent Peninsula, northeast of Lahad Datu town. Tabin Wildlife Reserve consists almost entirely of regenerating, logged lowland dipterocarp forest (sea level to about 550 metres), with several natural salt sources, and is almost totally surrounded by oil palm plantations. Elephant activity is

concentrated in the low, flat areas and near water sources, such as Tabin River drainage in the north and central parts of the Reserve (Alfred, 2000). Hunting and logging activities are prohibited throughout the range. Tabin WR is probably one of the best managed and policed wildlife conservation areas in Sabah, with a healthy elephant population of between 248-490 individuals. There is possibly some genetic flow between elephants in the Tabin Wildlife Reserve and those in the Kulamba Wildlife Reserve to the north (with 18 to 20 individuals) via swamp forest remaining between these two Reserves.

### **3. Deramakot, Ulu Segama and Kalabakan Managed Elephant Range ( 1,080,529 ha)**

This Managed Elephant Range (corresponding to Areas 4-9, 14-19 and 21 in Table 3) is the largest in Sabah. For management purposes, this large and scattered population can be divided into three sections:

#### *Deramakot (170,521 ha)*

The Deramakot area consists of parts of five Commercial Forest Reserves (Deramakot, Segaliud-Lokan, Tangkulap, Malubuk and Kuamut), with an estimated elephant population size of between 187-210 individuals. High elephant activity is concentrated at the southern and eastern part of Deramakot Forest Reserve, southern Segaliud Lokan FR, the northern part of Kuamut FR, and central and eastern parts of Tangkulap FR. Based on evidence gathered from a recent survey carried out by WWF Malaysia (under the AREAS Project), the elephants in these five Forest Reserves represent a single population, with groups periodically crossing the 70 metre wide Kinabatangan River which bisects this range. However, this elephant range is now disconnected from Kinabatangan Wildlife Sanctuary, downstream, by plantations, human settlement and the main road linking Sandakan and Lahad Datu towns. Deramakot FR (55,000 ha) is managed by the Sabah Forestry Department, and is the first timber production forest in Malaysia certified under Forest Stewardship Council principles and criteria as sustainably managed.

#### *Ulu Segama (281,779 ha)*

Ulu Segama Elephant Range consists of several adjacent Forest Reserves including Ulu Segama and Malua Commercial Forest Reserves and Danum Valley Protection Forest Reserve. The elephant population is estimated to consist of between 161 and 245 individuals. Several natural mineral sources exist in the area. Large parts of both the Commercial and Protection forests are used by elephants. The Ulu Segama and Malua FRs are managed for timber production by Sabah Foundation, while Danum Valley has a special management committee and is the site of one of the major forest research centres in Malaysia.

#### *Kalabakan (628,228 ha)*

The Kalabakan Elephant Range consists of several very large adjacent Commercial Forest Reserves (Kalabakan and Gunung Rara, and parts of Sapulut and Kuamut FRs),

plus several smaller protection forests (Brantian Tantulit, Ulu Sungai Napagon, Batu Timbang and Imbok). Most of the forest has been logged, and most lies within one of Sabah's three long-term forest management units. The elephant population within this range is estimated at between 280 and 330 individuals. Much of this range is unsuitable or of limited suitability for elephants, as it contains steep hills and mountains up to 1,500 metres above sea level, but there are many forested, flat valley bottoms rarely visited by humans, which represent havens for the elephants. An important point concerning this range is that it is contiguous with the elephant population in north east Kalimantan. Thus, the elephant population is shared between two countries, and is presumably greater than 330 individuals in total. Elephants are believed to move along the Sibuda and Agison River valleys between the two countries (Alfred, 2002) .

#### **4. Ulu Kalumpang/Tawau Hills Managed Elephant Range (79,408 Ha)**

The Ulu Kalumpang Elephant Range (corresponding to Areas 18 and 20 in Table 3) consists of the Ulu Kalumpang Protection Forest Reserve and the northern part of Tawau Hills Park. An estimated 59 to 90 elephants live in this generally steep area of dipterocarp forest which contains several river valleys. This range was formerly contiguous with the Kalabakan area, but has been cut off by the development of industrial tree plantations, oil palm and cocoa over the past twenty years.

#### **Comparing elephant densities in the Managed Elephant Ranges**

When one compares the four Managed Elephant Ranges in terms of elephant population density Lower Kinabatangan , Tabin and the Deramakot section of the Deramakot, Ulu Segama Kalabakan Management Range holds the highest densities (one elephant per 3-4 km<sup>2</sup>), while the Ulu Kalumpang/Tawau Hills Management Range and the Ulu Segama and Kalabakan sections of the Deramakot, Ulu Segama, Kalabakan Management Range have lower densities ( one elephant per 10-15 km<sup>2</sup>).

Although more research and monitoring are needed to establish the carrying capacity of the management ranges the high elephant density in some of the areas may make these less suited to receive translocated elephants from fragmented and problem causing groupings.

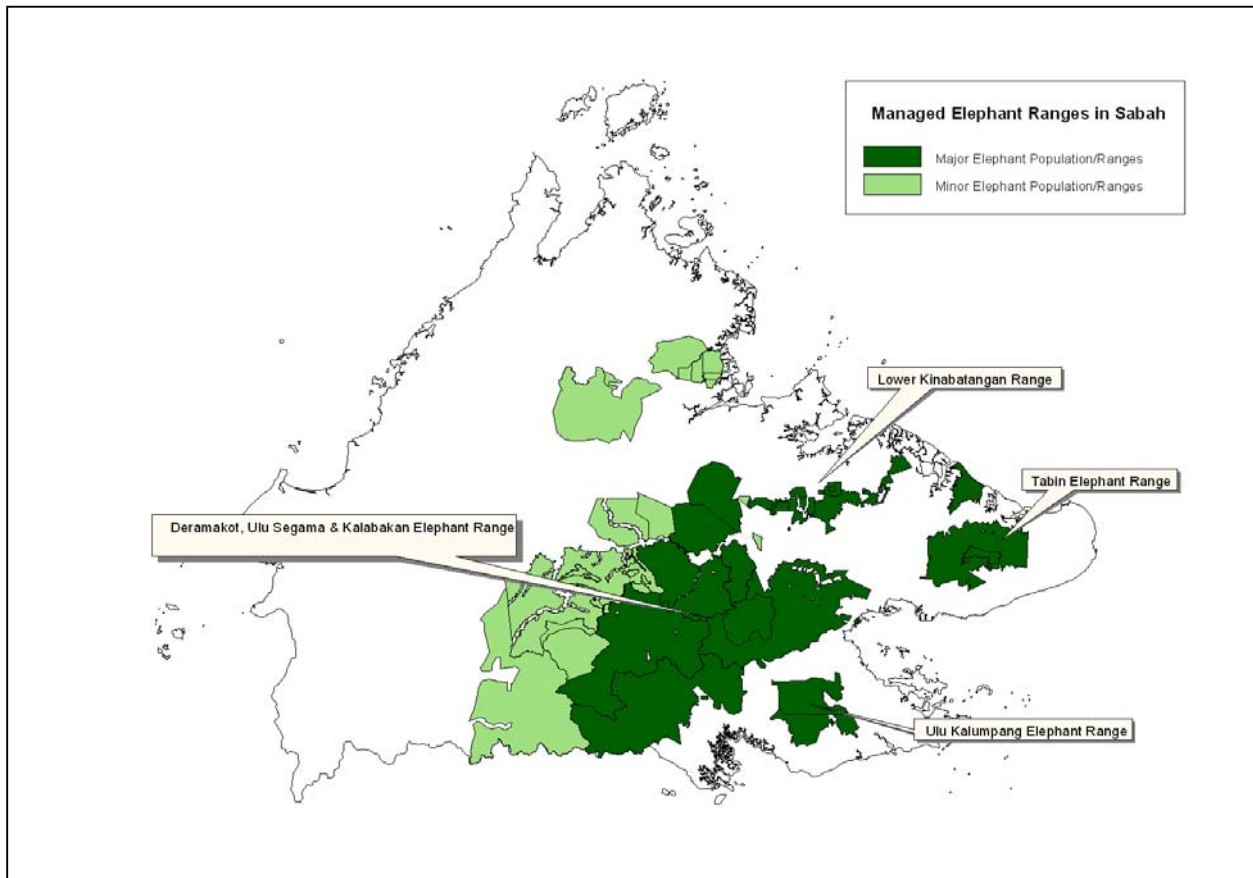


Figure 3. Map showing Sabah's four major elephant ranges

### **3. STATUS OF CAPTIVE ELEPHANTS**

At presently there is only one elephant in captivity in Sabah, which is an 18-year old tame bull elephant that lives at the new Lokawi Zoological and Botanical Park in Kota Kinabalu.

Unlike countries such as India or Sri Lanka, which are historically, culturally and religiously entwined with the elephants, the situation in Sabah is different. Here the local and indigenous people have never developed the kind of bonding and veneration that most people in India or Sri Lanka have. In Sabah elephants are often regarded as pests by the rural communities.

### **4. LEGAL STATUS OF ELEPHANTS**

#### Policy

In the national context Malaysia's conservation activities take place within the framework of the Malaysia Biodiversity Policy (1998). It's vision is to transform Malaysia into a world leader of excellence in conservation, research and utilization of tropical biological diversity by the year 2020. In Sabah an Elephant Conservation Plan (UNDP, 1994) was completed in 1994 with funding from the United Nations Development Program. Many of the elephant management practices used today by the Sabah Wildlife Department are based on the recommendations given in this report.

#### Legislation

A number of laws have been formulated in recent years to provide greater protection and better management of the biodiversity and natural environment of Sabah. These include the Wildlife Conservation Enactment 1997, the Water Resources Enactment 1998 and the Sabah Biodiversity Enactment 2000. The legal mandate of the Sabah Wildlife Department is set out in the recently gazetted Wildlife Conservation Enactment. The Asian elephant is protected under schedule II of this Enactment and any person found guilty of hunting elephants is liable on conviction to a fine of \$RM 50,000 or five (5) years imprisonment or both.

### **5. CONSERVATION PROBLEMS AND ISSUES**

#### **5.1 Habitat loss**

The main threat to elephants is the change in land status from forest to agriculture. Conversion to cocoa or oil palm after logging has been the main land use change removing elephant habitat. By 1989 a total of 716,394 hectares of natural forest, had been converted to permanent agriculture (mainly oil palm plantations). This represents 9.7 percent of Sabah's total land area. By the year 2000 the area of forest that had been

converted to agriculture had increased to slightly over a million hectares representing 14 percent of the State's total land area, most of it which was good elephant habitat.

## **5.2 Elephant-human Conflict**

Fragmentation of habitat is serious. The conversion of forest to agriculture, where elephants are generally not tolerated by people, creates major conflicts. It does so by (i) removing available habitat and space; (ii) fragmenting habitat and elephant populations into smaller units which may not be viable; (iii) disrupting traditional travel routes used by elephants; and (iv) increasing the likelihood of damage to crops, property and risks to human life. In some timber production forest, elephant damage to seedlings, nurseries and replanted areas has been reported recently.

This inevitably leads to the shooting of elephant by the affected parties. Very occasionally this results in human fatalities. Over the past five years there have been two reported deaths caused by elephant. One attack occurred near the Ulu Tongod Forest Reserve and the second occurred near the Kalabakan Forest Reserve. Both deaths resulted from confrontation with single bull elephants.

## **5.3 Poaching**

Poaching has never been a serious problem with Sabah's elephants (Tuuga, 1992). Occasional incidents of illegal killing do occur but these are usually related to the intrusion of elephants onto oil palm estates where they can cause extensive damage. It has been calculated that over the past eight years less than one percent of the population has been illegally killed each year, and the present overall trend is downwards (Sale, 1997).

## **5.4 Logging**

Elephants require space in which to move and feed, but this habitat need not be undisturbed forest. Logging, if properly practised, can therefore be compatible with elephant conservation. However logging does create access to remote areas via logging roads, thus increasing the potential for human disturbance and poaching (Sale and Tuuga, 1997).

# **6. PAST AND PRESENT CONSERVATION MEASURES**

## Protected areas

The State Government of Sabah has set up a system of protected areas (Figure 4), supplemented by forest management in Forest Management Unit concessions. The established protected areas include Danum Valley, Lower Kinabatangan Wildlife Sanctuary and the Tabin Wildlife Reserve. Proper management of Sabah's protected

areas is essential if they are to serve their function. Areas requiring further measures to be taken include the Lower Kinabatangan Wildlife Sanctuary and the Kulamba Wildlife Reserve. The necessary measures include full or strengthened legal status; mitigation of human-animal conflicts, removal of bottlenecks to animal movements and monitoring and patrolling.

### Surveys and monitoring

Surveys have been carried out in various parts of Sabah to provide an elephant population estimate. Further surveys are under way as a collaborative effort between the Sabah Wildlife Department and non-governmental organisations. An ongoing monitoring programme is being carried out by the Wildlife Department with assistance from the AREAS Project. This programme focuses on the Lower Kinabatangan Wildlife Sanctuary and other major elephant ranges and provides data which contributes to the development of improved management and conservation strategies in these areas.

### Management of problematic elephants

A total of about 300 elephants were shot by the Wildlife Department from the 1960's until 1994. Culling of rogue or problematic elephants ceased in 1994 and is now only used as a management method under the most extenuating circumstances. During the period from 1995 till 2001 a total of 40 animals were successfully translocated to viable elephant habitats from areas that were in the process of being converted to agriculture. Of these animals 25 were moved to the Tabin Wildlife Reserve in Lahad Datu.

At present Sabah has only one elephant in captivity. However, a small number of Sabah's elephants (15 animals) have been captured and sent to captive breeding establishments overseas. These animals were from pocketed areas or were frequent encroachers into oil palm plantations.

### Institutional set-up and cooperation with conservation partners

Work related to the management of wildlife in Sabah was originally administered by the Game Branch or the Wildlife Section of the Forestry Department. In 1988 the Game Branch was upgraded to departmental status within the Ministry of Tourism and Environmental Development. To date the Wildlife Department has received assistance in development from various sources. Presently the Danish Government (DANIDA) has a three year capacity building Project with the department. WWF-Malaysia and various other NGOs also work very closely, in matters pertaining to Wildlife Conservation. Other government institutions involved in conservation, are the Forestry Department, Sabah Foundation and Sabah Parks, who are involved directly or indirectly in protected areas, in which in some areas, elephants occur.

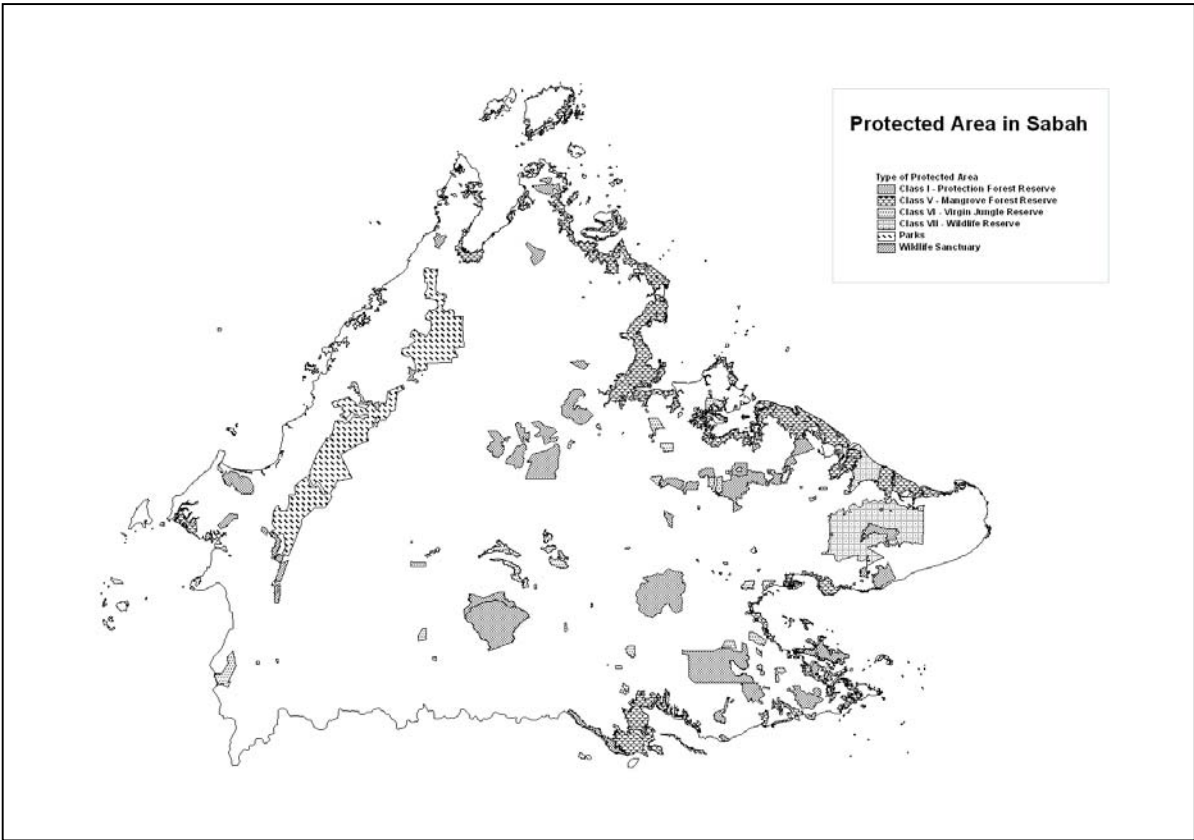


Figure 4. Map showing Sabah's protected areas



## 7. ACTION PLAN RECOMMENDATIONS

**Policy and practice with regard to the management and conservation of Sabah's wild population of Asian elephants:**

**To ensure the survival in perpetuity of a viable population of wild elephants in Sabah by;**

- **maintaining wild breeding populations in major elephant ranges, in harmony with any other management objectives that may exist for each specific forest area**
- **assessing the options, for the management of the minor elephant ranges, so that these populations may, wherever possible, contribute to the overall conservation of the species**

### **Actions**

#### **Managed Elephant Ranges**

- Establish close cooperation with the forest concession holders which operate within the management ranges in order to ensure that forest management practices are compatible to elephant management and conservation.
- Coordinate with other departments and stakeholders to ensure that land use developments have minimal impact on elephant populations.
- Assess the appropriateness of each management range to receive translocated elephants and establish post-translocation programs to monitor the movements of these
- Assess the feasibility of establishment of buffer zones around the Managed Elephant Ranges as well as corridors between them (e.g. a corridor between Lower Kinabatangan Management Range and the Deramakot, Ulu Segama, Kalabakan Range)

- Establish regular monitoring and patrolling and enhance elephant-human conflict mitigation efforts and activities, involving Honorary Wildlife Wardens, neighboring estates, villages and NGOs
- Ensure that the public are informed about the Managed Elephant Ranges and the elephant conservation policies and efforts in Sabah
- Stimulate and facilitate research in elephant ecology, behavior, genetics and populations dynamics (breeding patterns, annual movements, age structure, sex ration etc)

### **Fragmented populations outside Managed Elephant Ranges**

- Assess whether the small fragmented groupings of elephants outside the Managed Elephant Ranges cause substantial problems in terms of human-animal conflict
- In situations where this is the case, consider which of the following management options may be the most appropriate: 1. translocation to management range areas, 2. domestication of elephants for use in tourism, forestry or agriculture, 3. Ex-situ conservation outside Sabah, or 4. culling.

As in the past, translocation to suitable areas in the Managed Elephant Ranges will be the preferred and most practiced solution. Domestication and in- or ex-situ conservation outside Sabah will only be practiced on a small scale and when translocation may not be the optimal solution. Culling will only be practiced when human life is threatened.

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