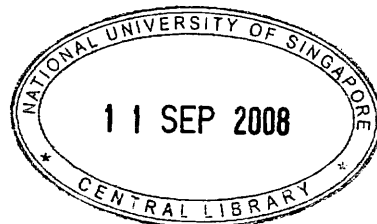


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Management and Status of Resources in Protected Areas of Peninsular Malaysia

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**THE DISTRIBUTION OF THE SUMATRAN RHINOCEROS
(*DICERORHINUS SUMATRENSIS*) AND THREATS TO
THEIR POPULATION IN PENINSULAR MALAYSIA**

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ABSTRACT

The Department of National Park and Wildlife's research programme on the Sumatran rhinoceros (*Dicerorhinus sumatrensis*) has been ongoing since the 1970's. The aim of the programme is to conserve the Sumatran rhinoceros. The main objectives are to collect and update data on the distribution of the Sumatran rhinoceros and other species; to identify new areas with the potential to support populations of Sumatran rhinoceros; to identify locations and types of threats; and to build capacity among the DWNP staff in collecting data and carrying out field surveys. Several main Sumatran rhinoceros areas have been surveyed to determine species distribution namely Sungai Badak, Koh Mai and Gunung Inas Forest Reserves (FRs) in the state of Kedah; Bintang Hijau, Temengor FRs and Royal Belum State Park in the state of Perak; Tekai, Tekam and Ulu Tembeling FRs in the state of Pahang; Endau Rompin National Park in the state of Johor; Gunung Basor, Stong Utara, Sungai Brook and Sungai Perias FRs in the state of Kelantan; Pelagat, Tembat and Jengai FRs in the state of Terengganu; and Taman Negara National Park. To date, numerous

threats have been recorded in most of the surveyed areas involving both local and foreign poachers from Thailand. Among the measures taken to address these threats are increased enforcement through patrolling, monitoring and monthly surveys. In terms of species mortality, 30 cases have been recorded between 1975 and 2003. The Sumatran rhinoceros unit of DWNP has had some measure of success, including monthly patrolling and monitoring of main rhino populations, the detention of foreign poachers and a public awareness programme in Endau Rompin National Park, all implemented by the state Rhino Protection Unit in the respective states.

INTRODUCTION

Of the three extant rhino species in Asia today, two once occurred in Peninsular Malaysia, i.e. the two-horned Sumatran rhino (*Dicerorhinus sumatrensis*) and the Lesser or one-horned Javan rhino (*Rhinoceros sondaicus*). The latter, however, went extinct in the 1930's. Naturally, the preferred habitat of Sumatran rhinoceros is lowland forests, but due to development and disturbance, the species today are mainly found in hilly and mountainous areas. The population is widely scattered, often in tiny non-viable populations. Prior to the 20th century, it was found throughout Southeast Asia, including the islands of Sumatra and Borneo. Today, however, it is restricted to small isolated populations occurring in Myanmar, Thailand, Malay Peninsula, Sumatra and Borneo (Van Strien, 1974; Flynn, 1981; Flynn and Abdullah, 1984). Santiapillai and MacKinnon (1990) stated that Sumatran rhinoceros is the most seriously endangered species of large mammals in the world because their home range is in conflict with humans. The Sumatran rhinoceros is the most critically endangered of all rhino species in the world (Anon, 1992). As in Africa, poaching for the horn is the major threat to all Asian rhinos.

BACKGROUND OF THE STUDY

Studies on the Sumatran rhinoceros distribution have been conducted since 1939 by T.R. Hubback, who gathered information from hunters and game wardens (Hislop, 1965). Difficult field conditions and the elusive nature of the species have hampered efforts to conduct extensive field surveys. Additionally, before 1989, some of the rhino core areas, such as Bintang Hijau F.R., Gunung Inas F.R. and Sungai Badak F.R. in state of Kedah; and Belum F.R. and Temenggor F.R. in state of Perak, were off-limits because of communist guerilla activity. In 1974, the Department of Wildlife and National Parks (DWNP) initiated a long-term study on the distribution and status of the Sumatran rhinoceros in Peninsular Malaysia.

This study continues today, but the scope has widened to include the development of Rhino Protection Units (RPU) at state level, awareness programmes and enforcement efforts in all known rhino habitat.

MATERIALS AND METHODS

From 1997 to 2003, all reports of rhino presence by the state RPU and information from the DWNP's wildlife inventory were compiled. Possible rhino habitats were surveyed on foot to ascertain the presence of animals. Confirmation reports by RPU were necessary because footprints of the Malayan Tapir (*Tapirus indicus*) are often confused with that of the rhino.

All signs of rhino were recorded such as tracks, mud wallows, food signs such as saplings twisted at feeding sites, marks on trees made by rubbing the horn, and scratch mark on the ground by foot. To standardize the data collected by the RPU in Peninsular Malaysia, at least five measurements of separate footprints have to be recorded to confirm the presence of the species. For each track, the maximum width between the lateral toes and the width of the middle toe was measured (Flynn, 1983). If the footprints are not clear, at least two other signs of the species must be recorded, such as wallows and scratch marks (see above). All signs must correspond with each other. The minimum number of individual animals in an area was estimated based on differences in median track size and the distance between track locations (Flynn and Abdullah, 1984).

GPS (GARMIN 12XL) and compass were used to determine the precise location of rhino signs together with other wildlife signs and the location of any human encroachment. Satellite mobile phone (Ericsson R 190) was also used to deliver any important messages to the nearest DWNP or police station. Data collected from the various rhino states were analysed with Microsoft Excel and transformed into GIS programme.

RESULTS AND DISCUSSIONS

Distribution

Figure 1 shows the Sumatran rhinoceros distribution in Peninsular Malaysia. Area of the distribution is shown in Table 1. Signs of the species, such as footprints, droppings, wallows and food signs, were recorded in most of the areas. Besides the distribution of the Sumatran rhinoceros, locations of encroachment data were also transformed into GIS map. Figure 2 and 3 show the locations of encroachments in Peninsular Malaysia and Taman Negara National Park, respectively.

Threats

There are two principal threats faced by the Sumatran rhinoceros in Peninsular Malaysia i.e. poaching and fragmentation of their habitats.

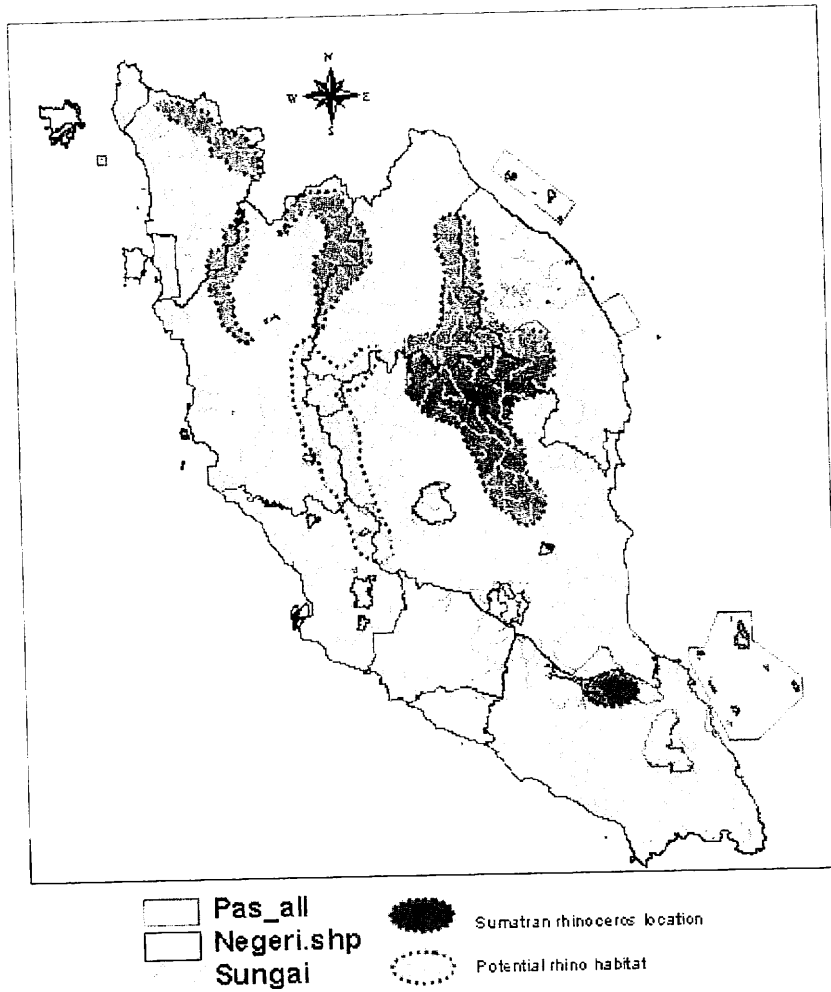


Figure 1. Distribution of Sumatran rhinoceros in Peninsular Malaysia (2004).

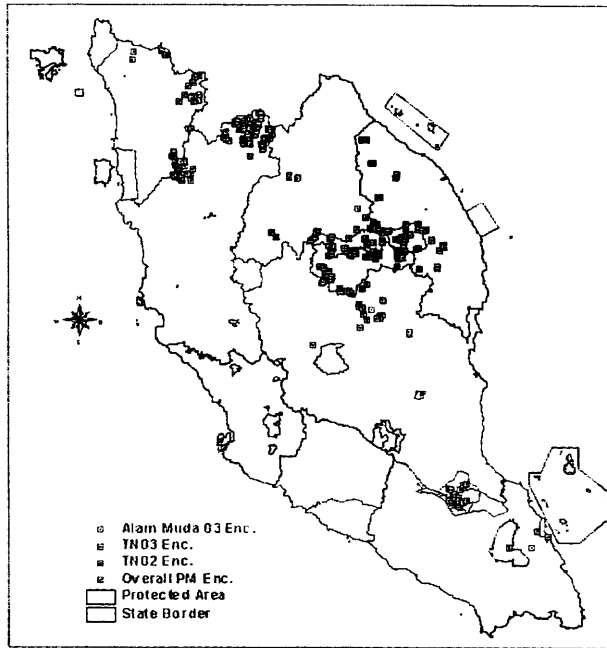


Figure 2. Encroachment locations in Peninsular Malaysia.

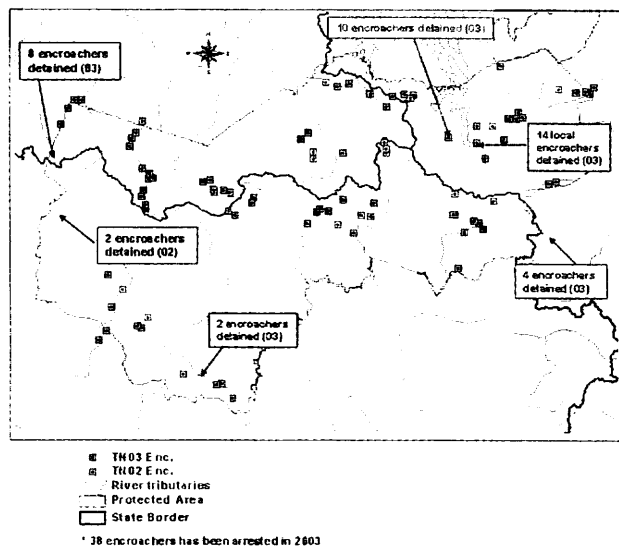


Figure 3. Encroachment locations in Peninsular Malaysia (2004).

Table 1: Distribution area of Sumatran rhinoceros in Peninsular Malaysia.

| No. | State | Area |
|-----|----------------------------|----------------------------------------------------------------------------------------------------------------------------------------------|
| 1 | Kedah | Gunung Inas F.R.*, Sungai Badak F.R. and Koh Moi F.R |
| 2 | Perak | Belum Royal State Park, Temenggor F.R. and Bintang Hijau F.R |
| 3 | Kelantan | Gunung Basor F.R., Gunung Stong F.R., Galas F.R. and Balah F.R. |
| 4 | Terengganu | Jengai F.R., Pasir Raja F.R., Petuang/Tembat F.R., Hulu Besut F.R., Hulu Nerus F.R., and Hulu Terengganu F.R. |
| 5 | Taman Negara National Park | Ulu Sg. Atok, Ulu Sg. Keniam, Ulu Sg. Sat, Ulu Sg. Sepia, Ulu Sg. Lebir, Ulu Sg. Pertang, Ulu Sg. Cacing, Ulu Sg. Terengan and Ulu Sg. Aring |
| 6 | Pahang | Tekam F.R., Tekai F.R., Chini F.R., Lesong F.R. and Bekelah F.R. |
| 7 | Johor | Endau Rompin National Park |

*F.R.: Forest Reserve

Poaching

Most of the rhino habitat surveyed had signs of encroachment and occasional poaching activity. Evidence of encroachment, such as marked tree bark (i.e., messages such as dates, location of water points and directions left by poachers), abandoned camps, foodstuff and snares, were detected in the course of the rhino surveys. Appendix 1 (Figure 4, 5, 6, 7, 8, 9 & 10) shows signs of encroachment in rhino core areas. Based on experience, the encroachment was attributed to Thais (60%), Orang Asli (30%) and Malaysians (10%). The main reasons for Thais encroaching into the forests of Peninsular Malaysia are to collect aloewood and hunt wildlife, especially small and large mammals. There were high numbers of encroachment activities recorded during the DWNP's Sumatran Rhinoceros and Other Wildlife Species surveys in Taman Negara in 2002 (DWNP, 2002); Pasir Raja Forest Reserve 2003; Taman Negara 2003 (DWNP, 2003); and Belum State Park 2004 (DWNP, 2004). The DWNP also successfully detained 66 encroachers: 52 Thais and 14 locals (between 2002 and 2004). Poaching activities were detected in several rhino areas, such as Tekam FR in the state of Pahang and Galas FR in the state of Kelantan.

Deforestation and Habitat Fragmentation

For the last 30 years, Peninsular Malaysia has experienced rapid development. Much of the lowland forests have been logged and converted into agricultural land and other development schemes. As a result, many cases of wildlife disturbance occur in agricultural areas, especially areas bordering forests. Flynn and Abdullah (1984) stated that fragmentation of forest areas into isolated habitat islands by logging and forest clearance has made the species more susceptible to extinction. An example of this statement can be observed at Tekam F.R. in state of Pahang. A rhino carcass was found there after several months of continuous monitoring, which suggests that population in isolated habitat and isolated population could be easily killed. This incident can be observed in most rhino habitat areas.

Although the Sumatran rhinoceros lives at higher altitudes, the species is known to periodically utilize forests at lower altitudes (Van Strien, 1974). Changes in lowland-use patterns would impact rhino habitats such as the emigration and dispersion corridors for the species (Santiapillai and Ashby, 1988). Mountain and hill areas, however, are less seriously affected, except areas such as Bintang Hijau FR, which has already been logged up to 1100 m.a.s.l. When such areas, are logged, the rhino moves to less disturbed habitat, usually to higher elevation.

Today, there are not many locations in Peninsular Malaysia where Sumatran rhinoceroses occur. Much of the rhino habitat has been cleared for agriculture and other development programmes. According to Khan (1987), the estimated number of the population is between 80 – 120 animals. In 2004, the estimated number by RPU's was 72 – 97 animals, indicating a decline of about 30 percent. The main reasons for this are poaching and deforestation. The high price of rhino body products continues to provide a high incentive for poaching. The exact number of rhinos killed by poachers in Peninsular Malaysia is not known. The actual number of rhinos killed by poachers is likely to be higher than the reported number here because large areas, such as the Main Range, remain yet to be surveyed and patrolled. Table 2 shows the mortalities recorded between 1975 and 2003.

Improving protection and management of the Sumatran rhinoceros and its habitat will be a top priority in conserving the species. An area that should be given special attention is the Endau Rompin National Park in Johor. In the 1980's, it was estimated that there were at least 20 individuals roaming in the area, but from numerous surveys conducted between 1997 and 2003, it was estimated that only two animals were there. In the last five years, no young (calf or juvenile) rhino has been reported in the area. Without any new birth, a population is essentially

dead but able to persist only because individuals of the species are long-lived (Flynn and Abdullah, 1984). There are probably only two ways to mitigate the situation i.e. relocate the animal/s to a different location, such as the Taman Negara National Park, or increase protection, monitoring programme and patrol of the area.

The management of Kaziranga Wildlife Sanctuary, India, successfully increased the numbers of the Indian rhinoceros (*Rhinoceros unicornis*) from less than 10 in 1908 to almost 1700 animals in the 1980's. With good monitoring and patrolling, the number of Javan rhinoceroses (*Rhinoceros sondaicus*) on the island of Java increased from 25 animals in 1967 to 54 animals in 1984. These examples indicate that the most important strategy towards conserving the Sumatran rhinoceros and other wildlife species in Peninsular Malaysia is to increase protection, patrolling and monitoring of the species. Therefore it is suggested that the department should increase the number of RPU staff and RPU enforcement activities.

Table 2: Mortality of Sumatran rhinoceros in Peninsular Malaysia (1975 – 2003).

| Year | Locality | Cause of death | Number |
|--------------|--------------------------------|---------------------|-----------------|
| 1975 | Endau - Rompin | Unknown | 1 |
| 1976 | Kuala Krai, Kelantan | Poached; dehorned | 1 |
| 1985 | Bukit Bujang, Johore | Shot; dehorned | 1 |
| 1986 | Kambau, Johore | Snared | 1 |
| 1986 | Sungai Dusun, Selangor | Shot, dehorned | 1 |
| 1988 | Tenggaroh, Johore | Shot, decapitated | 1 |
| 1988 | Tenggaroh, Johore | Shot; dehorned | 1 |
| 1989 | Tenggaroh; Johore | Shot; decapitated | 1 |
| 1992 | Medicine shop, Penang | Poached | 7 pairs of horn |
| 1992 | Medicine shop, Perak | Poached | 1 pair of horn |
| 1992 | Medicine shop; Johore | Poached | 1 pair of horn |
| 1992 | Alor Setar, Kedah | Poached | 1 |
| 1992 | Medicine shop; N. Sembilan | Poached | 1 pair of horn |
| 1993 | Ulu Besut (Pelagat F.R.) | Shot; dehorned | 1 |
| 1994 | Sungai Terang (Basor F.R.) | Unknown | 1 |
| 1998 | Gunung Shoid, Gua Musang | Shot; dehorned | 1 |
| 2002 | Alam Muda, Pahang (Tekam F.R.) | Poached; dehorned | 1 |
| 2003 | Sg. Dusun, Selangor | Bacterial Infection | 7 |
| TOTAL | | | 30 |

Source: 1. Abdullah *et al.* (1989); 2. RPU monthly report (1997 - 2003).

RECOMMENDATIONS

Conservation Actions

In general, the main causes of population decline are poaching and shrinking of populations due to logging, agricultural development, human settlement and shifting cultivation. Since the species is categorized as Critically Endangered by the IUCN (2001), priority must be placed on rhino conservation programmes. Some of the recommendations to conserve the Sumatran rhinoceros are given below:

1. Concentrate on initial *in-situ* conservation effort.
2. Improve anti-poaching measures by developing more effective anti-poaching teams and programmes.
3. Determine currently available resources, and evaluate any additional resources required to provide adequate protection.
4. Conduct surveys in potential rhino habitat, such as the main range, to identify new rhino populations.
5. Improve effectiveness of law enforcement throughout the species range with respect to the illegal trade in Sumatran rhinoceros parts and products.
6. Develop an intelligence networking unit.
7. Co-operate with other agencies for instance Security Forces; Immigration Department; Customs Department; Anti Smuggling Unit; and Forestry Department, and
8. Conduct firearms training.

It is also suggested that a conservation programme for this species be designed to include both short and long-term strategies. The short-term strategies that are currently being conducted include the protection of the species and its habitat through regular patrolling and monitoring in known rhino locations.

Other recommended short-term strategies

1. Protection of the species

Regular monitoring of core rhino locations should be conducted to ensure better protection of the species. Assistance and cooperation from the security forces is urgently needed to detain forest encroachers. Rhinos

occurring outside protected areas should also be monitored regularly. If the rhinos are no longer safe in the area, they must be captured and relocated to a safe area, such as Taman Negara National Park.

2. Increase RPU staff

The number of the staff in the unit should also be increased. There are currently 10 units, consisting of 62 personnel. In Taman Negara National Park, only 12 RPU personnel are assigned to conduct monthly monitoring of the total park area of 4343 km². It is suggested that each rhino state should have at least 2 RPU teams, excluding Taman Negara RPU, which should have at least 6 RPU teams consisting of 24 personnel.

3. Awareness programme

Awareness programmes should be conducted at all villages that border the rhino locations. In 1998, such an awareness programme conducted at Kg. Peta, Endau Rompin National Park, elicited a positive response from the villagers. Targets were schoolchildren, boatmen and forest guides.

Apart from the above, other conservation programmes that should be conducted are:

1. Cessation of the illegal trade in rhino horns and products.
2. Stabilization, extension and improvement of rhino habitat.
3. Recovery of rhino population to viable levels, and
4. Support of local communities for and hence benefit to them from rhino conservation.

As for the long-term strategies, it is suggested that where extremely low numbers (e.g., less than 3 animals in an area) of rhinos occur in any area, or in insecure habitats, these 'doomed animals' should be relocated to a suitable habitat, that has existing viable populations, and good law enforcement systems. According to Flynn (1978), an effective population size of at least 50 individuals has been proposed as the minimum necessary for maintaining short term fitness in most species. A population of 10 animals is considered to be reasonably viable based on current information and analysis (Anon. 1992). Taman Negara National Park is currently the only protected area that has rhinos and this area is considered suitable habitat for doomed animals to be relocated to. The rhino population in the 4343 km² Taman Negara National Park is estimated to be between 21 – 34 animals.

Aside from protection and monitoring activities, the RPU is also assigned the task of enforcement activity, jointly conducted with the Wildlife Crime Unit, under the DWNP's Law and Enforcement Division. It is recommended that the department should have its own intelligence division with the main task of seeking information on illegal wildlife trade. The detention of encroachers solves only a small portion of a much larger problem. It is vital for this intelligence unit to formulate strategies to detain the masterminds behind all smuggling and poaching activity, be it local or foreign.

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Figure 4: The carcass of a Sumatran rhinoceros found at Gunung Shoid, Gua Musang, Kelantan.



Figure 5: The skull of the Sumatran rhinoceros found at Tekam Forest Reserve, Pahang.



Figure 6: Sign of encroachment on the tree bark in Taman Negara National Park.



Figure 7: The snare operation in Bintang Hijau Forest Reserve, Perak.



Figure 8: Abandoned camp by poachers in Ulu Muda Forest Reserve, Kedah.



Figure 9: Poaching tools i.e. wire & nylon snares seized by the department staff in Aring, Kelantan.