DESCRIPTION OF THE HABITAT USED BY THE SUMATRAN RHINOCEROS IN SABAH

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INSTITUTE FOR TROPICAL BIOLOGY AND CONSERVATION
UNIVERSITI MALAYSIA SABAH
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ABSTRACT

DESCRIPTION OF THE HABITAT USED BY THE SUMATRAN RHINOCEROS IN SABAH

A field study on the Description of Habitat Used by the Sumatran rhinoceros in Sabah was done in four study areas as follows; Sg Sabran and Sg Purut – Sg Langgum were located in Danum Valley Conservation Area (DVCA) while Km 3 and Km 32 were situated in Tabin Wildlife Reserve (TWR), Lahad Datu Sabah. Five fieldworks were done from May 2007 until June 2008 to collect data for this study. The aim of this study was to collect data that are useful for the conservation management of the Sumatran rhinoceros in Sabah. Densities of woody saplings with the dbh measurement of 10 cm and below were taken to reflect the saplings availability. Frequency of salt licks and Sumatran rhinoceros signs including the numbers of wallows, footprints, dung and marking signs were also collected at the study areas. In each study area, 40 plots with the 10 x 10 m were the measuring constructed along 4 line transects (1 km each) to obtained the frequencies of the woody saplings inside the plots. Salt licks, wallows, footprints, dungs and marking signs were searched within the possible sites and also based on the Rhino Patrolling Unit (RPU) information. All of the signs locations were marked on the maps using GPS device. Saplings density at Sg Sabran (mean value 8.5± standard deviation 4.5) shows significant difference tested between Km 3 (3.1± 1.4), Km 32 (4.5± 3.6) and Sg Purut – Sg Langgum (4.6± 1.7), [F 3, 156) = 22.706, p<.05]. As all of the study areas were observed to have Sumatran rhinoceros signs, this suggests that the Sumatran rhinoceros is well adapted to living in forests that have difference saplings availability. There were 19, 13, 6 and 5 Sumatran rhinoceros wallows at Sg Sabran, Km 3, Sg Purut – Sg Langgum and Km 32 respectively. Two old adult footprints, 3 old dung heaps and Sumatran rhinoceroses marking signs on the vegetations were found in study locations. Salt lick was presence at Km 3 but not found in other study areas.

Keywords: Sumatran rhinoceros, saplings availability, wallows and salt licks.

ABSTRAK

Kajian di lapangan mengenai Penerangan tentang Habitat yang digunakan oleh badak Sumatra di Sabah telah dijalankan di dalam empat kawasan kajian seperti yang berikut; Sg Sabran, Sg Purut – Sg Langgum terletak di Kawasan Pemuliharaan Lembah Danum (DVCA) dan Km 3, Km 32 pula terletak di Hutan Simpan Tabin (TWR). Sebanyak lima kerja lapangan telah dijalankan dari bulan Mei 2007 hingga bulan Jun 2008 bagi mengumpulkan data bagi kajian ini. Tujuan kajian ini dijalankan adalah untuk mengumpul data yang berguna bagi tujuan pengurusan pemuliharaan badak Sumatra di Sabah secara khususnya. Kepadatan anak pokok berbatang yang mempunyai ukur lilit 10 cm dan ke bawah telah diambil untuk menerangkan tentang perolehan anak pokok di kawasan kajian. Kekerapan jilatan garam dan kesan-kesan tinggalan badak Sumatra termasuklah bilangan kubang, kesan tapak kaki, tinja badak dan kesan penandaan juga dikumpulkan di kawasan kajian. Dalam setiap kawasan kajian, 40 buah plot berukuran 10 x 10 m telah didirikan di dalam 4 transek lurus (1 km setiap satu) bagi mendapatkan kekerapan anak-anak pokok berbatang di dalam plot berkenaan. Lokasi jilatan garam, kubang, kesan tapak kaki, tinja badak dan kesan penandaan telah dicari dalam kesemua tempat yang berkemungkinan dan juga berdasarkan kepada maklumat Unit Kawalan Badak (RPU) sebelum ini. Kesemua lokasi kesan-kesan berkenaan telah ditandakan di dalam peta menggunakn alat GPS. Kepadatan anak-anak pokok di Sg Sabran (nilai min 8.5± sisihan piawai 4.5) menunjukkan perbezaan yang berkesan diantara Km 3 (3.1± 1.4), Km 32 (4.5± 3.6) dan Sg Purut – Sg Langgum (4.6± 1.7), [F 3, 156) = 22.706, p<.05]. Disebabkan kesemua kawasan kajian mempunyai kesan-kesan tinggalan badak pada sebelum ini, hasil kajian ini mendapati badak Sumatra dapat menyesuaikan dirinya dengan baik di dalam habitat yang mempunyai kepadatan anak-anak pokok yang berbeza-beza. Terdapat 19, 13, 6 dan 5 kubang-kubang badak di Sg Sabran, Km 3, Sg Purut-Sg Langgum dan Km 3 mengikut turutan. Dua kesan tapak kaki badak dewasa yang lama, 3 longgok tinja lama badak dan kesan penandaan pada tumbuhan telah dijumpai di kawasan kajian. Jilatan garam pula hanya dijumpai di Km 3 tetapi tidak dijumpai di kawasan lain kajian.

Katakunci: Badak Sumatra, perolehan anak-anak pokok, kubang-kubang dan jilatan garam.

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LIST OF ABBREVIATION

a.s.l.	above sea level
B.C.	Before Christ
BORA	Borneo Rhino Alliance
Ca	Calsium
CITES	Convention on International Trade in Endangered Species
cm	centimeter
DNA	Deoxyribonucleic acid
DVCA	Danum Valley Conservation Area
gbh	girth breast heigth
GPS	Global Positioning System
IUCN	International Union for Conservation of Nature and Natural Resources
Km	Kilometer
m	meter
mm	millimetre
NGO	Non Government Organization
P	Phosphorus
RM	Malaysian Ringgit
RPU	Rhino Patrolling Unit
Sg	Sungai
SOS Rhino	Save Our Sumatran Rhino
sp	Species
TWR	Tabin Wildlife Reserve
WWF	World Wildlife Fund
°	Degree
%	Percent

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CHAPTER 1

INTRODUCTION

1.1 Background of the Study

The Sumatran rhinoceros (*Dicerorhinus sumatrensis*) has been in the focus of the world conservation since 1970s, as their numbers have greatly reduced. There were 300 Sumatran rhinoceros located in three main areas on Sumatra (200), two or three areas in Peninsular Malaysia (75) and two areas in Sabah (25) (van Strien, 2005). Its conservation status has changed from endangered to critically endangered species according to the IUCN Red List (Foose and van Strien, 1995). It is the most endangered rhino species in this world as their numbers were less than 300, the rate of decline was at least 50% in 10 years, the situations was not stabilizing and the captive breeding was not reproducing very well (Foose and van Strien, 1995). The loss of habitat and poaching activities are the two most important factors that contributed to the decline of the population size of the Sumatran rhinoceros (van Strien, 2005). In addition, poaching activities which is associated with the use and trade activities of the rhino horn which may have contributed to the decline were recorded from China as early as 2600 B.C. (Rabinowitz, 1995).

In Sabah, the population density of the Bornean subspecies of the Sumatran rhinoceros was reported to be less than 20 since 1980's (Payne, 1986). In addition, its population is extremely in precarious situation, with low total number, a skewed sex ratio and many widely scattered small populations, resulting in the possible reproductive isolation from the main breeding areas (Malaysia Rhino Conservation Action Plan, 1993).

To save this species, the Government of Malaysia especially the State Government of Sabah has taken serious steps by gazetting the habitats for the conservation of the Sumatran rhinoceros. The Tabin Wildlife Reserve (TWR), a 120 521 ha of a mixed secondary-primary forest was gazetted primarily for large

mammals, in particular the Sumatran rhinoceros (Andau, 1987). The Danum Valley Conservation Area (DVCA), classified as Class I (Protection Forest) reserve, also harbors thirteen Sumatran rhinoceros (Alfred and Payne, 2005). Based on surveys conducted by an Non Government Organization (NGO) operating in Sabah, Save Our Sumatran Rhino (SOS Rhino), estimated population size of rhinos is about 50 to 70 individuals in TWR and DVCA (Thayaparan, 2006). As more surveys were done in recent years, this number has appeared to be on a much higher guest and estimation.

Even though previous efforts to conserve the Sumatran rhinoceros have not been so successful, saving this species requires more than just faith. It takes a lot of commitment and patience. *In situ* together with *ex situ* conservations must be strengthened. Supports from the world are needed during this critical time. As there are still protected forests, the chance for the survival of this species in Sabah is still strong and encouraging.

As the Sumatran rhinoceros is known to use certain parts of the known range more than the others, the habitat evaluation in its known ranges is presented in a way to understand the needs and preferences of the species for a better effort in *in situ* conservation. Further understanding on the ecological setting of this species may help the wildlife managers to set a better management protocols to save it from threat of extinction.

1.2 Problems Statement

1. Plant availability for the Sumatran rhinoceros in study areas at Tabin Wildlife Reserve and Danum Valley Conservation Area is unknown.
2. The number of salt licks at study areas is unknown.
3. As individual of rhinos are widely scattered in Tabin Wildlife Reserve and Danum Valley Conservation Area, signs of its existence are hard to find.

1.3 Objectives of the Study

The study was conducted in the selected areas in Tabin Wildlife Reserve and Danum Valley Conservation Area. The objectives of this research were;

1. To study the plant availability for the Sumatran rhinoceros in study areas.
2. To study the number of salt licks in study areas.
3. To study the Sumatran rhinoceros signs included the number of wallows at study areas, footprints, dungs and marking signs.

CHAPTER 2

LITERATURE REVIEW

2.1 Rhinoceros of the World

Inhibiting the Earth for 50 million years, the rhinoceros family Rhinocerotidae had thrived and diversified to fit many ecosystems (Foose and Blumer, 2006). However, evolutionary had leaves us with only five rhinos species living in Africa and Asia today. In Africa there are two species of rhinoceros; the black *Dicerorhinus bicornis* and the white *Ceratotherium simum.* However, there are two separated species of white rhinoceros in Africa recognized as the northern and southern white rhinoceros. Studies on mitochondrial DNA confirm that the two subspecies of the white rhinoceros are genetically distinct (WWF Factsheet, 2004). The northern subspecies *Ceratotherium simum simum* is listed separately by IUCN as critically endangered, although the southern subspecies *Ceratotherium simum cottoni* has now reached sufficient numbers to qualify for near threatened (CITES, 2004). Three of the five remaining rhinoceros in this world existing in Asia; the greater one-horned *Rhinoceros unicornis* is also known as the Indian rhinoceros, the Javan rhinoceros is also known as the lesser one-horned rhinoceros and the smallest rhinoceros with two horns the Sumatran rhinoceros also known as the hairy rhinoceros. Table 2.1 shows the physical differences between the five rhinoceros of the world.

Table 2.1: Physical differences between the five rhinos

Species	*Average height at shoulder (meter)*	*Average weight (kilogram)*	*Average length of front horn (meter)*
White rhinoceros	1.52-1.83	2268-3583	0.91-1.89
Black rhinoceros	1.52-1.83	998-1814	0.46-1.22
Indian rhinoceros	1.10-1.98	1497-1996	0.20-0.61
Javan rhinoceros	1.37-1.68	1361	0.25
Sumatran rhinoceros	0.91-1.52	318-907	0.25-0.78

Source: Adapted from Hull, 1998

2.2 The Sumatran Rhinoceros

The Sumatran rhinoceros belongs to the order of the Perissodactyla and is one of the three species of rhinos native to Asia. It is the smallest from the five of the living species of rhinoceros in this world with a weight range of between 320-900 kg (Hull, 1998). The Sumatran rhinoceros have three subspecies that are the southern Sumatran rhino *Dicerorhinus sumatrensis sumatrensis,* borneon or eastern Sumatran rhino *Dicerorhinus sumatrensis harrissoni and* Northern Sumatran rhino *Dicerorhinus sumatrensis lasiotis.*

Sumatran rhinoceros is the only species of rhinoceros in Malaysia as Javan rhinoceros was hunted to extinct on the Peninsula Malaysia in 1932 (WWF, 2010). Lowland with plentiful of rivers and wet areas are favored (Foose and van Strien, 1997). As lowlands are the first areas used by human to settle down, the Javan rhinoceros were easily preyed and the lost of habitat is ineviTable. However, the existence of Javan rhinoceros have never been recorded in Sabah (van Strien, 1974). The Javan rhinoceros was thought to have disappeared in Borneo due to natural causes about 12,000 years ago (Rabinowitz, 1995).

There are three subspecies of the Sumatran rhinoceros in the world that are differentiated by their skull measurements (van Strien, 1974). The *D. s. sumatrensis* is known as the western Sumatran rhinoceros lived mostly on western Sumatera and some may still live on a very few parts on Peninsular Malaysia. In

addition, there is a slight genetic difference between the western and eastern Sumatran rhinos (Asian Rhino Specialist Group, 1996). The Sumatran rhinoceros on the Peninsula Malaysia were once known as *D. s. niger*, but were later recognized to be similar to the rhinos on western Sumatera (Rookmaaker, 1984).

The second subspecies, the *D. s. lasiotis* is known as the northern Sumatran rhinoceros was once roamed in India and Bangladesh but has been declared extinct in these countries. However on the present day unconfirmed reports suggest that there may be a small population still surviving in Burma, but the political situation in the country has prevented verification (Asian Rhino Specialist Group, 1996).

The last subspecies, *D. s. harrissoni* is the subspecies of Sumatran rhinoceros that being studied by the researcher (see Figure 2.1). This species is distributed in Borneo and recognized as the smallest compared to the other subspecies. It was once spread in Asia and existed in the areas of lowland and mountain across Southeast Asia, from the hills of eastern Assam in India through Burma, Thailand, Indochina, the Malay Peninsula, and Sunda Islands of Sumatra and Borneo (van Strien, 1974; Groves, 1967). This subspecies is named after Tom Harrisson, who worked extensively with Bornean zoology and anthropology in the 1960s (Groves, 1965).

Figure 2.1: The Sumatran rhinoceros from Sabah, Malaysia

Source : From SOS Rhino, 2007

2.3 Poaching Threat

The Sumatran rhinoceros has disappeared from most parts of Borneo as a result of hunting for its valuable body parts especially the horn over thousands of years and particularly over the past one hundred years (Payne *et al.*, 2005). By the Tang Dynasty (600-900 A.D.), large quantities of horn including the Sumatran rhinoceros horn were imported to China (Rabinowitz, 1995). Schafer (1981) concluded that the near extinction of the Javan and Sumatran rhinos in modern times has been largely attributed to the trade during the Tang Dynasty.

The more rapid decline on the Borneo can attributed to the greater hunting skills of the Bornean Island people because most of the tribe lives in and from the jungle (van Strien, 1985). In a survey conducted in upper Kayan and upper Mentarang (in the northwest corner of East Kalimantan, bordering Sabah and Sarawak) in 1981 showed that no more rhinos remained in the area and the disappearance was due to heavy hunting by their fathers' generation (Blower *et al.*, 1981). Fortunately, the absence of real hunting tribes in southeast Sabah has resulted the survival of rhinos but until the year of 1980s the hunters had move