



# SUMATRAN RHINO POPULATION AND HABITAT VIABILITY ANALYSIS

BANDAR LAMPUNG, SOUTH SUMATRA, 1993



COVER PHOTO:

R. Tilson  
Sumatran rhinos/Ragunan Zoo

# **Sumatran Rhino in Indonesia Population and Habitat Viability Analysis Report**

Submitted to the  
**Department of Forestry  
Directorate General of Forest Protection  
and Nature Conservation, Indonesia**

A Collaborative Effort of the  
Captive Breeding Specialist Group  
Species Survival Commission of the IUCN  
with the following organizations:

**Indonesian Forest Protection & Nature Conservation (PHPA)  
IUCN/SSC Asian Rhino Specialist Group (ARSG)  
International Rhino Foundation (IRF)  
NYZS/International Wildlife Conservation Park (USA)  
Howletts and Port Lympne Foundation (UK)  
Minnesota Zoo (USA)**



# **Sumatran Rhino in Indonesia Population and Habitat Viability Analysis Report**

**of the Captive Breeding Specialist Group  
Species Survival Commission of the IUCN**

**12 July 1994**

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**Sumatran Rhino in Indonesia  
Population and Habitat  
Viability Analysis Report**

**Section 1:**

**PHVA Workshop Information**

## *Executive Summary*

### **Sumatran Rhino in Indonesia Population and Habitat Viability Analysis**

The Sumatran rhino is rapidly disappearing from the forests of Sumatra. Population estimates of wild Sumatran rhinos, from the time that the *Indonesian Rhino Conservation Strategy* was developed in October 1991 to the date of this workshop in November 1993, decreased from about 400 to less than 250 rhinos, possibly as low as 185. Poaching is considered the primary cause for this decline. There are no effective protection measures currently in place to stop poaching. Moreover, the captive breeding community for Sumatran rhinos has had no success in managing or propagating this species for future reinforcement of the wild populations.

***At the current rate of decline of wild populations, Sumatran rhinos will disappear by the end of this century if poaching is not stopped. Time is of the essence. National and international conservation organizations in Indonesia must act immediately to support the Directorate General of Forest Protection and Nature Conservation (PHPA) in Indonesia in its efforts to protect the Sumatran rhino and prevent its extinction.***

To address these issues, a Population and Habitat Viability Analysis (PHVA) Workshop for Sumatran rhinos (*Dicerorhinus sumatrensis*) was convened in Bandar Lampung, Sumatra on 11-13 November 1993. The workshop was organized and conducted by Komar Soemarna (Director of Nature Conservation, PHPA), Widodo Ramono (Director of Species Conservation, PHPA), Jansen Manansang (Taman Safari Indonesia), Ronald Tilson (Minnesota Zoo), and Ulysses Seal (IUCN/SSC Captive Breeding Specialist Group--CBSG). Sponsors of the workshop included: the Indonesian Directorate of Forest Protection and Nature Conservation (PHPA); International Rhino Foundation (IRF); NYZS/International Wildlife Conservation Park; Howletts & Port Lympne Foundation; Minnesota Zoo; and CBSG.

The workshop at Bandar Lampung was attended by 40 participants, primarily PHPA staff from the five national parks and other conservation areas of Sumatra. Additional representatives were from Malaysia, Thailand, New Zealand, Australia, United Kingdom, USA, Ireland, India and Sri Lanka, including the two program officers of the IUCN/SSC Asian Rhino Specialist Group, the Chair of IUCN/SSC CBSG, the President and Executive Officer of the International Rhino Foundation, the Assistant Director of the Department of Wildlife and National Parks of Malaysia, the Program Officers of Yayasan Mitra Rhino, the Sumatran Rhino Survey Project Team, WWF-Indonesia Programme, and Indonesian (TSI), Australasian (ASMP), and European (EEP) regional program representatives.

The workshop focused primarily on the distribution, status and threats of wild populations of Sumatran rhinos on the island of Sumatra. At the workshop five working groups were established: Distribution and Population Status; Life History and Vortex Analysis; Rhino Census Techniques; Rhino Poaching Problems and Solutions; and *In Situ* Management of Sumatran Rhinos. The workshop provided a unique opportunity to bring together Indonesian and



international rhino biologists who have censused, or are presently censusing, rhinos at sites in Sumatra, Chiefs and PHPA staff of Gunung Leuser, Kerinci Seblat, Bukit Barisan Selatan, Berbak, and Way Kambas National Parks, and international representatives from the IUCN/SSC Specialist Groups and representatives from Indonesian, Australian, European and North American zoos. The workshop concluded with the drafting of a *Indonesian Sumatran Rhino Action Plan*.

Estimates of habitat area and population numbers for wild Sumatran rhinos were derived in the **Distribution and Population Status Working Group** through consensus of PHPA staff and the field biologists. There are four relatively large Sumatran populations: Gunung Leuser National Park (90-120 rhinos); Bukit Barisan Selatan National Park (25-60 rhinos); Gunung Sumbing-Masurai in Jambi (40-50 rhinos); and Listen-Serbojadi in Aceh (15-25 rhinos). The number one priority for these rhino populations is to increase protection from poaching. There are two smaller rhino populations: Gunung Patah in South Sumatra (10-15 rhinos) and Bukit Kayu Embun in Bengkulu (10-15 rhinos). The number one priority for these rhinos is also increased protection from poaching. There are seven rhino populations estimated to be less than 10 individuals: Way Kambas National Park (3-5 rhinos); Sungai Ipuh & Gunung Seblat in Bengkulu (6-7 rhinos); Bukit Hitam in Bengkulu (3-5 rhinos); Torgamba & Tanjung Medan in Riau (3-5 rhinos); Ps. Pangarayan & Dalu Dalu in Riau (2 rhinos); Bukit Tapan & Silaut in West Sumatra (5 rhinos); and Lokop in Aceh (3-5 rhinos). These rhinos also need increased protection. Finally, there are four sites where rhinos are suspected to occur, but their numbers are unknown. These sites are: Berbak, Ketenong, Rokan Hilir, and Gunung Abong-Abong. The number one priority for these Sumatran rhino populations is to confirm their presence and numbers.

*In summary, population estimates of wild Sumatran rhinos, from the time that the Indonesian Rhino Conservation Strategy (1991-1992) was developed to the date of this workshop (1994), decreased from about 600 rhinos (range = 420-785) to about 250 rhinos. The most optimistic estimates are 215-319 plus possible presence; the more conservative estimates are 185-259 plus possible presence.*

The working group on **Life History and Vortex Analysis** was constrained because demographic data on wild Sumatran rhinos are not available from any studies and data from captive rhinos are meager. Therefore, they used data from the Asian greater one-horned rhino and the Javan rhino, suitably modified for the Sumatran rhino, assuming that the Sumatran rhino is a specialist of tropical forest habitat and is likely to show a more "K-selected" life history. Their analysis showed that rhino populations of under 10 individuals are at high risk of extinction even under ideal conditions and should be generally considered non-viable. Current rhino populations of 20-25 individuals can be considered viable only if poaching is stopped and habitat is protected so that the populations can increase to 50-100 animals over the next 100 years. Current populations of 50-75 or more rhinos can be considered to have a high probability of survival if poaching can be controlled to no more than 3% per year so that populations can increase to 75-100 over the next 100 years. However, annual poaching rates of 7% (which wild rhinos have suffered in the last decade) will decimate all wild populations regardless of their size.

*Given the present population sizes and poaching rates of rhino in Sumatra, the future of the species is highly insecure.*

The working group on **Rhino Census Techniques** discussed the most feasible options for estimating wild Sumatran rhino numbers, given difficult field conditions and making best use of reliable sources. Direct observation of rhinos in Sumatran rain forests are impossible, and it is not considered a viable technique. Several indirect methods suggested were the use of remote camera traps, measurement and identification of individual rhino tracks, and using dung density for estimating the size of local populations. This working group suggested that before any detailed study of rhino numbers is attempted, it will be important to establish first the range of the species throughout Sumatra using presence or absence criteria only.

The working group on **Rhino Poaching** focused on the fact that poaching of the Sumatran rhino is occurring both inside and outside of conservation areas of Sumatra. The principal factor driving poaching is the extreme rarity of the species and the high market value of its horn, particularly in the pharmaceutical industry of Hong Kong, Taiwan and China. For example, the market value of one kg of Sumatran rhino horn in Taiwan is US \$18,000. Repressive measures only against poachers were considered insufficient to stop poaching. A successful approach will also need to develop preventive measures to reduce the opportunities for poaching. Such measures include: implementing anti-poaching programs of the *Indonesia Rhino Conservation Strategy*; establishing and improving anti-poaching units and their programs in rhino habitat; disrupting the illegal trafficking network; and coordinating a multi-international effort among range countries to encourage full participation of non-CITES members.

The Director General of PHPA, as Chair of the Foundation of Rhino Friends (YMR), earlier recommended the establishment of an *in situ* rhino management center as one component of the *Indonesian Rhino Conservation Strategy*. Thus, a working group on **Rhino In Situ Management** was organized to formulate recommendations for establishing such a program for Sumatran rhinos that could be initiated immediately and developed in phases so that it is feasible to raise necessary funds. Its objective was to provide a site where rescued Sumatran rhinos can be placed and propagated under natural conditions. Estimates for the costs for facilities and operation of the rhino rescue and management teams were generated. A set of criteria to guide the construction of rhino enclosures at this site were proposed, as well as a set of criteria for the selection of best possible site for the *in situ* intensive management center. Finally, an implementation schedule and budget were developed.

On the last day of the workshop a comprehensive set of recommendations for the conservation management of Sumatran rhinos were reviewed, intensively discussed, and consensus was reached. These recommendations formed the basis for an *Indonesian Sumatran Rhino Action Plan*. It is important to note that the *Indonesian Sumatran Rhino Action Plan* presented here is in support of and is a logical extension of the *Indonesian Rhino Conservation Strategy* that was approved by the Director General of PHPA in 1993.

***The Indonesian Sumatran Rhino Action Plan emphasizes the critically endangered status of Sumatran rhino due to its restricted habitat, small population numbers, fragmented distribution, and extreme poaching pressures. The species will need strong conservation management strategies implemented immediately if it is to survive, in the wild or in captivity.***

Major problems identified during the PHVA workshop were:

- Inconsistent and incomplete database for censusing wild Sumatran rhino populations;
- Continued high levels of poaching of wild rhino populations and continued human encroachment and habitat degradation of protected areas;
- Need for improved training, support, equipment, and coordination of PHPA staff in rhino anti-poaching programs and habitat protection; and
- Need to develop an *in situ* intensive management center for Sumatran rhinos.

With these four problems in mind, the *Indonesian Sumatran Rhino Action Plan* provides the following prioritized recommendations to address immediate and critical conservation issues for **wild** Sumatran rhino populations:

- The number one priority is to increase protection of all remaining wild Sumatran rhino populations. To fully develop this concept, PHPA needs to convene an internal review to evaluate how best to use their available resources to initiate anti-poaching action immediately.
- Visits to sites where populations are estimated to be fewer than 15 individuals should be conducted immediately to establish rhino presence and numbers, possibly in cooperation with local university and NGO participants.
- Programs are needed to train, equip, fund and coordinate PHPA staff in developing more intensive rhino anti-poaching programs in all conservation areas, stronger law enforcement to decrease human encroachment of rhino habitat, and better liaison between PHPA and HPH (Hak Pengusahaan Hutan).
- Because of their low population numbers and uncertain habitat status, rhino populations at Torgamba and Dalu Dalu should be captured and translocated to a secure and similar habitat. A review by PHPA is needed to select the site (see below).
- Given the low population estimates of wild Sumatran rhinos, their extreme fragmentation, their low reproductive potential, the continued encroachment and degradation of their habitat, and insufficient habitat protection and law enforcement measures in the face of continued poaching pressures, an *in situ* intensive management center for **semi-wild or semi-captive** (depending upon your orientation) Sumatran rhinos should be established as soon as possible as one component of the *Indonesian Sumatran Rhino Action Plan*.

The workshop participants developed a set of criteria for the immediate establishment of an *in situ* intensive captive management program. The following recommendations will guide this program:

- Support for this *in situ* intensive management center for Sumatran rhinos should be sought from national and international, governmental and non-governmental agencies.
- The *in situ* intensive management center should be located adjacent to, or within, a major conservation area for Sumatran rhinos to encourage and support better wildlife management in the conservation area.
- Sumatran rhinos for the *in situ* center should be derived both from animals rescued from the wild as determined and recommended from PHPA, as well as rhinos already in captivity.
- The *in situ* center should have an ecotourism component to provide ongoing support for the operation of this center.

The combination of the above objectives form the basis of the *Indonesian Sumatran Rhino Action Plan*. This document was prepared in draft form during the workshop, and will continue to be reviewed and revised by key participants. This plan includes specific recommendations and priorities to PHPA for the long-term conservation, management and research of wild populations of Sumatran rhinos, as well as specific recommendations for the establishment of an *in situ* intensive management center, all of which are in support of the *Indonesian Rhino Conservation Strategy* published earlier. ■

Submitted by:            Ronald Tilson, Ph.D.  
                                 IUCN/SSC CBSG Southeast Asia Programs & Minnesota Zoo



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Bogor, 5 November 1993

Kepada Yth,  
Kepala Kanwil  
Departemen Kehutanan  
Propinsi Lampung  
di Bandar Lampung

Dengan hormat

Sehubungan dengan akan diselenggarakannya "Lokakarya Analisa Viabilitas Habitat Populasi Gajah Asia dan Badak Sumatera" di Hotel Marco Polo, Bandar Lampung, pada tanggal 8 - 13 November 1993, dengan ini kami mohon kesediaan Kantor wilayah Departemen Kehutanan Lampung untuk turut berpartisipasi dan menyiapkan personil untuk membantu kepanitiaan dalam penyelenggaraan Lokakarya tersebut. Bantuan tersebut kami harapkan dapat dimulai sejak awal hingga akhir acara.

Sebagai informasi (sesuai lampiran), Lokakarya ini diselenggarakan atas kerjasama Direktorat Jenderal PHPA Departemen Kehutanan dengan IUCN-SSC-CBSG.

Demikian permohonan kami, atas perhatian dan kerjasamanya kami ucapkan terima kasih.



Pelestarian Alam  
Mewakili

*Yas Kasim, MS.*

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1. Bp. Direktur Jenderal PHPA (sebagai laporan)
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4. Drs. Jansen Manansang (TSI)
5. Drs. Sukianto Lusli (WWF-IP)

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Lampiran :  
Perihal : Kepada Yth.

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U S A  
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Thank you for your activity report in Indonesia we received your activity report along Indonesia dated 27 April - 2 May 1993.

Related to the Asian Elephant and Sumatran Rhino Workshop which is planed to schedule on November 1993 principally we suport that activity.

Furthermore could you please help us to inform this matter to the foreign participants.

Thank you very much for your cooperation.



Director of Nature Conservation

Widodo Sukohadi Ramono

*Problem Statement*

**Sumatran Rhino  
Population and Habitat Viability Analysis**

President Soeharto of the Republic of Indonesia, in his letter of 25 January 1990 to the Duke of Edinburgh, President of the **World Wildlife Fund for Nature**, stated:

*"...I fully support the 'Points of Agreement' with its recommendations to save the Java and Sumatra Rhinos.*

*I have requested the Minister of Forestry to take the necessary steps and the Minister of State for Population and Environment to coordinate our efforts in saving and enhancing our Rhino population..."*

Previously, the IUCN/SSC CBSG, in conjunction with Department of Forest Protection and Nature Conservation of Indonesia (PHPA), coordinated a Javan Rhino Population Viability Analysis Workshop held in Bogor in June 1989 in which these Points of Agreement were developed. As a follow-up, an International Rhino Conference was held in San Diego in May 1991, and an Indonesian Rhino Conservation Workshop was conducted in Bogor in October 1991. Extreme polarization between the *ex situ* and *in situ* conservation agendas precluded the initiation of any implementation of these Points of Agreement.

Out of this controversy, the *Indonesian Rhino Conservation Strategy*, and its companion document, the *Indonesian Rhinoceros Conservation Action Plan Priorities*, was produced in June 1993. These reports give precise direction for the implementation of conservation strategies that will fulfill the statements of President Soeharto of Indonesia. This Sumatran Rhino PHVA Workshop is designed to determine explicit management strategies for the free-ranging populations of Sumatran rhinos in Indonesia and to recommend how specific *in situ* programs in Sumatra might contribute to this process.

The Sumatran rhinoceros (*Dicerorhinus sumatrensis*) once occurred from the foothills of the Himalayas in Bhutan and eastern India, through Myanmar, Thailand, and the Malay peninsula, and on the islands of Sumatra and Borneo. There have also been unconfirmed reports of the species in Cambodia, Laos and Vietnam. In general this species has survived much better in its native habitats than the Javan rhino. This may be partly because it mainly inhabits the mountains and forests of higher elevations which were not so subject to development and logging.

The largest number of the species *D. sumatrensis* now survives on the island of Sumatra and it is possible that several hundred animals still exist. However, the island is now in a phase of intense development resulting from Indonesia's transmigration program and the habitat available to the species is being rapidly reduced. In addition the sheer size of the island, compared to the available PHPA staff for protecting the species, makes adequate protection almost impossible. Even in areas where there is a strong presence of PHPA staff, poaching is active.

The IUCN/SSC Asian Rhino Action Plan (Khan, 1989) and derivatively the *Indonesian Rhino Conservation Strategy* (PHPA, 1993) estimate 420-785 Sumatran rhinos are living in seven or more mostly disjunct protected areas: 250-500 living in Kerinci-Seblat National Park (14,846 km<sup>2</sup>), 130-200 in Gunung Leuser National Park (8,025 km<sup>2</sup>), 25-60 in Barisan Selatan National Park (3,568 km<sup>2</sup>), perhaps a few in Berbak National Park (1,900 km<sup>2</sup>); one was reputed but not confirmed to have been sighted in Way Kambas National Park (1,300 km<sup>2</sup>), and a few may still remain in forests near Torgamba, Gunung Patah, Gunung Abong-abong and Lesten-Lukup. These numbers are estimates only, are based on surveys and speculations that are at least 10 years old, and are not based on quantitative methods. Thus, they are not considered reliable. There is little or no gene flow among these fragmented populations, poaching with firearms and wire snares is ongoing but undetermined in scope, and human encroachment continues to erode the edges of the protected areas. Clearly, this species in Sumatra is critically endangered.

The *International Studbook for Sumatran Rhinos* as of 20 August 1993 lists 10 males and 14 females living in captivity, of which two males and three females are in captivity in Indonesia at Taman Safari Indonesia, Ragunan Zoo and the Surabaya Zoo. Breeding has been observed but no offspring have yet been produced. The Sumatran Rhino Trust of the American Zoo and Aquarium Association (AZA), which was actively capturing isolated rhinos on the western edge of Kerinci Seblat National Park, has terminated its Memorandum of Understanding with PHPA. Thus, there is no *ex situ* program underway in Indonesia other than the small collection of Sumatran rhinos being held at three zoos. Thus, there is a need to reevaluate the role of how *ex situ* programs can contribute to a holistic conservation program for the species in Indonesia.

To provide direction to these issues, the goals of this workshop are designed to: 1) conduct a metapopulation and habitat viability assessment by utilizing a Geographic Information System (GIS) for all wild populations of Sumatran rhinos; 2) formulate management strategies for each population with risk assessments to prevent extinction and achieve the objective of maintaining viable, self-sustaining populations within the historic range of this subspecies; and 3) prepare a report of the analyses and results of the meeting with recommendations to the Indonesian Directorate General for PHPA and the IUCN/SSC Asian Rhino Specialist Group.

### Workshop Objectives

- Estimate probable populations of rhinos in protected areas of Sumatra using GIS-based habitat assessment techniques, the degree of fragmentation of these populations, and their probabilities for long-term survival with no intervention;
- Determine numbers of rhinos and subpopulations required for various probabilities of survival and preservation of genetic diversity for specified periods of time (i.e. 50, 100, 200 years) given known sizes of protected areas;
- Project the potential expansion or decline of rhino population numbers due to poaching, habitat alteration and differing management plans;
- Evaluate possible role of captive propagation *in situ* as a component of the above management options;
- Evaluate current management, conservation and education efforts in place in other countries which could serve as models for Sumatran rhinos;
- Recommend additional scenarios for action and future needs for research.



The combination of the above objectives form the basis for supporting and refining the *Indonesian Rhino Conservation Strategy* already in place. The document will be prepared in draft form during the workshop, and will be reviewed and revised by all participants during the workshop to achieve consensus on its content before departure. It will include specific recommendations and priorities for conservation management of both *ex situ* and *in situ* programs. Once consensus is reached the document will be translated into Bahasa Indonesian for distribution and implementation throughout Indonesia. The results of this workshop will be refined and used as a model for developing PHVAs for remaining extant populations elsewhere in Asia. ■

Submitted by:            Ronald Tilson, Ph.D.  
                                 IUCN/SSC CBSG Southeast Asia Programs & Minnesota Zoo

LOKAKARYA ANALISA VIABILITAS HABITAT DAN POPULASI  
GAJAH ASIA DAN BADAK SUMATERA  
(Asian Elephant & Sumatran Rhino PHVA Workshops)

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Hotel Marcopolo, Bandar Lampung, 8 - 13 November 1993

LAPORAN PENYELENGGARA

Assalamualaikaum Wr.Wb.,

Yang terhormat Bapak Menteri Kehutanan R.I. yang dalam hal ini diwakili oleh Bpk. Kepala Badan Penelitian dan Pengembangan Kehutanan,

Yang terhormat Bapak Gubernur KDH.Tingkat I Propinsi Lampung, yang dalam hal ini diwakili oleh Bpk. Asisten II Sekwilda Propinsi Lampung,

Yang kami hormati Bapak Kepala Kantor Wilayah Departemen Kehutanan Propinsi Lampung,

Para Pakar Internasional di bidang konservasi badak sumatera, gajah asia dan belibis pohon sayap putih, yang terdiri dari IUCN/CBSG, IUCN/SSC AsESG - AsRSG, International Rhino Foundation, Zoo Specialists,

Hadirin sekalian yang berbahagia.

Allow me to report on the preparation of this meeting in Bahasa Indonesia,

Perkenankan kami melaporkan bahwa pada saat ini telah berkumpul para pakar dibidang konservasi satwa badak sumatera, para pakar gajah asia dan para pakar belibis pohon sayap putih, para pelaksana teknis konservasi, pecinta margasatwa dan para pengamat yang berjumlah 60 orang.

Para peminat konservasi satwa tersebut yang berasal dari Amerika Serikat, Inggris, India, Sri Langka, Thailand, Malaysia, New Zealand, Australia dan Indonesia, berkumpul atas kerjasama antara: Direktorat Jenderal Perlindungan Hutan dan Pelestarian Alam Departemen Kehutanan, dengan Survival Service Commission (SSC) dari International Union for Conservation of Nature and Natural Resources (IUCN) yang diwakili oleh Captive Breeding Specialists Group (CBSG), dan Taman Safari Indonesia sebagai anggota IUCN SSC/CBSG.

Dalam rangka memperingati Hari Cinta Puspa dan Satwa Nasional tahun 1993, dengan mengambil tempat di Hotel Marcopolo Bandar Lampung di Propinsi yang terkenal gajahnya ini, para pakar dan teknis tersebut bermaksud untuk membicarakan mengenai konservasi badak, gajah dan belibis pohon sayap putih dalam suatu lokakarya yang bertujuan untuk:

merumuskan saran strategi pengembangan manajemen kawasan konservasi di Sumatera dan dengan sasaran-sasaran:

- analisis...

- analisis tentang status terakhir populasi dan distribusi gajah asia dan badak sumatera serta belibis pohon sayap putih,
- habitat dan pola pemanfaatan lahan,
- masalah perburuan liar,
- koordinasi antar instansi lokal terkait dan hal-hal penting lain, dalam perumusan strategi jangka panjang pengembangan manajemen populasi dan habitat satwa-satwa tersebut.
- masalah gangguan gajah

Demikian laporan kami dan akhirnya perkenankan kami memohon kepada Bapak Menteri Kehutanan untuk pada waktunya berkenan membuka Lokakarya ini.

Wassalamualaikum Wr.Wb.

tertanda,

Komar Soemarna MS.

Direktur Bina Kawasan Suaka Alam dan Konservasi Flora Fauna.

**Sambutan**  
**Gubernur Kepala Daerah Tingkat I Lampung**  
**Pada Pembukaan Lokakarya Analisa**  
**Viabilitas Habitat Populasi Gajah Dan Badak Sumatera**  
**Tanggal 8 November 1993**

Assalamu'alaikum Warakhmatullahi Wabarakatuh.

Yth. Dir. Jen. Perlindungan Hutan dan Pelestarian Alam (PHPA),  
Yth. Para Direktur dilingkup Direktorat Jenderal PHPA,  
Yth. Para Kepala Kantor Wilayah Kehutanan se Sumatera,  
Yth. Para Utusan Pemda Tk. I se Sumatera,  
Para Peserta Lokakarya Analisa Viabilitas Habitat Populasi Gajah dan Badak Sumatera,  
serta Hadirin yang kami hormati,

Pertama-tama marilah kita panjatkan puji syukur kehadirat Tuhan Yang Maha Esa atas segala limpahan rahmat dan karunia-Nya yang telah kita terima, sehingga kita dapat berkumpul pada hari ini dalam rangka Lokakarya Analisa Viabilitas Habitat Populasi Gajah dan Badak Sumatera sebagai salah satu mata acara pada Hari Cinta Puspa dan Satwa yang telah ditetapkan oleh Pemerintah pada setiap tanggal 5 November.

Kami merasa memperoleh kehormatan yang besar atas penyelenggaraan Lokakarya ini di Bandar Lampung.

Dalam hubungan ini perkenankan kami mengucapkan selamat datang kepada para peserta Lokakarya di daerah "Sang Bumi Ruwa Jurai yang kita cintai ini.

Saudara-saudara sekalian,

Beberapa hari yang lalu kita juga baru saja menyelenggarakan acara Puncak Penghijauan dan Konservasi Nasional Tingkat Propinsi tahun 1993. Dalam era globalisasi yang dipenuhi dengan isu-isu tentang konservasi sumber daya alam, maka acara seperti Puncak Penghijauan Nasional (PPN), Pekan Konservasi Alam Nasional (PKAN) dan tak terkecuali hari Cinta Puspa dan Satwa ini kiranya amat relevan dan penting untuk dimasyarakatkan.

Keanekaragaman flora dan fauna Indonesia sangat tinggi, sehubungan dengan keadaan tanah, letak geografi dan keadaan iklimnya. Sebagai salah satu usaha untuk melindungi flora dan fauna dari ancaman bahaya punah, Pemerintah telah menetapkan jenis-jenis tumbuhan dan satwa tertentu sebagai tumbuhan dan satwa yang dilindungi berdasarkan Undang-Undang Nomor 5 tahun 1990 tentang Konservasi Sumber Daya Alam dan Ekosistemnya serta Peraturan Perundangan lain yang berlaku. Di Pulau Sumatera, terdapat beberapa jenis tumbuhan dan satwa yang terancam punah

antara lain Bunga Rafflesia, Gajah dan Badak Sumatera. Khusus untuk Propinsi Lampung, Bunga Asar dan Gajah telah ditetapkan oleh Pemerintah sebagai identitas flora dan fauna daerah.

Sejalan dengan itu habitat Gajah dan Badak Sumatera dari tahun ke tahun di Propinsi Lampung semakin menyempit seiring dengan menurunnya jumlah kawasan sebagai konsekwensi dari pesatnya laju pertumbuhan penduduk dan laju pembangunan yang menuntut tersedianya lahan. Berdasarkan Tata Guna Hutan Kesepakatan (TGHK), luas kawasan hutan di Propinsi Lampung yaitu 1.257.208 ha atau 32,5% dari luas wilayah, yang terdiri dari hutan lindung 336.100 ha, hutan suaka dan hutan wisata 422.500 ha, hutan produksi terbatas 44.120 ha, hutan produksi tetap 281.029 ha dan hutan produksi yang dapat dikonservasi 153.459 ha. Populasi gajah di Propinsi Lampung dilaporkan antara 550-900 ekor. Sedangkan populasi badak belum dapat dipastikan jumlahnya, meskipun bukti-bukti keberadaannya saat ini telah ditemukan. Baru-baru ini dilaporkan perjumpaan badak baik secara langsung maupun tidak langsung oleh petugas BKSDA II di Taman Nasional Way Kambas. Disamping itu, juga badak Sumatera dilaporkan keberadaannya di Taman Nasional Bukit Barisan Selatan.

Khusus mengenai gajah sebagai identitas fauna daerah Lampung, kini menghadapi permasalahan sehubungan dengan penyempitan habitatnya yang semakin hari semakin menuntut penanganan yang lebih intensif dan terencana. Meskipun telah banyak upaya yang dilakukan untuk memecahkan masalah tersebut; misalnya upaya-upaya yang telah dilakukan oleh BKSDA II, seperti Pendirian Pusat Latihan Gajah, penggiringan, penangkapan dan penjinakan gajah; kerjasama antara Kantor Wilayah Departemen Kehutanan dengan Kantor Wilayah Departemen Transmigrasi, Kantor Wilayah Departemen Sosial/Dinas Sosial. Namun demikian gangguan gajah di daerah ini masih sering terjadi.

Dalam rangka memecahkan masalah ini kami mengharapkan agar upaya pemanfaatan dan pemasyarakatan gajah di Propinsi Lampung pada khususnya dan di Pulau Sumatera pada umumnya, terus ditingkatkan untuk mewujudkan kondisi yang menunjukkan bahwa gajah dan masyarakat, khususnya petani, dapat hidup berdampingan secara harmonis dan saling menguntungkan. Sehingga pada gilirannya gajah Sumatera sebagai salah satu unsur pembentuk ekosistem hutan hujan tropis dapat terjamin kelestariannya.

Oleh karena itu kami mengharapkan melalui Lokakarya ini dapat dilahirkan konsep-konsep pemikiran mengenai upaya pemasyarakatan dan pelestarian gajah serta badak Sumatera yang realistis.

Akhirnya kepada para peserta Lokakarya kami ucapkan selamat berlokokarya, semoga Tuhan Yang Maha Esa memberikan kemudahan didalam menyusun konsep-konsep pemikiran tersebut.

Terima kasih atas perhatian Saudara-saudara. Wassala mu'alaikum Warakhmatullahi Wabarakaatuh. ■

Gubernur Kepala Daerah TK I Lampung,  
Poedjono Pranyoto



MENTERI KEHUTANAN  
REPUBLIK INDONESIA

**SAMBUTAN PENGARAHAN**

**MENTERI KEHUTANAN REPUBLIK INDONESIA**

**PADA LOKAKARYA MENGENAI KONSERVASI  
GAJAH ASIA, BADAK SUMATERA DAN BELIBIS SAYAP PUTIH.**

**PADA 8-13 NOVEMBER 1993**

**MARCO POLO, BANDAR LAMPUNG, SUMATERA SELATAN**

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ASSALAMUALAIKUM WR.WB.

SAUDARA-SAUDARA DIREKTUR JENDERAL, DIREKTUR DAN KEPALA KANTOR WILAYAH SERTA KEPALA DINAS LINGKUP DEPARTEMEN KEHUTANAN YANG SAYA HORMATI.

SAURARA-SAUDARA PARA PESERTA LOKAKARYA, PARA UNDANGAN DAN HADIRIN SEKALIAN YANG SAYA HORMATI.

PERTAMA-TAMA MARILAH KITA MEMANJATKAN PUJI DAN SYUKUR KEHADIRAT TUHAN YANG MAHA ESA, BAHWA KARENA KEHENDAKNYA PADA HARI INI KITA DAPAT BERKUMPUL BERSAMA DI TEMPAT INI DALAM KEADAAN SEHAT WAL'AFIAT DALAM RANGKA MENGHADIRI LOKAKARYA MENGENAI KONSERVASI GAJAH ASIA, BADAK SUMATERA DAN BELIBIS SAYAP PUTIH YANG DISELENGGARAKAN ATAS KERJASAMA DEPARTEMEN KEHUTANAN, DIREKTORAT JENDERAL PERLINDUNGAN HUTAN DAN PELESTARIAN ALAM, YAYASAN MITRA RHINO, IUCN, WWF, AWB, AAZPA DAN IRF YANG TELAH BANYAK MEMBANTU DEPARTEMEN KEHUTANAN, DIREKTORAT JENDERAL PERLINDUNGAN HUTAN DAN PELESTARIAN ALAM DALAM TUGAS KONSERVASI BAIK IN-SITU MAUPUN EKS-SITU DI INDONESIA.

SAUDARA-SAUDARA SERTA HADIRIN SEKALIAN YANG SAYA HORMATI,

PADA KESEMPATAN INI SAYA INGIN MENGEMUKAKAN RASA KEGEMBIRAAN SAYA, KARENA SAUDARA-SAUDARA DAPAT MENGHADIRI LOKAKARYA INI YANG MERUPAKAN RANGKAIAN DARI KEGIATAN KONSERVASI FLORA DAN FAUNA NASIONAL DALAM RANGKA MEMPERINGATI "HARI CINTA PUSPA DAN SATWA NASIONAL (HCPSN)" YANG TELAH DITETAPKAN JATUH PADA SETIAP TANGGAL 5 NOPEMBER. HCPSN INI TELAH DICANANGKAN OLEH PRESIDEN REPUBLIK INDONESIA, DALAM KATA SAMBUTANNYA PADA UPACARA PENCANANGAN TAHUN LINGKUNGAN HIDUP PADA TANGGAL 10 JANUARI 1993 DI TAMAN MONAS, JAKARTA.

SAYA JUGA BERSYUKUR KEPADA TUHAN YANG MAHA ESA, KARENA SAUDARA-SAUDARA DAPAT MENGHADIRI LOKAKARYA INI UNTUK MEMBERIKAN SUMBANGAN SARAN DALAM KONSERVASI GAJAH ASIA, BADAK SIMATERA DAN BELIBIS SAYAP PUTIH. TENTUNYA SUMBANGAN SARAN SAUDARA INI AKAN SANGAT BERARTI BAGI UPAYA MENINGKATKAN PEMBANGUNAN BERWAWASAN LINGKUNGAN YANG BERKELANJUTAN.

TIDAK LUPA SAYA SAMPAIKAN TERIMA KASIH KEPADA SEMUA PIHAK YANG TELAH BERUPAYA, SEHINGGA LOKAKARYA INI DAPAT DILAKSANAKAN, TERUTAMA REKAN-REKAN KAMI DARI IUCN/SSC-CBSG, WWF, AWB AAZPA DAN IRF

SAUDARA-SAUDARA PESERTA LOKAKARYA YANG SAYA HORMATI,

DALAM PENJELASAN UNDANG-UNDANG NO. 5 TAHUN 1990 TENTANG KONSERVASI SUMBER DAYA ALAM HAYATI DAN EKOSISTEMNYA TELAH DITEGASKAN BAHWA SATWA LIAR ADALAH SEMUA BINATANG YANG HIDUP DI DARAT, DAN DI AIR, DAN ATAU DI UDARA YANG MASIH MEMPUNYAI SIFAT-SIFAT LIAR, BAIK YANG HIDUP BEBAS MAUPUN YANG DIPELIHARA OLEH SEMUA MANUSIA. GAJAH ASIA, BADAK SUMATERA, DAN BELIBIS

SAYAP PUTIH ADALAH SATWA LIAR YANG TELAH MENGALAMI PENURUNAN POPULASI YANG CUKUP DRASTIS DI ALAM DI TEMPAT HIDUPNYA YANG BEBAS. KETIGA JENIS SATWA LIAR INI ADALAH MERUPAKAN SUMBER DAYA ALAM HAYATI YANG MENEMPATI EKOSISTIM TERTENTU YANG DAPAT DIUSAHAKAN KELESTARIAN DAN KESEIMBANGAN EKOSISTIMNYA SEHINGGA DAPAT LEBIH MENDUKUNG UPAYA PENINGKATAN KESEJAHTERAAN MASYARAKAT DAN MUTU KEHIDUPAN MANUSIA. KONSERVASI SUMBER DAYA ALAM HAYATI DAN EKOSISTIMNYA INI ADALAH MERUPAKAN TANGGUNG JAWAB DAN KEWAJIBAN PEMERINTAH SERTA MASYARAKAT.

PARA HADIRIN SEKALIAN YANG SAYA HORMATI,

DALAM UNDANG-UNDANG NO. 5 TAHUN 1990 TENTANG KONSERVASI SUMBER DAYA ALAM HAYATI DAN EKOSISTEMNYA TELAH DITETAPKAN BAHWA KONSERVASI SUMBER DAYA ALAM HAYATI DAN EKOSISTEMNYA DILAKUKAN MELALUI KEGIATAN :

1. PERLINDUNGAN SISTEM PENYANGGA KEHIDUPAN
2. PENGAWETAN KEANEKARAGAMAN JENIS TUMBUHAN DAN SATWA BESERTA EKOSISTIMNYA;
3. PEMANFAATAN SECARA LESTARI SUMBER DAYA ALAM HAYATI DAN EKOSISTIMNYA.

SEDANGKAN PENGAWETAN KEANEKARAGAMAN TUMBUHAN DAN SATWA BESERTA EKOSISTEMNYA, DILAKSANAKAN MELALUI KEGIATAN :

- A. PENGAWETAN KEANEKARAGAMAN TUMBUHAN DAN SATWA BESERTA EKOSISTEMNYA;
- B. PENGAWETAN JENIS TUMBUHAN DAN SATWA

UPAYA-UPAYA PENGAWETAN JENIS TUMBUHAN INI BERPEDOMAN PADA TIGA HAL KEGIATAN SEBAGAI BERIKUT :

1. PENGAWETAN JENIS TUMBUHAN DAN SATWA DILAKSANAKAN DI DALAM DAN DI LUAR KAWASAN SUKA ALAM
2. PENGAWETAN JENIS TUMBUHAN DAN SATWA DI DALAM KAWASAN SUKA ALAM DILAKUKAN DENGAN MEMBIARKAN AGAR POPULASI SEMUA JENIS TUMBUHAN DAN SATWA TETAP SEIMBANG MENURUT PROSES ALAMI DI HABITATNYA



3. PENGAWETAN JENIS TUMBUHAN DAN SATWA DI LUAR KAWASAN SUAKA ALAM DILAKUKAN DENGAN MENJAGA DAN MENGEMBANGBIAKKAN JENIS TUMBUHAN DAN SATWA UNTUK MENGHINDARI BAHAYA KEPUNAHAN

TUMBUHAN DAN SATWA DIGOLONGKAN DALAM JENIS :

- A. TUMBUHAN DAN SATWA YANG DILINDUNGI;
- B. TUMBUHAN DAN SATWA YANG TIDAK DILINDUNGI.

SEDANGKAN JENIS TUMBUHAN DAN SATWA YANG DILINDUNGI DIGOLONGKAN DALAM :

- A. TUMBUHAN DAN SATWA DALAM BAHAYA KEPUNAHAN;
- B. TUMBUHAN DAN SATWA YANG POPULASINYA JARANG.

GAJAH ASIA, BADAK SUMATERA , DAN BELIBIS SAYAP PUTIH ADALAH TERMASUK DALAM KATAGORI SATWA DALAM BAHAYA KEPUNAHAN, DAN ATAU MERUPAKAN SATWA YANG POPULASINYA JARANG . TENTU SAJA KETIGA JENIS SATWA INI DI INDONESIA MERUPAKAN JENIS-JENIS SATWA YANG DILINDUNGI OLEH UNDANG-UNDANG NO. 5 TAHUN 1990 TENTANG KONSERVASI SUMBER DAYA ALAM HAYTATI DAN EKOSISTEMNYA. SEHINGGA SETIAP ORANG DILARANG UNTUK :

- A. MENANGKAP, MELUKAI, MEMBUNUH, MENYIMPAN, MEMILIKI, MEMELIHARA, MENGANGKUT DAN MEMPERNIAGAKAN SATWA YANG DILINDUNGI DALAM KEADAAN HIDUP;
- B. MENYIMPAN, MEMILIKI, MEMELIHARA, MENGANGKUT, DAN MEMPERNIAGAKAN SATWA YANG DILINDUNGI DALAM KEADAAN MATI;
- C. MENGELUARKAN SATWA YANG DILINDUNGI DARI SUATU TEMPAT DI INDONESIA KE TEMPAT LAIN DI DALAM ATAU DI LUAR INDONESIA;

D. MEMPERNIAGAKAN, MENYIMPAN ATAU MEMILIKI KULIT, TUBUH, ATAU BAGIAN-BAGIAN LAIN SATWA YANG DILINDUNGI ATAU BARANG-BARANG YANG DIBUAT DARI BAGIAN-BAGIAN SATWA SATWA TERSEBUT ATAU MENGELUARKANNYA DARI SUATU TEMPAT DI INDONESIA KE TEMPAT LAIN DI DALAM ATAU DI LUAR INDONESIA;

E. MENGAMBIL, MERUSAK, MEMUSNAHKAN, MEMPERNIAGAKAN, MENYIMPAN ATAU MEMILIKI TELUR DAN/ATAU SARANG SATWA YANG DILINDUNGI.

PENGECUALIAN DARI LARANGAN TERSEBUT HANYA DAPAT DILAKUKAN UNTUK KEPERLUAN PENELITIAN, ILMU PENGETAHUAN, DAN/ATAU PENYELAMATAN JENIS SATWA YANG BERSANGKUTAN; TERMASUK PEMBERIAN ATAU PENUKARAN JENIS SATWA KEPADA PIHAK LAIN DI LUAR NEGERI DENGAN IZIN PEMERINTAH. PENGECUALIAN DARI LARANGAN MENANGKAP, MELUKAI, DAN MEMBUNUH SATWA YANG DILINDUNGI DAPAT PULA DILAKUKAN DALAM HAL OLEH KARENA SUATU SEBAB SATWA YANG DILINDUNGI MEMBAHAYAKAN KEHIDUPAN MANUSIA.

SAUDARA-SAUDARA SEKALIAN PESERTA LOKAKARYA YANG SAYA HORMATI,

JELASLAH SUDAH BAHWA UNDANG-UNDANG NO. 5 TAHUN 1990 TENTANG KONSERVASI SUMBER DAYA ALAM HAYATI DAN EKOSISTEMNYA SANGAT MENEKANKAN BAGI KEPENTINGAN PEMBANGUNAN BERKELANJUTAN DAN KESEJAHTERAAN MANUSIA. APABILA TERJADI PELANGGARAN TERHADAP LARANGAN SEBAGAIMANA DIMAKSUD DI ATAS, SATWA YANG DILINDUNGI TERSEBUT DIRAMPAS UNTUK NEGARA. JENIS SATWA YANG DILINDUNGI ATAU BAGIAN-BAGIANNYA YANG DIRAMPAS UNTUK NEGARA DIKEMBALIKAN KE HABITATNYA ATAU DISERAHKAN KEPADA LEMBAGA-LEMBAGA YANG BERGERAK DI BIDANG KONSERVASI SATWA, KECUALI APABILA KEADAANNYA SUDAH TIDAK MEMUNGKINKAN UNTUK DIMANFAATKAN SEHINGGA DINILAI LEBIH BAIK DIMUSNAHKAN. PENGAWETAN JENIS

TUMBUHAN DAN SATWA YANG DILINDUNGI HANYA DAPAT DILAKUKAN DALAM BENTUK PEMELIHARAAN ATAU PENGEMBANGAN OLEH LEMBAGA-LEMBAGA YANG DIBENTUK UNTUK ITU.

PEMANFAATAN SECARA LESTARI SUMBER DAYA ALAM HAYATI DAN EKOSISTEMNYA DILAKUKAN MELALUI KEGIATAN :

- A. PEMANFAATAN KONDISI LINGKUNGAN KAWASAN PELESTARIAN ALAM;
- B. PEMANFAATAN JENIS TUMBUHAN DAN SATWA LIAR.

DIMANA PEMANFAATAN JENIS TUMBUHAN DAN SATWA LIAR DILAKUKAN DENGAN MEMPERHATIKAN KELANGSUNGAN POTENSI, DAYA DUKUNG, DAN KEANEKARAGAMAN JENIS TUMBUHAN DAN SATWA LIAR. SEDANGKAN PEMANFAATAN JENIS TUMBUHAN DAN SATWA LIAR DAPAT DILAKSANAKAN DALAM BENTUK :

- A. PENGKAJIAN, PENELITIAN DAN PENGEMBANGAN;
- B. PENANGKARAN;
- C. PERBURUAN;
- D. PERDAGANGAN
- E. PERAGAAN;
- F. PERTUKARAN;
- G. BUDIDAYA TANAMAN OBAT-OBATAN;
- H. PEMELIHARAAN UNTUK KESENANGAN.

HADIRIN SEKALIAN YANG SAYA HORMATI,

UNDANG-UNDANG NO. 5 TAHUN 1990 TENTANG KONSERVASI SUMBER DAYA ALAM HAYATI DAN EKOSISTEMNYA JUGA TIDAK MENGABAIKAN PERANSERTA MASYARAKAT, YAITU : PERAN SERTA MASYARAKAT DALAM KONSERVASI SUMBER DAYA ALAM HAYATI DAN EKOSISTEMNYA DIARAHKAN DAN DIGERAKKAN OLEH PEMERINTAH MELALUI BERBAGAI KEGIATAN YANG BERDAYA GUNA DAN BERHASIL GUNA; DALAM

MENGEMBANGKAN PERAN SERTA MASYARAKAT, PEMERINTAH MENUMBUHKAN DAN MENINGKATKAN SADAR KONSERVASI SUMBER DAYA ALAM HAYATI DAN EKOSISTEMNYA DIKALANGAN MASYARAKAT MELALUI PENDIDIKAN DAN PENYLUHAN. PERAN SERTA MASYARAKAT DALAM KONSERVASI SUMBER DAYA ALAM HAYATI DAN EKOSISTEMNYA INI SUDAH TUMBUH KEMBANG SEHINGGA SANGAT MEMBANTU DALAM MENINGKATKAN UPAYA KONSERVASI TUMBUHAN DAN JENIS SATWA YANG DILINDUNGI DI INDONESIA.

BERHASILNYA KONSERVASI SUMBER DAYA ALAM HAYATI DAN EKOSISTEMNYA BERKAITAN ERAT DENGAN TERCAPAINYA TIGA SASARAN KONSERVASI, YAITU :

1. MENJAMIN TERPELIHARANYA PROSES EKOLOGIS YANG MENUNJANG SISTEM PENYANGGA KEHIDUPAN BAGI KELANGSUNGAN PEMBANGUNAN DAN KESEJAHTERAAN MANUSIA (PERLINDUNGAN SISTEM PENYANGGA KEHIDUPAN)
2. MENJAMIN TERPELIHARANYA KEANEKARAGAMAN SUMBER GENETIK DAN TIPE-TIPE EKOSISTEMNYA SEHINGGA MAMPU MENUNJANG PEMBANGUNAN, ILMU PENGETAHUAN, DAN TEKNOLOGI YANG MEMUNGKINKAN PEMENUHAN KEBUTUHAN MANUSIA YANG MENGGUNAKAN SUMBER DAYA ALAM HAYATI BAGI KESEJAHTERAAN (PENGAWETAN SUMBER PLASMA NUTFAH)
3. MENGENDALIKAN CARA-CARA PEMANFAATAN SUMBER DAYA ALAM HAYATI SEHINGGA TERJAMIN KELESTARIANNYA. AKIBAT SAMPINGAN PENERAPAN ILMU PENGETAHUAN DAN TEKNOLOGI YANG KURANG BIAKSANA, BELUM HARMONISNYA PENGGUNAAN DAN PERUNTUKAN TANAH SERTA BELUM BERHASILNYA SASARAN KONSERVASI SECARA OPTIMAL, BAIK DI DARAT MAUPUN PERAIRAN DAPAT MENGAKIBATKAN TIMBULNYA GEJALA EROSI GENETIK, POLUSI, DAN PENURUNAN POTENSI SUMBER DAYA ALAM HAYATI (PEMANFAATAN SECARA LESTARI).

UPAYA PEMANFAATAN SECARA LESTARI SEBAGAI SALAH SATU ASPEK KONSERVASI SUMBER DAYA ALAM HAYATI DAN EKOSISTEMNYA, BELUM SEPENUHNYA DIKEMBANGKAN SESUAI DENGAN KEBUTUHAN, DEMIKIAN PULA PENGELOLAAN KAWASAN PELESTARIAN ALAM DALAM BENTUK TAMAN NASIONAL, TAMAN HUTAN RAYA, DAN TAMAN HUTAN WISATA ALAM, YANG MENYATUKAN FUNGSI PERLINDUNGAN SISTEM PENYANGGA KEHIDUPAN, PENGAWETAN KEANEKARAGAMAN JENIS TUMBUHAN DAN SATWA BESERTA EKOSISTEMNYA, DAN PEMANFAATAN SECARA LESTARI.

GAJAH ASIA, BADAK SUMATERA DAN BELIBIS SAYAP PUTIH YANG MERUPAKAN SUMBERDAYA ALAM HAYATI MERUPAKAN UNSUR EKOSISTEM YANG DAPAT DIMANFAATKAN UNTUK MENINGKATKAN KESEJAHTERAAN MASYARAKAT DAN MUTU KEHIDUPAN MANUSIA. NAMUN, KESEIMBANGAN EKOSISTEMNYA YANG HARUS TETAP TERJAMIN. OLEH KARENA ITU, MENINGGAT PENTINGNYA KONSERVASI SUMBER DAYA ALAM HAYATI DAN EKOSISTEMNYA BAGI PENINGKATAN KESEJAHTERAAN MASYARAKAT DAN MUTU KEHIDUPAN MANUSIA, MAKA MASYARAKAT JUGA MEMPUNYAI KEWAJIBAN DAN TANGGUNGJAWAB DALAM MELAKSANAKAN KEGIATAN KONSERVASI.

HADIRIN SEKALIAN PESERTA LOKAKARYA YANG SAYA HORMATI,

LOKAKARYA KONSERVASI GAJAH ASIA, BADAK SUMATERA, DAN BELIBIS SAYAP PUTIH YANG DIMULAI HARI INI, DIHARAPKAN DAPAT MEMBERI MASUKAN DAN MENYEMPURNAKAN HASIL-HASIL LOKAKARYA DAN SEMINAR YANG PERNAH DISELENGGARAKAN.

SEHUBUNGAN DENGAN HAL-HAL YANG TELAH SAYA SAMPAIKAN DIATAS, MENGENAI UNDANG-UNDANG NO. 5 TAHUN 1990 TENTANG KONSERVASI SUMBER DAYA ALAM HAYATI DAN EKOSISTEMNYA, DIMANA KETIGA JENIS DARI GAJAH ASIA, BADAK SUMATERA, DAN BELIBIS SAYAP PUTIH JUGA SEBAGAI SUMBER DAYA ALAM HAYATI DAN MERUPAKAN PULA SATWA LANGKA YANG TELAH DILINDUNGI;

MAKA BESAR HARAPAN SAYA AGAR DALAM LOKAKARYA INI SAUDARA-SAUDARA DAPAT MERUMUSKAN HAL-HAL YANG SANGAT MENDASAR UNTUK DAPAT MENGIMPLEMENTASIKAN KEGIATAN KONSERVASI DARI KETIGA JENIS SATWA LANGKA YANG TELAH DILINDUNGI TERSEBUT AGAR DAPAT BERMANFAAT BAGI KESEJAHTERAAN MASYARAKAT DAN KEHIDUPAN MANUSIA SECARA LESTARI. HAL INI DAPAT MENUNJANG PROGRAM PEMBANGUNAN JANGKA PANJANG TAHAP KE II DIMANA PROGRAM PEMBANGUNAN NASIONAL SAAT INI SUDAH MEMPRIORITASKAN KONSERVASI UNTUK DAPAT MENGENTASKAN KEMISKINAN. SEBAB SELAMA PROGRAM PEMBANGUNAN BELUM DAPAT MENGENTASKAN KEMISKINAN BERARTI PEMERINTAH BELUM BERHASIL MENINGKATKAN UPAYA KONSERVASI SUMBER DAYA ALAM HAYATI DAN EKOSISTEMNYA.

SAYA BERHARAP BAHWA RUMUSAN HASIL-HASIL LOKAKARYA INI DAN PETUNJUK-PETUNJUK PELAKSANAAN YANG AKAN DIHASILKAN OLEH PARA PAKAR GAJAH ASIA, BADAK SUMATERA, DAN BELIBIS SAYAP PUTIH, DAPAT SEGERA DIOPERASIONALKAN DILAPANGAN .

SAUDARA-SAUDARA HADIRIN YANG SAYA HORMATI,

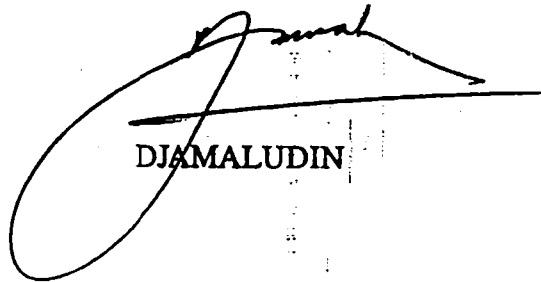
SEKALI LAGI SAYA SAMPAIKAN TERIMA KASIH KEPADA PANITIA PENYELENGGARA DAN SAUDARA-SAUDARA PESERTA DALAM BERPERANSERTA DALAM LOKAKARYA INI. SEMOGA SUMBANGAN PEMIKIRAN SAUDARA-SAUDARA DAPAT BERMANFAAT BAGI PENGEMBANGAN KONSERVASI GAJAH ASIA, BADAK SUMATERA, DAN BELIBIS SAYAP PUTIH, DAN SATWA LIAR LAIN PADA UMUMNYA DI INDONESIA.

AKHIRNYA DENGAN MENGUCAPKAN BISMILLAHIRROHMANIR-ROHIM, DENGAN INI SAYA BUKA LOKAKARYA KONSERVASI GAJAH ASIA, BADAK SUMATERA, DAN BELIBIS SAYAP PUTIH YANG MERUPAKAN RANGKAIAN PERINGATAN KEGIATAN HARI CINTA PUSPA DAN SATWA INDONESIA PADA 5 NOPEMBER 1993.

WASSALAMUALAIKUM. WR. WB.

BANDAR LAMPUNG, 8 NOPEMBER 1993

MENTERI KEHUTANAN



DJAMALUDIN

## **Sumatran Rhino in Indonesia Population and Habitat Viability Analysis**

**Bandar Lampung, South Sumatra  
11 - 13 November 1993**

### **Workshop Agenda**

#### **Sunday, 7 November**

Workshop participants and attendees arrive in Bandar Lampung.  
Late afternoon registration.

18:00-19:00 Workshop Coordinators meeting (after dinner)

#### **Monday-Wednesday, 8-10 November**

**Asian Elephant and White-Winged Wood Duck PHVA Workshops**

#### **Thursday, 11 November**

09:00-12:00 **Sumatran Rhino PHVA Workshop convenes.**

Opening comments (Komar, Bandar Lampung officials, Seal)  
Overview of rhino distribution and threats (Widodo, Santiapillai)  
Survey of Sumatran rhinos in Kerinci Seblat NP (Wells)

13:30-14:30 Presentation of map-linked database and land use patterns (Tilson)  
PHVA overview/initial modelling of rhino populations and GIS (Seal, Widodo)

14:30-17:30 Working groups:  
Protected areas, vortex models, censusing, *in situ* programs (Komar, PHPA, YMR & IRF)  
Discussion and data verification of working groups

20:00 Continue working groups

#### **Friday, 12 November**

08:30-12:00 Status reports of working groups (Komar, PHPA Chiefs, YMR & IRF)  
Continue working groups

13:30-16:30 Working groups: Evaluation of management strategies (PHPA staff, YMR & IRF)

19:30 Continue working groups

#### **Saturday, 13 November**

08:30-12:00 Working group reports (PHPA staff, YMR & IRF)  
Integration of management strategies (Seal, Tilson, PHPA staff)

13:30 Workshop draft recommendations: overall and site-specific



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# **Sumatran Rhino in Indonesia Population and Habitat Viability Analysis Report**

## **Section 2:**

### **Working Group Reports and Action Plan**

## **Working Group Report: Sumatran Rhino Distribution and Population Status in Sumatra**

*Working Group Members: Komar Soemarna, Widodo Sukohadi Ramono, Daniel Walter Sinaga (Facilitators), Dudi Rufendi, Titus Muladi, Suherti Reddy, Mual Daulay, Maria Sudjana, Amir Hamzah, Uchang Suparman, R. Bintoro, Prie Supriadi, Susilo Legowo, Siska Saskia Hendarin, Djoko Setiono, Djodi Mochtar, Charles Santiapillai, M. Priyono, Faustina Ida, Hayani Suprahman, and Kathy Traylor-Holzer.*

### **INTRODUCTION**

The Sumatran rhino in Sumatra is discontinuously distributed throughout the island. It occurs in discrete populations previously identified in surveys conducted prior to 1984. Human population pressure, particularly poaching, and habitat loss have decimated local populations throughout Sumatra. Given the rapid pace of agricultural development and continued poaching pressure, Sumatran rhino populations are unlikely to remain viable in the wild.

Even though Sumatran rhinos are large animals, they are difficult to census accurately in tropical rain forest habitat. Sumatran rhino population numbers at the turn of the century were estimated to be in the 1,000's. More recently, interviews with local villagers, PHPA staff, and some field observations published in the *Indonesian Rhinoceros Conservation Action Plan Priorities* (June 1993) estimated the Sumatran rhino population in Indonesia to be between 500 and 700.

At the PHVA workshop in Bandar Lampung the **Distribution and Status Working Group** reviewed the approximately 10-year-old database of Sumatran rhino population estimates in Sumatra. These estimates were revised with data provided by PHPA staff and field biologists attending the workshop using direct observations, indirect information, and habitat type. Forestry Land-Use Categories were tabulated for each population. Land development plans for the habitat of each population were then outlined, and management recommendations were made for each rhino population.

The goal of this working group was to recommend a Sumatran rhino population management plan that would conserve as many populations and habitats in Sumatra as possible (Table 1). ■

**Table 1. Site-specific summary recommendations for wild Sumatran rhino populations.**

<u>Site</u>	<u>Recommendation</u>
Way Kambas:	Strengthen protection.
Barisan Selatan:	Continue studies, keep roadside out of settlements.
Gn. Patah:	Survey needed.
Gn. Sumbing-Masurai:	Implement survey.
Berbak:	Survey needed.

Table 1. Continued.

<u>Site</u>	<u>Recommendation</u>
Ipuh Seblat:	APU (anti-poaching unit) extended to TNKS and BBS (North) linked with ETC. Enforcement on forest protection, education, secret agents for rhinos.
Torgamba:	Major review/survey/translocation.
Dalu dalu:	Major review/survey/translocation.
Rokan hilir:	Major review/survey/translocation.
Gn. Leuser:	Continue to maintain the protection of L as a continuous habitat.
Listen:	Immediate EIA.
Lokop:	Request to maintain natural production forest.
Gn. Abong-Abong:	Survey needed.
Bukit Kayu Embun:	See Ipuh Seblat.
Ketenong:	Review land use practices, remove gold mining.
Bukit Tapan/Silaut:	Education, public awareness, secret agents.
Bukit Hitam:	Survey needed.

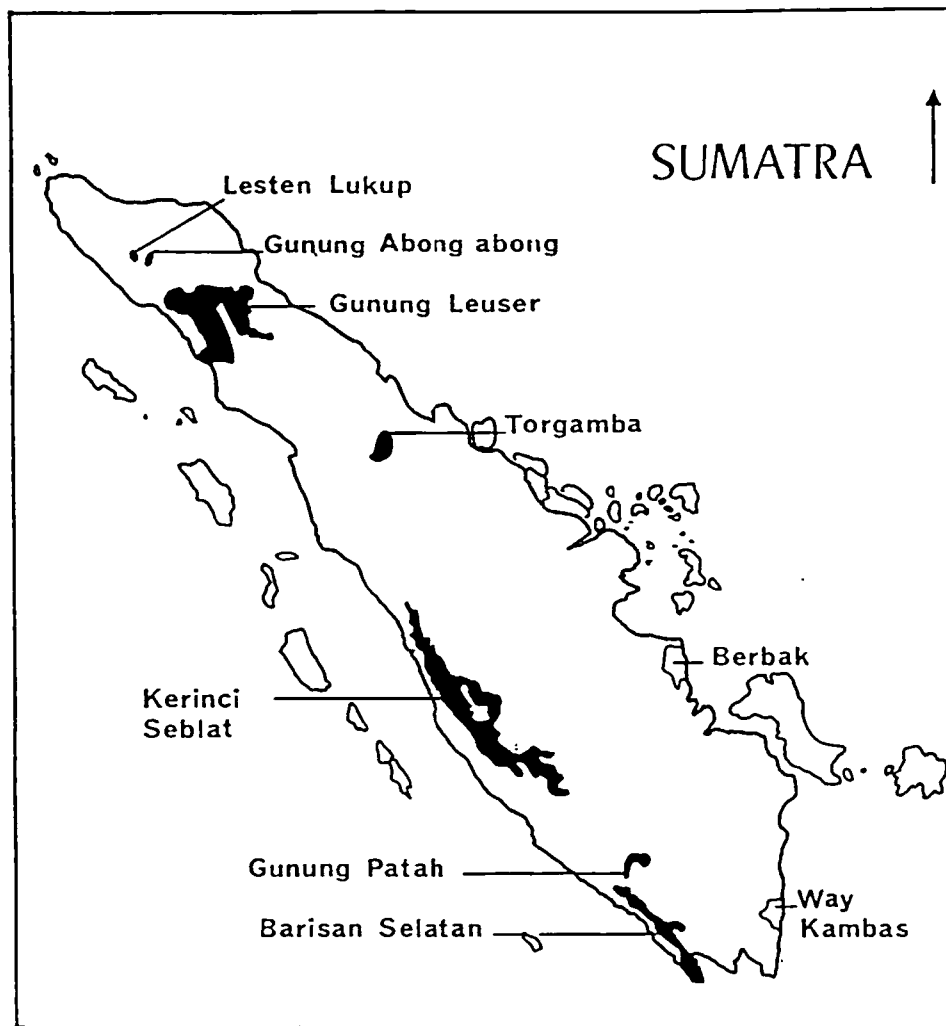




Table 2. Estimated Sumatran Rhino Population Numbers, Habitat Status and Threats in Sumatra.

	<u>Forest Status</u>	<u>Threats (Habitat)</u>	<u>Threats (Population)*</u>	<u>Remaining Population</u>	<u># of Populations</u>	<u>Remarks</u>
<u>I. Lampung</u> Way Kambas	NP	None	None	3-5 (8-20?)	1	New population, human activity, SH Univ data.
Barisan Selatan	NP	Encr	0.5/yr poached	2 + ?	1	Separated by cultivation. UNILA studies continue.
<u>II. South Sumatra</u> Gn Patah	PF	None	None	10-15	1	Uncertain present status.
<u>III. Jambi</u> Gn Sumbing-Masurai Berbak	NP NP	2-3% encr None	None None	40-50 Presence	3 1	Will be surveyed. Plan to be enlarged.
<u>IV. Bengkulu</u> Sungai Ipuh/G Seblat	ProdF/L	1%/yr encr; up to 10,000 ha conversion	7 captured	6-7	1	Anti-poaching unit needs support.
Bukit Kayu Embun	NP	None	Poaching	10-15	1	Surveyed, requires protection.
Ketenong	NP (2 saltik)	Gold mining, 4000 ha encr	None	Presence	?	Surveyed, review needed.
Bukit Hitam	PF	None	None	3-5	1	
<u>V. Riau</u> Torgamba/Tanjung Medan Ps Pangarayan/Dalu dalu Rokan hilir	ProdF/C ProdF/C ProdF/C	75% conv* Disturbed*** Disturbed	8 captured 85-88 3 captured 88-89 ?	3-5 2 Presence	Scattered Scattered ?	
<u>VI. West Sumatra</u> Bukit Tapan/Silaut	NP	1% encr	Poaching	5	1 + ?	Tapan center of poaching; 3 poached in 1990.
<u>VII. Aceh</u> Gunung Leuser	NP	Encr	None	90-120 (60) 15-25	5-7 (2;40+20) 1	Poaching under control. EIA needed
Listen/Serbojadi	PF&ProdF/L	Hydroelec dam (+40,000 ha will be inundated)	None	3-5	1	Maintain natural Prodf needed to support pop.
Lokop (300ha NR in Prod F)	Encroachment		None	Presence	?	No information.
Gn Abong-Abong	PF	10% encr	None	Presence	?	

Total: 215-319 + presence (185-259 + presence)

## **Working Group Report: Sumatran Rhino Life History and VORTEX Analysis**

*Working Group Members: Raman Sukumar, Ulysses Seal (Facilitators), Zainal-Zahari Zainuddin, and Tom Foose.*

### **LIFE HISTORY VARIABLES/INPUT FOR VORTEX POPULATION SIMULATIONS:**

Demographic data on the Sumatran rhino are not available from any studies in the wild. Data from captive rhinos are also meager. Therefore, the modelling group has used data from the Asian greater one-horned rhinoceros and the Javan rhinoceros, suitably modified for the Sumatran rhinoceros assuming that the Sumatran rhino is a specialist of tropical forest habitat and is likely to show a more "K-selected" life-history.

The following demographic variables were used in the VORTEX modelling:

#### **Breeding System**

The Sumatran rhino is a polygynous species, although in regions of very low density (1 rhino in 200 sq. km as reported for Kerinci Seblat) there may be an Allee effect (problems in adult males and females finding each other for mating). Males were assumed to begin breeding by 10 years and that 80% of them were in the breeding pool in a given year.

#### **Female reproductive rates**

Age at first reproduction in females was taken as 6 years. Inter-calving interval was varied between 4 and 5 years; birth probabilities were thus .025 and .020 per mature female per year respectively. Litter size is taken as 1 in all cases.

#### **Maximum longevity**

A maximum longevity of 40 years was fixed based on records from zoos.

#### **Sex ratio at birth**

At 1:1 ration of male and female calves at birth was assumed, although a marginally male-biased sex ratio is likely in a polygynous mammal.

#### **Correlation between EV (reproduction) and EV (survival)**

We assume that a correlation exists between the above variables.

#### **Mortality rates**

Mortality rates were adjusted in order to vary the deterministic population growth rates within desired limits. Male mortalities were always taken to be slightly higher than female mortalities as observed in polygynous species.

Probabilities of death in females per year were: 10-15% (age 0-1 year), 3-5% (age 1-5) and 4-5% (age 6 and above) and in males: 15-20% (age 0-1 year), 5% (age 1-4), 3-4% (age 5-20) and 8-10% (age 10 and above).

### **Environmental stochasticity**

This is modelled in VORTEX as variation in birth and death probabilities by sampling binomial distributions. Standard deviation in birth and death was fixed as 20% of the mean rates. Environmental variation is however not likely to be important in a long-lived species inhabiting the relatively stable rain forest habitat.

### **Carrying capacity**

Carrying capacity itself does not seem to be a limiting factor for most rhino populations. These populations have been reduced by poaching to levels of very low densities even though there is sufficient habitat to support much higher densities. Thus carrying capacity was met at 200 for the first round of simulations. However, another set of simulations as run by taking the carrying capacity as equal to the initial population size. No trend in carrying capacity was specified.

### **Inbreeding depression**

There are no data on inbreeding depression in rhinos. We therefore ran the simulations with no inbreeding and with inbreeding depression using a Heterosis model with a level of 3.14 lethal equivalents (which represents the mean of 40 mammalian species studied).

### **Catastrophes**

Very low probabilities of two catastrophes were modelled. Catastrophe I had a 1% probability of reducing reproduction by 5% and survival by 10%, while Catastrophe II had a 1% chance of reducing survival by 5% as compared to the normal levels specified earlier.

### **Harvest/poaching**

As poaching is the most important factor affecting Sumatran rhino populations, this was modelled this factor under one scenario. However we did not model this as a "harvest" in VORTEX because the rate of poaching is likely to frequency dependent. It would be more realistic to specify the rate of poaching as a proportion of the surviving population. We modelled two rates of poaching as a "catastrophe" under vortex by reducing survival probability.

- 1) A 7% rate of poaching as indicated by some data on trends in rhino numbers in Sumatra over the past 10 years.

- 2) A lower 3% rate of poaching.

### **Initial Population Sizes:**

Initial population sizes were varied from 10 to 200 rhinos.

### **Number of Years Simulations Run and Number of Times Simulations Repeated.**

All simulations were run 500 times for 100 years.

### Results of VORTEX Population Simulations:

**Scenario 1.** Deterministic growth rate  $r=0.033$ , no inbreeding depression, no poaching, no limit on carrying capacity ( $K=200$ ). This represents the "best case" scenario.

Under the best case scenario an initial population of about 20-25 would have a greater than 99% chance of surviving for 100 years. This scenario is however unrealistic for most Sumatran populations, except in cases where there is absolutely no poaching, the habitat is totally secure and there is scope for rhino populations to expand.

**Scenario 2.** Deterministic growth rate  $r=0.033$ , inbreeding depression, no poaching, carrying capacity equal to initial population size ( $K=N$ ) except for population size 10 ( $K=25$ ).

Where the habitat available is restricted (no scope for any expansion) and inbreeding depression is introduced, a population of 25 rhinos has a 96% chance of surviving for 100 years. This population would still diminish in size marginally over this time period to about 19 on average.

**Scenario 3.** Deterministic growth rate  $r=0.033$  (excluding poaching rate), low poaching (3%) inbreeding depression, no limit on carrying capacity ( $K=200$ ).

If a relatively low rate of poaching is introduced (such that the net growth rate is about 0.5% per year) an initial population size of 50 rhinos has a 92% chance and a population of 75 rhinos has a 98% chance of surviving for 100 years.

**Scenario 4.** Deterministic growth rate  $r=0.033$  (excluding poaching rate), high poaching (7%), no limit on carrying capacity ( $K=200$ ).

When the poaching rate is increased to the level of 7% per year suspected to be operating in Sumatra in recent years, the probability of survival reduces substantially for even very large populations. A population of 200 rhinos for instance has only a 19% chance of surviving for 100 years. Populations larger than about 50 rhinos may not become extinct during the next 20-40 but would decline to numbers low enough to make them highly vulnerable from that stage onwards.

**Scenario 5.** Deterministic growth rate  $r=0.004$ , no inbreeding depression, no poaching, no limit on carrying capacity ( $K=200$ ).

If the starting populations are close to stable ones in terms of growth rate, a population of 25 rhinos has a 82% chance of survival and one of 50 rhinos has a 97% chance of survival when there is no constraint on carrying capacity (Fig. 1). The populations do not reach carrying

capacity (Fig. 3) and lose 21-27% of their genetic heterozygosity in 100 years or about five generations (Fig. 4).

**Scenario 6.** Deterministic growth rate  $r=0.004$ , inbreeding depression, no poaching, no limit on carrying capacity ( $K=200$ ).

When inbreeding depression is introduced into the above scenario, there is a substantial difference in populations up to 25 rhinos (67% survival probability) but not for those above 50 rhinos (94% survival probability) (Fig. 1). However, the stochastic growth rates are slightly negative for initial populations of less than 100 (Fig. 2). The mean final population sizes are smaller (Fig. 3).

**Scenario 7.** Deterministic growth rate  $r=0.004$ , inbreeding depression, no poaching, carrying capacity equal to initial population size ( $K=N$ ) except for population size 10 ( $K=25$ ).

If a carrying capacity constraint is introduced a population of 25 rhinos has only a 42%, one of 50 rhinos a 87% and one of 75 a 97% chance of surviving for 100 years (Fig. 1). Note, however, that the average size of surviving populations initiated with 75 is only 40 (Fig. 3).

## SUMMARY RESULTS FROM VORTEX MODELLING

- Any rhino population under 10 individual is at high risk of extinction even under ideal conditions and should be generally considered inviable.
- Under ideal conditions of no constraint of habitat and no poaching a population in the range of 20-25 rhinos can be considered viable in situ if such conditions can be ensured /in future.
- If the population is however a nearly stable one a population of 50 rhinos is needed to ensure a high probability of survival.
- If poaching is limited to about 3% per year it may be possible to maintain a viable population if initial population sizes are in the range of 50-75 animals.
- If the high rate of (7%) of poaching experienced in recent years continues then no existing population can be considered secure, although the larger ones may not become extinct in the next 20-40 years.
- To maximize probability of survival under all identifiable risks, populations capable of attaining a size of 100 seem advisable. ■

TABLE 1. RESULTS OF VORTEX SIMULATION MODELLING OF SUMATRAN RHINO POPULATIONS.

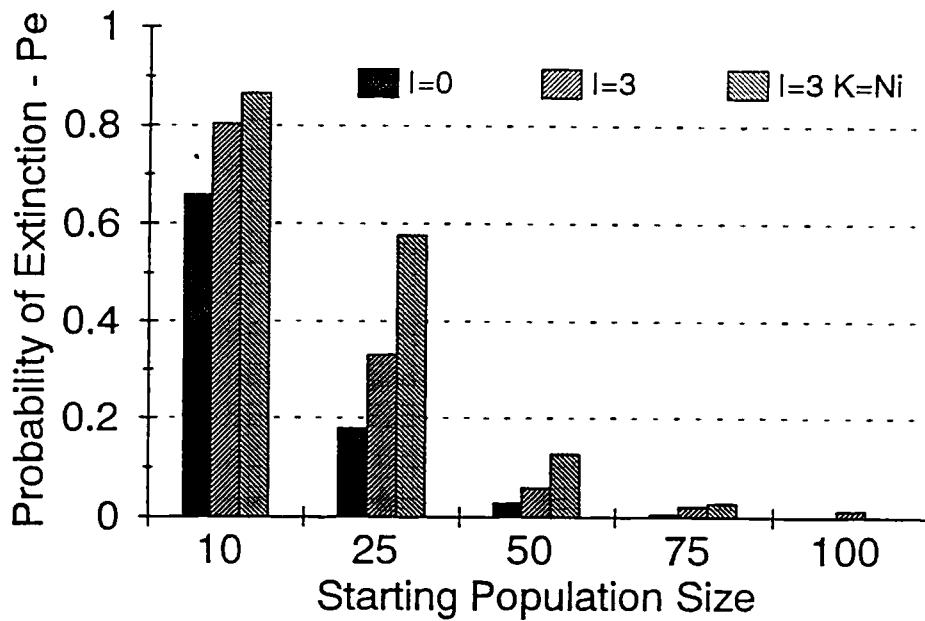
Scenario	Initial Population Size	Deterministic Growth Rate r - determin	Stochastic Growth Rate r - stochas	Probability of Extinction in 100 Years	Mean Size of Surviving Populations	% Genetic Heterozygosity Retained	Mean Time to Extinction Years	Scenario File #
1. Growing Population No Inbreeding No Poaching K=200	10	0.033	0.027	0.104	150 ± 57	87	38	SR3C10
	25	0.033	0.031	0.002	185 ± 28	92	96	SR3C25
2. Growing Population Inbreeding No Poaching K = N, if N > 10 K = 25, if N = 10	10	0.033	0.012	0.206	17 ± 6	77	52	SR3IK10
	25	0.033	0.017	0.042	19 ± 6	81	77	SR3IK25
	50	0.033	0.026	0	45 ± 6	90	-	SR3IK50
3. Growing Population Inbreeding Poaching = 3% K = 200	25	0.005	-0.012	0.370	27 ± 24	83	70	SR3ILP25
	50	0.005	-0.004	0.080	59 ± 46	90	81	SR3ILP50
	75	0.005	-0.002	0.022	85 ± 43	93	96	SR3ILP75
4. Growing Population Inbreeding Poaching = 7% K = 200	50	-0.039	-0.060	0.994	2 ± 1	78	53	SR3ICP50
	100	-0.039	-0.056	0.950	6 ± 5	87	67	SR3ICP99
	200	-0.039	-0.053	0.812	7 ± 5	87	79	SR3ICP98
5. Stationary Population No Inbreeding No Poaching K = 200	10	0.004	-0.012	0.658	29 ± 26	71	45	SR0C10
	25	0.004	-0.002	0.180	45 ± 38	82	69	SR0C25
	50	0.004	0.0007	0.030	76 ± 52	90	73	SR0C50
	75	0.004	0.002	0.006	99 ± 53	94	79	SR0C75
6. Stationary Population Inbreeding No Poaching K = 200	10	0.004	-0.021	0.804	12 ± 9	75	50	SR0IC10
	25	0.004	-0.010	0.332	28 ± 22	84	68	SR0IC25
	50	0.004	-0.004	0.060	57 ± 44	90	85	SR0I50
	75	0.004	-0.001	0.022	85 ± 53	94	85	SR0I75
	100	0.004	0.0003	0.014	106 ± 56	96	83	SR0I99
7. Stationary Population Inbreeding No Poaching K = N, if N > 10 K = 25, if N = 10	10	0.004	-0.023	0.866	9 ± 6	62	38	SR0IK10
	25	0.004	-0.017	0.576	9 ± 6	79	68	SR0IK25
	50	0.004	-0.007	0.128	24 ± 13	87	79	SR0IK50
	75	0.004	-0.003	0.028	40 ± 20	91	83	SR0IK75

**FIGURE LEGENDS**

- Fig. 1. Probability of extinction for stationary growth Sumatran rhino populations, scenarios 5, 6, and 7 in Table 1. Conditions for mortality and reproduction were adjusted to provide a near 0 ( $r = 0.004$ ) theoretical or deterministic growth rate. Results from 500 iterations (repetitions) for 100 years of each scenario. Scenario #5 had no inbreeding ( $I=0$  in the figures) and no poaching. The carrying capacity was set at 200 and the starting population sizes were 10, 25, 50, 75, and 100. Scenario #6 had the heterosis option for inbreeding added ( $I=3$  in the figures) with the number of lethal equivalents set at 3.14. Scenario #7 was the same as scenario #6 except that the  $K$  was limited to the starting population size ( $I=3$  and  $K=N_i$  in the figures) except for  $N_i=10$  where  $K$  was set at 25.
- Fig. 2. Stochastic growth rate for stationary growth Sumatran rhino populations, scenarios 5, 6, and 7 in Table 1. All conditions as stated for Figure 1.
- Fig. 3. Mean population size at after 100 years for stationary growth Sumatran rhino populations, scenarios 5, 6, and 7 in Table 1. All conditions as stated for Figure 1.
- Fig. 4. Mean % heterozygosity retained after 100 years for stationary growth Sumatran rhino populations, scenarios 5, 6, and 7 in Table 1. All conditions as stated for Figure 1.

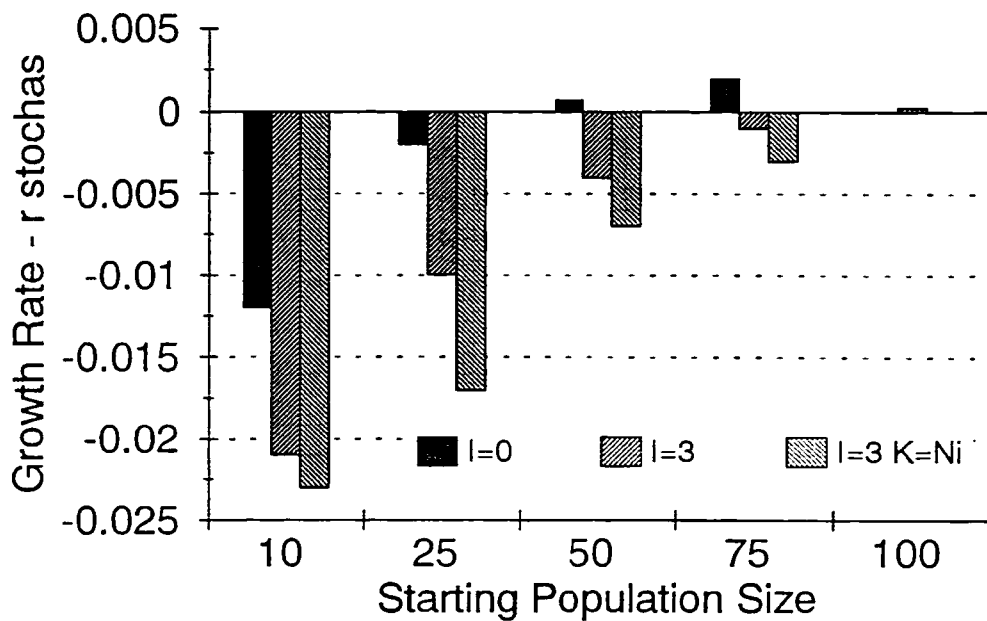
# SUMATRAN RHINO DEMOGRAPHY

Inbreeding & Initial N & K Effects



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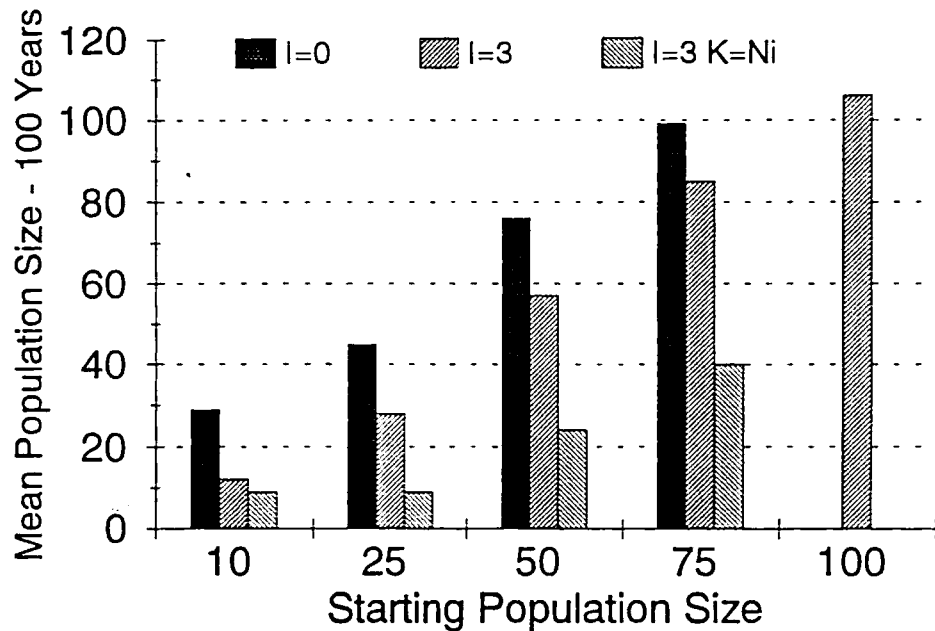
Inbreeding & Initial N & K Effects





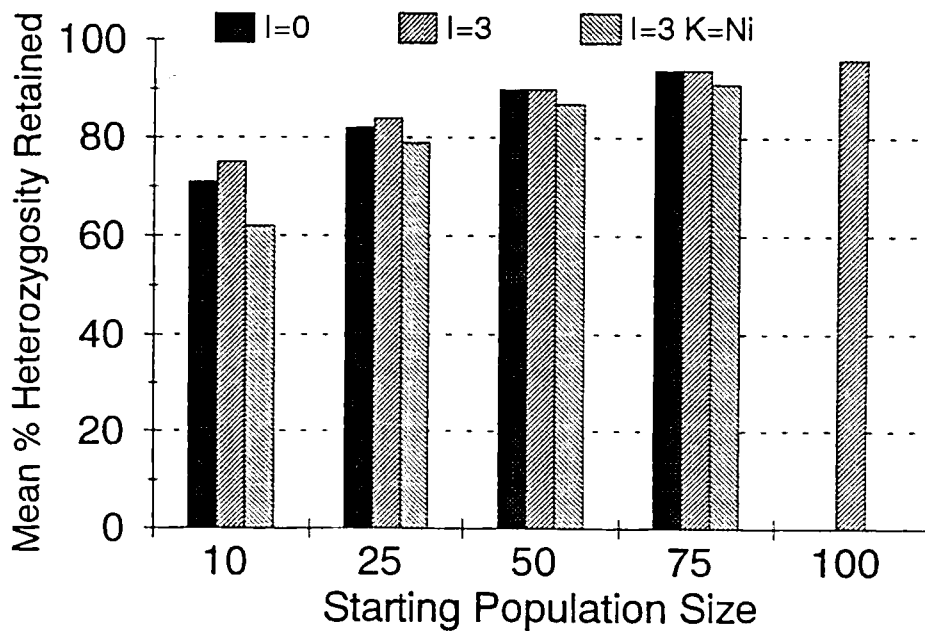
# SUMATRAN RHINO DEMOGRAPHY

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# SUMATRAN RHINO DEMOGRAPHY

Inbreeding & Initial N & K Effects



## Working Group Report: Sumatran Rhino Censusing Techniques

*Working Group Members: Marizal Ahmad, Widodo Ramono (Facilitators), R. Sukumar, Neil Franklin, Charles Santiapillai, Guy Hills Spedding, Joanne Reilly, and Colin McHenry.*

Given the very low densities of the Sumatran rhino and the poor visibility in rain forest habitat, it is obvious that accurate estimates of rhino numbers are not easy to obtain. The working group discussed the most feasible option of estimating rhino numbers, making best use of available resources, and given the difficult field conditions.

Census techniques can be broadly divided into direct count and indirect count methods. Direct sightings of rhinos are obviously impossible in Sumatran rain forests and can be eliminated from further discussion. Several indirect counts methods can be used; these include:

- **Photo-trap counts:** This method involves identifying rhinos through remote camera traps and using statistics based on "mark-recapture" method for arriving at animal numbers in a given area. The method is very expensive both in capital needed to purchase several cameras and tripping devices and in costs of film, batteries, etc. Its feasibility in areas of very low animal density is doubtful, except to establish presence of a species. It is however a very useful method in detailed studies in localized areas and can supplement other approaches to counting rhinos. An advantage of this method is that additional information on the age and sex of the animal may become available.
- **Track counts:** It may be possible to measure and identify rhino tracks by following animal trails and checking out wallows. Only tracks of rhinos of different sizes can be differentiated; it would require great field skills to differentiate tracks of two rhinos of the same age/size. A thorough combing of a well-defined area (which should be reasonably large, say 100 sq. km.) for tracks could thus give an estimate of the minimum numbers of rhinos using that area and hence the density of rhinos. It must be emphasized that the area should be properly defined (such as a water-shed or a block with known boundaries) and its area calculated, as otherwise track counts cannot be translated into animal densities (number of individuals per unit area).
- **Dung counts:** In theory, if the defecation rate and dung decay rate are known for a species, it is possible to use standard survey techniques (such as line transects of indefinite width or definite width) to estimate dung density in an area and convert this into animal density. This method has been used for elephants found at low densities in rain forest. This again does not seem directly feasible for rhinos given the extremely low densities in almost all areas. If a reasonably "high" density (say, above 0.05 rhino/sq. km) is suspected and the frequency of encounter of dung is "adequate" enough to return a sample size of at least 30-40 piles during the period of survey, this method should be tried out.

However, counts of dung can be probably used in conjunction with track counts while combing well-defined areas to arrive at minimum numbers of rhinos using the area. Size of dung can be used to differentiate animals, although this would not be possible if two rhinos of the same size use an area.

Another modification of the dung count would be to relate the frequency of encounter of rhino dung along trails to the frequency of encounter of elephant dung. Since elephant densities can be estimated using line transect dung counts, it may be possible to crudely estimate rhino densities (after correcting for differences in defecation rates in the two species). A crucial assumption here of course is that rhinos and elephants utilize the trails to a similar extent.

In future, it may become possible to identify individual rhinos based on DNA analysis of cells found in dung. It may thus be useful to collect and appropriately preserve samples of fresh dung found in the field.

## **THE APPROACH TO CENSUSING RHINO**

Before any detailed study of rhino numbers is attempted, it is important to establish the range of the species throughout Sumatra. This can be done through surveys of potential ranges for which no clear evidence of presence/absence is available. For certain regions of course the distribution range may be known, but even for these it would be useful to initiate new surveys as the situation has changed in recent years. Staff of PHPA, local universities and outside researchers can be involved in the survey. The survey would also serve the purpose of patrolling the area and locating and destroying traps set for rhinos by poachers. A note of the number of traps encountered in an area should be kept as this information would help in identifying areas vulnerable to poaching and also to check on the correlation between number of traps and rhino densities.

In all the surveys it is also important to keep a note of the effort (time spent in the field and the distance covered) so that the indirect signs of rhino can be used to arrive at relative densities in different regions, even if absolute numbers are not possible.

Parallel to the survey, a more detailed study of Sumatran rhinos in one or two regions should be initiated. This study should use all the three indirect methods listed above. Water-sheds or other defined areas of about 100 sq. km or more should be defined for the detailed survey of rhino tracks and dung. Ideally, the area of the unit to be surveyed should be based on a knowledge of the home range of the species. If the unit is too small there is the possibility of overestimate of rhino density (and vice versa). Several such units (at a minimum 3-5) should be surveyed to arrive at mean density and variance. Counts of tracks and dung can be supplemented by setting up camera traps along rhino trails and wallows. Experiments with attracting rhinos to camera traps by placing salt as baits may also be tried.

During the detailed study it would be useful to record other data such as signs of feeding and food plants of rhinos. A herbarium of food plants can be built up; this would be an aid in evaluation of potential rhino habitats. ■

**Table 1. Priority areas in Sumatra for survey of Sumatran rhino distribution and numbers.**

<u>Location</u>	<u>Poaching</u>	<u>Reasons Present pop.</u>	<u>Habitat threats</u>
1. B. Barisan Selatan NP	+	25-60	+
2. T.N. Kerinci Seblat			
Prop. Bengkulu			
- Sungai Ipuh/G. Seblat	+	6-7	-
- Bukit Kayu embun	+	10-15	+
- Ketenong	?	?	+
- Bukit Hitam	?	3-5	-
Prop. Jambi			
- Gunung Sumbing/Mesurai	?	40-50	-
Prop. South Sumatra			
- Gunung Patah	-	10-15	-
Prop. West Sumatra			
- Bukit Tapan/Silaut	++	5+	+
3. Way Kambas NP	-	8-20	-
4. Torgamba NP	+	3-5	++
5. Berbak NP	-	?	-
6. Rokan Hilir Prod. F	?	?	++
7. Gunung Abong-abong	-	?	+
8. Pasir Pangaraian Prod.F	+	2+	+
9. Listen/ Serbo jadi	-	15-25	++
10. Lokop	-	?	+

## Working Group Report: Poaching Problems and Solutions

*Working Group Members: Daniel Walter Sinaga (Facilitator), Desmonth, Mual Daulay, Jasmi Abdul, Marcellus Adi, Siska Saskia Hendarin, Phillip Wells, R. Bintoro, Muniful Hamid, Titus Muladi W., Prie Supriadi, Dudi Rufendi, and Ucang Sufarman.*

### BACKGROUND

There are several important considerations regarding the long-term survival of the Sumatran rhino in the wild. Many of these considerations have been previously identified in other publications or reports from workshops. These include the 1979 *Asian Rhino Action Plan* of the IUCN/SSC Asian Rhino Specialist Group, the 1991 *Indonesian Rhino Conservation Strategy*, and the 1993 *Indonesian Rhinoceros Conservation Action Plan Priorities*. Some of these considerations are:

- The future of wild Sumatran rhino populations is a cause of great concern, both nationally and internationally. The Sumatran rhino is the focus of attention in discussions of conservation of wildlife in Indonesia because of its critically threatened status. Wild populations are still declining as a result of loss of habitat and poaching.
- The conservation of the Sumatran rhino is not just the responsibility of the Government of Indonesia, but also of the people of Indonesia.
- The Indonesian Ministry of Forestry is the sole authority for the protection of the Sumatran rhino.
- The principal threats to the conservation of wild populations of Sumatran rhinos are people, fire, domestic animals, deforestation, and disease. People, especially poachers, are considered the greatest threat.
- The poaching of Sumatran rhinos will remain a controversial subject. In a single case, seven rhinos were poached in northern Bengkulu, Sumatra in 1990 and was a major news item for some time.
- The number of PHPA park staff in Sumatra totals 2,986 people (September 1993). Their role is to protect conservation areas and national parks.

<u>Province</u>	<u>No. of People</u>
DI. Aceh	313
Sumatera Utara	272
Sumatera Barat	164
Riau	354
Jambi	248
Bengkulu	142
Sumatera Selatan	222
Lampung	271

- There are an estimated 215-319 wild Sumatran rhinos living in 17 different sites in Sumatra.
- Poaching of Sumatran rhinos occurs both inside and outside of conservation areas (these outside areas are usually classified by the Department of Forestry as "production forests").
- The numbers of PHPA staff assigned to these production forests is very limited.

## POACHING

- Illegal poaching of Sumatran rhinos causes a loss of biological richness of Indonesia and a lowering of Indonesia's status in the international conservation community.
- The number of poachers is few because it requires a long time to acquire the skills to catch wild rhinos, either alive or dead, and there are very few mentors to pass on these skills.
- To trap a wild Sumatran rhino in the forest can take many months. Some rhinos have been trapped in shorter periods of only two months; others can take as long as a year or more.
- To trap a rhino requires expenses for field gear that can be too costly for most people.
- A poacher who successfully traps Sumatran rhinos can gain significant status in his local community.
- In general, the horn and feet of the Sumatran rhino are the most highly valued parts, but all parts can be sold for a price. The market price of Sumatran rhino horn is:

Sumatra	US\$ 2,000/kg
Hong Kong	US\$ 8,000/kg
Taiwan	US\$ 18,000/kg

- As the success of the anti-poaching operations in Sumatra increases, the market price for Sumatran rhino horn and body parts will increase, leading to increased efforts of poachers to trap more rhinos.
- Factors that increase a poacher's incentive to trap rhinos:
  - the price of the Sumatran rhino horn.
  - the large size of the rhino habitat.
  - limitations in the number and training of PHPA staff.
  - limitations in the PHPA infrastructure and budget for staff.
  - increased social status in local community if successful.

- many illegal traffickers who will provide "up-front" money for poachers.
- poor coordination of information among anti-poaching programs.
- poor community awareness and lack of education programs to deter recruitment of new poachers.
- the opportunity to gain large sums of money in poor rural areas by poaching is a big temptation.
- law enforcement and punishment for poaching is an insufficient deterrent in itself (for example, the case of poaching in northern Bengkulu 1990).

## THE SOLUTION TO THE PROBLEM

Repressive measures against poachers of Sumatran rhino are not sufficient. A solution to the poaching problem must include preventive measures to reduce opportunities for poaching. These preventative measure should include:

- Increase people's awareness to help law enforcement officers in the investigation of poachers and their activities.
- Increase the number, and improve the training of, PHPA staff assigned to Sumatran rhino conservation areas.
- Establish anti-poaching units in all conservation areas where Sumatran rhinos are currently found.
- Increase the infrastructure of PHPA and its funds for the anti-poaching units and the continued protection of forest habitat.
- Encourage logging companies in Sumatra to assist PHPA in protecting adjacent conservation areas from poachers and to discourage poaching in their logging concessions.
- Improve the coordination of the anti-poaching system among all relevant agencies.
- Increase the intensity of anti-poaching patrols and their protection of Sumatran rhino habitat.

Other recommendations to help resolve the poaching of wild Sumatran rhinos include the following:

- Investigation and disruption of the illegal trade network, especially for rhino horn products both in nationally and internationally.
- Pursuit of illegal trade cases completely, until the "Big Boss", the trafficker at the apex of the poaching hierarchy, is apprehended and prosecuted.
- Improved coordination between Indonesian embassy and governments in the neighboring countries of Malaysia, Brunei, Singapore, Thailand, and Myanmar to anticipate illegal trade in Sumatran rhinos.

- Increased requests to the IUCN and other international organizations involved in natural resources and ecosystems conservation to take action to encourage non-CITES members to participate fully.
- Immediate application to the IUCN and other international organizations for support funds and expertise on programs for the protection of Sumatran rhinos.
- Immediate development of a special program for "Sumatran Rhino Anti-Poaching Units" as soon as possible, after all surveys of rhino habitat have been completed, particularly those areas where human encroachment is possible. The criteria for the establishment of these units are described in the *Indonesian Rhino Conservation Strategy*. ■



**Pokok-Pokok Pikiran  
Upaya Penanggulangan Perburuan Liar  
Satwa Badak Sumatera (*Dicerorhinus sumatrensis*)  
Di Wilayah Sumatera**

**Oleh: Poaching Issues Group**

## **I. Latar Belakang**

1. Masalah satwa Badak Sumatera (*Dicerorhinus sumatrensis*) sudah banyak mendapat perhatian dan sorotan masyarakat di dalam maupun di luar negeri. Keberadaan Badak Sumatera sering dicontohkan dalam pembahasan yang berkaitan dengan Konservasi Sumber Daya Alam Hayati dan Ekosistemnya, karena satwa ini merupakan jenis primitif, langka dan cenderung berkurang akibat dari berkurangnya habitat dan perburuan liar.
2. Kelestarian Badak Sumatera bukan merupakan tanggung jawab pemerintah saja, tapi juga tanggung jawab masyarakat.
3. Kewenangan melaksanakan perlindungan dan pengamanan Badak Sumatera ada pada Menteri Kehutanan.
4. Pada hakekatnya manusia, api, ternak, daya-daya alam, hama dan penyakit, dapat mengancam kelestarian Badak Sumatera. Manusia merupakan subyek terbesar dan sangat mempengaruhi keberadaan Badak Sumatera.
5. Khusus mengenai hal yang berkaitan dengan perburuan liar Badak Sumatera, sering menjadi topik pembicaraan. Kasus perburuan liar terhadap 7 ekor Badak Sumatera di Bengkulu Utara, tahun 1990 mendapat perhatian yang serius.
6. Jumlah tenaga Jagawana di Sumatera 2986 orang (september 1993). Tugas mereka mengamankan hutan lindung dan kawasan konservasi.
 

1) DI. Aceh	313 orang
2) Sumatera Utara	272 orang
3) Sumatera Barat	164 orang
4) Riau	354 orang
5) Jambi	248 orang
6) Bengkulu	142 orang
7) Sumatera Selatan	222 orang
8) Lampung	271 orang
7. Terdapat 248 - 332 + pm ekor Badak Sumatera yang tersebar di 17 lokasi di Sumatera.

8. Perburuan Badak Sumatera ada kecenderungan juga dilakukan di kawasan Hutan produksi dan wilayah HPH.
9. Tenaga pengamanan Hutan di areal/kawasan Hutan Produksi (HPH) relatif terbatas.

## II. Perburuan Liar

1. Perburuan liar merupakan suatu kegiatan tindak pidana yang dapat menghilangkan kekayaan negara dan merusak martabat negara di dunia Internasional.
2. Jumlah pemburu liar Badak Sumatera jumlahnya terbatas, karena untuk dapat menangkap Badak Sumatera dalam keadaan hidup atau mati memerlukan pengetahuan, keberanian, kemampuan dan keterampilan khusus. (untuk masyarakat Aceh, biasanya orang yang berpengalaman dalam menangkap Badak Sumatera disebut Pawang badak).
3. Untuk dapat menangkap Badak Sumatera diperlukan waktu yang relatif lama, sekitar 2 bulan.
4. Untuk menangkap Badak Sumatera biayanya relatif sangat mahal.
5. Bagi sebagian Pawang Badak, keberhasilan menangkap Badak Sumatera merupakan suatu prestasi tersendiri yang dapat meningkatkan status sosialnya di lingkungan masyarakat setempat.
6. Perburuan liar Badak Sumatera pada umumnya ditujukan untuk mendapatkan cula dan kukunya. Tapi seluruh bagian tubuh saat ini juga bisa dimanfaatkan.
7. Harga cula Badak Sumatera di pasaran:
 

1) Lokal/Sumatera	US\$ 2,000/kg
2) Hongkong	US\$ 8,000/kg
3) Taiwan	US\$18,000/kg
8. Modus operandi perburuan liar Badak Sumatera selalu berkembang mengikuti perkembangan harga pasaran cula badak dan upaya pengamanan Badak Sumatera secara nasional ataupun internasional.
9. Faktor-faktor yang mendorong terjadinya perburuan liar, antara lain:
  - 1) Masih adanya Badak Sumatera di alam.
  - 2) Mahalnya harga cula Badak Sumatera.
  - 3) Luasnya areal/habitat Badak Sumatera di alam.
  - 4) Terbatasnya kuantitas dan kualitas tenaga pengamanan hutan/jagawana,
  - 5) Terbatasnya sarana, prasarana dan dana untuk pengamanan hutan, khususnya untuk melindungi dan mengamankan Badak Sumatera.
  - 6) Masih adanya anggapan sebagian masyarakat di Aceh bahwa dengan berhasil menangkap Badak dapat meningkatkan status sosialnya di lingkungan masyarakat setempat.

- 7) Adanya cukong-cukong yang mensponsori pemburuan liar Badak Sumatera dengan menyediakan dana.
- 8) Lemahnya koordinasi antara aparat/instansi yang berkepentingan khususnya dalam hal kurangnya pemberian informasi/komunikasi terhadap kegiatan yang berkaitan dengan pemburuan Badak Sumatera.
- 9) Lemahnya mental cukong-cukong dan kesadaran para pelaku pemburuan Badak Sumatera.
- 10) Desakan ekonomi untuk dapat memenuhi "kebutuhan perut" dan kepuasan.
- 11) Sanksi hukum yang pernah dijatuhkan terhadap pemburu liar Badak Sumatera masih belum memberikan "efek jera".(contoh: Kasus Bengkulu Utara 1990).

### III. Upaya Penanggulangan

1. Tindakan represif terhadap kegiatan pemburuan liar Badak Sumatera, bukanlah merupakan satu-satunya cara yang terbaik. Upaya-upaya yang bersifat preventif perlu ditingkatkan untuk menutup peluang dan mempersempit ruang gerak para pemburu dan para pelanggar hukum lainnya.
2. Upaya preventif antara lain:
  - 1) Meningkatkan kesadaran hukum masyarakat dengan tujuan untuk dapat membantu aparat penegak hukum dalam mendeteksi kegiatan para pemburu liar.
  - 2) Meningkatkan kualitas dan kuantitas tenaga pengamanan hutan/jagawana.
  - 3) Membentuk Regu/unit/tim Anti Pemburuan Liar Badak Sumatera pada wilayah-wilayah yang dianggap rawan perburuan .
  - 4) Meningkatkan sarana, prasarana dan dana untuk melaksanakan pengamanan hutan, khususnya perlindungan dan pengamanan badak Sumatera.
  - 5) Mendorong para pemegang HPH untuk lebih meningkatkan upaya pengamanan Badak Sumatera di areal HPH dan areal kawasan konservasi di sekitarnya.
  - 6) Meningkatkan koordinasi pengawasan dan pengamanan terpadu dalam rangka mencegah pemburuan liar Badak Sumatera antara Pemerintah dan Pihak-pihak/masyarakat yang peduli terhadap masalah kelestarian Badak Sumatera.
  - 7) Peningkatan patroli/intensitas pengamanan areal/habitat Badak Sumatera.
3. Mencari dan memutuskan jaringan perdagangan liar cula badak (ataupun bagian-bagian lainnya), baik secara Nasional maupun Internasional.
4. Menyelesaikan kasus perburuan liar Badak Sumatera sampai tuntas ke "otak pelakunya".
5. Melakukan koordinasi dan konsultasi dengan Kepala Instansi Perwakilan Negara RI di negara-negara tetangga seperti Malaysia, Brunei Darussalam, Singapura, Thailand, Myanmar dan lain-lain, dalam rangka mengantisipasi perburuan liar Badak Sumatera. Demikian juga melakukan koordinasi dan konsultasi dengan kepala kepala perwakilan negara tetangga dan lain-lain yang ada di Indonesia.

6. Meminta perhatian kepada IUCN, UNDP atau badan-badan Internasional lainnya yang berkeentingan di bidang konservasi Sumber Daya Alam Hayati dan Ekosistemnya, untuk mengambil langkah/ tindakan pembatasan perdagangan satwa liar/hasil satwa liar pada negara negara non anggota CITES.
7. Meminta dukungan pada IUCN, UNDP maupun badan-badan Internasional lainnya yang berkecimpung di bidang Konservasi Sumber Daya Alam Hayati dan Ekosistemnya dalam bentuk bantuan dana maupun keahlian untuk perlindungan dan pengamanan Badak Sumatera.
8. Pendirian/pengadaan Proyek-proyek Perlindungan dan Pengamanan Badak Sumatera di Wilayah Sumatera.
9. Rhino Anti Poaching Unit (RAUP) harus segera dibentuk didaerah/kawasan yang memiliki populasi badak dan banyak dijumpai aktivitas manusia di sekitarnya. Pembentukan RAUP perlu didahului survei intensif di kawasan-kawasan tersebut. Kriteria pembentukannya mengacu pada Indonesian Rhino Conservation Strategy. ■

Bandar Lampung, 12 November 1993

## **Working Group Report: In Situ Management of Sumatran Rhinos**

*Working Group Members: Haerudin Sadjudin, Jansen Manansang (Facilitators), Marcellus Adi, Sugeng Hariady, Susilo Legowo, Sukianto Lusli, Desmonth, Bastoni, Dudi Rufendi, Hayani Suprahman, Philip Wells, Nico Van Strien, Jasmi Abdul, Richard Jakob-Hoff, Peter Stroud, Ron Tilson, Jim Jackson, Peter Litchfield, and Tom Foose.*

### **BACKGROUND**

The Director General of PHPA, as Chairman of the Foundation of Rhino Friends (YMR), has recommended establishment of an *in situ* intensive management center (ISIMC) as one component of the *Indonesian Rhino Conservation Strategy*.

This recommendation is based upon several considerations:

- Loss of Sumatran rhinos due to poaching continues at a high level (evidently a greater than 50% reduction in populations over the last 10 years) and hence there is need to concentrate rhino both to improve protection and increase propagation
- A number of Sumatran rhinos are located outside areas where they can be protected with feasible resources or where they are part of populations that will be able to breed satisfactorily; they need to be rescued as soon as possible.
- Attempts at *ex situ* intensive management and captive breeding have been so far unsuccessful for multiple reasons but one suspected problem is the need to provide Sumatran rhinos with more natural conditions, e.g. much more spacious and well vegetated enclosures.
- An *in situ* intensive management center could provide this more natural environment for Sumatran rhinos.
- In addition, such an ISIMC could be an important center for education, public awareness, and tourism that would generate support for rhino conservation.

The previous program for intensive management of rhinos in Indonesia was conducted through the PHPA/Sumatran Rhino Trust program. This program was oriented to *ex situ* sites, both outside and inside Indonesia. The SRT/PHPA Program has now been terminated.

Preliminary plans and proposals for an intensive management center (ISIMC) and program have been prepared as part of the *Indonesian Sumatran Rhino Action Plan* developed to implement the Strategy. The purpose of this working group is to review and refine these plans with an objective of developing a plan that can be initiated immediately and developed in phases so that it is feasible to raise the funds required.

*To this end, the objective of this in situ intensive management center will be to provide a place where rescued rhino can be placed and propagated under conditions as natural as possible. In addition to the rescue of rhinos that continue to be at risk in native habitat, it is recommended that there be consideration of moving some or all of the Sumatran rhinos currently in captivity in zoos to the in situ intensive management center.*

## **PRELIMINARY PLANS**

The old SRT/PHPA Camp at Air Hitam is still operational as a base for anti-poaching activities in the Bengkulu area. A team of 15 persons are there. This camp still has five vehicles (four Toyota hard tops and a lorry) but both the camp and vehicles are in need of some rehabilitation to be fully functional.

One new site for the intensive management center has been proposed at Air Seblat about 50 km to the south of Air Hitam in Air Seblat. This area is primary forest and encompasses 15,000 hectares adjacent to the boundary of Kerinci Seblat National Park. The budget for the preliminary plan for the new facility at Air Seblat was presented. The total cost was US \$ 1,500,000 over three years: \$754,000 capital and \$792,000 operations.

Other areas are also possible and a site selection process is being proposed as described later in this report.

Three scenarios for maintenance of Sumatran rhinos were initially considered:

- Small bomas (enclosures) similar to zoo conditions or the existing situation at Air Hitam
- Very large enclosures (e.g., 1000 hectares or more)
- An intermediate or hybrid plan that would entail enclosures in the 5-10 hectare range and might commence by placing animals in small bomas until larger facilities are developed.

Consistent with this strategy, it is proposed that the first step is to activate the rescue team using Air Hitam as a base and temporary repository for any Sumatran rhinos captured. This first phase may extend through the first year. During this time, a site for a permanent ISIMC would be finalized and the center constructed.

## **RESCUE AND MANAGEMENT TEAM OF THE *IN SITU* SITE**

A rigorous review of costs was conducted for the following: the operation of the rescue team; the use of Air Hitam for the first phase; the selection of the new site; and the construction of the permanent facility. It was proposed that the field rescue team consist of 15 persons: 1 team leader; 6 for survey; 3 to monitor traps; 2 drivers; 1 mechanic; 1 guard; and 1 cook.

The average cost per person per month for this team is estimated as:

Salary	\$ 120
Food & Other Necessities	\$ 150
Per Diem Allowance	<u>\$ 50</u>
Total	\$ 320

Hence, for 15 team members, the monthly operation cost is \$4,800. A further \$625 is estimated to be needed for fuel. Hence, the total monthly cost for operation of the field team is \$5,425.

**Operation of Rescue/Management Team (initially from Air Hitam then from new site)**

	<u>Per Month</u>	<u>Per Year</u>
Field Team (15 Members)	\$ 5,425	65,100
Incidentals	\$ 1,500	18,000
Trap Construction		9,000
Movement of Rhino from Forest		9,000
Base Camp	\$ 4,860	58,320
Camp Manager	\$ 2,000	24,000
Husbandry	\$ 300	3,600
Veterinary Care	\$ 300	3,600
Vehicle Maintenance	<u>\$ 2,000</u>	<u>24,000</u>
TOTAL	\$ 23,500	\$ 215,000

Additionally, there will be a one-time cost of \$10,000 to place the camp and vehicles in functional condition and perhaps \$66,000 to rehabilitate existing bomas for this Phase 1.

**Facilities for Intensive Management Team at New Site:**

Living Quarters for 15 persons (8 Room House)	\$ 6,400
(8 sq m/person; 2 persons/room; each room = 16 sq m; cost \$50 sq m; each room = \$800)	
Service Building:	\$ 13,000
Kitchen (30 sq m)	
Storage (Food & Equipment) (78 sq m)	
Mess Hall (100 sq m)	
Workshop (40 sq m)	
Electricity House (10 sq m)	
Garage (12 sq m/vehicles; 6 vehicles = 72 sq m)	\$ 3,600
Office 2 25 sq m rooms = 50 sq m	\$ 2,500
Shower/Toilet	\$ 2,500
Water Tower (2 Pumps)	\$ 6,000
Site Clearance	<u>(by contractor for the wood ?)</u>
Subtotal	\$ 39,000

For the Air Seblat site, it may be necessary to construct a road and bridge. If Air Seblat is the site selected, it is proposed that the government be requested to construct these improvements.

Road (5 km long, 3 m wide) @ \$12,000 km for an unsealed road	\$ 150,000
Bridge (150 m long, 3 m wide)	\$ 45,000

### Equipment

Radio Telemetry collars and transmitters @ \$2,000	\$ 10,000
8 Motor Bikes @ \$1,600	\$ 13,000
5 High Frequency radios @ \$1,000	\$ 5,000
Radio Fax	\$ 3,000
VHF Radios (1 Base + 20 units)	\$ 10,000
5 Guns @ \$1,000	\$ 5,000
Capture (Dart) Gun	\$ 2,000
4 GPS Units @ \$1,000	\$ 4,000
Office & Furniture	\$ 5,000
2 Generators @ \$2,000	\$ 4,000
Computer & Printer	\$ 3,000
Tools (chainsaw, pump, welder)	\$ 10,000
Laboratory Equipment	\$ 5,000
2 Refrigerators (Scientific and Household)	\$ 1,000
Large (Rhino Size) Propane Cooler	\$ 10,000
Video System	\$ 10,000
TOTAL	\$ 100,000

### RHINO TRAPS AND REMOVAL OF RHINO FROM FOREST TO ISIMC.

Cost of Constructing Trap:

Material	\$ 500
Labor 45 man days @ 5000 rp.	\$ 225
Food for Team	\$ 135
Fuel for Team	\$ 100
Total Cost Per Trap	\$ 1,000

It is estimated that 3 traps will be necessary to achieve the capture of each rhino. It is proposed that there be an attempt to capture 3 rhino per year. Hence, the estimated cost of traps/year is \$9,000. It is further estimated that it will cost \$3,000 to move each rhino captured from the forest to the intensive management center. Hence this cost is also budgeted at \$9,000/year.



## RHINO ENCLOSURES

A set of criteria to guide construction of rhino enclosures at the ISIMC were developed:

- Provide natural conditions for breeding and feeding (as far as feasible)
- Hence provide enclosures that are 5-6 hectares in size;
- Provide vegetative cover including trees in part to provide females with hiding places;
- Provide natural water sources, especially to allow rhinos to have wallows;
- Provide hilly terrain;
- Provide more enclosures than rhinos so animals can be rotated (although the problem of plant toxins especially after regrowth will be an important husbandry factor)
- Permit rhinos to be kept singly but moved together for breeding when females in estrus;
- Provide space for offspring;
- Provide sensory (sight, sound, smell) barriers between animals when not together;
- Permit major breeding to occur in female enclosures;
- Attach radio telemetry devices (probably via collars) to rhino so can keep track of them;
- Provide artificial salt licks (perhaps as center of breeding encounters and as main point for visual observation of rhino (ideally facilitated by video system).

There is consensus on a basic configuration for the rhino enclosures consisting about 6-8 resident/recovery yards around a central area where the salt licks would be located and the sexes introduced at appropriate times. One unit with two inner rings could be constructed initially, and more units added as additional rhinos are captured and money becomes available.

The major cost of this facility will be fences; estimated costs are about US \$20/meter. Hence, costs for 9,000 meters (for each circular unit) would be about \$ 200,000; each 5-6 hectare enclosure in the complex would cost about \$ 25,000.

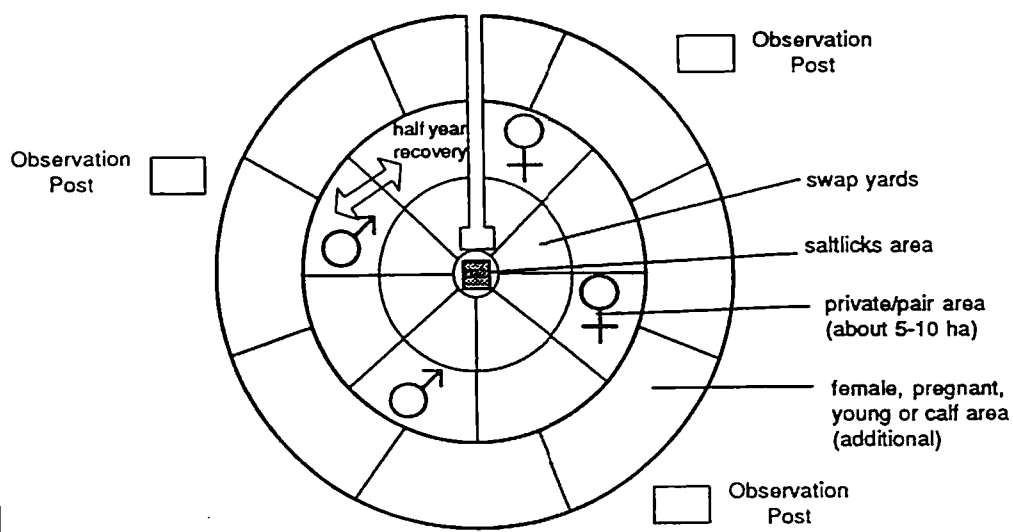


Fig. 1. Basic consideration of the *in situ* intensive management center for Sumatran rhinos.

## SELECTION OF SITE FOR THE *IN SITU* INTENSIVE MANAGEMENT CENTER

It is proposed that a rigorous process be used to select the site for the *in situ* intensive management center. Toward this end, a set of criteria have been proposed. These criteria have been prioritized: 3 = Essential; 2 = Important; 1 = Desirable

### Criteria for Selection of Site for Permanent Intensive Management Center:

- Essential:
  - Located in or adjacent to a national park
  - Area of primary forest with appropriate food for rhino
  - Plentiful water/streams
  - Good topography/no swamps/fertile soil
  - Potential tourist attraction (as self-sustaining revenue generator)
  - Ease of securing long-term use of land
  - Security situation/community or land use in surrounding area;
  
- Important:
  - Elevation 200-1000 meters
  - Few or no elephants (cost consideration/exclusion of elephants expensive)
  - Near (within 5 km) of a paved road
  
- Desirable:
  - Access to airstrip
  - Communications/utilities;
  - Natural boundaries

Four candidate sites were proposed during the Working Group. These four areas have been preliminarily evaluated according to the site selection criteria.

EVALUATION OF POTENTIAL SITES FOR THE <i>IN SITU</i> ISIMC														
AREA  Locality, Province, National Park (T.N.)	Score	T a m a n g	F o r e s t	W a t e r	T e r r a i n	T o u r i s m	T e n u r e	S e c u r i t y	E l e v a t i o n	E l e p h a n t s	P a v e d R o a d	A i r s t r i p	U t i l i t i e s	N a t r l B o u n d
Sukaraja, Lampung, T.N. Barisan Selatan	26	+	+	+	+	+	+	+	+	-	+	+	-	-
Bangko, Jambi, T.N. Kerinci Seblat	21	+	-	+	+	+	+	-	+	+	+	-	-	?
Air Seblat, Bengkulu, T.N. Kerinci Seblat	14	+	+	+	-	-	+	+	+	-	+	+	-	+
Sungai Lapan, Aceh T.N. Gunung Leuser	12	+	+	+	+	+	+	-	-	-	-	-	-	+

It is proposed that a feasibility study be conducted of at least three of the potential sites. This study would involve up to 3-4 persons (1 PHPA; 1 YMR; 1-2 from outside). It is estimated that the survey for each site would cost \$3,000.

**IMPLEMENTATION PLAN AND Timetable**

<b>Date</b>	<b>Activity</b>	<b>Cost</b>	<b>Possible Source</b>
<b>1994</b>			
Jan-Feb	Survey to Evaluate Potential Sites for ISIMC	\$ 10,000	SRT/YMR
Jan-Jun	Survey/Approval of Rhino Capture Sites	\$ 5,000	SRT/YMR/IRF
Feb	Provide First Equipment (GPS/Radios)	\$ 20,000	SRT/YMR/IRF
Mar-Apr	Air Hitam Camp & Vehicle Rehabilitation	\$ 10,000	IRF
Apr	Site Recommendation Report		
June	Site Selection/Approval		
Jun-Dec	Assume Support of Rescue/Management Team	\$ 112,000	IRF/YMR
Jul-Aug	Construct First Set of Rhino Traps	\$ 3,000	IRF
Jul-Aug	Engineering Survey/Plan	\$ 5,000	SRT/YMR
Oct-Nov	Construct ISIMC People Facilities	\$ 39,000	IRF/YMR
<b>TOTAL</b>		<b>\$ 204,000</b>	
<b>1995</b>			
Jan-Dec	Support Rescue/Management Team	\$ 215,000	IRF/YMR
Jan	Construct Phase 1 of Rhino Enclosures	\$ 100,000	IRF/YMR
Feb	Provide Remainder of Equipment	\$ 80,000	IRF/YMR
Mar	Move 1 Pair of Rhino from Captivity to Site	\$ 3,000	IRF/YMR
Apr	Initiate Phase 1 of Tourist Operation		
Jul	Construct Phase 2 of Rhino Enclosures	\$ 50,000	
Oct	Construct Phase 3 of Rhino Enclosures	\$ 50,000	
Nov	Initiate Phase 2 of Tourist Facility		
<b>TOTAL</b>		<b>\$ 516,000</b>	
<b>1996</b>			
Jan-Dec	Support Rescue/Management Team	\$ 225,000	
Jan-Dec	Construct Traps/Move Rhino	18,000	
Jan-Dec	Construct Second Set of Rhino Enclosures	\$ 200,000	
<b>TOTAL</b>		<b>\$ 443,000</b>	

**SUMMARY OF COSTS FOR 3 YEARS OF INTENSIVE MANAGEMENT PROGRAM**

<b>Item</b>	<b>Year 1</b>	<b>Year 2</b>	<b>Year 3</b>	<b>Total</b>
<b>Capital</b>				
<b>Facilities</b>	72,000	218,000	218,000	508,000
<b>Equipment</b>	20,000	80,000		100,000
<b>Operations</b>	<u>112,000</u>	<u>218,000</u>	<u>225,000</u>	<u>555,000</u>
<b>TOTAL</b>	<b>204,000</b>	<b>516,000</b>	<b>443,000</b>	<b>1,163,000</b>

## WORKING GROUP SUMMARY RECOMMENDATIONS

- An *in situ* intensive management center for Sumatran rhinos should be established as soon as possible as one component of the *Indonesian Sumatran Rhino Action Plan*.
- Support for this *in situ* intensive management center for Sumatran rhinos should be sought from national and international, governmental and non-governmental agencies.
- The *in situ* intensive management center should be located adjacent to, or within, a major conservation area for Sumatran rhinos to encourage and support better wildlife management in the conservation area.
- Sumatran rhinos for the *in situ* center should be derived both from animals rescued from the wild as determined and recommended from PHPA, as well as rhinos already in captivity.
- The *in situ* center should have an ecotourism component to provide ongoing support for the operation of this center. ■

**Sumatran Rhino in Indonesia  
Population and Habitat  
Viability Analysis Report**

**Section 3:**

**Indonesian Sumatran Rhino Action Plan**

## Indonesian Sumatran Rhino Action Plan

*Working Group Members: Komar Soemarna, Daniel Walter Sinaga, Ronald Tilson and Workshop Participants.*

### RECOMMENDATIONS FOR WILD SUMATRAN RHINO POPULATIONS

*The following recommendations for conservation management of wild populations were derived from the results of the Vortex modelling simulations, and assume that there will be no future loss of protected habitat or from poaching.*

- 1) Population management goals for the entire wild population of Sumatran rhinos need to be developed to ensure the long-term survival of the species.
- 2) The current combined subpopulation of approximately 250 Sumatran rhinos left in Sumatra is not sufficiently large enough to be considered an evolutionary viable population. Because they live in multiple fragmented populations, they will need to be managed as a metapopulation through some form of genetic supplementation.
- 3) Any rhino population under 10 individuals is at high risk of extinction even under ideal conditions and should be generally considered non-viable.
- 4) Under ideal conditions of a growth rate of 3.3%/year, no constraint of habitat and no poaching, a population in the range of 20-25 rhinos can be considered viable *in situ* if such conditions can be ensured in future.
- 5) If the population is, however, a nearly stable one, a population of 50-75 rhinos is needed to ensure a high probability of survival.
- 6) If the high rate (7%) of poaching experienced in recent years continues, then no existing population can be considered secure, although the larger ones may not become extinct in the next 20-40 years.
- 7) If poaching is reduced to about 3% per year it may be possible to maintain a viable population if initial population sizes are in the range of 50-75 animals.

## RECOMMENDATIONS FOR HABITAT PROTECTION FOR SUMATRAN RHINOS

*The Sumatran rhino, because of its restricted habitat, fragmented small populations and strong poaching pressure, will need immediate and wise conservation management strategies if it is to survive. The following prioritized recommendations for habitat and population conservation for wild Sumatran rhinos address immediate and critical conservation issues:*

There are four relatively large (15 or more individuals) Sumatran rhino populations:

- Gunung Leuser National Park (90-120 rhinos)
- Barisan Selatan National Park (25-60 rhinos)
- Gunung Sumbing-Masurai (40-50 rhinos)
- Listen-Serbojadi (15-25 rhinos)--this population is considered to be relatively large but could also be considered a small-medium population also.

8) The number one priority for these populations is to **increase protection**. To fully develop this concept, PHPA needs to convene an internal review to evaluate how best to use their available resources to initiate anti-poaching action immediately. Some components of this concept would include the following:

- Improve efficient utilization of the forest guards and guard posts;
- Intensify guard activity by increasing funding and equipment;
- Locate management authority within the park boundaries;
- Consider an additional operation office within the southern boundary of Leuser;
- Develop strong communication channels to direct protection operations;
- Improve the management organization through KPTN, and pengadaan Rayan-  
rayan/Sub Seksi di Kawasan (with boundary);
- Implement the "buffer zone" concept through cooperation of local people;
- Develop partnerships between universities and local NGOs;
- Recruit local people from nearby villages for guarding;
- Build post guard in/near village;
- Develop mobile units for forest patrolling; and
- Develop motivation and incentive programs for guards.
- Ecotourism development within National Parks and other protected areas should be developed with conservation components.

9) For **Barisan Selatan National Park**, ensure that there is no human encroachment along the planned road for this national park.

10) For **Listen Protection Forest and Serbojadi Production Forest** in Aceh, an Environment Impact Assessment should be conducted immediately to evaluate the impact of the possible construction of a hydroelectric project.

11) For **Gunung Leuser National Park**, it is imperative to maintain the park as a contiguous habitat for Sumatran rhinos.



- 12) There are two small to medium size (10-15 individuals) rhino populations that need **increased protection** along the same guidelines set for the relatively large populations:
  - Gunung Patah (10-15 rhinos)
  - Bukit Kayu Embun (10-15 rhinos)
- 13) For **Gunung Patah Protection Forest** in South Sumatra, there is a need to recruit local guards and involve them in the protection program for this area and to conduct a site visit in cooperation with local university participants to gather information regarding rhino presence and numbers given the limited resources of PHPA.
- 14) For **Bukit Kayu Embun Protection Forest** in Bengkulu, there is a need to monitor human movement into the area from nearby transmigration villages.
- 15) There are seven very small (less than 10 individuals) rhino populations that also need **increased protection** along the same guidelines set forth for relatively large populations (see above). These populations are:
  - Way Kambas National Park (3-5 rhinos)
  - Sungai Ipuh/G. Seblat (6-7 rhinos)
  - Bukit Hitam (3-5 rhinos)
  - Torgamba/Tanjung Medan (3-5 rhinos)
  - Ps. Pangarayan/Dalu Dalu (2 rhinos)
  - Bukit Tapan/Silaut (5 rhinos)
  - Lokop (3-5 rhinos)
- 16) For **Way Kambas National Park** in Lampung, as a result of recent observations of rhino presence in the park, it is recommended that an intensive field survey be conducted as soon as possible.
- 17) For **Sungai Ipuh Protected Forest** in Bengkulu, intensify anti-poaching activities by YMR and SBKSDA, have PHPA request the Ministry of Forestry to maintain the land-use status of this site as Protected Forest, have PHPA request the Ministry of Forestry to protect the area from human encroachment, and develop a better liaison between PHPA and HPH (Hak Pengusahaan Hutan).
- 18) For **Bukit Hitam Protected Forest** in Bengkulu, conduct a site visit to gather as much information as possible regarding rhino presence and numbers given limited resources.
- 19) For **Torgamba Production Forest** in Riau, capture and translocate the entire Sumatran rhino population to a secure and similar habitat. A review by PHPA is needed to select the site.
- 20) For **Dalu Dalu Production Forest** in Riau, capture and translocate the entire Sumatran rhino population to a secure and similar habitat. A review by PHPA is needed to select the site.

- 21) For **Bukit Tapan Protected Forest** in West Sumatra, develop a complete protection program by assigning PHPA forest guards to be posted in the area.
- 22) For **Lokop Nature Reserve** in Aceh, conduct a site visit to gather as much information as possible regarding rhino presence and numbers given limited resources, and have PHPA request the Ministry of Forestry to maintain the Productive Forest land-use status of TPTI (Tebang Pilih Tanam Indonesia), but to only conduct selected timber extraction and to request that the Serbojadi Nature Reserve be expanded to include the Sumatran rhino habitat adjacent to it at the termination of the current logging concession. This would be an approximate expansion from 300 to 3,000 ha.
- 23) There are four suspected rhino populations whose numbers are unknown which need a site visit to gather as much information as possible regarding rhino presence and numbers given the limited resources of PHPA. When the Sumatran rhino population estimates have been established, these populations should have **increased protection** as set forth in the recommendations outlined above. These suspected populations are:
  - Berbak National Park in Jambi
  - Ketenong Protected Forest in Bengkulu
  - Rokan Hilir Production Forest in Riau
  - Gunung Abong-Abong Protected Forest in Aceh
- 24) For **Berbak National Park**, have PHPA request the Asian Wetland Bureau to conduct a thorough survey of the site for Sumatran rhinos.
- 25) For **Ketenong Protected Forest** in Riau, request the Ministry of Forestry to remove gold mining activities within the national park and consider developing the site for ecotourism projects to generate revenue to support the park, and to review forestry land-use practices of the area outside of the park.

## RECOMMENDATIONS FOR *IN SITU* INTENSIVE MANAGEMENT OF SUMATRAN RHINOS

*Given the low population estimates of wild Sumatran rhinos, their extreme fragmentation, their low reproductive potential, the continued encroachment and degradation of their habitat, and insufficient habitat protection and law enforcement measures in the face of continued poaching pressures, the workshop participants developed a set of criteria for the establishment of an in situ intensive captive management program for immediate implementation. The following recommendations will guide this program:*

- 26) An *in situ* intensive management center for Sumatran rhinos should be established as soon as possible as one component of the *Indonesian Rhino Action Plan*.

- 27) Support for this *in situ* intensive management center for Sumatran rhinos should be sought from national and international, governmental and non-governmental agencies.
- 28) The *in situ* intensive management center should be located adjacent to, or within, a major conservation area for Sumatran rhinos to encourage and support better wildlife management in the conservation area.
- 29) Sumatran rhinos for the *in situ* center should be derived both from animals rescued from the wild as determined and recommended from PHPA, as well as rhinos already in captivity.
- 30) The *in situ* center should have an ecotourism component to provide ongoing support for the operation of this center.

The combination of the above recommendations form the basis of this *Indonesian Sumatran Rhino Action Plan*. This document was prepared during the Sumatran Rhino Population and Habitat Viability Analysis Workshop conducted by IUCN/SSC CBSG in collaboration with the Indonesian PHPA and other supporting organizations. It includes specific recommendations and priorities to the Directorate General of PHPA for the long-term conservation, management and research of wild populations of Sumatran rhinos in Indonesia, as well as specific recommendations for the establishment of an *in situ* intensive management center, all of which are in support of PHPA's *Indonesian Rhino Conservation Strategy* and *Indonesian Rhinoceros Conservation Action Plan Priorities*, both published in 1993. ■

## **Post-Workshop Working Group Report: An Emergency Plan to Immediately Improve Rhino Protection**

*Working Group Members: Widodo Ramono, Haerudin Sadjudin (Chairs), Marcel Adi, Jim Jackson, Ronald Tilson, and Tom Foose.*

The Sumatran rhino has become the most endangered of the rhino species. Their rate of decline has been as high as in any other rhino species. Their numbers (200-400) are lower than any other rhino species, except the Javan, whose population has been more stable. More specifically, there are 1/5 to 1/10 as many Sumatran rhino as there are Black Rhino, which has received so much publicity recently as the rhino species most threatened by extinction.

Poaching using steel snare traps is by far the greatest threat to the Sumatran rhino. Thus the number one recommended priority is to provide immediate and increased protection for all Sumatran rhino populations in Sumatra.

This protection will require that specific projects and plans be developed. The problem is vast in extent. The resources are scarce in Indonesia. The current PHPA infrastructure is stretched to its maximum attempting to protect one of the greatest concentrations of biological diversity on earth.

This improvement will therefore require more funds. The level of funds needed will require that fund raising occur both outside and inside Indonesia. Four major sources for the funds outside of Indonesia are: the global captive community, the GEF; non-range state governments; private and corporate donors. Without outside financial support, the Sumatran rhino will disappear in Indonesia.

Raising these funds will require identification of specific projects for funding.

Five major sources will produce these plans: PHPA, YMR, CBSG S.E. Asia Program, CBSG Rhino GCAP/GASP; the IRF.

A communication group should be developed to share information and jointly develop projects cooperatively. This group initially would consist of: Widodo Ramono (PHPA), Haerudin Sadjudin (YMR), Ron Tilson (IUCN/SSC CBSG S.E. Asia Program), Tom Foose (IUCN/SSC Rhino GCAP/GASP), Jim Jackson (IRF).

The IRF will form a partnership with YMR to channel funds from the international community to Indonesia to be used for projects recommended by PHPA through the YMR. This partnership will provide a vehicle available for potential donors, which will receive full recognition for their contributions. However, other direct donor relationships with PHPA and YMR are also available.

The next immediate steps are:

- Specific plans and projects to totally protect Sumatran rhino will be developed.
  - Operations:
    - PHPA will develop/refine existing plans as soon as possible.
    - As an initial measure, PHPA and YMR will immediately expand the Air Hitam anti-poaching program to secure the 3 largest populations: Gunung Leuser, Kerinci-Seblat, Barisan Selatan.
      - This plan will provide 2 teams of 5 persons per population. The cost will be \$ 15,000/year/team or \$ 30,000/year/population. The total for these teams will be \$ 90,000.
      - Each of the major populations requires a coordinator which will cost \$ 7,000 each for a total of \$ 21,000.
      - Central facilitation and coordination will be provided by the YMR Office in collaboration with PHPA. This cost will be \$ 12,000.
      - Total cost of the initial anti-poaching program will be \$ 132,000/year.
  - Marketing:
    - IRF/YMR/Others will promote the 1 rhino/1 guard concept to recruit funding for anti-poaching efforts as the immediate and primary objective.
    - IRF/YMR/Others will also try secondarily to recruit support for the ISIMC.
- PHPA/YMR/IRF will proceed with plan for GEF funds.
- The CBSG Rhino Global Animal Survival Plan (GASP) and IRF will initiate fund-raising outside Indonesia (and Malaysia) for the Sumatran rhino as the most urgent priority for new support for rhino conservation.
- YMR will initiate fund-raising inside Indonesia.
- IRF will work with YMR and PHPA to develop news to support fund-raising efforts. ■



**DEPARTEMEN KEHUTANAN**  
**KANTOR WILAYAH PROPINSI LAMPUNG**  
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**BANDAR LAMPUNG**

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Closing remark

ASIAN ELEPHANT AND SUMATRAN RHINO  
POPULATION AND HABITAT VIABILITY ANALYSIS WORKSHOPS

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Distinguish Prof. Dr. Ulysses Seal-IUCN/SSC CBSG Chairman,  
Distinguish Dr. Ronald Tilson - Minnesota Zoo and IUCN/SSC  
CBSG,  
Distinguish Dr. R. Sukumar - IUCN/SSC Asian Elephant SG  
Chairman,  
Distinguish Dr. Thomas Foose - International Rhino  
Foundation,  
Distinguish Dr. James Doherty - AAZPA Sumatran Rhino SSP  
Co-coordinator,  
Distinguish Representatives of WWF and AWB,  
Distinguish Workshop Participants,  
Ladies and Gentlemen,

The honourable Director General of Forest Protection and  
nature conservation of the ministry of forestry is unable  
to be with us today at the end of these valuable  
workshops. He requested me in my capacity as Kepala Kantor  
Wilayah Departemen Kehutanan Propinsi Lampung, to present  
some word as closing remarks to end these workshops,

Ladies and Gentlemen,

During these workshops we have discussed various aspects  
of the wild populations of Asian elephant, and Sumatrans  
rhinos as well as white wing wood ducks, in order to  
analyse their population and habitat.

These workshops are of strategic steps to conserve the mentioned three wild animal species ; this is mainly due to the followings:

- The species belong to protected animals and are being threatened more and more by habitat loss and fragmentation and a small portion by poachings,
- Indonesia faces a dilemma: in one hand, as stated in the national policy, has a great intention and responsibility to protect them for the benefit of Indonesian people and the global community as well; whereas in the other hand has a great responsibility to extend our national development which is still strongly leaning against the natural resources.

We highly appreciate the IUCN/SSC CBSG , the Asian elephant specialist group , the International Rhino Foundation, the WWF and AWB, the corresponding zoos, as well as the whole participated experts and international donors, for their participation in these workshops. I do hope that the results of these workshops could be used as useful guidances in overcoming the mentioned dilemma and taking over the mentioned responsibility.

May I on behalf of honourable Director General of Forest Protection and Nature Conservation of the Indonesian Ministry of Forestry herewith to extend deep thankful to all of you for your participation in these workshops. We highly appreciate your efforts to help this country in developing appropriate planing and implementation of better wildlife management practices.

Thanks to local Government of Lampung Province and related authorities who has given permission and great attention to these workshops, and every body for their active participation.

To the local newspapers I extend my thank for good publicity concerning conservation efforts of Asian elephant and Sumatran rhino, and white wing wood duck as well.

Last but not the least, my deep thanks are also addressed to the manager of Marcopolo Hotel for suitable accomodation and services, to Taman Safari Indonesia and the local forestry staff for good arrangement of these workshops.

Whit full of thank to god almighty, my I on behalf of the honourable Director General of Forest Pritection and Nature Conservation, officially close these workshop.

Thank you.

Bandar Lampung, Nopember 13 th, 1993.

Kakanwil Departemen Kehutanan  
Propinsi Lampung,





# **Sumatran Rhino in Indonesia Population and Habitat Viability Analysis Report**

## **Section 4:**

### **Supporting Reports and Articles**

**Preliminary Report**  
on the  
**Current Status of Sumatran Rhino**  
in  
**Bengkulu Region**  
of  
**Kerinci Seblat National Park.**

Based on work by Sumatran Rhino Survey  
between August 1992 and October 1993.

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**The following document is not an official report of the work  
of the Sumatran Rhino Survey Project, but has been put  
together exclusively for the purposes of the  
Sumatran Rhino PHVA at this workshop.**

**Bandar Lampung, November, 1993.**

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## ABSTRACT

The Sumatran Rhino Survey project has been operating in the Kerinci Seblat National Park over the last 16 months. From the beginning of this period the objectives have included an assessment of the current status of the Sumatran Rhino within this national park, as well as an investigation into the poaching intensity on the remaining population. To achieve these ends a two-phase approach to surveying has been employed. Initial work has concentrated on the Bengkulu section of Kerinci Seblat, accounting for 2440 of the total 12165 square kilometres of national park.

In the first phase, a Permanent Study Site was mapped and monitored, covering an area of 220 square kilometres. A permanent presence was maintained in this study site from February to November of this year (typical field times ranging from 10 to 34 days), and the intensity of the patrolling has resulted in a total of two rhinos being identified as living within the region. Trapping was also found to be common, and a total of 23 traps, of various ages, were discovered during the 8 months work within this study site.

The second phase required the surveying of several other areas within the Bengkulu section of the Kerinci Seblat National Park, survey methodology designed to allow the largest area to be investigated in the shortest time possible. Typical survey field-times ranged from 8 to 14 days, with all data collected in the field recorded in comprehensive survey reports. The evidence of rhino encountered within these external survey sites has enabled the categorisation of the external survey sites as having rhino densities equivalent to, better than, or worse than, that found from the Permanent Study Site.

Integrating work from the Permanent Study Site, the external surveys, and information from other sources (e.g. physical map data, land use data, local knowledge, park staff knowledge, etc.) has led to the assigning of rhino densities to the Kerinci Seblat region found within Bengkulu Province. In the calculation of the size of the remaining population several scenarios have been tried, differing in the way they treat the areas as yet unsurveyed.

However, the preferred scenario is based on an inferred core region of rhinos, covering approximately 1250 square kilometres of the province. All evidence collected over the last 16 months suggests that this is a correct assumption. Hence, for the Bengkulu section of the Kerinci Seblat National Park, it is suggested that approximately 17 rhinos presently exist there whilst, by direct extrapolation, the total Kerinci Seblat National Park has a population of approximately 83 individuals.

**Considering this in combination with data from the second most likely scenario, the Sumatran Rhino Survey project suggests that the range of 80 to 100 individuals be considered as the present population size for the Kerinci Seblat National Park**

## I. Introduction - Sumatran Rhino Survey.

The Sumatran Rhino Survey is a small, independently funded group dedicated to the study of the current status of the Sumatran Rhino (*Dicerorhinus sumatrensis* (Fischer, 1814)). The project commenced field-work in August of 1992, in the Taman Nasional Kerinci Seblat (TNKS), working jointly with:

LIPI (Indonesian Institute for Science - Puslitbang Biologi), and in cooperation with

Dit. Jen. PHPA (Directorate of Conservation),

Litbang Hutan (Forestry Dept.), and

Menteri Negara LH.

The team operates with support of The Royal Geographic Society,  
Save the Rhino International,  
London Zoological Society,  
several large companies, and many private individuals.

The work carried out by the project during the initial phase has involved:

- An investigation into the current status of the Sumatran Rhino in the Taman Nasional Kerinci Seblat, Sumatera, Indonesia.
- An investigation into the threats to the Sumatran Rhino population in this area.
- Consideration and formulation of possible management strategy alternatives for this population.
- Provision of other related ecological, biological and socio-economical data, about the TNKS, to the head of the Park management staff.

Within these broad goals, the project team also examined a number of other factors. These included (i). the disincentive effects, on local people, from entering a continually monitored study-site, (ii). the collection of distribution data on other species, especially Sumatran tiger (*Panthera tigris*), (iii). destruction of active rhino traps and, (iv). the noting of park areas under particularly intense pressure from external influences.

Finally, throughout the surveying work of the last 16 months, special consideration has been invested in the formulation of possible future ecological study programmes for the Sumatran rhino. The lack of ecological information on the species remains a considerable hurdle in the construction of sensible conservation strategies, and this project has been looking at the feasibility of a number of alternative ways of increasing this essential knowledge.

## II. The Taman Nasional Kerinci Seblat

The Taman Nasional Kerinci Seblat (TNKS) is distributed throughout four of the southern and central provinces of Sumatra. The park area within the province of Bengkulu accounts for approximately 2440 square kilometres of the total 12165 square kilometres. This 2440 square kilometres represents some of the prime rhino habitat for the Sumatran rhino, in that it is, in most parts, further from settlements, logging concessions, resource exploitation, and other disturbances, than the majority of the National Park contained within the other three provinces. It is for this reason that the Sumatran Rhino Survey decided to concentrate on this area in the initial phases of the programme.

The TNKS in Bengkulu province represents much of the core of the mountainous rainforest habitat available to the Sumatran Rhino. It forms a strip of forest running approximately from NW to SE, along the provinces eastern border with Jambi. Altitude ranges from 50 metres to over 2000 metres a.s.l., and represents the water catchment areas for numerous large, and vital, river systems. These include the Ketaun, the Ipuh, the Seblat, the Dikit, the Bantal, and the Menjuntio; rivers upon which Northern Bengkulu's population depend. The main road runs parallel, and close, to the coastline, though there are an increasing number of roads that enter into the interior of the province, whether this is to access logging concession areas, to access plantations, or to reach the numerous transmigration villages that have been developed over the last ten years. Frequently these various projects run very close to the national park boundary, though an advantage has been that they have enabled the survey teams to reach, using a 4 WD vehicle, the border of the TNKS relatively easily. These entry avenues have, on the other hand, made the national park open to exploitation by various groups, as discussed in Section VIII - "Poaching intensity and disturbance in TNKS Bengkulu".

Throughout the last 16 months the Sumatran Rhino Survey teams have concentrated on accessing a variety of forested areas throughout the province, including areas outside of the park (though these details have been omitted from the analysis and interpretations that follow later on in this report). All survey work in the province has been coordinated from the team's headquarters at Agro Muko plantation, 15 kilometres south of Muko Muko. Agro Muko is situated on the coast approximately equidistant from the towns of Padang (to the north) and Bengkulu (to the south). The headquarters is equipped with HT radio, allowing continuous contact with survey teams, as well as HF radio, allowing contact to be maintained with PHPA offices, Taman Nasional central office and the Permanent Study Site Base Camp. From the headquarters in Agro Muko it is possible to reach the border of 90% of the Bengkulu section of TNKS in an average of 3 hours travelling time, and this base is central to the entire eastern section of the national park.

The access path to the Permanent Study Site (discussed in more detail in Section III and IV) is situated some 2 hours drive from the Agro Muko Headquarters, followed by a two day trek from the final drop-off point. The Permanent Study Site (P.S.S.) itself accounts for approximately 220 square kilometres of N.P., and covers an area between the TNKS boundary and the Jambi-Bengkulu border. It encompasses the water catchment area of the Bantal, the Berau, and the Dikit rivers, and altitude ranges from 122 metres to 1375 metres a.s.l.

Map D., on page 15, shows the Kerinci Seblat National Park. The south-west province of Bengkulu represents the area in which the surveys, described below, have been carried out.

### III. Working Strategy for the Last Year

With the primary objective of the team being to assess the status of the Sumatran Rhino in the TNKS the strategy of operation was formulated. Bengkulu province was chosen as an initial site of study, for the reasons outlined in Section IV. However, the ever-present constraints imposed by time and lack of resources forced us to further modify survey methodology. In an ideal world, of course, the most accurate method would be to systematically visit all areas of the TNKS in Bengkulu. This was clearly unfeasible, since the team had no access to a helicopter, and only one vehicle. For this reason, a two-phase approach was considered to be appropriate, and this is described below.

Initially, the team spent considerable time selecting an area that represented a very typical section of TNKS within Bengkulu, though in choosing the site we did our best to find an area remote from settlements known to be active in entering the forest. This proved difficult, though a region of 220 square kilometres was finally chosen, situated between the Bantal Kiri and Bantal Kanan rivers (the geographical position of this region is described in the previous section, and results from the area are discussed in Section IV). Once the area had been confirmed as a suitable site a Base Camp was established in the centre of the region, with radio facilities allowing communication with the forest exterior. This base camp allowed the team to keep a permanent stock of food items, and other logistics, enabling surveying teams to stay within the locality for greatly increased lengths of time. These periods within the **Permanent Study-Site (P.S.S.)** ranged from 2 weeks to 5 weeks and this Base-Camp, used as a "stepping-stone", allowed the teams to penetrate deep into the National Park. On several occasions the survey teams were able to access as far as the Bengkulu-Jambi border. The continual presence of team members in the area, between February and November of this year, also had a significant effect in deterring intrusions by people intending to enter the forest.

From February of 1993 this P.S.S. area has been patrolled constantly. It was the teams intention to move through as large an area as possible, systematically noting all evidence of use of the region by Sumatran rhino. With sufficient patrolling intensity it was suggested that a reasonably accurate estimation of the numbers of rhino inhabiting the P.S.S. could be made. In the end the team has spent a total of 115 days on patrol in the P.S.S., covering approximately 240 kilometres of trail. Towards the end of September this system of patrol routes was further extended in the desire to thoroughly cover an even larger area. All wallows, signs of feeding, hoof prints, scrape marks, tree twists, and dung piles were recorded, and this detailed information can be found in the comprehensive set of individual P.S.S. survey reports that have been produced.

Naturally it is not possible to spend equivalent amounts of time in all areas of Bengkulu TNKS, thus a different approach was used to survey regions outside of the P.S.S. In these other areas, teams of 4 to 5 people were driven to the nearest access point, frequently a logging road, or transmigration village. From there the teams would depart on foot, carrying all provisions and equipment for between 8 and 14 days in the forest. Radio contact would be maintained with the HQ in Muko Muko, allowing the 4WD vehicle to pick the surveying team up at their exit point, towards the last day of that survey. Accurate communication of the teams' position has been enabled by the use of G.P.S. hand-held units, accurate maps, and a GRID reference system. All team movements can, as a result, be monitored from the HQ; and latitudinal/longitudinal positions verified upon exit from the forest.

During these surveys outside of the P.S.S. similar methods were used. All evidence of rhino within an area were noted, including all associated physical, meteorological, chronological and biological details. All the information from these surveys has been written up into full, and detailed, field-reports - including accurate maps - showing survey routes and positions of field-observations. This approach has been used so as to enable the repetition of surveys at a future date, thus allowing comparison of regions over a period of elapsed time.

Finally, the team has attempted to procure as much information as possible from local sources, including knowledgeable villagers, from gahru foragers (a valuable, aromatic and woody substance used in the perfume/incense industry), from PHPA staff, and from other staff involved in TNKS management.

Using the detailed work from the P.S.S. in conjunction with survey patrols external to this area, and with the information collected from other sources (as outlined above), it has been possible to construct a map of the present distribution of Sumatran Rhino in Bengkulu. This has allowed more accurate analysis of the species' present status within the province and, by extrapolation, with the TNKS taken as a whole. The interpretation of this distribution and inferred density map is discussed in more detail in Section VI

It was a concern, initially, that the survey teams were missing evidence of rhinos in the field. The work from the P.S.S. has, on the other hand, suggested that this is not the case, and that the intensity of the surveys in TNKS Bengkulu is, indeed, sufficient to discover whether a region has either no rhinos, a low density of rhinos, or a high density of rhinos. The value of the Permanent Study Site has been that it has allowed the team to assign a high degree of confidence to the results of the surveys in other areas of Bengkulu, having established that the survey methodology employed does indeed provide good indication as to the "quality" of a rhino area. The survey methodology has also been found sufficient to assess the poaching and intrusion threat for a particular area. Further discussion of these topics can be found in Section VIII - **"Poaching intensity and disturbance in TNKS Bengkulu"**

#### **IV. Summary of Survey Work in the Permanent Study Site.**

The reasons for the choice of the Permanent Study Site have been outlined above, but can be summarised as follows:

- It appeared to be an area at the core of the National Park, situated at a greater distance from villages, and other sites of potential disturbance, than many other comparable regions.
- Initial exploratory surveys showed no evidence of rhino trapping
- The area appeared to have a diverse fauna, an ideal flora, and suitable topography - factors again suggesting relatively little disturbance, and providing seemingly appropriate conditions for rhino habitation.

- Physical factors within the area were typical for much of the T.N.K.S., hence deemed to be representative of a wider area. Nothing has since suggested that the Permanent Study Site is anything but a fairly standard region of the National Park, at least for the factors that were investigated.

Beginning in February of 1993, the P.S.S. has been constantly monitored, with survey teams, over time, pushing out to investigate the surrounding area as far to the north and east as the Bengkulu-Jambi border allowed. Survey routes, frequently patrolled several times, were eventually extended to a total length of 220 kilometres, achieved after 115 days in the field. This comprehensive and systematic covering of such an area is suggested to be sufficient to estimate the approximate number of individual rhinos using the region, with the regular revisiting of locations increasing the likelihood that no individuals were missed.

All signs indicating presence of rhino were recorded, and these have been entered into the map (Map A.) of the Permanent Study Site shown overleaf.

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In summary, the Permanent Study Site was found to be almost completely devoid of Sumatran rhino. In all, evidence exists of 2 individuals within the area, though 1 of these animals probably spends a significant part of its life outside of the T.N.K.S. boundary. This has been ignored.

In only a small proportion of the P.S.S. were good quality rhino paths seen, though throughout the study there was little evidence of recent use of these trails. This was thought to be unusual until an area of intense trapping was discovered (traps approximately 6 months old), clearly removing virtually all the rhinos that had previously frequented that particular locality. Surveying of the surrounding area showed no signs of recent use, and all wallows were found to have been inactive for some considerable time. A second area was also discovered to contain numerous traps, though the ages of these were considerably older (approximately 2 years old). Furthermore, conditions of the rhino paths running through this area were in an overgrown and generally unused state, quite different from the recently poached section that was found initially. Obvious differences were the lack of wear marks on trail-side tree-trunks, a characteristic of the recently poached site. Trap construction, however, was almost identical in both cases, and it is likely that a single group of poachers has managed to systematically remove virtually all rhinos from the locality in, what appears to have been a two-phase operation. A third region was then discovered to have been systematically trapped, and the ages of these traps again ranged in age from 6 months to 3 years or more. Only one other area within the P.S.S. had rhino trails of such good quality, though again evidence of trapping was found (5 traps). However, observations suggest that this small section of trail is still used by rhino. Total area trapped, accounting for approximately 18 kilometres of trails, represents the only regions within the P.S.S. that have had, at some time in the recent past, a density of rhino perhaps comparable to that found in some areas of Taman Nasional Gunung Leuser during the long-term field study of Van Strien. However, at the present time it seems that these previously good rhino areas have been reduced to a state and density resembling that of the rest of the study-site. No other areas in the permanent study site were found to have good deep rhino trail systems, whether presently in-use or long since abandoned.

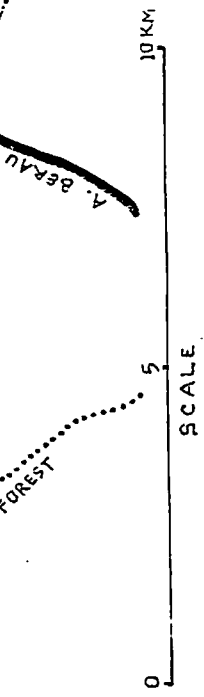
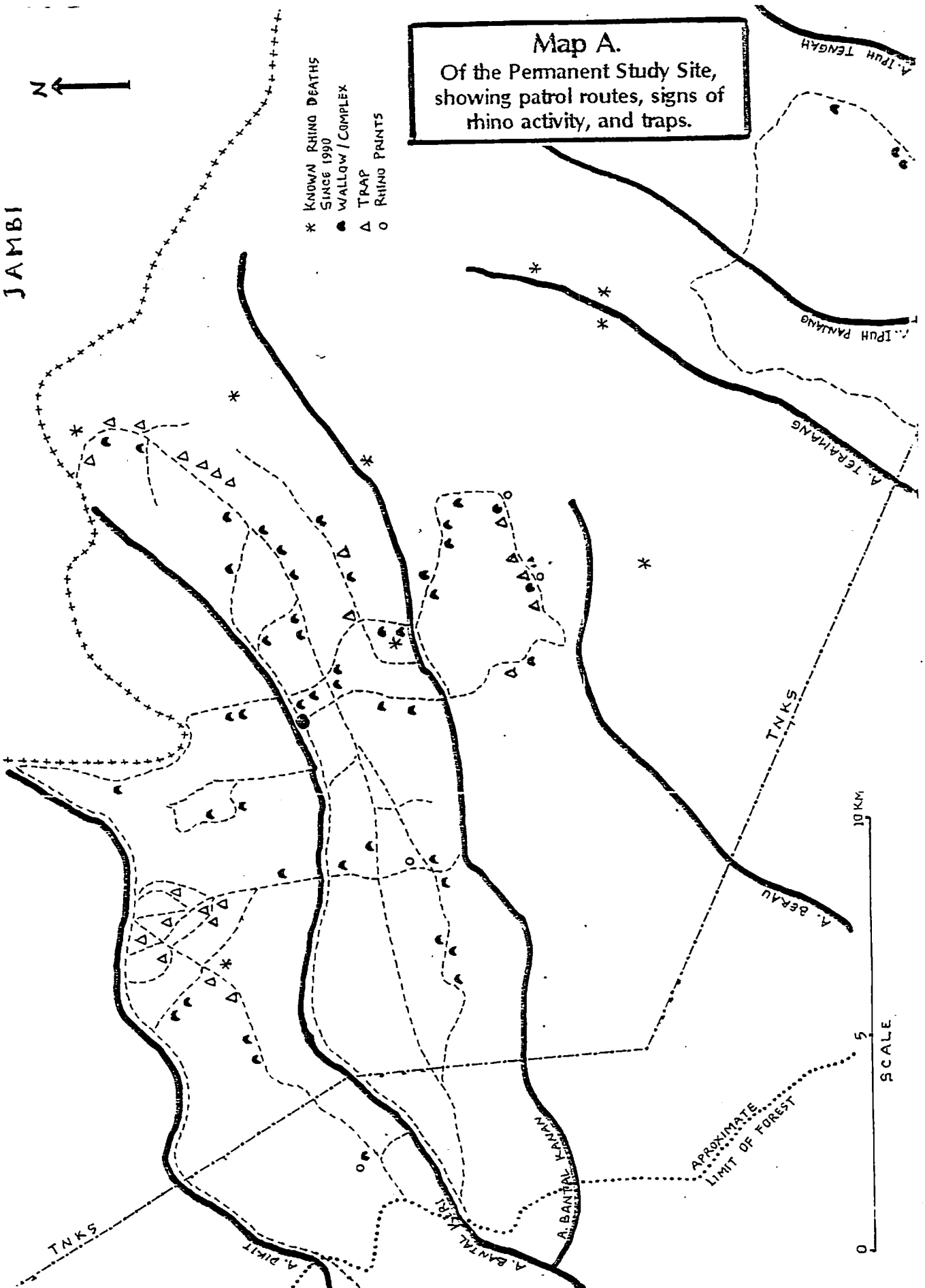


JAMBI



Map A.  
Of the Permanent Study Site,  
showing patrol routes, signs of  
rhino activity, and traps.

- \* KNOWN RHINO DEATHS SINCE 1990
- WALLOW / COMPLEX
- △ TRAP
- RHINO PRINTS



## V. Summary of survey work from areas external to Permanent Study Site.

The surveys outside of the Permanent Study Site are planned, ultimately, to cover the entire area of the T.N.K.S., though the huge area to be covered means that investigations of the intensity employed in the P.S.S. are impossible. Instead, the survey methodology was constructed such that large regions could be investigated in the time available. After one year the surveying of the Bengkulu component of the T.N.K.S. is almost complete. The remaining regions will require a further 5 weeks of field-work, and this will be carried out in January/February of 1994.

Surveys within Bengkulu have been carried out between August 1992 and October 1993, though the work within the P.S.S. has interfered with this at times. Altogether eight self-contained surveys were conducted, with average length of the field-periods being 11 days. The area covered was approximately 629 square kilometres, from a total of 2440 square kilometres for Bengkulu T.N.K.S. as a whole. As Map B. shows, the surveys have reached into some of the most remote regions of the national park. The surveys have usually involved following the main ridges between river courses, since all previous work has shown that such ridges are favoured by rhinos for moving from one part of their home range to another. As described above, all evidence of use of the area by rhino was noted, whether these observations indicated present occupation of the habitat, or occupation at some time in the past.

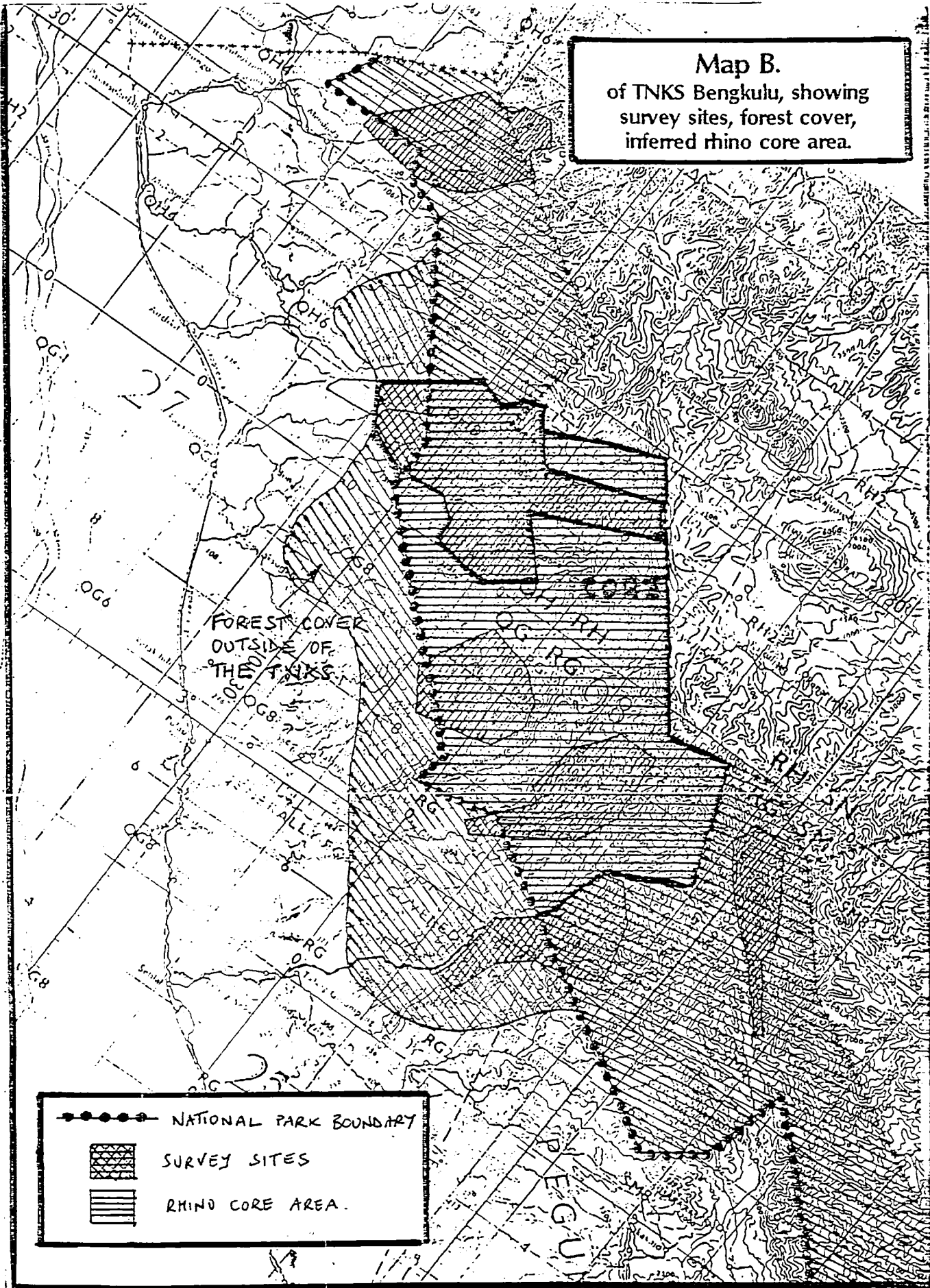
During the surveys of these regions the most basic questions were asked. Does the area show evidence of use by Sumatran rhino? Does the area appear to have a density approximately equal to, greater than, or less than the Permanent Study Site?

Surveys revealed no areas of TNKS Bengkulu with densities of rhino comparable to those found in some regions of Taman Nasional Gunung Leuser. Many areas were, to all extents and purposes, completely devoid of rhino, and it is likely that extremely intense poaching is the factor behind this. It is true to say that all of the areas which, from field observations, previously possessed good densities of rhino had been systematically and intensively poached over the last five years. Almost all wallows discovered were inactive, and many of them had been for months to years. No dung was found of age less than several weeks, and the majority was in the order of several months old. Needless to say, rhino tracks were rarely seen. Tree scrape marks, ground scrape marks, sapling twists and other marking signs were similarly uncommon. The quality of trails often suggested that these had been produced by rhinos in the past, with trees alongside the trails in some of the more recently poached regions still showing the characteristic wear marks, produced by passing rhinos. Invariably, in regions with trails of this quality, the density of traps was always extremely high. Traps were never found in areas that showed no evidence of having held rhinos in the past.

Details of the observations made during the surveys can be found in the original survey reports.

The map below (Map B.) shows the regions that have been surveyed so far. The remaining regions will be investigated in January/February of 1994.

Map B.  
of TNKS Bengkulu, showing  
survey sites, forest cover,  
inferred rhino core area.



## **VI. Results interpreted from the integration of Permanent Study Site survey work and surveys external to the P.S.S.**

As outlined in previous sections of this report it has not been possible to carry out intensive long-term monitoring of all the TNKS in Bengkulu because of the enormous size of the region. The methodology used is believed to be an adequate compromise between the need to see as large an area as possible, and the need to spend as long as possible within each of these survey sites.

In the final analysis of the data collected over the last 16 months several liberties have been taken, and these must be borne in mind throughout the consideration of the results. First of all, the evidence from the Permanent Study Site indicated a total population of two individual rhinos within an area of 220 square kilometres. This gives a density of 0.9 rhinos per 100 square kilometres.

Secondly, it is believed that the Permanent Study Site proved to be a physically and ecologically representative sample of the TNKS Bengkulu as a whole. For no factor could the P.S.S. region be considered unusual, and the frequency with which signs of rhino were encountered during surveys there was not atypical of the rest of TNKS Bengkulu.

Thirdly, though the various areas surveyed were of much the same quality throughout, differences were noticeable. This has allowed an index of quality (hence rhino density, as explained below) to be allocated to each region surveyed, essentially necessitating a decision to be made as to whether the survey area had a density approximately equal to, less than, or greater than the density of rhino found in the Permanent Study Site. This qualitative question was answered by referring to a combination of the detailed field observations collected, to the poaching intensity, information collected from other sources (such as from local people known to frequently enter the forest), and geographical/physical data from available maps.

In the calculation of rhino numbers that follows two approaches have been taken. The first involves treating the regions not yet surveyed as either good quality, poor quality, or intermediate quality rhino habitats (designated zones C, A, and B). These three scenarios provide upper and lower limits for the size of the population that probably exists in TNKS Bengkulu and, by simple extrapolation, in the TNKS as a whole.

The second approach to the calculation of probable population size in TNKS is the one favoured by the Sumatran rhino Survey team. This estimation is based on the inference of a core rhino area, a conclusion itself based on survey work, geographical and physical data, poaching intensity, and human disturbance. This core region, in the calculation of the population size, is assigned a density equal to that found in the Permanent Study Site (0.9 rhinos per 100 square kilometres). The areas of TNKS Bengkulu outside this core (Peripheral area) is assigned a density of 0.45 rhinos per 100 square kilometres (half that of the Permanent Study Site). This seems a reasonable assumption, bearing in mind that many areas surveyed appeared to be completely empty of rhino. Furthermore, this density of 0.45 rhinos agrees well with recent data from the Taman Nasional Gunung Leuser taken as a whole.

The following data is used throughout the calculations:

Area of Permanent Study Site	220 square km
Rhinos identified in Permanent Study Site	2 individuals
Area of Bengkulu Component of the TNKS	2440 square km
Total area of the TNKS	12165 square km

From Map B. showing zones of rhino density in TNKS Bengkulu:

Area surveyed within TNKS Bengkulu density similar to P.S.S.	382 square km
Area surveyed within TNKS Bengkulu density less than P.S.S.	247 square km
Area surveyed within TNKS Bengkulu density greater than P.S.S.	0 square km
Area of TNKS Bengkulu as yet unsurveyed	1811 square km

From Map B. showing inferred Core and Peripheral Rhino areas in TNKS Bengkulu:

Total core rhino area within TNKS Bengkulu	1250 square km
Total peripheral rhino area within TNKS Bengkulu	1190 square km

For the population sizes calculated based on these two approaches see the tables below:

**Three scenarios for calculation of the rhino population in the TNKS Bengkulu and the TNKS as a whole.**

***Scenario A (areas unseen assigned density 0.45 rhinos per 100 square km)***

	Assumed Density (rhinos per 100 square km)	Total area of Zone in square km	Rhino population in Zone
Zone A (TNKS Bengkulu)	0.45	247	1
Zone B (TNKS Bengkulu)	0.9	382	3
Zone C (TNKS Bengkulu)	3.6	0	0
Remaining (TNKS Bengkulu)	0.45	1811	8

Total for TNKS Bengkulu 13

Extrapolated total for the Taman Nasional Kerinci Seblat 63

**Scenario B (areas unseen assigned density 0.9 rhinos per 100 square km)**

	Assumed Density (rhinos per 100 square km)	Total area of Zone in square km	Rhino population in Zone
Zone A (TNKS Bengkulu)	0.45	247	1
Zone B (TNKS Bengkulu)	0.9	382	3
Zone C (TNKS Bengkulu)	3.6	0	0
Remaining (TNKS Bengkulu)	0.9	1811	16

Total for TNKS Bengkulu 21

Extrapolated total for the Taman Nasional Kerinci Seblat 104

**Scenario C (areas unseen assigned density 3.6 rhinos per 100 square km)**

	Assumed Density (rhinos per 100 square km)	Total area of Zone in square km	Rhino population in Zone
Zone A (TNKS Bengkulu)	0.45	247	1
Zone B (TNKS Bengkulu)	0.9	382	3
Zone C (TNKS Bengkulu)	3.6	0	0
Remaining (TNKS Bengkulu)	3.6	1811	65

Total for TNKS Bengkulu 70

Extrapolated total for the Taman Nasional Kerinci Seblat 347

**Calculation of the rhino population in the TNKS Bengkulu based on an inferred rhino core area of 1250 square km**

	Assumed Density (rhinos per 100 square km)	Total area of Zone in square km	Rhino population in Zone
Peripheral Area TNKS Beng.	0.45	1190	5
Core Area TNKS Bengkulu.	0.9	1250	11

Total for TNKS Bengkulu 17

Extrapolated total for the Taman Nasional Kerinci Seblat 83

## VII. Recommendations to the Sumatran Rhino PHVA Working Group

In summary, the scenarios chosen have produced population sizes for TNKS Bengkulu ranging from 13 to 70 animals. By extrapolation, in the TNKS as a whole, this would give a remaining rhino population of between 63 and 347 animals.

However, it must be borne in mind that the highest number (347) was achieved by assigning a density of 3.6 rhinos per 100 square kilometres to all the regions in the TNKS as yet unsurveyed. This density figure has been obtained from present data on the population in the Upper Mamas of Gunung Leuser National Park. Since this probably represents the highest density of rhino existing in Indonesia, the use of this density figure is clearly unrealistic. The scenario has only been tried in order to show the inappropriateness of previous population estimates for the TNKS.

The most appropriate scenario, based on an inferred rhino core distribution, of density equivalent to that found in the Permanent Study Site, gives a TNKS Bengkulu population of 17 individuals and a total TNKS population of 83 individuals. The second most appropriate scenario, in the opinion of the team, relies on extrapolating the rhino density found within the Permanent Study Site to the entire TNKS. This gives a Bengkulu population of 21 and a total TNKS population of 104 individuals.

**It is suggested that 80 and 100 animals be considered as best estimates for the likely size of the remaining population in the Taman Nasional Kerinci Seblat. However, many areas in the Kerinci Seblat are known to be devoid of rhinos, and it is estimated that this total population size will be downgraded after survey work in 1994.**

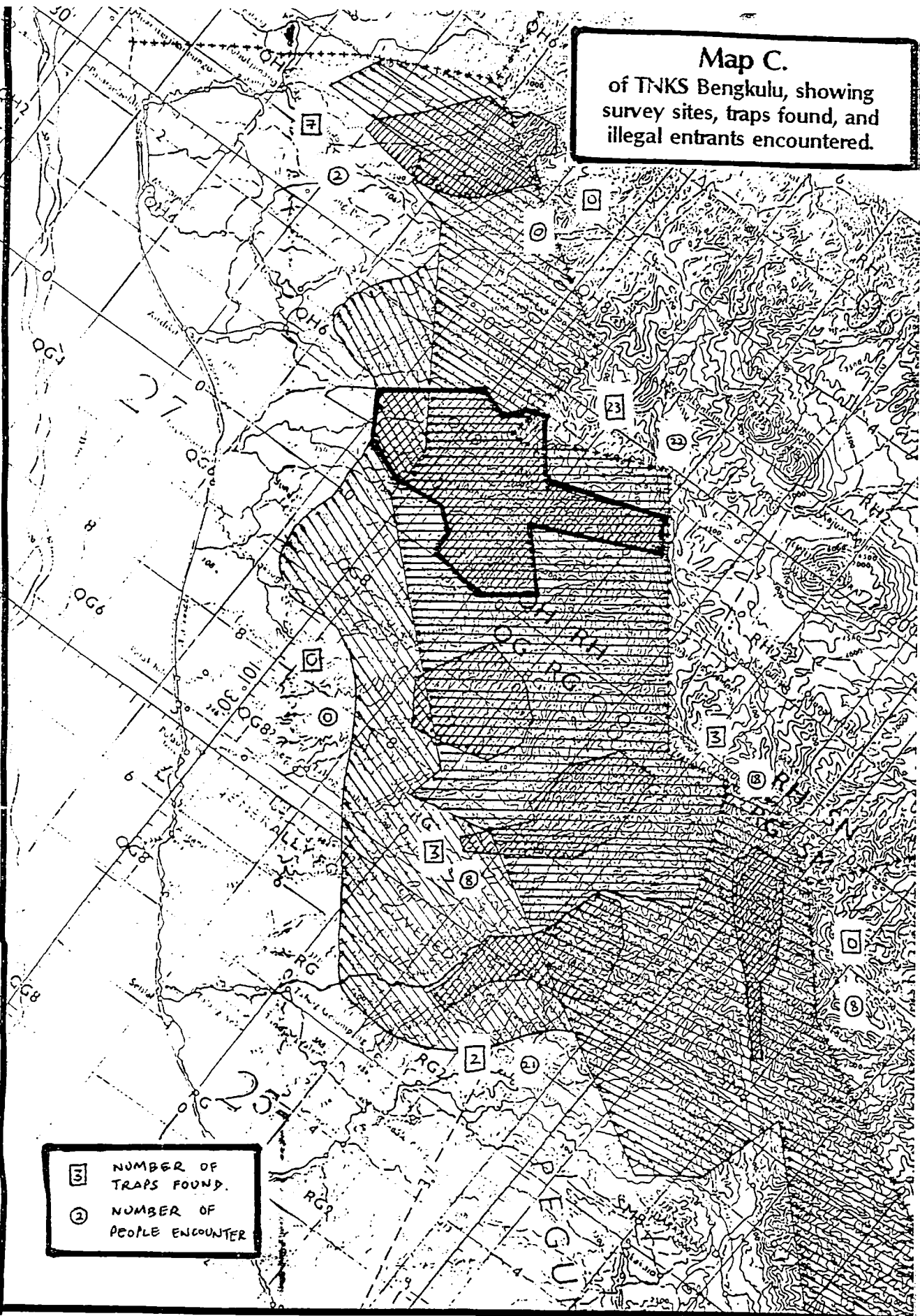
## VIII. Poaching intensity and disturbances in TNKS Bengkulu.

Poaching has already been discussed in relation to the Permanent Study Site, though surveys external to this site have consistently showed a similar pattern and intensity. As expected, absence of traps was only encountered in areas exhibiting no evidence of present, or previous, populations of rhino.

Similarly, all surveys revealed that intrusion of the National Park is a major problem. Camps are found along all rivers, even as far as the very core of the national park. People commonly enter from surrounding villages in order to collect gahru (expensive aromatic wood used in incense manufacture), rattans, wood resins; timber, gold, silver and birds' nests from caves, song-birds themselves, and primates. Hunting is common - sambar, rusa, mouse-deer, Argus pheasant and monitor lizards, amongst many other species, are often taken. Poaching of Sumatran tiger and Sumatran rhino still occurs.

The map overleaf, Map C., shows traps found in other areas of Bengkulu TNKS, as well as showing the numbers of people encountered illegally within the forest during these surveys.

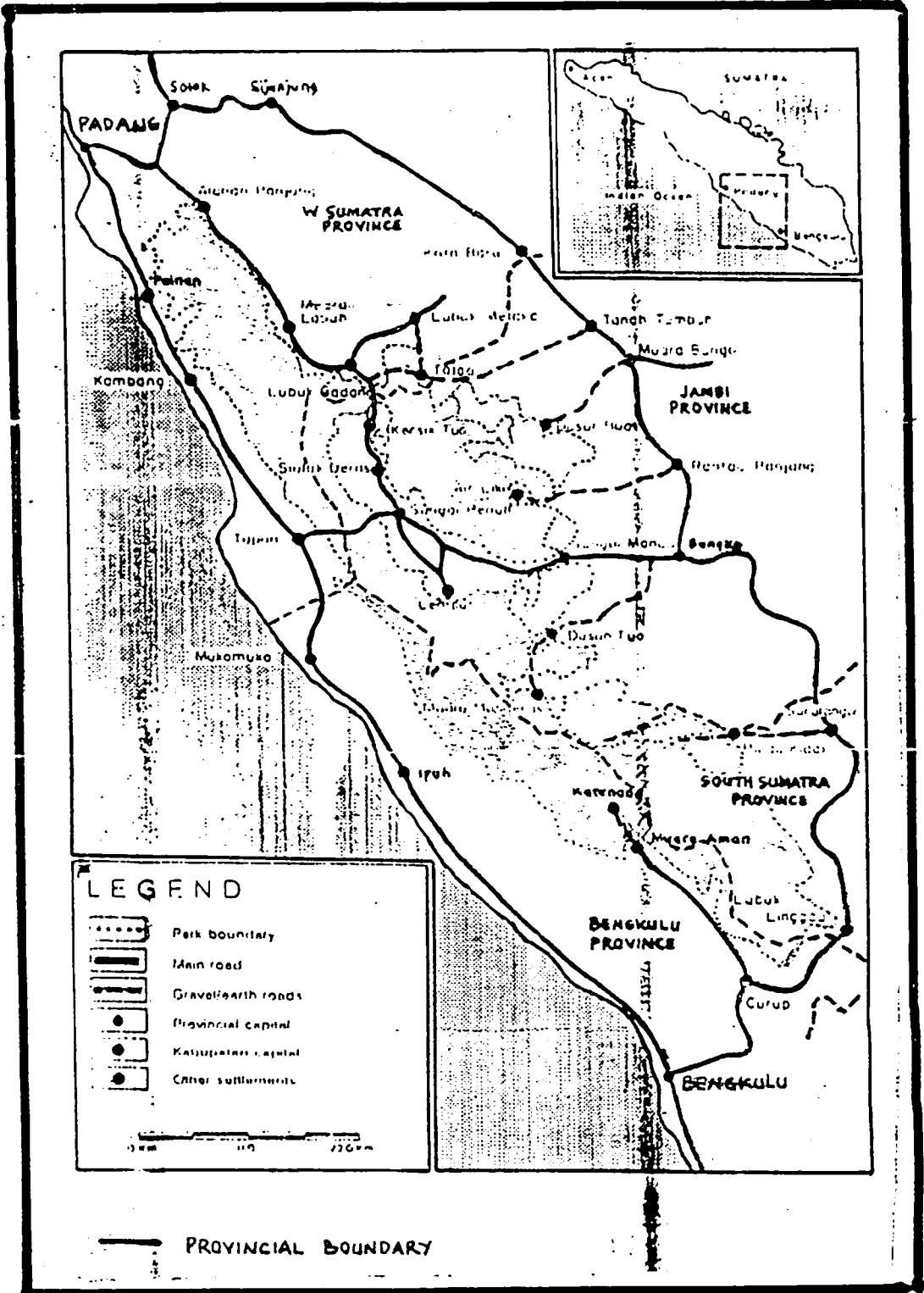
**Map C.**  
of TNKS Bengkulu, showing  
survey sites, traps found, and  
illegal entrants encountered.



③ NUMBER OF TRAPS FOUND.  
② NUMBER OF PEOPLE ENCOUNTERED



**Map D.**  
of Taman Nasional Kerinci Seblat,  
showing province boundaries,  
and major roads/settlements.



BADAK SUMATERA (DICERORHINUS SUMATRENSIS) FISCH. 1814  
DI TAMAN NASIONAL BUKIT BARISAN SELATAN BAGIAN SELATAN

STUDI PENDAHULUAN KONSERVASI BADAK SUMATERA  
1992

Oleh

TIM PENELITI BADAK SUMATERA  
BALAI PENELITIAN UNIVERSITAS LAMPUNG

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## PENDAHULUAN

Badak bercula dua *Dicerorhinus sumatrensis* adalah salah satu dari dua jenis badak yang terdapat di Indonesia. Populasi dan penyebarannya di Sumatera perlu menjadi pokok perhatian karena sebagai satwa langka yang dilindungi, kelestariannya tidak saja terancam oleh pemburu liar tetapi juga karena makin berkurangnya habitat mereka terutama di luar kawasan konservasi. Tanpa tindakan pengelolaan yang tepat dan terencana secara utuh dan berkelanjutan, dikhawatirkan badak sumatera akan mengalami kepunahan.

Akhir-akhir ini daerah penyebaran badak di Sumatera terbatas dalam beberapa kawasan konservasi dan salah satunya adalah Taman Nasional Bukit Barisan Selatan (TN. BBS). Keberadaan badak di TN. BBS ini pernah dilaporkan oleh van Strien (1985) bahwa perkiraan populasinya sekitar 40 - 75 dan daerah jelajahnya mencapai ketinggian 1200 m di atas permukaan laut. Tim Survey TN. BBS (1987) dalam laporannya mengemukakan bahwa terdapat 16 titik lokasi habitat badak yang umumnya menempati daerah-daerah aliran sungai, dan Tim Survey TN. BBS (1980) melaporkan bahwa di daerah aliran sungai Way Blambangan dan Way Sleman diperkirakan terdapat antara 13-18 ekor badak dan daerah ini merupakan Kawasan bagian Selatan TN. BBS.

Atas kerjasama Kementerian Kependudukan dan Lingkungan Hidup dan Departemen Kehutanan yang disponsori Bank International Indonesia, Universitas Lampung membentuk Tim Peneliti Badak Sumatera yang telah melakukan Studi Pendahuluan Konservasi Badak di Kawasan bagian Selatan TN. BBS. pada tahun 1992. Kegiatan ini mungkin perlu untuk dilanjutkan karena Universitas Lampung (Unila) memiliki Program Studi Biologi dan merupakan Perguruan Tinggi di Propinsi dengan dua Taman Nasional yang terdapat badak sumatera.

Dalam rangka penyelamatan badak sumatera, kawasan TN.BBS bagian Selatan ini memiliki potensi untuk dikembangkan menjadi salah satu stasiun penelitian badak di Sumatera baik ditinjau dari faktor geografis maupun faktor ekologisnya yang berada pada semenanjung dengan kondisi ekosistem yang beragam.

#### KONDISI HABITAT.

Habitat badak di TN. BBS bagian Selatan pada umumnya berupa daerah-daerah aliran sungai. Tiga daerah aliran sungai yang terdapat di sana yaitu ; Way Blambangan, Way Kejadian dan Way Sleman. Tipe vegetasi pada kawasan ini terdiri dari hutan primer dan hutan sekunder, belukar, padang alang-alang dan juga terdapat rawa dan danau terutama bagian Selatan yang berbatasan dengan laut.

Bukti keberadaan badak yang ditemukan yaitu berupa kotoran, jejak, goresan cula pada pohon dan sisa tumbuhan yang dimakannya dan umumnya pada kawasan yang masih berupa hutan, baik hutan sekunder maupun hutan primer. Di belukar juga ditemukan lorong-lorong jelajah yang digunakan badak sebagai jalur lintasannya. Pada kawasan ini banyak terdapat sumber-sumber air berupa anak sungai yang juga digunakan sebagai tempat berkubang.

Hasil analisis vegetasi tumbuhan di habitat badak yang dilakukan oleh Tim Peneliti Badak Sumatera Universitas Lampung (1992), diketahui bahwa pohon Cengkuang (*Dracontomelon mangiferum*) mendominasi vegetasi tingkat pohon, pohon Simpur (*Dillenia excelsa*) mendominasi vegetasi tingkat sapling dan Tepus (*Zingiber sp.*) mendominasi vegetasi dasar.

Berkaitan dengan kondisi sosial ekonomi penduduk yang umumnya menempati pantai Timur serta dua enclave (Pengekahan dan Way Haru) di pantai adalah petani dan nelayan. Jalur penghubung antar

pemukiman tersebut adalah melalui laut atau berjalan kaki mengikuti jalur pantai dan tidak terdapat sarana transportasi darat.

### ASPEK-ASPEK KONSERVASI

Dari hasil analisis vegetasi yang telah dilakukan Tim PBS Universitas Lampung (1992), diduga bahwa proses suksesi yang terjadi cenderung tidak menguntungkan bagi kelangsungan hidup badak jika dikaitkan dengan ketersediaan sumber pakan karena invasi tumbuhan Tepus (*Zingiber sp.*) dikhawatirkan akan berkembang membentuk vegetasi tersendiri. Selain itu, juga terdapat sejenis tumbuhan menjalar (*Ipomea sp.*) yang berkembang merubah struktur vegetasi dengan cara mengalahkan vegetasi hutan yang berada di sekitarnya. Banyak hal-hal penting tentang vegetasi habitat badak di lokasi ini yang perlu diteliti lebih lanjut terutama mengenai kecenderungan arah suksesi dan ketersediaan jenis-jenis tumbuhan yang merupakan sumber pakan bagi kelangsungan hidup badak.

Badak, Gajah dan Tapir sebagai sesama hewan herbivora diduga menggunakan homerange yang sama karena jejak Tapir dan Gajah selalu dijumpai di lokasi ditemukannya jejak badak, tetapi tidak demikian sebaliknya. Hal ini mungkin dapat menggambarkan keterbatasan kondisi vegetasi yang disukai badak atau perbedaan populasi yang nyata dari ketiga jenis hewan tersebut. Keadaan ini perlu menjadi bahan penelitian karena adanya kemungkinan lain tentang kompetisi yang mungkin saja sebagai salah satu faktor yang bersifat menekan perkembangan populasi badak di kawasan ini.

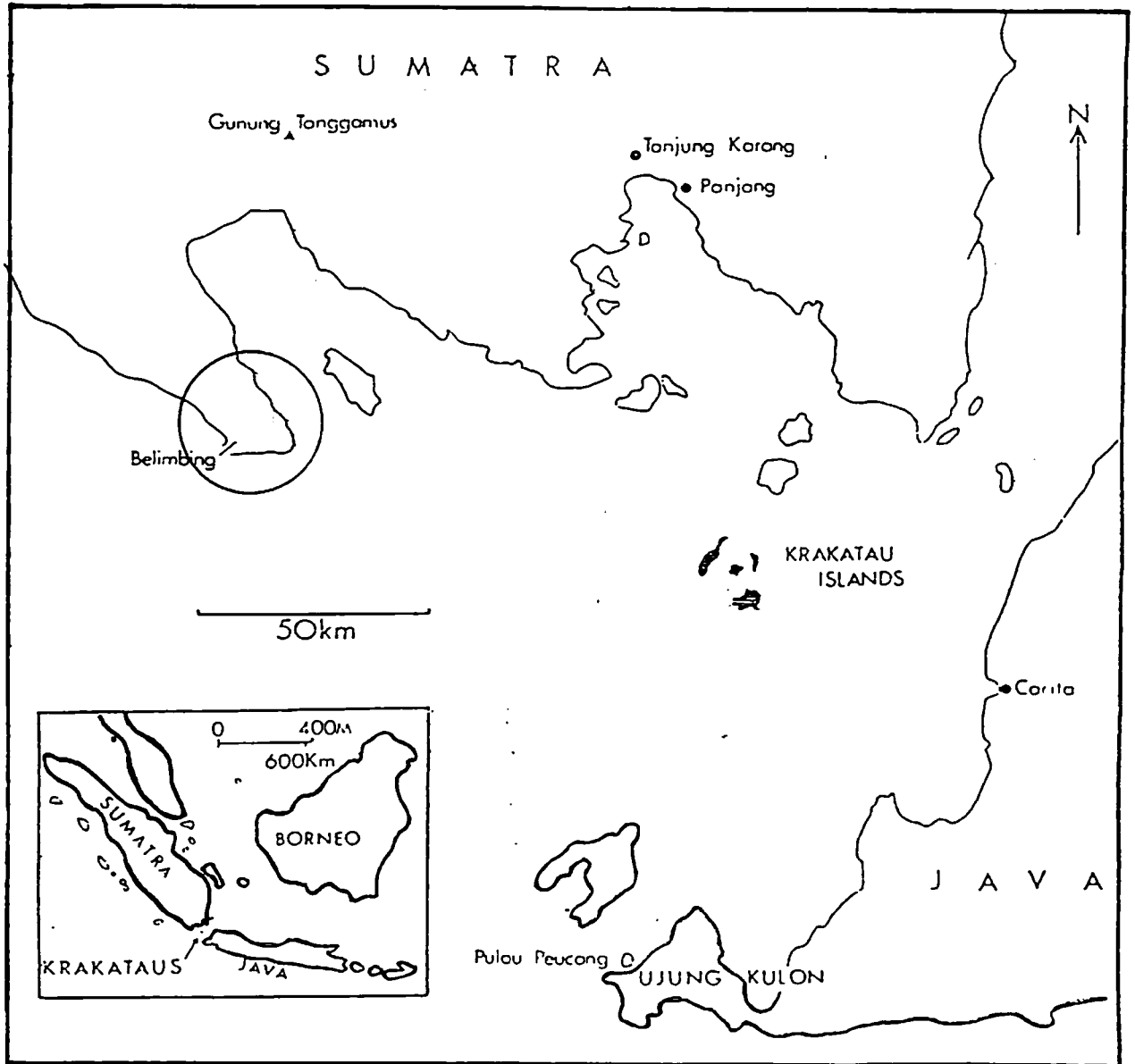
Berdasarkan dari pengamatan secara langsung maupun secara tidak langsung, di TN. BBS bagian Selatan ini juga terdapat berbagai jenis mammalia besar lainnya seperti anjing hutan, kerbau liar, beruang, harimau maupun hewan-hewan Primata. Di Danau yang terdapat

berbatasan dengan laut di bagian Selatan menurut informasi masyarakat, masih terdapat buaya dan berbagai jenis burung air. Jalur pantai yang memanjang di bagian Selatan juga merupakan lokasi bertelur beberapa jenis penyu. Keragaman jenis yang terdapat di kawasan ini yang didukung dengan bermacam tipe vegetasi mungkin tidak hanya merupakan objek yang menarik untuk diteliti terutama dengan tujuan untuk mempertahankan ataupun meningkatkan populasi jenis yang ada tetapi juga memiliki potensi yang bisa dikembangkan menjadi objek wisata alam.

#### REKOMENDASI

Dalam rangka penyelamatan kelangsungan hidup Badak Sumatera secara khusus dan penyelamatan ekosistem TN. BBS secara keseluruhan perlu dilakukan berbagai kegiatan yaitu ;

- Membangun stasiun penelitian Badak Sumatera dengan kegiatan penelitian yang berkesinambungan dalam upaya meningkatkan populasinya dan menurunkan resiko kepunahan akibat dari perburuan liar maupun perubahan kualitas habitat akibat proses suksesi.
- Membina kerja sama antar pengelola Taman Nasional dengan berbagai instansi maupun dengan badan-badan penelitian dan lembaga lainnya baik yang dapat berperan secara aktif maupun yang bersifat mendukung secara finansial.
- Perlu dirancang sejak dari awal agar upaya penyelamatan Badak di TN. BBS pada masa yang akan datang dapat dilakukan secara mandiri yaitu dengan merintis pengembangan wisata alam dan berbagai kegiatan yang juga menguntungkan bagi masyarakat sekitarnya tanpa merubah tujuan untuk konservasi.



Posisi Geografis Taman Nasional Barisan Selatan

# PETA LOKASI

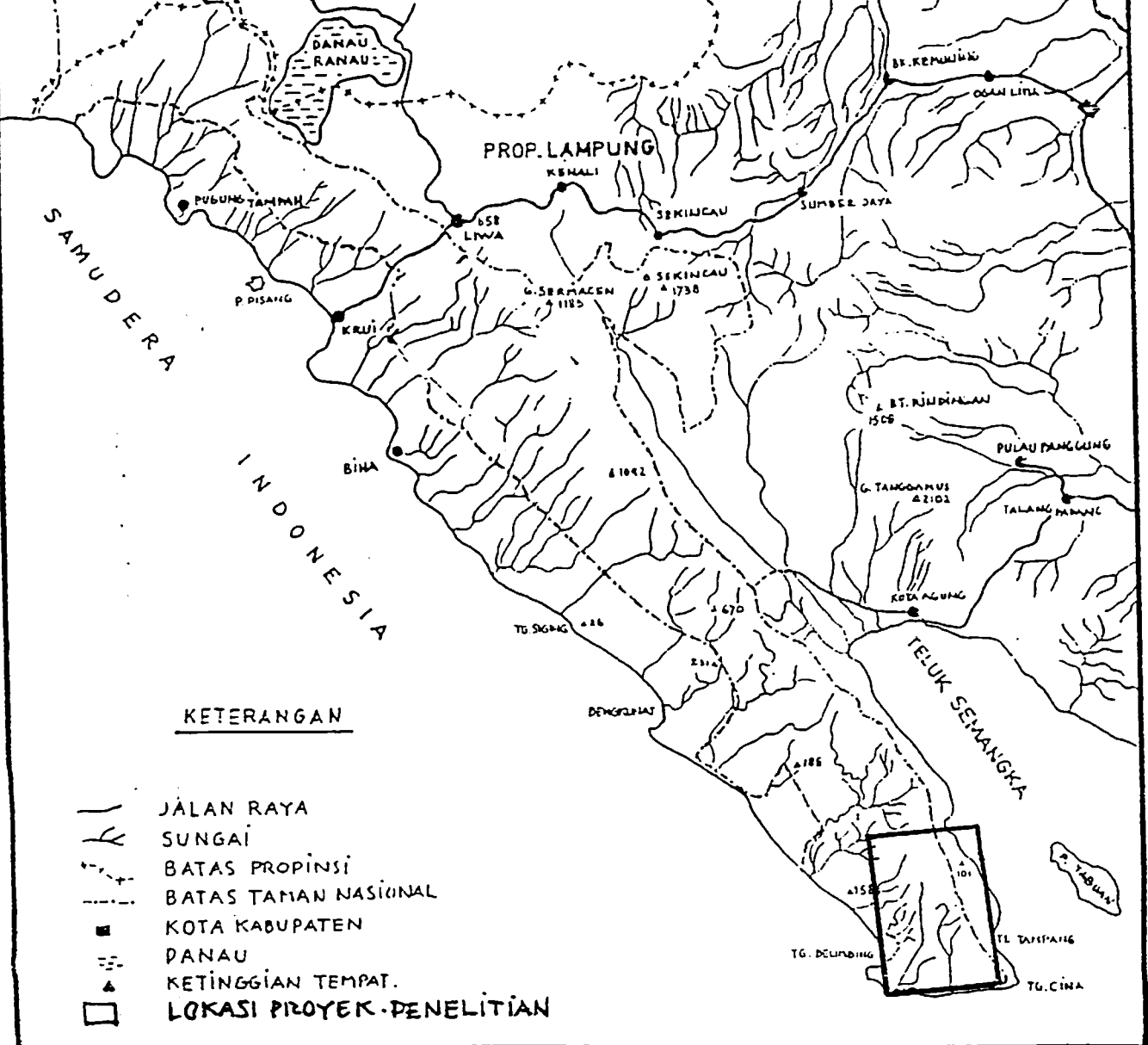
## TAMAN NASIONAL BUKIT BARISAN SELATAN

0 25 Km.



PROP. BENGKULU

PROP. SUMATERA SELATAN



### KETERANGAN

- JALAN RAYA
- SUNGAI
- BATAS PROPINSI
- BATAS TAMAN NASIONAL
- KOTA KABUPATEN
- DANAU
- KETINGGIAN TEMPAT.
- LOKASI PROYEK PENELITIAN





**Observations of Sumatran Rhinos  
in Way Kambas National Park**

**July 1993 - December 1993**

**Submitted by**

**Colin McHenry  
Southampton University, UK**

**Joanne Reilly  
Trinity College, IRELAND**

**Guy Hills Spedding  
Southampton University, UK**

**Kate Wilson  
University of Oxford, UK**

Evidence of Sumatran rhino has been found in the following general areas of the Way Kambas National Park, Lampung Tengah. This has included trackways, dung piles and vegetation damage, and a single direct sighting by one of the park guards in 1991.

#### **1. Way Kanan River.**

Sighting of rhino on north bank in 1991. Cast of track from animal was subsequently taken and formally identified by Dr Nico van Strien in July 1993 as belonging to a Sumatran rhino.

**2. West Kalibiru/Camp D.** On an old logging track from the area known as Camp D to a swamp grassland, Kalibiru, three dung piles were found in September 1993 by Guy Hills Spedding and Apriawan. Two were estimated to be one month old and the third approximately three months old. Two piles overlapped and the third was positioned approximately five metres away. In November 1993 a further pile of dung was found by Colin McHenry on the same path, approximately a kilometre away from the original three piles. This was estimated to be about a week old.

**3. Kalibatin.** A trackway was found in this area, along a dry stream bed, by a park patrol on 20th September 1993. The tracks led for a distance of about 30m. The personnel on this patrol included Pak Mukhlissan, head of the Way Kanan resort, and Apriawan.

During subsequent days, a further three trackways were found nearby, all in soft mud. One of these was located on the bank of the Way Negara Batin river and comprised about twenty prints. The second, in a dry stream bed, consisted of about ten prints. The final impression, also along a dry stream bed, comprised a single print.

Scrapings and urination sites were also found in the surrounding area.

**4. East Kalibiru.** On 19th September 1993, in an area of lowland dry rainforest with some swamp forest, vegetation was found which showed signs of rhino browse. Persons present were GHS, Bagus (Indonesian counterpart) and CMcH.

On 22nd September 1993, dung was found on an old logging trail leading from the Way Kambas river to the Way Wako river. A track was also found in a dry forest pond adjacent to this trail. This consisted of six prints. Persons present: GHS, CMcH.

**5. South Wako.** On 21st September 1993, on a logging trail from the Way Kambas river to the Way Wako river, approximately twenty dung piles were discovered. This was distributed over a distance of approximately 4km long. One of the dung piles had been deposited that morning, and still had a strong odour. Another had intact boli which included a bolus of 14cm diameter.

Fresh urine was found in the same location as the fresh dung. This had been sprayed on vegetation at a height of approximately 2m high.

Scratches from rhino horn were observed on more than ten trees/saplings in the same general area.

Mud was also found on five trees/saplings from rhino rubbing.

More than five saplings were found to be twisted, in a style characteristic of rhino activity. One had occurred very recently and assumed to be the same day. One sapling had been twisted twice. The diameter of one of these twisted saplings was 6cm.

A large number of scrapings were also found in this area.

Some of this evidence was recorded on video. Personnel present on this trip were: GHS, CMcH and Pak Mukhlissan.

**6. Camp C.** On 30th September twisted saplings and vegetation which showed signs of rhino browse were found in the area known as Camp C, in young secondary rainforest. Persons present: JER, GHS and Pak Mukhlissan.

**7. Rawa Pasir.** The most recent evidence, located on 1 November 1993, was a single dung pile, found in an area of swamp forest. This was believed to be a number of weeks old. Personnel present were: GHS and CMH.

Casts made of rhino prints have now been formally identified as belonging to Sumatran rhino, possibly a subadult. Including the 1991 evidence, the track data collected so far indicates that there are definitely two rhino in the park, probably three, and perhaps as many as five.