



**PROCEEDINGS**  
**OF THE WORKSHOP ON THE**  
**INDONESIAN RHINO CONSERVATION**

**Cisarua Bogor, Indonesia**  
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**Bogor, October 1991**

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## OPENING ADDRESS

BY

IR. SUTISNA WARTAPUTRA  
AT THE RHINO MEETING  
(3-5 OCTOBER 1991)

Distinguished Guests, Ladies and Gentlemen,

It gives me great pleasure to welcome you all to this important meeting convened to discuss the strategies that would help enhance the long-term survival prospects in the wild of two of the world's most endangered species of large mammals, the Javan and Sumatran rhinos in Indonesia

The evolutionary history of the rhinoceros dates back to 50 million years ago. Rhinoceroses were at one time, the dominant large land mammals in all the northern continents and in Africa. In the prehistoric times, there were over 65 genera of rhinos that occupied diverse ecological niches. To day however, only five species remain : three in Africa and two in Asia. All five species are threatened by habitat loss and poaching for their valuable horns. Conservation of the remaining rhino population has become a matter of international concern and a global responsibility. Here in Indonesia, we are fortunate to have two species of rhino : the Javan rhino confined to the Ujung Kulon National Park in West Java, and the Sumatran rhino which formerly ranged throughout Sumatra and Kalimantan but is now confined to a few discontinuous populations in Sumatra and perhaps East Kalimantan. The conservation of these species of large mammals is

one of our prime concerns. We in Indonesia are committed to do our very best and take all appropriate measures to protect these two species in their natural habitats.

Every country in the world has three forms of wealth : material, cultural and biological. The first two are the basis of almost all our economic and political life. The third composed of fauna and flora and the uses put to natural diversity, is far more potent for long term human welfare. The Government of Indonesia in recognition of the importance of biological asset, has made a longstanding commitment to protect the nation's biodiversity. Already we have more than 400 conservation areas covering 52,000 km<sup>2</sup> of forest land. 24 of these areas are national parks and four of these protect populations of rhinos. Although there is a small population of Javan rhino in Vietnam, yet the only viable and secure wild population of Javan rhinos is to be found here in Indonesia in the 300 Km<sup>2</sup> Ujung Kulon National Park. In Sumatra, three major national parks covering more than 25,000 km<sup>2</sup> of forest protect not only the Sumatran rhinos but vital watersheds as well as thousands of other animal and plant species, many of them are rare or endangered. The Indonesian Government has already allocated considerable financial and manpower resources to protect Sumatran rhinos in Gunung Leuser, Kerinci-Seblat, and Barisan Selatan National Parks. This reflects our commitment to the primary objective of conserving rhinos in-situ in their natural ecosystems.

These national parks become increasingly important for our conservation efforts as forest clearance continues and more natural habitat is lost. They are "islands" of

biodiversity set amidst an expanding agricultural landscape dominated by man. Outside the parks, the Conservation Department of PHPA in cooperation with the British and American zoos has established a programme to capture the "doomed" Sumatran rhinos in fragmented forest blocks. The animals captured so far have gone to captive breeding programmes. In future some of these rhinos will be translocated to remaining large areas of natural habitat and to semi-wild breeding facilities. Surveys will also be carried out to determine the possibility of establishing new sanctuaries for reintroduction of translocated and captive-bred animals.

In the case of the Javan rhino, we have concentrated on in-situ conservation in Ujung Kulon National Park. In the 1960s, the population had sunk to an all-time low of 25 animals. PHPA with assistance from WWF (World Wide Fund for Nature) concentrated on improving the protection and management of the park. This policy has indeed paid off. By 1980 the population of Javan rhinos had more than doubled to over 50 animals. Sadly, in 1981 five rhinos were found dead in the park, victims of an unknown disease. Today between 55 to 60 animals are known to survive with several new born calves. Concern has been expressed that the population may now be at carrying capacity within the peninsula. This is one of the issues that must be addressed at this meeting. We must determine whether the population is indeed at carrying capacity. And if it is, what are the most appropriate management activities to help the rhino population continue to expand. This will require a programme of systematic research and monitoring. This population of Javan

rhino is so precious that we cannot afford to take any unacceptable risks.

The Government of Indonesia is serious in its determination to protect the Javan and Sumatran rhinos. Already these species are protected by law. Killing a rhino is a criminal offence punishable by a heavy fine and a long prison sentence. Poaching is still one of the most serious threats faced by the rhinos. The recent poaching of some Sumatran rhinos in Kerinci - Seblat National Park only serves to highlight the continuing need to improve protection of the parks. This will require increased manpower, funding, equipment and training as well as extension programmes to convince local people of the need to conserve our natural resources. Indonesia alone cannot bear this burden. We need the help and support of International Organizations as well.

I am happy to report that within Indonesia, ordinary people and private organizations are already taking an increased interest in the PHPA's on going conservation efforts. The Indonesia Rhino Foundation (Yayasan Mitra Rhino Indonesia) was founded in 1990 and has already raised substantial funds for rhino conservation. Bank Indonesia International has generously donated funds for rhino conservation from credit cards depicting the Javan rhino. Some of the overseas conservation organizations present here today, in particular the WWF International and the Minnesota Zoo have already contributed toward rhino conservation efforts in Indonesia and we look forward to further collaboration.



Today there may be no more than 60 Javan rhinos and perhaps 400 Sumatran rhinos in Indonesia. But we are confident that with improved protection and management of the reserve system, we can look forward to a more secure future for the rhinos in Indonesian forests. We will manage these two species of rhinos both as national treasures and as global rarities. For Indonesia this is both an honour and a responsibility and we are determined to succeed in our conservation efforts.

As many of you will have already noticed, the Javan rhino has been chosen as the mascot of Visit Indonesia Year 1991. In the spirit of hospitality and the name of Javan rhino, we extend to you all a warm welcome to our archipelago. May this meeting and your visit be memorable, productive and above all enjoyable.

With the blessing of Allah the Great, I open this meeting officially.

## INTRODUCTION

by  
George Rabb

I am George Rabb, Chairman of the Species Survival Commission of IUCN - The World Conservation Union.

On behalf of IUCN and its partner organizations, it is an honor to respond to the call that Director General Sutisna has made for the Conservation of Rhino in Indonesia.

I would also like to acknowledge the considerable effort that WWF has made in helping PHPA arrange this workshop.

Mohd. Khan, who opened the session, is chairman of the Asian Rhino Specialist group of the Species Survival Commission (SSC). This is one of almost 100 SSC Specialist Groups working for conservation of wildlife. There are now 3500 experts and field unless from 155 countries in this volunteer network. Several of the groups are represented here, bringing their talent and experience to the problems in rhino conservation. These groups include the Reintroductions Specialist Group (Mark Stanley - Price, Chairman, is here), the Captive Breeding Specialist Group (Chairman Ulysses Seal could not be here because of his wife's illness, but Executive Officer Thomas Foose and others are here), African Rhino, Primates, Bears, and Storks Groups among others.

In order to make this workshop as productive as possible, Simon Stuart, Head of the Species Survival Program at IUCN, has worked with several of you to refine the agenda and its objectives, and I will turn the session over to him. From SSC/IUCN, thanks again for the opportunity to help the rhinos and the conservation programs of Indonesia.

## OBJECTIVES AND OVERVIEW OF MEETING

BY

SIMON N. STUART

1. Because the meeting is so much larger than was expected, it is necessary to change the agenda somewhat. All the talks scheduled for day 2 will be moved to day 1, thereby allowing working groups for both Javan and Sumatran Rhinos to run concurrently on day 2. The revised agenda will be circulated during the coffee break.
2. The suggested objectives of the meeting are as follows :
  - a. To develop an overall strategy for the Javan and Sumatran Rhinos in Indonesia, based on a review of the draft Indonesian rhino conservation plan, and the agreed results of the different working groups.
  - b. To suggest an implementation plan for the strategy, based on agreed priorities.
  - c. To develop a plan for the marketing and promotion of the strategy.
  - d. To propose a mechanism whereby the implementation of the strategy, may be evaluated and reviewed
3. It is emphasised that the results of the meeting should be recommendations to the PHFA, Government of Indonesia, who will then make their own decisions on policy and implementation.
4. The Points of Agreement from the June 1989 meeting were briefly reviewed. All these Points of Agreement were accepted by the October 1991 meeting, except paragraphs no 7, 8, 9, 13, 15, 19, and 20, and also 12 which is out of date. These controversial paragraphs will be debated in depth by the working groups. The non-controversial paragraphs will also be looked at by working groups with a view to details for implementation.
5. All participants were asked to listen to each other carefully with a view to develop real dialogue, and resolution of difficult issues.

## REVIEW OF THE ASIAN RHINO SPECIALIST GROUP ACTION PLAN FOR INDONESIA

by

Moch. Khan Bin Momin Khan

The foundation for this Action Plan was laid by Professor Rudolf Schenkel and his wife Lotte at the Bangkok meeting of the IUCN-SCC Asian Rhino Specialist Group Meeting in 1979.

### THE LESSER ONE HORNED OR JAVAN RHINO

The Javan Rhino occurred through most of South East Asia but has disappeared from almost all of its former range Assam, Burma, Thailand, Malaysia and Sumatra and is currently restricted to Java with scattered populations in Indochina.

The cause of decline is mainly attributable to the excessive demand for rhino horn.

The animals in Jawa are restricted to Ujung Kulon National Park, where as a result of strict protection the population has increased from about 25 animals in 1967 to about 55 today.

The Javan Rhino is the rarest large mammal in the world. Poaching is one of the serious threats to its survival. The species has been accorded protection since 1931. The Ujung Kulon National Park was established in West Java and it is managed by the local wildlife directorate which comes under the Ministry of Forestry.

#### Objectives :

- to preserve animal populations in the wild.
- to locate and/or establish other populations in the wild.
- to develop a captive propagation programme.
- to continue efforts to close down trade.

#### General recommendations :

- conduct intensive survey in Ujung Kulon.
- determine the resources available and those are additionally required to provide adequate protection.

#### Specific recommendations for Indonesia :

- strong anti-poaching measures
- training of staff
- public education
- initiation of appropriate forms of development in a buffer-zone outside the park to derive tangible economic benefits from the park.

- develop captive propagation programme
- formulate guidelines and perhaps conduct search for a site in which to establish a second wild population
- enforce strict measures to prohibit the use of Javan Rhino product.

#### THE ASIAN TWO-HORNED OR SUMATRAN RHINO

The Sumatran Rhinoceros is a species of rainforest in hilly and mountainous areas. It is more widely scattered, often in tiny inviable population. It is not as critically threatened as the Javan Rhino but probably experiencing the most serious level of poaching and habitat destruction.

Indonesia has 420 - 785 animals with possibility of additional animals in Kalimantan. A number of reserves, notably Gn. Leuser, Kerinci Seblat, and Bukit Barisan Selatan have been set aside to conserve wildlife including the Sumatran Rhino. Captive breeding is underway.

#### Objectives :

- Develop populations of at least 700 - 1000 rhinos in each of the major regions of its range : Sumatra, Borneo.
- To preserve, manage and where appropriate expand populations with potential to increase to 100 or more animals.
- To determine if the populations in each major part of its range constitute valid subspecies.
- To locate or establish additional viable populations, especially Kalimantan.
- To develop a captive population of 150 rhinos distributed in zoos world wide : South East Asia, North America, Europe.
- To continue efforts to close down trade.

#### General Recommendations :

Concentrate initial in-situ conservation efforts on the three populations :

	<u>Exist</u>	<u>Potential</u>
Gunung Leuser	130 - 200	140 - 800
Kerinci Seblat	250 - 500	500 - 1000
Bukit Barisan Selatan	25 - 60	70 - 360

- Calculate resources currently available and additionally required to provide protection for these populations.
- Ensure legal protection of viable populations.
- Organize surveys (Kalimantan highest priority).
- Continue to capture "doomed" animals to provide founders for captive populations.
- Manage captive animals as part of the overall conservation programme.
- Improve the effectiveness of law enforcement throughout the species range.

Specific Recommendations :

To ensure survival of viable populations, better protection is needed in Kerinci Seblat, Gunung Leuser and Bukit Barisan Selatan National Parks. Such protection should include :

- anti-poaching efforts.
- creation of appropriate forms of sustainable development in buffer zones around these parks to enable people to derive economic benefits from the protected areas.
- a public education programme.
- a training programme for all levels of staff.
- formal gazettement of Kerinci Seblat National Park
- monitoring of rhino populations.
- capture and translocation.
- research to determine number.
- to bring under control trade in rhino horn.

Captive breeding of the Sumatran Rhino has been actively carried out. There are 14 animals in captivity (5.9). In-situ conservation has not been equally active on with a lot of money spent by the Indonesian Government on in-situ conservation work.

Elsewhere in the briefing book is a proposal on the Global Heritage Species Program for the Sumatran Rhino. Dollars \$ 3,872,550 are being sought for this program to develop or create a Protection-Management Unit. Guard posts are proposed for protected areas as follows :

Protected Areas	Guard Posts
Gunung Leuser	12
Kerinci Seblat	17
Bukit Barisan Selatan	6
Kayan Mentarang	to be finalized
Ujung Kulon	to be finalized

Multi Purpose mobile units will be created to carry out surveys, enforcement, protection, capture/rescue, translocation, re-introduction, rehabilitation, education / extension.

DESCRIPTION OF NEW INDONESIAN RHINO FOUNDATION

by

Sutisna Wartaputra, Effendy A. Sumardja



INDONESIAN RHINO CONSERVATION PLAN

by

Abdul Bari, Effendy A. Sumardja, Sukianto Lusli

CURRENT PROGRESS

RESEARCH AND SURVEY

Sumatran Rhino

Sumatra:	Last Report/Survey
Gunung Leuser N.P.	van Strien/1985
Kerinci Seblat N.P.	Haryanto & Rufendi PHPA-WWF/1991
Barisan Selatan N.P.	FAO/UNDP/1980

Kalimantan:

Kayan Mentarang	?
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Javan Rhino

Ujung Kulon N.P.	Griffiths-WWF/1991
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Other Areas:

Way Kambas N.P.	?
Berbak Game Reserve	?

## CURRENT PROGRESS

## SUPPORT AND PROJECT TO CONSERVATION AREAS

Related to Rhino ConservationSumatran Rhino

National Park	Agency	GOI Annual Budget (USD)	Size SqKm.
Gunung Leuser	None	135,000	9,600
Kerinci Seblat	WWF	700,000	14,400
Barisan Selatan	None	95,000	3,600

## Kalimantan:

Kayan Mentarang	WWF	?	16,000
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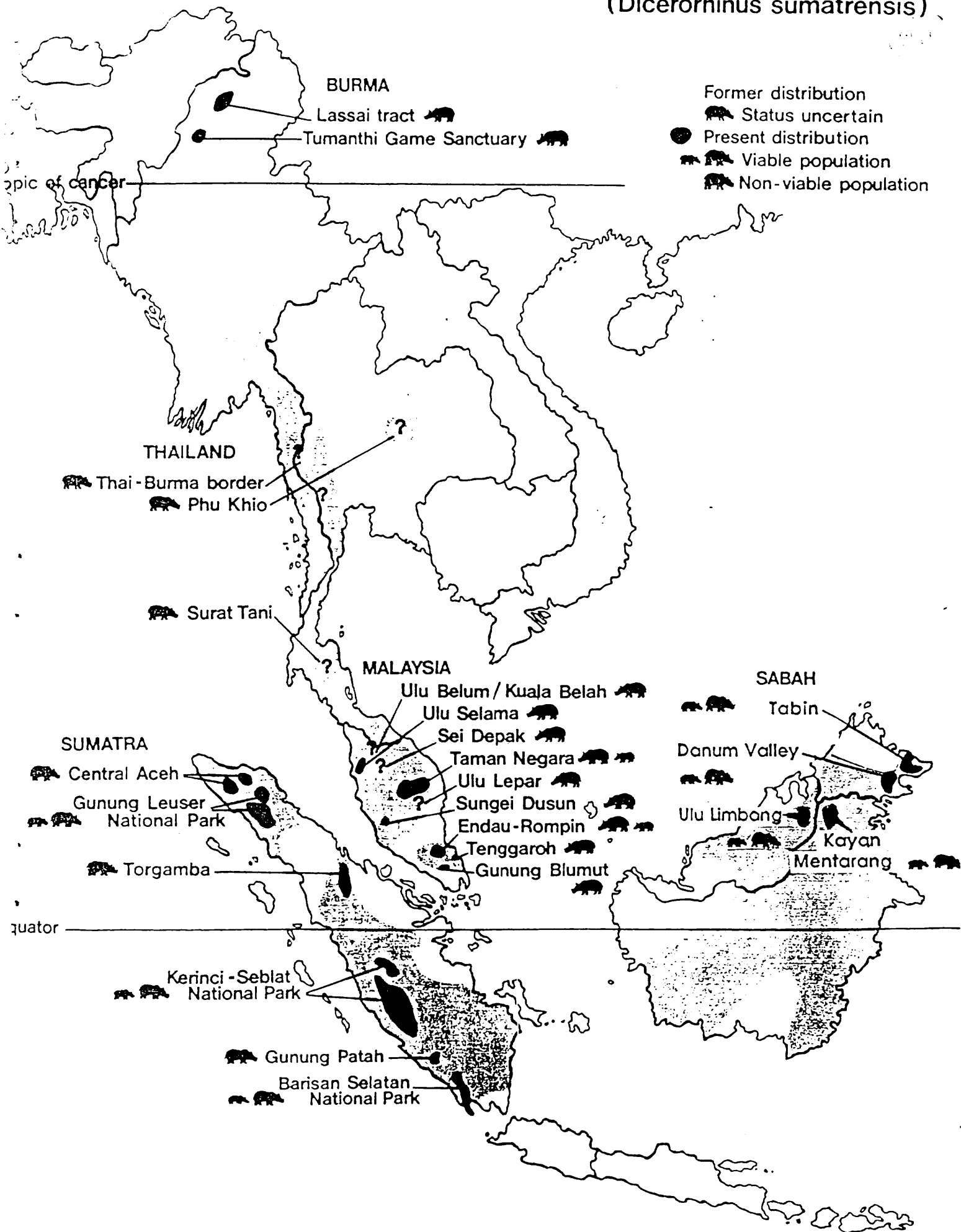
Javan Rhino

Ujung Kulon [area of 720 SqKm] (GOI annual approx. USD 140,000)	Gov't of New Zealand WWF for Nature Minnesota Zoo Indonesian Rhino Foundation Bank International Indonesia
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## Other Areas:

Way Kambas N.P.	None
Berbak Game Reserve	None

# DISTRIBUTION OF THE SUMATRAN RHINOCEROS (*Dicerorhinus sumatrensis*)



A C T I O N S :

Javan Rhino

In-situ Conservation

1. Maximum Protection of Javan rhino population in Ujung Kulon N.P.
2. Law Enforcement, Anti Poaching - Rhino Mobile Unit
3. Extention - Conservation Education and Awareness Programme
4. Population Survey and Trend of Javan Rhino in Ujung Kulon National Park.
5. Research on Biology and Ecology of Javan Rhino in Ujung Kulon.
6. Protect and Re-establish Mt. Horje as Javan Rhino Habitat Extention.
7. Resources and Support Consolidation to Develop Better and Longterm Management of Ujung Kulon National Park.

Ex-situ Conservation

1. Develop Capture Management Plan for Javan Rhino Translocation Schemes.
2. Feasibility Study on Suitability of Habitat at Re-introduction area/site.
3. Feasibility Study on location of Semi-wild Captive Breeding Scheme.

A C T I O N S :Sumatran Rhino

## In-situ Conservation

1. Protection of large population of wild rhino in Natural Habitat
2. Law Enforcement, Anti Poaching - Rhino Mobile Unit
3. Extention - Conservation Education and Awareness Programme
4. Population Survey and Research of Sumatran Rhino in 3 National Park: Gunung Leuser, Kerinci Seblat and Barisan Selatan.
5. Rescue of 'Doomed' Sumatran Rhino, Capture Protocol.
6. Translocation of 'Doomed' Sumatran Rhino into Protected Area.

## Ex-situ Conservation

1. Management Plan for Captive Breeding Scheme in the Participating Zoo.
2. Research and Study on Social and Breeding Behaviour, Reproduction Biolgy.
3. Training and Tranfer of Technologies and Expert Skill.
4. Evaluation of Current Captive Breeding Schemes
5. Develop Sumatran Rhino Sem-Wild Breeding Center, if Possible Close National Park.

## PRESENT STATUS

DISTRIBUTION:Sumatran Rhino

## Sumatra:

Gunung Leuser N.P.  
Kerinci Seblat N.P.  
Barisan Selatan N.P.

## Kalimantan:

Kayan Mentarang ?

Javan Rhino

Ujung Kulon N.P.

## Unconfirm data:

Way Kambas N.P.  
Berbak Game Reserve

## THE STRATEGY

TO ENSURE THE LONGTERM SURVIVAL OF  
INDONESIAN RHINO IN THE WILD.

### G O A L S:

1. PROTECT A LARGE WILD POPULATION
2. RE-ESTABLISH INDONESIAN RHINO WITHIN ITS PREVIOUS RANGE

### PRIORITIES and OBJECTIVES

Refer to ASIAN RHINO ACTION PLAN of IUCN/SSC ARSG, 1989.

#### Short-term:

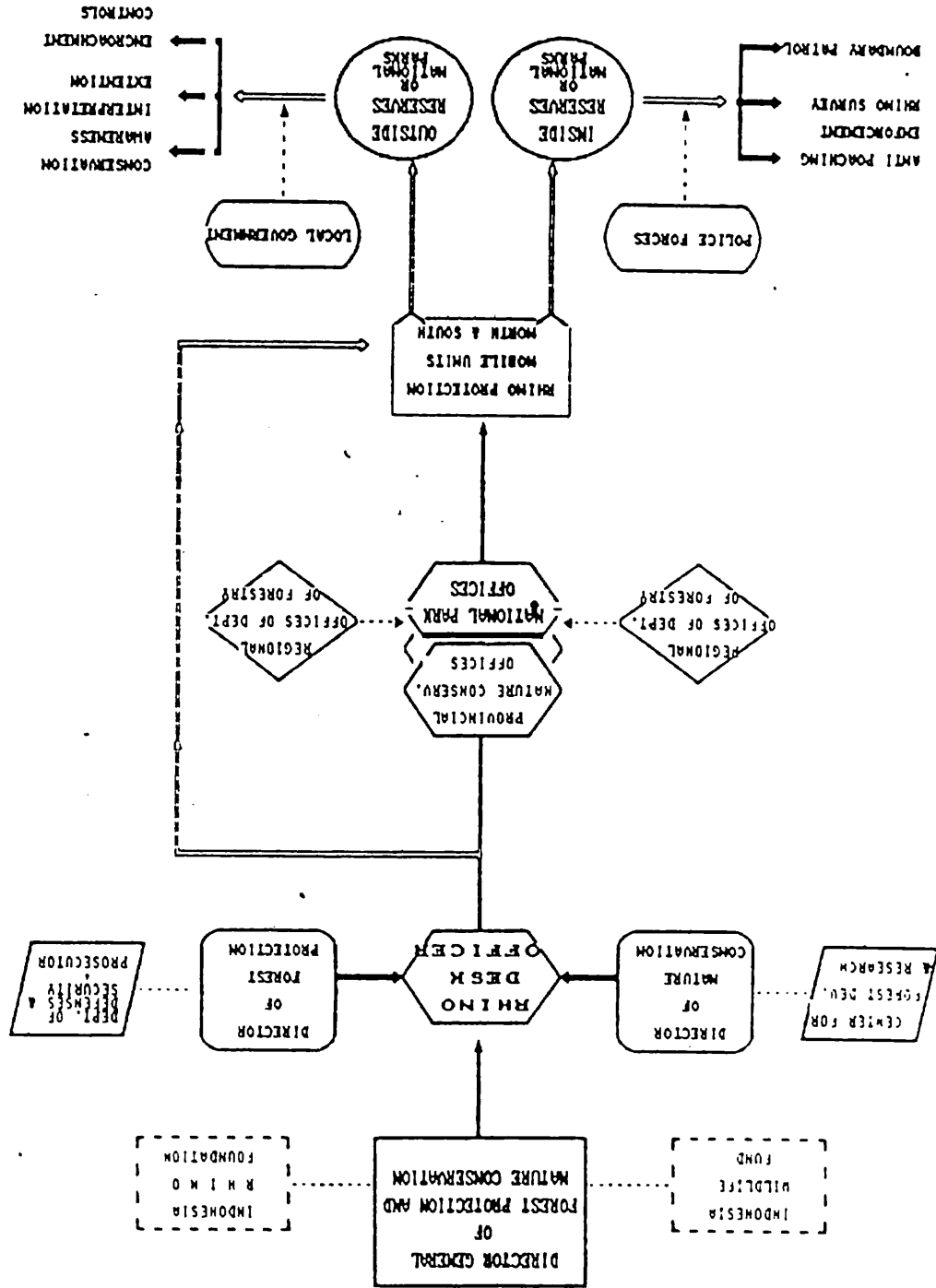
1. To Maintain and Protect Indonesian Rhino Sanctuaries.
2. Develop and establish Indonesian Rhino Unit.

#### Long-term:

1. To Expand the number of Indonesian Rhino Population and Sanctuary.
2. To Develop Captive Breeding Population as an insurance and re-introduction schemes.

# INDONESIAN RHINO PROTECTION MOBILE UNIT

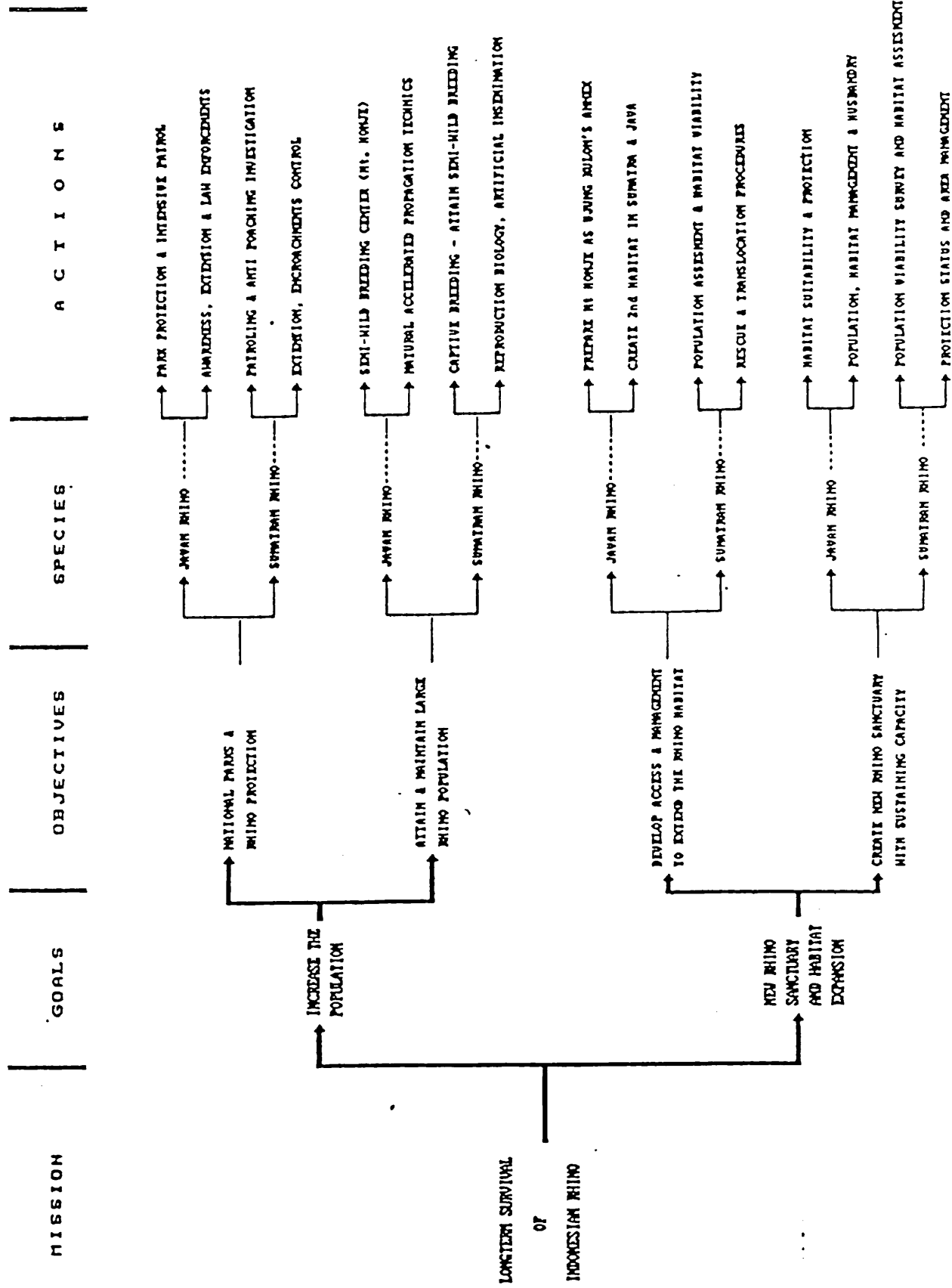
## ORGANIZATION CHART





# INDONESIAN RHINO CONSERVATION STRATEGY

## GLOBAL RELATIONSHIP ANALYSIS



**INDONESIAN RHINO CONSERVATION PLAN**  
**BUDGET COMPONENTS**  
(currency in US.\$)

DESCRIPTION	YEAR				
	1	2	3	4	5
<b>A. Rhino Conservation Units</b>					
1. Staff and Personnel Subsistence					
a. Hardship Compensation	30,000	45,000	60,000	72,000	72,000
b. Travel allowances	20,000	30,000	30,000	45,000	45,000
c. Health Care and Insurance	10,000	12,000	12,000	15,000	15,000
2. Transportation					
a. Local airfares	25,000	30,000	30,000	30,000	30,000
b. 4WD vehicle (Pick-up) (4 unit)	100,000	60,000	60,000	60,000	60,000
c. Motor-bikes	30,000	10,000	10,000	10,000	10,000
d. Inflatable boat	20,000	0	0	0	0
3. Communication equipments					
a. SSB radio	28,000	10,000	10,000	10,000	10,000
b. Handy-talky	8,000	2,000	2,000	2,000	2,000
c. Telephone lines	4,000	10,000	10,000	10,000	10,000
d. Fax Machines	2,000	5,000	5,000	5,000	5,000
4. Unit's base (in Sumatra)					
a. Offices	6,000	4,000	4,000	4,000	4,000
b. Housing	4,000	2,000	2,000	2,000	2,000
5. Field equipments					
a. Utility tents	8,500	3,000	8,500	3,000	3,000
b. Cooking utensils	2,500	1,000	2,500	1,000	1,000
c. Back-packs, bush-knife	3,000	2,000	3,000	2,000	2,000
d. Uniform, shoes, raincoat	4,000	2,000	4,000	2,000	2,000
e. Compass, binoculars	5,000	2,000	5,000	2,000	2,000
f. House-ware	2,000	1,000	2,000	1,000	1,000
g. Electric generator	16,000	5,000	16,000	5,000	5,000
h. Carpenter and mechanical tools	15,000	10,000	15,000	10,000	10,000
6. Fire-arm and ammunition supplies					
a. Pre-memory	0	0	0	0	0
7. Unit running expenses					
a. Base and office maintainances	6,000	4,000	4,000	4,000	4,000
b. Vehicle repair and maintainances	25,000	25,000	25,000	25,000	25,000

DESCRIPTION	YEAR				
	1	2	3	4	5
c. Petrol and others running cost	15,000	20,000	20,000	20,000	20,000
d. Stationary	4,000	3,000	3,000	3,000	3,000
e. Unallocated	10,000	6,000	6,000	6,000	6,000
8. Monitoring and data recording					
a. IBM PC AT (compatible) with: Processor 80386 with 25 Mhz Coprocesor 80387-25 Modem 1200 baut Monitor EGA 80 MB Hard Disk HP Laser Printer Uninterruptable Power Supply Mactrox Card	16,000	6,000	6,000	6,000	6,000
b. Map and aerial photo	30,000	10,000	10,000	10,000	10,000
<b>B. Translocation Programme</b>					
1. Survey and field investigation			100,000	60,000	60,000
2. Capture and transportation			180,000	100,000	100,000
3. Post-capture & temporary handling			60,000	60,000	60,000
4. Monitoring and tracking			140,000	100,000	100,000
<b>C. Rhino Breeding Center</b>					
1. Survey and feasibility analysis		8,000			
2. Site and construction plan					
a. Design			6,000	0	0
b. Supervision			8,000	8,000	8,000
3. Land and site preparation					
a. Land status and other documents			100,000	0	0
b. Boundary and demarcation			4,000	3,000	3,000
4. Facility and unit construction					
a. Service road			120,000	60,000	60,000
b. Holding pen and night stall			180,000	40,000	40,000
c. Play ground and fence			115,000	60,000	60,000
d. Keeper quarter			40,000	20,000	20,000
e. Veterinary house			30,000	20,000	20,000
f. Management office			18,000	20,000	20,000
g. Guest-house			15,000	20,000	20,000
h. Security post			20,000	10,000	10,000
i. Garage and workshop			14,000	20,000	20,000
j. Power (Gen-set) house			6,000	10,000	10,000
k. Water pump and tower			4,000	2,000	2,000

DESCRIPTION	YEAR				
	1	2	3	4	5
5. Personnel and staff subsistence					
a. Salary and hardship compensation			28,000	30,000	30,000
b. daily food supply			16,000	20,000	20,000
c. Travel allowances			16,000	20,000	20,000
d. Training and workshop			32,000	50,000	50,000
e. Health care and insurance			18,000	30,000	30,000
6. Rhino Management and running cost					
a. Medical and husbandry supply			15,000	10,000	10,000
b. Rhino's food supply			12,000	15,000	15,000
c. Stationary & tools			10,000	15,000	15,000
d. Petrol and engine maintainance			30,000	40,000	40,000
e. Unallocated			23,000	30,000	30,000
<b>TOTAL</b>	<b>449,000</b>	<b>328,000</b>	<b>1,725,000</b>	<b>1,238,000</b>	<b>1,238,000</b>

**GRAND TOTAL US\$ 4,813,000.00**

### CAPTURE RESULT OF SUMATRAN RHINO IN INDONESIA

No.	Name	Sex	Date of Capture	Capture Location	Present Location	Country	Remark
1.	Torgamba	M	25-11-85	Tanjung Medan	Port Lypne	UK	---
2.	Riau	F	22-01-86	Sungai Daun	--	--	died on 23-01-86 in collar trap
3.	Rokan	M	02-02-86	Boltrem	Surabaya	Indonesia	---
4.	Jalu	M	23-03-86	Tanjung Medan	Jakarta	Indonesia	---
5.	Napangga	M	15-06-86	Tanjung Medan	--	--	died on 06-08-87 in Malacca zoo
6.	Subur	F	22-06-86	Tanjung Medan	--	--	died on 30-10-87 in Port Lypne
7.	Meranti	F	21-07-87	Sungai Daun	Port Lypne	UK	
8.	Dalu	F	08-07-88	Air Hitam	Bogor	Indonesia	
9.	Mahato	F	22-07-88	Mahato	Cincinnati	USA	
10.	Barakas	F	24-07-88	Bt. Sosa/Kumu	San Diego	USA	
11.	Rapunzel	F	26-08-89	Air Hitam	Bronx N.Y.	USA	
12.	Ipuh	M	23-07-90	Air Retak	Cincinnati	USA	
13.	Ipak	F	06-03-91	Air Retak	N. Bengkulu	Indonesia	
14.	Romi/Muko	M	18-04-91	Air Rami	N. Bengkulu	Indonesia	
15.	Bina/Sabai	F	17-05-91	Air Retak	N. Bengkulu	Indonesia	
16.	Rami	F	11-06-91	Air Rami	N. Bengkulu	Indonesia	

FACTS OF JAVAN RHINO BIOLOGY AND EXPERIENCES OF  
CONSERVATION MEASURES AS A BASIS FOR STRATEGY  
CHOICE

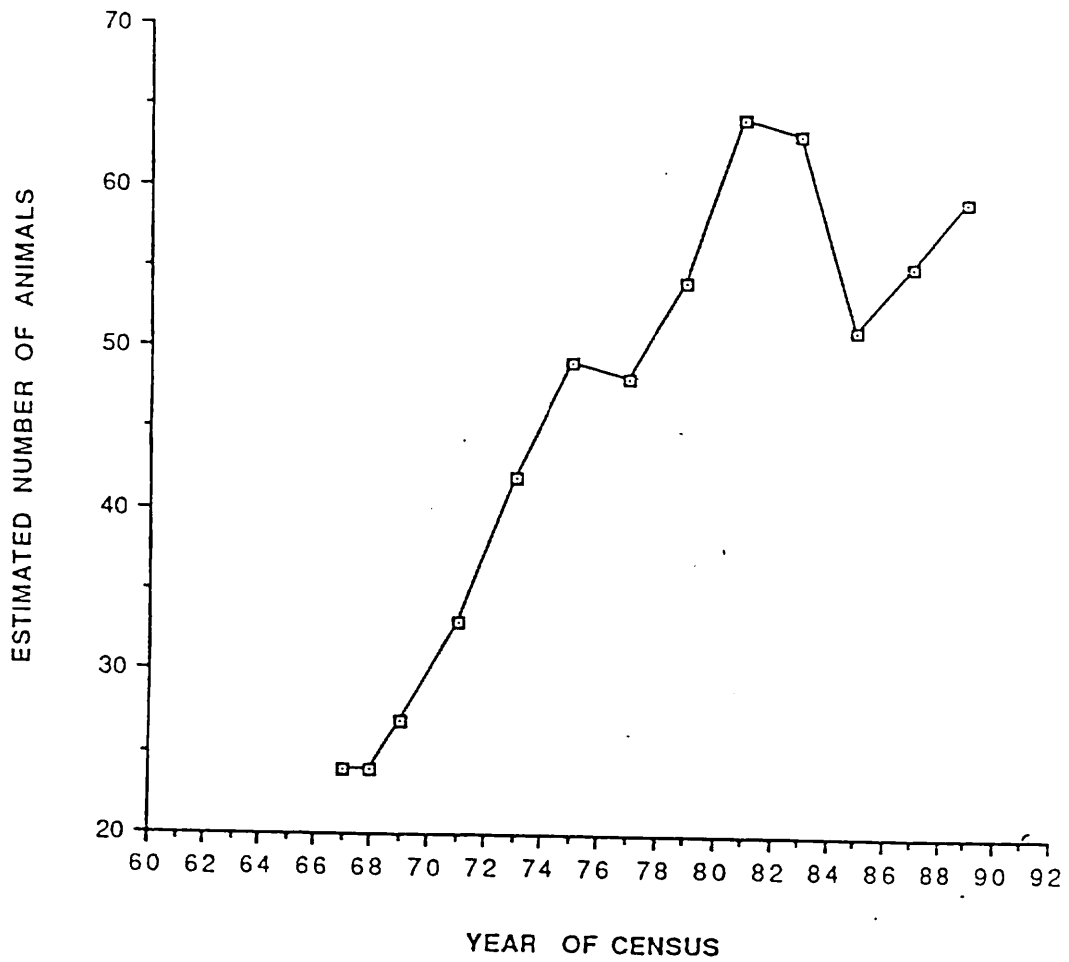
by

Rudolf Schenkel

by

Ulysses Seal, Thomas J. Foose, Robert Lacy

### JAVAN RHINOCEROS CENSUS HISTORY IN UJUNG KULON



## Population Projections if Ujung Kulon Not At Carrying Capacity

Year	If 52 Rhino in 1980				If 60 Rhino in 1980				If 110 Rhino in 1980			
	without '82 epidemic				with '82 epidemic				with 50% loss in '82			
	$\lambda=7\%$	$\lambda=5\%$	$\lambda=3\%$	$\lambda=7\%$	$\lambda=5\%$	$\lambda=3\%$	$\lambda=7\%$	$\lambda=5\%$	$\lambda=3\%$	$\lambda=7\%$	$\lambda=5\%$	$\lambda=3\%$
1980	52	52	52	52	60	60	60	60	110	110	110	
1981	56	55	54	56	64	63	62	64	110	110	110	
1982	60	57	55	52	69	66	64	64	55	55	55	
1983	64	60	57	59	74	69	66	68	59	58	57	
1984	68	63	59	63	79	73	68	73	63	61	58	
1985	73	66	60	67	84	77	70	78	64	64	60	
1986	78	70	62	72	90	80	72	84	66	67	62	
1987	84	73	64	77	96	84	74	90	77	70	64	
1988	89	77	66	83	103	89	76	96	82	74	66	
1989	96	81	68	88	110	93	78	103	88	77	68	
1990	102	85	70	95	118	98	80	110	94	82	70	

If 60 Rhino in 1980  
then rate of increase  
from 1967 = 7% per year  
or  $\lambda = 1.07$

$$\lambda^T = N_T/N_0$$

$$\lambda^{13} = N_{1980}/N_{1967}$$

$$\lambda^{13} = 60/25$$

$$\lambda = (60/25)^{1/13} = (2.4)^{.08}$$

$$\lambda = 1.07$$

If 52 Rhino in 1980  
then rate of increase  
from 1967 = 6% per year  
or  $\lambda = 1.06$

$$\lambda^T = N_T/N_0$$

$$\lambda^{13} = N_{1980}/N_{1967}$$

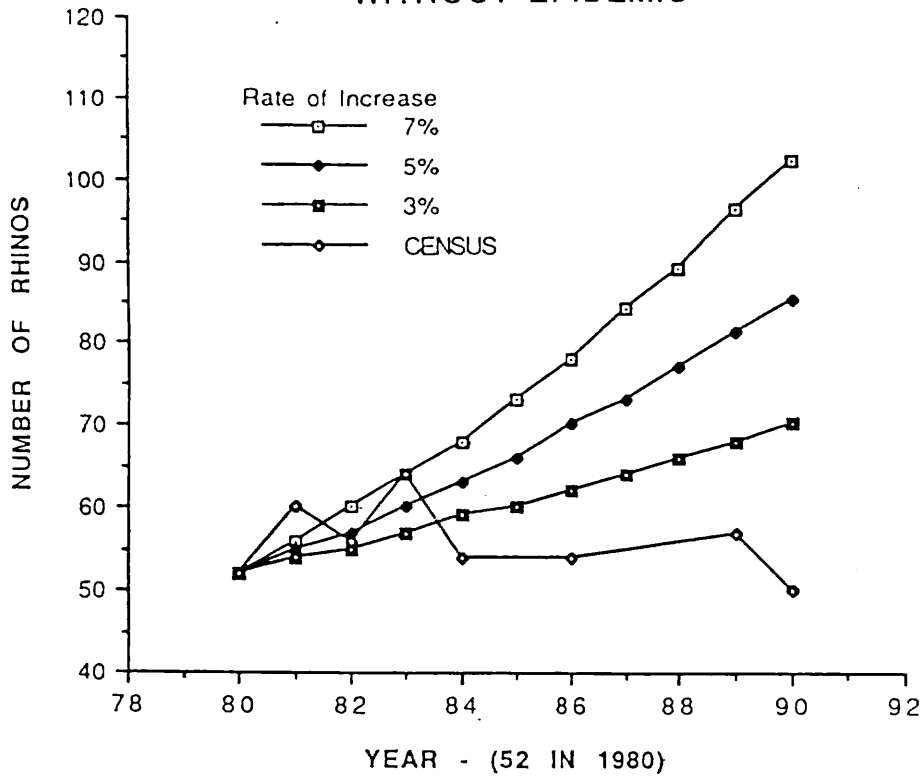
$$\lambda^{13} = 52/25$$

$$\lambda = (52/25)^{1/13} = (2.08)^{.08}$$

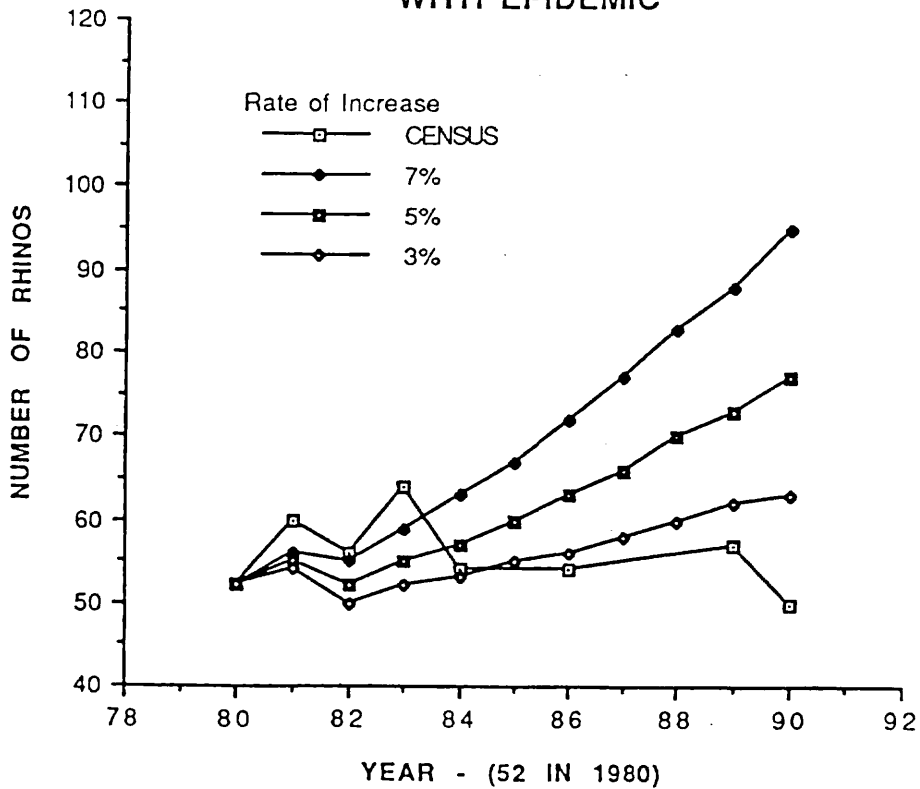
$$\lambda = 1.06$$



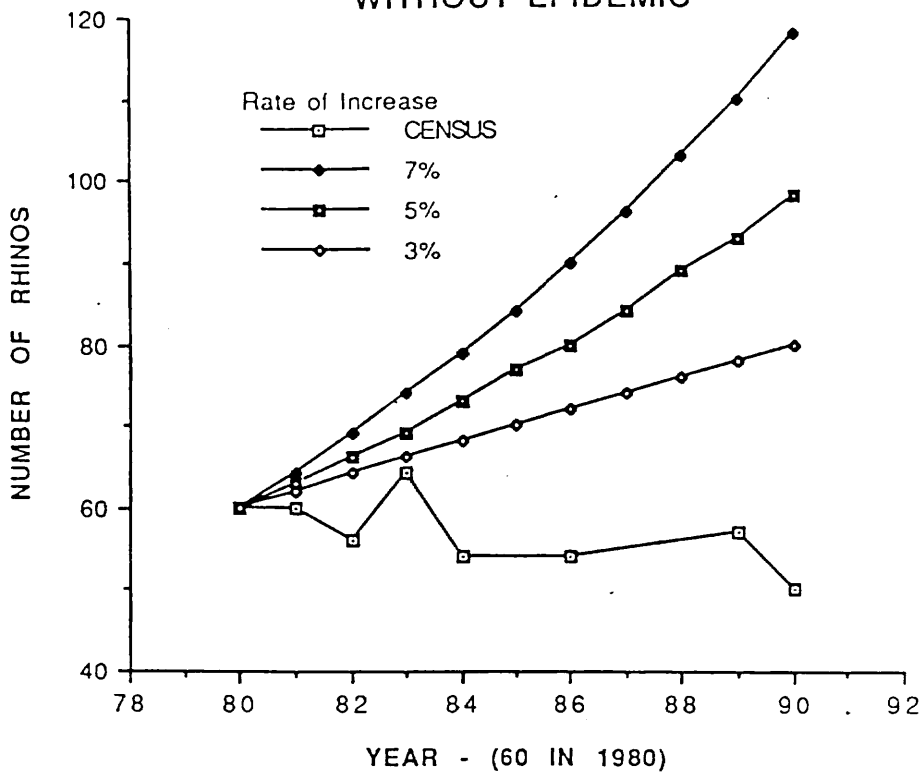
### UJUNG KULON PROJECTED POPULATION GROWTH WITHOUT EPIDEMIC



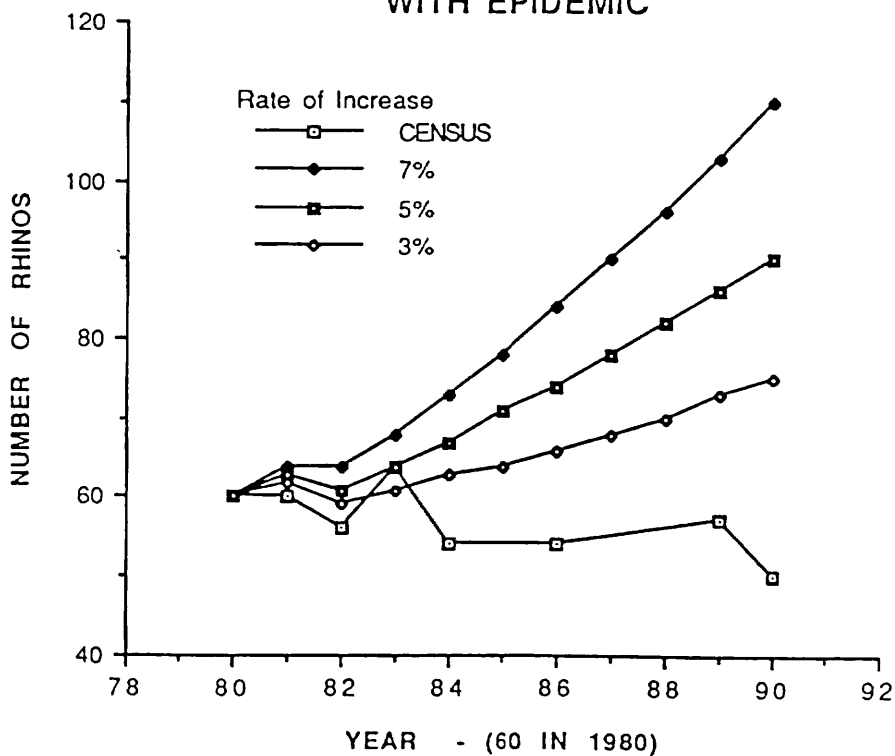
### UJUNG KULON PROJECTED POPULATION GROWTH WITH EPIDEMIC



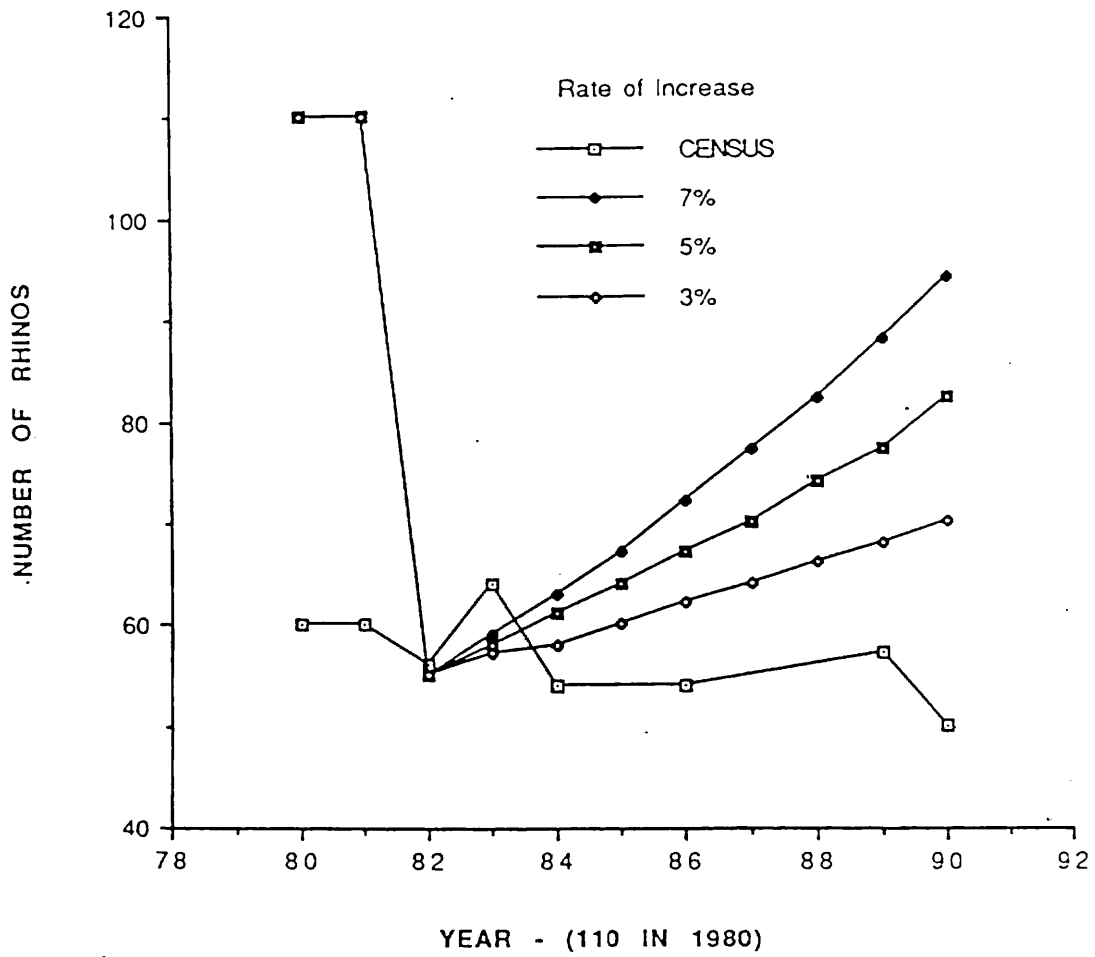
### UJUNG KULON PROJECTED POPULATION GROWTH WITHOUT EPIDEMIC



### UJUNG KULON PROJECTED POPULATION GROWTH WITH EPIDEMIC



### UJUNG KULON PROJECTED POPULATION GROWTH 50% DIE-OFF IN 1982



## EXPECTED LOSS OF GENETIC DIVERSITY

$$\Delta H = \left(1 - \frac{1}{2N_e}\right)^G$$

$\Delta H$  = Fraction of Original Heterozygosity Surviving

$N_e$  = Effective Population Size

$G$  = Number of Generations

	If $N_e = 5$	If $N_e = 10$	If $N_e = 25$
Since 1955 i.e. 2 Generations	$\Delta H = \left(1 - \frac{1}{2(5)}\right)^2$ $= (0.90)^2$ $= 0.81$	$\Delta H = \left(1 - \frac{1}{2(10)}\right)^2$ $= (0.95)^2$ $= 0.90$	$\Delta H = \left(1 - \frac{1}{2(25)}\right)^2$ $= (0.98)^2$ $= 0.96$
From 1955 to Year 2100 i.e. 7 Generations	$\Delta H = \left(1 - \frac{1}{2(5)}\right)^7$ $= (0.90)^7$ $= 0.49$	$\Delta H = \left(1 - \frac{1}{2(10)}\right)^7$ $= (0.95)^7$ $= 0.70$	$\Delta H = \left(1 - \frac{1}{2(25)}\right)^7$ $= (0.98)^7$ $= 0.87$

T. J. Foose  
15 Jan. 91

DECISION ANALYSIS

by

Nico van Strien

## SUMATRAN RHINO CAPTURE IN 1959 - 1960

by

B o e a d i

Location : Tenayan Ulu River, Pekan Baru - Riau

Method of Trapping : Setting Fence Traps, made of local wood-cuts by local people (hired), on selected grounds used to be wallowing spots of Rhinos.

Trap size :  $\pm$  20 m x 20 m (rectangle) with hang-closed - down doors set on at least, each wall side of the trap. A small room was made in the corner of trap to confine the caught rhino to enhance feeding and possible taming it.

The capture was under an agreement between The Ministry of Agriculture of the Republic of Indonesia and Bazel Zoo (Swiss), collaborated with Copenhagen Zoo (Denmark). The expenses paid by both zoos. The intention was to capture (ideally) 3 pairs of Sumatran Rhinos; each for Bozel, Copenhagen at the Bitanical Garden, Bogor.

Result :

Only three females happened to be translocated each to Bazel, Copenhagen and Bogor.

A single male captured but escaped in the following night through the bottom of the fence in the rivulet stream.

Three other previous caught females died in the trap due to mostly wounds on their foot padssoles and lack of nutrients (averagely after 1-2 months in captivity).

Five females caught in the consecutive months were released to the jungle after one day captured (due to high expense to feed them and more females were non target anymore).

Thus, totally twelve Sumatran rhinos captured since March 1959 to August 1961. Other beasts captured were three Tapirs (one male and two females) and released back to the jungle.

## STATUS OF THE SUMATRAN RHINO IN SABAH

by

Mahedi Andau

Current Rhino habitat : Two areas in Sabah have already been identified as important areas containing breeding populations of Rhino namely, the Tabin Wildlife reserve (120,521 ha) and the Danum valley conservation area (42,255 ha). Another new area which may contain a breeding population is the Maliau basin area including part of the Kuamut forest reserve. New sightings of at least two Rhinos were reported in the Kulamba Wildlife reserve but more surveys are required to determine the status of the rhino there.

Surveys of the south western part of Sabah adjoining the Kalimantan border were also carried out in late 1989 and early 1990 to determine the presence of rhinos but unfortunately none have as yet been found.

The Tabin wildlife reserve is now being established with a MR 3,000,000.00 grant from the Federal Land Development Authority (FELDA) which would provide for an office and staff quarters at Tabin, upgrading of the access road and purchase of two 4-WD vehicles and two motorcycles for monitoring and patrolling of the reserve. The United Nation Development Programme (UNDP) has also provide technical aid in providing a consultant/reserve manager for Tabin for a 2-year period. It is therefore hoped that a proper management plan can be drawn up for Tabin Wildlife Reserve to ensure proper protection and conservation of the rhinos there and that the experience gained can be applied to management of other important rhinos areas in Sabah.

### Captive Breeding Programme:

The capture programme for rhinos in Sabah is guided by two factors, namely, that the habitat clearly cannot be preserved and that the rhino is in immediate danger of being poached. Sabah now have 3 rhinos in captivity at our facilities in Sepilok in Sandakan. The breeding programme have not actually started because we have two adult males but one immature female.

The rhinos, however, have proved to be extremely useful in educating the local visitors particularly in convincing them of the false belief that the horn is an aphrodisiac. The myth of the rare Sumatran Rhino and its valuable medicinal value is somehow dispelled by the sight of the "ugly" animal !

The Wildlife Department hopes to be able to do translocation of "doomed" rhinos directly to the Tabin Wildlife Reserve but not until certain problems such as habituation of the animal to the area, security and actual monitoring of the animal upon release is worked out.





DRAFT

10 SEPTEMBER 1991

**INTERNATIONAL  
STUDBOOK**

**FOR**

**SUMATRAN RHINO**  
*(Dicerorhinus sumatrensis)*

Compiled by:

Dr. Thomas J. Foose & Dr. Zainal Zahari Zainuddin

SUMATRAN RHINO Studbook  
(Dicerorhinus sumatrensis)

ID #	Sex	Birth Date	Sire	Dam	Location	Date	Local ID	Birth-Origin	Country	Death-Date	Name	Breeder #
1	F	????	WILD	WILD	WMALAYSIA	30 Apr 1984	1	Wild Born	MALAYSIA		JERAM	MELAKA
					MALACCA	30 Apr 1984	1					
					SNG.DUSUM	13 Jan 1987	1					
					MALACCA	15 Aug 1987	1					
					SNG.DUSUM	31 May 1991	1					
2	M	- 1984	WILD	WILD	WMALAYSIA	1 May 1984	UNK	Wild Born		1 Jun 1984	ERONG	MELAKA 2
					MALACCA	1 Jun 1984 (died)						
3	F	????	WILD	WILD	WMALAYSIA	18 Apr 1985	2	Wild Born	MALAYSIA		MELINTANG	MELAKA 3
					MALACCA	18 Apr 1985	2					
					BANGKOK	- Jul 1986	UNK					
						- Nov 1986 (died)						
4	M	????	WILD	WILD	SUMATRA	25 Nov 1985	UNK	Wild Born	INDONESIA		TORGAMBA	LYMPNE
					LYMPNE	5 Apr 1986	UNK					
5	F	????	WILD	WILD	SUMATRA	23 Jan 1986	UNK	Wild Born	INDONESIA	23 Jan 1986	RIAU	
						23 Jan 1986 (died)						
6	M	????	WILD	WILD	SUMATRA	2 Feb 1986	UNK	Wild Born	INDONESIA		ROKAN	SURBYA
					SURABAYA	- May 1988	UNK					
7	F	????	WILD	WILD	WMALAYSIA	10 Feb 1986	3	Wild Born	MALAYSIA		RIMA	MELAKA 4
					MALACCA	10 Feb 1986	3					
					SNG.DUSUM	13 Jan 1987	3					
					MALACCA	6 Mar 1987	3					
8	M	????	WILD	WILD	SUMATRA	23 Mar 1986	UNK	Wild Born	INDONESIA		JALU	JAKART
					JAKARTA	24 May 1986	UNK					
9	M	????	WILD	WILD	SUMATRA	15 Jun 1986	6	Wild Born	INDONESIA	6 Aug 1987	NAPANGGA	MELAKA 5
					MALACCA	25 Apr 1987	6					
						6 Aug 1987 (died)						
10	F	????	WILD	WILD	SUMATRA	22 Jun 1986	UNK	Wild Born	INDONESIA	30 Oct 1986	SUBUR	LYMPNE 6
					LYMPNE	25 Aug 1986	UNK					
						30 Oct 1986 (died)						
11	F	????	WILD	WILD	WMALAYSIA	6 Jul 1986	4	Wild Born	MALAYSIA		JULIA	MELAKA 6
					MALACCA	6 Jul 1986	4					
					SNG.DUSUM	13 Jan 1987	4					
					MALACCA	21 Apr 1989	4					
						15 Dec 1989 (died)						
12	F	????	WILD	WILD	WMALAYSIA	9 Sep 1986	5	Wild Born	MALAYSIA		DUSUM	MELAKA 7
					MALACCA	9 Sep 1986	5					
					SNG.DUSUM	13 Jan 1987	5					
					MALACCA	6 Mar 1987	5					
					JAKARTA	25 Apr 1987	UNK					

SUMATRAN RHINO Studbook  
(*Dicerorhinus sumatrensis*)

Page 2

Stud #	Sex	Birth Date	Sire	Dam	Location	Date	Local ID	Birth-Origin	Country	Death-Date	Name	Breeder #
13	F	- 1983	WILD	WILD	WMALAYSIA	25 Feb 1987	7	Wild Born			PANJANG	MELAKA 8
					SNG.DUSUN	25 Feb 1987	7		MALAYSIA			
					MALACCA	5 Mar 1987	7					
					SNG.DUSUN	25 Sep 1987	7		MALAYSIA			
					MALACCA	20 Apr 1989	7					
				SNG.DUSUN	27 Apr 1991	7		MALAYSIA				
14	M	????	WILD	WILD	SABAH	26 Mar 1987	UNK	Wild Born	MALAYSIA			
						26 Mar 1987 (died)				26 Mar 1987		
15	F	23 May 1987	WILD	7	MALACCA	23 May 1987	8	Captive Born			MINAH	MELAKA 9
16	F	????	WILD	WILD	WMALAYSIA	1 Jul 1987	9	Wild Born				SERIDELIMAMELAKA 10
					MALACCA	1 Jul 1987	9					
						23 Sep 1988 (died)			23 Sep 1988			
17	M	????	WILD	WILD	SABAH	14 Jul 1987	UNK	Wild Born	MALAYSIA		TANEGANG	SEPLCK 11
					SEPILOK	14 Jul 1987	UNK		MALAYSIA			
18	F	????	WILD	WILD	SUMATRA	21 Jul 1987	UNK	Wild Born	INDONESIA		MERANTI	LYMPNE 12
					LYMPNE	30 Apr 1988	UNK		ENGLAND			
19	F	????	WILD	WILD	WMALAYSIA	26 Aug 1987	10	Wild Born			MAS MERAH	MELAKA 13
					MALACCA	26 Aug 1987	10					
					SNG.DUSUN	2 May 1991	10		MALAYSIA			
20	M	-1984 +/-1yr	WILD	WILD	WMALAYSIA	26 Mar 1988	11	Wild Born			SHAH	MELAKA 14
					MALACCA	26 Mar 1988	11					
					SNG.DUSUN	2 May 1991	11		MALAYSIA			
21	M	????	WILD	WILD	SABAH	24 May 1988	UNK	Wild Born	MALAYSIA			
						25 May 1988 (died)				25 May 1988		
22	F	????	WILD	WILD	SUMATRA	8 Jul 1988	UNK	Wild Born	INDONESIA		DALU	BOGOR 15
					TAMNSAFAR	30 Nov 1988	UNK		INDONESIA			
23	F	????	WILD	WILD	WMALAYSIA	11 Jul 1988	12	Wild Born			SEPUTIH	MELAKA 16
					MALACCA	12 Jul 1988	12					
					SNG.DUSUN	31 May 1991	12		MALAYSIA			
24	F	????	WILD	WILD	SUMATRA	22 Jul 1988	UNK	Wild Born	INDONESIA		MAHATO	CINC 17
					LOSANGELE	25 Nov 1988	UNK		U.S.A.			
					CINCINNAT	5 Jun 1989	UNK		U.S.A.			
25	F	????	WILD	WILD	SUMATRA	24 Jul 1988	UNK	Wild Born	INDONESIA		KUMU	SANDOGO 18
					SANDIEGOZ	25 Nov 1988	UNK		U.S.A.			
26	F	????	WILD	WILD	SABAH	22 Apr 1989	UNK	Wild Born	MALAYSIA		LUN PARAI	SEPLCK 2
					SEPILOK	22 Apr 1989	UNK		MALAYSIA			

**SUMATRAN RHINO Studbook**  
(*Dicerorhinus sumatrensis*)

Stud #	Sex	Birth Date	Sire	Dam	Location	Date	Local ID	Birth-Origin	Country	Death-Date	Name	Breeder #
27	F	????	WILD	WILD	SUMATRA	26 Aug 1989	UNK		INDONESIA		RAPUNZEL	BRONX 1
					LOSANGELE	29 Nov 1989	UNK		U.S.A.			
					NY BRONX	16 May 1990	UNK		U.S.A.			
28	M	????	WILD	WILD	SUMATRA	23 Jul 1990	UNK	Wild Born	INDONESIA		IPUH	CINC 2
					SANDIEGOZ	10 Apr 1991	UNK		U.S.A.			
29	F	????	WILD	WILD	SUMATRA	6 Mar 1991	UNK	Wild Born	INDONESIA			LA 1
30	M	????	WILD	WILD	SUMATRA	18 Apr 1991	UNK	Wild Born	INDONESIA			BOGOR 2
					TAMNSAFAR	2 Sep 1991	UNK		INDONESIA			
31	M	????	WILD	WILD	SABAH	5 May 1991	UNK	Wild Born	MALAYSIA-		TAKALA	SEPLOK 3
					SEPILOK	5 May 1991	UNK		MALAYSIA			
32	F	????	WILD	WILD	SUMATRA	17 May 1991	UNK	Wild Born	INDONESIA			BOGOR 3
					TAMNSAFAR	2 Sep 1991	UNK		INDONESIA			
33	F	????	WILD	WILD	SUMATRA	12 Jun 1991	UNK	Wild Born	INDONESIA			

TOTALS: 12.21.0 (33)

**LIVING SUMATRAN RHINOCEROS  
IN CAPTIVITY  
(10 September 1991)**

<u>COUNTRY</u>	<u>INSTITUTION</u>	<u>MALES</u>	<u>FEMALES</u>	<u>TOTAL</u>
Indonesia	Jakarta	1	1	2
	Surabaya	1		1
	Taman Safari	1	2	3
	Ipuh	0	2	2
	<i>Subtotal Indonesia</i>	<i>3</i>	<i>5</i>	<i>8</i>
Malaysia				
Peninsula	Malacca	0	2	2
	Sungai Dusun	1	4	5
	<i>Subtotal P. Malaysia</i>	<i>1</i>	<i>6</i>	<i>7</i>
Sabah	Sepilok	2	1	3
	<i>Subtotal Sabah</i>	<i>2</i>	<i>1</i>	<i>3</i>
United Kingdom	Port Lympne	1	1	2
	<i>Subtotal U.K.</i>	<i>1</i>	<i>1</i>	<i>2</i>
United States	Cincinnati		1	1
	New York		1	1
	San Diego	1	1	2
	<i>Subtotal U.S.A.</i>	<i>1</i>	<i>3</i>	<i>4</i>
<b>WORLD TOTAL</b>		<b>8</b>	<b>16</b>	<b>24</b>

SUMMARY - CAPTIVE PROGRAMS  
SUMATRAN RHINO - 1984 TO 1991

<u>COUNTRY</u>	<u>CAPTURED</u>	<u>BORN</u>	<u>IMPORTED</u>	<u>EXPORTED</u>	<u>DIED</u>	<u>ALIVE</u>
P. MALAYSIA	2/9	0/1	1/0	0/2	2/2	1/6
SABAH	4/1	0/0	0/0	0/0	2/0	2/1
INDONESIA	6/10	0/0	0/1	3/5	0/1	3/5
THAILAND	0/0	0/0	0/1	0/0	0/1	0/0
U.K.	0/0	0/0	1/2	0/0	0/1	1/1
<u>U.S.A.</u>	<u>0/0</u>	<u>0/0</u>	<u>1/3</u>	<u>0/0</u>	<u>0/0</u>	<u>1/3</u>
TOTAL	12/20	0/1	3/7	3/7	4/5	8/16

**SUMATRAN RHINO MORTALITY BY YEAR  
1984 - 1991**

	<u>1984</u>	<u>1985</u>	<u>1986</u>	<u>1987</u>	<u>1988</u>	<u>1989</u>	<u>1990</u>	<u>1991</u>
<b>Captures</b>	2	2	8	6	6	2	1	2
<b>Births</b>	0	0	1	0	0	0	0	0
<b>Deaths</b>	1	0	3	2	2	1	0	0
<b>Population at Risk</b>	2	3	11	15	19	19	19	24
<b>% Mortality</b>	50	0	27	13	11	5	0	0

T.J. Foose  
10 September 1991

SUMATRAN RHINO  
MORTALITY SUMMARY  
BY COUNTRY OF ORIGIN

	<u>CAPTURED</u>	<u>DIED</u>	<u>% MORTALITY</u>	<u>LAST DEATH</u>
INDONESIA	16	3	19	1987
P. MALAYSIA	11	4	36	1989
SABAH	5	2	40	1988
	—	—	—	
TOTAL	32	9	28	

T.J. Foose  
10 September 1991



**SUMMARY OF MORTALITY  
SUMATRAN RHINO IN CAPTIVITY  
1984-1991**

<u>Animal</u>	<u>Sex</u>	<u>Date &amp; Place of Capture</u>	<u>Date &amp; Place of Death</u>	<u>Date to Death Place</u>	<u>Cause of Death</u>	<u>Condition &amp; Age at Capture</u>
2 Erong	M	01-05-84 Malaysia	01-06-84 Malacca	01-05-84	Inanition	Poor/Calf (est. 3 mo.) Discovered abandoned in jungle
3 Melintang	F	18-04-85 Malaysia	15-11-86 Bangkok	00-07-86	Accident: Ensnared Neck in Enclosure	Good/Adult
5 Riau	F	23-01-86 Sumatra	23-01-86 Sumatra	23-01-86	Accident: Died of Trauma in Corral Trap	Good/Adult
9 Napangga	M	15-06-86 Sumatra	06-08-87 Malacca	25-04-87	Unknown	Poor/Adult
10 Subur	F	25-06-86 Sumatra	30-10-86 England	25-08-86	Digestive	Marginal/Adult
11 Julia	F	06-07-86 Malaysia	15-12-89 Malacca	06-07-86	Cecal Impaction	Good/Adult
14	M	26-03-87 Sabah	26-03-87 Sabah	26-03-87	Capture Trauma	?/Adult
16 Seridelima	F	01-07-87 Malaysia	23-09-88 Malacca	01-07-87	Salmonella	Marginal/Adult
21	M	24-05-88 Sabah	25-05-88 Sabah	24-05-88	Capture Trauma	?/Adult

SUCSESSES AND FAILURES IN AFRICAN RHINO CONSERVATION

by

N. Leader Williams

## SUCCESSSES & FAILURES IN INDIAN RHINO CONSERVATION

by

Dr. John B. Sale, U.N. Wildlife Adviser

The species population of around 1,700 is centred on Kaziranga in Assam, which has over 1,000 animals (developed from 30 in 1912), and Chitawan in Nepal which has 400 animals (developed from 75 in 1962).

This distribution has resulted from contraction of the species' former range, which stretched from the Indus valley in present day Pakistan to the borders of Burma. Causes include excessive hunting and habitat loss to agriculture attempting to provide food for 20 % of the world's human population.

India's recent rhino conservation efforts stem from the establishment of a Rhino Management Committee in 1979, under chairmanship of the author. There was an apparent need to disperse the over-concentration of rhinos in the eastern state of Assam, in order to avoid "biological" disasters such as disease, drowning due to floods and poaching, and political instability which could jeopardise conservation in the area. Accordingly, the Committee drew up a priorities list of possible translocation sites, headed by Dudhwa National Park which had suitable Indian rhino habitat, as well as good management according to a prepared plan. An additional point regarding Dudhwa was the need to fill the "Coarse grazer" gap in the grazing mosaic left by the local extinction of the rhino at the end of the last century which was adversely affecting the Swamp Deer population in Dudhwa. Preparations for a translocation of 30 individuals included inspection of potential donor sites in Assam; experients in capture and transport methodology (assisted by Dr. Mike Woodford, Chairman of the SSC Veterinary Specialist Group) and preparation of holding stockades and a rhino area perimeter fence (electrified) enclosing some 19 km<sup>2</sup> in Dudhwa.

In 1984 five rhinos (2;3) were caught and held on site in stockades, pending the air/road journey to Dudhwa at the end of the 10 - day capture period. Further captures in Assam being impossible, the government of India made an agreement with His Majesty's Government of Nepal to obtain four young adult female rhinos in exchange for 16 domestic elephants, in 1985. The four rhinos were trucked directly from their capture area surrounding Chitawan National Park to Dudhwa.

The results to date of the translocation of nine (2;7) rhinos to Dudhwa during 1984/1985 are as follows :

1. Mortalities resulting from translocation - one elderly female.
2. Births 5 (all from young adult females translocated); one was killed by a tiger as a newborn, others doing well).

3. Other mortalities : one male, from old age in 1989.  
one adult female, as a result of intervention to treat a  
medical problem.

There is an outstanding need to translocate a further 20 animals  
into Dudhwa in order to meet the original target of 30 for a  
founder population.

In Nepal, dispersal of the Chitawan population resulted in  
translocation of 13 animals to Bardia Reserve in western Nepal in  
1986. Of these, one animal died of old age, one was poached after  
wondering out of the reserve and an adult male wandered over the  
border into nearby India (this may yet return to Bardia). Five  
calves have been born, bringing the current total of this group  
to 16. All adults have settled into regular home ranges.

Encouraged by this initial success, a further 25 rhinos were  
translocated from Chitawan to Bardia early in 1991, with WWF  
assistance.

In conclusion, the apprehension on which the Dudhwa translocation  
from Assam was based have proven well founded in that losses due  
to annual flooding and poaching continue. Final pronouncement on  
the translocations would be premature but early results are very  
promising in that there was only one translocation loss (out of  
47 translocated) and there have been 10 births. There is clearly  
no need to consider a captive breeding strategy for this species  
at the present time but that rather further translocation should  
be seen as the main form of management, in addition to strength-  
ening the protection of long-standing populations.

REVIEW OF ONGOING RHINO CONSERVATION PROGRAMS

by

Jim Doherty, Kathy MacKinnon, Ross Hodder,  
Russell H. Betts

## SUMATRAN RHINO CAPTIVE BREEDING MANAGEMENT PLAN IN INDONESIA

by

Linda Prasetyo

### Captive Breeding Management Policy

Captive Breeding has been managed by the Indonesian Management Authority : the Directorate General of Forest Protection and Nature Conservation (PHPA) of the Ministry of Forestry in collaboration with the Indonesian Zoological Parks Association (PKBSI).

### Cooperation among Indonesian Zoos

Cooperation among Indonesia Zoos participating in Sumatran Rhino Captive Breeding Programme, which are Ragunan Zoo, Surabaya Zoo, and Indonesia Safari Park (TSI) has been done in the field of :

1. Research in reproductive biology
2. Exchange of scientific information

### Indonesian Center for Reproduction of Endangered Wildlife (Indonesian CREW)

Sumatran Rhino Captive Breeding efforts have started with serious preparation and good facility as Indonesia Safari Park (TSI) has been assigned as the Indonesian CREW by PHPA. Conservation oriented research and management has started by the Indonesian Government in collaboration with PKBSI, Indonesia Safari Park, Bogor Agricultural University (IPB), Sumatran Rhino Trust, and other private organizations.

The activities have been done in the field as well as in captivity by a Team for captive Propagation of wildlife under cooperation between PHPA IPB - TSI.

This team has got a wildlife sperm bank at the Indonesian CREW prepared for Sumatran Rhino and other endangered wildlife.

The following attached items are being sought for use in research projects.



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 Directorate general phpa  
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PROFORMA-RECHNUNG NR 1053235

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1	13103/0065	MINITÜB-Handverschließ- gerät	1	1.825,00		1.825,00
2	13105/0065	Magazin-Befüller, 3-teilig mit 10 Röhrchenmagazinen	1	649,00		649,00
3	13100/7965	MINITÜB Handabfüllgerät Modell R 79, komplett	1	4.395,00		4.395,00
4	13101/0110	Füllkopf mit 6 Nadeln für R 79	3	136,00		408,00
5	13101/0300	Samenflasche, 300 cc für Handabfüllgerät R 79	3	20,00		60,00
6	13101/7965	Werkzeugsatz, 11-teilig für Handabfüllgerät und Handbedruckmaschine	1	31,00		31,00
7	13105/3665	Röhrchenmagazin, Kap. 36 MINITÜBS	10	12,00		120,00
8	13410/1201	Mehrzweck-MINITÜB-Kassette Kap. 12 MINITÜBS mit Lift in 12 verschiedenen Farben	30	253,00%		75,00
UBERTRAG						7.563,00

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9	13401/0065	MINITÜBS weiß, 65 mm	10.000	20,00%.		200,0
10	13400/9900	Verschlußkugeln, Metall, 2,78 mm	5.000	7,00%.		35,0
11	13400/0300	Verschlußkugeln, Glas, dunkelrot, 2,78 mm	2.500	20,00%.		50,0
12	13400/0200	Verschlußkugeln, Glas, dunkelgrün, 2,78 mm	2.500	20,00%.		50,0
13	13400/0100	Verschlußkugeln, Glas, dunkelblau, 2,78 mm	2.500	20,00%.		50,0
14	13400/0900	Verschlußkugeln, Glas, orange, 2,78 mm	2.500	20,00%.		50,0
15	17020/0000	MINITÜB-Besamungsgerät	5	23,00		115,0
16	17000/0750	Besamungspipette für Rinder, Rotspitz 075	5.000	116,00%.		580,0
17	11220/0045	Pferdevagina, "Hannover" mit Ventil, Innenschlauch, Bändern und Auffangglas	1	532,00		532,0
ÜBERTRAG						9.225,0

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18	16543/2806	MVE Cryo-Behälter, 42,2 L, stat. Haltezeit: 324 Tage & Kanister 279mm x 56mm	1	2.164,00		2.164,00
19	16511/7006	MVE Cryo-Behälter, 11,0 L, stat. Haltezeit: 78 Tage & Kanister 279mm x 38mm	1	1.258,00		1.258,00
20	16503/3006	MVE Cryo-Behälter, 3,6 L, stat. Haltezeit: 36 Tage, & Kanister 127mm x 38mm	1	1.095,00		1.095,00
21	11900/0000	Elektro-Ejakulator mit Elektrode für Bullen und Schafe	1	3.175,00		3.175,00
22	17025/0000	QUICK-LOCK Besamungsgerät für HÜLLEN aller Art	2	31,00		62,00
23	17005/0000	Besamungshülle MULTIFIT, bzw. Universal, f. MINITÜB mittl. und Minipailletten	1.000	83,00%		83,00
24	17320/0000	Besamungsgerät für Schafpipetten	2	17,00		34,00
ÜBERTRAG						17.096,90



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25	17300/0000	Schafbesamungspipette	100	24,00%		24,00

Ursprung: FRG Deutschland  
 Pos. 15-18: USA

WARENWERT DM NETTO	VERPACKUNG DM	FRACHT DM	VERSICHERUNG DM	MWST DM	CIF SINGAPORE
17.120,90	120,00	550,00	90,00		17.880,90

ZAHLUNGSBEDINGUNG: Vorkasse  
 VERPACKUNG: Karton  
 VOLUMEN: 0,600  
 LIEFERZEIT: 3 Wochen  
 NETTO KG: 85,652  
 VERSANDART: Luftfracht  
 GÜLTIGKEIT: 3 Monate  
 BRUTTO KG: 95,000

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DRAFT GLOBAL STRATEGY FOR THE SUMATRAN RHINO

by

Thomas J. Foose

OVERALL PLENARY DISCUSSION

by

SIMON N. STUART

UJUNG KULON PHOTOGRAPHICAL SURVEY

by

Mike Griffith

(Slide Presentation)

REPORT OF WORKING GROUP ON RHINO BIOLOGY

Chair: Nigel Leader-Williams

A) Group agreed to the following agenda:

- 1) Summary of general rhino biology to discuss likely life history strategy of Javan rhinos.
- 2) Discussion of available data on numbers of rhinos in Ujung Kulon, particularly as it regards debate over carrying capacity.
- 3) Point by point discussion of input parameters to Javan rhino PVA, using available Javan rhino data and suggestions for better comparative data.
- 4) Discussion of whether PVA inputs in general (i.e. what the model asks for) should be changed for data-poor species like the Javan rhino.
- 5) Discussion of catastrophes, their frequency and impact on population
- 6) Biological likelihood of relative success for translocated vs. re-introduced populations and a discussion of likely biological determinants of success
- 7) Research needs:
  - a) present status in Ujung Kulon
  - b) research on future re-introduction sites
  - c) research needs on Javan rhino biology for use in conservation planning

Of these points, the working group discussed numbers 1, 2, and 5. Agenda point 6 was referred to working group on translocations and re-introductions.

B) For agenda point 1, the following general points of agreement were reached:

\* Based on a review of evolutionary relationships, general habitat preference, feeding behavior, social structure and size relationships between the species, it was concluded that Javan and Sumatran rhinos are more likely to share ecological characteristics with black rhinos than with Indian and white rhinos.

\* Assuming that Javan rhinos are more similar to black rhinos than to Indian rhinos in an ecological sense has implications for assumptions made on unknown parameters used in the PVA model:

/Javan rhinos are likely to be monomorphic which implies no sex-specific differences in mortality as opposed to what was included in original PVA model.

/Home range sizes in male and female Javan rhinos are likely to be similar, as in the case of the black rhinos, hence the opportunity for one male to monopolize several females for breeding is likely reduced for Javan rhinos. For the purposes of the PVA we should assume that any one male will have the opportunity to breed with 2 or 3 females and that

any female will breed with 2 or 3 males. Again for model purposes, this is more analogous to a facultatively monogamous breeding situation than is currently included in the PVA.

/The PVA model currently assumes high levels of juvenile mortality, based partly on Indian rhino data. It is likely that juvenile mortality will be lower in Javan rhinos due to lack of predation on infants by tigers.

C) Leader-Williams remarked that year to year census counts have been presented in different forms in different published materials. This raises questions as to what the census data indicate relative to whether the population in Ujung Kulon is presently at or near carrying capacity. There is also some question about whether census results are comparable over the period 1967 to present. Individuals with access to census data were requested to prepare a consensus graph of annual census counts. General discussion on how to improve census techniques was referred to the working group on monitoring techniques.

Nico van Strien pointed out that the counts probably do vary from year to year. But, even with consistent year-to-year census data, the currently used technique cannot be used to determine whether the population is at carrying capacity. As population density increases, the current census technique cannot differentiate between animals as well and will underestimate the total count. The result is a flattening out of a curve of the census results regardless of whether carrying capacity is being approached or not.

The group agreed that the PVA simulation should be run at a range of possible carrying capacities for the Ujung Kulon population (50, 70, 100, and 200).

Based on available data and comparative studies, the group agreed that it was unlikely that competition with banteng is likely to be a significant factor in Javan rhino ecology. Further studies on this issue were recommended.

D) The group evaluated six general types of catastrophes: volcanic eruption, forest fires, drought, disease, accidental poisonings, and poaching.

Volcano--for the purposes of the PVA the probability of this event was assumed to be zero.

Forest fires--fire, while a possible event, was determined to be of no possible impact to the population for the PVA.

Drought--again, for the purposes of the PVA, assumed to have zero impact.

Disease--the 1982 disease event was associated with a year of high rainfall. It is possible that the disease was spread as animals congregated in higher densities than normal. At one

extreme the PVA should model a disease event at the frequency of exceptionally wet years. At the other extreme, the PVA should model disease events at a frequency of one per 60 years, the actual rate observed since 1930. Disease severity should be examined at 10 percent mortality (the known rate in 1982) and 20 percent mortality (a possible high range for the 1982 disease event).

Poaching--Two approaches for investigating poaching were suggested. One, using data on actual rates of poaching since 1929, model a frequency and severity equal to the value obtained by looking at the total number poached over the years versus the total number available to be poached. Second, model the population under the assumption of absolute protection and a poaching level of zero.

Tom Foose cautioned that we continue to include in the PVA analysis some worst-case scenarios to help develop a strategy of least regrets. Leader-Williams suggested that we are aiming to build a sensitivity analysis into the PVA process as we use it to examine various scenarios from worst-case to optimistic.

E) The group adjourned, having agreed that a smaller number of people would check individual inputs to the PVA model, now that the more general principles were established. Future research needs could be discussed at some later stage.



R.C. Lacy

Preliminary Computer Analyses of the Effect of Translocations on the Viability of the Ujung Kulon and the Recipient Population

To begin the exploration of the effects that removals of animals from Ujung Kulon might have on the viability of that population, and the likelihood that a newly established second population would survive, we used the VORTEX computer modelling program (described in the Briefing Book). The results presented below are intended only to illustrate the types of analyses that are desired before any animals are removed from Ujung Kulon. For some parameters, better data can and should be obtained from reviews of the literature on rhino biology. Only a subset of the range of parameters that could impact the population viability have been explored. More simulations (at least 1000) with each set of parameters should be run to obtain more precise results. Population biology input parameters, as suggested by the Comparative Rhino Biology Working Group, are summarized below. More detailed discussion of these parameters can be found in the PVA section of the Briefing Book.

The present size and carrying capacity of the Ujung Kulon population was assumed to be either 50, 70, or 70 animals. The Working Group suggested other values as well, but further exploration of the effect of population size on viability can await data from the photo census.

Reproduction and mortality rates were set to approximate the values observed in Indian rhinos; the values also yield expected mean population growth rates comparable to those believed to have been obtained in Ujung Kulon.

Catastrophes were assumed to be of two types: disease epidemic and extensive poaching. For a "worst case" scenario, disease epidemics were estimated to occur about once a decade and to kill 20% of the rhinos, while once every 20 years (on average) a breakdown of park protection was assumed to result in a kill of 25% of the rhinos by poachers. For an optimistic scenario, disease epidemics were assumed to kill 10% of the rhinos, and poaching was assumed to be totally and permanently prevented.

The severity of inbreeding depression was modelled with a genetic load of either 3.5 lethal equivalents (near the median value for mammals) or 7.0 lethal equivalents (more severe impact of inbreeding). (See Briefing Book for further explanation.)

Management options examined included the removal of 6, 12, or 21 rhinos from Ujung Kulon and the translocation of those animals (assumed, optimistically, to occur without mortality) to a second population. A 2:1 female:male sex ratio was assumed for the translocated rhinos. The new population was assumed to have biological characteristics (fecundity, mortality, catastrophes, etc.) identical to those of the Ujung Kulon population, except that a carrying capacity of 100 was assumed for the new population.

JAVAN RHINO PVA SIMULATIONS - EFFECTS OF REMOVALS

POPULATION PARAMETERS					CATASTROPHES				REMOVALS		PROJECTIONS				
YRS	K	$\lambda$	M <sub>L</sub>	G	FRQ	SVRT	FRQ	SVRT	INBRD	TOT #	YRS	P(E)	T <sub>E</sub>	POP.	H <sub>E</sub>
200	100	1.04	.33	15	.10	.80	.05	.75	3.5	0	-	.03	189	65	.84
	70											0	-	53	.80
	50											.22	136	29	.69
	100									6	1	.01	116	66	.83
	70											.06	152	51	.78
	50											.21	142	25	.69
	100									12	1	.01	200	66	.84
	70											.04	163	51	.79
	50											.32	152	24	.70
	100									21	1				
	70											.04	145	53	.77
	50											.33	147	28	.66
	100														
	70								7.0	0	-	.12	142	49	.82
	50											.11	167	39	.79
	100											.54	140	12	.65
	70									6	1				
	50											.12	168	42	.78
	100											.56	150	14	.63
	70											.06	159	49	.82
	50									12	1	.15	162	39	.80
	100											.58	149	18	.68
	70									21	1	.19	155	36	.76
	50											.73	137	12	.59





WORKING GROUP I

---

"MANAGEMENT AND PROTECTION OF UJUNG KULON NATIONAL PARK"

Co - chairmen : Dr. Hails and Mr. Soedarmadji

Members : Dr. Ross Hodder  
Prof. Ruedi Schenkel  
Mr. M. Bismark  
Mr. Haryanto  
Dr. Hadi Alikodra  
Mr. Haerudin R. Sadjudin  
Mr. Martin Tyson  
Mr. Soebagjo HS  
Mr. Effendy Sumardja  
Dr. Ronald L. Tilson

A Primary Goal of Ujung Kulon N.P is to conserve the Javan Rhino in its habitat

A Secondary Goal is to provide a reservoir of Javan Rhino for their expansion into their former habitat in Indonesia

To achieve these two goals, and in the context of this workshop, we identified 6 key objectives which relate to the "Action" points covered in the document on in-situ conservation of the Javan Rhino.

The recommendations which we make warrant initial expression through the development of specific "Action Plans". Such "Action Plans" should provide both a review and specific prescriptions for action. It is essential that these "Action Plans" receive the maximum possible financial and practical support from international conservation and development assistance agencies.

**Objective: 1. Maintain a Strong Park Management and Administration Unit**

Recommendation 1 : Re-examine the management structure of the park staff and carry out a strategic planning exercise to ensure their effective deployment. Special attention

should be paid to :

- the location of the Park Headquarters
- implementation of activities in the park
- time demands on the Park Superindant
- need for a Operations Manager

**Objective : 2. Maximise Protection of the Javan Rhino Population Through Adequate Law Enforcement.**

Recommendation 2 : Establish regulation to empower Park guards to enforce the law when appenhending offenders. Serious consideration should be given to provision of fire arms to make this possible.

Recommendation 3 : Improve upon procedures to ensure that offenders are rapidly and effectively prosecuted with minimal cost and inconvenience to PHPA.

Recommendation 4 : Establish efficient communication network both within the park system and its Head Office, and between Head Office and Jakarta.

Recommendation 5 : Establish on going training programme for all levels of Park staff with special attention being paid to Guard staff. This should lead to a systematic and supervised approach to managing and deploying the Park Guards.

Recommendation 6 : Assess the needs,(and identify sources) for the necessary equipment and physical infrastructure to enable park staff to conduct their duties.

Recommendation 7 : Re-assess and amend where necessary the current recruitment strategy to ensure appropriate staff selection. A balance must be found between those who are academically well qualified and those who have good field skill. Emphasis must be placed on reliability

Objective : 3. Conduct an Education and Awareness Programme

This would be a vital part of the park work and implementation should begin at a very early stage. The difference between Education (formal or informal) but involving school and children) and Awareness (informal aimed at the broad public, mainly adult) *should be recognised.*

3.1 EDUCATION

Recommendation 8 : Aim to get conservation into the National school curriculum in the long-term. Utilise rhino conservation as a case study in this.

Recommendation 9 : Develop conservation education aids, utilising rhinos, for use by teachers in informal education activities in schools in the villages surrounding Ujung Kulon. To be done in association with RAMUKA and other extra-curricular activities.

For both 8 and 9 specific material (teachers kits) need to be prepared.

3.2. AWARENESS

Develop conservation awareness programmes for :

- a. Central Government
- b. Regional Government
- c. Local communities
- d. Tourists
- e. Private sector

Recommendation 10 : Conduct an awareness campaign at Central Government level (details dealt with by Working Group 7)

Recommendation 11 : Conduct an awareness campaign at Regional Government level with specific reference to :

- interesting and involving the Bupati of Pandeglang.
- providing an information kit for the use of the Park Superintendent when meeting with other government depts such as agriculture, fisheries, etc.

Recommendation 12 : Develop support materials for use with local communities and conduct an awareness programme in conjunction with law enforcement and buffer-zone activities.

Recommendation 13 : Develop an interpretation programme for tourists. This should be broad-based but have rhino conservation as a major component. It should also :

- be bilingual (Bahasa Indonesia and English)
- be integrated with a system of bilingual guides
- be pro-actively distributed to the tourism servicing industry

Recommendation 14 : Prepare information materials to attract funding from private sector (details delt with by Working Group on Marketing)

**Objective : 4. Establish a Vigorous Research Programme**

This will provide the baseline information for management decisions and preparation of the Education and Awareness Programmes. It will also enhance the profile, credibility and importance of the Park.



Recommendation 15 : Study population trends in the Javan Rhino with special emphasis on the :

- continuity of existing methods to enable long-term comparison to be made
- incorporation of new technologies to improve accuracy with time.

Recommendation 16 : Based on a thorough review of available information, and identification of needs, conduct baseline studies on the Javan Rhino and its habitats to give a comprehensive picture of the ecology of the species. The following is a non-exclusive list of some priorities :

- habitat preferences and carrying capacity
- feeding studies (available resources and opportunities for supplementation)
- population structure and dynamics
- competition and social interactions
- sociobiology (daily range through radio-tracking, effective sex-ratio, breeding behaviour, etc.)
- monitoring the distribution of vegetation types and changes over time

Recommendation 17 : Conduct studies on other important plant and animal species.

The mechanism for this research should be a rhino research co-ordination desk based in PHPA which would draw upon personnel and expertise both from Indonesia and from overseas. Such a desk could be responsible for the production of a periodic publication in conjunction with the awareness programme.

Recommendation 18 : Produce a periodic publication on research activities at Ujong Kulon.

**Objective : 5. Conduct Buffer Zone and Other Work In The Gunung Honje Area**

These recommendations recognise :

- a) the potential of Gn. Honje as potential rhino habitat
- b) the pressures placed in the park by the communities living in this area.

Recommendation 19 : Resurvey and clearly delineate the Park boundary around Gn. Honje. Proceed as fast as possible with the Gazettement of the whole area as a National Park as a matter of high priority.

Recommendation 20 : Carry out a survey and evaluation of the Gn. Honje area to assess the potential and needs for the re-establishment of rhino habitat.

Recommendation 21 : Identify "traditional use" zones within the Park boundary and in the vicinity of villages. These zones would be for the controlled use of villages to manage and extract minor forest produce (non-timber).

Recommendation 22 : Establish agricultural extension work in the villages of the buffer zone surrounding the park. This work should promote the establishment of intensive, settled and profitable agriculture. Full use must be made of the environmental services provided by the Park.

Recommendation 23 : Identify families living inside the park boundary. Reconcile their situation either by relocation and compensation, or by re-aligning the park boundary. Arbitration to be carried out on a case-by-case basis.

Recommendation 24 : Increase the degree of protection from Park Guards to the G..Honje area.

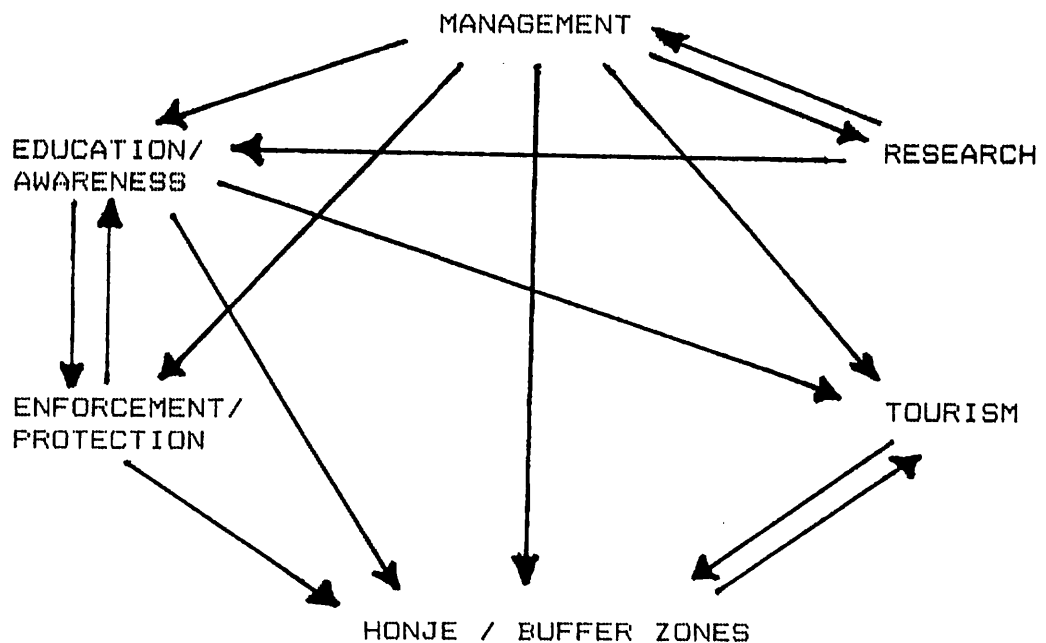
**Objective : 6. Encourage Tourism In A Controlled Manner**

Tourism will enable the park to realise certain economic potentials of interest to the region.

Recommendation 25 : Conduct an evaluation of how tourism can be managed within the constraints of the long-term interests of the conservation of the species and habitat within the park.

**LINKAGES**

There are important linkages within these programmes which should be recognised.



Working Group 2

Preamble

The long-term goal to establish a total population of at least 2,000 Javan rhinos distributed over 10-20 viable populations in suitable areas in their former range (including areas outside Indonesia), was reiterated. This means that additional populations must be established in appropriate locations, using the animals in Ujung Kulon as the initial source population. This needs to be done in a way that minimizes risks to both the source population and any new translocated populations.

The group took note of PHPA's decision that the first additional population will be established through translocation to secure natural habitat within the species' former range. The group did not review the relative merits of using captive breeding versus translocations as a means of establishing additional populations.

Preconditions

These preconditions relate to information required before making a final decision to proceed with a translocation program. They refer mainly to the situation in the source site, rather than the receiving site.

- A. Results from the photo-survey should be assessed to determine:
  1. Numbers in Ujung Kulon
  2. Age structure of population in Ujung Kulon
  3. Sex ratio
  4. Home-range (this would require a higher density of cameras in a portion of the park and kept in place for a longer period of time)
- B. A vegetational survey in both receiving and source sites should be carried out to determine suitability of habitat.
- C. There should be a study on possible competitive interactions between rhinos and banteng in Ujung Kulon to assess potential impact of removals.

- D. An investigation should be carried out into the potential increased risk of disease in Ujung Kulon associated with removal of animals.
- E. A literature review on other experiences with rhino translocations should be carried out to help determine optimal/minimal numbers for successful release.
- F. Modelling work should be continued to determine the potential effect of removals on the source population and the likelihood of success of translocated populations of various sizes (see attached initial examples of extractions of 6, 12, and 21 animals from populations of 56, 70, 90 and 120).
- G. Genetic management of the translocated population should be planned carefully to ensure that sufficient founders are represented (if necessary through staggered releases).

#### Options Explored

Discussions of options focussed on potential areas for the first translocated population and on other sites for subsequent translocations. The sites were evaluated according to the following criteria:

- A. Is the site within the natural historic range of the Javan rhino?
- B. Is the site likely to contain appropriate habitat?
- C. Does the site have a year-round supply of water?
- D. Is the site protectable from the point of view of both habitat and rhinos?
- E. Is the site large enough to potentially sustain a viable population (> 100 animals)?
- F. Is there evidence that Javan rhino currently occur in the site?
- G. What is the ease of translocating animals to the site?
- H. What is the degree of separation of the release site from the source population?
- I. What is the present management capacity in the site?
- J. What is the potential management capacity (including the ability to attract outside funding)?

- K. What is the degree of local government commitment to the conservation of the site?
- L. How much potential is there to develop eco-tourism at the site?
- M. What is the potential for local community education and extension?

The first five of these considerations are considered absolute requirements for any translocation site. The sites considered were:

Gunung Honje  
 Pulau Panaitan  
 Way Kambas  
 Barisan-Selatan  
 Berbak  
 Seberida

The scoring for some of these sites is given in the attached table. Pulau Panaitan was ruled out of consideration because it failed to meet three of the absolute criteria (outside historic natural range, no year-round water supply, and not large enough to sustain a viable population).

Gunung Honje was not selected because it was considered that its suitable habitat could be repopulated with natural migration and increased protection. Also, it would not provide the added benefits of a second distinct population, free from the effects of catastrophes acting on Ujung Kulon.

In comparison to the other sites, Way Kambas emerged as the best site for the first translocation. Way Kambas has the potential to hold more rhinos than Ujung Kulon, is relatively accessible for transporting rhinos, and its current level of protection and potential for future improvements are better than any of the other possibilities. Barisan Selatan, Berbak, and Seberida were considered as possible sites for re-introductions in the future.

#### Specific Recommendations

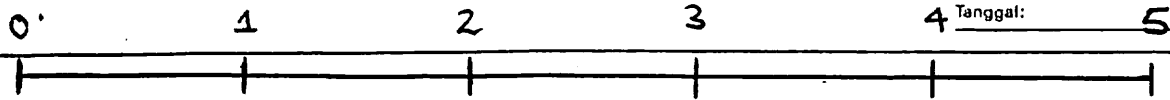
- A. It is recommended that the draft Indonesian Rhino Conservation Strategy be adopted with revisions relating to Javan rhinos as suggested in this document. On the basis of this strategy, a five year plan for the conservation of the Javan rhino, incorporating a strategy for translocating rhinos from Ujung Kulon to Way Kambas, should be developed.

- B. Based on information available to the groups it was agreed that Way Kambas is the best site for the first translocation of Javan rhinos, pending the results of necessary feasibility studies. The group recommends that steps commence immediately to prepare Way Kambas as a potential site for translocations. These include the recommendations of workshop six as general considerations and specifically include a survey of the area for evidence of an existing Javan rhino population.
- C. It is recommended that Gunung Honje be re-populated through natural migration and increased protection, rather than by a managed translocation.
- D. It is recommended that increased protection be put in place for Way Kambas as a matter of priority.
- E. Increased protection should begin for other potential re-introduction sites, particularly Berbak and Barisan Selatan, and surveys should be carried out to assess the possible survival of Javan rhinos in these areas.
- F. The studies recommended in the pre-conditions listed above should be completed by the end of 1992.
- G. An ad-hoc advisory panel should be established to review, by the end of 1992, the results of the photo-survey project in Ujung Kulon, the literature review of rhino translocations, and the results of modelling exercises, to make recommendations on optimal numbers of rhinos to be removed from Ujung Kulon and under what timetable. The panel should comprise the following expertise:
- / rhino biologists with translocation expertise
  - / population biologists with expertise in computer modelling
  - / site managers for Ujung Kulon and Way Kambas.
- H. An advisory committee to PHFA, perhaps associated with Indonesian Rhino Foundation, should be established. This committee should advise on each major action to be included in the five year plan for the conservation of Javan rhinos and in the event of any major disruption to the implementation of the plan. This group will also meet in the fourth year of the plan to make recommendations for the plan's revision. Specifically, the committee should address the issue of at what stage an ex-situ component to the plan would benefit the on-going conservation program for the Javan rhino.

YEARS

No.:

72



→ Camera count

--- → Source vegetation / Battery competition

Ujong Kulon

--- → Disease risk study

--- → Home range study

--- → Receiving vegetation / Feasibility study

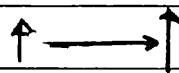
--- → Increased security

Way Kambira

→ literature review

--- → Models of optimal removals

Desk studies



Removals

↔ Ad hoc panel to review removal numbers

Review

↔ Review of major action

? ? Review of any ? catastrophe ?

Overall review of plans success ↔

Revision of Plan by PHPA ↑



Other in site sites





	Pulau Panaitan	Way Kambas	Berbak	Barisan Selatan
Natural Range	N	Y	Y	Y
Suitable Habitat	Y	Y	Y	Y
Year-round water	N	Y	Y	Y
Protectable	Y	Y	Y	?
Viable pops.	N	Y	Y	?
Evidence of J. rhinos	N	?	?	?
Ease of transport	3	2	2	1
Separation	2	3	3	3
Present mgmt.	1	2	1	0
Potential mgmt.	2	3	2	2
Local govt. support	3	3	2	1
Tourism	3	3	2	1
Education/ext ension	1	3	2	1

In cases where a numerical score is given: zero is the worst score and three is the best. Scoring is relative between the sites and not an absolute score on another objective basis.

## GROUP 3: REVIEW OF THE SUMATRAN RHINO EX-SITU AND HUSBANDRY PROGRAM

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### I. INTRODUCTION

The goal of Group 3 was to formulate and recommend minimum husbandry and management standards for the existing captive population of Sumatran rhinos. The rarity of this animal makes it particularly important that the world zoo community develop and implement the best possible management strategy. The current population consists of 24 animals which are distributed among four different countries (Indonesia, Malaysia, United Kingdom and United States). This makes it especially critical that communication and information-sharing between various holding institutions be improved. At present, there is great variation in the protocols being employed. Standardization and improvement of management and husbandry techniques is therefore a high priority. To this end, the Group developed minimum recommended standards for housing, diet, veterinary care, social management, research and reporting.

The following recommendations were made:

### II. HOUSING

#### A. Night stall/Holding facilities:

- (1) Minimum size is 5m x 6m.
- (2) All facilities should not have less than 3 interconnected stalls for each pair of rhinos.

(3) Walls between stalls should be solid to provide a visual barrier (e.g., concrete, wood).

(4) Minimum height of the wall should be 1.67m  
It is best to allow more space above barrier for increased ventilation and acoustic and olfactory communication between animals.

(5) Stalls should have concrete floors that are easy to clean and have proper drainage. (A trough outside the night stall may be included for the collection of urine samples. Some animals have developed foot problems on hard concrete floors. Rubber mats and proper bedding should therefore be provided as necessary. Dirt is not an acceptable substrate).

(6) A concrete trough should be provided as a source of fresh drinking water. To discourage climbing, the trough should be positioned near the ground and not be located in a corner.

(7) Clean, piped water should be available for drinking and cleaning purposes.

(8) A power source for lights over the stall and electrical outlets should be provided.

(9) Adequate ventilation should be provided in all indoor facilities.

(10) A keeper and food storage/preparation area should be located in the night stall/holding area.

(11) Vehicle access should be provided to both the night stall and outdoor enclosure areas to help facilitate any crating and transport of animals.

(12) Night stalls should also include a crush to facilitate veterinary care and research. Recommended size is 2m long x 1m wide.

(13) Heated floors or radiant heaters should be utilized in colder climates.

#### **B. Outdoor Yards:**

(1) A minimum of two yards should be provided for each pair of rhinos.

(2) The minimum size of each yard should be 18m x 18m and the yards should be interconnected to facilitate movement of animals between yards. (i.e., to allow for breeding

introductions and separation of females and calves from other rhinos.

(3) Sufficient shade should be provided. It is recommended that a minimum of 50% of the yard should be shaded at any given time.

(4) Mud wallows/pool should be available. In addition, these should be located in a shaded area of the enclosure. Mud wallows should be filled in regularly as a sanitary measure.

(5) Minimum height of the perimeter wall should be 1.75m.

(6) Whenever dry moats are used, the gradient should never exceed 30%.

(7) Use of electric fencing to contain animals is not recommended.

(8) Turf is ideal for ground cover, but it is recognized that it will be difficult to maintain due to the foraging, wallowing and trampling activities of the animals.

(9) Trees should be planted either in or near the enclosure to provide shade.

(10) Vertical and horizontal posts should be provided for the animals to rub against.

### III. DIET

(1) A minimum of 33% of the diet should consist of leaves, although forage in excess of 60% is recommended. Other available foods (fruits, vegetables and grass/hay) should be supplied to meet the animals' daily requirements.

(2) All diets should be supplemented with 2kg of concentrates (pellets) per day.

(3) All diets should also be supplemented with mineral mix/salt/vitamins.

(4) Clean drinking water should be provided ad libitum.

### IV. SOCIAL MANAGEMENT

(1) Sumatran rhinos are not social, and adult animals should therefore not be maintained in the same enclosure on a regular basis.

(2) To facilitate breeding, all institutions holding adult rhinos should maintain a minimum of a pair. All adult animals should be in a breeding situation.

(3) Adult males and females should be introduced daily to increase the chances that conception will occur. A minimum of 8 hours per day is recommended.

(4) Adult rhinos can be aggressive. When animals are paired, they should be observed continuously for at least 30 minutes following the initial introduction. Some aggression is to be considered a normal part of courtship behavior. However, each institution should use its own discretion when deciding when to separate animals.

#### V. VETERINARY CARE

(1) Any facility housing Sumatran rhinos should employ a veterinarian (full or part time) who has rhino health care experience.

(2) A physical examination should be performed on each animal upon arrival at a zoo facility. An evaluation for endoparasites should be conducted at this time.

(3) Routine fecal examinations should occur every 1 - 2 months. Routine deworming should occur every 3 - 4 months.

(4) Physiometric measurements should be collected including the total body length, shoulder height, girth and body weight whenever possible.

(5) Foot baths should be placed at all entrances to rhino enclosures.

(6) All surfaces of the night stall should be cleaned thoroughly on a daily basis.

(7) Foods, especially fresh vegetables, fruits and browse, should be thoroughly cleaned and disinfected whenever possible (to prevent possible Salmonella infections).

#### VI. RESEARCH

Those involved in the management and breeding of captive Sumatran rhinos recognize the importance of collaboration and communication with those involved in field studies and surveys of this species in its natural habitat. It is the intent of this group to work closely with those involved in such research and to