CONSERVATION AND MANAGEMENT OF SUMATRAN RHINO IN INDONESIA

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by

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1.0 Introduction

Of the three species of rhino that are extant today in Asia, two occur in Indonesia viz., the Lesser or one-horned Javan rhino (*Rhinoceros sondaicus*) and the two-horned Sumatran rhino (*Dicerorhinus sumatrensis*). While the Javan rhino is confined to just one locality in Indonesia (Ujung Kulon National Park in West Java), the smaller and hairier Sumatran rhino is more widely distributed in Sumatra and perhaps in Kalimantan (Indonesian Borneo) as well. Throughout their range in Indonesia, the two species are in conflict with man and are among the most seriously endangered species of large mammals in the world (Santiapillai & MacKinnon 1990).

The Sumatran rhino has the longest evolutionary history of the rhinoceros family (Sheeline 1987). Since its origin about 40 million years ago, it appears to have changed little (Macdonald 1984). A number of species allied to the Sumatran rhino lived in the forests of Central and Western Europe during the Tertiary period. The Sumatran rhino is a relatively recent immigrant to Southeast Asia from Western Europe (van Strien 1974). Today the total world population of Sumatran rhino is estimated to be between 700 and 1000 animals, with most of them being in Sumatra.

2.0 Species Account

Although the Sumatran rhino is more widely distributed and enjoys numerical superiority over the Javan rhino, it is neverthless under serious threat from poaching and fragmentation of its habitat throughout its range. In Sumatra and Kalimantan, the slaughter of the species has been so extensive since the turn of the century that the animal has disappeared from much of its former strongholds especially in Kalimantan where it is either extremely rare or has been virtually exterminated. Its decline in range and number in Sumatra is attributed chiefly to fragmentation of its habitat through indiscriminate forest clearance and to poaching, stimulated by the illegal trade in horns, hides and hooves.

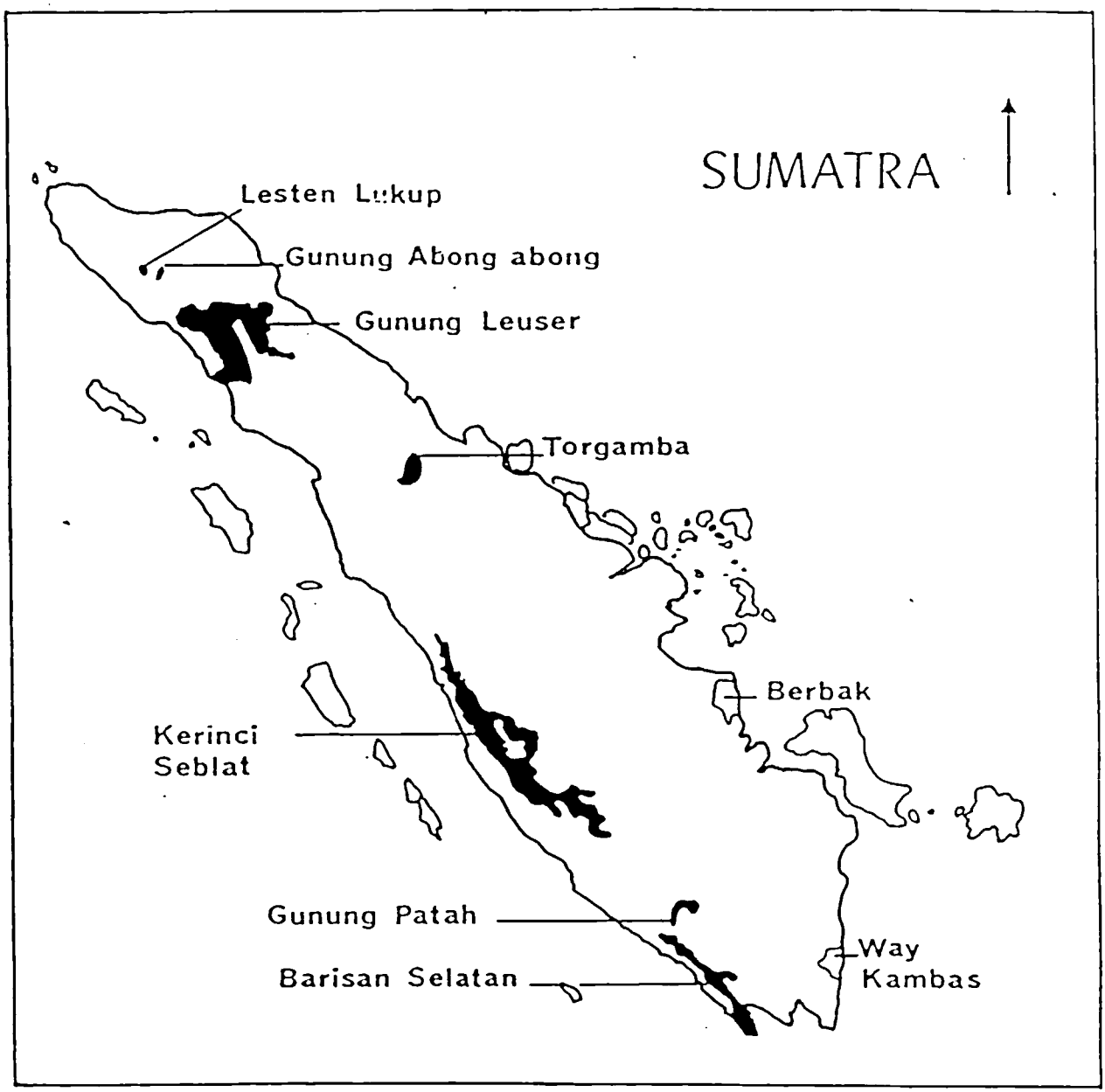

Fig. 1. Present distribution of Dicerorhinus sumatrensis in Sumatra

2.1 Distribution & Population: In recent historical times, the Sumatran rhino's geographic distribution extended from Borneo and Sumatra in the east via the Malay Peninsula through Burma to Bengal and Assam in the west (Groves 1982). There have also been unconfirmed reports of the species in Cambodia, Laos and Vietnam (Khan 1989). Today, it is known from Sumatra, possibly Kalimantan, Peninsular Malaysia, Sabah and Sarawak. It is likely that the species still survies in parts of Burma given the extent of large rhino habitat that still occurs in this little surveyed country. Sumatra however is its stronghold today.

The Sumatran rhino's ecological preference has probably enabled this species to survive while the Javan rhino lowland living, has become extinct. Throughout Asia, the mountainous areas have suffered least from man's activties and they have therefore offered refuges for many endangered and endemic species.

The total number of Sumatran rhino in Sumatra is estimated to be between 425 and 800 animals (Table 1). Many of these estimates were simply educated guesses and hence must be treated with caution. The three most important rhino areas that need to be protected against all encroachment are: Gunung Leuser NP, Kerinci-Seblat NP and Barisan Selatan NP. Sumatran rhino does not build up high populations in any one place (Groves 1982). The animals, especially the adult males, are known to wander widely in search of food and mates. Hence maintenance of large areas is vital to ensure the long-term survival of Sumatran rhino populations.

2.2 Rhino habitat: The Sumatran rhino is a very adaptable species. It is known to inhabit a variety of habitats that range from lowland swamp forests to primary rainforest up to an altitude of 1,900 m (Borner 1973). Although associated with higher altitudes, the Sumatran rhino is known to periodically utilize forests at lower altitudes, especially secondary forests where the amount of fodder within reach is greater than in primary forest (van Strien 1974).

According to Borner (1979), the Sumatran rhino is much lighter and more mobile than the Javan rhino and so is able to inhabit higher and steeper areas on firm ground. About a hundred species of plants are known to be eaten by the rhino in the wild but 98% of the food intake may be composed of saplings (Flynn 1980).

Table 1. Distribution and number of Sumatran rhino in Sumatra
Source: (VS) van Strien (1986).

	Locality	No. of rhino	Area of habitat (km2)
1.	Gn Leuser NP	130-200 (VS)	9,000
2.	Kerinci-Seblat NP	250-500 (VS)	14,000
3.	Barisan Selatan NP	25-60 (VS)	3,600
4.	Gn. Patah Pt.F	few animals	700
5.	Torgamba Pd.F	10-15	200
6.	Gn. Abong-Anong Pt.F	10-25	?
7.	Lesten-Lukup Pt.F	few animals	?
	Total	425-800	27,500+

Pt.F = Protection Forest,
Pd.F = Production Forest, NP = National Park.

2.3 Areas where the Sumatran rhino occurs: In Sumatra, the principal rhino areas are: (1) Gunung Leuser National Park (c. 9,000 km2) in the north , (2) Torgamba Forest (200 km2) in the north, (3) Kerinci-Seblat National Park (c. 14,000 km2) in the west, (4) Barisan Selatan National Park (3,600 km2) in the south and (5) Gunung Patah (400 km2) in the south (Fig. 1). Torgamba has been so badly disturbed that it is unlikely that it would hold more than a few animals. In addition, small populations of Sumatran rhino are scattered discontinuously over the Barisan mountain chain that runs along the western part of the island. These include small populations of rhinos in Lesten Lukup, Gunung Abong-Abong in the north and near Ipoh and Muko-Muko in the south.

2.4 Conservation importance of Rhino reserves: The three principal rhino reserves in Sumatra (Gunung Leuser, Kerinci-Seblat and Barisan Selatan National Parks) together account for a total of 26,600 km2 of protected areas. They also represent the life support systems for a host of other rare, endangered or endemic species that are sympatric with the Sumatran rhino (Table 2). Of the 19 species of Threatened Mammals in Sumatra listed by IUCN (1988), both Gunung Leuser NP and Kerinci-Seblat NP have 13 (68%) species each while Barisan Selatan NP has 12 species (or 63%). These include some of the key endangered species such as the Sumatran tiger, Sumatran elephant, Orang Utan (only in Gunung Leuser) and the Serow. Furthermore each of the reserves supports 8 species out of the 11 species (73%) of Primates known in Sumatra (Table 3).

Table 2. Some Rare and Endangered Species Protected in Rhino Reserves

Species	Gunung Leuser	Kerinci-Seblat	Barisan Selatan
Pongo pygmaeus (E)	+	-	-
Nasolagus netscheri (I)	-	+	-
Cuon alpinus (V)	+	+	+
Aonyx cinerea (K)	+	+	+
Lutra lutra (V)	-	+	?
Lutra perspicillata (K)	+	+	+
Lutra sumatrana (K)	+	-	+
Cynogale bennetti (K)	-	-	?
Felis marmorata (I)	+	+	-
Felis planiceps (I)	+	+	-
Felis temmincki (I)	+	+	+
Felis viverrina	+	+	+
Neofelis nebulosa (V)	+	+	+
Panthera tigris (E)	+	+	+
Elephas maximus (E)	+	+	+
Tapirus indicus (E)	-	+	+
Dicerorhinus sumatrensis (E)	+	+	+
Capricornis sumtraensis (E)	+	+	+
Hylobates syndactylus	+	+	+
Hylobates agilis	-	+	+
Hylobates lar	+	-	-
Presbytis thomasi (En)	+	-	-
Presbytis femoralis	-	+	+
Helarctos malayanus	+	+	+
Mustela hamekri (En)	+	+	+
Crocodylus porosus (E)	-	+	+
Tomistoma schlegeli	-	+	+
Argusianus argus	-	+	+
Lophura inornata	-	+	-
Picumnus innominatus	-	+	-
Rattus inflatus (En)	-	+	-
Total	19	26	20

E = Endangered; V = Vulnerable; I = Indeterminate; En = Endemic

Besides, some of the most important rivers such as Alas, Musi and Batang Hari originate from the principal watersheds that the three conservation areas protect along the Barisan chain. Agriculture and therefore human survival in Sumatra depends on the maintenance of these crucial watersheds of the major rivers. This should be the mostpotent argument in favour of habitat protection in Sumatra.

3.0 Threats to the Sumatran rhino

The two principal threats facing the Sumatran rhino in Indonesia are poaching and fragmentation of its habitat. The value of the rhino horn makes it inevitable that poaching will continue.

3.1 Poaching: Throughout its range in Sumatra, the rhino is under heavy hunting pressure. The dependence of Sumatran rhino on salt licks and other concentrated mineral sources makes it extremely vulnerable to poachers (Payne, 1990). Poaching of the Sumatran rhino takes place both outside and within protected areas. The exact number of Sumatran rhinos that are poached annually must be substantial as in 1990 alone "at least 10 rhinoceros in the Kerinci-Seblat National Park in West Sumatra were killed during a four month period" (Anon 1990). Several of the Sumatran rhinos that were captured within the Torgamba forest for captive breeding were found to have snare wounds. Poachers may also unintentionally kill pregnant and lactating females which appear to depend most on salt licks (Payne, 1990).

Controlling poaching, therefore, must remain a top priority in any conservation programme. In Royal Chitwan National Park in Nepal, armed soldiers were mobilized to protect the park's Indian rhino population as a result of which the numbers more than doubled from 160 in 1966 to 375 in 1974 (Martin 1984). Combatting poaching is always an expensive operation that requires trained personnel, equipment and vehicles. But in the long run, it will help improve the security of the rhino and its habitat (Abdulla et al., 1989).

3.2 Deforestation: The conversion of forest into agricultural holdings has been identified as one of the most serious threats facing all large mammals throughout Sumatra (Santiapillai & Ashby 1988). Changes in land-use patterns lead to the contraction of the rhino habitat and destroy emigration and dispersion corridors. It is estimated that between 65 and 80% of the forests in the lowlands of Sumatra have already been lost (Whitten et al., 1984). The mountain and hill areas where the Sumatran rhinos predominate, are less seriously affected, but the disruption of continuous cover is already substantial in some cases, and perhaps 20% of their area may tentatively be estimated as already removed on the scanty information available.

As far as the Sumatran rhino conservation is concerned while the need to retain large tracts of undisturbed climax ecosystems is axiomatic, it is not essential ipso facto to stop commercial exploitation of timber in forest to be managed as habitat for the rhino: it is simply necessary to control it strictly. Sumatran rhino is known to utilize logged out areas where there is an abundance of regenerating plants.

Table 3. Number of Primate species in the three rhino reserves in Sumatra

	Common name	Scientific name	GL	KS	BS
1.	Orang utan	Pongo pygmaeus	+	–	–
2.	Siamang	Hylobates syndactylus	+	+	+
3.	White-handed gibbon	Hylobates lar	+	–	–
4.	Agile gibbon	Hylobates agilis	–	+	+
5.	Long-tailed macaque	Macaca fascicularis	+	+	+
6.	Pig-tailed macaque	Macaca nemstrina	+	+	+
7.	Banded leaf-monkey	Presbytis melalophos	–	+	+
8.	Thomas' leaf monkey	Presbytis thomasi	+	–	–
9.	Silvered leaf monkey	Presbytis cristata	+	+	+
10	Slow loris	Nycticebus coucang	+	+	+
11	Western tarsier	Tarsius bancanus	–	+	+
	Total		8	8	8

Source: MacKinnon & MacKinnon (1986).

4.0 Conservation Priorities

Today the largest number of Sumatran rhino is known to occur in Indonesia. Those rhino populations that inhabit the three large protected areas in Sumatra are viable provided poaching is kept under control and human encroachment of their habitat is curtailed. Given this situation, the overwhelming priority must be the strengthening of the in-situ conservation of the species within its natural habitat.

4.1 In-situ conservation in Protected Areas: The three protected areas in Sumatra (Gunung Leuser, Kerinci and Barisan Selatan national parks) have been identified as areas of global conservation importance by IUCN and are centres of biological diversity. Together they protect not only the Sumatran rhino but most other Sumatran plant and animal species as well. In Kalimantan, the Sumatran rhino is extinct in Kutai National Park, but it may still occur in the Kayan-Mentarang reserve in the east, especially in the Ulu Sembakung extension. This reserve is recognized as a major centre of biodiversity in Borneo.

Therefore improving the protection and manangement of the three Sumatran reserves and the Kayan-Mentarang in Kalimantan is the top priority for conservation of the Sumatran rhino. Given the large size of these conservation areas, much attention must be placed on the socio-economic problems attendant on the establishment of such reserves in the first place and as Lahiri-Choudhury (1990) argues, if any large mammal conservation is to succeed in the future, the conservation philosophy might have to be changed to an adjustment between the needs of the animals on the one hand and those of the people, especially those living in the fringe areas dependent on forest resources for their subsistence. The Species Heritage Programme proposed by IUCN/SSC would be a good way to raise support, funds and resources to strengthen the protected areas where the Sumatran rhino occurs.

4.2 In-situ conservation outside protected areas: There are probably still substantial numbers of Sumatran rhinos living in forests outside reserve boundaries. Not all of these forests are designated for conversion to agriculture. The Sumatran rhino prefers hill forests and is known to occur in several protection forests such as Gunung Patah, Gunung Abong-Abong and Lesten Lukup. Better protection of these forests especially those between Kerinci-Seblat and Barisan Selatan National Parks, and more effective management will increase their conservation value. Stricter law enforcement against poachers will also protect Sumatran rhinos in remote areas.

4.3 Translocation: Sumatra's forests are vanishing fast, a result of clearance for logging and agriculture. There are several small populations of rhinos pocketed in isolated patches of forest as at Torgamba. These rhino populations are unlikely to be viable in the long run and the animals have been declared 'doomed'. The Directorate General of Forest Protection and Nature Conservation (PHPA) and the Sumatran Rhino Trust (SRT)'s strategy is to capture these 'doomed' rhinos and remove them to captive breeding facilities in Indonesia, Britain and USA. These are expensive operations. A cheaper and better conservation alternative would be to translocate 'doomed' animals to other secure reserves in Sumatra within the animals' former range such as the Berbak Game reserve in Jambi province. Prior to any such translocation, measures must be taken to improve protection and effective management of the target reserves. Again in-situ conservation of rhinos in their natural havitats will benefit both the rhino and thousands of other 'less glamourous' species.

4.4 Captive Breeding programmes: 'Doomed' animals are currently captured for breeding schemes in zoos far away from thecapture site. Since the ultimate aims of such programmes are to reintroduce captive-bred animals into the wild, considerable resources must also be allocated for protection of suitable wild habitats. Reintroductions of captive-bred animals into the wild are notorioulsy difficult, especially forest dwelling species due to the behavioural and ecological needs of the species, and the need to 'educate' captive-born animals to living wild.

If the captive breeding programme is to continue, then attention must be given to the possibility of breeding wild-caught translocated animals in semi-wild conditions i.e in very large enclosures (400 ha or more) (Abdulla et al. 1989). In the 480 km2 fenced are in the Umfolozi Game Reserve in Southa Africa, between 1965 and 1970, the number of white rhinos increased 250% in five years to 1,764 animals (Owen-Smith 1983).

Breeding in semi-wild conditions has several advantages over breeding them in the confines of zoos:-

1. the animals are translocated to natural habitats, rather than zoo conditions and so remain essentially 'wild'.

2. the animals can be well protected but remain within natural habitat in a much larger reserfe area..

3. the animals are born under sem-wild conditions and are already familiar with the environment and food plants prior to release.

4. such a programme is cheaper, easier and more likely to be effective than a zoo programme and subsequent reintroduction scheme. (According to Abdulla et al. (1989), the costs involved with the capture of a Sumatran rhino in Indonesia and suvsequent transport to USA range from US$ 150,000 to US$ 200,000).

5. resources continue to be spent on improving protection and management of the reserve as part of the breeding scheme.

6. the presence of a breeding paddock is a tourist attraction even though the paddock is sufficiently large that rhinos can avoid the attention of visitors if they wish to do so.

From the conservation point of view, captive breeding schemes in zoos are the least attractive option.

Animals are removed from the wild; few zoos have adequate facilities or space to build up a breeding population at one site (Abdulla et al. (1989) point out that in order to breed a founder population of 20 rhinos, there must be at least 30-40 paddocks and might stalls to accommodate breeding females and cow-calf pairs. Many zoos, especially those in the west, will not have such space to spare); zoos compete over animals for display purposes; maintaining animals in zoos is expensive; there is still no reasonable time frame for return of captive-bred animals to the wild.

Since 1985 captive breeding schemes for Sumatran rhinos have resulted in the capture of 27 animals in Indonesia and Malaysia. Nine of these animals (33%) have died and there have still been no successful births as a result of the breeding scheme. Therefore, the zoo option is the most expensive in terms of funding and resources yet it is probably the least likely to succeed.

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