

Habitat loss

When one compares a map of the current distribution of the five rhino species with one showing the distribution c. 1800, the difference is striking. Many countries have lost their rhino populations altogether: Burkina Faso, Ivory Coast, Ghana, Togo, Benin, Nigeria, Chad, Central African Republic, Sudan and Mozambique in Africa; and Pakistan, Bhutan, Bangladesh, Myanmar, Thailand, Cambodia, Laos and Sarawak in Asia.

The most obvious reason for the decline from around a million rhinos in the year 1800 to approximately 18,000 today is poaching, but habitat loss has also been a key factor. There are several ways in which this is manifested:

- Clearance of land for human settlement and agricultural production
- Logging, authorised and illegal

Black rhinos – Kenya

In Kenya, for example, between 1948 and 1957, a government-sponsored settlement scheme was implemented in the Makueni District, near to the Chyulu Hills. The District straddles the road and railway that run between Nairobi, the capital, and Mombasa, an important port on the Kenyan coast. The local people, the Akamba, had taken advantage of the building of the railway at the beginning of the 20th century, and began trading goods. Further settlement was constrained by harsh climatic conditions, tsetse fly, human-wildlife conflict and government prohibition. As the population grew, the Akamba intensified their struggle to increase access to land outside the Akamba Reserve.

Initially the Government resisted these moves, but continued protests, livestock predation and the severe degradation of the land eventually persuaded it of the need to implement a land clearance scheme. Bush was cleared for tsetse fly control, and Game Warden J.A. Hunter was brought in to shoot some 1,000 black rhino that were causing problems (see also the previous section of traditional Chinese medicine). Today, just a dozen or so black rhinos survive in the Chyulu Hills, now critically endangered and, in a neat turn of history, protected by Richard Bonham, whose wife's grandfather was the very same J.A. Hunter.

Kenya's rhinos are confined to National Parks and private fenced sanctuaries. There are currently some 33 million Kenyans. It is estimated that by 2020 there will be 45 million. Pressure on protected areas and on all forms of wildlife within them, will increase unless we look at ways in which to knit conservation with development.

Sumatran rhinos – Indonesia and Malaysia

The Sumatran rhino numbers probably less than 300, with only four or five populations where more than a handful survives (Bukit Barisan Selatan National Park, Gunung Leuser NP, and Way Kambas NP on Sumatra; Taman Negara NP in Peninsula Malaysia; and Tabin Wildlife Reserve in Sabah, Malaysia). Exact figures are difficult to give, but the largest populations occur in Bukit Barisan Selatan (60+) and Gunung Leuser (50+).

Habitat encroachment has become a much more serious problem recently in most Sumatran rhino areas. For example, in Sumatra, perhaps 30% of Bukit Barisan Selatan has been

converted over the last 15 years and Way Kambas lost 15% over the last five years. The land is used for cash crops, and particularly for palm oil plantations.

Since the nineteenth century, primary rainforest throughout Indonesia and Malaysia has been targeted for its desirable hardwoods. Species such as the semaram, merbau, kruing and meranti are favourites of loggers, fetching a very high price on the international market, around (US\$1,800) per m³.

The negative effects of logging – legal and illegal – have been much described. Species endemic to Malaysia and Indonesia, such as the Sumatran tiger, elephant, rhinoceros, orangutans, hornbills, cloud leopards and the world's largest flower, the rafflesia have all declined steeply in number, as their range has been reduced. In Borneo, in Tabin Wildlife Reserve in Sabah, for example, the 30 or so Sumatran rhinos have effectively retreated to the Core Area, untouched primary rainforest, while the surrounding secondary rainforest now functions mainly as a buffer zone. Ethnic groups such as the Gayo, Alas, Acehnese, Batak, Pakpak, Karo, Singkil, Penan and Dayak, who formerly practised a shifting cultivation pattern that was matched by forest regeneration, have lost their traditional homes, livelihoods and knowledge about the use of plant species. The denudation of mountain slopes has led to flash flooding, to water-supply problems for large catchment areas, and to unprecedented erosion.

Although laws exist to try to prevent illegal logging, enforcing them can be difficult. In many areas, while logging within protected areas is illegal, retrieving logs washed downstream by rivers is not. So unscrupulous loggers harvest trees and wait for a flood to wash them downriver where they claim them.

The tsunami has also been used as an excuse for new logging activity. There is undoubtedly a need for building materials. It is estimated that the minimum wood requirement needed for the reconstruction and rehabilitation of Aceh, in the northern tip of Sumatra, which is foreseen to last for five years, is 1.1 million cubic metres (m³) of logs, equivalent to 446,000 m³ of sawn timber. Such a huge timber requirement will worsen the already sorry state of the forests of Aceh and nearby provinces. Logging activities in Aceh are currently concentrated in the districts of Aceh Besar, Aceh Tenggara, Aceh Singkil and Aceh Timur, which, coincidentally, are areas where there are conservation sites or places covered by the Leuser Ecosystem, one of the richest bastions of tropical rainforest in Southeast Asia. Local people's homes tend to be built from cheap and renewable softwoods and bamboo, rather than the tropical hardwoods so desired by international markets, yet logging permits for hardwoods have increased dramatically. The inference is that corrupt politicians have used the tsunami's effects as an opportunity to make money, and indeed former governor Abdullah Puteh is now in jail for corruption.

Habitat fragmentation

The impact of habitat fragmentation has been well documented by writers such as Jared Diamond. In very general terms, smaller areas support lower biodiversity and smaller populations. Although black, Sumatran and Javan rhinos are largely solitary animals, they still need to be part of a larger population for genetic diversity and breeding to take place. Many conservation biologists consider 15-20 individuals to be the minimum number of rhinos needed for a successful breeding nucleus capable of recovering to viable population levels, which is 50-100 rhinos for an individual population and perhaps 2,500 to 5,000 of all

populations combined, i.e., a metapopulation. A metapopulation is a collection of separate subpopulations among which animals can move because there are corridors or can be moved by managers. With any fewer than 15 or so, reproduction chances and long-term genetic viability are compromised. (Of course, there are examples of wild populations that are fewer in number and which are breeding nonetheless.)

So if the habitat becomes fragmented, then rhino populations are smaller. With so few animals surviving, the loss of even a few individuals may easily become fatal for the species. Even if a few animals survive, the reproductive process can be disrupted by an uneven sex, unbalanced age structure, or reduced rates of inter-sexual encounters. There are indications that this has happened in many areas, most recently in the Kerinci-Seblat National Park in central Sumatra. Therefore it's vital that all rhino surviving receive the strictest protection achievable in the wild and that through evacuations from unviable situations, translocations and captive breeding, the existing populations can be reinforced and new one established.

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