

The Proposed Translocation of the Javan Rhinoceros *Rhinoceros sondaicus*

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ABSTRACT

Ujung Kulon is the last stronghold of the Javan rhinoceros, with a population estimated to be 54. None survive outside, even in zoos. The sudden death in 1982 of five animals, perhaps as a result of an epidemic disease, underlined the vulnerability of these rhinos. Among the measures proposed to safeguard the animals from early extinction was the translocation of a nucleus of breeding individuals from Ujung Kulon to the Pulau Panaitan nearby or the Way Kambas Game Reserve in Sumatra. In principle, the translocation of Javan rhinos into Way Kambas is justifiable in that the animal lived there a few decades ago, and despite indiscriminate logging in the past, appropriate habitats still exist there. However, the main concern is over the present inadequate anti-poaching measures and the easy accessibility of the reserve to poachers. Way Kambas is also situated in one of the most densely populated provinces of Sumatra. The rhinos in Ujung Kulon represent a highly inbred population and are therefore vulnerable to the effects of inbreeding depression and other stochastic processes. We suggest that there is a strong case for translocating a proportion of the Javan rhinos from Ujung Kulon when their numbers have increased to about 80 individuals, and when such expertise becomes available to carry out the translocation in safety. As a first stage, captive, free-range breeding of a few individuals in the Pulau Panaitan within the Ujung Kulon National Park complex

is recommended. We are not convinced that the available security in Way Kambas Game Reserve in Sumatra is sufficient to guarantee the survival of the Javan rhinos.

INTRODUCTION

The Javan or lesser one-horned rhinoceros *Rhinoceros sondaicus* Desmarest, 1822, is restricted to the Ujung Kulon National Park at the western tip of Java (Fig. 1). It is found nowhere else and none survive even in zoos. Of the three extant species in Asia, the Javan rhino perhaps faces the bleakest prospects for long-term survival because the small population size makes it vulnerable to sudden perturbations in the environment. Twenty years ago, only about 20 were known. In an effort to save the rhino from early extinction, the World Wildlife Fund (WWF) launched a conservation programme in 1967, as a result of which the number of rhinos in Ujung Kulon has more than doubled (Fig. 2).

At the beginning of 1982, five rhinos were found dead in a very restricted area in Ujung Kulon, emphasising the plight of these animals. They were thought to have succumbed to an epidemic disease such as anthrax (Schenkel & Schenkel, 1982). An outbreak of *Septicaemia epizootica* in November 1981 was believed to have been responsible for the death of about 50 buffaloes and 350 goats in the neighbourhood of Ujung Kulon. In an effort to safeguard the remaining rhinos from further epidemics, Schenkel & Schenkel (1982) recommended *inter alia* the translocation of a breeding nucleus from Ujung Kulon to another suitable reserve, such as the Way Kambas Game Reserve in Southern Sumatra (Fig. 1). This paper is an attempt to assess the feasibility of such a translocation.

Ujung Kulon National Park

Ujung Kulon National Park is situated at the extreme western tip of Java (Fig. 1) and includes not only the Ujung Kulon peninsula (30 000 ha) but also the two northern islands of Pulau Peucang (441 ha) and Pulau Panaitan (12 034 ha) and the Gunung Honje reserve (10 000 ha) in the east. The whole complex lies between 6°38' and 6°52' south latitude and 105°12' and 105°30' east longitude. It was first established in 1921 as a Game Reserve, being declared a National Park in 1980,

and has remained in a wild state ever since the eruption of the Krakatau Volcano in 1883, which destroyed the Pulau Peucang (Veth, 1912). The 20-m high tidal waves also destroyed 25–30% of Ujung Kulon, especially along the northern and northeastern coasts (Hoogerwerf, 1970). Primary

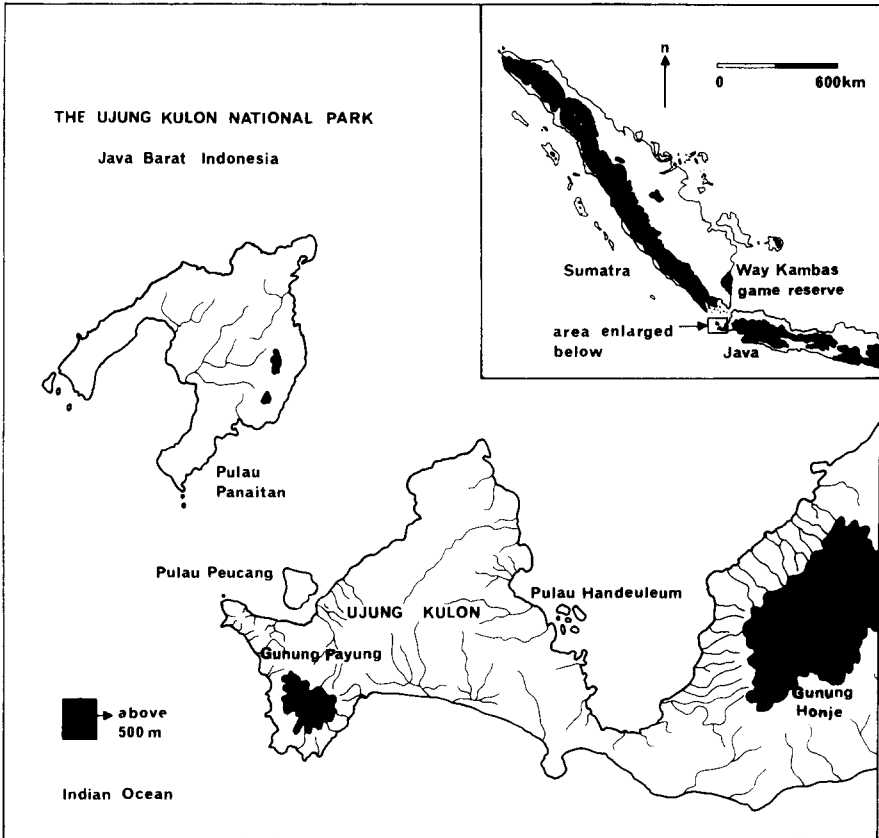


Fig. 1. Map to indicate the relative positions of Ujung Kulon, Pulau Panaitan and Way Kambas Game Reserve.

forest vegetation is found in the interior, especially along the slopes of Gunung Payung. According to Hommel (1983), most of the vegetation in Ujung Kulon is largely semi-deciduous in character except in the southwestern parts, where evergreen forests predominate. The middle canopy is largely composed of *Ardisia humilis* while *Arenga obtusifolia*

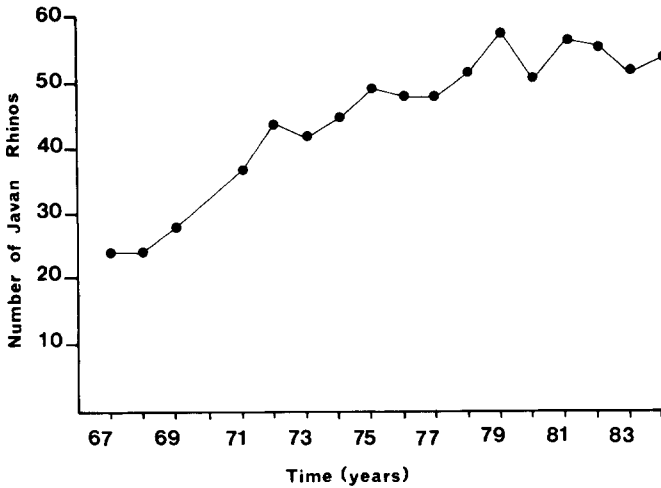


Fig. 2. Changes in the number of Javan rhinos in the Ujung Kulon National Park, Indonesia (Source: Ujung Kulon National Park Office, Labuan, Java Barat, Indonesia).

represents the commonest palm (Schenkel & Schenkel-Hulliger, 1969; Dransfield, 1971). The Park has a maritime climate with an annual rainfall of 3000 mm.

Today the National Park represents the last stronghold of the Javan rhinoceros, the entire population of this species being restricted to Ujung Kulon peninsula (30 000 ha). Hoogerwerf (1970) and Schenkel & Schenkel-Hulliger (1969) provide information on their ecology while Rookmaaker (1983) gives an excellent bibliography on rhinoceroses in general.

TRANSLOCATION

Large mammal translocation is frequently a controversial issue, which, as Smith (1954) points out, often receives widespread approval before its worth has been given serious consideration. Re-introduction of any animal into an area in which it no longer occurs should not be undertaken without competent ecological advice (IUCN, 1970). During the translocation of some of the threatened rhinos from the unprotected borders of Meru National Park in Kenya, 8 animals out of 42 died shortly after (Martin & Martin, 1982). Such high losses would be unacceptable in the case of the Javan rhinos in Ujung Kulon and thus even greater caution is needed before attempting their removal. Their rarity alone

would not permit any experimentation. The successful translocation of the Indian rhinos *Rhinoceros unicornis* from the Kaziranga National Park in Assam to the Dudhwa National Park in India in 1984 was carefully carried out and the whole operation involved a feasibility study, and preparatory, release and follow-up phases (Singh & Rao, 1984).

On the question of re-introduction, IUCN states that 'where a wild species has become locally extinct and the reasons for its disappearance have been removed without any radical alteration in the condition of the habitat, it may be re-introduced with relative safety into its old range, because it will be again interacting with the biotic and physical system in which it evolved' (Petrides, 1968). Thus the re-introduction of the Javan rhino into the Way Kambas Game Reserve in Sumatra appears, in principle, to be justifiable in that the animal once lived there and became extinct in 1961. However, since then the reserve has been drastically altered as a consequence of indiscriminate logging. Over 70% of the reserve has become converted to scrubby bush and along along *Imperata cylindrica* grasslands (Caufield, 1984). If rhinos can survive in logged forests (Van Strien, 1985), then the present condition of Way Kambas Game Reserve should not be a powerful argument against their relocation. The reserve has appropriate habitats for the rhinos, viz. mudflats, sandy beaches, mangroves, freshwater (non-peat) swamp forests, lowland forests, patches of dipterocarp forests, rivers and estuaries. Plants such as *Glochidion sericeum*, *Hibiscus tiliacum*, *Ardisia humilis*, *Leea indica*, *Rhizophora conjugata* known to be eaten by the Javan rhino in Ujung Kulon are also present in Way Kambas.

Poaching

But the main cause for concern in making a re-introduction to Way Kambas at present is security. The reserve is easily accessible to poachers and the present anti-poaching measures are inadequate to guarantee the rhinos' survival. It is relatively easy for a single poacher to kill a rhino and remove its horn without attracting attention (Western, 1982), for unlike the elephant the rhino is rather solitary and has a small home range. On the other hand, the killing of elephants for their tusks requires the co-operative help of a number of poachers. In Kenya, intensive poaching was responsible for the reduction of rhino numbers to near extinction (Hillman & Martin, 1979); and the first priority in Ujung

Kulon Park itself must be the effective protection of the Park against poachers. Even as recently as March 1985, three poachers were arrested for killing a rhino in December 1984. In the early 1960s, one-third of the Javan rhinos fell victim to poachers (Martin & Martin, 1982). Today the average retail price of 1 kg of rhino horn on the black market can be as high as US\$4000 (equivalent to eight years' salary of a game guard). As long as rhino horn fetches such a high price, poachers will always have a strong incentive to break the law. The existing penalties do not seem to act as an effective deterrent.

Nevertheless, the population of Javan rhinos in Ujung Kulon seems to have increased. Since 1979 the increase has been slow and today the rhinos may be approaching the carrying capacity of the Park (Fig. 2) judging from the census figures available in the Park office. However, in the past, Ujung Kulon had a much larger population of rhinos (Hoogerwerf, 1970); and it is likely that the present increase will continue provided the food resources are adequate. Schenkel *et al.* (1978) point out that population density might be limited either by the constraints of the carrying capacity or by intraspecific intolerance and avoidance. Therefore, while efficient anti-poaching measures should be adopted in the Park, a simultaneous programme to improve the carrying capacity of the area along the lines recommended by Schenkel *et al.* (1978) should also be attempted.

Way Kambas Game Reserve (130 000 ha) is more than four times the size of the Ujung Kulon peninsula and is surrounded on three sides by cultivated areas and human settlements. Its eastern boundary is 60 km of sea coast. The reserve is situated in one of the most densely populated provinces in Sumatra, namely Lampung. Between 1961 and 1980, the human population in Lampung province increased from 1.6 to 4.6 million, largely due to the influx of transmigrants from over-crowded Java (Scholz, 1983). In 1961 the population density was 50 per km², but in 1980, it had risen to 139 per km². Plans have been made to declare Way Kambas a National Park but before this is done legislation should be tightened to make anti-poaching efforts more effective.

REPRODUCTION AND GENETIC CONSIDERATIONS

It would also be expedient to heed the recommendations of Jungius (1978) that a captive breeding unit be established in which animals can

be kept under free-range conditions. Surplus animals could then be translocated at appropriate times. Such a captive breeding unit for the Javan rhino could be established in the nearby island of Pulau Panaitan, which is now part of the Ujung Kulon National Park complex. It is about 120 km² and should therefore be able to accommodate a maximum of 12 animals. At present the major disturbance to this island comes from illegal fishing and wood collection. These activities could be stopped by strengthening the guard posts. However, we feel that there should be no translocation until the population has increased to about 80 and expertise is available to ensure that the work is done effectively. The size of the reserve may mean that released animals might lose contact with one another, and the possibility of sexually receptive individuals meeting will decrease as the population size is reduced and the area increased. The reproductive potential of the rhino is low and oestrus in females lasts only 24 h.

A long-term conservation policy should consider the maintenance of genetic variation in natural populations. The rhinos in Ujung Kulon represent a closed population with a possibly high degree of inbreeding through lack of immigration. This is likely to have caused a decline in variability. There is unfortunately no accepted 'Plimsoll line' when assessing what population size is 'safe' and what is 'unsafe' (Grieg, 1979). There are many examples in favour of successful establishment of populations from a few individuals. Père David's deer *Elaphurus davidianus*, now numbering more than 800, represent animals that started from fewer than a dozen (Bower, 1980).

The analysis of the cause of death of the rhinos in Ujung Kulon overlooks the role of inbreeding, which could lead to an increase in the effects of deleterious genes within a small population. There is evidence for a correlation between the level of inbreeding and poor breeding rates in Prezwalski's horse (Bouman, 1977), and the implications for the Javan rhino in Ujung Kulon are serious, for a small, isolated population may subsequently become extirpated from an area by its inability to adapt to selection pressure (Miller, 1979). Van Strien (1985), on the basis of a detailed study of the Sumatran rhinoceros *Dicerorhinus sumatrensis*, recommended a minimum population size for short-term and long-term survival of 70 and 700 individuals, respectively. The effective population size for immediate and long-term fitness should be 50 and 500, respectively (Frankel & Soulé, 1981). The population of Javan rhino in Ujung Kulon National Park is estimated to be about 54

(Haerudin, 1984), which would mean that the prospects for its short-term survival, though grim, are not entirely hopeless. Small populations of rhinos have survived and increased in number under careful management and effective protection. In the Kaziranga National Park in Assam, the number of Indian rhinos increased from a few specimens in 1908 to about 150 in 1950 (Hoogerwerf, 1970), and today the total has reached about 1000 (Singh & Rao, 1984). Likewise in the Umfolozi Reserve in South African Zululand, the number of white rhinos *Ceratotherium simum* increased from a stock of 20 to well over 600 in an area of comparable size to that of Ujung Kulon (Schürte, 1960). Very strict protective measures enabled the rhinos in the Garamba National Park in Zaire to increase from 100 in 1939 to more than 1000 in 1963 (Verschuren, 1967).

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