STATUS OF THE JAVAN RHINO IN UJONG KULON NATIONAL PARK

by Charles Santiapillai, Widodo Sukohadi and Bambang Petrus Darmadja

INTRODUCTION

The Javan rhino (*Rhinoceros sondaicus* Desm.) is one of the most highly endangered species of large mammals in the world. Ujung Kulon National Park harbours what appears to be the only viable population of Javan rhino. Recent reports from Indo-China confirm the presence of Javan rhino in Vietnam, but the numbers there are so small and the habitat so unprotected that the animals there appear to have no long-term future in the wild. Hence, global concern has focussed on the plight of the Javan rhino in Ujung Kulon National Park. The high price of the rhino horn, both locally and abroad, means that the Javan rhino is under constant threat from poachers. The absolute protection of the park and its rhinos must therefore be the highest priority for action in the short-term.

In an effort to enhance the conservation of the Javan rhino in Ujung Kulon, an inter-organizational meeting convened by the Species Survival Commission (SSC) of the International Union for Conservation of Nature and Natural Resources (IUCN), the Directorate-General of Forest Protection and Nature Conservation (PHPA) and the World Wide Fund for Nature (WWF) was held in Bogor on 5-7 June 1989. Prior to this meeting, a survey was carried out in Ujung Kulon jointly by the PHPA and WWF in order to assess the status of the Javan rhino so that the necessary action could be taken to enhance the conservation of the species and improve its long-term survival in the wild. This paper discusses the outcome of the survey.

It's been nearly three years since the last survey was carried out with the view to censussing the Javan rhino in Ujung Kulon. The 1986 survey carried out by the Ujung Kulon staff revealed that there were at least 54 animals. In 1982, 5 rhinos were found dead along the south coast (Haerudin, 1987). Since then at least 2 animals were officially known to have been killed by poachers (Widodo & Santiapillai, 1989a). It was, therefore, time to carry out another survey of the entire area in order to assess the status of the Javan rhino in Ujung Kulon.

The Study Area

Ujung Kulon National Park is situated at the south western tip of Java (Fig. 1) and covers an area of 30,000 ha. The topography is dominated by the Gunung Payung (480 m) in the west and by Gunung Honje in the east. The vegetation is varied ranging from primary forests on Gunung Payung to secondary vegetation in the north and south (Ammann, 1985). The eruption of the Krakatau volcano in 1883 meant that a large portion of the forests in the north would have been heavily submerged and subsequently would have undergone profound changes. The vegetation on the south coast was altered not by the volcanic eruption, but by the activities of man in connection with agriculture (Hoogerwerf, 1970). The Javan rhino, in comparison to the Sumatran rhino, has a preference for the lowland forests and is known to survive well in secondary vegetation (Schenkel & Schenkel-Hulliger, 1969).

METHOD

Given the dense and tangled nature of the vegetation in Ujung Kulon, it would be almost impossible to census the Javan rhino by direct observation. For the same reason, an aerial survey would be expensive and worthless. Therefore, the census relied on an indirect method that involves the identification of the

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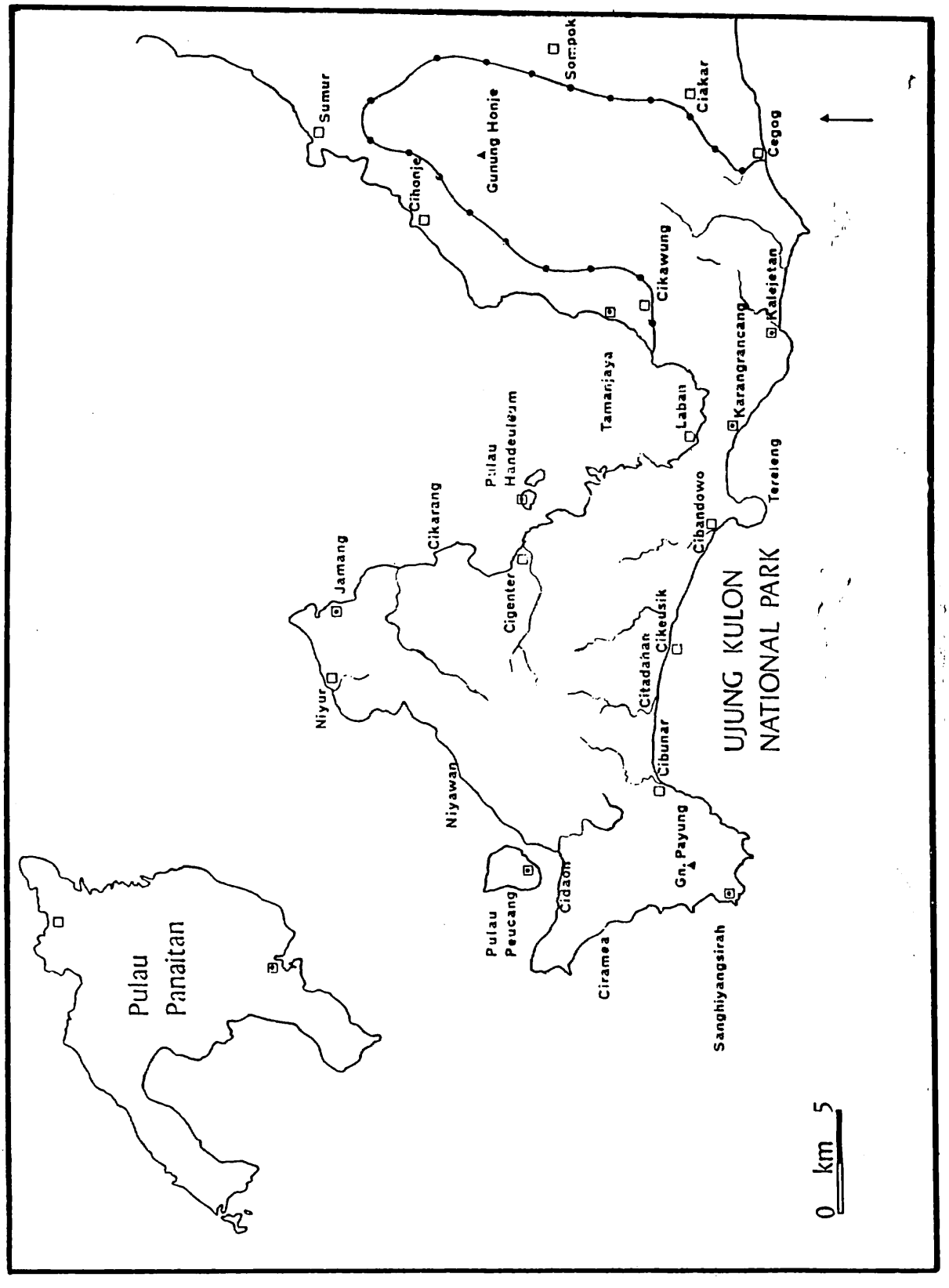

Fig. 1 Map of Ujung Kulon National Park located at the south-western tip of Java

rhinos on the basis of their foot-prints. The method was adapted from that carried out by Schenkel & Schenkel-Hulliger (1969) in which a number of survey teams scour through the entire park observing and recording all fresh rhino signs. In this joint survey by PHPA and WWF, there were 12 teams each with 4 guards. One of the guards in each team was experienced in tracking rhinos on the basis of the foot-prints. In addition to these teams, Widodo S. Ramono, Charles Santiapillai and Pak Aspuri carried out a survey of the Gunung Kendeng area that stretches from Cidaon to Cibunar and along the south coast to Citadahan and then northwards to one of the tributaries of the Cikeusik river (Fig. 1). Before the census was carried out, the teams were taught how to observe and record the foot-prints by one of the authors, Mr. Widodo S. Ramono, so as to make their data comparable. The 12 teams were dropped at strategic places (Fig. 2) to enable them to reach their target areas and the census was carried out on two days (28 and 29 May) in which only those foot-prints that were fresh (i.e less than 48 hours) were measured and recorded.

We avoided cutting permanent transects in which to record rhino presence and activity for two reasons: first of all it was very time consuming and secondly, the method is not without its drawbacks. Rhinos, like human beings, prefer to walk down paths; therefore, foot-print density will be higher along the transects than in the surrounding forest. Because of such considerations, Schenkel & Schenkel-Hulliger's (1969) method, despite its limitations, provided the best means for a rapid assessment of rhino numbers and density.

RESULTS

Rhino Distribution

On the basis of the foot-prints alone, the survey confirmed Schenkel & Schenkel – Hulliger's (1969) observations that the Javan rhino is a wanderer and is distributed over a wide area in Ujung Kulon. If other indicators such as presence of wallows and middens were to be included, the area occupied by the Javan rhino would be much larger. One of the reasons for the nomadic behaviour of the Javan rhino is the variety of plants the animal has to feed on (Hoogerwerf, 1970). It would also increase the chances of an animal encountering its conspecifics in the area. Staying on in a particular area and feeding might be a disadvantage to such a large herbivore.

The area where most of the foot-prints were recorded was near IX. Citadahan (Fig. 2) which accounted for 34.1% of all the foot-prints observed (85) in the park. The least active rhino

Table 1: The proportion of different age-classes

Age-class	I	II	III	IV	V	Total
Est. age	<0.5yr	.5-1	1-2	3+	3+	
Foot-print	<20cm	20-23	24-25	26-28	29-30+	
	–	–	12	35	11	58
%	0	0	20.7	60.3	19.0	100

Note: category IV denotes adult females and subadult males while category V includes adult males and the oldest females.

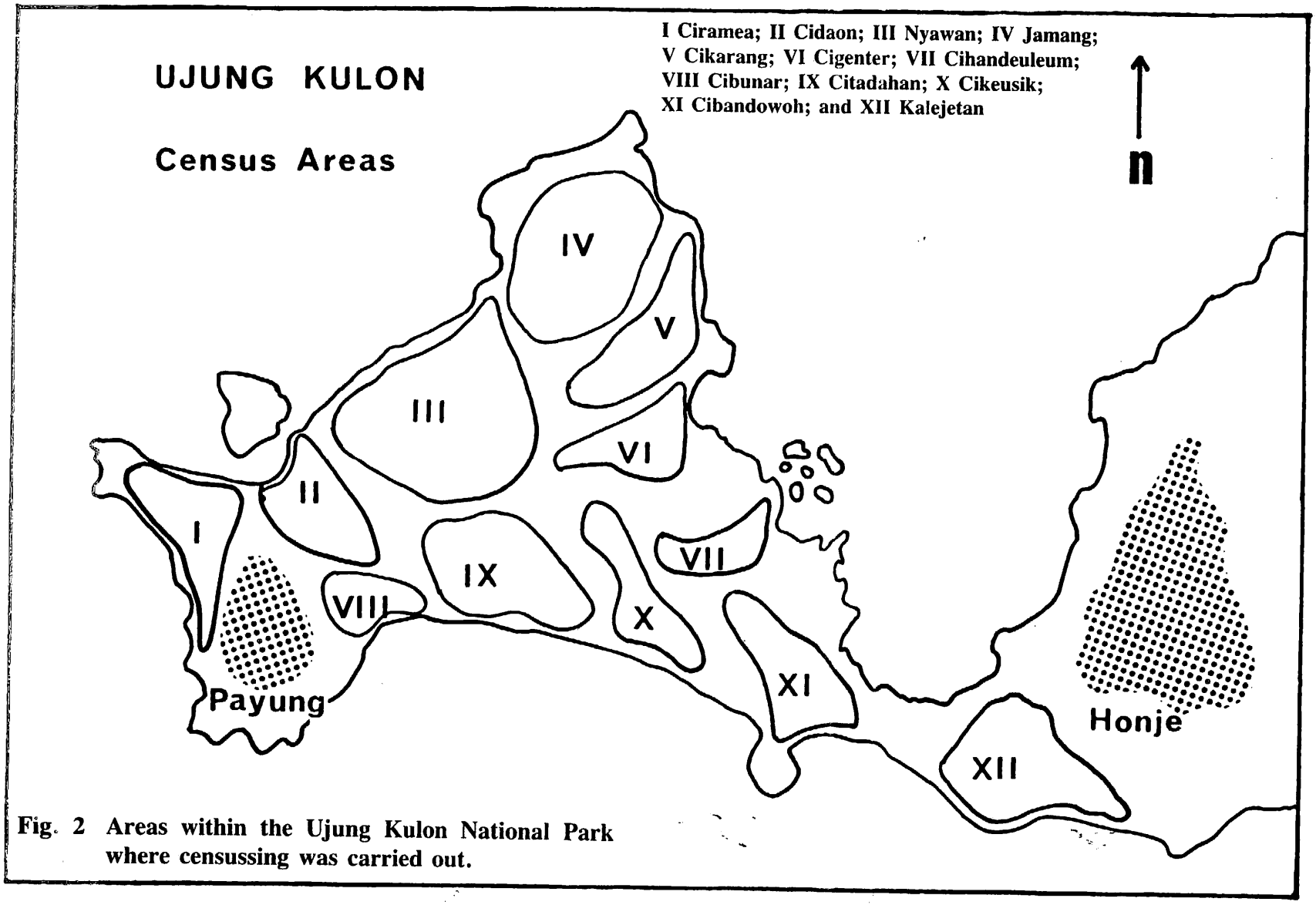

Fig. 2 Areas within the Ujung Kulon National Park where censussing was carried out.

area was near V. Cikarang west of Tanjung Balagadigi (1.2% of the foot-prints). It is interesting to note that the area near III. Nyawan, which in November 1988 indicated a low rhino activity, showed a much higher rhino activity in May 1989 as indicated by the number of fresh rhino prints seen here (13% of the total). This indicates that the rhinos do shift their feeding areas from time to time and from one season to another. The census also confirmed earlier observations (Schenkel & Schenkel-Hulliger, 1969; Ammann, 1985; Widodo & Santiapillai, 1989b) that the Javan rhino has extended its range across the Karangrancang-kalejetan area.

Population Structure

In order to study the population structure, we followed the classification of the age classes provided by Schenkel & Schenkel-Hulliger (1969) which identified five categories (Table 1) on the basis of the width of the fore-foot. In this analysis, all the fore-foot print measurements of the higher total (n = 58) were used.

As can be seen in Table 1, the population appears to be composed of sub-adults (20.7%), adults (60.3%) and very old animals (19.0%). The young and juveniles were not recorded in the census. This does not mean that younger animals were absent. There can be many reasons why these categories were not scored. First of all, calves are difficult to detect on the basis of foot-prints as their foot-prints are less deeply embedded on the soil. Furthermore, because their foot-prints are small, they could be easily overlooked (Ammann, 1985).

Also, not all the areas in the park were

Table 2: The measurements of hind-foot/fore-foot (cm) recorded in Ujung Kulon in the 12 areas

I	(Ciramea):	25/26, 26/27, 26/27, 27/28, 24/25, (no. of rhino = 3)
II	(Cidaon):	26/27, 29/30, 23/24, 26/27, 24/25, 27/28, 25/28, 27/28 (n = 6-7)
III	(Nyawan):	28/29, 26/27 27/28, 24/25, 26/27, 26/27, 28/30, 26/27, 24/25, 28/29 (n = 5-7)
IV	(Jamang):	28/29, 27/28, 23/24 (n = 3)
V	(Cikarang):	26/27, (n = 1)
VI	(Cigenter):	24/25, 25/26, 24/25, 24/25 (n = 2-4)
VII	(Cihandeuleum):	28/29, 26/27, 25/26, 26/28 (n = 4)
VIII	(Cibunar):	25/26, 25/27, 30/31 25/26, 29/30, 27/28 (n = 6)
IX	(Citadahan):	26/27, 25/26, 26/27, 25/26, 27/28, 28/29, 24/25, 27/28, 25/26, 26/27, 26/27, 27/28, 27/28, 24/25, 24/25, 24/25, 23/24, 23/24, 27/28, 27/28, 26/27, 23/24, 26/27, 25/26, 24/25, 28/29, 25/26 23/24, 24/25 (n = 7-10)
X	(Cikeusik):	26/27, 27/28, 27/29, 26/27 (n = 3-4)
XI	(Cibandowoh):	25/26, 27/28, 23/24, 25/26, 28/29 (n = 4-5)
XII	(Kalejetan):	26/28, 25/27, 25/26, 25/26, 20/30 (n = 4)

thoroughly surveyed. Inaccessible areas where the calves and their mothers are more likely to stay were not surveyed within the short time available. Therefore, these smaller categories could easily have been overlooked. It is often that these young age classes are under-represented in any survey.

The smallest fore-foot print observed was 24.0 cm while the largest measured 31.0 cm.

Population Size

The raw data from the census done in May given in Table 2, while Table 3 gives the final minimum and maximum estimates of the number of Javan rhino and the average estimate of the total population size as deduced from the data in Table 2.

The 57+ Javan rhinos occupy an area of 300 km^2, giving a crude density of 0.19/km^2. The census estimate must be regarded as an under-estimate as not all the animals present could have been counted. In the two censuses carried out by Ammann (1985) in 1978 and 1980, the population size was estimated to be 49.5 and 52 respectively (mean values). Haerudin (1987) estimated the number of Javan rhino in Ujung Kulon in 1984 to be 52. In the last survey carried out by the PHPA in 1984, the number of rhinos was estimated to be 54 (B. Darmadja, pers. comm.). Since 1984, at least 2 animals were known to have been killed by poachers (Widodo & Santiapillai, 1989a). The May 1989 census data indicate that the population of Javan rhino in Ujung Kulon appears to have grown slightly in number and could well be approaching the carrying capacity of the habitat.

In the estimation of the number of rhinos within the 12 areas surveyed, the census figures were arranged contiguously in order to see if an animal with a particular combination of hind-foot/fore-foot measurements could be seen moving into the adjacent area. In such instances, two or more animals with identical measurements were scored as one. On the other hand, if the same combinations of measurements were recorded at distances of over 3-4 km, then it was thought to belong to separate animals. This method of elimination has many pitfalls and it is no doubt highly subjective. There is no way in which we can be certain that two foot-prints that differ very slightly do belong to separate individuals. The foot-prints of the same animal can show significant differences depending on the nature of the soil and weather conditions. During the survey it rained to most areas, but not heavily. This enabled the survey teams to score many foot prints that were visible clearly on the soft soil. In this way, much of the foot-prints that were recorded and measured were those of the animals that moved within the past 48 hours or so.

Conservation Implications

Despite the encouraging signs of a slight increase in number since the last survey in 1986, the Javan rhino population is still highly endangered and is vulnerable to poaching, habitat destruction and catastrophic changes in the environment (such as the volcanic eruption as in 1883). Population viability analysis (PVA) indicates that the loss of 3 animals/year to illegal hunting could drive the population to extinction within two decades. Given this background the

Table 3: Census results

1989	Lower total	Higher total	Mean
	48+	58+	
from Gn. Kendeng*	4	4	
Total	52+	62+	57+

* *Data from census carried out independently by Widodo, Santiapillai & Aspuri*

overwhelming short-term conservation action must be to strengthen the protection of the park to such an extent that the losses due to poaching are reduced to zero.

On the other hand, it is equally clear that the Javan rhino population in Ujung Kulon is not large enough to guarantee the long-term survival of the species *in situ*. It is too small for long-term viability in ecological, demographic and genetic terms. An analysis of the census data for the past ten years indicates that the numbers have fluctuated between 50 and 60. This could well mean that the population might be approaching the carrying capacity of the habitat. If this is so, then the population in Ujung Kulon is unlikely to increase substantially in the years to come. In the worst case scenario, the absence of young animals might indicate a self-regulatory behavioural response of the population reaching the carrying capacity (K) of its environment.

It would therefore be prudent if a second population of Javan rhino could be established somewhere within its former range in Indonesia. The two areas that were once considered for the translocation of a founder population of Javan rhino from Ujung Kulon are the Pulau Panaitan and the Way Kambas Game Reserve, recently declared a National Park (Santiapillai & Suprahman, 1986). The lack of fresh water throughout the year in the Pulau Panaitan effectively rules out the long-term survival prospects of the founder population. The Way Kambas National Park, with its new status and increased protection, appears, therefore, the best site for the re-introduction of the Javan rhino in its former range. (The last Javan rhino was shot in Way Kambas in 1931).

However, the immediate concern for the genetic and demographic survival of the species is to rapidly increase its number. This would indicate a carefully managed captive breeding programme, preferably established near the translocation site itself, so as to minimise the risks attendant on the transport of animals from distant areas. In the meantime, the translocation site must be rehabilitated both ecologically and politically (Warland, 1975) if future translocations are to succeed. Large mammal translocations are often controversial issues where mortalities can be high. For a variety of reasons, the mortality among the Sumatran rhinos that were transported beyond the borders of their countries was very high – up to 60% (Khan, 1989 in press). Such high losses would be unacceptable in the case of the Javan rhino in Ujung Kulon. Their rarity alone would not permit any experimentation.

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PHASIANIDAE AND THEIR MANAGEMENT IN PUNJAB – PAKISTAN

by Abdul Aleem Chaudhry and Umeed Khalid

Punjab has been endowed with an assortment of Phasianids, some of which provide sportsmen the thrill of hunting, whereas some others have been hanging on a thread waiting for their fate to be decided by "Man". Amongst the pheasants, Chir pheasant *(Catreus wallichii)* has been extinct since 1956 and efforts are underway to breed them in captivity and re-introduce them in their natural habitat. White Crested kaleej *(Lophura leucomelana hamiltonii)* is still holding on. Indian Red jungle fowl *(Gallus gallus)* is not to be found within the boundaries of the Punjab province. Peafowl *(Pavo cristatus)*, though rarely found in the wild, is well represented in captive collections.

The partridges, excellent game and table birds, are represented in the Punjab by Chukor *(Alectoris chukar chukar)*, Seesee *(Amnoperdix grisecgularis)*, Indian black partridge *(Francolinus francolinus asiae)*, and North Indian grey partridge *(Francolinus pondicerianus interpositus)*, all of which have a fair population and are managed for the sportsmen.

Chukor inhabits the Salt and Suleiman ranges in the Punjab, affecting barren, stony, sparsely scrub covered hillsides strewn with boulders in the neighbourhood of cultivated riverine valleys ranging between 800 to 1500 metres above sea level. Seesee have a similar