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STATUS OF THE SWAMP DEER *CERVUS DUVAUCELI DUVAUCELI* IN THE DUDWA,  
NATIONAL PARK, UTTAR PRADESH

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# STATUS OF THE SWAMP DEER *CERVUS DUVAUCELI DUVAUCELI* IN THE DUDWA NATIONAL PARK, UTTAR PRADESH<sup>1</sup>

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(With three text-figures)

Despite protection to the Dudwa National Park since 1968, the swamp deer population has continued to decline. Satiana, which had about 1200 swamp deer in the early 1970s currently has only 300. In other areas, the population has remained static or has increased as in Kakraha. The reason for this decline at Satiana is the seasonal movement of the deer into two marshes that lie outside the Park in agricultural areas. Protection in these areas is non-existent and poaching presumably takes a heavy toll. It is suggested that a fence be erected along the Park boundary at Satiana to prevent the seasonal movement of swamp deer into agricultural areas.

## INTRODUCTION

Most threatened species of deer occur in isolated rural areas of developing countries where wildlife poaching and pressures on wildlife habitats, to graze stock, cut grass or collect fuel is frequently intense (Holloway 1975). The rapid decline of the swamp deer *Cervus duvauceli duvauceli* in the terai of Uttar Pradesh (U.P.) over recent years is a case in point. This despite the establishment of two sanctuaries, Kishanpur and Katemiaghat, and the Dudwa National Park with the objective to conserve this species. Out of eleven areas where swamp deer were reported in the mid 1960s (Schaller 1967) only three held any 'reasonable' numbers by the early 1970s (Holloway 1973). The situation has deteriorated in some areas (Table 1).

Preferred habitat of the swamp deer are marshes and grasslands. Due to the repatriation of settlers throughout the terai of U.P. most of the grassland have been converted into agriculture in the past, the predominant crops being sugarcane *Saccharum officinarum*, wheat *Triticum aestivum* and paddy *Oryza sativa*. Forestry policies have often considered grasslands as 'wastelands'. The resulting planting of exotics and indigenous tree species in grasslands has converted several good grassland habitats into woodlands (Rahmani *et al.* 1988). In addition, relentless hunting has decimated the large herds that were seen in the terai belt (Singh 1973). Today, North Lakhimpur, South Lakhimpur and Pilibhit are the only three forest divisions where swamp deer exist in U.P. Excepting Dudwa Nation-

al Park which holds the largest population, the current status of the swamp deer in other areas of U.P. is unknown.

Despite protection of the Dudwa National Park since 1968, the swamp deer numbers have continued to decline there. The main grasslands of the Park are present along the Suheli river, hence most of the swamp deer are seen along the river which forms the southern boundary of the Park (Fig. 1). The grasslands of Satiana had the maximum numbers of swamp deer. Certain areas that are traditionally used for rutting by the herds at Satiana have not been included in the National Park. This has resulted in the movement of the swamp deer into unprotected agricultural areas for over half the year. Due to the high incidence of poaching outside the Park, the deer numbers continue to decline there. In areas where such movement is not seen populations have remained static or have shown an increase.

## STUDY AREA

In 1968, 212 sq. km, of the North Kheri forest division was declared as Dudwa Wildlife Sanctuary primarily to conserve the swamp deer. On 1 February 1977 the Dudwa Sanctuary was upgraded to a National Park, and covered an area of 614 sq. km, with a core area of 490 sq. km (Fig 1). In 1987 Dudwa National Park was brought under Project Tiger. Along with the Kishanpur Wildlife Sanctuary (158 sq. km core area and 43 sq. km buffer) the Project Tiger area covers 815 sq. km. However, the two forest areas are not contiguous.

The Dudwa National Park is situated between 28°24' and 28°27'N and 80°31' and 80°52'E in the northern extremity of Lakhimpur Kheri district of Uttar Pradesh (Fig. 1). Elevation above sea level

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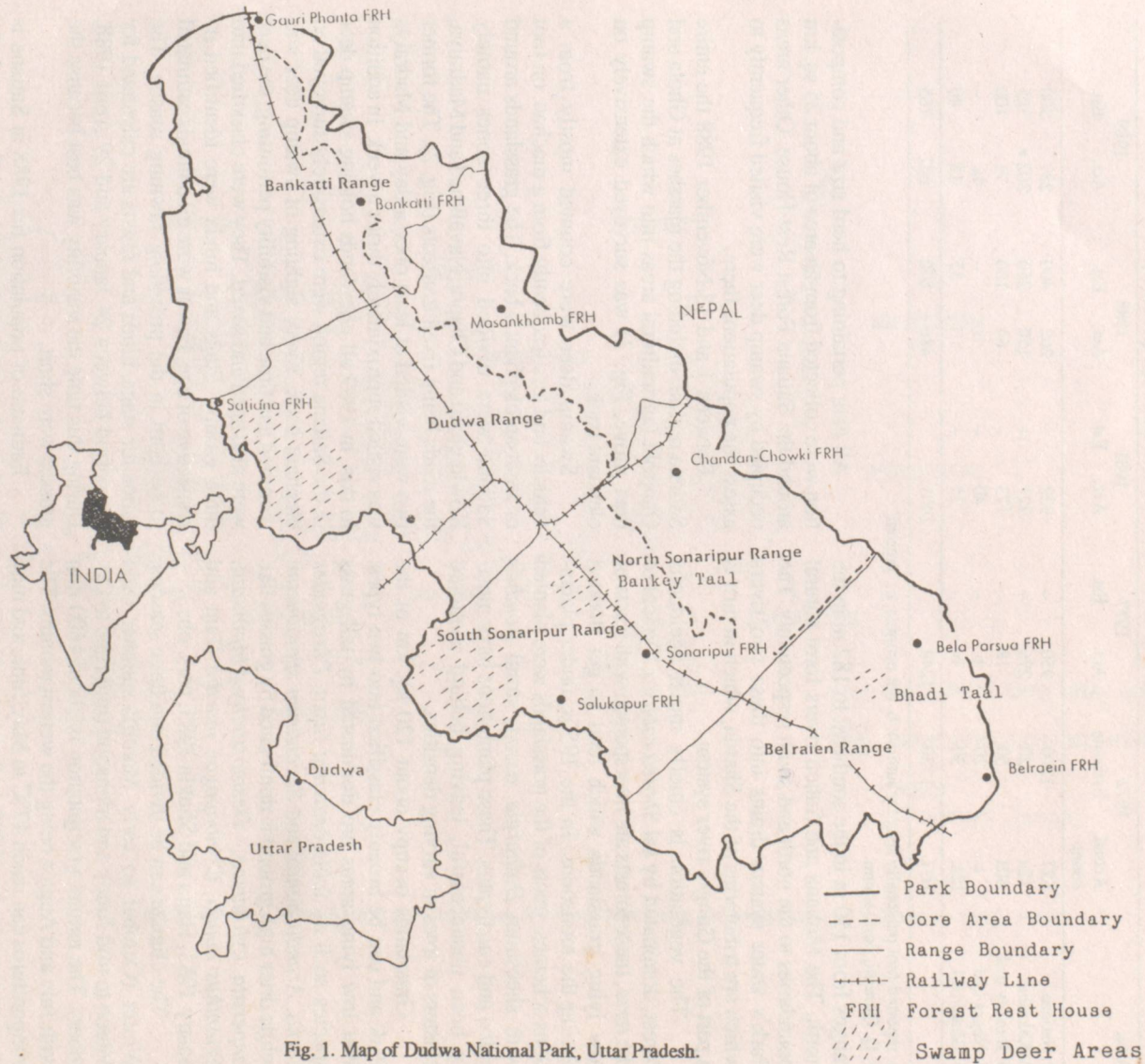


Fig. 1. Map of Dudwa National Park, Uttar Pradesh.

TABLE I  
POPULATION OF SWAMP DEER IN DUDWA NATIONAL PARK AS REPORTED BY HOLLOWAY (1972),  
SCHAAF & SINGH (1977), V.P. SINGH (1984) AND THIS STUDY (1988 & 89)

Area	1972		1977		1981		1988		1989	
	Actual count	Estimate	Act.	Est.	Act.	Est.	Act.	Est.	Act.	Est.
1. Satiana	627	1200	950	—	932	—	262	400	287	300
2. Kakraha	12a	20	276	—	221	—	150	250	302 *	325
3. Bankey taal	40a	50	18	—	173	—	64	100	71	100
4. Nagra taal	c.	20	b.	—	40	—	b.	—	4a.	—
5. Bhadi taal	12a.	30	b.	—	35	—	10	35	18	40
	691	1320	1244		1401		486	800	682	765

a. reported (not personally seen by author); b. not counted; c. 'present'

\* Q. Qureshi, pers. comm.

ranges from 150 m in the southeast to 182 m in the north. The Mohana and Suheli rivers form natural boundaries to the north and south respectively. The Park's water system drains into these two rivers which are tributaries of the Sharda, which in turn is a part of the Ganges river system.

The vegetation is chiefly moist deciduous forest, dominated by sal *Shorea robusta*. Typical of the *terai*, these forests are interspersed with tracts of low lying grasslands which tend to get flooded during the monsoons. In the 1950s, under plantations schemes, tracts of the grasslands were planted with sheeshum *Dalbergia sissoo*, simul *Bombax ceiba* and eucalyptus. These plantations have mostly been unsuccessful, leaving behind scattered clusters of trees in varying densities.

Grasslands occupy about 120 sq. km of the Park and can be broadly classified into two types. Wet low lying areas are dominated by tall grass species such as *Schlerostachya fusca*, *Phragmites karka*, *Arundo donax* and *Saccharum spontaneum* while drier high ground is dominated by grasses like *Imperata cylindrica*, *Desmostachya bipinnata*, *Erianthus munja*, *Cymbopogon martini* (Jain and Sastry 1983, Hajra and Shukla 1983, pers. obs.).

The climate can be divided into three seasons. Winter (October to early March); summer (mid March to mid June); and monsoon (mid June to October). The annual precipitation is about 1600 mm with July and August being the wettest months. The temperatures can reach 47°C in May/June, and may drop to a minimum of 0°C in December/January.

#### METHODS

The study period extended from 22 January 1988 to 22 June 1988, 1 to 13 November 1988 and from 15 February 1989 to 10 July 1989.

All data pertaining to herd size and composition were collected from an area of about 25 sq. km around the Satiana Forest Rest House. Other areas occupied by swamp deer were visited frequently to assess the populations there.

Between 1 and 13 November 1988 the entire Satiana region, including the marshes at Ghola and Ghajrola (agricultural areas into which the swamp deer move, Fig. 2) was surveyed extensively on elephant back.

Swamp deer were counted mostly from a vehicle, and less frequently from a machan, on foot or from an elephant's back. The grasslands around Satiana were divided into three zones namely Kowhaghatti and Chapra, Navalkhad and Madraiya, the roads being fixed transects (Fig. 2). The former two were visited at least once a day and Madraiya was visited approximately thrice a week. In addition to this, in 1989 all grasslands holding swamp deer in the Satiana region were extensively surveyed on elephant back. Every sighting of swamp deer was recorded and time and visibility permitting, the deer were also aged and sexed. They were classified into three groups. Stags and hinds were identified irrespective of age. Fawns were all animals estimated to be born in the preceding fawning season. The ratios for stags, hinds and fawns are calculated for the period between 24 January and 29 April 1988. During this time the visibility was best because the grasses were short.

Estimate of population for 1988 at Satiana is based on the percentage of grasslands covered. As in 1988, counts were made from the roads and only about 65% of the grassland area was visible from the vehicle. Therefore while estimating (Table 1), I have correspondingly calculated for Satiana. In 1989 Satiana was surveyed extensively using elephants.

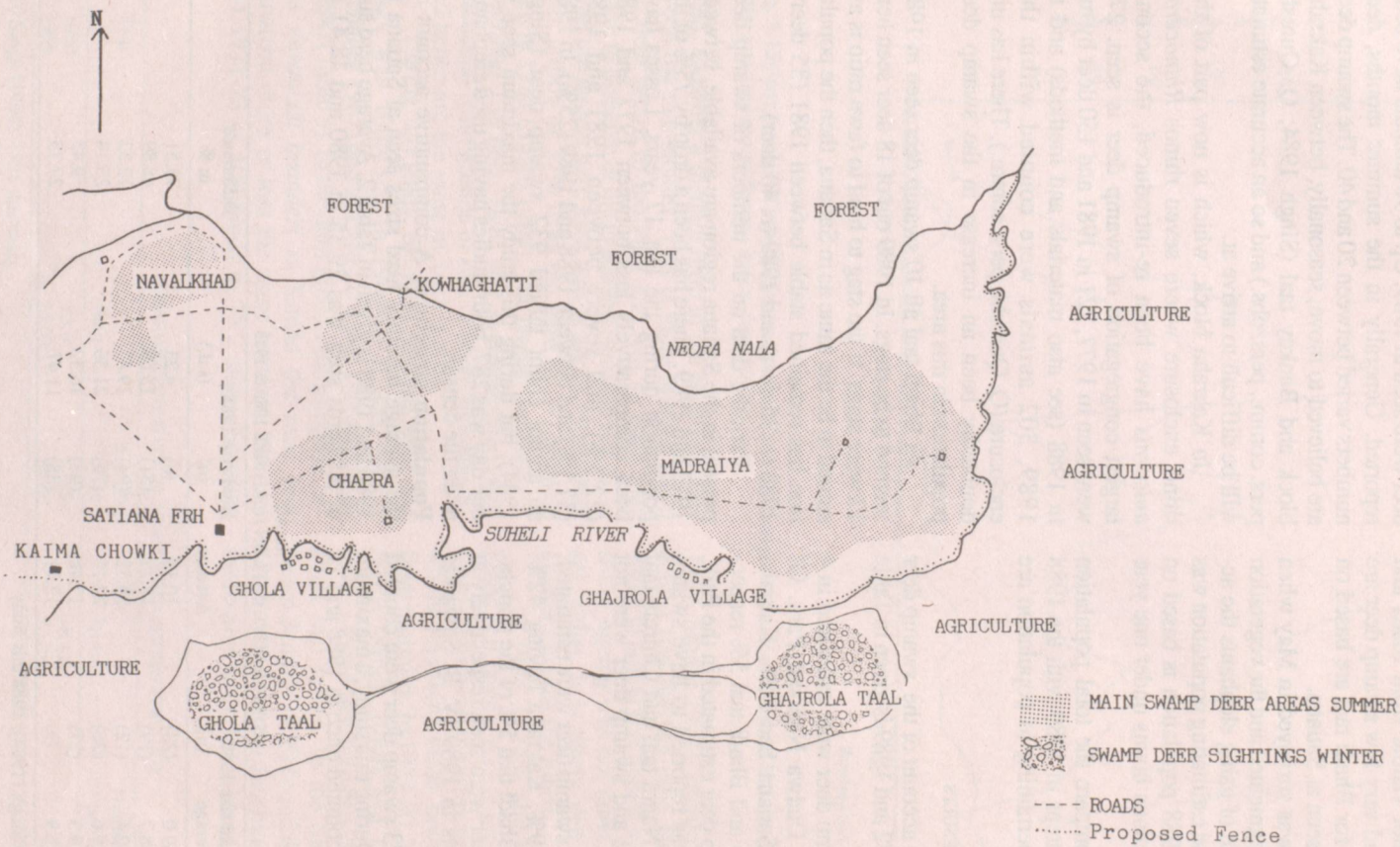


Fig. 2 Satiana (Dudwa Range) showing ranges of swamp deer during end winter/summer and monsoon/early winter.

By this method areas not visible from roads and machans are covered and very few swamp deer are missed. Both estimates for Bhadi taal are based on population structure as seen at Satiana.

In 1988 Kakraha was surveyed in May when swamp deer herds are fragmented and the vegetation is tall. Therefore in spite of using elephants the actual counts were poor and estimating population was difficult. Estimate of 1988 population is based on total 1989 population minus fawns under one year old.

In this paper I compare the total population present in the various areas in 1989 with the 1988 census. Other details pertaining to population are from 1988.

#### RESULTS

**Census:** A comparative account of the swamp deer population between 1972 and 1989 is given in Table 1.

In 1988, 800 swamp deer were estimated in 4 disjunct grasslands of Dudwa National Park. Of these four grasslands Satiana had 50%, Kakraha 31%, Bankey taal 13% and Bhadi taal 5% respectively of the 800 swamp deer estimated in the Park. The remaining two areas reported to have swamp deer (Singh 1984), i.e. Nagra taal and Churela taal were visited only twice and swamp deer were not seen there.

In 1989 about 765 swamp deer were estimated, with Satiana having 39%, Kakraha having 42%, Bankey taal 13%, and Bhadi taal 5% of the population. Four and seven deer were seen respectively at Nagra and Churela taals in 1989 (V. B. Sawarkar pers. comm.)

At Bankey taal 173 swamp deer were counted in 1981 (Singh 1984). During this study, a maximum of 64 swamp deer was counted once in 1988 and 71

deer were seen in 1989. Up to 90 animals have been reported. Generally in the summer months, deer numbers varied between 20 and 40. The swamp deer are believed to move, seasonally, between Kakraha block and Bankey taal (Singh 1984, Q. Qureshi pers. comm., pers. obs.) and so an accurate estimate will be difficult to arrive at.

In Kakraha block, which is now part of the rhino enclosure where seven rhinos *Rhinoceros unicornis* have been re-introduced, the second largest congregation of swamp deer is seen. 276 were seen in 1977, 221 in 1981 and 150 deer by me in 1988 (see also materials and methods) and in 1989, 302 animals were counted within the enclosure (Q. Qureshi, pers. comm.). There has undoubtedly been an increase in the swamp deer population in this area.

At Bhadi taal all 10 swamp deer seen in 1988 seemed to be stags. In 1989 out of 18 deer seen here 12 were stags. If the stag to hind to fawn ratio is assumed to be the same as in Satiana, then the population has remained stable between 1981 (35 deer), 1988 (c. 35 deer) and 1989 (c. 40 deer).

Periodic data on the numbers of swamp deer present in the Satiana region are available, between 1972 and 1989. There has been a drop by 75% of the population during the last 17 years. Losses have been comparatively less between 1972 and 1981 (22.3%), and severe between 1981 and 1988 (57.1%) and between 1988 and 1989 (25%). In 1981 an actual count tallied 932 swamp deer (Singh 1984), but during this study the maximum seen in one day was 287, both studies having used elephants to do the census.

**Population structure:** A comparative account of the average monthly herd sizes seen at Satiana in 1980 and 1988 is given in Table 2. Average herd size of all herds seen was 29.35 in 1980 and 18.41 in

TABLE 2  
COMPARATIVE DATA ON HERD SIZE 1980 & 1988

Months	Herd size 1980		Average	Herd size 1988		Difference in %
	Average	(n)		(n)	(s.d.)	
1. Jan.	39.0	(23)	10.33	(6)	4.23	73.51
2. Feb.	38.7	(19)	19.78	(51)	15.69	48.89
2. Mar.	32.6	(12)	28.52	(94)	29.47	12.52
3. April	29.6	(26)	22.16	(75)	21.56	25.14
4. May	19.3	(27)	17.48	(96)	16.52	9.43
5. June	16.9	(9)	12.21	(38)	11.47	27.75

(n) = Number of herds; 1980 Singh (1984); 1988 this study.

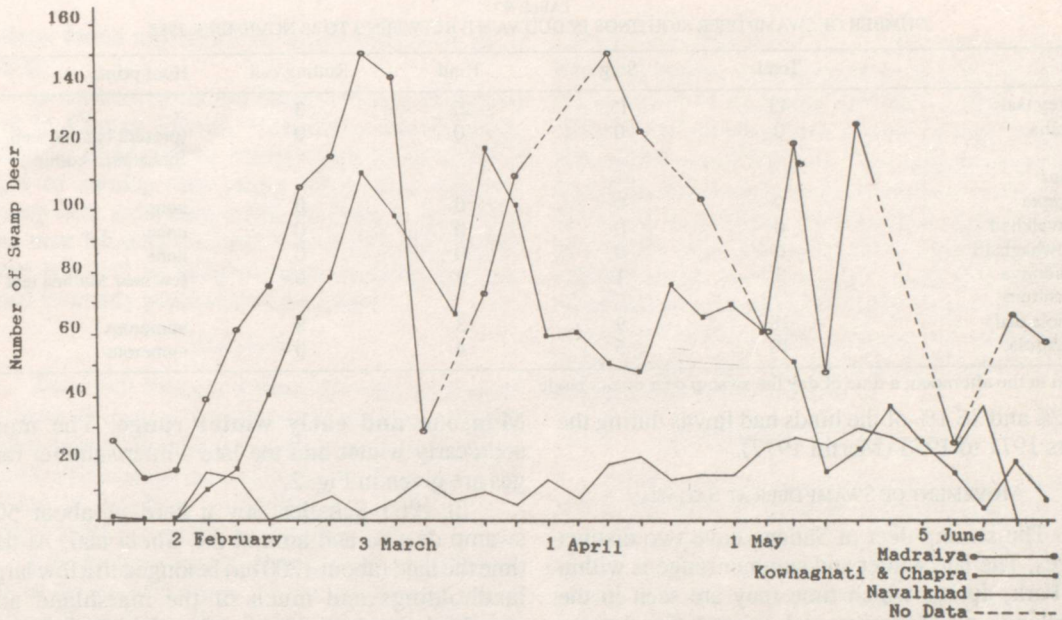


Fig. 3. Highest number of swamp deer seen on any given day during 5-day periods between 23 January and 22 June 1988 in the grassland around Satiana Forest Rest House.

1988, showing a distinct drop in the herd sizes between the two studies. This is more marked when the deer return to the Park and less so once they begin to disperse in the grassland (see also Fig.3). In 1988 the largest herd seen was of about 150 swamp deer, a drop of 37% from the herd of 237 animals seen in 1981 (Singh 1984). The largest herd seen in 1989 had 130 deer. Herd size averages have been calculated from groups of two or more individuals, and hence are the same in both studies.

During this study, the ratio between hind and stags was 100:45.5. In 1964-65 it was 100:50 (Schaller 1967) and in 1979-80 it was 100:40 (Singh 1984) (Table 3). In the hard ground Barasingha *Cervus duvauceli branderi* in Kanha the ratio had remained more or less the same between 1964-65 and 1971-73 at 100 hinds to 75.2 stags (Schaller

1967, Martin 1977). Martin (op. cit.) also found in Kanha that the sex ratio between yearlings is 1:1 while in adults it is biased towards the hinds. In this study, ageing was not done while noting down the sex ratios. It is likely that the bias will be even greater towards the hinds.

In 1988 37.14% and in 1989 c. 30% of the hinds had fawns. As counts were carried out more than 6 months after the fawning period, these figures would represent those fawns that survived early fawn mortality. In 1979-80, 27.58% of the hinds had fawns (Singh 1984) and for 1964-65 Schaller (1967) found that between 26.85 and 35.19% of the hinds had fawns. In the Sukla Phanta reserve in Nepal Schaaf (1978) found that between 33.9% and 42.6% of the swamp deer hinds had fawns over three successive years. In the barasingha at Kanha, 26.7%,

TABLE 3  
COMPARATIVE DATA ON HERD COMPOSITION 1980 - 1988

Year	Stag	% of Total Hind	Fawn	Number of fawns per 100 hinds
1980	25.4	58.5	16.12	27.58
1988	25.02	54.65	20.03	37.14

1980 Singh (1984), 1988 this study

TABLE 4  
NUMBER OF SWAMP DEER SIGHTINGS IN DUDWA N.P. BETWEEN 3 TO 13 NOVEMBER 1988

Area	Total	Stag	Hind	Rutting call	Hoof prints
Bankey taal	43	15	22	3	—
Kakraha	0	0	0	0	(present but not seen, Sinha pers. comm.)
Satiana					
Chapra	0	0	0	0	none
Navalkhad	0	0	0	0	none
Kowhaghatti	0	0	0	0	none
Madraiya	3	1	1	0*	few near Muthna taal
Agriculture					
Ghola taal	18	9	3	8	numerous
Ghajrola	10	5	4	0*	numerous

\*Seen in the afternoon, a time of day the swamp deer do not bugle

41.2% and 36.1% of the hinds had fawns during the years 1971 to 1973 (Martin 1977).

#### MOVEMENT OF SWAMP DEER AT SATIANA

The swamp deer at Satiana have two distinct ranges. The late winter and summer range is within the Park, during which time they are seen in the grasslands of Madraiya and around the Satiana Forest Rest House. During the monsoons and early winter the deer move outside the Park and are present in predominantly agricultural areas (Fig. 2). As both ranges are adjacent to each other, distance travelled by the deer is about two kilometres at most.

With the onset of the monsoons the swamp deer at Satiana emigrate into the adjacent agricultural areas (Singh 1984, Schaaf and Singh 1977, this study). For the next seven months the deer live in the jheels (and in the sugar cane) of Ghola and Ghajrola. It is in this marshy habitat that the annual rut commences at the end of August and ends in the last week of January (Singh 1984).

About mid January, when the grasses have dried up, the annual grass burning begins and is completed by the end of February. The swamp deer begin returning to the Park in the end of January following the grass burn. At first they arrive in small herds, and then gather in larger groups before dispersing within the grasslands. The swamp deer are seen at Madraiya first and then at Chapra and Kowhaghatti and lastly at Navalkhad (Fig. 3). By the end of June the swamp deer begin moving out of the Park into the adjacent agricultural areas of Ghola and Ghajrola.

**Monsoon and early winter range:** The monsoon/early winter and the late winter/summer ranges are given in Fig. 2.

In 1965 Schaller saw a herd of about 500 swamp deer in and around the Ghola taal. At this time the land (about 1200 ha) belonged to a few large landholdings and much of the marshland and grassland remained intact. After the Land Ceiling Act, the land was cut into smaller portions ranging from 1.2 ha upwards and distributed among landless immigrants from eastern U.P. and the Punjab. The grasslands and marshes swiftly gave way to sugar-cane and to a lesser extent paddy.

All that remains of the marsh at Ghola is one fairly large jheel called Ghola taal that covers about 100 ha less than 1 km. west of the Satiana Forest Rest house. From this a narrow channel, about 50 m at its widest, runs roughly parallel to the Suheli river and widens into another jheel adjacent to Ghajrola village, and in parts contiguous with the forest that flanks the Suheli river. This jheel is south of the Madraiya grasslands (Fig. 2). Thick stands of grass predominantly *Sachharum spontaneum* (local name kans) are present in and around the jheels.

At Ghola (in the 1st week of November 1988) I counted about 18 swamp deer of which 9 were stags. Of these at least 5 stags were bugling. At Ghajrola the jheel was surveyed only in the afternoon and so rutting was not heard. Ten swamp deer were seen of which 5 were male. Inquiries among the locals indicated that at least 7-8 rutting stags were present. It was also understood from the agriculturists that several swamp deer spent the day inside the sugar-cane. It is probable that the swamp deer of Madraiya move into Ghajrola while the deer around the

Satiana forest rest house move into Ghola (Figs. 2 and 3).

In contrast inside the Park no swamp deer were seen in Chapra Phanta, Navalkhad, Kowhaghatti and most of Madraiya. Furthermore there were no signs of swamp deer using these areas. Only 3 swamp deer were seen inside the Park, 1 stag and 1 hind near Muthna taal and 1 hind near the electric fence adjacent to Ghajrola taal. Bugling was not heard from any place within the Park.

#### DISCUSSION

Till 1988 Satiana region had the maximum numbers of swamp deer found in the Park. With a further loss of about a hundred animals the population is now slightly less than that of Kakraha. The decline in numbers in Satiana is reflected as a general reduction in the total population.

It is widely assumed that the loss of habitat is one of the major causes for the decline of many species of animals. The decline of swamp deer at Satiana can be attributed only indirectly to a loss of habitat because the area has been protected since 1967, first as a Wildlife Sanctuary and then as a National Park.

Singh (1984) postulated that one reason for the decline of the swamp deer population was a high fawn mortality rate caused by the flooding of the grasslands during the monsoons. Data available to me contradicts this. Fawning success rates of 27.58% in 1980, 37.14% in 1988 and c. 30% in 1989 indicate normal fawning successes as compared to other mono-tocous deer (Martin 1977, Schaaf 1978). Furthermore, fawning takes place between end May and early July (Singh 1984), just with the onset of the monsoons at the end of June. Thus the fawns would escape all but unusually early floods. Fawn mortality is therefore not a likely explanation for the decline.

The major cause for the decline in deer populations all over the world has been over exploitation by hunting (Cowan and Holloway 1973). In India two other Cervidae, the hangul *Cervus elaphus hanglu* and the Manipur brow antlered deer *Cervus eldi eldi* have been seriously affected by hunting (Kurt 1978, Ranjitsinh 1978). Holloway (1973) and Singh (1984) recognized poaching as the cause for the decline of the swamp deer at Satiana. While hunting may not occur within the Park it is fairly

widespread outside the Park. The swamp deer are therefore vulnerable when they leave the Park and move into their monsoon and early winter ranges. Evidence of poaching was present at both the marshes at Ghola and Ghajrola. The marshes are entered in buffalo drawn carts and swamp deer are shot with the aid of a spotlight. Alternatively, hunters drive around the crop areas and shoot deer from jeeps. Conversations amongst local agriculturists indicated frequent poaching incidents, especially by the wealthier farmers. Furthermore gunshots were heard almost daily throughout the study periods from the Satiana Rest House.

#### MOVEMENT OF THE SWAMP DEER

Similar to the barasingha at Kanha (Martin 1977), the swamp deer at Satiana have distinct seasonal ranges. As a little over half the year is spent outside the Park in what are presently agriculture areas this has had a direct negative influence on the population. Before a conservation strategy can be prepared it is imperative to understand the causes behind this seasonal movement. While only an in-depth study will reveal in detail these factors, I attempt here to postulate certain relevant ideas. Seasonal migration or movement has been well documented in deer. This movement between seasonal ranges is an adaptation to specific climatic or food conditions in the different ranges during the year. In the elk *Cervus canadensis* and in the moose *Alces alces* such movements are largely due to non-availability of food due to snow (Phillips *et al.* 1973). Similar movements due to snow are seen in the hangul (Kurt 1978). In the hard ground barasingha at Kanha this movement is due to seasonal non-availability of water in different parts of its range (Martin 1977). Furthermore, deer are known to be traditional and have a strong tendency to return to their seasonal ranges over the years (Martin 1977, Schaaf 1978, Cederlund *et al.* 1987). In fact this tendency to return to rutting grounds appears to be so strong that in old fallow deer areas the rutting grounds were used for over 50 years (Ueckermann 1968).

In the barasingha at Kanha in central India, lack of surface water is the main factor behind the deer's movement (Martin 1977). At Dudwa this is not the case, for due to a high water level, surface water is available in almost the entire area

throughout the year.

It has been suggested that the deer migrate outside the Park at Satiana due to flooding of the grasslands (Singh 1984, Schaaf and Singh 1977). This is unlikely due to three reasons: a) Ghola and Ghajrola are also prone to flooding during the monsoons, b) Flood waters are not a permanent feature and subside within a few hours or days, depending on the intensity of the rains, c) The swamp deer had already begun leaving the Park at the end of June 1988, much before the monsoons had set in.

In 1989 I surveyed the entire grassland areas of Satiana using elephants between 2 and 6 July. No swamp deer were seen at Kowhaghatti, Navalkhad or Chapra. In the adjacent Ghola taal at least 13 animals were present. Similarly, at Madraiya less than 10 deer were located. The outward migration had already taken place well before flooding of any sort had occurred.

The reasons possibly lie in a need for a specific habitat during the monsoons and for the rutting season. This habitat is the marsh or jheel (shallow lake that dries up in part or completely in summer). All swamp deer seen during the November 1988 survey were found in and around the jheels, the only exceptions being the 3 deer seen at Madraiya, and even these were close to a waterbody. At Bankey taal, in three visits in November 1988, all the swamp deer seen were within the water grazing on aquatic vegetation. Singh (1984) says that aquatic vegetation forms an important part of the swamp deer's diet. Therefore the marsh would be an important source of food to the swamp deer when grasses elsewhere have flowered and dried up.

The marsh also appears to be important for rutting. An integral aspect of the rutting season is wallowing (Schaller 1967, Martin 1977, Schaaf 1978, Singh 1984, pers. obs.). At all the marshes visited, several wallowing holes were present at the periphery of the jheels. Martin (1977) and Schaaf (1978) state that stags appear to show site fidelity to their wallows.

Furthermore, as the swamp deer have presumably been using the Ghola and Ghajrola taals for several years as their rutting grounds, they would traditionally return to these taals to rut in. Martin's (1977) observation that at least one wallow remained the same between 1964-65 and 1972-73 would also indicate a strong traditional bond to the

rutting grounds among swamp deer.

At Satiana, though there are several ponds and taals they are all quite deep. Marshland habitat (or jheels) do not exist inside the Park in this region. Hence the swamp deer would be compelled to leave the Park to fulfill specific habitat requirements for the monsoon and early winter period.

The swamp deer would be induced to return to the Park primarily due to the new grasses emerging after the annual grass burn in January. Undoubtedly the human related disturbances would hasten their return, in spite of the conditions appearing to be favourable outside.

#### CONCLUSIONS

Satiana was the only area with a significant loss in swamp deer numbers. At Kakraha there has been an increase in deer numbers probably as a result of the deer being localised within the rhino re-introduction area. At Bhadi taal and Bankey taal the population seems to have remained stable but more data is necessary for these two regions.

The decline of the Satiana population is due to traditional movements into preferred habitat that lie in areas which are not protected from poaching. In areas of the Dudwa National Park where such movements into agricultural areas are not found, the swamp deer populations have remained stable or increased over the years.

Intensive patrolling of the Ghola and Ghajrola agricultural areas during the monsoon and winter is the immediate action that needs to be taken to ensure the survival of the swamp deer at Satiana.

Ideally the agricultural areas of Ghola and Ghajrola should have been acquired to prevent further loss of habitat and to prevent poaching in the vital rutting grounds. However, these areas are quite densely populated now and land acquisition will be difficult to achieve. Instead, I propose that the entire length of the Suheli upto its confluence with the Neora nala be permanently fenced so that the deer are forcibly retained within the Park throughout the year. If the outward seasonal movement of the swamp deer is not stopped it is likely that the swamp deer will vanish from the grasslands of Satiana in a few years.

One basic requirement for the survival of any species is safe breeding grounds. At Satiana, where the largest herds of swamp deer were present, tradi-

tional movement patterns between breeding and non-breeding grounds were not taken into consideration when the Dudwa National Park was created. This has resulted in an annual exposure of the swamp deer to heavy poaching pressures and the continuing conversion of swamp deer rutting grounds into agriculture.

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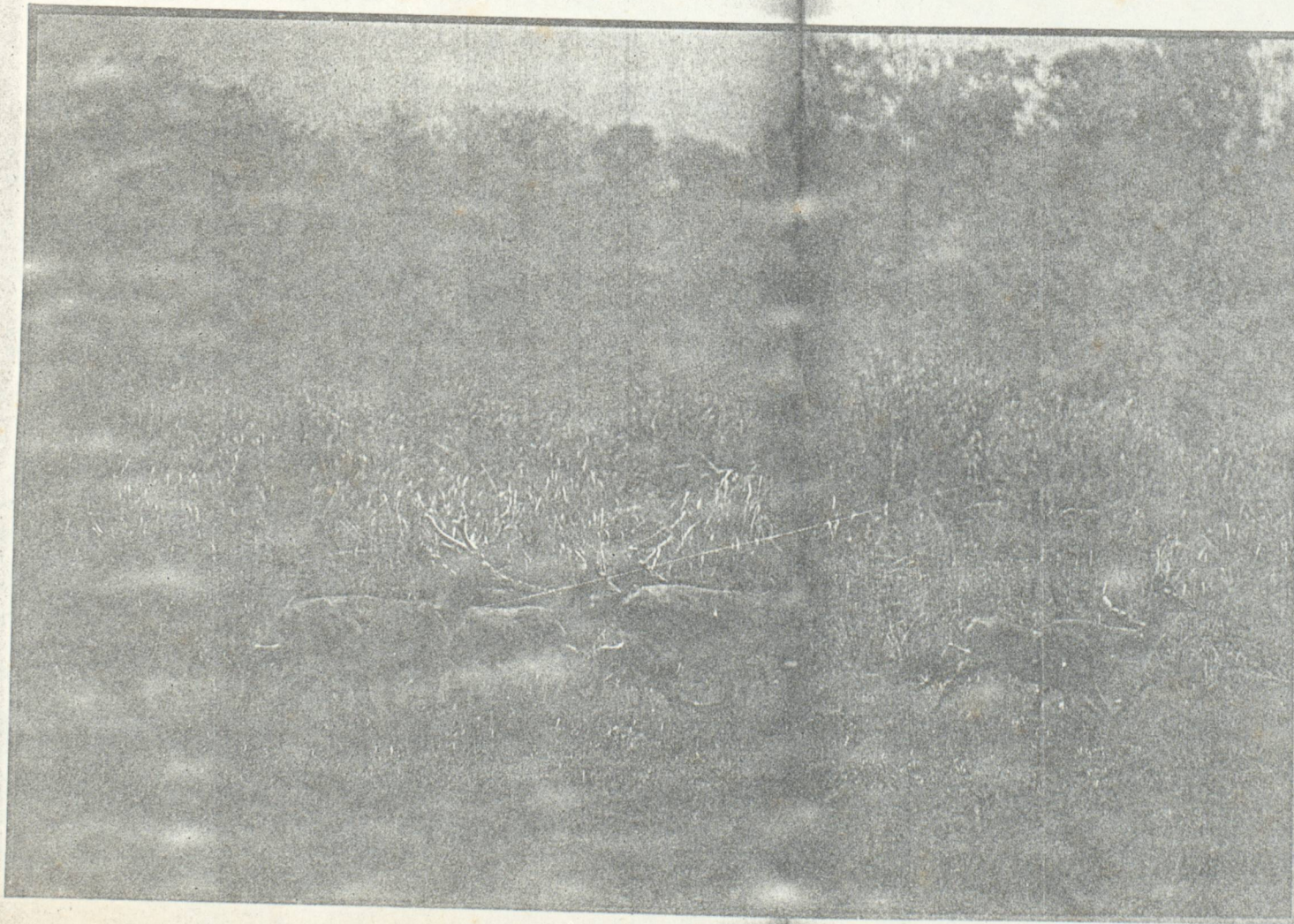
# VANISHING!

## The Swamp Deer of Satiana

TEXT AND PHOTOGRAPHS BY RAVI SANKARAN

As the sun made ready to set, we turned back from the far end of the *jheel*. The elephant squelched noisily through the marsh, plucking at tufts of grass. Then the bugling began. A nudge and the elephant was brought to a halt. Closer still, another stag echoed its challenge, the call alternately rising and falling, deep and resonant. A call that had drifted over these marshes every winter since time immemorial. In a matter of a few minutes half a dozen stags had disclosed their whereabouts by bugling. It was an enchanting spectacle: the white cotton like flowers of *kans*, patches of dark water glinting in the approaching dusk, and then again the bugling of rutting

Each year, after the annual grass burn, the swamp deer return to the park, to congregate on the emerging grasses. And each year the herds grow smaller.



Marshland is an essential habitat requirement of rutting stags. At Satiana, the marshes are outside park limits, and open to the deprivations of man.



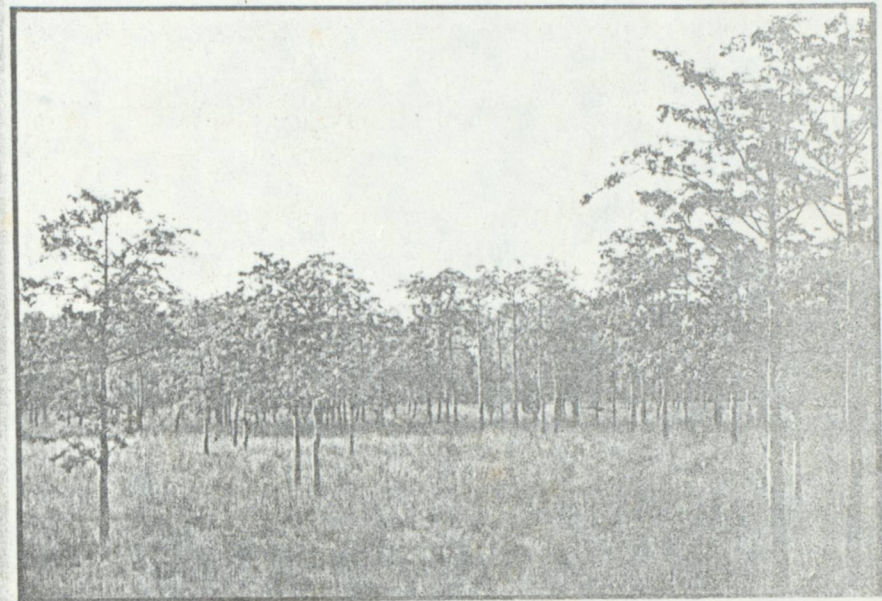
stags. Both mahout and I sat absorbing it all. He, perhaps, was thinking what an excellent paddy field this would make; I dreamt of what once must have been. The fidgeting elephant brought us out of our reverie. As we made our way back to the National Park on a cart track beside which stretched fields of sugarcane, the vision of immense beauty faded into a sense of despondency. For I had finally seen for myself why the largest herd of swamp deer at Dudwa has steadily declined to a fraction of its former size.

**F**ifty years ago, the alluvial grasslands that stretched from the river Sharda in the south to the escarpment above the Neora *nala* in the north were home to the largest congregation of the marsh dwelling northern race of the swamp deer *Cervus duvauceli duvauceli*. It was a land made inhospitable to man by the "deprivations of wild beasts" and by malaria that raged among the local populace. The swamp deer roamed these marshes; and early settlers recall that herds of over 500 animals were a common sight. After Independence and partition came the need for agricultural lands to resettle displaced people from Punjab, Sind and Bengal. Vast tracts of *terai* were reclaimed, marshes filled and drained. Settlers from overpopulated eastern Uttar Pradesh followed; first as landless labour and then, after the land ceiling act, as holders of small agricultural plots. Acre after acre of sugarcane has replaced the marshes and grasslands. Today, near Dudwa National Park alone there are three major sugar mills, scores of smaller sugarcane processing plants; hundreds of tractors and jeeps, and bustling towns shops that boast of luxuries that few agricultural townships

can afford.

**W**ith the tide of encroaching humanity came the decimation of animal populations, and the herds of swamp deer began dwindling at an alarming rate. Judging from the reminiscences of various early settlers that I have met, the butchery that was carried out must have had few parallels in the country. Swamp deer have always been considered poor eating, but in the name of crop protection animals were shot and the carcasses left to rot where they fell. Mirchia *jheel* to the west, the *bhagars* on the banks of the Sharda to the south, were all once prime swamp deer areas. Shoots that bagged fifty animals were not uncommon. Today the swamp deer no longer exist there.

In the sixties, the swamp deer in the *terai* of northern Lakhimpur district gained some respite. Billy Arjan Singh, an agriculturist and a deeply committed conservationist, lobbied fiercely for the declaration of the forests, grasslands and marshes of Dudwa as a sanctuary. His efforts culminated in the declaration of the area as a Sanctuary in 1967, primarily to protect the swamp deer. In 1977 it was upgraded to a National Park and at the end of 1988 the National Park, along with the Kishanpur Sanctuary (about 30 km south), was brought under the purview of Project Tiger. The project area consists of 850 sq. km of excellent moist deciduous forests, dominated by *sal* and

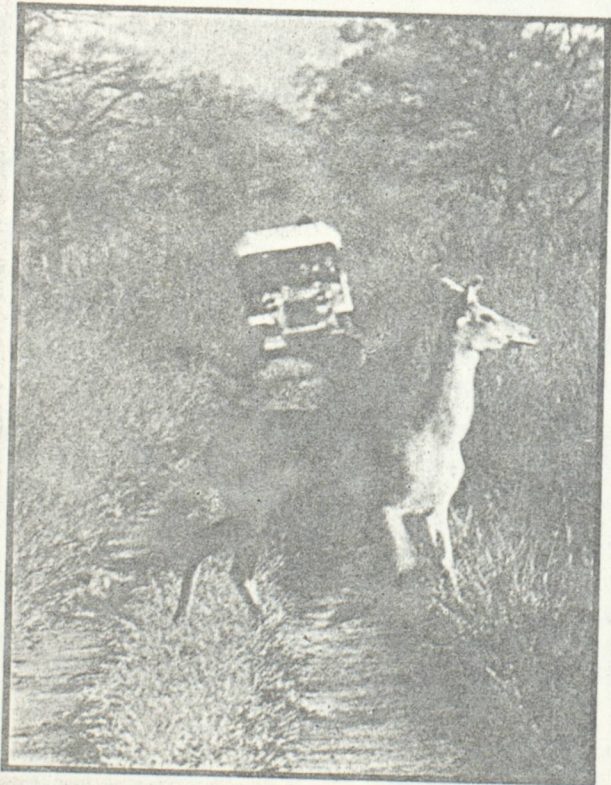


The deer's well-protected summer range, consisting of alluvial grasslands and *sal* forests.

interspersed with large tracts of alluvial grasslands.

**W**ith all these measures having been taken, one would have thought that the swamp deer and other ungulates would now thrive. But herbivore populations are declining, in some areas insidiously, and in others so drastically that one can see the numbers falling every year.

Currently Dudwa has about 750 swamp deer, the maximum numbers being present in two disjunct grasslands, Satiana and Kakraha. Smaller populations exist at Bankey Taal, Bhadi Taal, Nagra Taal, Churela Taal and Naan Taal. In 1985, when the rhino re-introduction programme began, the extensive grasslands of Kakraha were enclosed by an electric fence within which seven rhinos were released. Several years ago the population of swamp deer at Kakraha was not large. But after the area was declared a National Park, strict protection was given from livestock grazing and *nikasi* (the rights permitting local villagers to collect thatch grass and firewood from the Park) was abolished. The numbers gradually increased: today it houses a little over 300 swamp deer, the largest number within the Park.



When they enter the Park, the deer flee at the first sign of a vehicle. Gradually, as they become more familiar with jeeps, they are less easily alarmed, though still wary.

While one can be complacent about the populations that have remained static at the *taals*, and even be encouraged by about the increasing numbers at Kakraha, the problems faced by the swamp deer at Satiana are depressing. Satiana once had the largest population of swamp deer in this region, perhaps even in the entire *terai*. In the early seventies there certainly were over 1200 deer at Satiana alone. Today only a pathetically low population of about 300 survive.

Various reasons have been postulated for the declining of the swamp deer at Satiana. On the basis of the information I collected while studying the Bengal Florican at the Dudwa National Park, I found that the answers are in fact quite different.

Satiana lies in the southwest corner of the Park. Here the Suheli is barely a stream. To the north is the Neora *nala*, above which lie the *sal* forests for which Dudwa is best known. To the south and west of the Suheli is a vast sea of agriculture. Here the National Park has no buffer zone; prime grasslands merge with sugarcane, and only the meandering path of the Suheli prevents further encroachment by farmers.

**T**he problem lies in the very drawing of the boundaries of the Park — which was established to ensure the survival of India's largest herds of swamp deer. But neither the biology nor the movement patterns of the deer were known. As a result the Park protected excellently the deer's summer grounds, but left the crucial breeding areas open to the deprivations of man.

At Satiana the swamp deer use the grasslands within the Park for just five months a year — between the annual grass burn in January and the onset of the monsoon in June. At the end of June they move into two excellent marshes, Ghola and Ghajrola *taals*, that lie just outside the Park, surrounded by agriculture. Here they spend the next seven months raiding crops, and in the process being shot at. It is here that the annual rut begins at the end of September, continuing till the end of December. And this is, in my opinion, the crux of the problem. Good marshes are lacking within the Park at Satiana, but are an important habitat requirement of the swamp deer, especially during the rutting season. Secondly the swamp deer, like other species in the family Cervidae, show strong site fidelity to their breeding grounds, returning year after year to the same areas. The Ghola and Ghajrola *taals* have been used since time immemorial by the swamp deer as their rutting grounds. To fulfill specific habitat needs, out of a strong traditional sense, and with the added incentive of emerging crops of sugarcane, paddy and wheat, the swamp deer continue this seasonal movement out of protected areas into these *jheels*. These areas are small, ill protected marshes amidst vast tracts of agriculture. Here, in the name of crop protection and out of avarice for cheap flesh, the butchery continues unabated. And every year, when the grasslands are burnt within the Park at the end of January, the swamp deer return to congregate in

ever diminishing numbers on the emerging grasses.

While at Satiana, I heard gunshots almost every day. There was no way to know whether animals were killed each time, or which animals were being shot at, if at all. But with cartridges costing Rs. 14 each, few (if any) farmers will simply fire into the air. Legal action is almost never taken against the poachers. Patrolling at Dudwa is extremely poor, but not all the blame can be laid at the feet of the forest guards. On one hand they are poorly equipped, and their shotguns are no match for the poachers' rifles. On the other, there is virtually no support from the higher authorities within the department. The negative role that the administrative services and the judiciary play probably takes the cake. An exchange of fire between wildlife guards and a jeep load of poachers within the sanctuary limits resulted in the death of a poacher. The guards were doing their duty, yet the police and the judiciary saw fit to embroil them in a protracted legal wrangle. Some of the guards were even jailed for a few months. In a more recent instance a guard was killed by a group of poachers. The murderers walked away scot free. As a result of such episodes, the morale of the staff is low, their commitment to their jobs often non-existent.

In sharp contrast an elephant ride within the rhino enclosure is a welcome change from the dejection that Satiana often instills in me. Here, on a good day, one sees hundreds of hog deer and numerous swamp deer. It becomes obvious to the observer that the movement of animals from park to agriculture and the subsequent poaching pressure is the root cause for the pathetically small herbivore population in Satiana.



*C. d. duvauceli* are sometimes referred to as Barasingha; the name, however, is more commonly used only for the subspecies found in Kanha.



Swamp deer doe — is her time running out?

Two solutions are apparent. Firstly the acquisition of the Ghola and Ghajrola areas. However the opportunity to do so appears to have long since passed. Currently, several hundred families live along the Suheli in scattered hamlets in what was some years ago prime swamp deer habitat. To displace them will not be easy. Furthermore, I question the ethics of such a step. Does the survival of 300 deer entitle us to displace hundreds of people from their homes? Especially when we know that the acute shortage of fertile land makes it almost impossible to provide alternative agricultural land? And when the swamp deer as a species is not threatened with extinction?

As the problem lies in the deer's seasonal movement into Ghola and Ghajrola *taals*, I propose that we stop the movement into the agricultural areas. This could be achieved with the aid of a chain link fence along the Suheli river. If the *jheels* of Ghola and Ghajrola are essential to the survival of the swamp deer, then a fence which blocks movement may prove detrimental. However, if the current situation continues, within four of five years it may be too late to do anything at all.

The swamp deer of Satiana teaches us an important lesson: the need for adequate research before making crucial decisions about our natural heritage. At the time Dudwa was declared a sanctuary, it seemed logical to use the Suheli river as the Park boundary. But little did the planners realize that the areas beyond the Suheli were of greater importance to the deer than the grasslands that were to be protected. The end result was that the endangered ungulate for which the Park was created continues to decline. For the swamp deer of Satiana, time is running out. Fast. ■