
*Figure 9. Map of Mali showing the Gourma (striped area) and the National Park: La B ouck de B aoule (stippled area).*

Unless appropriate integrated management of the elephant range is carried out, the future of the species in the Gourma looks extremely bleak. The long-term objectives of such management would be to maintain or increase the existing elephant population, while simultaneously increasing existing levels of livestock productivity in a sustainable manner. The approach can be justified on grounds of the local and international importance of the elephants, development of the nation's protected areas, tourism, employment, restoration of wildlife, sustainable livestock production, and sensitization of the Government and the public to conservation.

I recommend that the existing Elephant Reserve be redefined as a multiple use area (IUCN category 3) covering the majority of the Gourma elephant range and that within this, one or more sanctuaries (IUCN category 4) be established in critical habitats. Thus the elephant range can be divided into zones subject to varying intensities of management, each of which can be given legal definition under the provisions of existing legislation. An associated planning programme, culminating in a written management plan, is desirable.

Pending such a programme, two measures are urgently needed. The first is control (by the Direction Nationale des Eaux et Forets (DNEF) over what is probably the area most critical to elephants, namely Banzena water hole and its surrounds. Here, a very productive bore-hole which was recently sunk threatens elephant access in the future. The second is the deployment of DNEF agents throughout the elephant range to enforce the law.

Rob Oliver

# South Africa Celebrates Rhino Successes

### Black Rhinos in Natal and South Africa

At a time when the black rhinoceros is under extreme pressure and declining rapidly over much of its range in Africa, t is encouraging to know that in Natal the reverse situation is found. This Province, lying along the north-eastern seaboard of South Africa, contains the active nucleus of the black rhinoceros population south of the Limpopo River. Since 1962, the Natal Parks, Game and Fish Preservation Board has provided rhinos from certain of the Zulu land reserves for re-introduction into other conservation areas within the former range of the species.

The importance of Natal's rhino was highlighted by Peter Hitchins in 1975 by his statement that ot the 439 black rhinos in the Republic 400 occurred in Natal. While not very significant at that time in terms of the total population in Africa, the continuing decline of the species elsewhere has focussed attention on this population and its role in providing excess animals for conservation.

The current population in Natal stands at about 420, distributed between the Hluhluwe-Umfolozi (±300), Mkuzi (±60) and Ndumu Game Reserves (±30), and Itala (±25) and Weenen Nature Reserves (4). Apart from the newly-established populations in Itala and Weenen, the remainder have remained fairly stable over the last 10 to 15 years.

The three major Zululand Reserves of Hluhluwe-Umfolozi, Mkuzi and Ndumu have provided the individuals for translocation over the years. Most have come from HluhluweUmfolozi, and t is here that the black rhino population has been most intensively studied.

A game count in 1961 produced a population estimate of 300 for Hluhluwe, with densities ranging from 0.6 to 1.7 rhinos/km$^2$. The same year a population crash occurred in the north-eastern area of the reserve with 46 animals dying over a four month period. These events were reported by Peter Hitchins who also found that numbers continued to decline in Hluhluwe during the dry cycle of the late 1960s, so that by 1972 the estimate was 199. Over the same period numbers increased to about 129 in Umfolozi. The overall density in 1972 of 0.36 rhinos/km$^2$ for Hluhluwe-Umfolozi was still far higher than found elsewhere in Africa. e.g. Masai Mara Game Reserve 0.1/km$^2$, Olduvai Gorge 0.002/km$^2$ and Ngorongoro Crater 0.004/km$^2$. The response of the population over this period and the high

*Figure 10. Black rhino.*

population density suggested that the carrying capacity had been reached, at least in Hluhluwe, and this prompted the translocation of 20 black rhinos to Kruger National Park in 1971.

No further removals took place until 1977 when t was agreed that a further 20 black rhinos could be made available from Hluhluwe over a 5 year period to large conservation areas within the species' former range and where habitat conditions were suitable. In the meantime, we re-assessed the population structure in Hluhluwe and Umfolozi using data from 1975—977 and found that the sex and age ratios were very similar to those reported in 1972 by Peter Hitchins, arid as recorded deaths had decreased we assumed that the population had probably not declined. This assessment was carried out during a high rainfall cycle when black rhinos were unlikely to have been under significant environmental stress, and the removals represented less than the expected rate of increase for Hluhluwe of 5%.

The next dry cycle began in 1977/78, the stocking rates of both grazers and browsers in the reserve were above carrying capacity and the habitat rapidly deteriorated. By 1979 most of the vegetation monitoring sites showed over-utilisation of the browse resources and 5 black rhino deaths were recorded in the late winter in Umfolozi. To pre-empt a population decline such as had occurred in the 1960s, Peter Hitchins and Jeremy Anderson recommended that the black rhino density in Umfolozi should be reduced, and 14 animals were removed in 1980. The dry cycle continued, so in late 1980 Tony Whateley, Jeremy Anderson and I decided to re-sample population structures throughout the area. This was made possible through a donation of helicopter hours by the Endangered Wildlife Trust. A total of 128 rhino, or 37% of the population, were contacted in 19 hours flying. The results were extremely interesting, as the percentages of immature rhino under 3.5 years old in Hluhluwe and Umfolozi (excluding the central corridor) were only 11% and 8% respectively, and no calves under a year were recorded in Umfolozi.

On the basis of this study, it was recommended that the population density of black rhino throughout Hluhluwe-Umfolozi should be depressed by removing 30 animals in 1981, and that thereafter the

'expected' rate of increase each year should be removed. A similar policy was adopted for Mkuzi and Ndumu Game Reserves, so that as from 1982 about 19 black rhino became available annually.

In this way, a total of 135 rhino have been moved from the Zululand Reserves since 1962. Within Natal, the recipients have been Ndumu (15), Itala (23) and Weenen (4); while translocations externally have been limited to Pilanesberg Game Reserve in Bophutatswana (23) and Kruger National Park in the Transvaal (70).

Reports on the performances of the black rhino in the latter two areas are most encouraging. For example, in Kruger Anthony Hall-Martin has reported that they are breeding faster than the parent Hluhluwe-Umfolozi population, this being shown by higher immature (<3.5y): adult female ratios (1.2 versus 0.4) and a higher percentage of calves under one year old (9% versus 5%). This is at a black rhino density of about 0.2/km$^2$ in Kruger as opposed to 0.36 in Hluhluwe-Umfolozi.

The future for the black rhinoceros in South Africa therefore looks bright, providing adequate protective measures against poaching can be maintained. However, as a precautionary measure, the Natal Parks Board is hoping to send *5* rhinos to a captive breeding project in the USA. The concept is to create a reservoir outside Africa which could be drawn on to re-stock reserves at a later date, particularly if local extinction had occurred.

Martin Brooks

# Tusk Measurements Provide Insight into Elephant Population Dynamics

In the first newsletter of the African Elephant and Rhino Specialist Group, we announce a new project, funded by the New York Zoological Society, whose goal was to elaborate the relationship between ivory trade statistics and the status of the elephant populations from which the ivory comes. Ian Parker had made important progress in this area, while pointing out the need for further study. Parker's results are being thoroughly re-examined, and the full extent of their application explored.

The project has two stages, the first looking at how much information can be derived about individual elephants from individual tusks, and the second at how these results can be used to derive information about elephant populations from tusk populations.

The first stage has been completed. Using data from culled elephants provided by Ian Parker, mathematical models have been developed which use tusk measurements to determine sex and age. There were three steps to this. The first was to determine which tusk measurements are thc most reliable. This was done by comparing right and left tusks for the same elephant, recognizing that if one cannot accurately predict one tusk from the other, it would be unwise to attempt to predict anything else.

All tusk measurements are quite reliable. Weight and lip circumference are best, and equally good, followed by total length. It is interesting that two of these measures, length and weight, are of dimensions altered by wear and