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# Luangwa rhinos: “Big is best, small is feasible”

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The conservation of large and therefore genetically viable populations of black rhinos within large protected areas poses a problem that has been discussed previously in *Pachyderm*: “big is best, small is feasible” (Western 1984). Tsavo’s population of black rhinos and elephants was depleted during the 1970s and by the early 1980s only small numbers of rhinos remained in Kenya. At that time international attention became focused on the plight of both black rhinos and elephants and very high conservation priorities were given to Selous and Luangwa because these areas contained Africa’s largest populations of each species (Cumming and Jackson 1984). No reader of *Pachyderm* needs to be told that the conservation effort has like Humpty Dumpty ‘had a great fall’ and it is now a matter of trying to better the performance of ‘all the king’s horses and all the king’s men’ and put back together a realistic policy (Western 1984). Probably less than a hundred scattered rhinos currently survive in either Selous or Luangwa, where in the early 1980s there were a few thousand.

The seriousness of the situation in the Selous took some while to be appreciated because no full-time researcher was based there in the 1980s (Western and Vigne 1984 with Douglas-Hamilton 1984). However, I for one had the sorry task of witnessing the decline of Luangwa’s rhinos and elephants during 1980-85. Over that period data were collected from both an intensive study site and over more extensive areas using law enforcement patrols (Bell 1986), both to make recommendations for improved conservation in Luangwa and to document any lessons that could be learnt for future conservation initiatives.

## Big is Rarely Big Enough

When I arrived in Zambia there was a mood of optimism in conservation circles. ‘Save the Rhino Trust’ (SRT) had recently been established with what was then WWF’s largest ever single grant of US\$ 0.5 million over three years and believed it was succeeding in its aims because patrols were capturing large numbers of offenders (Anon. 1980-85). This represented a great improvement on the 1970s when the National Park and Wildlife Service had lacked the resources to undertake any patrolling. But was it enough? To answer this question it was obviously necessary to monitor trends in rhino and elephant numbers rather than to count captured offenders and by 1982 it had become clear that SRT was not succeeding (Leader-Williams 1985). Individually recognized rhinos were being killed in the study area, around 70% skulls found throughout Luangwa valley were axed and scouts were seeing fewer rhinos on their patrols (Leader-Williams 1988; Leader-Williams and Albon 1988).

On the one hand SRT had received a very large grant and needed to appear worthy of support if it was to raise further funds after WWF’s grant ran out in December 1982. On the other, the funds allocated to SRT had only permitted it to field an anti-poaching unit of 22 men in Luangwa, too few to cover the 16,660 sq km

of national parks let alone the 34,910 sq km of game management areas. As a solution to the problem I recommended in early 1983 that SRT should retrench to cover the areas of a few hundred sq km where rhinos still survived in higher densities (Leader-Williams 1985), utilizing the rule-of-thumb that scouts need to be at an effective density of one man per 50 to 20 sq km (Cumming, Martin and Taylor 1984; Bell and Clarke 1986). In the event SRT responded with only a partial reorganisation. This was effected initially by some redeployment and assigning one or two permanent patrols to one small area, and latterly by an increase in manpower following NORAD’s funding of SRT in 1984.

By 1985 it was clear these changes had been fruitless. Rhinos had declined at rates varying from 99% to 24% per year since 1979, the lower rates being for the more heavily patrolled smaller areas where rhinos were still sighted relatively regularly; elephants too had recognized such areas of comparative safety by moving into them. However the point was that rhinos and elephants still continued to be shot in all areas, the effort was spread too thinly to prevent the decrease of rhinos in any sector. In a formal analysis of the data from Luangwa, it was shown that rates of change in rhino and elephant sightings by patrols were directly related to patrol effort, corrected for size of area and initial sighting rate (Leader-Williams and Albon 1988). Extrapolation of the relationship to a 0% change in rhino numbers does indeed suggest that SRT should have concentrated all its available manpower in one small area of 400 sq km. We return, therefore, to the fact that the quandary that “big is best, but small is feasible” was not faced squarely in the 1980s.

## Why Big was Really Small

One apparent anomaly remains to be explained, that of the apparently large grant awarded to Zambia by WWF in the expectation that SRT would be effective at curtailing illegal exploitation of rhinos and elephants over the large area of the Luangwa valley. Zambia is amongst that group of countries which spends relatively little (in Zambia’s case US\$ 11 per sq km per year in 1980) on their conservation areas. However it appeared that no one set the size of the WWF grant against another rule of thumb current in the early 1980s, namely that around US\$ 200 per sq km needed to be spent annually to maintain the integrity of conservation areas (Cumming, Martin and Taylor 1984; Bell and Clarke 1986). This was later confirmed by the direct relationship which resulted from comparing the spending on their conservation areas by different countries and their success at protecting rhinos and elephants (Leader-Williams and Albon 1988). Thus the supposedly large WWF grant to Zambia was really only sufficient to protect around 700 sq km over three years, a conclusion not too different from that reached by considering the distribution of patrol effort within Luangwa. The grant was large in only one context, comparison with other grants made, or perhaps affordable, by conservation

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organisations. In the more pertinent context, that of what it realistically could have been expected to achieve, the grant was in fact small.

## What is a Realistic Value

The annual sum of US\$ 200 per sq km that it was necessary to spend in 1980 to maintain the integrity of conservation areas and talk of grants of US\$ 0.5 million being small may make subscribers to conservation despair at its apparent high costs. However, it is important to be aware that in situ conservation is much more economical than ex situ conservation. At the normal density of 0.4 rhinos per sq km, effective protection of each animal would have cost US\$ 500 per year in 1980 if all conservation costs were charged to rhinos as the main indicator species. Moreover, 1 sq km of Africa normally contains a lot more than 0.4 rhinos, in the case of Luangwa around 2.2 elephants, a few hundred impala, many thousands of trees and much else besides. Even if the sum for effective protection of African conservation areas has risen to US\$ 400 per sq km today, it is still safe to say that in situ conservation represents excellent value for money. This can be amply demonstrated by comparing in situ costs with London Zoo's animal adoption scheme which is based on what it costs to look after and feed one animal for a year (Anon. 1988). Adoption of a rhino costs £2,000 and of an elephant £ 6,000. Thus the pachyderm equivalent of 1 sq km of Africa kept in a zoo can be estimated conservatively to cost £ 14,000(0.4 x 2,000 + 2.2 x 6,000) or US\$ 22,000.

## A Little can do a Lot

The lessons here for those who fund conservation are fairly obvious. Adequate resources must be invested to achieve given

objectives in conservation. Funds invested or utilized at "dilute" levels merely delay the inevitable and are ultimately wasted. Hence, the relatively small sums that international conservation agencies and NGO's have available to spend on valuable species in developing countries are most likely to achieve results in one of two contrasting situations. First, in low-spending countries only if they are concentrated at appropriate levels over small areas, in the case of rhinos within formal fenced sanctuaries or high-priority core areas. Second, over large areas only if funds are allocated to a relatively high-spending country like Zimbabwe which now needs extra resources to prevent Zambians killing rhinos in the Zambezi valley.

Can the concept "big is best and feasible" ever become a reality for large conservation areas in low-spending countries? Clearly not without more funds than can be invested by conservation organisations or, more importantly, without rectification of the socio-economic problems attendant upon people living within or around conservation areas (e.g. Marks 1984; Dalal-Clayton and Lewis 1984; Bell 1987). Sorting out the latter, and maintaining and/or rebuilding large populations of valuable species, most probably requires the funding of conservation and rural development projects by international aid organisations. The Luangwa Integrated Resources Development Project, funded by NORAD, is now under way and it can only be hoped that appropriately directed schemes which allow local residents to participate in plans for their conservation areas, coupled with enhanced investment in infrastructure and policing, will permit the recovery of elephants and rhinos to the point where they can contribute more directly to the rural economy of the Luangwa valley. After witnessing this particular Humpty Dumpty falling off the wall, I do hope that he can be put back together again.

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