Group size and Ranging Patterns of Queen Elizabeth National Park Elephants

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Like elsewhere in Africa, the elephants of Queen Elizabeth National Park (QENP) suffered a drastic decline in numbers in the 1970's. The major cause was the illegal killing of elephants for the sale of ivory. It was noted that elephant groups had become fewer in the park but one large group had formed. In 1989, therefore, it was found necessary to investigate what effect this critical reduction in numbers had on the ecology of the QENP elephants. This paper, which forms a part of that work, tries to examine the effect of critical reduction on the group size and ranging patterns of the remaining elephants.

Smaller groups of elephants are now very frequent, suggesting that the large semi-permanent groups may be starting to split up. A group of about 200 individuals which range on the northern side of Kazinga Channel were, at the beginning of the study, encountered only in the areas of Hamukungu and Kasenyi. Now two years later they are frequenting the Crater regions and Mweya Peninsula. A second group of about 60 whose movement is more parallel to the Kazinga Channel have also of late been encountered in the Chambura Game Reserve. The areas least frequently used were undoubtedly where mass massacres took place in the 1970's. It is therefore possible that some of these individuals survived from these regions. Bulls in musth are known to cross the Channel to seek mates.

Illegal Activities and Law Enforcement in the Central Luangwa Valley, Zambia, from 1979 to 1992

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l. Data on illegal activity and law enforcement from the central Luangwa Valley, Zambia, are analysed for two time periods, the first 1979-82, when the National Parks and Wildlife Service was supported by the Save the Rhino Trust (SRT), the second (1988-92), when it was supported by the Luangwa Integrated Resource Development Project (LIRDP). Data on the intervening period are not currently available.

2. Prior to 1979, there was effectively no law enforcement in the area which was subject to extremely heavy illegal offtake of elephant, rhino and other species. During the SRT period, there were up to 22 effective wildlife scouts engaged in law enforcement, with an operating budget estimated at US$1 5/km^2/ year. This was sufficient to reduce but snot halt the decline of elephant and rhino populations.

3. The LIRDP period was supported by major funding from the Norwegian Agency for Development Cooperation, NORAD, which was used for an integrated rural development programme. The wildlife management component was allocated about US$65/km^2/year; this led to the increase of scouts to 285 by 1991 and comparable increase in law enforcement effort.

4. Between 1988-92, illegal offtake of elephant was reduced by a factor of 88% to an acceptable level estimated at about 10% of the sustainable yield

of the population. At the same time, indices of all other classes of illegal activity were reduced by between 75 and 90%.

5. Analysis of the relationships between indices of illegal activity and various law enforce≠ment parameters demonstrates logarithmic relationships indicative of diminishing re≠turns on law enforcement effort and expendi≠ture at low levels.

6. This result leads to the conclusion that, for most wildlife management purposes, includ≠ing the conservation of elephant, acceptable levels of illegal offtake can be achieved for about US$ 70/ km^2/year, that is considerably less than the amounts recommended by other authors. It is noted however, that this result was achieved in the context of the LIRDP community participation programme. More≠over, it implies a significant increase in staff efficiency, requiring in turn a focus on staff quality at all levels.

7. The proposed scenario is probably not effec≠tive for rhino, which are both more attractive to illegal hunters and have lower sustainable yields than elephants.

8. The analysis provides no evidence that the 1990 CITES ban on ivory trading has had an influence on the rate of illegal offtake of elephants.

The African Elephant Database

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The African Elephant Database is a repository of information on numbers and range of the species arranged on a country-by-country basis. Each record of elephant numbers is accompanied by a map showing the specific area to which the estimate refers. Each record is clearly labeled with its own numerical code. Computer-generated maps can be related to accompanying tables that give details such as name of the census zone, date of estimate, counting method, quality of estimate and source of data. The geographical information is digitized from maps of varying scales into a computer where it is stored for further use. In this way, data from different populations or countries can be combined to make maps or produce data overviews on a country, regional or continental scale. Currently the database holds three different layers of geographical information: elephant range, estimates of elephant numbers and distribution of protected areas. However, in our earlier attempts to con≠struct a continental population estimate many more data layers were entered from existing continental datasets such as human population, rainfall, habitat type, various economic indicators at a country level, even tsetse fly distribution. These data were analysed by multiple regression to identify which factors were significantly associated with elephant density. Of all the factors analysed protected status was most positively associated with elephant density (Burrill and Douglas-Hamilton 1987).

Uses of the database

Once these data are entered, the computer has great powers of analysis and presentation. It can generate areas from its internal maps and calculate elephant range based on different factors such as country, region, protected status, or the quality of Input data. It thus allows overviews to be constructed at a variety of levels.

While the technique of multiple regression has been valuable in creating a continental overview, it could be even more useful on a country or regional basis where the datasets are of far higher quality and better resolution. For example, a field-derived relationship between elephant densities and the distances from roads or rivers, a GIS technique, coupled with the database, was used to calculate elephant estimates for some Central African forest areas (Michelmore *et al*, in press). The database also has far greater analytical potential which has yet to be tapped. For example, two additional factors that may be strongly associated with elephant densities on the continent are land use and investment in law enforcement within protected areas. The database allows the juxtaposition of these