1976/047 (both surys noted)

SELOUS ELEPHANT COUNT   SOUTH-EAST TANZANIA

1976/021 } - Mal/Bp noted
1976/011)

INTRODUCTION

The Selous Game Reserve is the largest in Africa. The very vastness of the area has mitigated against any previous complete census. It is distinguished for several reasons as an area of outstanding interest:

1.   It is huge covering some 21,000 square miles (55,000 km^2);

2.   It has no human population, although there was one formerly;

3.   It forms the major part of the largest unbroken elephant range in Africa;

4.   It is one of the few reserves representing the miombo habitat in its variety of forms.

As a first step in assessing the wildlife resource I was invited by the Game Department to organize a systematic census of the large mammal populations, and to bring the necessary equipment, namely a four-seater aircraft, furnished with a radar altimeter essential for height control. It was decided that the most logical and efficient way to employ the aircraft would be to fly regularly spaced transects so that data on numbers, distribution and habitat condition could be collected simultaneously (Gwynne & Croze 1975). The counts were to be carried out over the whole Selous and adjoining areas in both the wet and dry seasons. So far the wet season count has been accomplished, and the dry season count will be carried out in September.

Although all large animals were to be counted the major emphasis of this survey is on elephants. They are not only the dominant herbivore, but the Selous elephant population is one of the largest, if not the largest, in Africa, and as such has an intrinsic interest. The research has been designed to contribute to the I.U.C.N.'s Elephant programme conducted by a group of the Survival Service Commission of which I am the Chairman together with Dr. Harvey Croze. We regard the Selous Game Reserve as an area of key importance in understanding elephant biology throughout Africa.

An important feature of this survey is the training of Game Department staff in the techniques of aerial observation and recording, and later in analysis of the complete data. The aim is to build up an independent team who will be able to carry out similar surveys in the Selous or other reserves. Such systematic reconnaissance flights are undoubtedly the cheapest and most efficient method of collecting ecological data on which to base utilization and development programmes, and also provide a framework for future management orientated research.

RESEARCH OBJECTIVES

1.   To record numbers and distribution of all large animals;

2.   To record distribution and ecological parameters of all major habitats;

3.   To record the elephant age structure by aerial photogrammetry.

METHODS

Transects were flown at 250 feet above the ground and two rear-seat observers scanned a strip of ground demarcated by parallel streamers attached to the struts on either side of the aircraft. The two strips amounted to 300 metres. All animals seen within the streamers were counted and the results were dictated into tape-recorders so that the observers did not have to take their eyes off the ground. The narrowness of the strips was chosen to make it easier to see animals in thick vegetation and to compensate for the observers' initial inexperience (Norton-Griffiths, 1976).

Before flying observers were tested for aptitude and accuracy in training sessions where they had to count animals on slides flashed on a screen for five seconds. Ecological data on habitats was recorded by Mr. Alan Rodgers sitting in the right-hand front seat. He also took photographs periodically so that a complete photographic library is being built up of every major habitat type. All data were recorded so that observations could be related to the grid squares in which they occurred.

The transects were spaced five nautical miles apart (9.2km.). The grid covered the entire Reserve and in most places went 10 n.m. beyond. North of Liwale, scene of the heaviest elephant control operations in Tanzania, we counted an extensive area outside the Reserve.

RESULTS

A preliminary reconnaissance of one week in January, when I familiarized myself with the Selous and its problems, led to two periods of training and counting in March and April which amounted to just under five weeks.

The census sampled an area of $73,407$ km^2 which included the entire Selous Game Reserve (of $55,000$ km^2). All recordings have been transcribed on to data sheets and now await computer analysis of density and biomass distributions. Likewise data on habitats is now ready to be plotted on to distribution maps. The wet season counts are complete. Analysis will be carried out when the dry season count is finished and the two sets of data can be compared.

The only data which has received preliminary analysis is concerned with elephants. Within the area sampled we estimate a minimum population of 81,600 elephants. Confidence limits have yet to be calculated and the estimate may be revised upwards once various biases, such as observer undercount caused by poor visibility, have been considered.

The elephant population was evenly distributed, with an overall density of $1.11/km^2$. The area sampled was divided arbitrarily into 15 blocks within which the density varied between .005 and $2.13/km^2$. The blocks with the highest density were found along the confluence of the Luwegu, Mbarangandu and Njenje Rivers, and in Mikumi National Park, Beho-Beho, and Ulanga areas. The lowest densities were found near Liwale and along the Reserve boundaries, although the precise nature of this boundary effect will not become apparent until the second count and final analysis have been completed.

The mean group size for elephants was 2.9, which is remarkably low in comparison with most other elephant populations (of Kabalega and the other extreme where mean group size = circa 20 55

DISCUSSION

There are few conclusions that can be drawn at this stage, but some definite features of the Selous ecosystem have emerged.

1. Elephants dominate the large mammal biomass.

2. Their overall density of $1/km^2$ is low compared to most other East African National Parks or Reserves where they occur. It is however comparable to the miombo habitat of the Ruaha National Park (Norton-Griffiths, 1975).

3. The elephants do not seem to have suffered population concentration at the hands of man. If anything they have invaded areas formerly occupied by man (Matzke, 1975).

4. The elephants do not seem to be causing significant damage to the woody vegetation, although their effects seem to be localized. This topic needs further analysis.

5. Their low mean group size may be due to a low degree of harassment by man. We counted all elephant carcasses within the strips and found the ratio of dead to live elephants low relative to other areas investigated in the course of the Pan African I.U.C.N. elephant survey. It would seem therefore that the incidence of poaching within the Reserve is also relatively low despite the fact that this is the largest elephant population in East Africa. Again this tentative conclusion must be tested by further data collection and analysis.

6. In most of the above respects the Selous elephant population is unusual. Our estimate exceeds the expectations of Nicholson (pers. comm) and it may be that the population has actually increased in recent years. We intend to carry out the investigation of the population dynamics following the dry season count.

7. In all events Tanzania has a priceless asset in the Selous Game Reserve whose true magnitude is now becoming evident for the first time.

FUTURE PLANS

I will return in September to carry out an exact repeat of the wet season count. I would recommend that exactly the same team of Bakari Mbano, Alan Rodgers, and George Mgongo should be used, who have reached a high level of competence. In addition it would be helpful if the Super-Cub could be made available, so that intensive block counting can be done to calibrate the observers which will help to arrive at more accurate final estimates. It is also of top priority that enough flying hours should be available to carry out the photogrammetry of the elephant population dynamics. Finally, it would be of great value to the Game Division and the Ministry if we were to run long transects out from the census area so that the animal densities of the Selous can be related to the overall animal densities of South East Tanzania. If flying time were available to do this it will be possible to assess the overall resource and the effect of current Game Management practices, but this will require funds beyond the present amount allocated.

ACKNOWLEDGEMENTS

REFERENCES

Gwynne, M.D. & Croze, H. (1975) The Concept and Practice of Ecological Monitoring over Large Areas of Land: The Systematic Reconnaissance Flight (S.R.F.) (Int. Livestock Symp. Ibadan)

Norton-Griffiths, M. (1976) Counting Animals (A.W.L.F. Publication)

Norton-Griffiths, M. (1975) The numbers and distribution of large mammals in Ruaha National Park, Tanzania (E. Afr. Wildl. J. 13: 121-140)