
THE LOSS OF A POPULATION OF ELEPHANTS IN THE MIDDLE SHIRE VALLEY, SOUTHERN MALAWI

¹B.Y. Sherry and ²Fran H. Tattersall*

¹Down to Earth (1994) Pvt. Ltd., PO Box GD 672 Greendale, Harare, Zimbabwe

²Wildlife Conservation Research Unit, Department of Zoology, University of Oxford, South Parks Road, Oxford OX2 3PS, UK

*Author for correspondence

ABSTRACT

This paper presents the results of two surveys of elephants in the Middle Shire Valley, southern Malawi, carried out in 1983-1987 and 1994, corresponding to the periods before and after the population's destruction. The 1983-1987 survey estimated that the Middle Shire Valley supported 200-300 elephants, ranging over about 1,000km², much of it within Majete Wildlife Reserve. In 1986 and 1987 there was a massive influx of Mozambican refugees, and a refugee camp was established in the northern part of the elephants' range. With the refugees came AK 47 automatic military rifles and elephant hunting escalated to unprecedented levels. The Malawi Government's response was inadequate to contain the poaching, and by 1992 reports from the field suggested that the entire elephant herd had been eliminated. Ground and aerial surveys carried out in 1994 confirmed that no elephants remained in the region and suggested that it was unlikely that any had escaped into Mozambique, but that they had all been killed in and around Majete Wildlife Reserve. The implications of the extinction of perhaps 10% or more of Malawi's national elephant herd are discussed. Recommendations are made for ensuring the maintenance of Majete Wildlife Reserve, and for the development of strategies which will prevent Malawi's remaining elephant populations from suffering a similar fate.

INTRODUCTION

In the 19th century, elephants (*Loxodonta africana*) ranged widely throughout Malawi (Faulkner, 1868; Johnston, 1897). During the colonial period, however, elephant "control" was a significant part of agricultural development, and by the 1950s the elephants' range had become considerably fragmented and restricted (Muldoon, 1957). During the mid 1980s, Malawi's elephants numbered about 2,500 (Jachmann & Bell, 1984; McShane, 1986; Douglas-Hamilton, 1988; Cumming *et al.*, 1990). Until recently there

were nine discrete populations, both in and around a number of national parks, wildlife reserves and forest reserves. By the early 1990s, however, one of these populations, centred around Majete Wildlife Reserve (MWR) in the Middle Shire Valley (MSV), southern Malawi, was extinct.

Long-standing conflict has occurred between elephants and man in both Mwanza and Chikwawa districts of the MSV, particularly with regard to crop-raiding (Morgan-Davies, 1983). There was, however, a healthy mutual respect between elephants and man in the region, and they tended to avoid each other. As late as early 1986 there was no apparent large-scale elephant poaching.

Since 1983, and probably earlier, much of MWR was as heavily hunted as the surrounding unprotected areas, which accounted for the generally low densities of large mammal populations (Clarke, 1983). There were no Department of National Parks and Wildlife (DNPW) staff stationed outside MWR, and in general wild animals were left to fend for themselves, with minimal protection. Under such conditions Sherry (1987) warned that commercial poachers could very quickly reduce elephant numbers.

Following increased hostilities in neighbouring Mozambique, hundreds of thousands of refugees flooded into southern Malawi during 1986 and 1987. With the establishment of numerous refugee camps in the region, there was a general breakdown of law and order. Elephant hunting with AK 47 automatic rifles proliferated, apparently led by a small number of Mozambicans who became well-known to local communities (Sefu, 1993). In 1989 a joint Malawi Government/FAO national survey of large mammals gave an estimate of 125 elephants for the Majete area (Simon *et al.*, 1990) and noted an increase in elephant poaching.

In response to field reports of the apparent disappearance of the MSV elephant population, the DNPW Re-

search Unit carried out a ground survey of part of MWR to assess their status in 1992 (Bhima, 1992). This was followed up in 1993 by an DPWN aerial survey. The remains of only five elephants were located in MWR and there was no sign of living elephants.

However, doubts remained among senior DNPW staff: first, that there had ever been a large (more than 100), permanent MSV elephant population, and second that the population had been exterminated rather than that it had emigrated into Mozambique. Here, the size and range of the MSV elephant population is detailed between 1983 and 1987. Then, through analysis of DNPW scout reports and interviews with the DNPW staff and local villagers, the circumstances surrounding the very heavy hunting pressure sustained by the population between 1986 and 1992 are documented. Finally, through ground and aerial searches carried out in 1994, the population's extermination through commercial hunting is confirmed.

METHODS

Study area

The MSV lies in the Great Rift Valley in the southern region of Malawi. The study area covered 1,200km² of the MSV (Figure 1), over half of which comprises the 689km² MWR. The main vegetation type occurring in the MSV is miombo woodland. There are three seasons: the hot, wet season (November to March); the cool, dry season (April to August) and the hot, dry season (September to November).

1983-1987

Range and seasonal distribution were estimated by direct observation, local knowledge and by the presence of vegetation damage, spoor and droppings (Jachmann & Bell, 1979, 1984). Direct observation of the elephants was difficult because of their low density, their secretive, aggressive nature, and the broken country and dense vegetation in which they occurred. They had considerable impact as crop-raiders, and therefore in settled parts of the study area local people were interviewed informally, concerning the number, seasonality and behaviour of elephants visiting their areas.

In MWR, staff of DNPW were requested to report any of their own observations or hearsay information gleaned during their patrols or visits to neighbouring villages.

Elephant density was estimated using the formula derived from studies in Kasungu National Park and Nkhotakota Game Reserve, Malawi, by Jachmann (1984a,b) and Jachmann & Bell (1979,1984) which incorporates defecation rate (ranging from 23.6 droppings per elephant per day in the wet season to 15.7 in the late, dry season, September-October) and rate of dung decay (averaging 16.5 per day in the early and mid-dry season and end of rains in August). This method involves recording numbers of droppings along roads of known width and length.

Population size was also estimated by direct sightings along roads, following Caughley's (1980) formula for strip counts. Population size was calculated assuming a dry season range estimated from the distribution of elephant signs during this season.

As far as possible, each group of elephants seen was sexed and aged following Hanks's (1979) criteria for field identification: old adult (30-60 years); younger adult (15-30 years); sub-adult (10-15 years); juvenile (3-10 years); calf (1-3 years); young-of-the-year (<1 year).

Scout report analysis and interviews

Control of wildlife comes under the jurisdiction of the DNPW (Nsanjama, 1985). In MWR there were four scout posts, each staffed by two or three law-enforcement scouts and their assistants. Each scout camp produced monthly reports including details of their patrol routes and patrol effort, law-enforcement activities, sightings or signs of large mammals and any problems encountered. All available monthly scout reports were read, from all four camps, for the period 1986-1992. From these, data were collated on poaching incidents, sightings of elephants or carcasses, and patrol effort. However, out of an expected 288 original, hand-written scout reports, only 112 were on file.

In 1994 the DNPW field staff in MWR along with members of rural communities adjacent to the Reserve were interviewed informally. In addition, a meeting was held with the DNPW Parks and Wildlife Assistant who had been in charge of MWR during much of the period when the elephants had been killed. Eight days were spent interviewing villagers within the elephants' former local range. A total of 16 villages were visited, including four in the Mwanza River Valley to the south and south-west of MWR. Local people were informed of the purpose of the study through the local government

party chairman, or informally on a one-to-one basis. They were asked when elephants had last visited these areas and of the location of elephant carcasses (a cash incentive was offered for this).

1994 aerial surveys

In order to locate further elephant remains, two sample flights were flown in 1994, over parts of the former dry season elephant range. The first covered southern and central areas of MWR, and the second covered northern areas, and included land lying to the north of the Reserve. In total, 200 linear kilometres were surveyed at an altitude of approximately 100m above ground level. Carcasses were recorded in a 100m strip along one side of the flight path, following Taylor & Cumming's (1988) method for surveying live elephants.

RESULTS

Elephant status in the MSV, 1983-1987

The total area of elephant range in the MSV covered approximately 1,000km² (Figure 1), which was also effectively the elephants' wet season range. From the start of the dry season in April, concentrations of elephants increased around permanent water supplies in two main areas: along the banks of the Shire river in the north of MWR; and outside MWR to the north, along the Mawatwe and Makili river valleys adjacent to the Shire river (Figure 1). During the early part of the study, the dry season range was estimated to cover 550km², but later, during the mid 1980s this shrank to 400km² as a result of hunting pressure.

Using dropping counts along vehicle tracks over three years (1984-1986) overall mean \pm SE density of elephants was estimated at $0.54 \pm 0.8/\text{km}^2$ (1984: 0.52 ± 0.08 ; 1985; 1986: 0.51 ± 0.08), and from the combined density samples an overall mean \pm SE population of 294 ± 42 was estimated. These estimates assumed a dry season range of 550km², which may have been excessive. At a density of $0.54 \pm 0.08/\text{km}^2$, an adjusted dry season range of 400km² gave a population estimate of 214. Direct sightings gave an estimate of 279 elephants.

Of the 34 groups of elephants seen, fifteen were bachelor groups, comprising a total of 26 animals (mean \pm SE group size = 1.7 ± 1.2 ; range = 1-5). The remaining 19 groups were breeding groups, totalling 185 animals (mean group size = 9.7 ± 5.6 ; range = 5-23 elephants). Of 142 individuals in 27 groups fully sexed and aged, 40 were adult or sub-adult males, 47 adult or sub-adult

females, 23 juveniles, 20 calves and 12 were classed as young-of-the-year. Thus, approximately one in four females had a young-of-the-year calf, indicating an inter-calf interval of about four years.

Between 1984-1987 there was little field evidence of mortality, and the remains of only five elephants were discovered, three having been killed between 1982 and 1986.

Analysis of scout reports and interviews

Interviews and analysis of reports by MWR field staff for the period 1986 to 1992 provided considerable insight into the circumstances surrounding the elimination of the MSV elephants. Commercial poaching appears to have begun during late 1986 and continued unabated in the ensuing years up to 1991. After March 1991 there were no elephant sightings. Local villagers living to the west of the MWR did not recall elephants passing through their area into Mozambique.

In late 1986, a refugee camp was established near the elephants' northern dry season high-occupance zone (Figure 1). The camp eventually hosted in excess of 60,000 refugees, and previously undisturbed woodland supplied their building and fuel-wood requirements. Disruption of elephant behaviour and increased



Photo credit: Paul Beattie

The remains of an elephant carcass in MWR.

conflict between elephants and man was an inevitable consequence of the camp's location at this site. During the period 1988-1991, there are records of at least 40 elephants killed by poachers. Nine refugees were arrested and 13 AK 47s and 14.5kg of ivory were confiscated outside MWR.

In spite of numerous reports of elephant poaching and harassment of scouts by armed poachers, there was little effective response by the Government. Although some poachers were arrested, and some AK 47s were recovered by the Police Mobile Force, following an early incident in which DNPW scouts encountered armed poachers, there is little evidence for further substantial support.

The DNPW scouts were armed with .303 rifles, usually with no more than three rounds of ammunition each -no real match against groups of poachers armed with automatic weapons and apparently plenty of ammunition. Although some increases were made in law-enforcement staff numbers, the only other response was to exhort the scouts, in writing, to increase their efforts. Morale amongst MWR staff became severely eroded.

Analysis of patrol effort showed that coverage of the MWR became minimal, with scouts patrolling for as little as nine days per man per month, half of their required 18 days.

Carcass surveys during 1994

Forty-six elephant remains (including the five found by the DNPW surveys in 1992 - 1993) were located by ground searches both within and outside MWR, and aerial surveys located a further six carcasses not previously reported, in addition to two which had been located before (Figure 2).

Although in total only 52 elephant remains were located, extrapolation of the results of the aerial survey samples support the hypothesis that all the elephants (200 or more) were killed in and around MWR. Eight carcasses were seen during the flights, which covered an area of 20km². Using a dry season range of 400km² this gives an overall estimate of 160 elephant carcasses. However, assuming that approximately 30% of the population was less than ten years old, and therefore not large enough to have easily identifiable carcasses in an aerial survey, the total number of animals killed can be estimated at 229 animals. There was no evidence that any elephants had fled into Mozambique.

DISCUSSION

In spite of a stated commitment to wildlife conservation, during the mid-1980s the Malawi Government was unable to provide the law enforcement input necessary to curb illegal hunting in and around MWR. The consequence of this failure has been the extinction of one of Malawi's few remaining elephant populations, possibly amounting to as much as 10% of the national herd.

The loss of the MSV population has wider implications for Malawi's eight discrete remaining elephant populations. These currently have a discontinuous range, being isolated by agricultural development and high-density human settlement. Many elephants normally resident in protected areas extend their range seasonally (usually during the wet season) when they follow normal dispersal patterns and are attracted to agricultural crops (Morgan-Davies, 1983). In some parts of the country there is movement across international boundaries, between Malawi and Zambia in the west and between Malawi and Mozambique in the east (Jachmann & Bell, 1979; Morgan-Davies, 1983). Such movements make comprehensive elephant protection extremely difficult.

Whilst the greatest threats to Malawi's elephants are probably the ever increasing demands for agricultural land and fuel-wood which are destroying the elephants' habitat, illegal hunting, not only for ivory but for meat and community protection as well, may also pose a threat. Prior to the extirpation of the MSV elephants, other protected areas had suffered the depredations of illegal elephant hunting, both from within Malawi and from Zambia (Bell & Jachmann, 1984; McShane, 1986). Conflict between elephants and man in the peripheral areas of the elephants' range is likely to remain an ongoing problem (Bell *et al.*, 1982; Bell, 1985). If Malawi's elephants are to survive this combination of threats there must be the utmost commitment and co-operation among all concerned agencies, not only in government and local non-government organisations, but also in the external donor community and in neighbouring countries.

RECOMMENDATIONS

A national strategy is needed to ensure the survival of Malawi's remaining elephants. Such a strategy should learn from mistakes made in the MSV and could be adapted to other large wildlife. The following actions are recommended:

- Improvement of ground coverage and communication between field staff and senior DNPW personnel, to ensure that changes in the status quo are rapidly detected and brought to the authorities' attention.
- Establishment of a national crisis response law-enforcement unit within the DNPW, with police support, to ensure that field staff are given the necessary moral and material support.
- A review of the southern African regional commitments of senior DNPW personnel, which might be compromising the attainment of Malawi's internal wildlife conservation goals by placing unfair demands on resources.
- Attainment of substantial donor assistance to provide Malawi's DNPW with adequate resources to achieve basic conservation goals for MWR and other areas. The successful future of Majete as a wildlife reserve seems likely to hinge upon external funding.
- Improved co-operation and exchange of information between Malawi and the neighbouring elephant range countries of Mozambique and Zambia.
- The re-introduction of elephants to MWR is not recommended until such time as illegal activities within the Reserve, such as tree-cutting and poaching, are under control.

ACKNOWLEDGEMENTS

The support and encouragement given over the years spanned by these studies, by the Chief Parks and Wildlife Officer and his staff at Malawi's DNPW are greatly appreciated. Thanks are due also to the Biology Department of Chancellor College, University of Malawi. The Wildlife Society of Malawi promoted the 1994 Majete elephant study, and grateful acknowledgement is extended to Fauna & Flora International, which helped to fund this study with a grant from its *Oryx* 100% fund.

REFERENCES

Bell, R.H.V. (1985) The man-animal interface; an assessment of crop damage and wildlife control. In: *Conservation and Wildlife Management in Africa*. (Eds. R.H.V. Bell and E. McShane-Caluzi.) US Peace Corps, Washington, D.C.

Bell, R.H.V., Jachmann, H. & Hall-Martin, A.J. (1982) The man-elephant interaction/conflict in Kasungu National Park, Malawi. Malawi Department of National Parks and Wildlife Report, Lilongwe.

Bell, R.H.V. & Jachmann, H. (1984) The influence of fire on the use of *Brachystegia* woodland by elephant. *Afr. J. Ecol.* 22, 157-163.

Bhima, R. (1992) The status of elephants in Liwonde National Park and Majete Game Reserve. Malawi Government Report, Lilongwe.

Caughley, G. (1980) *Analysis of Vertebrate Populations*. John Wiley and Sons.

Clarke, J.E. (1983) Protected areas master plan for Southern Region. Malawi Government, Lilongwe.

Cumming, D.H.M., Du Toit, R.F. & Stuart, S.N. (1990) *African Elephants and Rhinos. Status Survey and Conservation Action Plan*. IUCN/SSC African Elephant and Rhino Specialist Group, IUCN, Gland, Switzerland. 72 pp.

Douglas-Hamilton, I. (1988) *African Elephant Database Report 1987*. UNEP, Nairobi.

Faulkner, H. (1868) *Elephant Haunts: A Sportsman's Narrative of the Search for Livingstone*. Facsimile edition, Society of Malawi and Royal Geographical Society.

Hanks, J. (1979) *A Struggle for Survival. The Elephant Problem*. Country Life Books, Feltham, England.

Jachmann, H. (1984a) *The Ecology of the Elephants in Kasungu National Park, Malawi; with Specific Reference to Management of Elephant Populations in the achystegia Biome of South Central Africa*. Ph.D. thesis. University of Groningen.

Jachmann, H. (1984b) Assessment of elephant numbers by means of dropping counts on roads and tracks and its use in the Nkhotakota game reserve. Malawi. *Nyala* 10, 33-38.

Jachmann, H. & Bell, R.H.V. (1979) The assessment of elephant numbers and occupancy by means of dropping counts in Kasungu National Park, Malawi. *Afr. J. Ecol.* 17, 231-239.

Jachmann, H. & Bell, R.H.V. (1984) The use of elephant droppings in assessing numbers, occupancy and age structure; a refinement of the method. *Afr. J. Ecol.* 22, 127-156.

-
- Johnston, H.H. (1897) *British Central Africa*. Methuen, London.
- McShane, T.O. (1986) Vwaza March Game Reserve: a baseline ecological survey. Department of National Parks and Wildlife, Lilongwe.
- Morgan-Davies, A.M. (1983) Crop and livestock protection, Malawi. Report of the Southern Region Wildlife Control Unit. Department of National Parks and Wildlife, Lilongwe.
- Muldoon, G. (1957) *The Trumpeting Herd*. Rupert Hunt-Davies, England.
- Nsanjama, H. (1985) Wildlife control in Malawi. In: *Conservation and Wildlife Management in Africa*. (Eds. R.H.V. and E. McShane-Caluzi.) US Peace Corps, Washington, D.C.
- Sefu, L. (1993) Refugee impact on Lower Shire protected areas. Malawi Government Report, Blantyre.
- Sherry, B.Y. (1987) *Aspects of the Ecology of the Elephant *Loxodonta africana* (Blumenbach, 1797) in the Middle Shire Valley, Southern Malawi*. M.Sc. thesis. University of Malawi, Malawi.
- Simon, H.W., Rogers, P.M. Chiwona, E.A., Bhima, R. & Banda, H.M. (1991) *Wildlife Management and Crop Protection - Mammals Inventory, Malawi, 1989-1990*. Malawi/FAO Project.