

# Decline of elephants and other wildlife in the Nasolot–South Turkana and Kerio Valley–Kamnarok conservation areas, Kenya

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## Abstract

The 2002 total aerial count of elephants for Nasolot, South Turkana, Kerio Valley and Kamnarok National Reserves and surrounding dispersal areas was conducted between 4 and 8 August. Two aircraft fitted with global positioning system (GPS) were used in navigation, recording survey paths and waypoints. Total counts of elephants and other wildlife species were done and livestock numbers estimated. Elephants counted were 490, many in the northern parts of their range. This count is a decline of 362 individuals or 42.4% since 1997 and 302 or 38.1% since 1999. This drastic decrease since 1997 suggests that this elephant population is severely threatened. The distribution pattern of elephants during all the counts (1997, 1999 and 2002) is similar, with most elephants distributed in the northern and southern parts of the ecosystem. The number of carcasses recorded was 62, compared with 45 in 1999 and 13 in 1997. The carcass ratio was 11.2% contrasted with 5.4% in 1999. This ratio is much higher than that of other elephant ranges in the country. If it is a relative index of poaching levels, the situation in the ecosystem is alarming. About 29,000 head of livestock were estimated in the study area, signifying a high level of human activity in the area, thus carrying a high potential for human–wildlife conflict.

## Résumé

Du 4 au 8 août 2002, on a procédé au recensement aérien total des éléphants des Réserves Nationales de Nasolot, du Turkana-sud, du Kerio Valley et de Kamnarok et des aires de dispersion environnantes. Deux avions équipés d'un système de positionnement global (GPS) ont servi à la navigation pour relever les sentiers étudiés et les points de repère. On a procédé au comptage total des éléphants et des autres espèces sauvages et à une estimation du bétail. Les éléphants dénombrés étaient au nombre de 490, plus nombreux dans les parties nord de leur aire de répartition. Ce chiffre représente une baisse de 362 individus, ou de 42,4 % depuis 1997, et de 302, ou 38,1 % depuis 1999. Cette chute dramatique constatée depuis 1997 suggère que cette population d'éléphants est gravement menacée. Le schéma de distribution des éléphants est resté semblable pendant tous les comptages (1997, 1999 et 2002), et la plupart des éléphants se répartissaient dans les portions nord et sud de l'écosystème. Le nombre de carcasses rapportées était de 62, alors qu'il était de 45 en 1999 et de 13 en 1997. Le pourcentage des carcasses représente 11,2 %, contre 5,4 % en 1999. Ce pourcentage est beaucoup plus élevé que celui des autres aires de répartition des éléphants dans la région. Si on peut le considérer comme un indice relatif du taux de braconnage, la situation est alarmante dans l'écosystème en question. On a évalué le nombre de têtes de bétail à environ 29.000 dans la zone étudiée, ce qui signifie un taux élevé d'activité humaine et, par conséquent, un risque considérable de conflits hommes-animaux sauvages.

## Introduction

The 2002 aerial count was undertaken as part of a Kenya Wildlife Service (KWS) initiative to determine the current status of Kenya's elephant population. Nasolot and

South Turkana reserves hold the largest elephant population in western Kenya and some of its security patrols are administered from Mt Elgon National Park (90 km away), which is one of the four Monitoring of Illegal Killing of Elephants (MIKE) sites in Kenya.

Historical information on elephants in this area is scant. In 1973 the estimate for Turkana District was 1500 elephants, but no figures were given for the other districts (Jarman 1973). The Department of Resource Surveys and Remote Sensing (DRSRS) carried out a small number of surveys during the 1970s and 1980s. These generally gave low estimates—a few hundred animals across the whole area—with the exception of one count in Turkana in 1981 that gave an estimate of over 800 elephants outside the reserves.

In 1990 local KWS staff estimated that there were 400 elephants in Nasolot and South Turkana game reserves at the northern end of the range, with another 100 in Kerio Valley and Kamnarok to the south. DRSRS sample counts in the same year gave estimates of 535 for West Pokot (including Nasolot), 0 for Turkana and 596 for Baringo. However, the confidence limits were high. No survey was carried out in Elgeyo Marakwet. A sample aerial count of the area was carried out in June 1992 (Mbugua 1992). Very few elephants were seen inside the sample strips, so the count was treated as a low-intensity total count. This provided a similar figure of 580 elephants, of which 525 were in Nasolot and South Turkana. Because this was carried out at low intensity, it was estimated that the total population could have consisted of over 900 elephants.

Total aerial counts of the Nasolot and South Turkana elephants were carried out in June 1997 (Muriuki et al. 1997) and July 1999 (Omondi et al. 1999). Elephants counted were 852 in 1997 and 792 in 1999. In both counts most of the elephants were found in the northern block of Nasolot–South Turkana, with smaller numbers seen in the southern Kerio Valley and Kamnarok Reserves. Pastoralism remains the major economic activity in the dispersal areas.

Kamnarok National Reserves and the surrounding areas (fig. 1). The surrounding dispersal areas east and west of the study area are moderately settled by people who have restricted wildlife movements. The Nasolot North Reserve covers about 92 km<sup>2</sup>.

Topography and rainfall determine vegetation types. The study area is characterized by light bushland with significant areas of dwarf shrubland and grassland. Moisture and elevation gradients influence vegetation, with higher elevations having more woody cover than the lowlands.

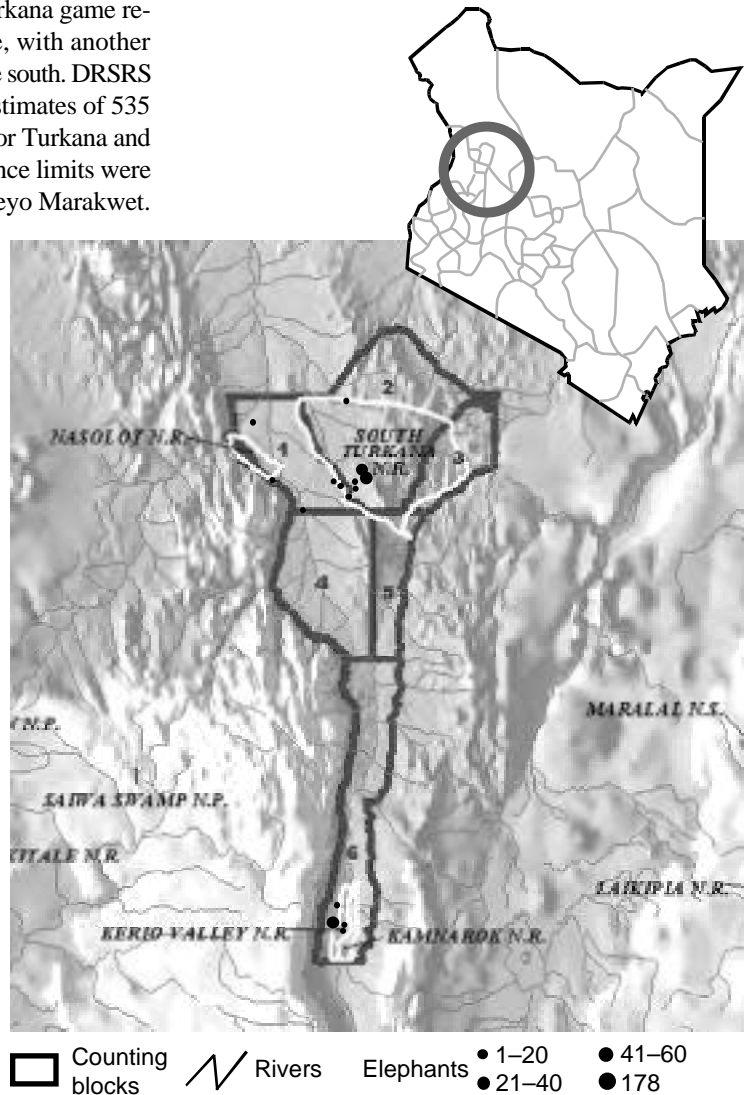


Figure 1. Elephant distribution as observed in the August 2002 aerial count in the Nasolot–South Turkana and Kerio Valley–Kamnarok study area. (GPS map produced by R. Mayienda, GIS Section, IT Dept. KWS.)

## Study area

The study area covered the Nasolot, South Turkana, Kerio Valley and

The main watercourses support evergreen or semi-deciduous riverine vegetation, which form dense forests with a dominance of various tree species such as *Acacia tortilis*, *Acacia seyal*, *Balanites aegyptiaca*, *Dichrostachys cinerea* and *Salvadora persica*. Away from the watercourses, the common species vary somewhat with region and soil type. Cover is sparse, often less than 5%, bushes being typically thorny and rather widely spaced.

The climate is arid and hot. Temperatures are high throughout the year with an average daily level of about 24° C to 38° C. Rainfall is low with an annual average of about 180 mm. The survey was carried out during the dry season, which falls around August to December.

## Methods

The method adopted for the 2002 total aerial count for wildlife and livestock was that used in the 1999 census (see methods of Douglas-Hamilton et al. 1994 and Douglas-Hamilton 1997). The count therefore employed the global positioning system (GPS) technique with ArcView software used for plotting species distribution maps (for example, figs. 1 and 2).

Two aircraft were used in the count. The survey crews consisted of one observer and a pilot for a two-seater aircraft; a pilot, a front-seat observer and two rear-seat observers for the four-seater aircraft. Each used GPS in navigation, recording the survey path and waypoints. The exercise started every morning at 0730 and ended late in the evening. Breaks were taken during refuelling of the aircraft and at lunch. All observations were saved in GPS as waypoints with the geographical location referenced and used to produce species distribution maps. Unless the view was obstructed by thick vegetation, photographs were used to establish the correct count of large herds (Douglas-Hamilton 1997). All waypoints were downloaded onto a computer at the operation base each evening and the front-seat observers did a summary table of each block. Any double counts in neighbouring blocks were also worked out and eliminated during these sessions.

## Results

Total flying time was 33 hr 32 min, total count time 21 hr 12 min. Like in the previous count of 1999, all species of animals seen were recorded to get a good

picture of species numbers, diversity and distribution. Eight wildlife species were counted: 12 baboons, 5 Cape buffaloes, 3 dikdik, 490 elephants, 1 gazelle, 2 lesser kudus, 1 oryx, 11 warthogs. Most of these animals were found in the southern parts of Sigor–Kolosia (blocks 4 and 5) and Kerio Valley (block 6). In 1999, most of the species were found in the northern blocks of Nasolot–South Turkana (blocks 1–3).

### Elephants

The number of elephants counted was 490. This is a major decline from previous counts. Blocks 1 and 2 (Nasolot and South Turkana) had the highest number (285 or 58% of total elephants counted). Like in the previous count of 1999, no elephants were counted inside Nasolot Game Reserve. Most were found farther south-east towards South Turkana Reserve and the rest in Kerio Valley Game Reserve in the farthest south area of the Kerio Valley (fig.1). This Kerio Valley block had 42% (205 elephants) of the total number of elephants counted. No elephants were counted in blocks 4 and 5 (Sigor and Kolossia).

### Carcasses

Observed during the count were 62 carcasses, compared with 13 in 1997 and 45 in 1999 (table 1). Most were in blocks 1 and 2 (50%); the rest were spread over the other blocks (fig. 2).

### Livestock

Livestock were concentrated in the southern blocks with none or very few recorded in the northern blocks. The number of livestock estimated during the count was 28,700 (almost the same number estimated in the last count of 1999); 39% were cattle and 61% sheep and goats (table 2).

## Discussion

### Elephant and carcass trends

Elephant trends in this ecosystem have continued to decline since 1997 (Muriuki et al.). Compared with the 1999 count (Omondi et al.), the 2002 count indicated a major decline (38.1%) in elephant numbers. Between 1997 and 1999, the decline had been 7%. The carcass ratios have also continued to increase between 1997 and 2002 (1.5% for 1997, 5.4% for 1999

Table 1. Carcass trends in Nasolot–South Turkana ecosystem between 1997 and 2002

Year of count	Live elephants (no.)	Carcasses (no.)		Carcasses (%)	Recent (%)
		Old	Recent		
1997	852	10	3	1.5	23
1999	792	36	9	5.4	20
2002	490	52	10	11.2	16.1

Most of the recent or fresh carcasses were found in the Nasolot–South Turkana blocks (mainly in block 1) while most of the old were in block 4 (see fig. 2).

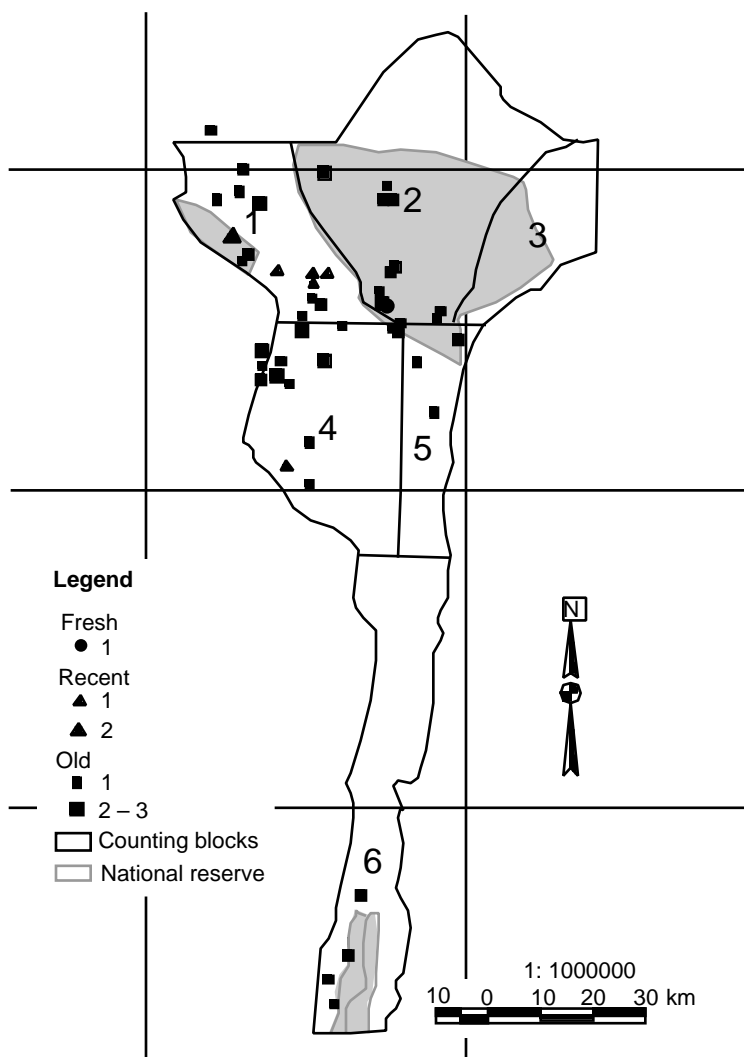


Figure 2. Elephant carcasses as spotted in the August 2002 aerial count, Nasolot–South Turkana and Kerio Valley–Kamnarok. (Modified from the GPS map produced by R. Mayienda, GIS Section, IT Dept., KWS.)

and 11.2% for 2002). This clearly reflects the trend in the dwindling numbers of live elephants as portrayed by count results (fig. 1). It is therefore clear that this population is highly threatened compared with populations in other Kenyan ranges, which have registered increases.

### Livestock

The large number of livestock in the Nasolot–South Turkana ecosystem presents a big change from the results of the last count. It signifies a high level of human activity in the area. As in other ranges, increased human–elephant interactions are a potential threat to the survival of the elephant population. These interactions are likely to lead to conflict and increased vulnerability of elephants to various causes of death. The interactions involve competition for limited resources such as water and grazing areas. With the presence of so many illegal firearms in the hands of local people, who are often seen carrying them while grazing or herding their livestock, incidents of elephant mortality will continue to increase. It is also important to note that the encroachment into Kerio Valley and Kamnarok in the south has led to intense human–elephant conflict. This conflict has been attributed to increased human population that has forced people to move into the reserve in search of pasture for livestock, firewood and honey (Kerio Valley warden, pers. comm., August 2002). These human–elephant interactions have led to four human deaths in two years. The Nasolot–South Turkana area is insecure, with very little tourist activity; cattle rustling has become a serious problem in the last few years and KWS often encounters large parties of armed men. The seizure of 28 tusks in South Turkana in 1999 suggests that the com-

Table 2. Livestock estimates in Nasolot–South Turkana ecosystem

Blocks	Cattle	Camels	Sheep & goats	Total
1	–	–	800	800
2	100	60	470	630
3	50	–	–	50
4	5,118	10	7,162	12,290
5	2,160	20	1,405	3,585
6	3,273	–	–	3,273
Outside	540	25	7,485	8,050
Total	11,241	115	17,322	28,678

mercial ivory trade was active in this area. Intelligence reports indicate that elephants are often killed if raiding gangs encounter them; they eat the meat and take the tusks. It is likely that only a very small percentage of the overall elephant mortality is actually reported, many of the carcasses being in inaccessible areas.

## Conclusion

These observations make it evident that wildlife species have continued to decline in this ecosystem. In 1999 total wildlife numbers were 1031; during this count, only 525 animals were counted. The decline (49%) calls for immediate action to find and control the causes, to save some wildlife populations from local extinction.

The Nasolot–Kamnarok elephant population is severely threatened by the influx of firearms from neighbouring countries. The presence of sophisticated weapons has led to escalated violence through banditry and cattle rustling. The elephants have not been spared in battles between local communities. They have been killed either for ivory and meat or as an outcome of human conflict.

Because of the threats faced, more resources should be set aside for wildlife protection in this ecosystem. Intensive air and ground patrols should be carried out continuously to monitor the status of all species, especially the elephants. With so many firearms concentrated within a small area and the general lack of security, the future of these elephants is bleak unless far more stringent law enforcement is put in place.

## Acknowledgements

We would like to acknowledge all the participants and organizations for their financial, material and moral

support from the time of preparation through to the actual count. We are grateful to MIKE through its director, Nigel Hunter; the European Commission through the African Elephant Specialist Group's (AfESG) programme officer Leo Niskanen for funding the exercise; and KWS director Joseph Kioko for committing two KWS aircraft towards this exercise and giving his encouragement, both of which ensured the success of this count.

We appreciate the efforts and dedication shown by KWS pilots Bongo Woodley and Anthony Kiroken, who flew tirelessly to ensure that all blocks were covered within schedule.

We would also like to thank the wardens for Kerio Valley and Nasolot National Reserves, Dickson Korir and David Muthui respectively, and their staff for their support on the ground. We applaud the dedication of the drivers, rangers and aircraft attendants, without whom the count would not have been smooth. Finally, to all those who participated in any way but have not been mentioned, we thank you for your contribution towards making the Nasolot count a success.

## References

- Douglas-Hamilton, I. 1997. Counting elephants from the air: total counts. *African Wildlife Foundation manual*, chapter 4. African Wildlife Foundation, Nairobi.
- Douglas-Hamilton, I., Gachago, S., Litoroh, M., Mirangi, J. 1994. Tsavo elephant count. Kenya Wildlife Service, Nairobi. Unpublished.
- Jarman, P.J. 1973. Minutes of meeting to discuss Kenya's elephant population, 17 September 1973. Zoology Department, University of Nairobi. Game Department, Nairobi.
- Mbugua, S. 1992. Survey of the Nasolot/South Turkana and Rimoi /Lake Kamnarok elephant populations. Kenya Wildlife Service, Nairobi. Unpublished.
- Muriuki, G., Ndeti, R., Opiyo, M., Omondi, P. 1997. Total aerial count of elephants and other large herbivores: Nasolot, South Turkana, Kamnarok and Rimoi National Reserves, Kenya Wildlife Service, Nairobi. Unpublished.
- Omondi, P., King, J., Muriuki, G., and Geddes, C. 1999. Total aerial count of Nasolot, South Turkana, Rimoi and Kamnarok National Reserves and surrounding areas. Kenya Wildlife Service, Nairobi. Unpublished.