

GREEN HUNTING AS AN ALTERNATIVE TO LETHAL HUNTING

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Abstract

Private nature reserves and adjoining large national parks such as the 2.2 million ha Kruger National Park (KNP) in South Africa, not only need to function as integrated ecological units but also need to be financially viable to support efficient management practices. The Association of Private Nature Reserves (APNR), on the western boundary of the KNP encompass an area of 180 000 ha and forms one of the largest private nature reserves in the world. These reserves host from time to time some of the few remaining large tusked bulls, which periodically emerge from the KNP. As hunting is permitted within the APNR, trophy bulls are of economic importance to the reserves. Green hunting of elephant bulls was pioneered by Save the Elephants within the Timbavati Private Nature Reserve in 1998. Green hunting offers an alternative to lethal hunting without depleting the gene pool whilst also contributing financially towards the management of the APNR. As a consequence of the green hunts, bulls are fitted with satellite collars which provide information that will not only contribute towards our knowledge of dispersal as a population regulation process, but will also lead to an understanding of whether social-, safety- or nutritional benefits motivate elephant movements.

Introduction

The conservation of the African elephant, *Loxodonta africana africana* (Blumenbach, 1797) (see Roca *et al.* 2001), represents a challenge, not only due to the ethical issues that are involved, but also because of the dearth of information on which management decisions are often based. Elephants are charismatic species, capable of arousing tremendous public sentiment. The apparent destruction of life, possible reduction in genetic diversity and the disturbances to survivors caused by trophy hunting are of immediate concern to many people. This review outlines trophy hunting within the APNR and highlights the potential benefits of green hunting as an alternative to lethal hunting of trophy bulls.

Historical overview of the APNR

The indiscriminate hunting of elephants over two centuries ago had largely removed elephants from most of South Africa (Hall-Martin 1992). In 1898 when the Sabi Sand Game Reserve was proclaimed, prior to the formation of the KNP, elephants were believed to be extinct in this area (Garaï 1998). At the turn of the nineteenth century, only a few dozen elephants were to be found between the Letaba and Olifants rivers, within the present day KNP (Hanks 1979; Ebedes *et al.* 1991, Hall-Martin 1992, Whyte 2001). The KNP was recolonised by elephants from Mozambique, which also pressed westwards into privately owned land (Hall-Martin 1980). In 1954 the Timbavati Private Nature Reserve was formed, which consisted of 45 landowners on the western border adjacent to the central districts of the KNP. In 1960 the KNP fenced their western boundary to arrest the spread of foot-and-mouth disease (Joubert 1996). This fence disrupted the east-west migration of wildebeest and zebra and led to a substantial decrease in both populations (Whyte 1985, Whyte & Joubert 1988). Prior to 1962, no elephants were resident outside the borders of the KNP (Kettlitz 1962). A decade later Lambrechts (1974) estimated that *ca* 220 resident elephants occurred within the private nature reserves of the Lowveld.

In 1972 both the Klaserie and Timbavati Private Nature Reserves were officially formed. As time progressed, bordering farms were incorporated to increase the land surface area (De Villiers 1994). To date, the APNR consists of the Klaserie, Timbavati and Umbabat Private Nature Reserves (24° 02' - 24° 33' S; 31° 02' - 31° 29'E) and comprises approximately 180 000ha. In earlier years the chequered land-use history of farms within the APNR had meant that certain areas were subjected to cattle ranching, heavy and selective hunting pressure, excessive creation of artificial water points, the artificial control of veld fires and animal populations which were either over protected or over-hunted (Witkowsky 1983, Pretorius 1993, Joubert 1996). Despite private landowners within these areas being sympathetic towards conservation and contributing in a positive way towards the ecological integrity of core conservation areas such as the KNP, numerous private owners often make the regulation of policy difficult. The Timbavati Private Nature Reserve has however pioneered a unique constitution, where by all landowners bind themselves to a common policy. Although neighbouring reserves have bound themselves to a different extent, all three reserves have recently adopted the

management principles and policies of the KNP and form part of the greater Kruger National Park biosphere (Joubert 1996). The willingness of the APNR to co-operate and comply with regional interests which would be beneficial to the conservation of enlarged ecological units could serve as a land-use model for privately owned land within buffer zones. The adoption of a common approach towards the management of elephants, which are capable of covering large tracts of land in search of food and water, provides a particular challenge to private landowners that border on national parks.

Annual aerial censuses have indicated that elephant numbers have increased within the APNR in recent years. Elephant estimates increased from 189 in 1983 to over 500 in 1992 (De Villiers 1994) and appeared to stabilise at just over 500 from 1992 until 1996 and then steadily increased to over 900 in 2002 (I. Whyte pers.comm.). These increases are thought to represent an influx of elephants from the KNP following the removal of internal fences between the reserves and the western boundary fence in 1993/1994. The APNR elephant population is adjacent to a so-called high elephant density zone within the KNP, where the authorities have allowed elephant numbers to increase following the termination of culling operations in 1995 and the implementation of a new elephant management policy (Whyte *et al.* 1999). At present, the elephants within the APNR represent one of the largest elephant populations on privately owned land in the world (Hall-Martin 1992).

Trophy hunting within the APNR

Tusk growth in elephants is continuous (Pilgram & Western 1986) with the weight of male tusks increasing exponentially with age, while female's tusk weight increase linearly (Laws 1966). Hunters (legal and illegal) generally target large-tusked individuals making old individuals scarce in most populations. Unlike many reserves in Africa, the KNP has not been subjected to heavy poaching. Several large-tusked bulls are therefore still to be found within the well-protected borders of the KNP. A number of individuals with the potential to grow large tusks have been sighted within the APNR, presumably after immigrating from the KNP.

Although hunting is not allowed within national parks such as the KNP, controlled hunting has been permitted in the APNR based on the premise that the

population is large enough to allow the removal of a limited number without altering or affecting population size and structure. Since 1985, a total of 96 bulls have been hunted in the APNR. Hunted animals have been aged at 26 and older, and only two individuals carried ivory less than 18kg, which was not considered as acceptable trophies (De Villiers 1994). Hunters would classify animals with a minimum tusk weight of 80 lbs as representative of trophy animals (Smith 1990). The income from elephant and other trophy hunting in 2002 amounted to \$ 178 000 and \$ 300 000 respectively for the Klaserie and Timbavati Private Nature Reserves, and covered 60 to 70 % of the budgets (Stalmans *et al.* 2003). Trophy hunting of large tusked bulls thus provides a profitable alternative to non-consumptive use, but may impact negatively upon tourism because of public disapproval (Dublin 1996). When considering that tourist based land-use practices within the Timbavati Private Nature Reserve have increased from 35 to 65% over the last three years (P.R. White pers comm.), public opinion needs to be taken into consideration when formulating management policies. Also, the effects of trophy hunting upon non-target animals have not been established and may prove traumatic (Garai 1996, Garai 1998), thereby further limiting tourist game viewing as a possible source of revenue to some private landowners.

Adult bulls occur at a proportion of 15% of the population (Whyte 2001), while in 1991 only 9.3% of the bulls within the APNR could be considered trophy animals. Long-term selective off-takes of trophy bulls will ultimately depress the quality of trophies, as trophy hunting is highly selective with respect to sex, age and outstanding physical features (Joubert 1996, Stalmans *et al.* 2002). De Villiers (1994) showed that the past hunting rates (an average of six bulls were hunted annually from 1985 to 1992) could not have been sustained without immigration from the KNP population. Without recruitment from the KNP population, trophy bulls within the APNR would be shot out within five to six years. Recently, concern has been raised at private landowners benefiting from national assets, i.e. immigrations of animals from the KNP since the removal of boundary fences (Stalmans *et al.* 2003).

Other than the economic and genetic value of large tusked bulls, older large tusked bulls are also of social importance to breeding females as females preferentially mate with older more experienced bulls (Poole & Moss 1981, Poole 1982, Poole 1987).

The importance of older bulls within elephant society has also recently been highlighted by other studies (Slotow *et al.* 2000, Slotow *et al.* 2001, Slotow & van Dyk 2001), and it may well be that not only matriarchs within family units have a crucial social function (McComb *et al.* 2001). Clearly, large tusked bulls can be considered as valuable assets to the APNR, and valuable members of elephant society and on this basis we promote green hunting within the reserves.

Green hunting as an alternative to lethal hunting

What is green hunting?

Green hunting provides the sportsman with an alternative to the more familiar lethal hunts. During green hunts, the animal is shot with an anaesthetic dart instead of a bullet. The hunter therefore still gets to experience the skill and risk of the hunt, but with the difference that the large tusked bulls which are targeted are not removed from the population. The green hunter pays \$25 000 for the opportunity which contributes financially towards the management of the reserve. Whilst fitting a satellite collar, careful measurements and detailed photographs of the tusks are taken to enable the hunter to have fibreglass or bronze replicas made. After the antidote is administered, under the supervision of a qualified veterinarian, the elephant recovers and moves off with the fitted satellite collar, which provides real time information on the elephant's whereabouts. The green hunter returns from the hunt with the option to receive regular updates on the bull's movements in the months to come.

Green hunting in the Timbavati Private Nature Reserve

Save the Elephants and Timbavati Private Nature Reserve have pioneered green hunting of elephants as an alternative to lethal hunting (Douglas-Hamilton 1998). Since 1998, elephant bulls within the Timbavati Private Nature Reserve have formed part of a green hunt initiative, whereby trophy bulls are darted and fitted with satellite collars for research purposes. All green hunts adhere to strict protocols established by the warden and the Department of Nature Conservation. To date, five satellite collars have been placed on bulls within the area. Remote tracking, using satellite collars can provide valuable information on habitat type occupancy and has the potential to generate large

amounts of high quality data with minimum human intervention. Satellite tracking also allows the study of movements in areas, which may be inaccessible and has proved to be cost-effective when traveling budgets are limited. The technique can map fine scale movements, which can then be related to detailed vegetation maps or topographical features. Furthermore, it offers an enhanced opportunity to study specific aspects of habitat use, and in combination with point sampling behavior, the association between various elephant groups can be established (Douglas-Hamilton 1998). Determining habitat usage patterns in combination with terrain and vegetative characteristics will improve our understanding of the range requirements of elephants. Combining site-based data on vegetation impact with the movement of elephants across the landscape would thus make an important contribution towards the management of free-ranging elephant populations.

Prior to discussing the benefits of green hunting in greater detail, we would like to focus on a trophy bull named Mac. As we are into our second year of tracking Mac, he represents an example of the type of information that can be gathered from green hunted bulls. Mac's satellite collar was programmed to supply three daily readings of his GPS location, which were followed up by ground observations. The data on his location was accessed via the programme MS Track Pro, and the GPS locations were imported into ArcView GIS 3.2. (Anon 1992). The minimum convex polygon (MCP) was used to determine the size of Mac's home range as this method provides an estimate of the total area that would have been covered (Jaremovic & Croft 1987). The ArcView extension *Animal Movement* (Hooge & Echenlaub 2000) was used to calculate the area of the MCP. After 15 months we have established that the total area traversed by Mac represents 4 540 km² (Figure 1). These results differ considerably from previous estimates of home range size for bulls within the Klaserie- and Timbavati Private Nature Reserves. De Villiers (1997) estimated a mean home range surface area of 238 km² within the APNR by using conventional radio telemetry methods. Two distinct areas within Mac's home range were distinguished. These included a northern section between the Npongolo and Tsende rivers in the KNP, which Mac frequented for eight months of the year. The southern section extended to areas within the APNR and covered a four-month period of Mac's range movements. Ground observations established that Mac was in musth for approximately

three of these four months and on both occasions he occupied the APNR. While in musth he was either associating with family units or moving between family units. These preliminary results suggest that the home range size of mature bulls is dependent on reproductive activity, and clearly distinguishes between home ranges occupied during musth and non-musth periods. Likewise, De Villiers (1994) concluded that the home range size of bulls was not correlated with age but rather with reproductive state.

Benefits of green hunting

The potential benefits of green hunting are numerous. Especially when green hunts are linked to a scientific research programs and take place in accordance with pre-determined protocols and strict hunting ethics. Green hunting avoids depleting the gene pool of large tusked bulls through the selective off take of trophy animals. Green hunting will require that an animal be darted at least twice over the course of a few years, either to remove a satellite collar or to replace one when the batteries have run down, thereby optimizing income for conservation while simultaneously generating scientific insights from the targeted animal. Furthermore, the quality of the sporting experience is undiminished as the proximity to the animal, exposure of the hunter to obtain an unobstructed shot, and the following of the darted animal, are practical components of the darting experience (Harris 2002). Green hunting also endorses an ethic that ensures the survival and protection of the trophy bulls as green hunters are provided with information obtained from the continual monitoring of the green hunted animal. The negative impact of lethal hunting is avoided through green hunts because it causes minimal disturbance in comparison to the social disruption caused by lethal hunts. Elephants generate substantial income through tourism and green hunting avoids frightening the animals whereas lethal hunting potentially lowers the photo-tourism amenity of the area. Finally, green hunting initiatives linked to scientific research programs with follow-up ground observations will provide valuable insights into whether social-, safety- or nutritional benefits motivate elephant movements.

Conclusion

Since the removal of the western boundary fence between the APNR and the KNP, the APNR is likely functioning as a dispersal sink (Owen-Smith 1983). Although not established, we expect bulls to emigrate from the KNP more frequently than family units, as bulls are known to cover larger areas than family units and are generally the first to colonise new areas (Hall-Martin 1992). The vegetation structure and composition can thus be expected to alter as more and more elephants utilise the APNR. Determining the movements of herd structures within the APNR and adjacent areas will contribute greatly towards establishing how dispersal alleviates the effects of localised over-utilisation of forage resources. Incorporating green hunting (Douglas-Hamilton 1998) into research methods has permitted us to obtain information on the range behavior of bulls. This information has previously not been gathered within the KNP ecosystem by means of satellite collars and has been underestimated. Furthermore, green hunting has allowed the targeting of large tusked bulls without depleting the gene pool, and this has taken place at financial benefit, rather than cost, to the APNR. We therefore recommend the use of green hunting as an alternative to lethal hunting trophy bulls within private nature reserves such as the APNR and elsewhere.

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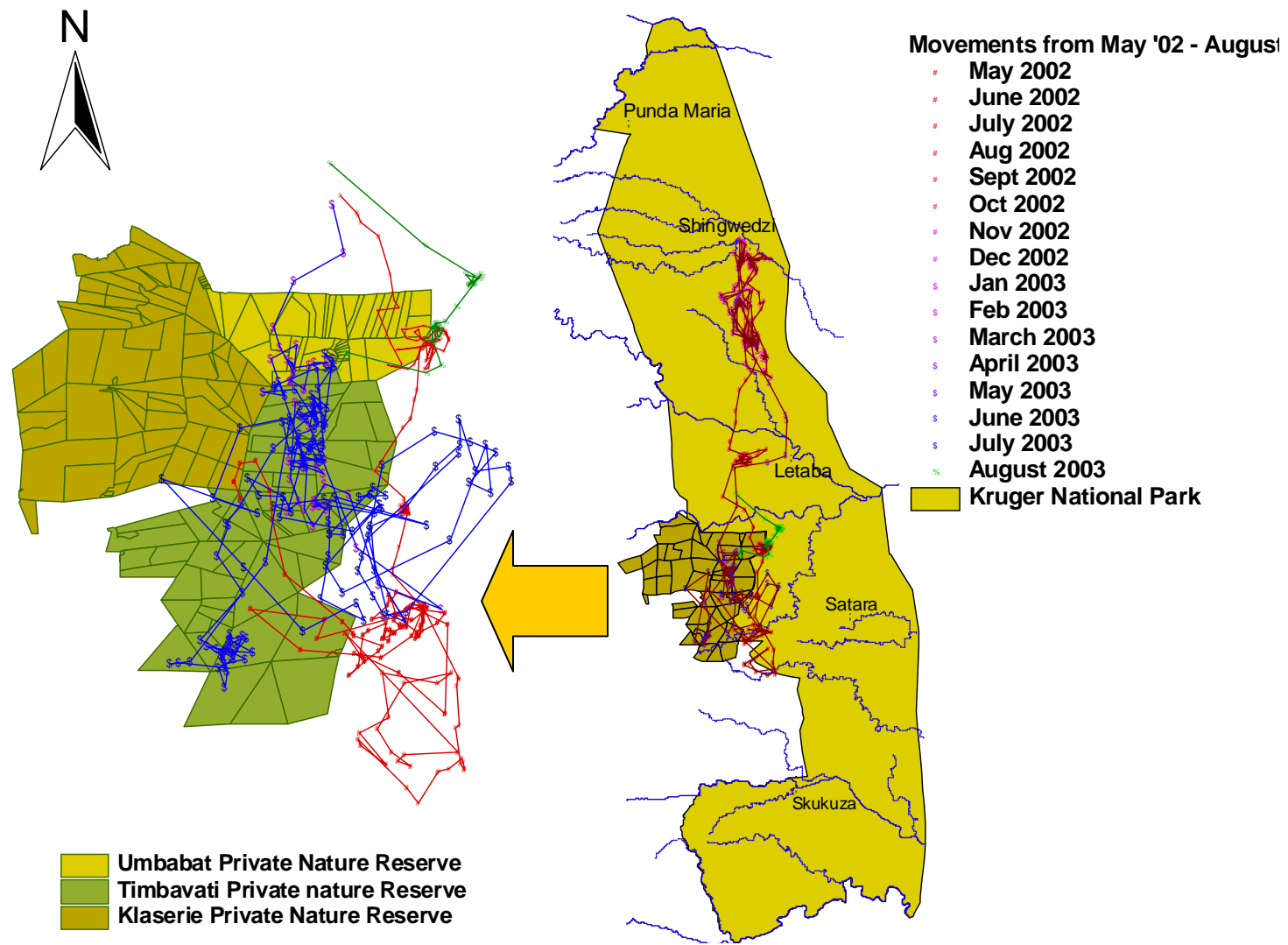


Figure 1 The movements of Mac from when he was green hunted in May 2002 until August 2003 within the Kruger National Park and the Associated Private Nature Reserves.