
Management implications of new research on problem elephants

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Abstract

The pressing problem of human–elephant conflict has attracted considerable conservation interest and is increasingly being studied in Africa under an initiative spearheaded by AfESG. Important ideas are beginning to emerge from recent research that may be directly relevant to managing ‘problem elephants’. One of these concerns the persistence of problem elephant behaviour in many populations, even when identified culprit individuals are regularly removed from these populations over a long period. Rather than having a few habitual problem animals that can be removed, it is possible that elephant populations have what may be termed a problem component. As animals comprising this component are removed, for example by killing or translocating them, others take their place. If this problem component theory is true, it implies that either killing or translocation options, if chosen, will have to continue indefinitely. This reasoning is difficult to test but is supported by considerable circumstantial evidence and does agree with accepted principles in agricultural pest control. Merely killing individuals of a pest species seldom has much impact on the problem and most pests are effectively controlled only by denying them either their target food or a nearby refuge.

Resume

Le problème urgent posé par les conflits hommes-éléphants suscite beaucoup d'intérêt dans le monde de la conservation et est de plus en plus étudié en Afrique grâce à une initiative du GSEAf. Des idées importantes commencent à émerger des recherches récentes qui peuvent avoir un rapport direct avec la gestion des « éléphants à problèmes ». Une d'elles concerne la persistance du comportement des éléphants à problèmes dans de nombreuses populations, même lorsque les coupables, identifiés, sont régulièrement écartés de ces populations pendant de longues périodes. Plutôt que d'avoir quelques animaux qui ont l'habitude de faire des problèmes, il est possible que ce soient les populations d'éléphants qui connaissent ce que l'on pourrait appeler une composante à problème. Lorsque les animaux qui ont cette composante sont enlevés, par exemple en les tuant ou en les déplaçant, d'autres prennent leur place. Si cette théorie de la composante à problème s'avère exacte, cela signifie que les options d'abattage comme de déplacement, lorsqu'on les choisit, devraient se poursuivre indéfiniment. Ce raisonnement est difficile à tester, mais il est étayé par des preuves très éloquentes et s'accorde avec les principes reconnus du contrôle des nuisances en agriculture. Le fait de tuer simplement des individus d'une espèce nuisible a rarement un impact sur le problème posé, et la plupart des animaux nuisibles ne sont efficacement contrôlés que lorsqu'on leur interdit l'accès à la nourriture ou à un refuge proche.

Introduction

It is well documented that many African elephant populations conflict with sedentary, agriculturally based people at the edges of their respective distributions and that the resolution of human–elephant conflict is a priority issue in the conservation of the species (WWF 1997; Hoare 2000a). From observations of other agricultural pest species, intuitively one

would reason that the proximity of more elephants might mean more problems (that is, that the activity of such ‘problem elephants’ exhibits some ‘density dependence’) (Barnes et al. 1995). Very little evidence has so far accumulated, however, to support a hypothesis that levels of problem–elephant activity are dependent on local elephant numbers or densities.

There is evidence to suggest that levels of problem–elephant activity may be more dependent on the

behaviour of individual animals than on the local abundance of elephants. Hoare (1999a) proposes a 'male behaviour hypothesis' to explain the irregular and unpredictable nature of crop raiding and other conflict incidents attributed mainly to bull elephants in many savanna areas of Africa. This agrees with the conclusions of similar, previous work on Asian elephants in India (Sukumar 1991; Sukumar and Gadgil 1988). Even where elephant cow groups are known to raid crops, it is plausible to suggest that individual matriarchal behaviour may be an important factor, especially since few elephant populations are food limited in the wild and crop raiding by females and offspring appears to be concentrated around peak time of the harvest and usually in farming areas close to a natural refuge.

Regardless of any debate, scientific or otherwise, on causal factors, the management of human–elephant conflict goes on in practice across the African continent. But the frequently practised removal of supposedly identified individual culprit elephants by wildlife managers has apparently repeatedly failed to produce any meaningful reduction in conflict incidence.

Recent social and biological research into human–elephant conflict (Hoare 2000b) has now reached the stage where although there is still a lot to learn, it is possible to feed back some important recommendations that should be discussed and field tested by managers responsible for conflict mitigation (AfESG 2001). One of the most far-reaching of these issues involves questioning the assumption that merely removing a problem elephant (by either killing it or translocating it) has any meaningful effect on subsequently alleviating conflict levels at the human–elephant interface.

Killing problem elephants

Killing is a standard problem–elephant control measure that has been applied for many years over much of Africa. It is employed as a quick–fix method, since it is popular with both wildlife authorities and affected people. Its advantages are that it is relatively cheap and quick to carry out, has high public relations value for wildlife authorities (chiefly through the 'retribution factor' and provision of free meat to affected people) and may in fact have some temporary effect. The temporary effect and public relations value have been exploited in many sites by killing individual elephants at intervals during peak seasons of conflict.

As this develops into a cycle that is repeated indefinitely, it really amounts to what has been termed a 'ritual palliative' to affected people (Hoare 1995).

Practical disadvantages of killing are being increasingly noted as the problem of human–elephant conflict becomes apparently intractable in some places. First, killing has to be done by trained personnel and can be a dangerous activity. Second, it is particularly difficult to identify culprit animals; even well-organized researchers with technological aids like radio collars and night-vision equipment have great difficulty sexing and identifying many individual animals at night, which is when most elephant raiding occurs.

Most important of all, it seems to have little deterrent effect on other persistent raiders (fig. 1), something that anecdotal reports have attested to for a long time. Wildlife managers often maintain that killing an elephant 'teaches' others to avoid entering farming areas. The example given in figure 1 is one of the most unambiguous of its kind yet produced and clearly does not support this view.

The persistence of elephant raiding almost everywhere where problem elephants have been destroyed, in some cases for decades (such as the area in fig. 1), must call the method into question. Also the rising appreciation of elephants (whether aesthetic, ecological or financial), has led to further doubt about the wisdom of widespread reliance upon killing as a control strategy.

Translocating problem elephants

In some situations, translocating live problem elephants has recently been proposed as a solution alternative to killing them and indeed has been undertaken for this purpose in several parts of Africa (Karindawaro 1998). Elephants can be immobilized fairly easily by teams of specialist people but the subsequent safe transport of such huge animals is a complicated logistical exercise costing large sums of money. But as live capture and translocation of problem elephants is an option especially attractive to the many opponents of destroying them, the required financial resources can sometimes be found. There is much to suggest, however, that this option is far from a panacea.

First, as with any decision to kill an offender, correctly identifying the culprit is very difficult. Also it is impossible to be certain that the problem will not be exported with the animal, especially if the behaviour hypothesis is to be believed. Alternatively,

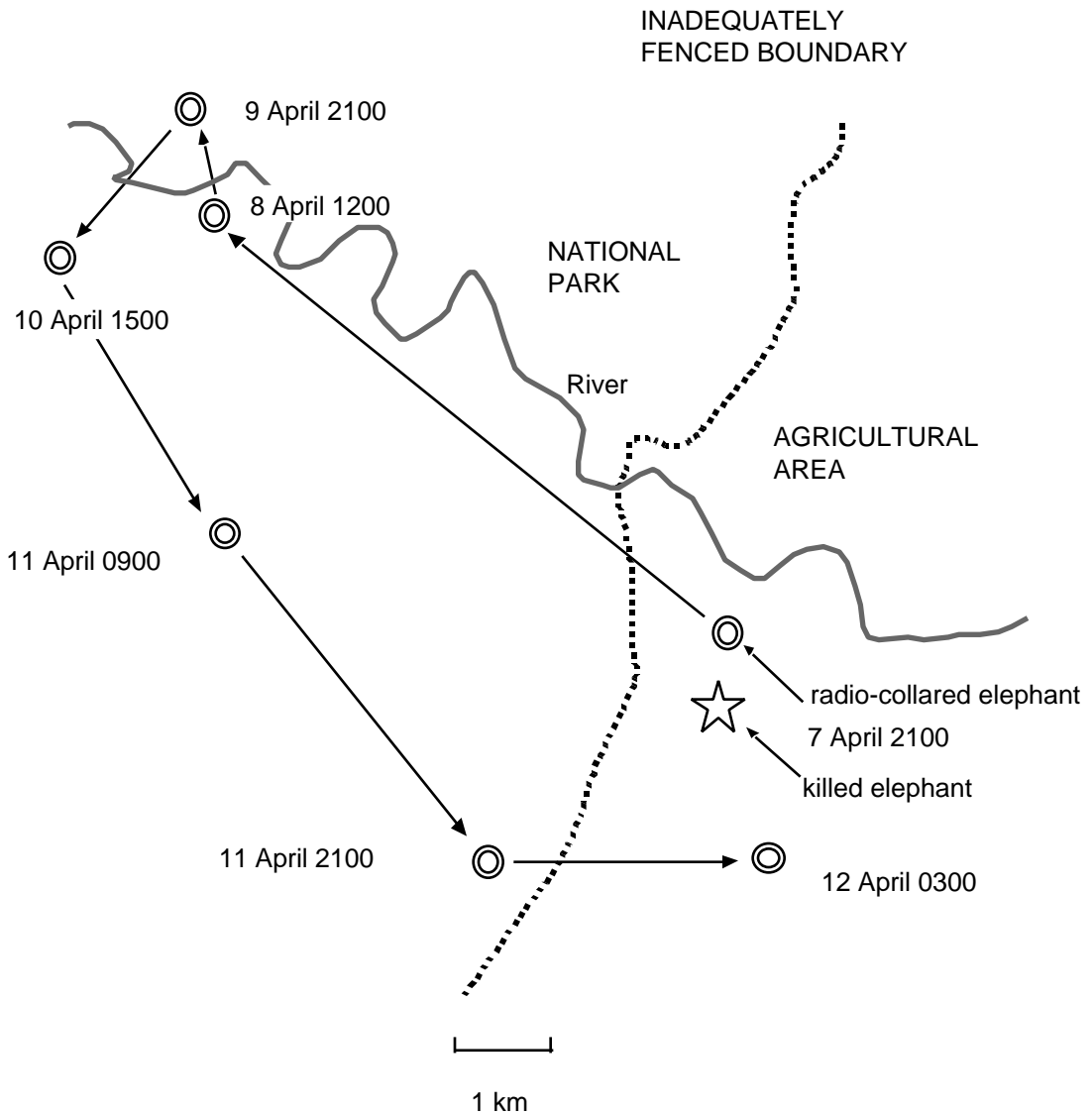


Figure 1. Movements of a radio-collared male elephant tracked by a researcher in Zimbabwe. One of the elephant's group mates was shot dead in the farming area on the night of 7 April. The animal returned initially to the sanctuary of the adjacent national park but four nights later (11–12 April) was crop raiding again in the farming area close to where the shooting took place. April is the peak of the harvest season. (Redrawn with permission from Osborn unpubl.)

the problem animal might return to its former range.

An additional disturbing issue that has emerged with elephant translocation in practice is welfare concerns in transit, which even the closest supportive veterinary care cannot always address. Elephants translocated within Kenya, for example, have had to endure extended, stressful periods of incarceration in vehicles because of logistical problems in road trans-

port (Njumbi et al. 1996). These problems were not fully anticipated at the time of capture.

The problem component idea

Unfortunately, in most human–elephant conflict situations in Africa the extent of the problem has not been monitored systematically or measured quantitatively.

Therefore, judgement of conflict intensity has often had to rely on the scientifically crude but socially very important barometer of tolerance to elephants by affected local communities (Hill 1998). An almost universal demand from human communities affected to any degree is that problem elephants be shot.

As problem elephants have been studied for longer periods by researchers in the field, significant evidence is emerging about why reliance on the removal of such individuals may be flawed as a long-term control method. This is because it now appears that almost any elephant population, rather than having a few habitual raiders that can be successfully removed, may have what might be termed a 'problem component'. As animals comprising this problem component are removed, others replace them (Hoare 1999b). The problem component thus remains. Elephant crop raiding both in Asia (Sukumar and Gadgil 1988) and Africa (Hoare 1999a) has been hypothesized as conforming to the predictions of optimal foraging theory. Therefore there seems no valid reason not to suspect that if those individuals who are in a position to practise crop raiding are removed, others will copy them without having to be 'taught'.

The problem component idea arose out of a study to investigate whether the same individual elephants are usually responsible for most conflict incidents at any given site (habitual raiders) (Hoare 1999b). It was arrived at by working backwards, as it were—asking why the removal of culprits (especially males) seemed to have so little lasting deterrent value. What is not clear at present is whether the problem component idea is equally applicable in larger elephant populations where there is scope for immigration as well as in those that are small and greatly range restricted (pocketed populations).

Implications for problem-elephant management

If the problem component idea is true, the removed animal will probably be replaced by another problem animal from within the same population, thus implying that either killing or translocation options, if chosen, will have to continue indefinitely. At present the theory rests only on strong circumstantial evidence since adequate manipulative experimentation to prove it would be impossible in most countries with elephants. Nevertheless, the management implications from the general line of reasoning presented here are twofold and solid enough to be seriously considered.

First, the likelihood of a problem component in

any elephant population should be taken into account. In many cases if you have elephants, some of them will cause problems for neighbouring people. Second, such an inevitability having been accepted, elephant problems are best managed in situ, but removing culprit individuals increasingly appears to be an ineffective way to manage them.

Doubts about the effectiveness of problem-elephant removal are in line with an accepted principle of agricultural pest control, which states that merely killing individuals of a species of pest that is numerous is seldom effective (Caughley and Sinclair 1994). In some other species (notably some feral mammals, wild birds and wild rodents), enthusiastic bouts of pest destruction have failed to have an impact on the problem because reduced intraspecific competition increases the fecundity of survivors. Notwithstanding that elephants are slow breeding compared to most pest species and that their problem activity may not show density dependence anyway, a logical principle still applies: what needs to be controlled in the case of most agricultural pests is not the pest itself but *the effects* of the pest. To adequately control the effect of an agricultural pest you need to do one of two things around the farming system where it is being a nuisance: either deny it the source of food or deny it a place to live nearby.

Multiple countermeasures against problem elephants

Applied research across Africa has revealed a whole suite of countermeasures that can be used against problem elephants (Hoare 2000a, AfESG 2001). These can be grouped into 10 broad categories: traditional methods applied by farmers, disturbance of problem elephants, killing of individual elephants, various forms of fences and barriers, olfactory and sound repellents, translocation, compensation schemes, revenue-generating wildlife utilization programmes, increased research effort, and land planning with land-use zonation.

Any one of these is not necessarily very effective on its own, but a whole package of individual measures derived from these categories can act synergistically and make a difference. Killing does have a place amongst these control measures (for example, for very aggressive animals or persistent fence breakers) but the traditional, widespread reliance upon it should be decreased by the combined use of appropriate non-fatal alternatives.

Dealing in such complicated ways with problem ele-

phants and the effects they have on people is one of the most difficult scenarios that wildlife managers in Africa face. Appreciating, planning, funding and implementing integrated packages of widely differing individual countermeasures against problem elephants becomes a complex discipline, as much an art as a science.

What may have contributed to this overall difficulty is the way human–elephant conflict has traditionally been viewed as a problem in isolation. A recent analysis and synthesis of management options for human–elephant conflict (AfESG 2001) suggests that the subject should be incorporated more vigorously into the broader issues of elephant conservation. Human–elephant conflict mitigation should rank alongside other routinely applied elephant management activities like census of elephant populations, law enforcement against poaching and monitoring of elephant effects on crucial wildlife habitats. In particular, the topic should be included in the multifaceted national management plans or programs for elephant conservation that are increasingly being drawn up to suit individual African elephant range states, such as Kenya (MGM 1998), Mozambique (MADR 1999) and Ghana (GWD 2001).

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References

- [AfESG] African Elephant Specialist Group (2001) A decision support system for managing human–elephant conflict situations in Africa. IUCN African Elephant Specialist Group Report
- Barnes, R.F.W., Asika, S., and Asamoah-Boateng, B. (1995) Timber, cocoa and crop-raiding elephants: a preliminary study from southern Ghana. *Pachyderm* 19, 33–38.
- Caughley, G., and Sinclair, A.R.E. (1994) *Wildlife ecology and management*. Blackwell Science, Oxford.
- [GWD] Ghana Wildlife Division (2001) *Strategy for conservation of elephants in Ghana*. Ghana Wildlife Division, Accra.
- Hill, C.M. (1998) Conflicting attitudes towards elephants around the Budongo Forest Reserve, Uganda. *Environmental Conservation* 25(3), 244–250.
- Hoare, R. (1995) Options for the control of elephants in conflict with people. *Pachyderm* 19, 54–63.
- Hoare, R. E. (1999a) Determinants of human–elephant conflict in a land use mosaic. *Journal of Applied Ecology* 36, 689–700.
- Hoare, R. E. (1999b) Assessing the evidence for the existence of habitual problem elephants. IUCN African Elephant Specialist Group Report.
- Hoare, R. (2000a) Humans and elephants in conflict: the outlook for coexistence. *Oryx* 34(1), 34–38.
- Hoare, R. (2000b) Projects of the IUCN AfESG human–elephant conflict taskforce: results and recommendations. *Pachyderm* 28, 73–77.
- Karindawaro, K.S. (1998) Nineteen problem elephants relocated to Montana Ranch. *Zimbabwe Wildlife* (July), 20.
- [MADR] Ministerio da Agricultura e Desenvolvimento Rural (1999) *National strategy for the management of elephants in Mozambique*. MADR, Direccao Nacional de Floresta e Fauna Bravia, Republica de Mozambique, Maputo, 26 p.
- MGM (1998) *Evaluation of the elephant conservation and community wildlife programme (1993–1998) of the Kenya Wildlife Service*. Report to the European Union. MGM Consultants Ltd. 125 p.
- Njumbi, S., Waithaka, J., Gachago, S., Sakwa, J., Mwathe, K., Mungai, P., Mulama, M., Mutinda, H., Omondi, P., and Litoroh, M. (1996) Translocation of elephants: the Kenyan experience. *Pachyderm* 22, 61–65.
- Osborn, F.V. (unpubl.) The ecology of crop raiding elephants in Zimbabwe. PhD thesis, 1998, University of Cambridge, UK.
- Sukumar, R. (1991) The management of large mammals in relation to male strategies and conflict with people. *Biological Conservation* 55, 93–102.
- Sukumar, R., and Gadgil, M. (1988) Male–female differences in foraging on crops by Asian elephants. *Animal Behaviour* 36, 1233–1255.
- [WWF] World Wide Fund for Nature (1997) *Conserving Africa's elephants: current issues and priorities for action*. Dublin, H.T, McShane, T.O., and Newby, J. eds. WWF International Report. World Wide Fund for Nature, Gland, Switzerland.