Introduction

Human-wildlife conflict (HWC) is an escalating global and increasingly widespread wildlife conservation problem. Most human-elephant conflict (HEC) research focuses along the edge of or encroaching on protected areas, e.g. crop-raiding, fence-breaching or damage-causing elephants (Loxodonta africana). Elephants with repeated perceived “negative tendencies” are referred to as “problem elephants”. In Africa, “problem elephants” may be legally hunted or destroyed. Long-term, HEC is not resolved by lethal control; it does not solve the root of this complex problem. This ranges from poorly maintained fences, high local elephant population growth, encroaching human activities/settlements or management interventions or zonations that are not biologically relevant to elephant, or appropriate for managing the ecological or human wildlife impact of elephant.

Objectives

To demonstrate that mitigation through reliance on a single mitigation technique is largely ineffective and that combinations of non-lethal techniques in the short to long-term are more effective at addressing HEC.

Methods

Short to medium-term mitigation strategies to curb fence-breaching

Resident movement studies are essential to determine known and contained zones of influence defined by elephant behaviour for pro-active management and is facilitated through satellite collar deployment. Five UHF satellite collars were deployed on elephants (4 cows and 1 bull at Reserve A in Limpopo to track resident movements of herds and the dominant bull (Bull A). The collars, 3 UHF ID tags and geo-fencing created early warning systems for management interventions prior to a fence breach (Figure 1).

Simpler elephant deterrents e.g. tree-smoke briquettes, chili rope fences, chili smoke briquettes, are also effective. A bee-hive fence comprising of 20 occupied hives (suspending and linked to each other by a rope to allow the hived to swing if disturbed) at 10m intervals was erected in one hotspot zone to deter fence-breaches in this zone (Figure 2).

Tusk-bracing, a more immediate and individual behavioural modification tool, was adopted at collar deployment of Bull A’s right tusk (left tusk very short at Reserve A. This novel and innovative method involved embedding wiring into the elephant’s tusk with contact under the lip so that when the elephant attempted to break electric wires with his tusks, the tusk wire acted as a conductor and the elephant received a shock (Figure 3).

Medium to long-term mitigation strategies to curb HEC

Fertility control through porcine zona pellucida (pZP) immunoncontraception is a non-hormonal population management tool that reduces and stabilizes local population growth rates in the medium to long-term. pZP immunoncontraception has been administered to ± 850 cows on 26 reserves across South Africa, including Reserve A since 2000.

Results

• Tusk-bracing is a conditioning technique to reinforce the negative consequence of making contact with and trying to breach fences.
• Only 2 breaches occurred a month post tusk-breaching. No breaches occurred along the bee-hive fence-line.
• Bull A’s breaches correlated with non-musth periods, when he would try to return to his historical bull area north of the exclusion fence.
• Unfortunately, Bull A broke his right tusk in a fight with another bull (tusk also broke) a month post tusk-bracing, rendering the wiring redundant.
• The collar data demonstrates that Bull A was often held accountable for fence damage/breaks when the cause was another species (giraffe) or unknown.
• Immunoncontraception reduces or stabilises local growth rates and competition of local resources, particularly amongst bulls who may seek out new ranges outside perimeter fences. Breaches into Reserve A were from non-resident bulls. Resident bulls were mostly breached into areas of historical range cut-off by an exclusion fence erected in 2016.

Conclusions

Many traditional lethal mitigation and population control techniques are intended to encompass only localised effects on elephant within a target zone, assuming no effect into adjacent undisturbed zones, or into contiguous neighbouring landholdings. Furthermore, “problem behaviours” e.g. crop-raiding/fence-breaching are primarily done by individual elephants, not elephants as a category and is not simply generic elephant behavioural ecology. Management of and successfully mitigate or reduce HEC, from an individual to local population scale, particularly for fence-breaching activities.

References

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Best practice transdisciplinary mitigation approaches to human-elephant conflict: from over-population to individual animals

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