A Novel Approach to Elephant Culling

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Abstract

Elephant culling remains one of the most contested interventions in conservation management, although sometimes required where high elephant densities contribute to habitat degradation and pressure on other species. This paper describes the development and field testing of an alternative culling method designed to improve operational control, personnel safety, and animal-welfare outcomes.

Drawing on prior experience with elephant translocation, semi-soft release protocols, and the use of plastic boma sheeting, the method directs elephants into a temporary funnel boma and contains them momentarily within a designated shooting area before dispatch.

Field trials conducted in Zimbabwe, indicated that the method could be implemented effectively under appropriate wind, access, and site conditions. Observations suggested improvements in control, safety, processing efficiency, and the speed of dispatch, while also identifying operational limitations and areas for refinement.

Research is recommended to evaluate acute stress responses and compare welfare outcomes with conventional culling approaches. Further research is required to quantify acute stress responses and compare welfare outcomes with those of conventional culling approaches. Comparative work should also examine stress responses associated with darting and translocation to new ranges.

1. Introduction

Elephant culling has long been a contentious practice within conservation management. Critics frequently characterise it as unacceptable, inhumane, or cruel, whereas proponents regard it as a necessary intervention in contexts of excessive population growth and associated ecological degradation. Proposed culling operations are often delayed or prevented by external pressure and public criticism, a pattern intensified by the reach of social media. Such interventions may undermine decisions made by practitioners directly engaged with ecological conditions on the ground and responsible for the long-term viability of wildlife populations and their habitats.

In response to these concerns, the present work sought to improve the manner in which elephant culling is conducted, with the objective of reducing avoidable suffering, increasing operational control, improving personnel safety and carcass processing, and removing all

evidence of culled animals to minimise effects on surviving elephants living in the same landscape.

2. Background and Rationale

Over several years, the AWMC team (with experience over six decades) has developed practical insight into the ecological consequences of elephant overpopulation through operations across wildlife areas of varying size, configuration, and condition. From both terrestrial and aerial perspectives, the team has observed how excessive elephant densities can degrade habitats and adversely affect other species. Collaboration with conservationists across diverse roles in the wildlife sector has further deepened the team's understanding of these challenges.

Internal discussions considered a range of previous and ongoing proposed management responses across a number of platforms, some practical and carefully developed, and others shaped more by emotion than by feasible conservation outcomes. Although AWMC does not itself make these kinds of ecological or scientific management decisions, as a wildlife management company it recognises the need for the sector to address elephant overpopulation. The company is frequently called upon to implement interventions once such decisions have been authorised. Accordingly, AWMC remains committed to applying its operational expertise to the continuous improvement of animal-welfare practices across all its activities.

In areas where elephant abundance has exceeded agreed ecological or management thresholds, substantial population reduction may be considered as an immediate means of limiting further ecological damage. Corridors, fertility control, and natural population regulation may require extended implementation periods and are subject to additional constraints; consequently, translocation and culling are the principal interventions capable of reducing population size over a short period.

Translocation. Although translocation is a core component of AWMC's work, moving elephants is constrained by limited suitable release areas, long transport distances, logistical complexity, and high financial cost. Further to this, there are ethical and welfare implications that need to be considered. Aside from the obvious acute stress that is brought on by the capture process, recent research involving the team suggests that translocated elephants may require a minimum of two years to adapt to a new range. During this period, they may experience considerable stress and trauma, particularly matriarchs responsible for group cohesion and decision-making. Often resulting in unacceptable mortalities over a two-year period.

Culling. Culling remains controversial and is frequently opposed, yet it is among the few interventions capable of reducing elephant numbers within a short timeframe. Where it is deemed ecologically necessary, the challenge is to reconcile compassion for individual animals with broader conservation responsibility by making the process safer, faster, more controlled, and as humane as possible.

2.1 Conventional Culling Methods

Scoline. Used historically, mainly in South Africa's Kruger National Park, this method involved darting elephant family groups from a helicopter with large doses of Succinylcholine (Succinyl dicholine chloride). The neuromuscular blocker rapidly paralyses the animals, causing collapse, respiratory failure through diaphragm paralysis, and eventual cardiac arrest. Although the elephants were shot after they were all down, many suffocated before the follow-up shots were delivered. The components of Scoline – succinic acid and choline – occur naturally in mammalian metabolic pathways, and therefore, its use meant that the meat was safe for human consumption. Research showed that the animals remained conscious throughout the immobilisation process causing severe fear and suffering and was subsequently considered inhumane. There were variations to this method where each animal was shot from the helicopter once down, but this method had shortcomings and later the Scoline was abandoned entirely. Elephants were then corralled and kept in a tight circle by helicopter, then brain shot directly from the helicopter. Carcasses were usually uplifted to a designated processing point.

ZimParks 70's & 80's. Developed by ZimParks personnel during the 1970s and 1980s, this approach became highly effective as teams gained experience. A fixed-wing aircraft guided a team of four to six people downwind to within 30m of resting elephant herds (there were variations depending on the team doing the culling). Starting with the biggest elephants first, the lead shooter, supported by a gun-bearer/reloader, attempted to bring down as many animals as possible in the initial volley while two other shooters were responsible for the animals on the periphery, thereby containing the group. This was followed immediately by a shooter using a 7.62 mm semi-automatic rifle to complete the dispatch. Butchering teams followed closely, allowing carcasses to be sorted and processed immediately in the field. Using this method, teams dispatched as many as 50 animals in a day. The method required exceptional skill to dispatch entire herds quickly and safely. That expertise has largely been lost, making the approach neither viable nor widely accepted today. Imperfect execution also created a risk of wounded or breakaway animals, and there was no reliable way to ensure that entire family groups were dispatched together.

Helicopter Driven. Developed in East Africa (primarily Uganda), this has been the most recently used technique. A helicopter located the elephants and separated a suitable family group of up to 15 animals from the larger herd while directing the ground team into position. The ground team comprised four to six shooters and gun bearers, divided into left- and right-flank groups. Positioned downwind, the shooters waited as the helicopter drove the elephants toward them. When the animals were within range, the lead shooter would initiate firing, and the two teams dispatched them from largest to smallest on their respective flanks. Once all animals were confirmed dead, the skinning and butchering teams began processing the carcasses. Although this method may still be used, it poses substantial risks to shooters, increases the likelihood of wounded or escaping animals, and involves the helicopter directly in the shooting phase. We therefore consider it no longer suitable or acceptable.

Brain Shooting from Helicopter. When performed by a skilled pilot and shooter, brain shooting from a helicopter when animals are on the run, starting from the back of the line and working forwards, has showed promise to be a rapid and effective method of culling elephants. However, civil aviation restrictions in most African countries, together with other limitations, make the method unfeasible.

2.2 Culling vs. Trophy Hunting

Elephant culling and trophy hunting are distinct wildlife management practices driven by different primary motivations, funding structures, and operational methods. Elephant culling is an official, state-sanctioned population control measure executed by conservation authorities to systematically reduce elephant numbers in specific areas where overpopulation threatens biodiversity, habitats, or local communities. It involves killing entire family groups to prevent social disruption and is typically funded by property owners or donors, with the primary objective being ecological balance.

In contrast, trophy hunting is a commercial enterprise where selected individuals – usually older, large-tusked bulls, and other species – are targeted by paying private hunters for sport and personal keepsakes. This practice is managed through strict quota systems intended to generate high-value revenue for safari operators, with financial benefits for conservation programs and rural communities, focusing on the economic value of individual animals rather than the rapid reduction of a local population.

Their intentions and outcomes are fundamentally different; however, they are often mistakenly lumped together.

3. Objective and Hypothesis

In 2025, the AWMC team sought to test an alternative elephant-culling method based on prior experience with boma sheeting and semi-soft release protocols. The hypothesis was that elephants could be herded into a temporary plastic funnel boma and contained within a designated shooting area, allowing the cull to be conducted in a more controlled, safer, more humane, and more technically refined manner than conventional approaches.

3.1 Basis for the Method

AWMC's experience with elephant translocations has included semi-soft release protocols in which entire herds are released into large holding bomas once transported to their destination. Bomas are constructed using 3m UV-treated woven poly-plastic sheeting and high-strain fencing wire or cable set up amongst trees around a water point. These bomas allow transported elephants to regroup, provide immediate access to water, and give the animals a short settling period before final release.

When herding elephants out of smaller properties by helicopter into adjacent wildlife areas, AWMC has also used boma sheeting to funnel elephants through temporarily opened fence lines. The visible plastic barrier helps guide movement where animals may otherwise continue to perceive a removed fence line as a boundary.

3.2 Trial Setting and Adaptation

Based on these experiences, the team tested whether elephants could be herded into a plastic funnel boma leading to a controlled holding and shooting area. An initial attempt at Property A in the Zimbabwe Lowveld, was abandoned after wind conditions proved unfavourable and elephants could not be moved successfully into the structure.

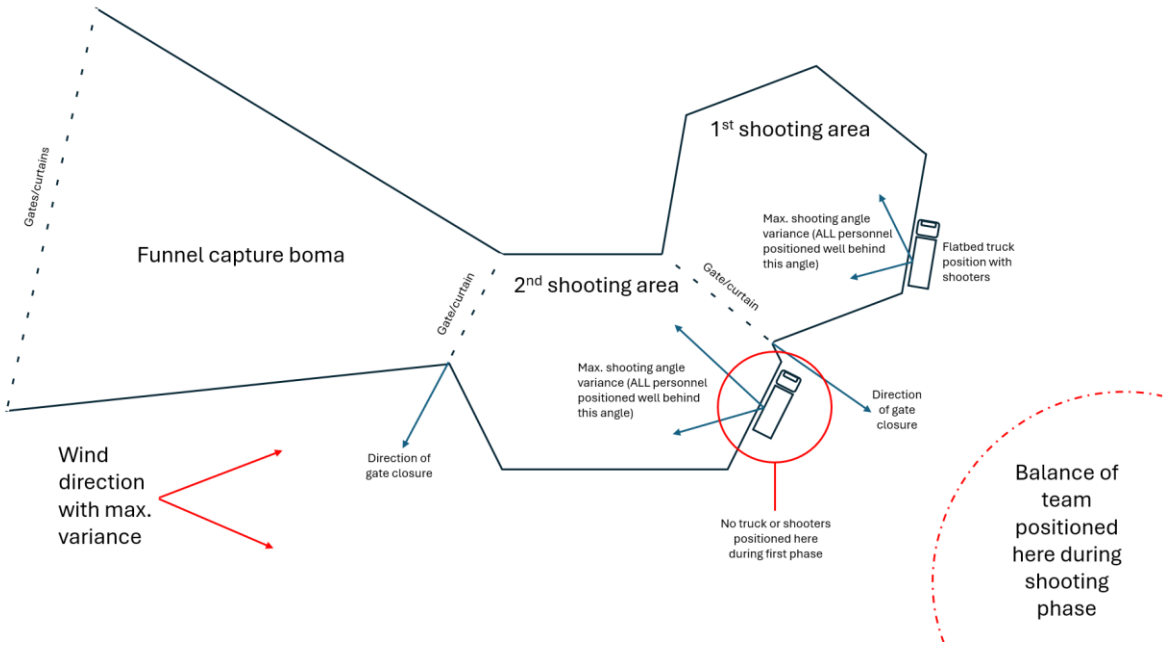
A subsequent opportunity at Property B in the Zimbabwe Lowveld, with support from the management there, allowed the method to be tested more fully. Following review of the Property A attempt, the team determined that the boma should be constructed on the same day as the operation. This allowed equipment to be positioned near located herds, the boma to be aligned with the current wind direction, and the operation to proceed before the elephants moved too far from the site.

4. Materials and Methods

4.1 Operational Procedure

1. Elephants are located by helicopter as close to first light as possible.
2. Once a suitable number of target animals have been identified, the ground team is directed by radio to the selected operational area.
3. A boma site is selected from the air based on cover for camouflaging plastic sheeting, favourable wind direction, road access, and an open shooting area approximately 50m x 50m.
4. The boma layout is confirmed on the ground, including the funnel, gates, and shooting area.
5. The boma is constructed, typically within one to two hours depending on size and vegetation density and type.
6. During construction, the helicopter relocates the elephants and carefully separates a suitable family group to be driven toward the boma.
7. Activities are timed so that the animals are near the boma when construction is completed and the ground crew has reached their positions.
8. A flatbed truck is positioned outside the shooting area, downwind of the elephants, to provide a stable elevated shooting platform and safe direction of fire.
9. The shooters are positioned on the flatbed truck.
10. The lead shooter wears a headset to maintain direct communication with the pilot.
11. The elephants are driven into the boma, after which a siren from the helicopter signals closure of the entrance gate.
12. A second gate at the shooting area is closed from outside the boma using a long cable to pull it shut, again on a helicopter siren signal.
13. Once the elephants are contained within the shooting area ground staff confirm that all personnel are safely positioned behind the shooters before shooting can commence.
14. Once the helicopter has withdrawn, the pilot will issue final authorisation to proceed.
15. The helicopter is entirely removed from the shooting phase.
16. Once conditions are favourable the lead shooter gives the signal to commence shooting.
17. Shooting begins with the largest animals first and works down to the smallest.
18. The shooters aim for brain shots for immediate dispatch.
19. The elephants invariably stand close to the centre of the shooting area, and the maximum shooting distance is 30m.
20. There are three shooters with heavy calibre rifles and one shooter with a semi-automatic 7.62 mm rifle.

21. Each shooter is supported by a gun bearer carrying a loaded reserve rifle, thereby minimising delays associated with reloading.
22. After all animals are down, a designated shooter enters the area with a semi-automatic 7.62mm rifle to quickly confirm all animals are dead.
23. Only experienced shooters are allowed to participate; team composition is kept consistent to support procedural continuity and efficiency.
24. Once all animals are confirmed dead the data team proceeds to record a variety of data and collect samples while the boma team dismantles and packs the structure.
25. After sampling, weighing, and positioning are completed, the processing team begins skinning and butchering the carcasses for distribution.



5. Results

Date	Shots fired	Animals	Initial time	Total time
16 June	32	7	32 s	1 min 30 s
17 June	33	11	30 s	1 min 45 s
18 June	32	11	20 s	2 min 28 s
18 June	30	9	11 s	1 min 10 s
20 June	19	9	10 s	1 min 03 s

5.1 Notes on Outcome Measures

The table summarises changes in operational performance over four days of applying the method. The limited number of operations and the absence of a formal comparator mean that these data should be interpreted descriptively rather than as evidence of causal improvement.

Shots fired: This refers to the total number of rounds fired during each day's operation.

Initial time: This records the time from the first shot until most animals are down. Smaller animals are sometimes obscured behind larger animals and can only be dispatched after the shooter carrying the 7.62 mm rifle has entered the shooting area.

Total time: This records the time from the first shot until the final animal is confirmed dead.

6. Discussion

On 18 June 2025 the first operation was conducted that included a second shooting area within the boma to assess whether multiple groups could be culled using the same temporary structure. During this trial, the team briefly delayed the initiation of shooting to observe the animals' behavioural response after entry into the shooting area. The elephants settled rapidly and stood near the centre of the enclosure. However, their close grouping restricted access to clear brain-shot opportunities for each adult. Once shooting commenced, movement within the group increased, thereby reducing shot placement efficiency and extending the time required to confirm death of the final animal.

For the second group on the same day, shooting commenced immediately after the animals entered the shooting area and while they were still moving toward the shooters. This procedural adjustment reduced total dispatch time by more than half. Across subsequent operations, increased shooter familiarity with the method and team cohesion was associated with reductions in both the number of rounds fired and the time required to bring animals down. These observations indicate that operator experience and timing of shot initiation are likely to be important determinants of operational efficiency. Further improvements are expected as the method is honed.

6.1 Potential Advantages of the Method

Controlled process: The procedure is carried out in a contained setting, allowing for cleaner execution, fewer rounds fired, and fewer animals wounded before final dispatch.

Improved safety: The method greatly reduces risk to shooters by limiting exposure to stray bullets, ricochets, and the possibility of being trampled by elephants.

Animal welfare: Observations indicate the animals appear unaware of the outcome and are dispatched quickly, reducing the likelihood of prolonged distress or suffering. However, welfare advantages should be treated as provisional pending further research.

Speed and efficiency: Fewer rounds are required, the group is dispatched more quickly than in conventional methods, and processing is faster because all activity occurs within a controlled area.

Secondary trauma: There appears to be little if any information transferred to uninvolved animals in the nearby vicinity. This interpretation remains observational and requires systematic behavioural investigation.

Reduced breakaway risk: The contained setting minimises the chance of animals breaking away or wounded animals escaping, a problem observed too often with other methods.

Access and logistics: Animals are dispatched close to road access and remain near one another, which simplifies recovery, processing, and transport.

Helicopter safety: The aircraft is fully removed from the shooting phase, reducing risk and separating aerial herding from the dispatch process.

6.2 Limitations and Operational Constraints

Cost: The method adds expense because a dedicated ground team is required to construct, manage, and dismantle the boma.

Operational uncertainty: The method may fail if wind direction changes, if animals move too far from the boma before construction is complete, or if local conditions prevent effective herding.

Gate-team risk: Although minimal, there remains some risk of trampling for staff positioned near the boma entrance gates.

6.3 Recommended Operational Refinements

Future applications of the method should prioritise further reductions in dispatch time through shooter preparation, clear communication protocols, and continued refinement of shot sequencing.

Processing efficiency should also be improved through the use of better-organised carcass-processing teams, with defined roles, equipment allocation, and workflow procedures established before operations begin.

Future trials should assess the feasibility of moving carcasses intact to a central processing point, which may improve hygiene, efficiency, weighing accuracy, and meat distribution logistics. It will also remove all evidence of cull activities from the site.

7. Research Recommendations

- Examine acute stress responses in elephants subjected to this method.
- Assess whether, and to what extent, the method reduces physiological stress compared with conventional culling approaches.
- Focus on measurable indicators of acute stress, including post-mortem assessment of adrenal tissue.
- Compare adrenal-gland findings with observations from previous culling operations, where haemorrhaging was recorded in several adult animals.
- Use these findings to support a comparative welfare assessment of this method against existing approaches.

- Establish if this approach does in fact cause less information to be communicated to other elephants in the vicinity that were not target animals.
- Determine if this method causes a landscape of fear, and if so, cull site locations need to be carefully selected with this in mind.

8. Ethical Considerations

Elephant culling raises substantial ethical concerns because it involves the deliberate killing of sentient animals in pursuit of broader conservation objectives. Any decision to use this method should therefore be made only after careful assessment of ecological necessity, available alternatives, animal-welfare implications, and the likely consequences of inaction.

Ethical justification should depend on whether the intervention is proportionate to the conservation problem being addressed and whether it represents the least harmful feasible option under the circumstances. Where culling is considered necessary, procedures should prioritise minimising fear, distress, injury, and delay, while also reducing risks to personnel and ensuring that animals are dispatched as quickly and reliably as possible.

Implementation should be subject to prior ethical review, clear authorisation, competent personnel, appropriate supervision, and transparent documentation of outcomes. Post-operation evaluation should include welfare-related observations, operational performance data, and lessons learned so that future decisions are informed by evidence rather than assumption.

- Confirm that population reduction is ecologically justified and that non-lethal alternatives have been considered.
- Ensure that the method is conducted by trained personnel under appropriate authority and supervision.
- Minimise animal distress, duration of the procedure, risk of wounding, and risk to field staff.
- Record outcomes transparently, including welfare indicators, operational difficulties, and any adverse events.
- Use post-operation review to refine protocols and improve accountability in future operations.

9. Conclusion

Although the method has several limitations, as outlined in the preceding discussion of advantages and disadvantages, our assessment is that its benefits substantially outweigh its drawbacks. From an operational perspective, the approach offers notable improvements for personnel, particularly by creating a more controlled and clinically managed process and by reducing safety risks for shooters. While culling remains inherently difficult and involves significant ethical considerations, the available observations suggest that this method may also represent a less distressing, much quicker, and more controlled alternative for the animals when compared with previous culling methods. Based on our observations, this method appears to substantially reduce, and may even prevent, the transmission of information from

culled elephants to non-target elephants in the same area. However, claims concerning animal-welfare benefits and reduced transmission of information to non-target elephants should be regarded as hypotheses requiring empirical evaluation.

We conclude, based on the observations and evidence collected to date, that the method constitutes a meaningful improvement in circumstances where the culling of large numbers of elephants is deemed necessary. We therefore recommend that this approach be considered for future elephant culling operations, subject to appropriate ethical review, site-specific assessment, and continued refinement through daily debriefing, monitoring and combined with ongoing research.

10. Addendum

To date, this method has been used to cull almost 400 elephants. Significant improvements have been made in shooting efficiency, dispatch speed, and boma construction times. On average, 20 animals are processed effectively each day.

During one operation in October 2025, a projectile, possibly a ricochet, struck the upper cable of the shooting area and enabled several animals to escape. The contingency plan was implemented immediately, the situation was contained, and all animals were subsequently accounted for. Although this was the only reported incident and is unlikely to recur, it underscores the need for robust contingency plans for similar events.

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