

Unsuccessful introductions of adult elephant bulls to confined areas in South Africa

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Abstract

South Africa's successful elephant conservation strategies have initiated the translocation of elephant breeding groups and adult bulls from high-density populations to smaller confined areas. A limited number of the adult bull introductions were unsuccessful. An investigation was undertaken to determine the causes of the bull break-outs. No common factors were identified. Recommendations are offered as a guide to future translocation efforts.

Résumé

Les stratégies réussies de conservation des éléphants en Afrique du Sud ont donné naissance à la translocation de groupes reproducteurs et des adultes mâles des populations très denses vers des zones confinées plus petites. Un petit nombre d'introductions de adultes mâles n'a pas réussi. On a mené une enquête pour déterminer les causes des échecs chez les mâles. On n'a identifié aucun facteur commun. On présente des recommandations pour aider les efforts futurs de translocations.

Introduction

This investigation forms part of a project commissioned by the Elephant Management and Owners Association (EMOA) to develop a database of all elephant populations in South Africa that cannot be considered part of the Kruger National Park (KNP) metapopulation. The investigation was considered a priority by the Northern Province Nature Conservation Department as a result of a recent unsuccessful attempt to introduce a mature elephant bull older than 40 years to a confined area in Northern Province, and the fact that other break-outs by mature bulls have occurred in the past. The department's decisions on future permit applications are based on these recommendations that have further been incorporated into the new EMOA elephant policy. The Kruger National Park capture team fully supports these recommendations.

Investigation *modus operandi*

The aim of this investigation was to determine the reasons for a limited number of unsuccessful mature elephant bull introductions to game-fenced properties, while others had been successful. The expertise and experience of as many interested and affected parties as possible have been considered in this process.

The investigation was conducted as follows. (The term 'boma' as used here is a large, electrified holding camp of at least one hectare into which the elephants are released after transportation.)

- Kruger National Park was approached for a list of all recipients of mature elephant bulls.
- The 15 landowners or their respective managers who had received adult bulls from KNP were interviewed.
- Information on the construction of the release bomas, and their electrification in particular, was

collected. Where possible the actual release bomas were inspected.

- The circumstances under which break-outs occurred were investigated.
- Discussions were held with a number of conservation scientists who among them have had considerable experience with the capture, translocation and release of elephants into confined areas.
- Attempts were made to establish if any common factors were associated with successful and unsuccessful introductions.

History of bull elephant introductions

From 1998 to 2000, KNP sold 71 adult elephant bulls to 15 properties within South Africa. Sale of family units has been ongoing since 1995. The capture operation was carried out by KNP officials using their own specialized equipment and personnel, and the elephants were transported to the purchaser's property.

The distance between the capture and the release sites varied considerably. The straight-line distances between the nearest KNP boundary to the release site ranged from 8 to more than 300 km. On arrival at their destination the elephants were released into an electrified acclimatization boma. The function of this boma is essentially to introduce the elephants to an electric fence and ensure that they experience sufficient meaningful electric shocks for them to develop a permanent respect for such fences.

The vegetation, and therefore available food plants for elephants, varied in all instances between the capture and the release sites, in various degrees. Unfortunately no detailed analysis of the vegetation at capture and release sites could be done because of prevailing financial and time constraints. However, since the type and quality of available food differed in each case (including those with no break-outs), food sources were not regarded as a primary cause for any adult bull break-outs.

Success rates

The purchasers of the bulls included the KwaZulu-Natal Wildlife (Hluhluwe-Umfolozi Park received 10 bulls), the North West Parks and Tourism Board (Pilanesberg and Madikwe Game Reserves each received 6 bulls), and 13 private landowners (55 elephants).

Following their introduction, a number of escapes from the fenced area were reported, occurring under a variety of circumstances that rendered the electric fence ineffective. In some cases these elephants returned to the property within a few days while others never returned. These instances therefore cannot be regarded as unsuccessful introductions or constitute break-outs and for the purposes of this investigation are defined as escapes.

Some of the reasons for the escapes are as follows:

- power failure on a perimeter fence during the rainy season
- avoidance of the perimeter fence by swimming across a flooded river
- destruction of fences in drainage lines caused by excessive rainfall
- inability of management to patrol and maintain the perimeter fence during an excessively wet season
- lack of electrification of gates in the perimeter fence
- placement of food outside the boma fence

In two instances free-ranging elephants entered an enclosure and joined the introduced elephant group.

An elephant introduction is considered to have been unsuccessful in instances where the bulls have either broken out of a functional electrified perimeter fence or broken out of the release boma and subsequently the perimeter fence.

Out of the 15 introductions, break-outs occurred on five properties under circumstances that indicate that the eight bulls in question had not developed a respect for the electric fence. Kruger National Park has an area more than 5000 km² and has about 10,000 elephants. It is therefore not possible to monitor all elephant bulls to the extent that the behaviour of all is known. Therefore, it is not possible to know whether a bull that is being captured for translocation has had previous experience with breaking fences. The number of elephant bulls introduced to the 15 properties, along with the subsequent escapes and break-outs, is summarized in table 1.

Factors that appear to have influenced break-outs

The release boma

The relevant provincial conservation authority had in all cases prescribed the design of the release boma. These designs were essentially adequate and were based on past experience. However, different construction

standards were applied in each case. The most important shortcomings of these release bomas are listed here:

- The use of only one energizer for all live wires. Multiple circuits reduce the risk of the fence being rendered inoperative should one of the circuits be shorted out or a live wire snap.
- The use of inadequate materials in the construction of the release gate. In more than one instance the release gate was constructed by welding two standard production cattle gates together. These gates are made from 2.5 or 3.0 mm steel tubing and are inadequate for elephants.
- Inadequate electrification of the release gate.
- Poor electrical conductivity of the soil inside and adjacent to the boma fence, resulting in an inadequate earth circuit. This may have reduced the effectiveness of the electric fence in some instances, particularly in dry, sandy or stony soils.
- The release of bulls from the boma before they have attained a respect for the fence.
- Electric wires under tension, which break easily. Bulls with long tusks are able to use them to break highly strained wires.

Age, social status and numbers of bulls introduced

It is reasonable to assume that the older a bull is, the

greater is the chance that it has developed ingrained behaviour patterns. Older bulls can also be expected to have come into contact with electric fences in KNP, and some of these have almost certainly developed techniques for traversing such obstacles. Plenty of anecdotal evidence exists to support this. KNP field personnel have in the past recognized particular individuals as ‘problem’ bulls and these bulls have well-earned reputations as fence breakers. Old bulls, 30–35 years of age or older, have possibly migrated beyond the borders of KNP during their lives.

It is also most probable that these older bulls have consorted with numerous female groups during their reproductive lives. The number of females of reproductive age on the properties where these bulls have been released has in all cases been limited to a handful. In addition, if none of these cows was in oestrous at the time and therefore of no particular interest to the bulls, this could well have enhanced their urge to escape.

When older bulls are removed from their traditional home ranges and introduced to a new locality with foreign vegetation and surroundings and not enough adult females, their urge to return to a familiar environment appears to be greater than that of younger bulls and cows. Bulls with large tusks can also be expected to be more adept at avoiding electric shocks while manipulating fences and gate mechanisms.

Table 1. Results of adult elephant bull introductions to 15 properties between February 1998 and August 2000. Properties are grouped according to locality and not in chronological order of the introductions

No.	Province	Reserve	Adult bulls introduced	Escaped because of fence fault	Break-outs through live fence
1	KwaZulu-Natal	Mkuze Falls Safaris	16	0	1
2	KwaZulu-Natal	Pongola Biosphere Reserve	3	2	0
3	KwaZulu-Natal	KwaZulu-Natal Wildlife–HUPs	10	0	0
4	KwaZulu-Natal	Senekal Suikerboerdery, Pongola	1	0	0
5	KwaZulu-Natal	Magudu Game Reserve	2	0	0
6	Mpumalanga	Wilson’s Kop Boerdery	2	0	2
7	Northern	Ndzalama Game Reserve	10	1	0
8	Northern	Thornybusch Game Lodge	1	0	0
9 & 10	Northern	Maremani Nature Reserve and Dubamanzi Conservancy	7	0	0
11	Northern	Limpopo Safaris	4	2	2
12	Northern	Greater KuduLand Safaris	2	0	0
13	Northern	Shambala Game Reserve	1	0	1
14	North West	Pilanesberg Game Reserve	6	0	0
15	North West	Madikwe Game Reserve	6	0	2
		Total	71	5	8

When bulls were introduced in pairs they reportedly had a mutual calming effect on each other. In one instance two mature bulls were released into a boma and the older broke out through the fence during the night to feed on oranges that had been dumped just outside the fence. This was discovered only the next morning; the younger bull was still in the boma, but in an extremely agitated state. Amazingly the older bull returned through the damaged boma fence after a few hours, and when they saw each other, the younger one immediately calmed down and stopped its attacks on the fence.

Elephants are individualistic and differ widely in behavioural traits and temperament. Docile individuals habituate more easily in their new surroundings than aggressive ones. Elephants with an established history of fence breaking and general intolerance towards humans will obviously be more difficult to acclimatize. It is possible that it is these so-called problem bulls that have repeatedly broken out through a fence. However, a number of scientists with practical experience in introducing elephants to confined areas are of the opinion that any bull, irrespective of its age, size and temperament, can be taught to respect electric fences. The key to success, they say, is ensuring that these bulls receive effective and meaningful electric shocks from the release-boma fence.

Experience in South Africa indicates that elephants remember the effect of an electric fence for a very long time. Where successfully introduced elephants (that is, those that have been successfully conditioned in an electrified release boma for as little as 24 hours) use a vehicle track that runs parallel to an electric fence they walk only on the tyre track farthest from the fence. This is possibly to avoid accidental contact with the electric wires. This behaviour is also quickly learned by young calves (R.D. Carr, personal observations).

The presence of an established founder-family group

The presence of a family group on the property before the mature bulls are released appears to have had little effect in the cases studied. Instances exist where female and juvenile groups were present on the property yet the mature bulls broke out. In one case the bulls remained in the vicinity of the family group for a couple of days, then they moved to the opposite end of the property and broke out of the perimeter

fence. They then joined a family group on the adjoining property. Quite possibly the reproductive state of the females influenced their behaviour.

In most instances the mature bulls associated with the female group after being released from the boma for varying periods of time, and thereafter they showed no inclination to escape.

In two other instances free-ranging bulls broke into the property and joined either the family group or the bull group. On one reserve three subadult bulls pushed open an unlocked gate to enter.

Proximity of previous home range and release sites

In one instance two bulls were released onto a property that was only 8 km from the KNP boundary near Malelane, the vicinity of their capture. Both these bulls broke out of the boma and perimeter fence during the first night and returned to the park.

In a second instance where two bulls broke out, the reserve lies on the Limpopo River. Free-ranging elephants occur just across the river in Zimbabwe, and these animals form part of the KNP population. Since all four of these bulls were captured in the northern section of KNP, it is likely that they recognized their surroundings. However, two other reserves in a similar situation had no break-outs.

Recommendations

The most critical phase of the introduction of elephants to a new and strange environment is the time they spend in the release boma. In particular the elephants will be introduced to an electrified fence system, and must, in a short period, attain a lasting respect for such a fence. The construction of the boma is only part of the process. Successful management of the boma-training period requires a particular understanding of elephant behaviour. If specialist knowledge and experience can be acquired for this phase of the operation, then this should be considered. It is unrealistic to expect that this critical phase can be left to the limited skills of the new, inexperienced owner or manager, irrespective of their general wildlife management capabilities.

This investigation was unable to identify any common factors or circumstances that might have led to break-outs. However, various shortcomings were apparent in some cases, and the following recommen-

datations are offered for introducing bulls to confined areas.

The bulls

- Adult bulls should be translocated only to areas where there is already an established family unit.
- The introduction of elephants to areas that are in close proximity to hunting activities should be avoided or at least temporary cessation of hunting should be considered.
- Adult bulls should be translocated in pairs, preferably of differing ages. The companionship between two bulls that are introduced as a pair has a mutual calming effect, possibly resulting in a lowered urge to break out.
- Bulls should not originate from an area with known 'problem bulls'. (Removal of a problem animal from a particular area to a very large reserve is a different matter.)
- It is advantageous to capture bulls from an area where there is tourist activity and where they are habituated to human presence. This will help considerably to calm them in the new reserve.
- Bulls over the age of 30 years should not be translocated to areas smaller than 30,000 hectares and with a population of less than 50 elephants. Experienced persons can determine this age by head shape and broadness, neck thickness, tusk thickness at base and the molars when the animal is anaesthetized. Although there is no evidence showing that age alone has played a determining role in the success or failure of bull introductions, the morality of removing an old bull over 30 or 35 years old from a comfortable and well-established environment and subjecting him to the social and physical hardships of translocation is questionable. These old bulls are best left in the environment where they are settled.
- Old bulls over 40 should not be translocated at all.

The boma

Differing opinions exist among experienced elephant managers regarding the strength of the release-boma fence. Some are of the opinion that the fence needs to be extremely strong in construction while others have stated that a well-designed electrical system is the key issue. There is reason to believe that most bulls, irrespective of their temperament, can develop

respect for an electric fence provided they receive meaningful electric shocks while in the release boma. Bulls that have learned to break the wires with their tusks or push trees onto the fence or have learned to cause a short by other means remain a problem. The following points should be considered in constructing the boma fence:

- The boma for adult bulls should be 2 ha in size.
- Sufficient food must be available for the elephants during their confinement. If the boma is large enough, with dense natural vegetation, and the elephants are confined for only one or two days, this should not be a problem. Artificial food is not advisable for various reasons.

Electrification of the fence should have the following specifications over and above the standard specifications given in the EMOA policy:

- A voltage of 6000–9000 should be maintained throughout the elephants' stay in the boma.
- The entire steel and wire fence of the release boma must be effectively earthed to the ground. This can best be done by burying the bottom strand or strands of the mesh along the entire length of the boma fence.
- The soil should be saturated with water up to a distance of 4 m on the inside of the fence just before the elephants are off-loaded from the truck to maximize the earthing effect of the electric fence. This is particularly necessary for sandy or stony soils. The more effective the shock the quicker the elephant will learn to respect the fence. For old bulls, or those with long tusks, that might have learned to negotiate electric fences in the past, additional live wires should be positioned inside the fence, especially in corners, to guarantee an effective shock. A successful technique used at Pilanesberg was to string a live wire across the corners of the boma high enough to touch the back of the elephant and give it an unexpected shock.

Alternative fence designs to modify existing bomas are possible, such as this one successfully used at Mkuze Falls Safaris: two parallel fences are set about 3 m apart with additional slack electric wires. The inner one consists of only four to five live strands of steel wire, supported on wooden poles, and the outer one (the main fence) constructed from Bonox-mesh or diamond-mesh; the cables act as the earth. The wires of the inner fence must be slack enough to prevent a bull from breaking them easily with his tusks. Slack wires tend to slide off the tusks easily. The in-

ner fence will also prevent even bulls with long tusks from getting to the main fence or the gates to do any damage.

- Multiple energizers should be used. If only one energizer is used for all the live wires a single short circuit will render the entire fence inoperable. Two or more separate circuits are therefore more effective.
- The release gate should preferably be of a sliding design and one that can be opened remotely with a cable or rope if necessary. This gate must also be electrified.
- The construction of the release gate and the off-loading ramp must be of heavy steel because this is the weakest section of the confinement. It must also be carefully electrified.

The release

It is essential that large adult bulls receive a shock and learn respect for the perimeter fence before they are released from the boma. Adult bulls should not be confined in the boma for long, or they become bored, hungry and agitated. They should be released once the dominant individual has experienced the electric fence and appears to have calmed down. One to two days is recommended.

- A specialist should be present and advise on the release time of bulls from the boma.
- Large bulls should be fitted with a radio collar.
- Specifically in areas where there is hunting, bulls should be monitored.

Conclusions

This investigation did not reveal any common factors or circumstances to which break-outs by mature bulls can be attributed. It must be accepted that elephants are intelligent animals and that each individual will behave differently depending on its unique temperament and life experiences. No two elephants will react in the same way in the same situation.

The most important step in introducing and establishing elephants in a new environment and specifically into relatively small, confined areas is the training period in the release boma. It is here that they must be introduced to an electrified fence, in some instances for the first time, and develop a lasting respect for it. The effectiveness of the fence and the management of this critical period are essential to the success of the entire operation.

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Authors' note

The EMOA policy document, 'The introduction to and management of elephants in confined areas', may be ordered from the corresponding author.