

SP247 The use of behavioural studies to assist with management decisions for a large elephant population in a small private game reserve, South Africa

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Introduction

Pongola Game Reserve was established in 1993 and covers an area of approximately 73.6 km² on the western shore of the Jozini Dam. The dam occurs along the entire eastern and northern boundary. There is a railway that runs through the reserve, bisecting the area from the southern border to the northwest. The climate is hot and arid with an average 400-600mm of rainfall per year. Between 1979 and 2001 over 800 elephants were reintroduced to over 58 reserves in South Africa, Pongola Game Reserve being one of them. Seventeen elephants in two family groups were translocated from Kruger National Park to Pongola Game Reserve throughout June 1997. Six bulls were introduced, three within the course of 1998 (one of which died and one was shot); and three in 2002 (one of which died). Five orphan elephants, all approximately ten years old, moved into the Pongola Game Reserve from a nearby reserve in July of 2000 and remained together as a separate group of four females and one male (Shannon et al, 2006). The elephant carrying capacity for Pongola has been estimated at 37 animals, but the numbers are at over 75 individuals and still rising with a very high birth rate.

In 2008, the Disney Corporation provided funding for vasectomies of the bull elephants in an attempt to cap the population. Although 9 bull elephants between the ages of 10 and 50 were identified as possible candidates for the vasectomies, only 7 bulls were actually vasectomized because the dominant male Impi and the second dominant male Ngani were too big and difficult to capture. Impi was removed from the reserve in May 2010 and Ngani was darted with GNRH (gonadotropin-releasing hormone) suppressant.

Since the vasectomies, hormone treatment for Ngani and removal of Impi mating activity has ceased in the elephant population. Some of the non-vasectomized younger bulls at Pongola are beginning to show increased interest in fertile females (H. Zitzer personal communication) and the concern is that these younger bulls will soon come into musth and start breeding. If the younger males do start to breed in the group then this will not only thwart the attempts to control population growth, but will also subject the herd to the deleterious genetic effects associated with inbreeding. It is therefore imperative that the behaviour of these adolescent males is monitored closely and plans are put in place for additional vasectomies or removal of younger males in the future.

Even if the vasectomies can control the elephant population in the long-term, the landowners at Pongola are still concerned about the immediate damage to vegetation caused by the elephants. One possible solution to this problem is to relocate some of the elephants to an alternative site (for example, the nearby reserve of Thanda has a small elephant herd and has expressed an interest in increasing the size of the elephant population). However, removing part of an existing elephant population can cause disruption to herd dynamics and result in problematic elephants, particularly if there are not enough older individuals remaining in the herd to regulate younger elephant behaviour (c.f. "delinquent" adolescent male elephants as the result of widespread culling: Slotow et al., 2000; Slotow & van Dyk, 2001). With this in mind, it is important that decisions regarding elephant removal from Pongola are made in conjunction with behavioural data collection to ensure minimal disruption to the elephant population.

An alternative solution is to liaise with land owners of adjacent properties to drop perimeter fences and increase the land area available to the elephant (and therefore reduce concentrated grazing and vegetation damage from which the plants are unable to recover). The Space for Elephants Foundation has identified sites around Pongola where fence lines could be dropped, but expanding the elephant home range is both expensive and politically sensitive as the admission of elephants to new areas of land will result in some damage to vegetation at these new sites. Data relating to the ranging patterns, feeding and habitat use of the elephants in Pongola will be extremely useful for decision making regarding range expansion.

The landowners and management team at Pongola are therefore faced with three major management decisions relating to the elephant population, namely:

1. Whether expansion of the elephant home range by dropping fences would resolve the problems of vegetation damage to the land within the reserve
2. If removal of some of the elephants is necessary, which elephants should be removed
3. Whether the existing vasectomies are a viable method for controlling the elephant population in terms of their effect on bull and herd behavior and the prevention of further breeding, or if additional vasectomies will be required in the near future

Habitat use and ranging patterns of the Pongola elephant population was investigated during 2004 and 2005 (Shannon et al., 2006), but the population size has almost doubled since then. The first aim of this current research project is therefore to monitor elephant ranging, feeding and habitat use at Pongola to generate scientific output that can be used to assist decisions regarding range expansion. If elephants are to be removed from Pongola then it is important to identify which individuals to remove that will result in minimal disruption to herd dynamics and reduce the likelihood of 'delinquent' elephants in the remaining herds at Pongola. Data relating to this decision will be twofold: firstly, ranging patterns and association indices of the herds and bull elephants will provide insight into cohesive units that could be removed in their entirety, and rates of behaviour exhibited by the bull elephants and their interactions with other herd members will determine which of the bulls have developed the full suite of social behavior required for the 'policing' of adolescents and maintaining herd cohesion (meaning that they could take control of the population should other bulls be removed). If the non-vasectomised adolescent bulls are starting to show signs of sexual maturity and are likely to start breeding in the near future then plans must be made for their removal or subsequent vasectomies. The third aim of this current research project is to monitor the behaviour of the younger bulls to identify a time-line for this management decision. Data relating to this issue will be produced by investigate of rates of adolescent bull behaviour and their interactions with other herd members. Finally, this project aims to monitor the effect of vasectomies on bull behaviour and the subsequent effect on male-female interactions and herd dynamics to determine if vasectomising bull elephants is a viable and cost-effective method of elephant population control and is applicable to other small independent game reserves.

Research Design

Disney Corporation has funded Heike Zitzer to monitor the behaviour of the elephants at Pongola in the long-term. Following discussions and practice sessions during the visit in February 2011, it was decided that Heike will collect the ranging, habitat use and general behaviour using instantaneous scan samples at 30-minute intervals, bull elephant social and sexual behaviour of the 7 vasectomized bulls and Ngani using focal animal samples, and daily

records of physical signs of herd condition and sexual maturity. The data sets collected by Heike will be considerably enhanced during the June – August period when university students provided by Operation Wallacea and WEI are completing elephant behavior based dissertations. In addition to assisting Heike with the instantaneous scan samples at 30-minute intervals and focal animals samples of social and sexual behaviour of the 7 vasectomized bulls and Ngani, the Operation Wallacea students will be responsible for monitoring female elephant behaviour and the behaviour and social interactions of the adolescent bulls using focal animal samples. These students will also monitor male-male, male-female and female-female patterns of proximity as an additional indicator of social bonds between individuals, changes to adolescent male association patterns and general herd cohesion. Potential titles for the Operation Wallacea dissertation projects are:

1. Diet, activity, ranging and habitat preferences of elephants in Pongola Private Game Reserve
2. Ranging, activity and association patterns of vasectomised bull elephants in Pongola Private Game Reserve
3. Association patterns, social behaviour and dominance interactions of vasectomised bull elephants in Pongola Private Game Reserve
4. Association patterns and social interactions between vasectomised bull elephants and sexually active female elephants
5. Association patterns, social behaviour and dominance interactions of adolescent male elephants in a population governed by vasectomised bull elephants
6. Sex differences in foraging behaviour and habitat preferences in the elephants of Pongola Private Game Reserve
7. Ranging, habitat preferences, and behaviour of female elephants in a population governed by vasectomised bull elephants

Data Collection

Data will be collected each day by Disney Corporation funded researcher Heike Zitzer (year round) and university students working in conjunction with the UK based NGO Operation Wallacea (June, July and August). Each of the vasectomized bulls, Ngani (the bull elephant received hormone suppressants) and the matriarchs of each of the two herds (A & B families, and the orphans) has been fitted with a radio collar. The approximate location of the bulls and herds will be identified each morning between 5.30am and 6.00am. From this information, a decision will be made regarding which individual or herd to track that day, while ensuring equal numbers of observation days of each bull and herd. From 6.00am onwards, the researcher(s) will approach the herd via game vehicle and use telemetry to track the elephants until visual contact is made. Upon located the individual/herd, behavioural data collection will commence using standardized data collection sheets. Behavioural data collection will consist of two types of data collection relating to: ranging, habitat and general behaviour, and bull elephant social and sexual behaviour. Additional data relating to physical signs of herd condition and sexual maturity will be recorded in notebooks throughout the day. Effort will be made to observe the elephants for as long as possible each day, but when observations become impossible (e.g. when elephants move into dense thickets) then observations will be terminated and the researcher(s) will return to camp to concentrate on data entry.

References

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