



Introduction

As part of the Northern Tuli Predator project, it was decided in 2008 to conduct an annual spotted hyaena survey. The purpose for the census is not only to calculate the density and population distribution of spotted hyaena, but also to test a possible hypothesis that will look into how lions in Northern Tuli Game Reserve (Notugre) might be affected by spotted hyaenas (hyaena hereafter). This census was the second annual census done for Notugre.

Methods

The location of each calling station was pre-determined and placed out randomly 3.2 km from each other on a GIS map (ArcGIS 9.2™). Calling stations were placed out in such a manner that no camps were close to the stations, but also that there were no overlap in areas surveyed. One of the objectives of this census was to cover as much surface area of Notugre as possible.

A large set of horned-shaped speakers was mounted on a tripod and placed approximate 15m in front of the vehicle. The speakers were connected to an amplifier and MP3 player situated in the vehicle. Sounds of a buffalo calf in distress and hyenas squabbling over a kill was then played continuously for 30min and the speakers, functioning on a mechanized electric motor, was then turned 90° every 5min to obtain a circular calling radius. Broadcasting of the

sounds commenced after sunset and all lights were switched off. Only once in a while a quick scan with a spotlight was done of the surrounding area for any signs of carnivores attracted to the calling station. After the 30min of broadcasting, the speaker setup was packed up and moved to the next station.

Recent calibration of the parameters for this method (Ferreira & Funston, *in press*; and Funston & Ferreira, *in prep*) predicts that spotted hyaenas respond up to 2.1 ± 0.6 km away from the call-up stations. Each station would thus effectively sample an area of 14.2 km². With respect to response probability of hyaenas a correction factor of 1.47 is applied.

Every carnivore that arrived at the site was recorded as well as any vocalization heard during the 30min of broadcasting. Other information recorded was: GPS location, site description, and environmental conditions, time started broadcasting, time at which animals arrived or vocalized and also the sex (if possible).

Results and discussion

A total of 17 calling stations were done during 4 nights of work, covering 96% of the study area, and I manage to attract 82 hyaenas and 37 black-backed jackals. Hyaenas were seen at 14 (82.3%) of the 17 calling stations. The mean number seen at those calling stations that hyaenas were attracted to was 5.9 (SD 4.3). From 14 calling stations the largest number of hyaenas that arrived was 14. At one calling station two different clans of hyaenas, 15 in total, arrived numbering 7 and 8 respectively. All other hyaena numbers attracted to calling stations ranged between 1 and 8.

Hyaenas counted at the calling stations were all over the estimated age of 1 year, since hyaena cubs are mostly restricted to their dens up until the age of 12 months. At one calling station I heard the sounds and calls of young cubs calling.

This was at the same calling station where 14 hyaenas arrived and I believe that an active den was in close proximity to my station.

From the data, the survey indicated that there are currently approximately 126 hyaenas (95% confidence intervals of 99 to 154) in Notugre. This gives a population density of 17.5 / 100 km², which is very similar to the density calculated in the 2008 survey. By comparison, Mills *et al.* 2001 found a lower hyena density (13.2 / 100km²) in a similar habitat type, but found similar high densities (21.7 / 100km²) in Acacia species on bottomlands and Mopane-Combretum bush.

There was no statistical difference ($\mu = 75.5$, $P > 0.05$, Mann-Whitney U-test) between the census done in 2008 ($\mu = 4.8 \pm 3.5$ range 1-12) and 2009 ($\mu = 5.9 \pm 4.3$ range 1 -14), which lends credibility to the method used.

TABLE 1: Summary of hyena census done in Notugre with 17 calling stations

	#	Average time to arrive (min)	Average number at c/s
Spotted Hyaenas	82	14.00	5.9
Lions	-	-	-
Leopards	-	-	-
Black Back Jackal	37	12.00	2.2

The behavior from the hyaenas attracted to the calling stations was very interesting. If there were 1 to 2 that arrived they almost always came together from the same direction, but if more than 2 hyaenas arrived from they came from any direction followed by soft growling sounds while they meet each other in a friendly manner (sniffing of the genitals etc) – they always seem to ‘know’ the other hyaenas that arrived and this would indicate that they are possibly from the same clan, but went out foraging in smaller groups of 1-2. Hyaenas attracted to

the calling stations situated close to the western backline and veterinary fence were extremely skittish. Any light that were fixed on them made them run for 'cover' in darkness.

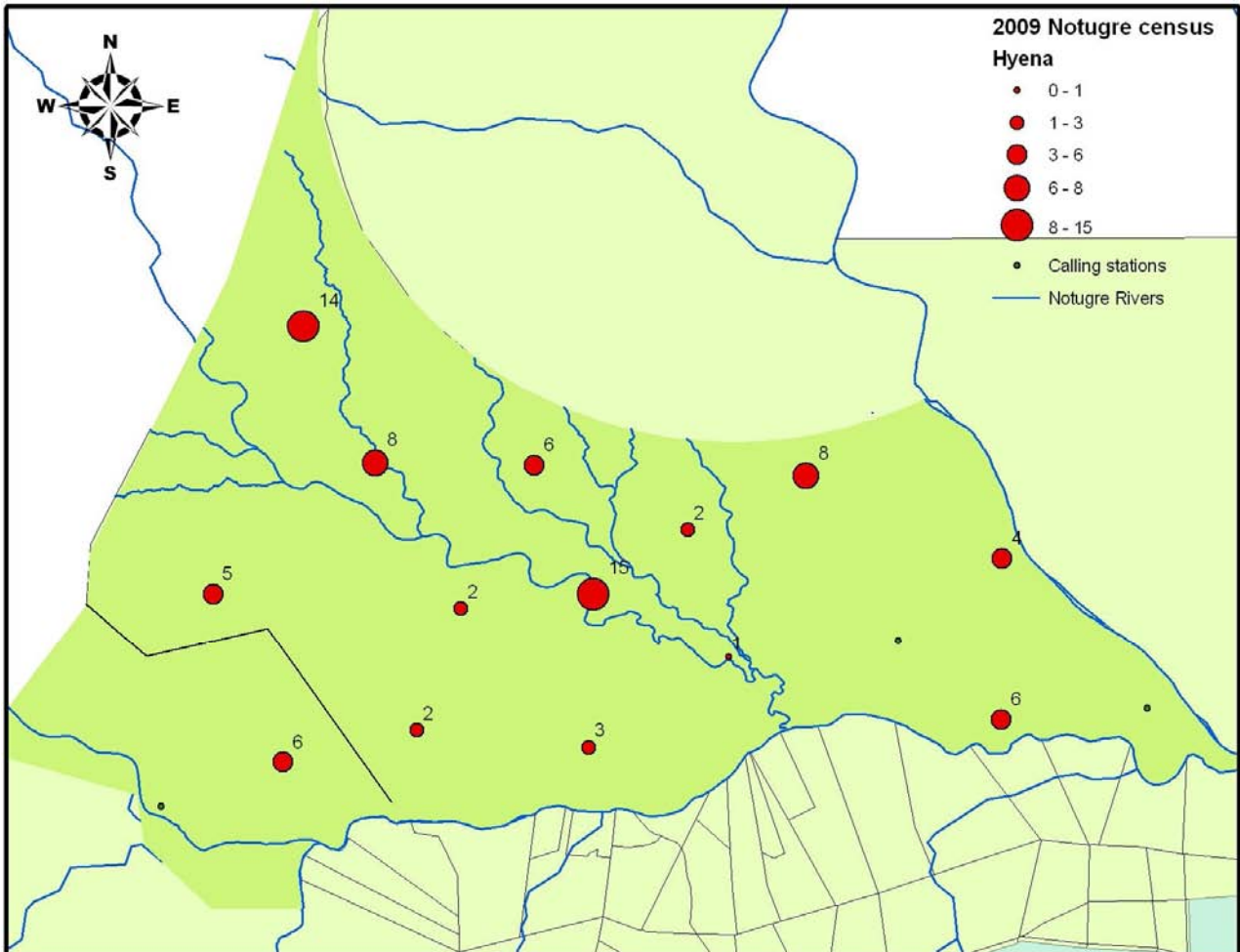


FIGURE 1: Map showing the locations and number of spotted hyaenas that arrived for all calling stations done in Notugre for 2009

This survey was initiated in order to conduct an annual survey whereby over time the accuracy of the numbers will increase, but also that trends and patterns can be calculated. This data not only gives a better understanding of what the spotted hyaena population looks like in the Notugre, but it will also help me to look into aspects of what influence their numbers might have on the fragile and splintered lion population and other large carnivores. Also, judging from the frequency of

spoor found, calls heard at night and the distinct white scat seen across the landscape, it would appear that spotted hyaenas are in high abundance in Notugre and breeding successfully.

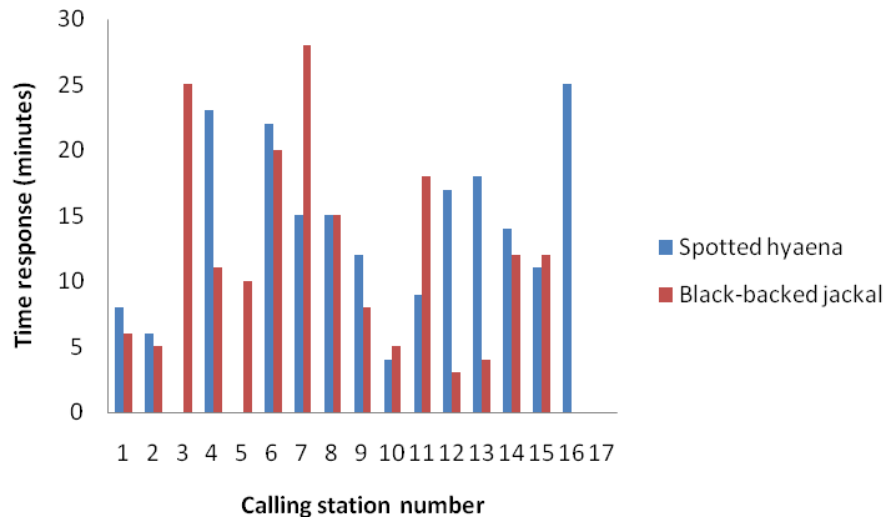
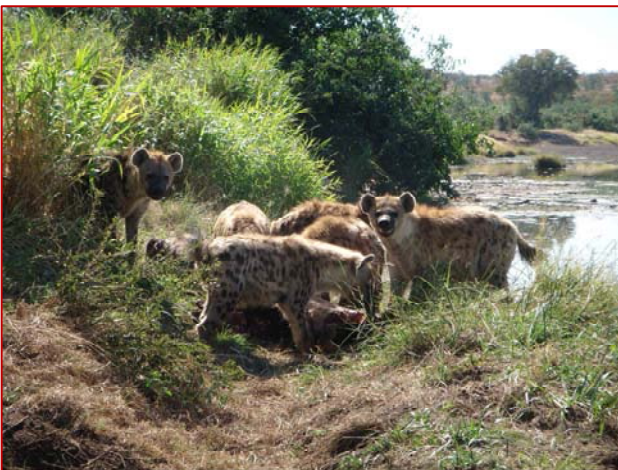


FIGURE 2: Time response in minutes of both spotted hyaenas and black-backed jackal that arrived at the calling stations

Spotted hyaenas in action:





Acknowledgements

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References

Ferreira, S.M. & Funston, P.J. *in press*. Estimating lion population variables: Prey and disease effects in Kruger National Park, South Africa. *Wildlife Research*

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