
Notes and records

Status of large carnivores in Bouba Ndjida National Park, Cameroon

Hans Bauer

Institute of Environmental Sciences, Leiden University, PO Box 9518, 2300 RA Leiden, The Netherlands

Introduction

Large carnivores present a special challenge in conservation science, because of their large ranges, low densities and propensity for conflict with livestock (Woodroge, 2001). Lion (*Panthera leo*, L.), cheetah (*Acinonyx jubatus*, Schreber), wild dog (*Lycaon pictus*, Temminck) and possibly other carnivore populations are small and fragmented in West and Central Africa (Nowell & Jackson, 1996; Breuer, 2003; Bauer & Van Der Merwe, 2004). This article is a contribution to fill the information gap on large carnivores in the sub-region.

In April 2004, we surveyed the Bouba Ndjida National Park (BNNP) with the use of calling stations (Ogutu & Dublin, 1998). BNNP is a 2200 km² savannah area in the Benoue catchment in Cameroon, on the border with Chad (see Fig. 1). The southern sector, covering roughly 2/3 of the park, is relatively well protected, but the northern sector is infested with poachers, cattle and migrant fisherfolk. Very little research has been performed in this area, the only published information is by Van Lavieren & Bosch (1977) and Van Lavieren & Esser (1980).

Material and methods

The protocol described here was adapted from Ogutu & Dublin (1998), based on previous experiences in the region. I used a tape of continuous calf distress and hyena sounds, played on a 12 V cassette player connected to a 400 W amplifier and two speakers of 50 W and 16 Ω positioned on top of a 4 \times 4 vehicle. Other materials used included nightvision binoculars, torch, spotlight and Global Positioning System[®] (GPS).

Correspondence: E-mail: bauer@cml.leidenuniv.nl

Calling stations were played at night with a rest between 1 and 4 AM. Each calling station consisted of four cycles of 10 min broadcast and 10 min silence. Speakers were turned 90 degrees after 5 min broadcast. Calling stations were performed near the tracks and were 5 km apart. After three calling stations with only human response in the northern sector, I decided to abort the survey there. Our results are therefore limited to the southern sector, where 20% of the area was covered with 22 calling stations (see Fig. 1).

If lions approached the car they were observed for some time using the spotlight. If hyenas (*Crocuta crocuta*, Erxleben) approached the car, they were counted in the dark, based on sounds and based on eye reflections from a weak torch. After a few minutes, the spotlight was switched on in the direction where they were last heard, allowing for a few seconds' observation while they ran off. If neither lions nor hyenas responded, the call-up was concluded by switching on the spotlight pointing to the sky, slowly lowering and then turning 360 degrees, to confirm the absence of lions and hyenas.

Results

In total, nine lions responded to three calling stations. Responses were observed both in the evening and in the morning, both at the start and at the end of a broadcasting cycle. I observed a male and a female adult lion with three juveniles in the centre of BNNP, the male and juveniles fled when the spotlight was turned on – although not in great haste. Further South, two adults approached the car, a male and a female, they apparently did not fear our presence or the spotlight at all. Towards the West, I observed one adult male at a large distance, he did not approach the car; a second individual was heard but not observed.

The number of hyena responses is more difficult to assess, because hyenas in northern Cameroon are generally very skittish. A total of twelve hyenas were either observed or heard simultaneously or coming from different directions, but more hyenas may have been present.

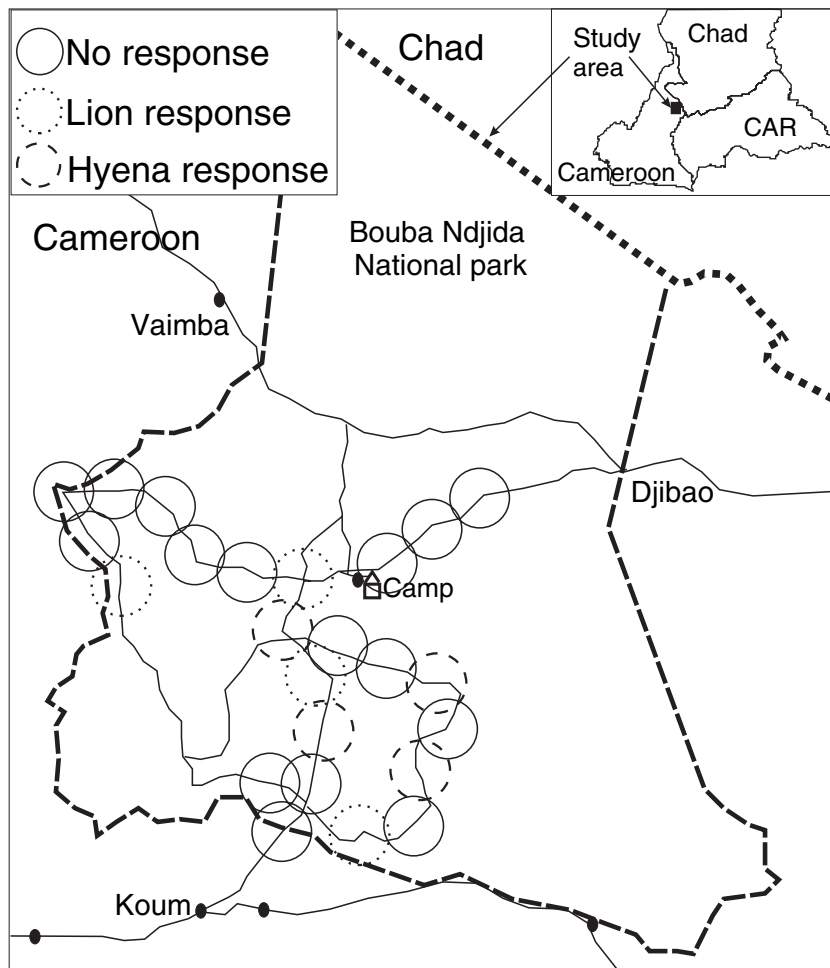


Fig 1 Map of Bouba Ndjida National Park, circles represent the surface covered by calling stations

Discussion

Ideally, density calculations should be based on local calibration; an empirical assessment of effective range and response rate. That is, one should find lion and hyena first, then call from 5 km and progressively come towards them and assess the distance at which they react (effective range) and the percentage that reacts at all (response rate). This was practically impossible, and we will use figures from literature instead. Ogutu & Dublin (1998) found an effective range of 2.5 km and a response rate of 26% (39% for lions without a carcass and 0% for lions at a carcass). Mills, Juritz & Zuccini (2001) found an effective range of 3.2 km and an individual response rate of between 43% and 77% for hyenas. We will conservatively postulate an effective range of 2.5 km and a response rate of 75% for both species.

This leads to a conservative estimate of lion density at 0.028 km^{-2} and of hyena density at 0.037 km^{-2} . The minimum numbers in the southern sector of BNNP may therefore be 40 lions and 54 hyenas; more speculative but realistic guestimates for the entire park are 60 lions and 120 hyenas.

We have no new empirical data on the status of other large carnivores. In literature, we found an estimate of five to fifteen wild dogs in BNNP (Breuer, 2003), the presence of unknown numbers of leopard (*Panthera pardus*, L.) and the absence of cheetah (Van Lavieren & Bosch, 1977; pers. obs.). BNNP is part of an area with a mosaic of landuse forms, including hunting zones and other areas containing wildlife. None of the existing carnivore populations must therefore be considered as isolated. In conclusion the composition and abundance of the large carnivore guild of BNNP was similar

to the nearby and better documented Benoue National Park.

Calling stations have been described as an efficient and accurate lion and hyena census technique, depending on the quality of local calibration (Mills *et al.*, 2001). In BNNP and many other protected areas in the region, however, the investment in calibration would have to be an order of magnitude higher than in the survey itself because of low biomass density, dense bush, lack of roads and skittish carnivores. This compromises the usefulness of the method; the present results should be seen as a reliable approximation but the use and development of other techniques in future is recommended.

Acknowledgements

I acknowledge the assistance of Hans de Iongh, Jean Paul Kwabong, Nathalie Vanherle, Frank Princee, Iliara Di Silvestre, Paul Scholte, Lambi Stephen, Jean Paul Arabeyre and Seini Ndjibdi. I thank the Ministry for Environment and Forests for the necessary authorizations, the Centre for Environment and Development studies in Cameroon for logistic support, the Garoua Wildlife School for institutional support and the Van Tienhoven Foundation for funding.

References

- BAUER, H. & VAN DER MERWE, S. (2004) Inventory of free ranging lions (*Panthera leo*) in Africa. *Oryx* **38**, 26–31.
- BREUER, T. (2003) Distribution and conservation of African wild dogs in Cameroon. *Canid News* **6**, 1–11.
- MILLS, M.G.L., JURITZ, J.M. & ZUCCINI, W. (2001) Estimating the size of spotted hyena (*Crocuta crocuta*) populations through playback recordings allowing for nonresponse. *Anim. Conserv.* **4**, 335–343.
- NOWELL, K. & JACKSON, P. (1996) Wild Cats, Status Survey and Action Plan. IUCN, Gland.
- OGUTU, J.O. & DUBLIN, H.T. (1998) The response of lions and spotted hyenas to sound playbacks as a technique for estimating population size. *Afr. J. Ecol.* **36**, 83–95.
- VAN LAVIEREN, L.P. & BOSCH, M.L. (1977) Evaluation des densités de grands mammifères dans le Parc National de Bouba Ndjida, Cameroun. *La Terre et la Vie* **31**, 3–32.
- VAN LAVIEREN, L.P. & ESSER, J.D. (1980) Numbers, distribution and habitat preference of large mammals in Bouba Ndjida National Park, Cameroon. *Afr. J. Ecol.* **17**, 141–153.
- WOODROFFE, R. (2001) Strategies for carnivore conservation: lessons from contemporary extinctions. In: *Carnivore Conservation* (Eds J. L. GITTLEMAN, S. M. FUNK, D. MACDONALD and R. K. WAYNE). Cambridge University Press, Cambridge.

(Manuscript accepted 11 December 2006)

doi: 10.1111/j.1365-2028.2006.00751.x