Research Report - 2008

DESERT LION CONSERVATION
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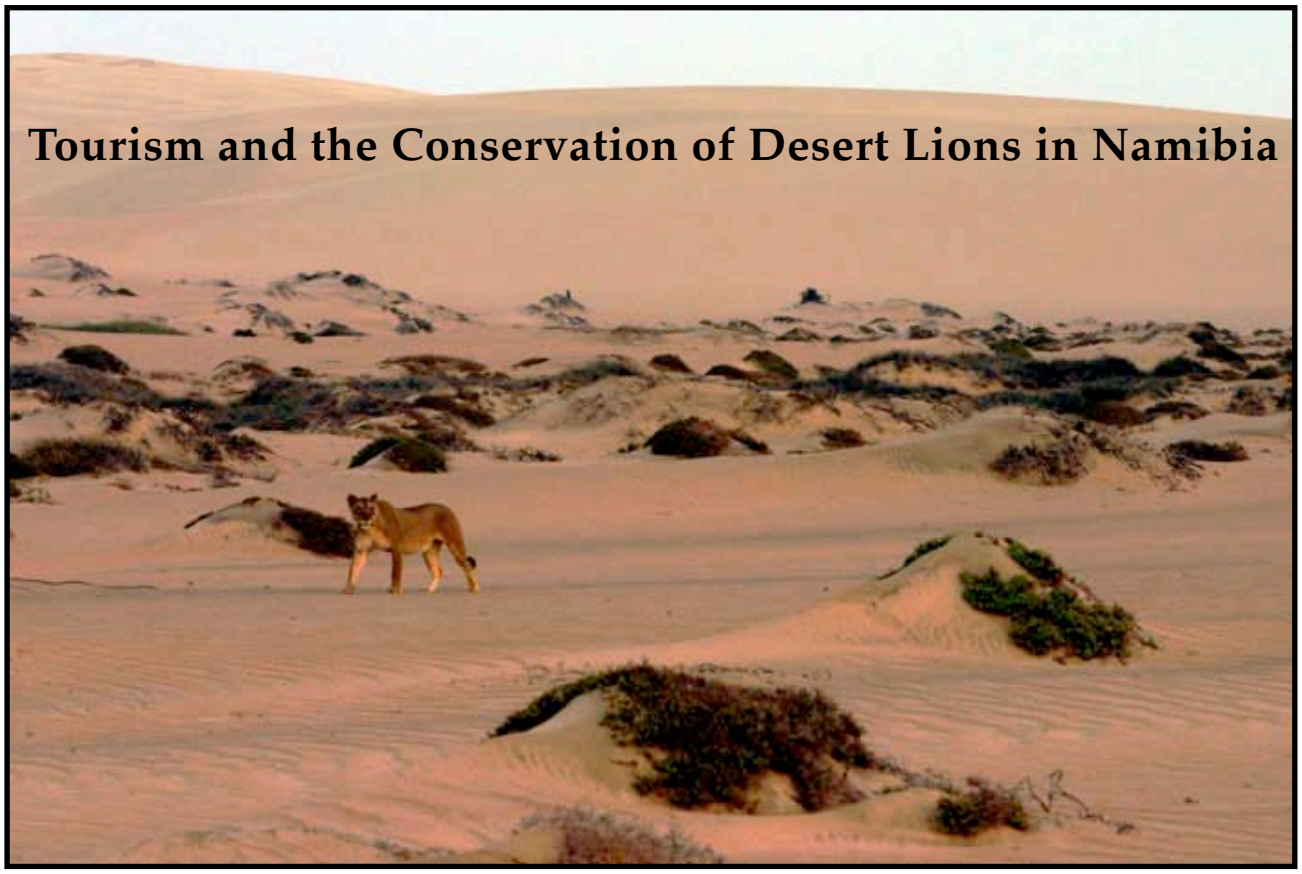
5 March 2008

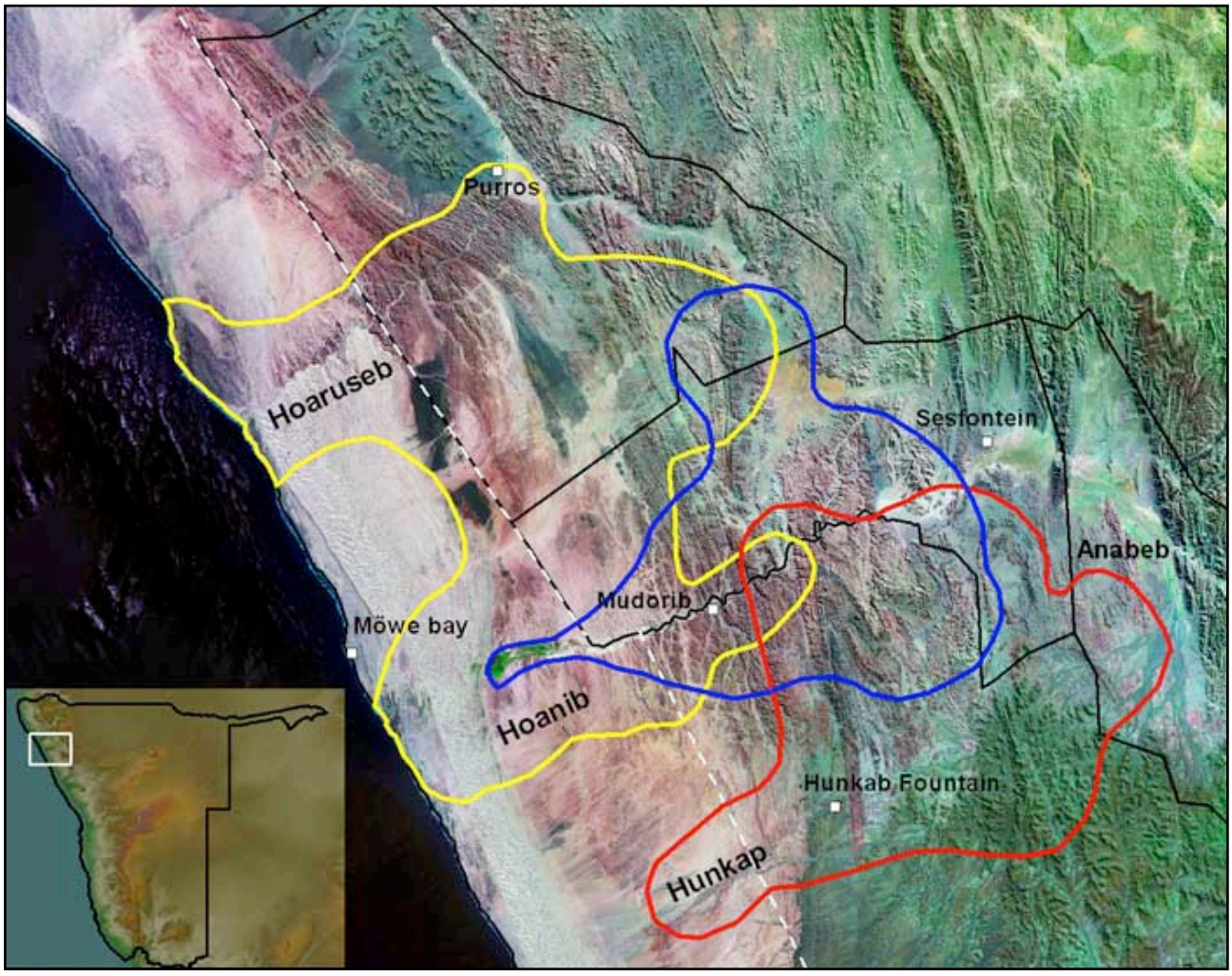


Introduction

Tourism can play an important role in the protection and conservation of wildlife and the natural environment. The simultaneous growth of wildlife populations, tourism, and community-based conservation during the past five years in the Kunene Region (northwest) of Namibia is testimony to this. Under the current climate where local people benefit from wildlife, primarily through tourism, and communal conservancies enter into agreements with tour operators, the tourism industry's potential role in wildlife conservation is ever increasing. Along with black rhinos and elephants, lions are one of the most popular species among tourists. The value of lions and the benefits through tourism in the Kunene Region, must arguably out-way the losses incurred when lions kill livestock. Notwithstanding, people still pose the biggest threat to lions. Local communities suffer financial losses when lions prey on their livestock, upon which they often retaliate (legally) by killing lions. The tourism industry and related entities (including communal conservancies) enjoy the benefits, but the local people that live close to lions (i.e. individual farmers) suffer all the losses. This discrepancy has previously been identified and there is a need for preferential benefits to those local people.

During 2007 the Desert Lion Project focussed on the northern section of the Kunene in an effort to improve the tourism potential of Desert lions. The main study area was the Hoaruseb River and the Purros Conservancy, with the objective to develop a blueprint for lion tourism and HWC management, including a system where direct benefits derived from lions would reach the appropriate local people. The study area was expanded to the Hoanib River (Sesfontein Conservancy) and Hunkap River (Anabeb Conservancy), and is referred to as the Northern Kunene (Figure 1). A sound understanding of the ecology and behaviour of the lion population is essential, and lions were observed for 2418 hours (92 x 24-hr periods) during 2007.

Figure 1. The distribution and size of the home ranges of three groups of lions in Northern Kunene during 2007. (Hoaruseb group - 4584 km^2, Hoanib group - 2345 km^2, Hunkap - 2927 km^2).

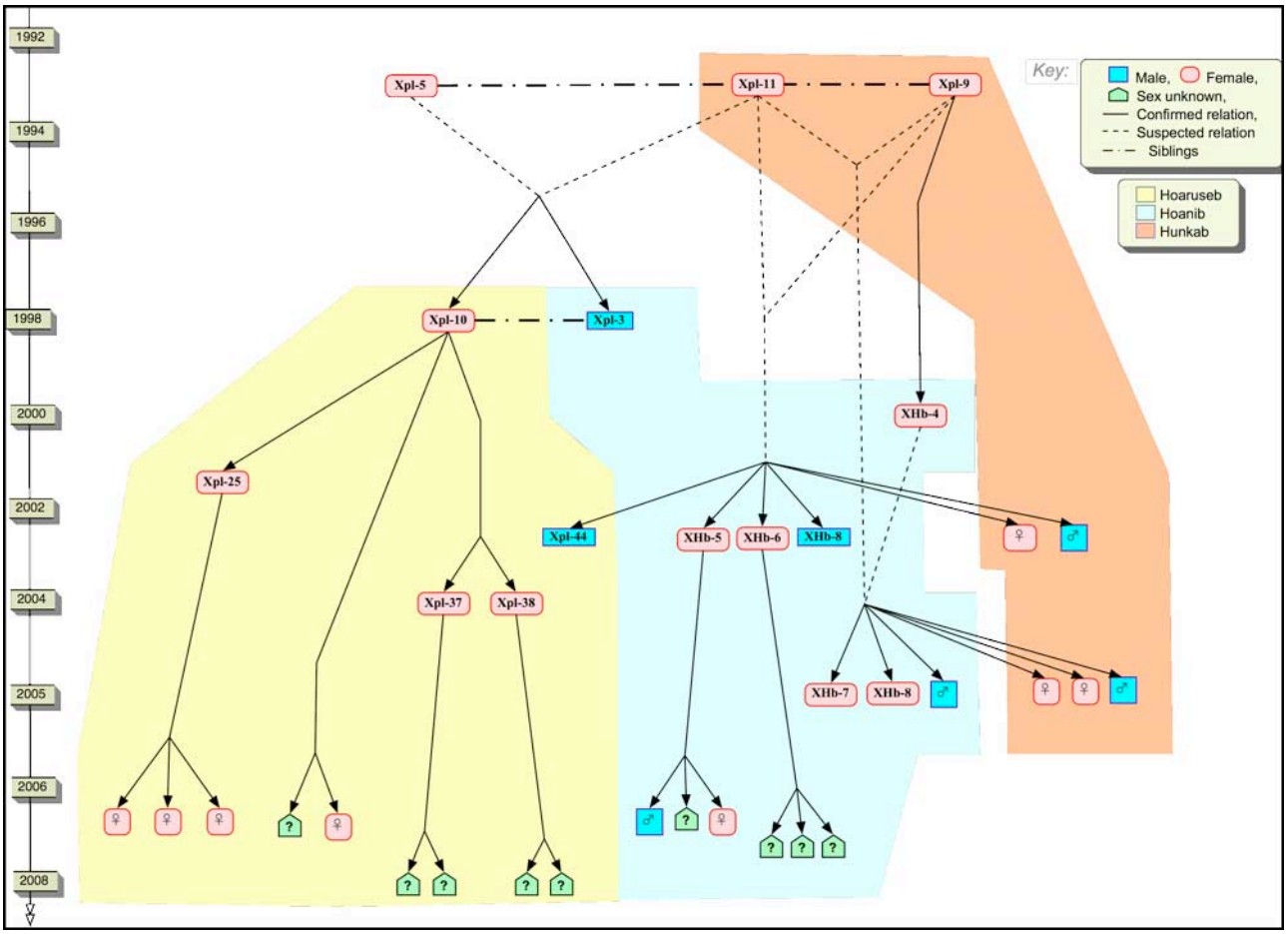


Lion Ecology & Behaviour

The information on population structure, ecology and behaviour of lions that live in the study area, is the product of extensive research between 1999 and 2007. There are three distinct groups or prides of lions that live around the three ephemeral river systems in Northern Kunene (Figure 1). Long-term records reveal the genealogy and genetic relationships between the individuals in each group (Figure 2). The Hoanib and Hoaruseb

groups are recent dispersals, founded by core members that emigrated from the Aub/ Barab area. The Hunkap group is an extension of the Aub pride, but they may have separated permanently from the Aub pride. Most of the adult lions in the three groups, especially those older than eight years, are closely related, and are descendants from the Aub pride.

Figure 2. Genealogy of lions in the Northern Kunene during 2007.



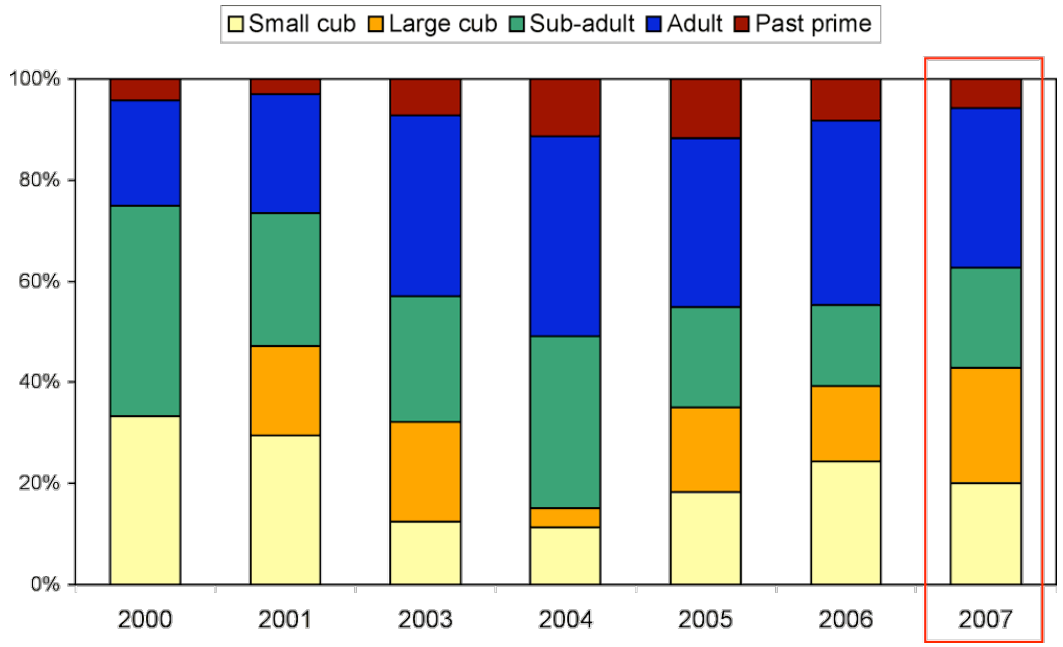
At the end of 2007 there were a total of 35 individually known lions in the study area (Table 1). The age structure of this sub-population has a healthy balance of individuals in all age classes, and it compares favourably with data for the entire Kunene lion population for the previous seven years (Figure 3).

The sex ratio, however, is grossly in favour of females (1 female : 0.5 male, n = 27). Although sex ratios in mammal populations are known to fluctuate, the absence of males in such a small population is of concern. Communal conservancies and the Ministry of Environment and Tourism (MET) when setting trophy-hunting quotas for lions in the Northern Kunene must consider this result.

Table 1. Demography of lions in the Northern Kunene during 2007

	Lion pride		
	Hoaruseb	Hoanib	Hunkap
Total number of lions	14	14	7
Adult males	1	2	1
Adult females	4	2	3
Sub-adults	0	4	3
Cubs	9	6	0
Ephemeral rivers used	Hoaruseb Hoanib	Hoanib Mudorib	Mudorib Hoanib Hunkap
Communal conservancy	Purros Sesfontein	Sesfontein Purros	Anabeb Sesfontein
Home range size (km^2)	4584	2345	2927
Total lion distribution	6171 km^2		
Total number of lions	35		
Density (lion $100km^{-2}$)	0.56		

Figure 3. The distribution of age classes of lions in the Northern Kunene in 2007, compared with data for the entire Kunene lion population between 2000 and 2006 (Small cub < 1yr, Large cub 1 – 2 yrs; Sub-adult 2 – 4 yrs; Adult 4 – 10 yrs; Past prime > 10 yrs).



Each of the three prides utilised more that one ephemeral river system, and the home ranges of all three prides spans across two communal conservancies (Table 1). They occupied a total area of 6171 km^2 (Figure 1), and there was extensive overlap between the home ranges of all three prides (Table 2). On average lions shared 31% of their home range with a bordering pride. The Hoanib pride had exclusive access to only 26% of their home range. Despite this overlap in home range use, lions rarely interacted with members of the other prides.

Table 2. Home range overlap between three lion prides in Northern Kunene during 2007. Overlap is expressed as a percentage of the home range size of the pride in the vertical column.

Pride	Percentage overlap with:		
	Hoaruseb	Hoanib	Hunkap
Hoaruseb	-	16.5%	2.5%
Hoanib	32.3%	-	41.3%
Hunkap	4.0%	33.1%	-

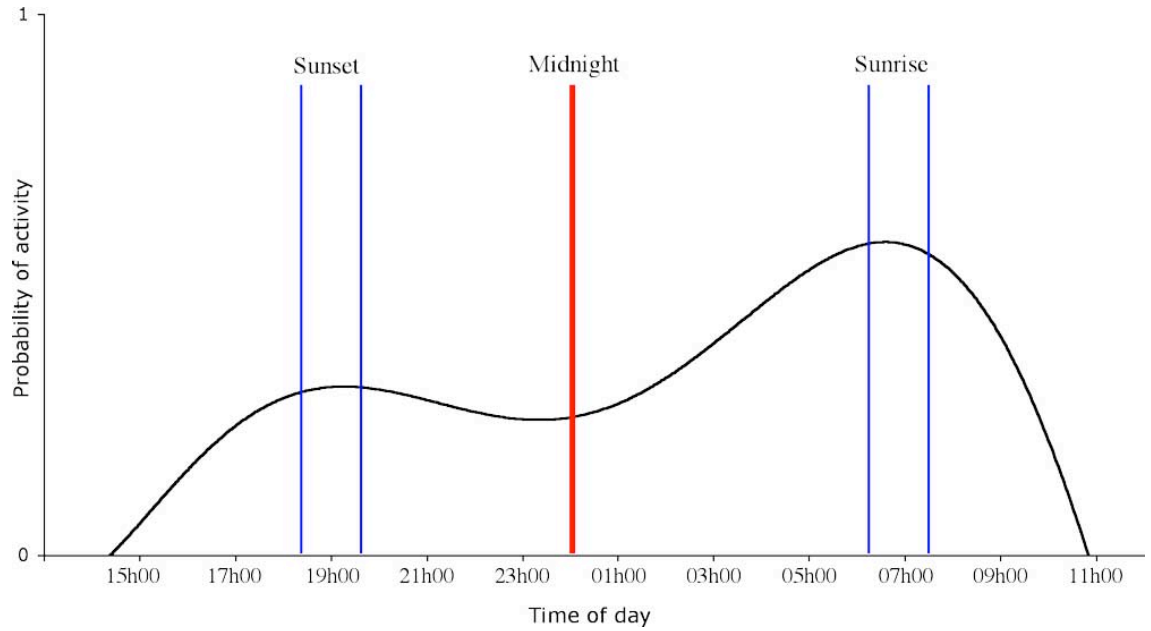
Table 3. Prey animals killed by lions in Northern Kunene during 2007.

Species	Number
Oryx	26
Hartmann zebra	4
Ostrich	4
Springbok	4
Donkey	3
Giraffe	2
Kudu	2
Egyptian goose	2
Steenbok	1
Baboon	1
Honey badger	1
Kori bustard	1
Total	51

Lions hunted 12 different species of prey and killed 51 animals (Table 3). Oryx was the most important prey species, followed by zebra, ostrich and springbok. These four species formed 75% of the lion's food items. Livestock (donkeys) represented only 5% of the kills.

Lions were inactive for 72 % of the 24-hour day (N = 92 days). During the middle of the day (10h00 – 15h00; Figure 4) they generally rested in thick vegetation and were not visible. Although lions were active mostly at night, the main peak of activity was around sunrise, followed by another increase in activity at sunset.

Figure 4. Activity patterns of lions in the Northern Kunene during 2007. Data were collected during 92 periods of 24-hour observations. Activity patterns are presented as a probability, based on the average time (proportion per hour) that lions were active during 2208 hours of observations.



Managing Human-Lion conflict – Purros Conservancy

During 2007 several meetings were held at the Purros Conservancy to discuss the control and management of conflict between people and lions. The main stakeholders that attended the meetings were the Purros Conservancy, MET, Integrated Rural Development and Nature Conservation (IRDNC), Desert Lion Conservation, and local tourism operators. A breakthrough was made on 4 September 2008 when all the stakeholders endorsed a concept plan for the increase of benefits derived from lions, the management of human-lion conflicts, the development of lion eco-tourism, and the conservation of lions.

A “lion fund” was established by the Purros Conservancy to manage all income generated from lions, e.g. tourism levies. The aim of the Fund is for the benefit of the Purros community, to ensure that preferential benefits go to individuals farmers when lions kill their livestock, to support management activities aimed at preventing conflicts with lions, and contribute to the monitoring and conservation of lions.

IRDNC agreed to provide funding and logistical support to establish a self-insurance scheme with the Purros Conservancy, as part of their HACSIS programme. Under the scheme all registered members of the Purros Conservancy are eligible to claim for livestock losses to lions. Eligible claims are, however, subject to certain conditions. For example, claims for livestock killed in wildlife zones or at night would not be valid, and livestock losses must be reported within three days. The Conservancy Committee will manage the scheme, verify claims by investigating all cases, and make payments according to agreed market-related prices for each livestock species.

Conflict management options

Options to manage and resolve human-lion conflicts fall into two categories: “preventative” and “reactive” measures. Preventative measures, as the term suggests, are aimed at avoiding conflict through proactive management. Reactive measures are efforts to resolve problems after conflict has occurred, and include killing lions or capturing and translocating lions away from the conflict area.

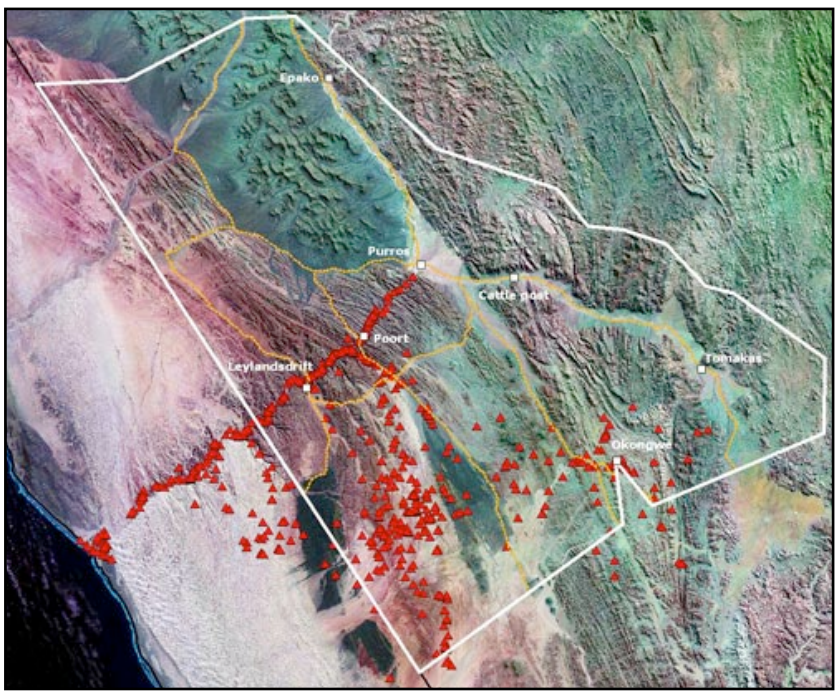


Figure 5. Locations of lions in the Purros Conservancy between 2005 and 2007.

Limiting the amount of overlap between the areas used for livestock farming and the distribution of the lions (preventative) is the most effective management option. Lion movements are concentrated in the southwest corner of the Purros Conservancy (Figure 5). If an area of 1,090 km^2 were to be set aside by the Purros Conservancy for wildlife (Figure 6) and not used for cattle farming, the conflict with lions can be limited, if not avoided altogether. The Hoaruseb River, however, is a critical zone with high potential for conflict. The Purros Conservancy depends on the river for water and grazing. Research data from 2005 to 2007 show that lions seldom move beyond a specific bend in the river. This point is 10 km west of Purros and is proposed as the boundary between the wildlife zone and the area used for livestock farming (Figure 7).

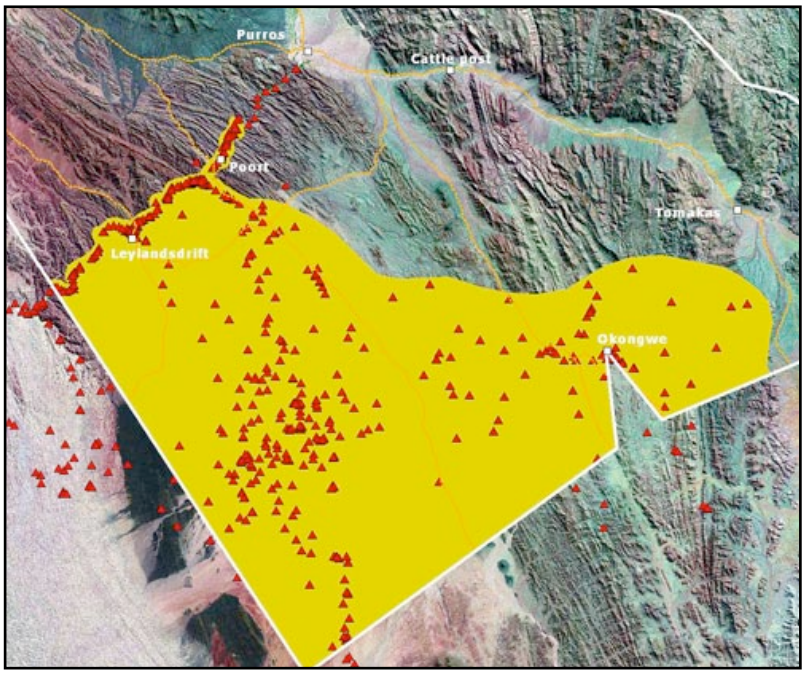


Figure 6. Proposed wildlife zone in the Purros Conservancy that include the main concentration area of lions.

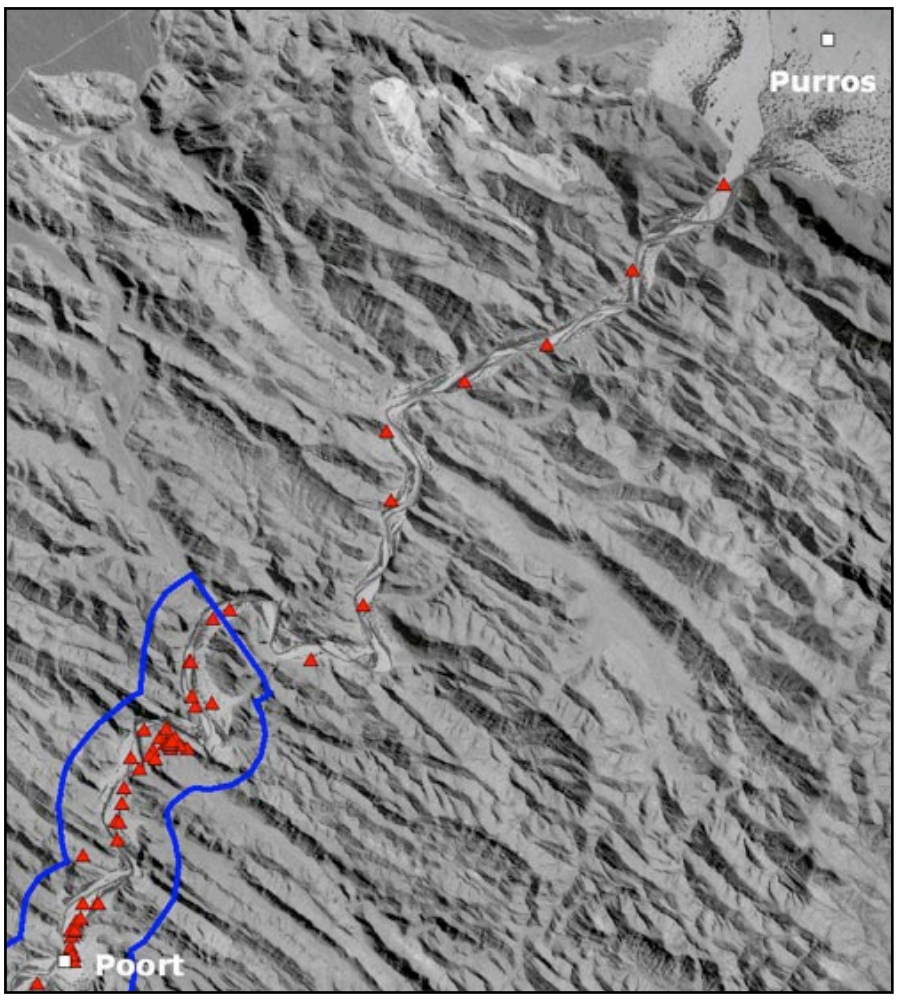


Figure 7. The proposed boundary (blue line) in the Hoaruseb River of a wildlife zone, aimed at limiting conflict between lions and livestock.

In 2007 the spatial and temporal movements of lions and livestock were monitored simultaneously on 39 days (24-hour observations). These data were collected when there was potential conflict between lions and livestock - when lions were ≤ 15 km from Purros (east of the Poort, see Figure 7). Lions moved beyond the proposed zone on 70 % of the days. The proportion of time that both lions and livestock spent inside a 10-km-section west of Purros (Figure 8) was a function of the distance from Purros (Figure 9).

Figure 8. A schematic layout of a 10 km stretch of the Hoaruseb River west of Purros, divided into 1 km sections (see Figure 9).

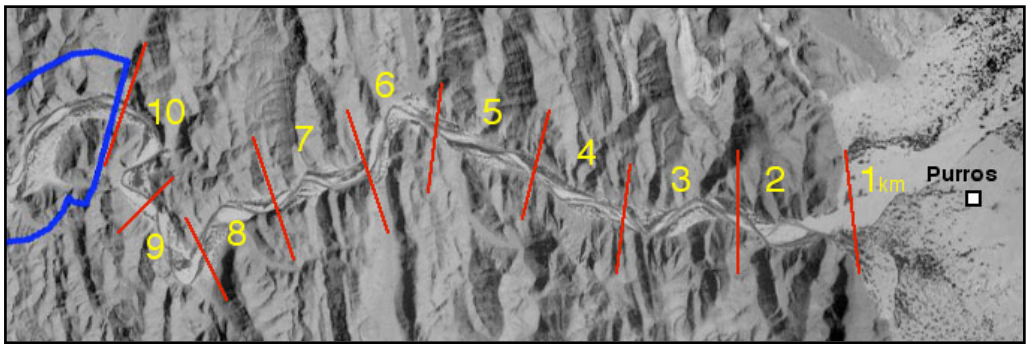
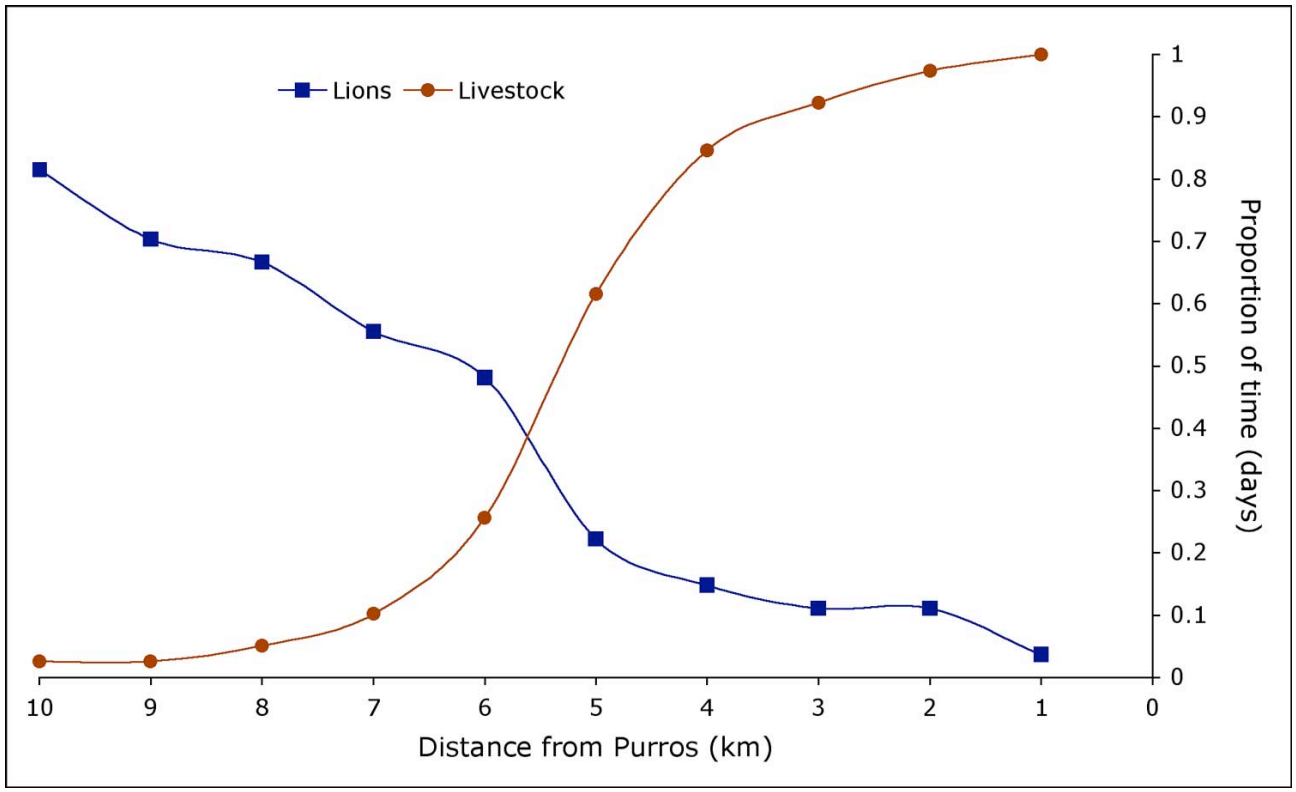


Figure 9. The proportion of time that lions and livestock spent in the Hoaruseb River as a function of the distance west of Purros (N = 39 days; see Figure 8).



Livestock regularly moved up to 6 km west of Purros, whereas lions preferred distances of between 5 and 10 km west of Purros. Although the data indicate spatial separation in habitat-use, the overlap for the section 2 - 7 km west of Purros, is problematic. Lions are most likely to encounter and kill livestock in the section 4 - 6 km from Purros. However, despite these high-risk areas, encounters between lions and livestock during the 39 days of intensive observations were rare. Lions encountered livestock on four occasions and they

killed three donkeys. This was due to a temporal separation in the use of the overlapping habitat. Lions moved here at night and livestock during the day. The Purros Conservancy actively managed their livestock by only allowing the animals to graze in the river between 10h00 and 17h00, when lions were inactive (see Figure 4).

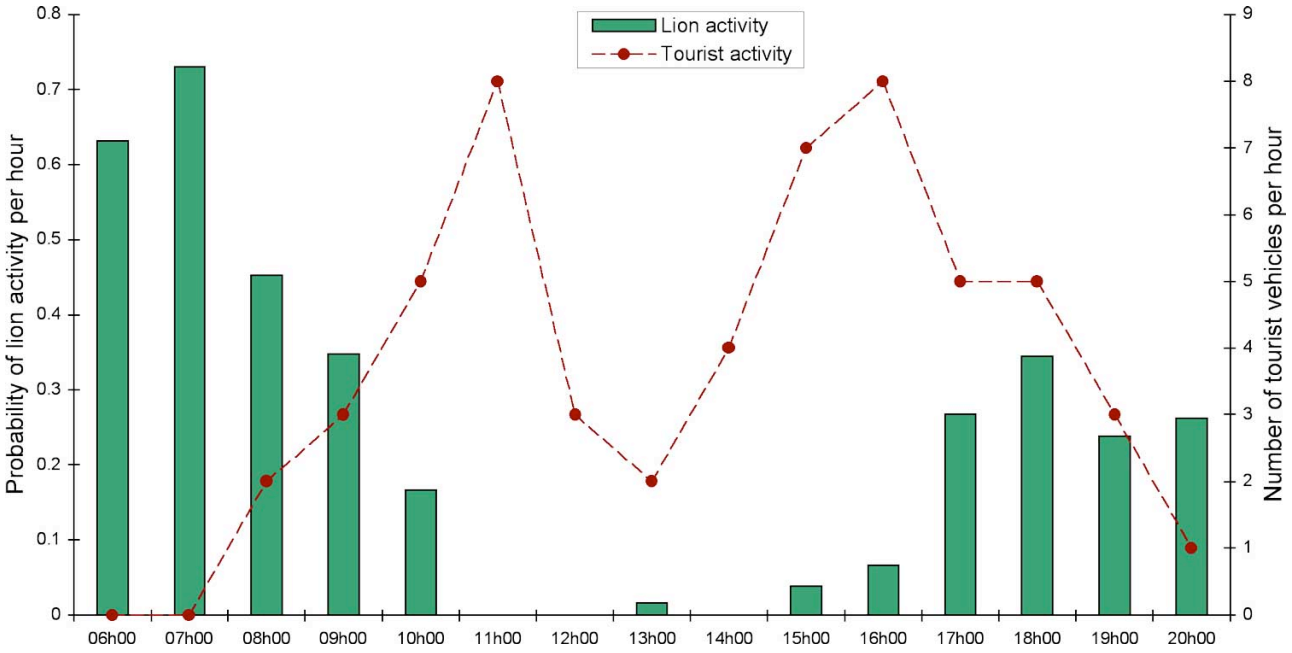
Lion Eco-tourism

The philosophy behind eco-tourism of lions in the Purros Conservancy is that the sustainable use of lions through tourism should generate financial benefits to the Conservancy and the tour operators, that out-way the costs of living with lions, and therefore contribute to the conservation of the species. This can be achieved by developing generalised guided tours, offered by trained members of the Conservancy; and specialised tours, offered by a tour operator in partnership with the Conservancy, to track and view lions.

A sound understanding of the habits and behaviour of the lions is essential in developing cost-effective procedures for locating and viewing lions. Because of their nocturnal habits, the movements and behaviour of lions are often poorly understood. Tour operators will benefit from accurate and current information on lions, and there is a need to provide such information to the industry, so as to increase the potential benefit of tourism to wildlife conservation. Collaborating with the Purros Conservancies and involving them in the process is essential.

The success and impact of tourism pressure on the lions was evaluated in the Hoaruseb River during 2006 and 2007. The Hoaruseb lions spent 85 % of their time in the riverbed and the remainder in rocky outcrops close to the river (5 – 10 km). The likelihood of finding and seeing the lions, during a sample of 82 attempts, was high (69 %). Despite this high probability of seeing lions, only 8 % of the 86 tourists vehicles that drove past the lions (average = 4.2 vehicles per day) actually saw them. The peak tourism traffic was between 09h00 and 11h00, and between 15h00 and18h00 (Figure 10), when lions were inactive. When resting, lions generally selected resting spots behind vegetation and other forms of cover. The average distance between passing vehicles and lions was 74 metres (range: 15 -250 m). The lions were mostly relaxed when vehicles drove past them, but when vehicles were noisy or caused disturbance, they often walked or ran out of sight.

Figure 10. Daytime activity patterns of lions and tourist vehicles in the Hoaruseb River during 2007. Data were collected during 83 periods of 24-hour observations. Tourism activity represents the number of vehicles that drove past the lions per hour, during the 24-hour observations. See Figure 4 for an explanation on lion activity.



These findings suggest that, with the correct approach and knowledge, lions can be located and viewed with reliability. The Desert Lion Project can provide training to Conservancy members and local tour operators that will improve the tourism potential of lions. Such training will help to increase the success rate of finding and approaching lions during game drives, and improve the quality and accuracy of information conveyed to tourists. The success of lion eco-tourism depends on a) a sound knowledge of the behaviour & ecology of the lions acquired through applied research, b) a well developed and tested eco-tourism package that is based on cost-effective, practical and reliable techniques, and c) extensive involvement and training of the Purros Conservancy, where they will retain ownership, along with the tour operators, over the tourism activities and derive direct benefits from lions.

Acknowledgments

Desert Lion Conservation received financial support and sponsorship from the following parties during 2007 (listed alphabetically): The Cardboard Box Travel Shop, Cycology Cycles, Cymot/ Green Sport, Dunlop (Namibia), Charles & Doris Glehn, Go Green Fund (Nedbank), IRDNC, Namibia Nature Foundation, Jody Allan Patton, Andreas Savaretti, J & A Schneider, Hayley Smith, Eric & Joey Stander, Total (Namibia), Wilderness Safaris-Namibia, Wilderness Trust, L & S Weintrobe. Karen Nott is thanked for her efficient and much needed help with the administration, finances and logistics of the project. I would like to acknowledge the help & support (food, supplies, fuel, logistics, ideas & discussions) of the following people: Steve & Louise Braine, Philippa Haden, Linda de Jager, Karen & Trevor Nott, Henk Schoeman, Garth Owen-Smith & Margie Jacobsohn, John & Barbara Patterson, Rob Roy Ramey & Laura Brown, Russell & Tina Vinjevold, Pieter de Wet, Skeleton Coast Camp – Wilderness Safaris, Keith & Suzie Wright. The Ministry of Environment and Tourism is thanked for their support since 1999.