

Preliminary report on the status of lions in the Mozambican component of the
Greater Limpopo Lion Conservation Unit.



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March 2015



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Introduction

The Greater Limpopo Lion Conservation Unit (GLLCU) in southern Africa is important for the regional and global viability of lions because it is one of Africa's ten remaining population strongholds (IUCN, 2006). However, although the region is vast (~73,000 km²), the majority of the GLLCU are high-conflict landscapes where lions may be faced with the compounded challenges of prey depletion caused by bushmeat poaching, accidental snaring, targeted poaching for body parts, retaliatory and pre-emptive killing by pastoralists and loss of habitat (including prey) to agricultural land conversion. There is therefore a pressing need to identify and secure lion populations in this region before their habitat is further fragmented or irretrievably lost. Furthermore, in the context of acute continental range declines, it is crucial to improve the conservation status of lions in the Mozambican portion of the GLLCU thus making the best use of these available habitats.

This project began with an initial investigation of lion status in Limpopo National Park during 2011-2012. We identified a small but critically important lion population existing under considerable human impact (Everatt et al., 2014). We have since expanded this project and are taking a landscape-scale approach to identify the conservation actions required to ensure the growth and persistence of the regional lion (meta-) population while simultaneously providing the necessary information to improve the conservation prospects for the lions of Limpopo.

Objectives

- 1) Quantify the impact of poaching and livestock conflict on the conservation of lions in the GLLCU.
- 2) Quantify habitat availability, connectivity and source-sink dynamics for lions in the GLLCU.
- 3) Determine key threats and identify appropriate solutions to improve the conservation of lions in the Mozambican component of the GLLCU (Limpopo, Banhine National Park, Lebombo Conservancy).
- 4) Evaluate management and land-use strategies required to maintain a viable lion meta-population across the GLLCU.

Activities completed

- A lion call-up survey was conducted across 1 852 km² in Limpopo (2012), and 969 km² in Lebombo Conservancy (2013).
- A camera trapping survey was conducted from 82 sites in Limpopo (2012) and 28 sites in Lebombo Conservancy (2013).
- Spoor surveys were conducted along 2 052 km of transects in Limpopo, Banhine and adjacent areas (within 50 x 200 km² grid cells) (2015) (Fig. 1) and 639 km in Limpopo (2012-2013).
- Scat detector dog surveys were conducted along 639 km of transects in Limpopo and Banhine (2015).
- Prey counts were conducted along 1 774 km of transects in Limpopo and Banhine (2015).

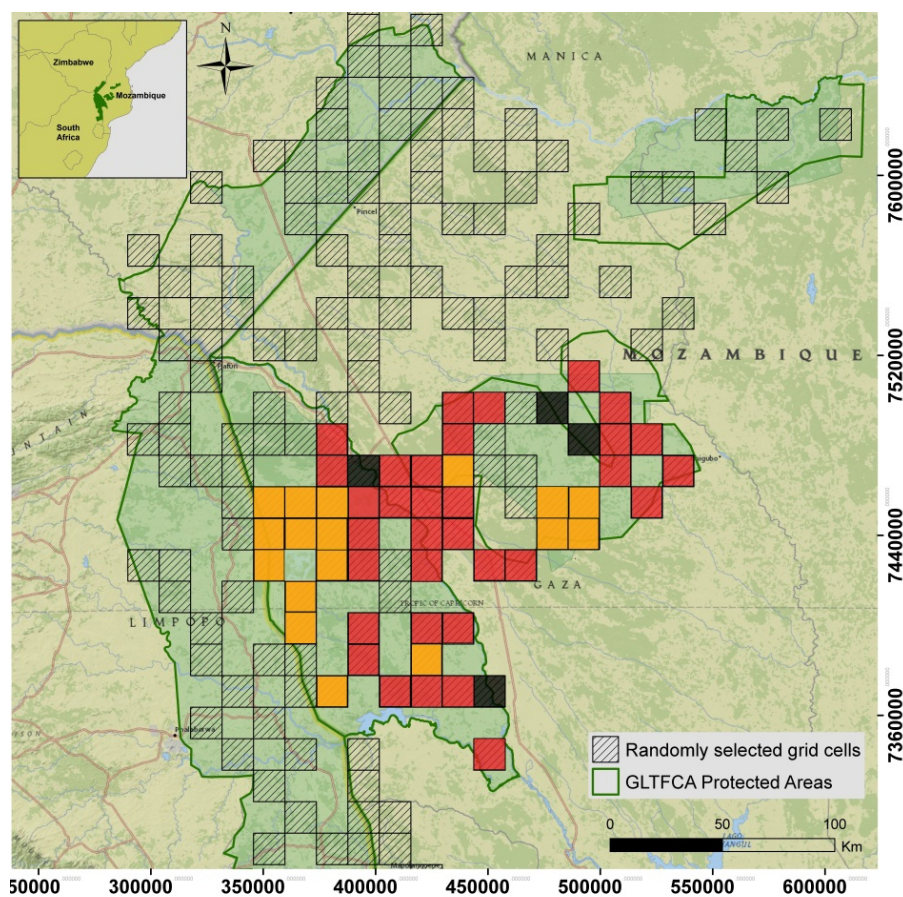


Figure 1: Study area including survey grid with 150 randomly selected cells for spoor sampling within an occupancy framework (shaded), cells completed where **lions were detected (orange)** and not detected (red) (July 2014-Feb 2015), and cells omitted because they contain more than 80% cultivation/livestock (black).

Preliminary status of lions

Lion abundance

- There are an estimated **66 lions in Limpopo**, for an overall density estimate of 0.99 lions/100km² (Everatt et al., 2014), from a minimum of six documented prides. There are an additional estimated **nine lions in the Lebombo Conservancy** (north), for a density of 0.97 lions/100km², from a minimum of one pride, and **one to two prides in Banhine**.

Lion distribution

- Lions occur across **34% of the surveyed range**, including **43% in Limpopo** and **31% in Banhine** (2015) (Fig. 1). The distribution of lion home ranges in Limpopo is most strongly limited by the availability of large prey and by the pressures from agro-pastoralist communities, while their use of habitat within home ranges is most strongly limited by bushmeat poaching and prey occurrence (Everatt et al., 2015)
- There are five critical lion areas in Limpopo and two critical lion areas in Banhine (Fig. 2).

Threats and trends

- The main cause of lion mortality in Limpopo and Lebombo is poaching for 'muti', followed by retaliatory killing in defense of livestock and 'by-catch' in bushmeat snares (Table 1; Figs. 3 & 4).
- There is sufficient prey in Limpopo for lion densities to **increase by more than 3x** (if persecution is reduced) (Everatt et al., 2014). Furthermore, prey is also limited by bushmeat hunting.
 - Based on these results; we believe that the lion population in Limpopo, Banhine and Lebombo could increase considerably with the implementation of effective conservation strategies.

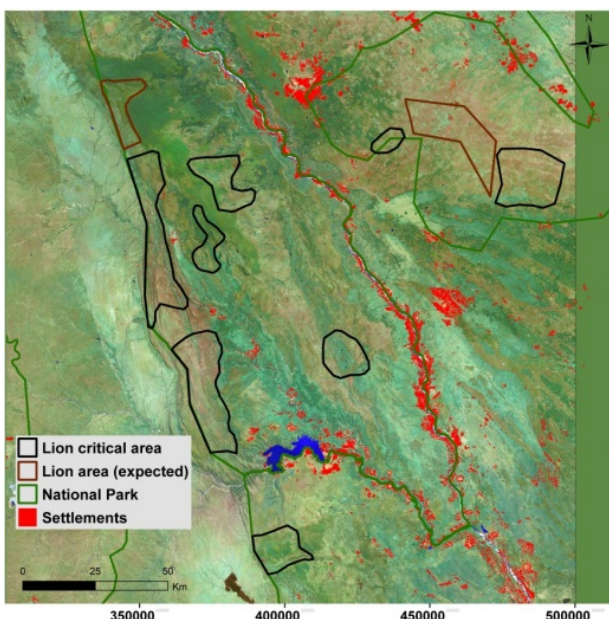


Figure 2. Critical lion areas in Limpopo, Banhine and Lebombo (where we have documented lion residency from 2011 to 2015 (LNP, LC) and in 2015 (BNP)) and areas expected to be important for lions based on habitat similarities with critical areas.

Table 1. Direct threats to lions in Limpopo National Park and Lebombo Conservancy.

Threats	Incidences recorded	Demographics
Killed for body parts used in superstitious beliefs "muti"	3 lions poisoned, with heads, feet, tails and organs removed	2 males 1 female
	2 lions killed unknown method, with skin and teeth removed	2 unknown
Killed in retaliation of livestock depredation	3 lions snared while attempting to access cattle in boma (1 lion also used for muti)	3 males
Killed as by-catch in bushmeat snares	1 lion photographed with a snare	1 female
	1 lion found snared	1 male
Killed for unknown reasons	1 shot claws removed for muti	1 male



Figure 3. A poisoning incident in Limpopo Park near Machampane tourist camp and Massingir Velho village killing three lions and seven vultures (August 2015). The perpetrators poisoned a buffalo carcass to attract scavengers and returned to remove lion and vulture body parts for muti. Some carcasses were dragged into a waterhole and fed on by a crocodile. Researchers assisted by park staff collected and burned the carcasses to prevent further poisoning (photo on left by A. Alexander).



Figure 4. Young male lion killed in a snare set outside of a cattle boma in Lebombo Conservancy (September 2013). Meat (hanging in rear) and skin were then sold for 'muti', illustrating an overlap between the threats posed to lions by retaliatory killing for livestock depredation and the threats from the muti trade.

GPS Tracking of Focal Lion Prides

We aim to fit GPS satellite tracking collars on one male and one female lion from each of seven focal prides. These prides all have exposure to livestock and are therefore at risk of conflict. The data will be used to:

- Investigate lion habitat and feeding ecology in relation to the distribution of wild prey and cattle.
 - Investigate changes in lion ecology in response to resettlement.
- **The information will be used to determine the best management strategies to reduce conflict and increase lion numbers.**

In addition we will place a “virtual fence” around villages and cattle areas, which will provide us with emergency notifications when a lion pride enters these areas. A response team will chase the lions away and warn residents to put their livestock into the safety of bomas, thus pre-emptively reducing lion-livestock conflict.

Xonghile pride (Lebombo)



There are four males and three females (breeding) in the Xonghile pride. This is currently the only established pride in the Lebombo Conservancy (between the Nwanetsi River and Elephants (Olifants) River). While there has been relatively high dispersal into the area from Kruger over the years, many of the dispersers have been killed by cattle herders. However, recent resettlement of these families out of the area will likely permit the formation of another pride south of the Xonghile pride’s home range. The Xonghile pride ranges back and forth across the South Africa-Mozambique border thru small holes in the fence. Their home range includes large herds of buffalo, zebra, giraffe, waterbuck and kudu. They may also encounter cattle herds along the eastern section of their home range.

Machampane pride (Limpopo)



There was a minimum of two adult males and two adult females (breeding) in this pride. However the recent poisoning event killed two males and one female. We have since found evidence of two surviving lions in the area. The pride has access to relatively high densities of wildebeest, zebra, kudu, waterbuck and impala, with waterbuck being the most common prey documented. The Machampane pride also has high access to cattle herds and the park has received complaints of conflict. This is the park's most accessible lion pride, regularly ranging past the Machampane tourist camp, and therefore the pride with the highest value for tourism.

Mavodze pride (Limpopo)



There is a minimum of three females and one male in this pride. This pride ranges across the Kruger-Limpopo border in an area with relatively high numbers of zebra, buffalo, kudu and waterbuck with waterbuck and buffalo being their most common prey documented. The Mavodze pride is probably the most secure pride in LNP from livestock conflict; however it is possible that they range within access to cattle herds from Machamba village.

Shingwedzi pride (Limpopo)



There is a minimum of four males and three females (breeding) in this pride. The Shingwedzi pride ranges across the Kruger-Limpopo border and within just a few kilometres of Makandazulo village. Their range overlaps greatly with cattle herds and large herds of buffalo. While their most common prey has been buffalo, waterbuck and kudu, they have a high chance of livestock conflict.

Maleni Pan pride (Limpopo)



This pride has consisted of two males and three females (breeding). One of the males is wearing an old collar, and likely immigrated from Kruger. The home range of this pride is based around a series of pans through the sandveld. This pride has wet season access to buffalo, with kudu, impala and porcupine being preyed on in the dry season. The main park road crosses through this pride's home range and they are therefore well known to the people living in Limpopo. This pride may overlap with cattle herds from the Limpopo River villages.

Impala Pan pride (Limpopo)



We have counted one male and three females (breeding) in this pride. The Impala Pan pride's range overlaps a series of pans with resident herds of impala and seasonal herds of buffalo and zebra as well as with herds of cattle from Makandazulo village and likely also from Chimangue village. The chief of Makandazulo has pointed towards this pride's home range area as the source of lions which have come into conflict with cattle in the village.

Banhine pride (Banhine)



There are a minimum of two lions living together in one area of Banhine and at least one adult male in another area. We suspect that there is a pride in the first area because park rangers and some bushmeat hunters we spoke with have indicated that lions had been present in the area for some time. The Banhine (pride) lives in the southern sandveld of the park, frequenting a string of pans, where they have access to low densities of kudu and nyala and seasonal access to buffalo. Kudu appear to be their main prey. There are large herds of cattle both to the south and to the north of these lions and they may come into conflict.

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Acknowledgements

We wish to thank the National Administration of Conservation Areas in Mozambique and the management of Limpopo and Banhine National Parks and the Lebombo Conservancy for facilitating and encouraging the project. This project would not be possible without the generous support of our sponsors. We are primarily supported by Panthera and Nelson Mandela Metropolitan University with additional sponsorship provided by General Tyre, Ironman Suspension, Acana, Twin Cities EcoTurismo and Game Park Services and past support from Wilderness Trust, Idea Wild, Acer and the Centre for Wildlife Management, University of Pretoria.