



Kwando Carnivore Project

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Human-Lion Conflict in the Mudumu South Complex, Zambezi Region, Namibia Report February 2016



Horse Shoe pride, Bwabwata NP, Zambezi Region

Photo: Paul Funston

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With input from Balyerwa, Dzoti and Wuparo Conservancies

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Background

The Mudumu-South Complex, Zambezi Region, Namibia, is made up of protected areas, conservancies and community forests and lies adjacent to the Kwando River in the southernmost tip of the eastern part of the region. This area lies at the heart of the Kavango-Zambezi Transfrontier Conservation Area (KAZA TFCA), within the Kwando Wildlife Dispersal Area (WDA), and is one of six identified as imperative for wildlife connectivity within KAZA. The Kwando WDA is an important area for transboundary movement of many wildlife species including all of the larger carnivores, and is pivotal to the success of KAZA as a wildlife landscape, and an especially important area of connectivity of lions between Angola, Botswana and Zambia.

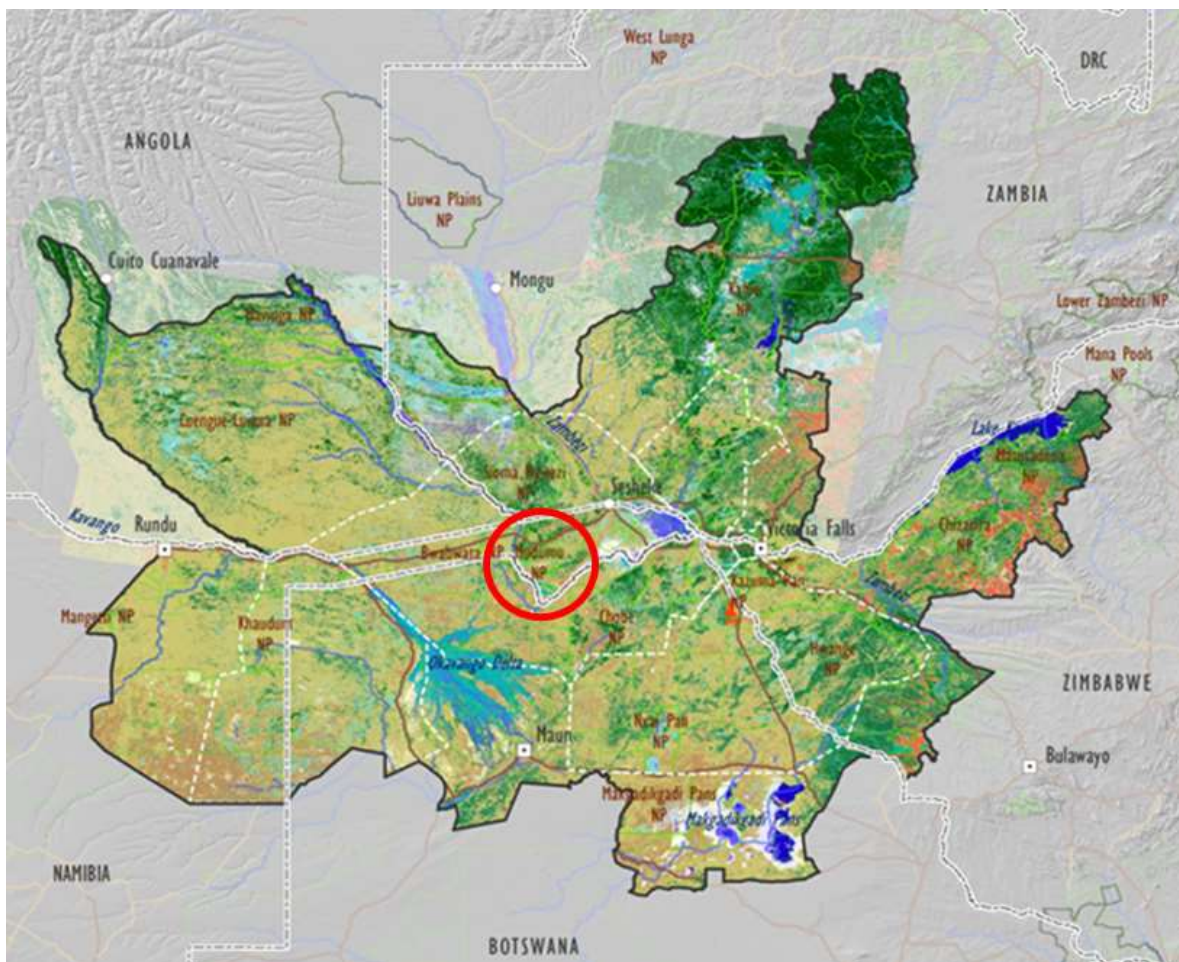


Figure 1. Map depicting the Mudumu-South Complex, Zambezi Region, Namibia in relation to the Kavango-Zambezi Transfrontier Conservation Area (Map source: WWF and PPF).



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During 2012 and 2013, predation on cattle by lions in the East Zambezi Region of Namibia increased dramatically, seemingly in response to lion populations in Nkasa Rupara and Mudumu national parks reaching their ecological thresholds. In 2012/13 a total of 135 cattle were reported killed by lions, followed by 61 in 2014. In response 17 lions were killed in retaliation in late 2012/2013. This precipitated the Lion-Farmer Conflict Mitigation Project, spearheaded by testing a design for lion-proof kraals at two locations. Lions were mainly killing cattle in the farming and village areas of the Balyerwa, Wuparo and Dzoti conservancies, which lie between the two parks (Figure 2). One pride was particularly heavily culled, the Lupala Pride, which was 15 individuals strong in early 2012, and by the end of 2013 had been reduced to 3 individuals. By the end of 2014, only a single adult female remained of this pride leaving a vacant territory and severely impacting tourism activities in the area.

The program really took off in 2014. With funding from Big Cat Initiative, Panthera and the Millennium Challenge Account (MCA) in partnership with IRDNC, a further 27 lion-proof kraals were built and a human-lion conflict mitigation coordinator, Hans Fwelimbi, a resident of the Samudono village in the Wuparo Conservancy, was appointed. Immediate successes included a reduction in the numbers of cattle killed in 2014, 61 in total, and only three lions were killed in retaliation.

To get the program started the lion-proof kraals we built were donated to farmers that had lost livestock to lions. This was an attempt to sharply reduce the number of cattle killed and as quickly as possible change people's perceptions towards the lions and allow the lion population to recover. Selection was done in collaboration with the management of the affected conservancies using the event book system, which is a community run wildlife monitoring system. Each record of human-wildlife conflict is investigated by community game guards (CGG), who respond to reports of conflict and record all pertinent information in their event books. These data are used to guide our efforts, identify hotspots of conflict, and to measure the effectiveness of our mitigation methods. Nowadays the lion conflict coordinator facilitates much of this and investigates all incidences with the CGGs and assists in transporting the game guards and chasing lions away from farmer's kraals at night.



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Cattle predation statistics

There has been a steady decline in the number of livestock killed by lions in the MSC since 2012/2013. During 2014, 61 cattle were killed (69% decline), and during 2015 this figure dropped to 28 cattle (a further 67% decline); a combined decline of 73%. Although the Lupala pride, which were the most offending lions were almost entirely eliminated during 2013 and 2014, there is little doubt that kraal improvements in areas of conflict and “hotspots” of conflict is a big contributor to this decline. The Lupala Pride was replaced in early 2014, by the Mparamure Pride (10 lions in total); and in late 2015 the small Liadura Pride (three lionesses) moved into the area seemingly from Botswana. The numbers of cattle killed by lions per year and per conservancy in the Mudumu-South Complex are presented in Table 1.

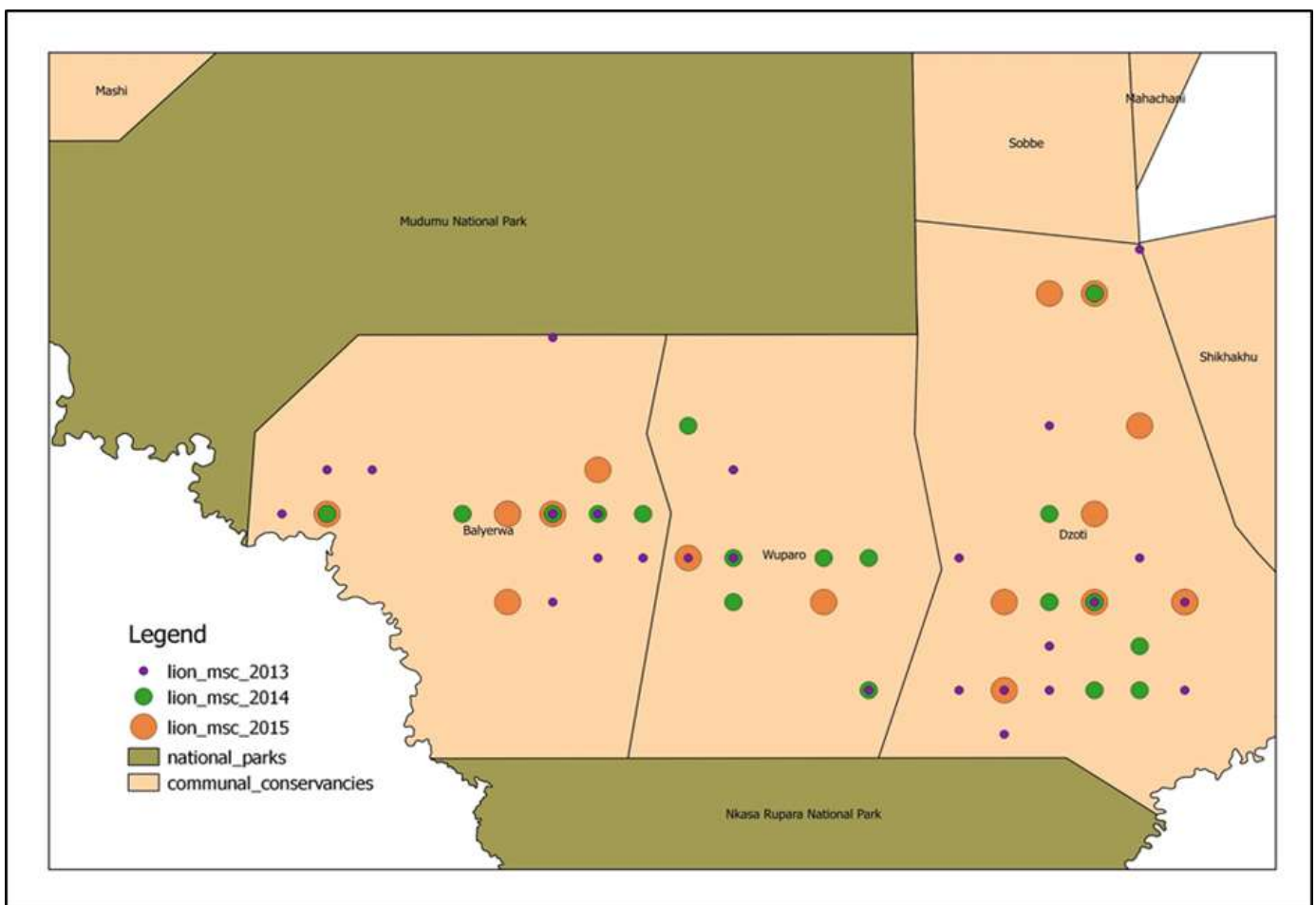


Figure 2. Locations of incidents where lions killed cattle in the conservancies of the Mudumu-South Complex from 2013 to 2015.



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Table 1. Cattle losses to lions per conservancy in the Mudumu-South Complex from 2013 to 2015 (Event Book data from Balyerwa, Dzoti and Wuparo Conservancies).

Conservancy	Balyerwa	Dzoti	Wuparo	Total (%)
No of cattle killed in 2013:				
While kraaled	21	17	15	53 (39%)
While grazing	31	31	20	82 (61%)
No of cattle killed in 2014:				
While kraaled	0	5	3	8 (13%)
While grazing	22	23	8	53 (87%)
No of cattle killed in 2015:				
While kraaled	0	4	2	6 (20%)
While grazing	14	8	2	24 (80%)
Total	88	88	50	226

From the data it is clear that irrespective of the declines in predation levels and the building of the kraals that nevertheless the majority (70%, n = 159) of cows were actually killed while grazing unattended by herders. However, the total number of cattle killed per year has declined steeply suggesting that the high numbers of lion-proof kraals makes this area less attractive to lions and that community members are starting to take greater responsibility for managing their cattle. The next step in the program is to further reduce killing of cattle by lions while cattle are grazing. To date not a single cow has been killed by lions, or any other large carnivore, in the reinforced lion-proof kraals.

Figure 3 illustrates the shift in cattle depredation as during 2012/2013, cattle predation that took place in kraals made up almost half of all cattle predation, but this has shifted to approximately 20% over the past two years as lion-proof kraals were constructed. This strongly suggests that lion-proof kraals have played a significant role in reducing livestock depredation in MSC.



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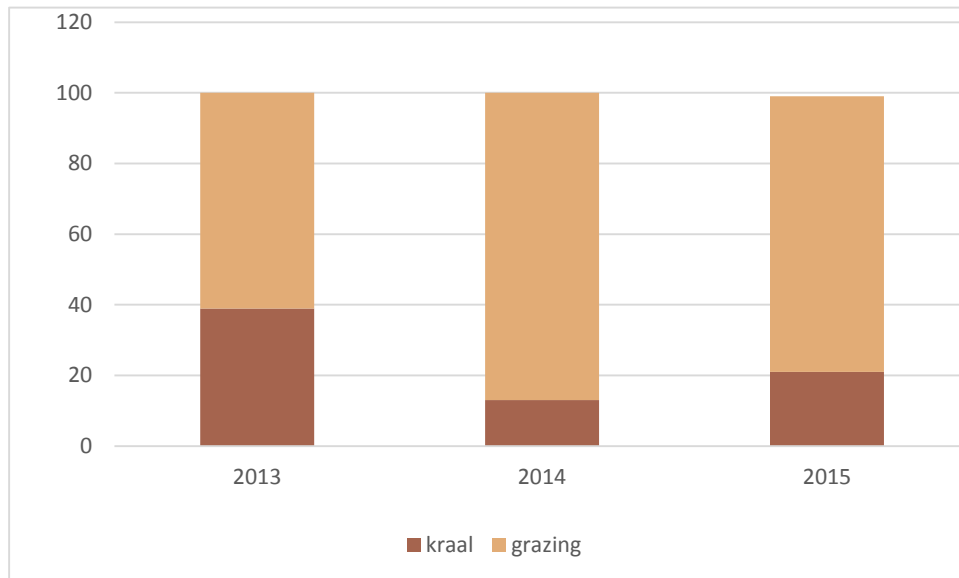


Figure 3. Percentage of cattle killed grazing vs in kraals in the Mudumu-South Complex from 2013 to 2015.

Seasonality of conflict

When all the data from 2013 to 2015 is compiled (Figure 4), it is clear that predation on cattle occurs throughout the year, with two clear periods of greater activity. There is an increase during the wet season from October until March, which is likely due to prey dispersing with the onset of the rains resulting in the lions having to work harder for food. Of importance for the farmers is that there is also a sharp spike in cattle predation in June. This would seem to be in response to cattle being left out at night unattended in order to graze on the remaining corn and mahango plants after the crops have been harvested during May. This is done to help fatten the cattle before the winter months but is clearly a cause of much of the cattle depredation by lions. Depicting the 2015 data separately (Figure 5) it appears that opportunistic attacks on livestock by lions that used to occur throughout the year have been reduced to almost zero other than during the wettest time of the year and the persistent spike in June.



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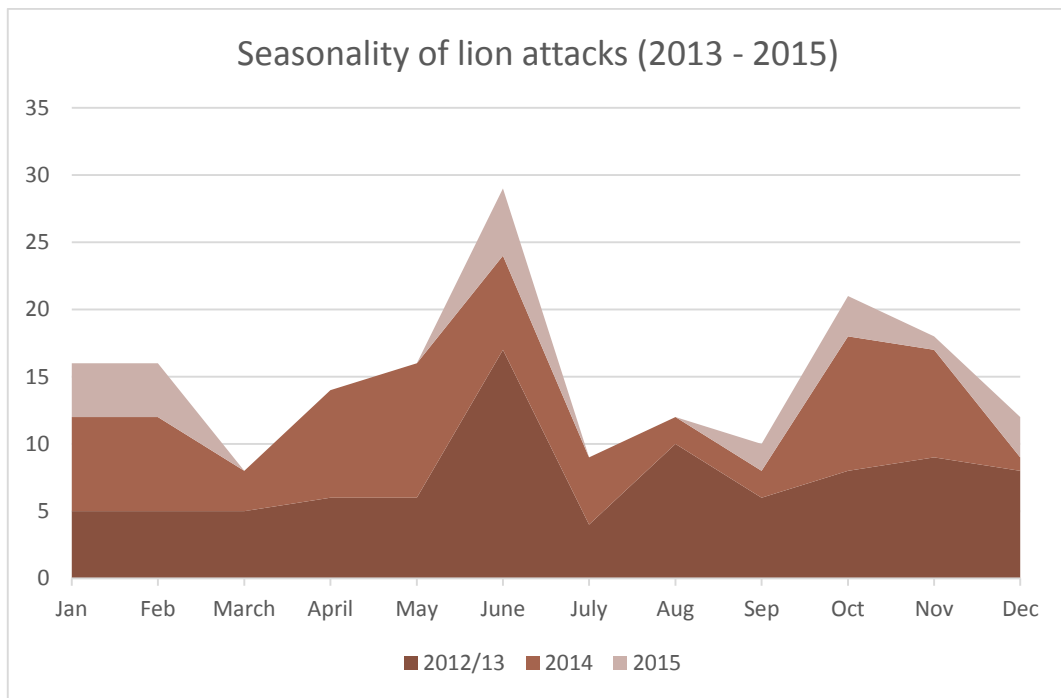


Figure 4. Seasonality of lion predation on cattle in the Mudumu-South Complex, Zambezi Region, from 2013 to 2015.

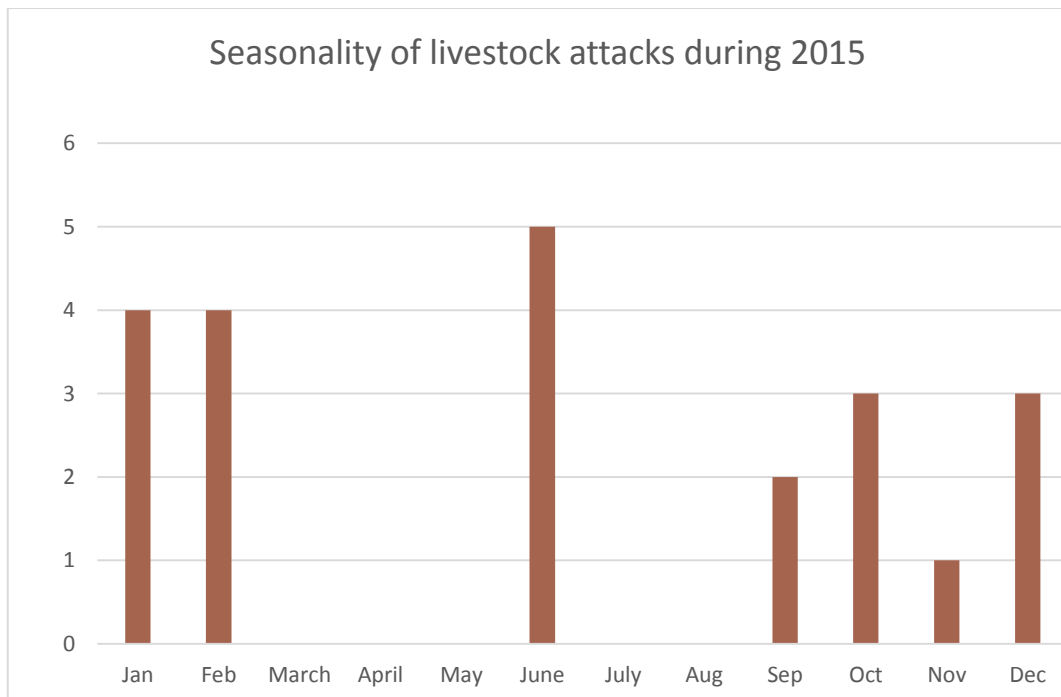


Figure 5. Seasonality of lion predation on cattle in the Mudumu-South Complex, Zambezi Region, for 2015.



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Activities in 2015

1. Kraal building

Data from the conservancy game guard event book system is collated annually in order to identify farmers who have lost the most cattle to lion attack (see Table 1). An important distinction is made between farmers whose cattle had been killed while in a kraal at night, and those killed grazing in the day. No amelioration was offered to farmers whose cattle were killed grazing if they were unattended (no herder present). During 2015, a total of twenty lion-proof kraals were built bringing the total number of lion-proof kraals in the Mudumu-South Complex to 49. The conflict co-ordinator, Hans Fwelimbi, monitors kraal usage during the dry and wet seasons and now over 95% of farmers are using their kraals year-round, no longer moving their cattle to traditional summer grazing areas, preferring to know that their cattle are safer in the new kraals. The remaining farmers that are currently not using their kraals are grazing their cattle in traditional wet season areas, and will use the kraals again in the dry season. Kraal sizes depend on number of cattle owned by farmers. For example, 25m x 25m kraals are for less than 100 cattle, 40m x 40m kraals are for more than 100 cattle or where families are willing to share and collectively own more than 300 cattle between family members. Only one 40m x 60m kraal has been constructed where cattle numbers exceeded 300 animals.

Table 2. The number and size of kraals built and average expenditure (in US\$) of the 49 lion-proof kraals in the Mudumu-South Complex.

	Number of kraals built	Average expenditure
25 x 25 m kraals	36	\$54000
40 x 40 m kraals	12	\$24000
40 x 60 m kraals	1	\$2500
Total	49	\$80500



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Our plans to experiment with “living wall” kraals during 2015 were not carried out due to extreme drought and high temperatures last year. All crops and most gardens failed due to the heat, lack of rain and the drying up of channels and water sources. The Directorate of Forestry donated *Commiphora* trees that were illegally chopped down for field barriers, which they confiscated. They also donated kei apple saplings to experiment with as living walls. We believe that this concept has value in our focus area and have postponed this activity until the wet season at the end of 2016.

2. Employ a dedicated team of community game guards to assist with tracking and chasing lions away from high risk conflict areas

Much awareness has been created within the community regarding the MSC lions and the threat of lethal response to conflict with livestock. In March 2015 we took a group made up of officials from the Ministry of Environment and Tourism (MET), CGGs from the affected conservancies as well as collaborators in partner NGOs on an exchange visit to the Longshields Program, Hwange Lion Project in Zimbabwe. We took part in fieldwork and challenges that the lion guardians regularly undertake in their everyday lives. These include scaring lions using loud noise out of cattle areas and back into the parks, which is extremely effective and has reduced cattle and lion mortality by more than 80%.

The group was also exposed to the concept of Holistic Rangeland Management (HRM), where cattle are collectively kraaled in mobile bomas. This method increased crop yield due to nutrification of the soil from cattle dung and has the added benefit of protection of livestock. The HRM concept resonated strongly with our group, being agro-pastoralists. During our time in Zimbabwe we developed a framework and concept on how MET park personnel from the Zambezi Region parks and CGGs from the affected conservancies can develop a team based on the Zimbabwe model to monitor park boundaries and chase lions when they stray into cattle areas. This concept needs to be developed further in collaboration with both MET and the conservancies during 2016/17.

3. Training farmers and education

Farmer training has been on going with all farmers and their families participating in learning of fencing techniques and kraal construction. Farmer awareness and education on the importance of kraaling cattle at night has had positive results.



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4. *Developing a performance payment system*

Discussions have been held with community development and conservation NGOs on the development of a performance payment system. Suggestions for performance payments have included payments for communal grazing, herding, kraaling and deductions for killing of carnivores. Despite financial benefits attached to communal kraaling of cattle, there is a deep cultural aversion to this practice and initial enquiries and encouragement were not successful. In October and November 2015 we carried out a camera trapping survey in collaboration with CGGs throughout the conservancies of the Mudumu-South Complex in order to establish the frequency of lion and other large carnivore movements within grid cells. Data from this survey will inform us on the frequency of large carnivore movement outside protected areas to guide a payment system to farmers living in the same grid cells.

After approximately 1560 camera trapping nights, we found most movement of large carnivores were within or close to the boundaries of protected areas, which may suggest that camera trapping is not an effective method on which to base financial or performance benefits.

Activities planned for 2016:

1. *Kraal building and monitoring*

For 2016 we want to adapt the kraal-building model to a partnered investment where the farmers/livestock owners provide the poles and labour for the kraals and we provide the expertise and fencing material. Many farmers have approached us asking if this is a possibility as they cannot afford fencing, but they have access to poles and labour. This will allow us to quickly expand the program beyond its current limit of the three conservancies within the Mudumu-South Complex, without the project having to raise the full costs of each kraal.

2. *A Holistic Rangeland Management pilot project*

As lion attacks on un-herded cattle now make up almost 80% of the problem, it is imperative that this is solved. With cultural issues surrounding communal grazing and kraaling and farming practices changing now that all children go to school and spend far less time attending livestock, tackling the communal grazing/herding issue is challenging. HRM is an ideal method of working towards solving this as the focus of HRM is on food security through improving rangeland conditions and crops. This is done by nutrifying



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the soil with cattle trampling dung and during the communal kraaling process, with the added benefit of protection of cattle in mobile bomas. We have chosen four farmers whose families have enough cattle collectively, who are respected by their communities and who are willing to commit to the monitoring process of this method. HRM can easily be adapted to include new participants and larger herds as farmers become willing to participate.

3. Farmer workshops and community awareness

We will partner with the agricultural extension officers from the Ministry of Agriculture to hold farmer workshops within each conservancy to tackle the issues of herding, communal kraaling and HRM. We will invite successful farmers and agriculture experts as speakers to promote the concept of productivity through improved farming methods. We would like to link with lodges in the area to provide opportunities for communities and school children to visit our national parks where they will get exposure to lions and other wildlife and learn about their intrinsic value. We have already committed to the annual sports day held in August in the Mudumu-South Complex where the soccer and netball events will be sponsored by the lion project in order to link meaningful events within the community to the presence and tolerance of lions.

4. Expand our focus area

We will now start to investigate conflict incidents in areas further east of Dzoti conservancy in Bamunu conservancy and beyond and north and east of Mudumu National Park in the Sobbe and Mashi conservancies. This will add over 1500 km² to our focus area. We also plan to collect data from conservancies that lie along the Chobe River, adjacent to the Chobe National Park, Botswana, where lion sightings and cattle depredation are increasingly being reported.

5. Develop the concept of an MET/game guard

Further effort needs to be put into developing this plan particularly in preparation for the number of sub-adult lions that are now present in the protected areas resulting in additional pressure on adult lions to provide food.



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6. Benefits – performance payments

Efforts are already underway to identify meaningful benefits within the community that can be included in a performance payment system. We are currently structuring a survey to be carried out within the Mudumu-South Complex to assess perceptions of lions, large carnivores and to identify how the community feels that lions could be beneficial to them.

Project partners

- Integrated Rural Development and Nature Conservation (IRDNC) provided the guidance in networking within the community and facilitated all the initial meeting, i.e. the Traditional Authorities, Conservancy Committees, Farmers, Community Game Guards and Ministry of Environment officials from Regional Services and Parks and Wildlife of the Zambezi Region. In addition, they provided significant funding for the construction of lion-proof kraals in Balyerwa and Wuparo conservancies through an MCA-Namibia grant.
- Conservancies (Balyerwa, Dzoti and Wuparo) contributed all event book data on incidents of lion predation on livestock. This information included number of cattle killed, where they were killed, owner of the cattle and the number of lions involved in the incidents as well as the outcome of any follow up by game guards. The conservancies and IRDNC facilitator (Obicious Siyanga) for the Mudumu South Complex guided the decision making process of allocating lion-proof kraals. CGGs from all three affected conservancies participated in deployment of a grid of camera traps in order to assess the frequency of occurrence of large carnivores outside of the protected areas.
- Ministry of Environment and Tourism (Ortwin Aschenborn and Bright Sanzila) have provided valuable information on locations of collared lions that leave protected areas and roam in cattle areas. This information has been used to inform the farmers to be alert and to provide extra protection for their cattle. MET (Shadreck Siloka) contributed information and support at all the start-up meetings with the conservancies and provided a valuable communication channel with MET Head Office in Windhoek. Shadreck and Bright contributed significantly to the baseline concept of an MET/CGG collaborative team. Despite immense pressure, MET made the critical decision to keep lions off the trophy hunting quota despite ongoing and intense conflict between



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farmers and lions in the Mudumu South Complex. Matambo Singwangwa partnered in the camera trapping efforts in Mudumu National Park. Our gratitude also goes to the wardens and staff of Mudumu and Nkasa Rupara National Park.

- Mashi and Sangwali Traditional Authorities welcomed the project and gave permission in their respective areas.
- Panthera provided the necessary support and start-up funds in early 2013 when the conflict was on the increase. They provided a vehicle which could be used by the community to respond to farmers and they provided funds through a Zoos Victoria Grant to employ a co-ordinator from within the community. Panthera was the catalyst in the process of establishing a lion-farmer conflict mitigation project and a valued and long-term partner in the mitigation of lion-related conflict in the Zambezi Region and their guidance and ongoing support is critical to the successful outcome of this project.
- National Geographic's Big Cat Initiative provided tremendous financial support towards the building of lion-proof kraals and supporting the team working in the field. Due to this funding we were able to upgrade to lion-proof every kraal that was attacked by a lion during from 2012 until the end of 2015.
- Ministry of Agriculture: Directorate of Forestry (Carol Murphy) was instrumental in the development of a partnership with the Masida, Lubuta and Sachona community forests. We were able to access their annual sustainable harvest of mopane poles for kraal construction. Carol also arranged the donation of the Commiphora and Kei apple saplings for the living walled kraals. I would like to extend a huge thank you to Mr Muthali for transporting the poles from the community forests to the kraal sites free of charge in the DoF truck, which was a significant contribution.

Provisional Research Findings

- There is limited connectivity of lions living in the protected areas of Linyanti, Botswana/Mudumu Complexes, Namibia to the protected areas of Sioma Ngwezi in Zambia which can be directly attributed to conflict with farmers in Namibia. Bush meat snaring in southern Sioma, where Zambia



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borders Namibia is likely to play a role. Data on the dispersal of sub-adult lions and their role in lion connectivity of the Mudumu Complexes is lacking.

- The construction of lion-proof kraals and in lion conflict hotspots has had a direct impact on the number of livestock that have been attacked in kraals. Continued effort in lion-farmer conflict mitigation will facilitate connectivity for lions through the Mudumu Complexes.
- Agricultural methods such as HRM that facilitate communal kraaling, grazing and herding must be implemented in the Mudumu Complexes to reduce the number of livestock killed by lions while grazing. Farming practices such as allowing cattle to graze on fields where crops were recently harvested need to be adapted to reduce this opportunity for lions to access grazing cattle.

Acknowledgements

We are grateful for the guidance, support and efforts from Paul Funston, Laly Lichtenfeld, Beaven Munali, Dominic Mwema, Carol Murphy, Mr Muthali, Stuart Pimm, Brent Stapelkamp, Jo Tagg, Shadreck Siloka, Obicious Siyanga, Bright Sanzila, Ortwin Aschenborn, Morgan Saisai, Matambo Singwangwa and Balyerwa, Dzoti and Wuparo conservancies, particularly the community game guards who shared their experiences with us.

