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# ZAMBEZE DELTA ECOLOGY

*Holistic Ecological Research Project*



DR Byron du Preez

# MONTHLY RESEARCH REPORTS





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JULY 2018



# ZAMBEZE DELTA RESTORATION

*Holistic Ecological Research Project*



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# MONTHLY RESEARCH REPORT





## BACKGROUND AND SUMMARY OF THE PROCESS

After the original and illogical political blockades to the export of wildlife from Zimbabwe, from where the lions were originally to be sourced, 24 lions were eventually obtained from private wildlife areas in South Africa, and to whom we are grateful:

<i>Karongwe:</i>	2 females
<i>Khamab:</i>	2 females
<i>Makalali:</i>	6 females
<i>Mkuze:</i>	1 male + 2 females
<i>Tembe:</i>	4 females
<i>Tswalu:</i>	5 males + 2 females

All of the lions had to be self-sustaining and free-ranging wild animals as absolute criteria for selection, and the source sites were carefully chosen based on this. A coincidental advantage of selecting a range of areas over which to source the lions is in the significantly augmented resulting genetic diversity of the seed population. 5 of the 6 areas actually provided the lions for free, and assisted in their capture, care, and transport of the lions.

The lions were all captured by qualified wildlife professionals, and kept in quarantine bomas at source until the results of the veterinary disease screening protocols cleared each individual for translocation. The lions were then variously integrated into the four groups that would eventually represent each of the acclimatisation bomas at the release site.

15 of the lions, representing each group, were collared using satellite tracking tags custom made by Savannah Tracking – 4 of which were special prototypes that we requested to include solar panels for boosting collar lifespan, and which we believe are the first to ever be deployed onto lions.

The lions arrived by air charter over 5 loads between the 22<sup>nd</sup>, 24<sup>th</sup> and 27<sup>th</sup> of June, directly from source in South Africa to Coutada 11's Mungari Airstrip, Mozambique, where they were processed by the National Authorities before transfer via vehicle to their final destination; the soft-release bomas on the edge of the Zambeze Delta Floodplain.





# HABITUATION | SOFT-RELEASE BOMAS

A set of double bomas were constructed in the ecotone along the edge of the floodplain in each of Coutadas 10 and 11. This area of habitat transition, from open to dense vegetation types, is typically characterised by high densities of large ungulates, and provides optimal cover for an ambush predator; it is the ideal ecological niche for lions, and we predict that this is where they will spend the majority of their time.

Each of the four large sub-bomas is exactly 1 hectare in area, and contains an anthill with dense clump of vegetation in the centre of the enclosure for security and cover. The sites were carefully selected to include plentiful shade, but positioned in such a way so that the fences could be built in straight lines without having to cut down any trees (though small boughs of rapidly growing and common tree species were used as fence poles – many of which have subsequently rooted and sprouted leaves whilst still supporting the fence). The boma fences are electrified by a solar energiser and 6 strands of hot wire; including offsets at ground level both inside and out. For extra security, both bomas are also continually manned by guards from the local communities, housed on raised platforms near the boma sites.

A double-door feeding bay ensures a continual solid perimeter and absolute safety when transferring food into the bomas. Lions are fed every 3 days as per the permitted quota for each boma, and fresh water is delivered via an external water tank connected to a ball-valve inside a water trough in the boma. Both sets of bomas have done their construction crews proud, and there have been neither perimeter breaches nor injuries to any individuals – the large space within the bomas no doubt helping to create a relaxed environment, as reflected in the behaviour of the lions.





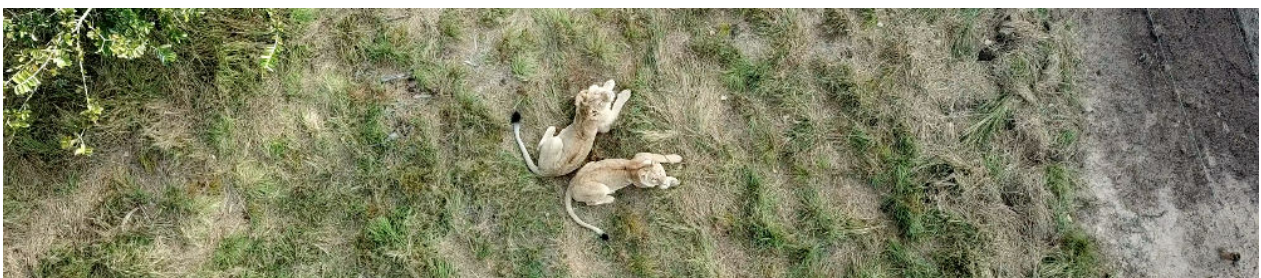


# THE HABITUATION PROCESS

Habituation is a critically important, though often underrated, component of ecological research. In basic terms, habituation means that an individual or group of animals accept the presence of an observer without changing their behaviour (i.e. from fear or aggression). This obviously has huge implications for behavioural studies, and significantly facilitates working with the animals in terms of physical capture and handling, for example when changing collars. When done properly by experienced professionals, habituated animals will often blame their group-mates or search their surrounds for a stinging/biting creature when darted, displaying no association of the experience to the familiar vehicle parked at a respectable distance.

To this end, hours were spent on an almost daily basis parked in various positions around the perimeter, offering the best views of the boma inhabitants. Whilst sometimes seemingly a waste of productive time, there has been a marked improvement in the reaction of the lions to the vehicle; where the group in the east boma would initially run for cover upon detection of the vehicle, they no longer do so, and, though still wary, will often ignore the vehicle completely.

Feeding also presents an enormous opportunity for positive habituation to calling lions in to feed, where the lions learn that the sounds of distressed animals played over a speaker indicate a free meal, and that the vehicle is not there to challenge them. By spending time almost daily with the lions, the arrival of the vehicle itself creates no association with food – instead, after placing the food carcasses in the feeding bays, a random amount of time from minutes to hours is allowed to elapse before the gates are opened. Using this method, we have habituated the lions to the sounds of a squealing pig played at high volume as soon as the gates are opened. The future advantage of this exercise is being able to call lions out of dense habitat types into a more suitable area from where they can be observed and/or redarted as required.







# COMMUNITY ENGAGEMENT

In a serious effort to prevent any potential human-wildlife conflict incidents, with the facilitation and support of the local Government Administrator and free transport provided by Zambeze Delta Safaris, several of the local communities living closest to the floodplain were moved on the 28<sup>th</sup> and 29<sup>th</sup> July 2018 to a more suitable area closer to the local school and clinic.

In addition to this, 5 of the anti-poaching scouts have volunteered to act as community/lion guardians, and are being trained in how to prevent and deal with lion encounters. These guardians will be equipped with InReach Global Positioning Satellite units, to which instant messages can be sent regarding the current location and movement of lions (from their remote satellite tracking collars) so that they can advise and assist the communities in avoiding these areas. The devices will also be used to track the major pathways and high-use environmental features used by the communities (such as wells and popular fishing spots), to facilitate the immediate reaction to lions moving in the vicinity of these areas. There will be enough guardians to be able to cover 3 of the 11 villages at any one time, and they will be randomly redeployed between villages based on the current movement of lions so that they are always servicing the communities closest to the animals. In reality however, with the resettlement of the villages away from the floodplain, there is low risk of humans encountering lions during their normal daily activities.







# PROBLEMS

As with every field-based project, we have encountered problems and frustrations along the way that have affected planning and progress; though thankfully so far these have been relatively minor in terms of the overall objectives.

3 of the 15 satellite collars deployed on the lions are not reporting to the satellite server (though their VHF transponders appear to be working normally), and it is not apparent what the actual problem is (the manufacturer believes that a new design of circuit board has caused the feedback energy from the iridium antenna into the antenna to overload and fry the GPS amplifier – they are working on a solution). The individuals to whom these collars have been fitted will be tracked down post-release and redarted to swap out with functional replacements. We enjoy a good working relationship with the collar manufacturer, and will no doubt shortly resolve whatever issues exist.

We have also received unseasonably high rainfall for this period, so much so that the bomas very nearly became inaccessible by vehicle, and in fact for a period it has recently been impossible to drive between the bomas; though fortunately the routes from each respective camp were not completely blocked, and the bomas in each Coutada could still be serviced by the teams based in each area. This just meant that feeding and habituation of lions in both sites could not be conducted by the same vehicle, and so direct comparison of behaviour and acclimatisation could not be achieved – however the weather has since cleared, and the program is back on track.



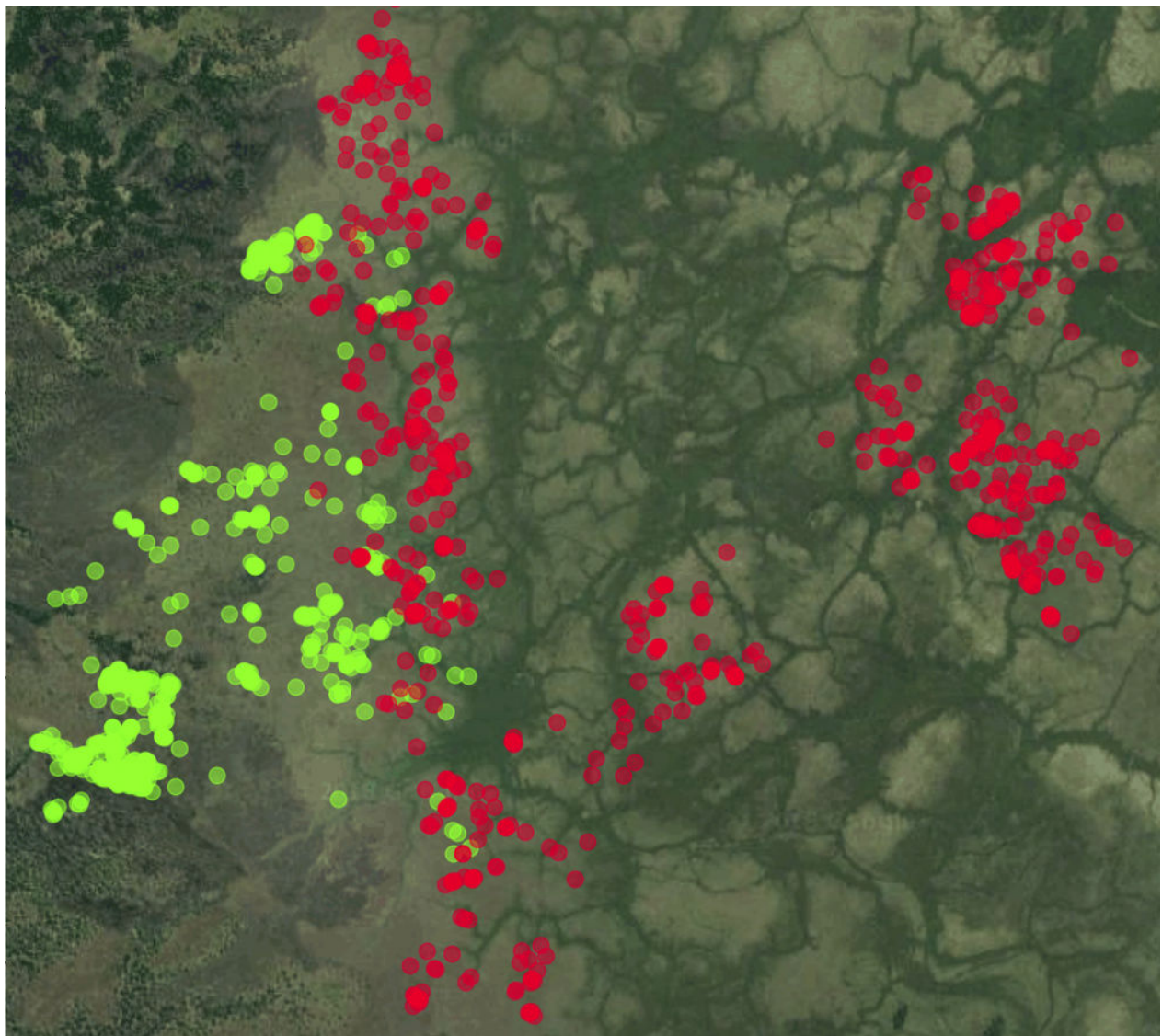




# COLLARS

In addition to the lion collars, and as an integral part of the holistic component of the research, in July 2018 we also deployed additional collars onto the large herbivores – increasing the total number of collars deployed (excluding lions) to 41 individuals of 7 key species: warthog, reedbuck, hartebeest, sable, zebra, eland, buffalo and elephant.

These species represent the most common potential lion prey, and cover a range of body sizes and ecological niches so that by studying the interaction between species before and after the lion release we can better understand the impact that lions have on the behavioural ecology of these animals through both direct predation and the fear and risk thereof.







## NEXT

The next phase of the project is definitely going to be the most interesting and exciting, when the lions are released into the Zambeze Delta ecosystem in what will cumulatively represent the largest lion population to inhabit the area in at least the last half century.

For the research project, this will also create an interesting balance between continual remote monitoring and analysis of the lion locations via satellite, and time spent in the field physically tracking and observing the animals.

Both aspects offer unique opportunities to better understand the apex predator, and the impact it has on its ecosystem.







*The culmination of several years worth of man-hours, **from several very focussed individuals,** was the successful arrival of 24 lions to the Zambeze Delta; an incredible feat of international teamwork, **and an amazing coup for real conservation.***





AUGUST 2018

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# MONTHLY RESEARCH REPORT





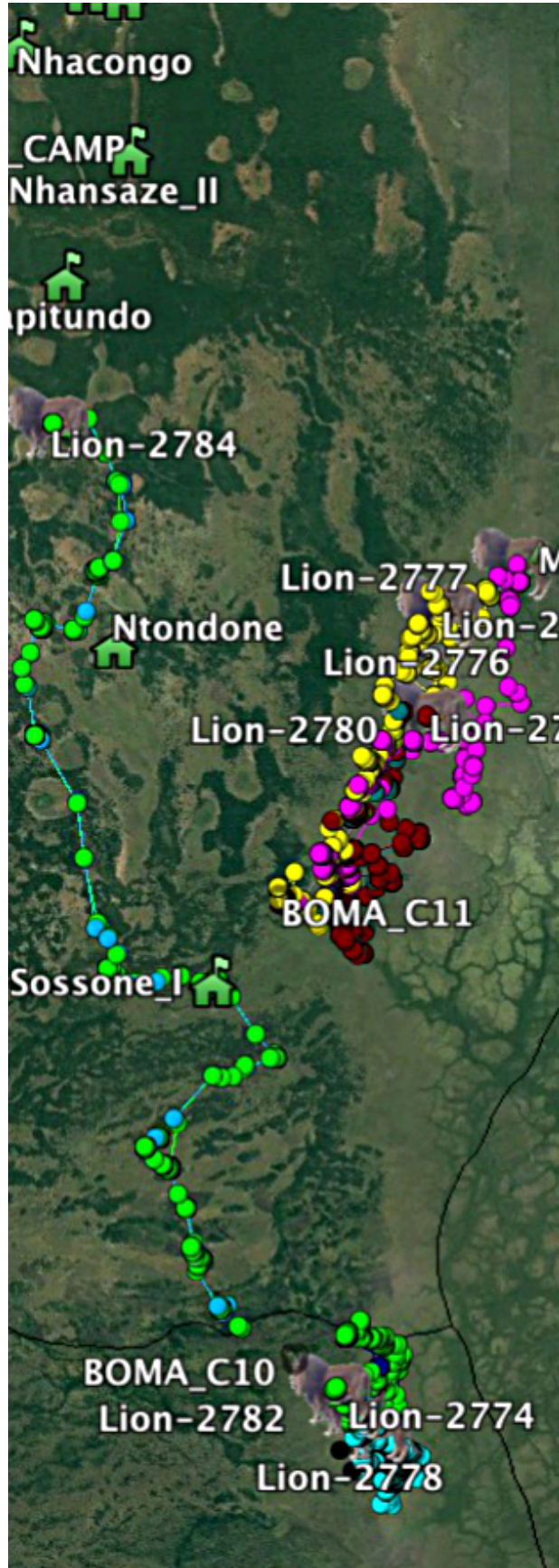
# REINTRODUCTION OF 24 LIONS

The major event of August 2018 was obviously the successful release of the lions from their habituation bomas. Success in this aspect is not simply judged by the lions walking out of the gates, but in their response to the new environment. The lions were therefore released in batches so that each could be carefully observed and monitored in manageable units before releasing the next group. However, the habituation process was clearly adequate, as the lions have mostly remained in the general vicinity of their bomas.



*Completely relaxed, the final release group of lions feeds on a waterbuck carcass in front of members of the Mozambican Press who were invited to observe and record the historic event*





This map represents two weeks of post-release lion movement data. Most of the lions (*here displayed on the map in warm colours*) naturally moved onto the Zambeze River Floodplain, where there exists exceptional large mammal biomass, and provides relatively easy hunting for the lions on the naive prey populations.

The exception to this pattern is the two male lions from Tswalu (*represented in blue and green on the map*), who are starting to mature, and instinctively becoming territorial. The lone Mozambican male was heard roaring from Mungari Camp on the 17<sup>th</sup> of August, and it is presumed that the younger males are seeking him out to establish their boundaries.

These young males have become the focus of the monitoring effort as their pattern of movement has intersected with many human settlements along the way. Fortunately the lions are relatively easy to find and observe, and Mark has been very successful in locating them via helicopter.





# GENERAL NOTES FROM THE FIELD

Overall, the lions have been relatively easy to find and observe using the new biotelemetry equipment. The only real impediment to monitoring has been terrestrial access when the lions have moved over wet ground in the floodplain that the vehicle cannot cross. However, we are in an extremely fortunate position to have access to a helicopter, and both Mark and Pete have been incredibly helpful in flying for the lions whenever necessary. Finding the lions becomes an urgent priority in cases where either the animals have not moved for several hours (*which could either indicate being caught in a snare, or on a kill – both of interest to the research team*), and when they camp out near a village (*greatest risk of contact with people*).



Because the lions are so easy to locate and very relaxed towards the presence of the research vehicle, as well as the fact that they are residing in areas of high prey density, we have been able to observe them feeding on several kills, including: bushpig, warthog, reedbuck, & waterbuck. Additionally, we have been able to start collecting lion scat samples, from which we are able to determine a more complete record of their diet through extraction of the undigestible remains and microscopy of the hair sculation that is unique to each species. We would ideally need several such samples each month from every lion group so that we can comprehensively analyse both prey selection and the seasonal influence on specific predation rates. Dirty but fascinating work, and with massive relevance to informed ecological management.





THE GREATEST PRIVILEGE OF CONSERVATION  
*is the office*





SEPTEMBER 2018

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## THE HIGHS & LOWS OF TRUE CONSERVATION

After last month's excitement of years of planning and investment culminating in the successful release of 24 lions, we were dealt a heavy blow at the beginning of September: one of our lions was caught in a gin-trap set by a poacher and had to be humanely euthanased.

The two vagrant lions dubbed '*The Naughty Boys*' (and highlighted in the August 2018 monthly report) unfortunately wandered too far from the relatively safety from humans on the floodplain, and for a few weeks seemingly walked from village to village, often sharing the same water sources as the people. Throughout this period, these two lions were extremely closely monitored from vehicles on the ground, helicopters in the sky, and remotely via satellite from hundreds of kilometres away. It was this intensity of monitoring that flagged a problem as soon as the two males sat in one spot for a few hours longer than normal, followed by one of them moving off – this was not normal behaviour for vagrant males and so the helicopter was immediately deployed to check it out.

It was a sickening sight. The young male lion (collar number ST2010-2783) had stepped in a gin-trap with his front left paw. The force of closing caused the trap's jaws to break most of the bones in the lion's foot. We had a veterinarian present in camp at the time, but the damage was beyond repair, and the only humane course of action was euthanasia.

**WARNING: the following image is graphic in nature  
but represents the real devastation of poaching  
AND IT IS THIS THAT DRIVES TRUE CONSERVATIONISTS**









## PRAGMATIC CONSERVATION IN THE REAL WORLD

The silver lining to the lion poaching incident was that it was felt far and wide as a national tragedy, and as such, the perpetrator was swiftly dealt with by the judicial system and received a heavy sentence that would hopefully discourage others from similarly targeting lions throughout Mozambique.

The unfortunate fact is that it seems as this was very much a targeted incident as the poacher was reportedly advertising lion body parts for the traditional medicine trade. This practice is based on superstition, and countless animals are killed for no real benefit to people. This topic of conservation throughout Africa and Asia requires a massive drive to educate the people and prevent the wanton destruction of biodiversity.







# NHAZUA; THE SURVIVING MALE VAGRANT

The loss of his brother and coalition mate was obviously a stressful experience for the surviving male (collar number ST2010-2784) whose immediate reaction was to get out of the area as fast as possible. This in turn created a level of stress for both the research team and the local community as the lion passed through several villages during his flight (including walking down the road between Mungari and Ngazi Camps!).

In fact, on Saturday the 8<sup>th</sup> of September, this lion found himself in a clump of forest about a hectare in size and surrounded on all sides by people. On this day we spent 6 hours in the air attempting to dart him so that we could safely remove him from a dangerous situation for both himself and the people, but unfortunately the vegetation was too dense to get a darting opportunity. Eventually we managed to flush him out of the area and away from the people. In the two week period that followed we tracked him doggedly to be able to intervene again immediately if necessary, eventually following him back out onto the floodplain where he seems to have settled; for the time being at least.

Interestingly, and very gratefully, despite his affinity for areas of intensive human activity, male 2784 never once showed any sign of aggression towards the people (and was probably only attracted by the smell of the drying meat racks). In the local culture, the spirits of community leaders pass on into lions when they die, and because this lion visited so many villages we decided to name him ‘*Nhazua*’ in honour of Mark’s late tracker, who was a well respected member of the community. We just hope that he has paid his respects and can get on with the job of being an apex predator and repopulating the Zambeze Delta ecosystem!





# THE OTHER 22+ LIONS

Fortunately, the rest of the lions have behaved relatively predictably since release; sticking to the floodplain where they are making a small dent in the warthog and reedbuck populations! We have been regularly tracking each group throughout the month as we start to understand the developing social dynamics between and within each group.

The most exciting news however was the sighting of two new males that have moved into the area, obviously drawn in by the prospect of a mate as they were both spotted with a different colored female on both occasions in which they were spotted.



Mark managed to take this excellent picture of one of the males as yet still unsure of the threat posed by the helicopter. Both males have significantly larger manes than the imported males, and so present a good prospect for siring cubs in the near future.





*the sun sets*

**ON 24+ LIONS**

