

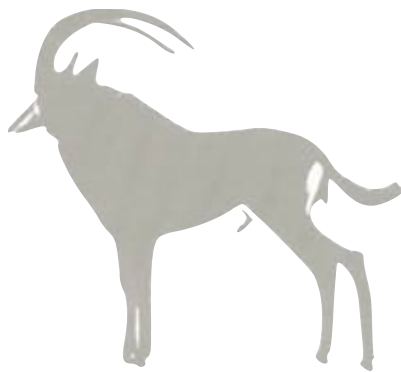


ZAMBEZI DELTA CONSERVATION

ANNUAL REPORT
2019

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1. EXECUTIVE SUMMARY



2. RESEARCH & MONITORING

DASHBOARD STATS



24LIONS	LION POPULATION	41
	NUMBER OF ADULTS	21
	CUBS BORN IN 2019	20
	MEAN HOME RANGE SIZE	~60 km ²
	MEAN DAILY DISTANCE	~4.5 km
WILDLIFE	WILDLIFE COLLARS REMOVED	17
	COLLARS DEPLOYED	21
AERIAL COUNT	TOTAL AERIAL COUNT	12 102
	AREA COVERED	540 km ²
CAMERA TRAPPING	CAMERAS PLACED	96
	LEOPARD PICTURES	23
	LEOPARD INDIVIDUALS	6

2.1 TWENTY FOUR LIONS

Since the release of the 24 lions in August 2018, the population has exploded. We have confirmed a total of 20 cubs within the first year, with a few more females due for cubs at the end of the year. Overall, the lion population has grown to 41 lions.

Some highlights from 2019 include:

- recording a number of successful litters (Fig. 1)
- collaring a Mozambican (or Moz) Male lion (Fig. 2)
- locating three lionesses for the first time since their release & fitting each with a new GPS collar
- re-collaring all lions with faulty collars

Overall, lion home ranges remained relatively constant throughout the year (~60 km²). Prides that were showing erratic movement have now settled into fairly fixed areas, especially those with cubs. Currently, the Moz Male (MOZ-M001) has tenure over 4 prides, including 18 cubs; the Tame Coalition (TSW-M001 & TSW-M002) have tenure over 2 prides, while the Mkuze Male (MKU-M001) is trying to establish a position with the Tame pride. The population has a wide genetic diversity which is ideal for population viability.

Thanks to the regular aerial support funded entirely by the Cabela Family Foundation, we are able to get constant visuals on the lions and thus successfully monitor the entire population.



Figure 1. A new lion cub born in the delta.



Figure 2. Mozambican male lion.

2.2 WILDLIFE MONITORING

2.2.1 COLLARING

This year included another first for the Zambeze Delta Conservation with the collaring of two female leopards in Coutada 11. Both females are providing novel data in an area that has received no leopard research in the past. We are excited at the prospect of collaring more leopards in 2020 to compare the spatio-temporal movement within the delta.



Figure 3. Deploying an elephant GPS collar.

In October we also collared five more elephants in the swamps of Marromeu Game Reserve. The elephants included one bull and four cows from different herds. All elephants have shown normal movement since then (i.e. remaining within the swamps) and the herds have moved further apart (Fig. 3).

When conducting research on wildlife, it is our responsibility to prevent any harm to the animal and to remove any piece of equipment that is placed on an animal for monitoring purposes. This past year we removed the collars of more than 20 animals, including elephant, eland, reedbuck, sable, warthog, zebra (Fig. 4). We are still monitoring several herbivore species with functioning GPS collars and we plan to remove them as soon as the GPS system stops working.



Figure 4. Removing a collar from a massive eland

2.2.2 ANNUAL AERIAL SURVEYS

Aerial surveys have been used for decades to count wildlife populations. These counts are very time efficient and relatively cost effective. Additionally, they provide land owners or reserve managers with immediate results. Aerial counts have been the main method for counting game in the Zambeze Delta since the 1960s¹. However, given the size of the area (>10 000km²) and the associated costs involved, these surveys are not conducted annually. Therefore, designing a fine-scale aerial survey which can be replicated annually is likely to hold great conservation significance as annual trends in game can be observed and explained.

In November 2019, we conducted the first annual aerial survey within Coutada 11. This survey is targeted at counting wildlife species (particularly large herbivores) to provide an annual count of wildlife within the concession. We plan to conduct this survey on an annual basis to generate consistent, long-term trends of wildlife populations in Coutada 11. The aims of these annual aerial surveys are to:

- 1) provide consistent population estimates of large mammals
- 2) determine long-term changes in wildlife populations
- 3) use game count data to determine the effects of predation, with particular focus on an increasing lion population and even predict future effects
- 4) use the data obtained from the aerial survey to allow for better conservation management across the landscape

In an attempt to provide long-term, comparative results, we decided to survey a portion of Coutada 11. This formed part of the “*Ecotonal survey*” conducted in previous counts¹. The aerial survey was conducted over a two-day period (total = 12 hours) at the peak of the dry season. The survey covered a total of 540km², which was largely concentrated along the floodplain and ecotone region of the concession (Fig. 5). The survey consisted of 51 transects which ran east to west.

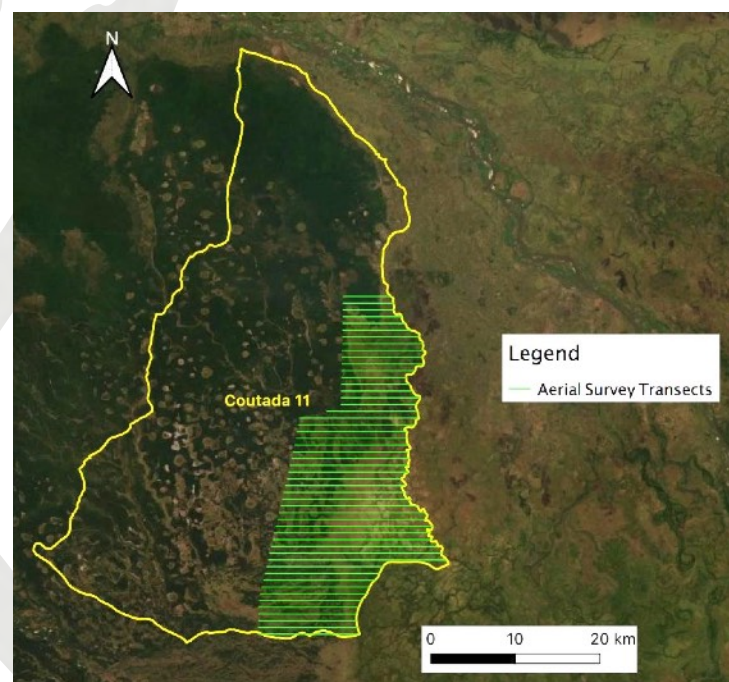


Figure 5. Aerial survey transects over Coutada 11.

¹Beilfuss, R.D., Bento, C.M., Haldane, M. & Ribaue, M. (2010). Status and distribution of large herbivores in the Marromeu Complex of the Zambezi Delta, Mozambique.



Figure 6. The aerial survey team.

Two experienced wildlife pilots (Mark Haldane & Peter Perlstein) conducted the flying in a Robinson-44 helicopter. The counting team consisted of experienced Mozambican ecologist Carlos Bento, from the National History Museum in Maputo as well as Andres Hayes, Laurette Brandt and Willem Briers-Louw (Fig. 6).

The preliminary results are indicated in Table 1. It must be noted that some species were heavily under counted, which is due to the habitat and size of the animal (e.g. bushbuck & red duiker). The total count was over 12 000 animals which indicates a healthy, thriving ecosystem. A detailed aerial survey report will be available by January 2020.

Table 1. Total numbers of species and density for the aerial survey.

Species	Count	Crude density (animals/km ²)
Common reedbuck	4234	7,84
Common warthog	2438	4,51
Waterbuck	2088	3,87
Lichtenstein's hartebeest	1159	2,15
Sable antelope	884	1,64
Selous zebra	499	0,92
Nyala	278	0,51
Yellow baboon	189	0,35
African buffalo	108	0,20
Eland	74	0,14
Bushpig	42	0,08
Bushbuck	27	0,05
Southern ground hornbill	22	0,04
Impala	18	0,03
Red duiker	16	0,03
Oribi	10	0,02
Southern crowned crane	6	0,01
Palmnut vulture	6	0,01
Hippopotamus	2	0,00
Crocodile	2	0,00
TOTAL	12 102	22,41

2.2.3 CAMERA TRAPPING SURVEY

Camera trapping is a non-invasive and cost-effective method to monitor wildlife populations, as well as estimate population sizes and densities of animals². In 2019 we started the first-ever camera trapping survey in the Zambezi Delta. The focus of this survey is estimate leopard population size and density within the area.

The survey area was divided into two grids, covering a total area of 300 km². Each grid cell measured 2.5 x 2.5km with on camera station per grid cell (Fig. 7). Camera trap stations consist of two camera traps facing opposite each other perpendicular to a road or trail. This is done because leopards can be identified by a unique coat pattern, which allows for capture-recapture analysis. The same applies for species such as serval, spotted hyena and civet. The survey is set to be completed in mid-November and a similar grid design will be conducted on an annual basis to estimate changes in leopard population densities over time. A detailed report on our findings will be provided in the beginning of 2020.

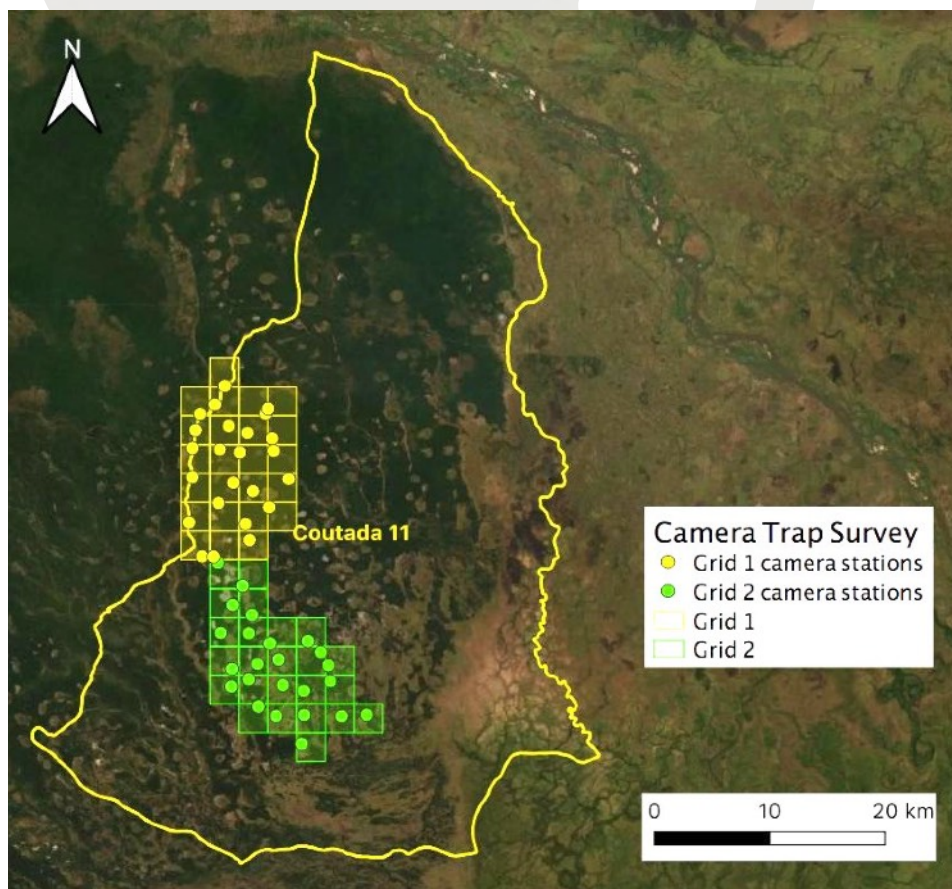


Figure 7. Camera trapping grid design in Coutada 11.

²Karanth, K.U. (1995). Estimating tiger populations from camera trap data using capture-recapture models. *Biological Conservation*, 71, 333-338.



Figure 8. Camera trap photos of a male and a collared female walking together (left) and the collared female walking towards the camera (right).



Figure 9. Two camera trap photos of an uncollared female captured at two different sites. The red inserts show her unique rosette pattern.

3. ANTI-POACHING



DASHBOARD STATS

POACHERS ARRESTED	81
SNARES REMOVED	1177
GIN TRAPS REMOVED	88
CARCASSES CONFISCATED	180
CAMPS DESTROYED	71



Figure 10. Zambeze Delta APU.

The Zambeze Delta Safaris APU patrols the area on foot and motorcycle. Due to the nature of the wetland system, many areas are inaccessible by motorcycle, but thanks to the Dallas Safari Club, the APU is given regular flying time to patrol area these inaccessible areas, which are often targeted. The presence of helicopters has proven to be an effective deterrent for poachers.

In 2019 we saw an increase in the number of poachers using dogs to capture wildlife within Coutada 11. This is concerning because these poachers, who use a combination of dogs and spotlights, can kill up to 50 animals in one night. They hunt on the darkest nights, therefore our APU must strategically plan their patrols around moon phases. These poachers appear to be entering from areas outside of the concession and do so throughout the year. Fortunately, there appears to be a decline in the level of poaching by local communities living within the concession. This is likely a result of the community involvement within the area (e.g. meat delivery, building a clinic, community bee project, etc.), with locals receiving direct benefits for not poaching and abiding by the laws within the concession.



Figure 11. Anti-poaching unit patrolling a section along the concession boundary.

4. COMMUNITY PROJECTS

DASHBOARD STATS

BEE PROJECT	TOTAL BEE HIVES PLACED	130
	TOTAL BEE HIVES ACTIVE	65
AGRICULTURAL FIELD	PLOTS ASSIGNED	150
	PEOPLE BENEFITTED	750
CLINIC	AVERAGE MONTHLY PATIENTS (MALARIA ONLY)	50
COMMUNITY FISHING PROJECT	FISHING TRIPS	20
	PEOPLE BENEFITTED	240
	TOTAL FISH CAUGHT	40 000 - 50 000
MEAT DELIVERY	TOTAL MEAT WEIGHT	31 989kg



4.1 BEE PROJECT

The community bee project was an initiative started by Zambeze Delta Safaris (ZDS) and Ivan Carter Wildlife Conservation Alliance (ICWCA). This project designates bee hives to members within the community with the aim of producing natural, organic honey which is then shared between the community and ZDS/ICWCA. The community members act as the bee shepherds, cleaning the area around the hive, protecting the hive from damage, etc. In return they are given half of the produce, which they are able to keep for themselves or sell to ZDS/ICWCA.



Figure 12. Zachariah (right) placing a top-bar hive.

The bee project is currently managed by the community leader, Zachariah Made. Zachariah has a motorbike of his own and regularly checks on the bee hives, providing advice to the bee shepherds for effective bee management. Each hive is numbered to keep track of when each hive get bees, which is important to time the placement of the super (the box that gets filled with honey) on top of the hive and to know when to harvest the honey. In total, 130 hives have been placed, this includes 70 top-bar

hives (of which 40 have bees) and 60 Langstroth hives (of which 25 have bees).

Despite the success thus far, there have been some setbacks:

- 3 hives were robbed in October. Action was taken by arranging a community meeting. The Chief of the village explained the importance of the hives for the community & asked for no more robbing hives. No bee hives have been robbed since.
- Insects are a problem, particularly ants. But by regularly applying grease to the stand, ants don't enter the hive.



Figure 13. Langstroth bee hive.

4.2 AGRICULTURAL FIELD

In December 2019, an agricultural field was ploughed in the northern section of Coutada 11. This field will provide villagers with an area designated for crop planting, with the aim of reducing the amount of deforestation in the concession.

Although no local people are allowed to move into and establish a village in a hunting concession, it is unfortunately still done. Because of the major devastation caused by slash-and-burn agriculture, it is important to move all villages from within the core wildlife area to the designated area for local communities. This also provides better control of movement (legal and illegal) within the concession, which hopefully leads to less poaching.

The official handover of the agricultural field between concession owner Mark Haldane, community leader Zachariah Made and Chief Thozo was held on 5 December. Chief Thozo and Zachariah designated plots to each person that attended the opening. The field consists of 150 x 0.5 hectare plots and each plot can provide for an entire family. Additionally, villages that move into the designated area are provided with benefits such as community meat drops and potential inclusion in the bee project.



Figure 14. John Deere tractor used to plough the field (left) and assigning plots to the community (right).

4.3 HEALTH CARE

A brand new clinic and was built in 2018 to provide important health care for community members within Coutada 11. The other nearest clinic is over 40 km away in a village called Nensa and most villagers have to walk to get there.



Figure 15. Dr. Cando outside of his new house.

Dr. Quizito Cando, arrived from Beira, Mozambique on 16 March 2019 and started working on the 26th of the month. In his first two months, he treated a total of 130 patients (70 children and 30 adults) for malaria alone. This involved doing a malaria test and providing treatment. Malaria is the leading cause of death in Mozambique and the country has the third highest malaria cases in the world. Therefore,

having an on-site doctor is important to treating patients with malaria.

In 2019 a house was built for Dr Quizito Cando. The house was completed in December and he has now settled into his new home. Figure 15 shows the completed house which is adjacent to the clinic.

4.4 COMMUNITY FISHING PROJECT

The community fishing project provides locals with the opportunity to fish within selected areas in Coutada 11. These fishing expeditions are supervised by ZDS staff with locals catching barbel, which is an abundant fish species within rivers and streams. In total, 20 groups of 12 people each were allowed to fish in Coutada 11. This resulted in a total of 240 people (excluding their families) which benefitted from the project. On average, 2 000 - 2 500 fish were caught per trip which amounts to 40 000 - 50 000 fish caught during the year.

4.5 COMMUNITY MEAT DELIVERY

Poaching of wildlife is a major concern throughout the Zambezi Delta. People poach wildlife either for consumption or to obtain an income by selling the meat in villages or towns. By providing meat to the community, the people are still able to obtain meat for consumption or selling, but it is done in a system method, as opposed to poaching which is totally unregulated and can cause major population declines in targeted species.



In 2019 alone, 31 989kg of meat was delivered to communities within Coutada 11. This is largely from buffalo and reedbuck, two common species in the Zambeze Delta. By regulating the amount of meat provided to communities and managing the off-take of wildlife (from hunting) compared to wildlife population trends, we are able to effectively conserve wildlife and provide communities with a sustainable food source.



Figure 16. Zachariah Made (far right) distributing buffalo meat to the community.

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