Final Evaluation Report

Your Details	
Full Name	María Elisa Sandoval Serés
Project Title	Impact of interspecific competition on African wild dogs (*Lycaon pictus*) in an ecosystem with artificial perennial water provision
Application ID	31076-1
Grant Amount	£5960
Email Address	esandovalseres@gmail.com Elisa.sandoval@zoo.ox.ac.uk
Date of this Report	22 November 2021

1. Indicate the level of achievement of the project's original objectives and include any relevant comments on factors affecting this.

Objective	Not achieved	Partially achieved	Fully achieved	Comments
To identify the level of competition between African wild dogs and larger predators, I will determine the seasonal (early dry-late dry, nomadic and denning) diet preference of African wild dogs, and the seasonal diet overlap of African wild dogs with lions and spotted hyaenas.			■	I analysed a historical data set of scat samples collected from 2015 to 2019 by PDC staff of African wild dogs (209 scats) and by Dr Mbizah of lions (351 scats) and spotted hyaenas (317 scats).
During the denning season when the pack faces a trade-off between time spent at the den and time spent away from the den while foraging, I will determine how den site selection factors, babysitting time, and foraging distance influence predation risk and herewith pup recruitment and survival.		■		We were only able to gather one week of camera trap data from two different dens (total: 2410 images, and 896 videos). This is because African wild dogs broke some of our camera traps within a week and we could not gather spatial data as these two packs were uncollared. However, we were able to check on the immediate presence of predators close to the dens by doing spoor transects. I will also use a historical data set from PDC, which has information of wild dog den site locations since 2014. Plan to finish in 2023.
To determine the level of kleptoparasitism risk of African wild dogs' kills from lions and spotted hyaenas depending on different distances from waterholes.		■		We performed 43 playback experiments in total (24 playbacks close to water and 19 playbacks 5 km away from water). We still want to perform more playbacks next year to increase our sample size. Plan to finish in 2022.

I will assess whether African wild dogs use either reactive or proactive coping behaviours to avoid interspecific competition with lions and spotted hyenas, what behaviours they use and whether these behaviours are affected by the type of competing species and seasonality.				In total, we performed 111 behavioural sessions following five different packs (total duration of observations: 20 hours). We identified 72 rest sites in total (32 with predator presence known). We were only able to identify 12 kill sites (only two carcasses seen properly). We have been able to gather spatial information from three packs and record immediate presence of predators in each behavioural session. I will also use historical data from Hwange Lion Project gathered with camera traps on the years 2017 to 2019; and PDC historical data on wild dog sightings, kills and rest sites. Plan to finish in 2023.
Conclusion: I will recommend water management strategies to help African wild dogs' conservation within a semi-arid ecosystem with limited water to potentially reduce the potential conflict between competing predators.				This is the ultimate goal, which we plan to finish at the end of 2023, once we have all the results from this research.

2. Please explain any unforeseen difficulties that arose during the project and how these were tackled.

Due to the COVID pandemic, I had to postpone my fieldwork for a whole year. Instead of performing my fieldwork in 2020, I performed it in 2021.

As the African wild dog is an endangered species that has large home ranges and lives in low densities (Woodroffe and Sillero-Zubiri, 2012), it is a difficult species to study, track, follow and observe. In addition, it is even more difficult to find African wild dog dens and kill sites, and to be able to observe wild dogs for a long period of time inside Hwange National Park (HNP), as the vegetation is too dense and most of the times we are unable to follow the packs off-road. Furthermore, the VHF-collars of African wild dogs ran out of battery life at the end of last year and, due to the COVID pandemic, the staff from Painted Dog Conservation (PDC) were unable to enter the park to replace the collars from the collared wild dogs. This made it even more difficult to find any packs inside HNP as only two packs (both without a dominant female) had a working collar, and one of these packs is found outside HNP. Moreover, it is difficult to collar a new pack inside HNP not only because of the difficulty to find any wild dogs, but also because there is a lack of veterinary personnel, and ZIMPARKS (the Zimbabwean Government) requires us to be accompanied by a veterinarian from the park whenever we want to collar a wild

dog. We only found two dens of two different packs, and unfortunately, we were not able to gather GPS data on these packs, as they are uncollared. Moreover, wild dogs destroyed two out of four camera traps that we set at two different dens; thus, we were only able to gather 1 week of camera trap data around the dens. This is why we have gathered very few data on the behaviour, reproduction and kill sites of wild dogs. However, we were able to deploy a GPS collar in a new pack and I am positive that with at least another fieldwork season, we will be able to gather more data that can be incorporated in the historical data set from PDC which I will be able to use to complete my research.

Furthermore, due to the problems as described above, there are currently no collared lions nor spotted hyaenas within HNP, which creates the extra difficulty to find the exact location of where hyaenas and lions are in regard to the location of wild dogs. We have been able to solve this problem by recording every sighting of lions and hyaenas, and by recording the spoor of lions and hyaenas whenever we are following the wild dogs.

In addition to all this, it is difficult sometimes to perform fieldwork due to COVID pandemic restrictions or due to a lack of research rangers from ZIMPARKS, as we cannot go into the park without a ranger from ZIMPARKS. We have been trying to tackle this by working in different areas of HNP where operational rangers are able to accompany us inside HNP.

All this has delayed the data collection. However, I am positive that I will be able to complete my research as I am planning for another fieldwork season in 2022 and I am also working with the historical data sets from PDC, and from the Hwange Lion Project and the CNRS-HERD project.

3. Briefly describe the three most important outcomes of your project.

a) Level of resource competition: There was no seasonal effect on the diet of any of the three carnivores. However, the level of resource competition of African wild dogs with spotted hyaenas and lions is high, especially the level of resource competition with spotted hyaenas. It seems that the level of competition of African wild dogs with lions increases when water is scarce.

b) African wild dog reproduction: It seems that spotted hyaenas were always present close to the dens, but lions were only present close to one den once (within 1 month of monitoring the den).

c) Avoidance strategy and kleptoparasitism risk: It seems that the risk of kleptoparasitism from spotted hyaenas of African wild dog kills does not change depending on the distance from waterholes. However, the kleptoparasitism risk from lions to wild dog kills is higher when the location of the kill is close to the waterholes. It seems that African wild dogs when moving and resting use a reactive strategy when avoiding spotted hyaenas and a proactive strategy when avoiding lions. However, when African wild dogs kill their prey, it seems that they use a reactive strategy when avoiding both predators.

However, these are just preliminary results which do not yet allow us to draw robust conclusions, we will therefore have to gather more data and do at least another fieldwork season in 2022.

4. What do you consider to be the most significant achievement of this work?

Every time I went tracking for African wild dogs, I would always be with at least one staff member from PDC who had full expertise of tracking wild dogs, together with one ranger from ZIMPARKS whenever we were inside HNP and sometimes with students from ZIMPARKS and PDC. In addition, when we collared a wild dog, the veterinarian from parks would also participate. I trained two local trackers and six local students from Painted Dog Conservation to gather detailed behavioural data from wild dogs and to use a method to identify the immediate presence of lions and spotted hyaenas around dens, kills and rest sites of wild dogs. PDC staff also trained me to track wild dogs and recognise behaviours. This sharing of knowledge enriched every one of us and helped us to improve this study, and in turn, our understanding of wild dog ecology.

5. Briefly describe the involvement of local communities and how they have benefitted from the project.

As the total progress of my study to date is around 43%, I still need to perform at least another fieldwork season to be able to gather more data to answer my research questions and be able to propose water management solutions to decrease the competition of wild dogs with larger predators and, in turn, decrease wild dog mortality risk.

I still need to do another fieldwork season in 2022 (renewal of research permits from Zimbabwe are already in process) to be able to gather enough data to perform robust statistical analyses. More specifically, I still need to perform 40 more playback experiments around waterholes, follow more wild dog packs to gather detailed behavioural observations, more locations of rest, den and kill sites, and observe if there was immediate presence of predators (lions and spotted hyaenas) close to the African wild dogs. I plan to perform my second fieldwork season from June to October 2022.

6. Are there any plans to continue this work?

N/A

7. How do you plan to share the results of your work with others?

I intend to publish at least four to five peer-reviewed papers.

- Level of competition by determining the diet overlap between African wild dogs and larger carnivores (manuscript already written, but still in process).

- How den site selection factors, babysitting time, and foraging distance influence predation risk, pup recruitment and survival.

- Kleptoparasitism risk of African wild dogs depending on distance from waterholes.

- Reactive and proactive coping behaviours to avoid interspecific competition.

- Water management recommendations for African wild dogs' conservation.

In addition, I have already submitted a report showing some preliminary results to the Government of Zimbabwe, both to Zimbabwe Parks and Wildlife Management Authority (ZIMPARKS) and the Research Council of Zimbabwe.

I also plan to participate in different Wildlife Conferences to show my results.

8. Timescale: Over what period was the grant used? How does this compare to the anticipated or actual length of the project?

The Rufford Foundation grant was used from April to November 2021 for my first fieldwork season. I was planning to conduct 4 to 6 months of fieldwork, but I ended up doing 7 months of fieldwork in 2021 because, due to COVID, I was unable to do any fieldwork in 2020.

This funding was extremely useful to be able to start with the data collection of this study, which I intend to finish in 2023. At the end of this research in 2023, I intend to have given advice on water management strategies to benefit African wild dog conservation in water limited ecosystems.

Fieldwork: May-October 2021, 2022, maybe 2023.

Data analyses and write up: October-November of each year from 2021 to 2023.

9. Budget: Provide a breakdown of budgeted versus actual expenditure and the reasons for any differences. All figures should be in £ sterling, indicating the local exchange rate used. It is important that you retain the management accounts and all paid invoices relating to the project for at least 2 years as these may be required for inspection at our discretion.

Item	Budgeted Amount	Actual Amount	Difference	Comments
Car maintenance	350		-350	In the end PDC covered these costs.
Satellite Phone (Iridium)	1000	745	-255	We managed to pay for the Satellite phone 1000 US dollars at the end.

Permits (Research council permit, ZIMPARKS, Immigration visa)	847	847		At the end Rufford Foundation grant covered all the costs for research.
Audio moths	420		-420	In the end we decided not to buy audio moths because we needed camera traps instead, and we thought that camera traps would give the necessary information that we required.
Tracking equipment (receiver, headphones)	1487	438	-1049	In the end I did not have to buy all the tracking equipment because PDC lent me some of it, such as the antennas.
Fuel (7 months)	1856		-1856	Rufford foundation was going to pay for 1856 on fuel, but at the end PDC was able to cover these costs.
Transport Flight London-Victoria, Zimbabwe (two suitcases with extra weight checked in)		456	+456	Re-allocation of funds
1 AWE GPS collar (Iridium)		1856	+1856	Re-allocation of funds
Laptop for my fieldwork assistant from Painted Dog Conservation who is a local worker and student		420	+420	Re-allocation of funds - This is because my fieldwork assistant did not have a laptop, and it was necessary for him to have one as he will be gathering more data for this research while I am in Oxford, UK.
Permits (Research council permit, ZIMPARKS, Immigration visa)		633	+633	At the end Rufford Foundation grant covered all the costs for research.
8 Camera traps, sd cards, and batteries		420	+420	Re-allocation of funds
SUB-TOTAL of Rufford Grant	**5960**	**5815**	**-145**	**All re-allocation confirmed by The Rufford Foundation**
8 Camera traps, sd cards, and batteries		500	+500	Rhode Trust
Extra batteries, 125 gigas sd cards for camera traps and playbacks experiment stuff		130	+130	Personal Funding
Transport Flight London-		1000	+1000	Department of Zoology,

Victoria, Zimbabwe (two suitcases with extra weight checked in)				University of Oxford, UK, paid 1000 pounds. As the costs of the flight was more expensive than expected due to the extra costs of extra suitcases and extra weight to bring all the fieldwork equipment, Rufford Foundation paid for 456 pounds.
1 Tellus GPS collar (Iridium)		1700	+1700	Robertson Grant, Post-panther scholarship WILDCRU
1 AWE GPS collar (Iridium)		1674	+1674	We decided to invest in GPS collars for African wild dogs. PDC Netherlands and PDC Donors
TOTAL SPENT ON PROJECT		**10507**		

10. Looking ahead, what do you feel are the important next steps?

- Perform another fieldwork season from June to October in 2022.
- Statistical analyses of our data from 2021 to have preliminary results.
- Continue writing up reports and draft scientific papers.
- Keep training new PDC students on attachment from different local Universities who will come in 2022.
- Use the results obtained from this research to propose to the Zimbabwean Government water management solutions to decrease interspecific competition and help African wild dog conservation.

11. Did you use The Rufford Foundation logo in any materials produced in relation to this project? Did the Foundation receive any publicity during the course of your work?

The Rufford Foundation logo was used when I presented my research to audience from around the World at the Global Biodiversity Festival at the end of May 2021.

It was also used for the report to the Research Council of Zimbabwe, and to the Rhodes Trust Report.

12. Please provide a full list of all the members of your team and briefly what was their role in the project.

N/A

13. Any other comments?

I would just like to say thank you to The Rufford Foundation to help me with my first fieldwork season to start gathering the data to accomplish this study with the ultimate goal to help African wild dog conservation.

References:

Woodroffe R, Sillero-Zubiri C (2012) African Wild Dog (Lycaon pictus). The IUCN Red List of Threatened Species. IUCN Red List Threat Species 8235:e.T12436A16711116. https://doi.org/e.T12436A16711116