Final Evaluation Report

Your Details	
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Project Title	Robust Wildlife Population Monitoring Under Challenging Conditions
Application ID	23269-1
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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
Data on 12 mammal species distribution, relative abundance and threats across poorly understood region is collected and shared with local NGO's and other conservation practitioners for future conservation work.				Interview, hunter diary and camera trap data have all provided valuable detections of species of conservation importance, such as the critically endangered gorilla, chimpanzee, the endangered forest elephant and the vulnerable giant pangolin. I have just submitted my PhD on the 30th September 2019 and am in the process of writing up reports which will be shared with ZSL and other NGOs operational in the region. However, I have presented the results of my work to NGOs operating in the region and they are aware of the results I have obtained.
Useful data from 40 camera traps over 30 nights in two villages				30 cameras were set for 60 days in both villages, totaling 3600 camera trap days. Data from both villages have been collected and analysed and identified important village level differences in species depletion between the two villages, with implications for conservation action and food security. As a result of this research. my current post-doc is building on the results of this work to help develop protein alternative projects that will improve food security and reduce dependence on hunting.
4 rounds of seasonal presence/absence interviews completed in one village				All data collection in the field went smoothly and we were able to collect all the data necessary for analysis. Interesting insights into the process and how local knowledge can be gathered in a culturally relevant and efficient way were gained.
6-9 months of daily-diary data collected in two villages				All data collection in the field went smoothly and we were able to collect all the data necessary for subsequent analysis. Hunters were able to provide

				data on species occupancy which matched well with the camera trap data, and at times were more insightful where camera traps failed to detect species enough for analysis. Hunter offtake data revealed trends in offtake, motivations for hunting and village level differences in species depletion.
Capacity building of local community via agricultural workshops in two villages				Two workshops have been held to share information on simple methods for improving yields via natural methods. We have identified key people in both villages who they feel will best be able to help others learn these new methods. Follow up visits have taken place and the team are planning to apply for further funding to continue the activities there.
Capacity building of research team: 4 future in-country conservationists receive technical training and field experience				All the research team attended a full day training with the ZSL camera trap team, to teach them the correct way to set camera traps and optimal camera trap survey design. The team are now confident in setting camera traps and have a good level of practical experience in doing so, which they can take on to future jobs. I have applied for funding for my field assistant lead to visit the UK for a month to attend the SCCS conference and co-present the results of the PhD and to finish writing up a paper on the results.
Report written for conservation practitioners, on optimal survey design and how best to incorporate local ecological knowledge into monitoring studies.				Having submitted my PhD later than planned, I am now in the process of writing a report to share with local NGOs and conservation practitioners, outlining methods to discern the optimal survey design and to carry out cost/benefit analyses to choose the most efficient and effective method for monitoring mammal species in tropical forests. I am in discussion with local and international NGOs operating in Cameroon about applying the methods I developed and used during my research to improve the effectiveness and

				inclusiveness of their monitoring methods.
Wider engagement and disseminating of results via presentations and popular media				I have presented the results of this work at a workshop on methods to best monitor pangolins, held in Cambridge by the IUCN Pangolin Specialist Group. I have also presented at the ECCB in Finland. I returned to Cameroon this month to present the results of my PhD at a workshop organised by the University of Gottingen and in collaboration with the Higher Institute of Environmental Sciences in Yaoundé. The audience was comprised of Cameroonian early career researchers, policy makers and NGOs operating in Cameroon and across Central and West Africa. I am in contact with The Conversation Africa and The Conversation UK. Both are keen to publish a piece on my work and will soon begin to arrange seminars and guest talks in universities and NGOs in the UK.
Publication of at least 2 papers in high-impact journals				Having just submitted my PhD, I am actively working on three papers for submission by December 2019. I am aiming to submit in Methods in Ecology and Evolution, Conservation Biology and Ecology & Society. During the course of this research, the ethical implications of working with local people for conservation became an issue close to my heart and I published a paper in Conservation Biology about the ethics of social research when studying wild meat hunting. Another paper on the ethics of social research for conservation is in review with Conservation Biology.

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

Clashes in the logistics needs between my research and the needs of my host NGO in Cameroon meant that at times I was not able to get into the field as planned, and plans had to change at the last minute. We overcame this by ensuring that I maintained a high level of communication with the logistics team so that if anything

did change, we were able to rearrange plans to ensure that our team had enough time to complete the work.

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

a) *I collected data on critically endangered species at two sites, and gained a greater understanding of threats from hunting, and land use change.* Village level threats to biodiversity and food security were identified, and the need for protein alternatives was identified in one village, while the need to steer hunters away from hunting endangered species in their rich forest was identified in another. I am continuing my work in these villages as a result of these results and am working to but in alternatives in place to ensure the food security of the village inhabitants, as well as the protection of species of conservation concern.

b) *I refined an emerging monitoring method and gaining insights in how best to design and implement community-based monitoring projects.* Greater understanding of the bias and strengths of local ecological knowledge for wildlife conservation monitoring was gained, in particular the species that lend themselves best to monitoring with camera traps or with interview based methods, and the optimal survey design required for each monitoring method to ensure power to detect change in species population trends in the most efficient way possible. This is really important to ensure the sustainability of monitoring, especially where resources are limited.

c) *Capacity building and awareness.* The communities we worked in are now actively involved in the co-design of alternative protein projects that are both culturally relevant and desired by the inhabitants. The work now being carried out to provide alternatives was informed by my PhD research and the awareness of species loss and implications for food security developed by participants through the self-monitoring of the mammal species they depend on for food. The effectiveness of self-monitoring methods developed with participants throughout this work. Additionally, two of my research team are now in full time employment, carrying out social and ecological research in Cameroon.

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

Local communities benefitted from the agricultural extension workshops and knowledge exchange regarding best practice to increase yields, diversity their crops and livelihoods and reduce damage from pests. Additionally, the chief and a few village representatives from one village want to set up their own 'forest protection' group, to better protect their community forest from external poachers (a growing problem which was discussed a lot during this project).

As a result of this work, the two villages are now actively participating in the co-design of protein alternative projects that will serve to improve their food security and reduce their reliance on wild meat hunting.

5. Are there any plans to continue this work?

Yes. I am working in the same villages through my post-doc, looking to answer the livelihood and food security focussed questions and issues that were encountered during this research. Furthermore, the research team are in the process of writing further funding applications to scale-up the agricultural extension workshops to reach more people and provide more materials and in-depth training to improve agricultural output. This would also be of conservation benefit. Diversifying crops means people are busier all year round. The peak in hunting that we observed during the low agricultural season and before cultural events such as Christmas could be reduced, through being occupied more consistently all year round and due to increased profits made from agriculture. This would help to reduce the incentives for supplementary hunting (other than for their own subsistence).

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

- I will be writing the reports as promised (although later than planned as I only recently submitted my PhD, I apologise).
- I will continue to attend conferences in the UK and abroad to share the findings of our papers and reports.
- I will return to Cameroon to feed back the results to the communities and answer any questions they have during specific results sharing meetings in March 2020.
- I'm hoping that funding for my research team to come to the UK to work with me will come through and provide them with opportunities to present the findings of our work at the University and at the Student Conference for Conservation Science (SCCS).
- I will identify relevant research groups and NGOs who are interested in hosting me to give a talk about my work.

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

The grant was requested for use from September 2017 until October 2019. The fieldwork element was completed on time (finishing June 2018).

8. 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
Travel for research (to and from sites and collecting supplies)	510	499	-11	
PI accommodation	210	208	-2	
PI subsistence	200	275	+ 75	
Flight	500	477	-23	
Local research team staff costs	1080	1059	- 21	
Camera trapping costs and equipment	2600	2458	-142	
TOTAL	**5500**	**4975**	**+25**	

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

The next steps are to complete the reports based on the findings of my PhD for NGOs and other conservation actors who may be interested in my results, and to continue to reach out to people who may want to collaborate with me to refine their monitoring survey design and application of local knowledge for monitoring purposes. Another important step is to help the research team to get additional funding so that they can continue with their agricultural support work in the villages and feedback the results of this work to the communities.

10. 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?

Yes, during presentations at Imperial College London, Oxford University, Zoological Society London, the European Conference for Conservation Biology (ECCB) and and the conservation conflict workshop in Cameroon. Rufford will be acknowledged in papers and reports produced from this work and is acknowledged in my thesis.

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

- **Irene Franceline MBOUWE** (Research Assistant, graduated from HIES in 2015): Irene has great experience in project planning and qualitative research, especially regarding community projects in Cameroon. She was involved with the early stages of field research and played a major role in the cleaning and preparation of field data ready for analysis.

- **Fabrice KENTATCHIME** (Research Assistant, graduated from HIES in 2014): Fabrice has extensive mammal and primate monitoring experience, working part-time on a long-term monitoring project in Mbam & Djerem National Park. He also has camera-trapping and excellent volunteer management experience. He has a background in agroforestry and is experienced in giving workshops on improved agricultural practices. Fabrice was the research team leader. He helped to manage the allocation of budget and organised the logistics of fieldtrips when I was back in the UK. He also led the camera trap fieldwork and was a valuable member of the team
- **Thibaut Cedric KAMOGNE** (Research Assistant, graduated from HIES in 2015): Cedric conducted his MSc project on bushmeat drivers and demand in Cameroon. A social scientist by training, he is a great addition to the village interview team. He assisted in the interviews and in the collection of the hunter diary data. He has also helped with data entry and with the camera trap fieldwork.
- **Joel TSAMBANG** (MSc student, currently at Yaoundé university HIES): Joel worked closely with Fabrice, Tibo and myself to set camera traps adjacent to both by study villages in 2017-2018. He also assisted with village interviews and was a really lively and engaged new member of the team.

12. Any other comments?

I want to thank Rufford for their support, without which I would not have been able to carry out the vital camera trapping element of my PhD research. Doing so has added huge value to my project and allowed for a much greater understanding of the application of local ecological knowledge for wildlife population monitoring to be gained. I will continue to send you papers and reports that have been produced as a result of this work and apologise that I have not yet been able to do this as I submitted my work later than originally planned.