

The Rufford Small Grants Foundation

Final Report

Congratulations on the completion of your project that was supported by The Rufford Small Grants Foundation.

We ask all grant recipients to complete a Final Report Form that helps us to gauge the success of our grant giving. We understand that projects often do not follow the predicted course but knowledge of your experiences is valuable to us and others who may be undertaking similar work. Please be as honest as you can in answering the questions – remember that negative experiences are just as valuable as positive ones if they help others to learn from them.

Please complete the form in English and be as clear and concise as you can. We will ask for further information if required. If you have any other materials produced by the project, particularly a few relevant photographs please send these to us separately.

Please submit your final report to jane@rufford.org.

Thank you for your help.

Josh Cole, Grants Director

Grant Recipient Details

Your name	Nicole Limunga Smolensky
Project title	Population Ecology and Conservation of Dwarf Crocodiles in Cameroon
RSG reference	9450-1
Reporting period	April 2013
Amount of grant	£6000
Your email address	nsmo@tamu.edu
Date of this report	April 14 2013

1. Please 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
Geographic distribution of dwarf crocodile species			X	We've discovered two cryptic species of dwarf crocodiles in Cameroon. This coming year (2013-2014), I will be working with the governmental ministries, zoos and local conservation offices, explaining the distribution of the both species, how to identify the two and minimize anthropogenic induced hybridisation.
Population Estimation		X		I was able to quantify relative abundances in three regions across the country. In general, the populations appear to be smaller in Cameroon than in Gabon, the only other country with population estimates. It was difficult to find populations in which I could obtain samples sizes robust enough to quantify the demographic structure (e.g. mostly young vs. mostly adults). This parameter gives an idea about the relative conservation status of the population. I encountered mostly young individuals which can be taken as an indicator of hunting pressure. The adults are either present or elusive, or their numbers are reduced due to hunting.
Hunting Impacts			X	Twenty-eight hunters participated in an informal interview at one site. Nearly all (23/28) attest to hunting dwarf crocodiles. Approximately half of the hunters targeted adults, and more than half of these hunters trade these crocodiles within their community. Urban market surveys may not reflect the true impact of hunting dwarf crocodiles. I am currently trying to assess the local impact of hunting by matching the distribution of the hunters' catchment with the distribution of my population surveys.
Training local technicians			x	I had the opportunity to work with 5 local park guards, 16 hunters and 3 conservation organizations (WWF, WCS and Projet Grands Singes). At each site I trained the park guards and hunters in capture and monitoring techniques. At

				all sites they have detailed location records of all crocodiles. At one site they use this information in their ecotourism activities.
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2. Please explain any unforeseen difficulties that arose during the project and how these were tackled (if relevant).

One difficulty that will always be present in governmental ministries and conservation agencies is the turnover of personnel. Thus, establishing relationships, rapport and transfer of information is an on-going endeavour I pursue to make sure the information about the dwarf crocodiles is available to the current authorities and conservation practitioners. I do this by providing electronic and/or hard copy project updates and reports from previous years for each site visited each year to the respective local and national government offices and NGOs. By providing multiple hard copies each year I am trying to ensure the information remains available to these entities despite the turnover in personnel. Another unexpected difficulty was witnessing tainted relationships between local villagers and conservation practitioners at some sites. For example, at one site the local villagers were dismayed that a local WCS office did not construct its headquarters there. They wanted the WCS office built there due to the associated development of infrastructure such as roads, electricity, and possible economic opportunities associated with ecotourism. Consequently, any visiting researcher doing ecological research was perceived to be affiliated with WCS and asked to leave. If the villagers did not want me to conduct my research after I presented the project I would leave. Subsequently I would discuss my experience with the respective conservation practitioners and local government personnel. Unfortunately, there was not much I could personally do in these instances but respect the villagers' request to leave. At other sites the local NGO (e.g. EcoFac) may run into financial difficulties and leave the villages resulting in a loss of economic opportunity for those communities. Alternatively, local NGOs may work with the local authorities to enforce anti-poaching laws. All of these situations led to strained relationships between the conservation practitioners and the local communities. These problems were multifaceted both economically and spatially exemplifying the typical challenges in integrated conservation and development.

Another unexpected situation was the lost opportunity to train and have a field technician from the Democratic Republic of Congo. I was to meet a Congolese conservation practitioner named Robert Abani in Cameroon to work with in the field however he was not able to make it Cameroon for training. He was not able to neither secure funds nor obtain a visa to enter Cameroon.

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

- a) **My research documents two cryptic species of dwarf crocodiles within Cameroon and improves the resolution of the geographic distribution of these cryptic species.** My findings expand the knowledge to date of these poorly known crocodile species, specifically refining the distribution of each species. Range maps of the dwarf crocodiles is displayed on the Crocodile Specialist Group (CSG) of the International Union for Conservation of Nature website. I will provide an updated distribution map to CSG and publish my results in a peer-reviewed journal.

Protecting biodiversity includes minimising the loss of genetic diversity, which can occur via the mixing of cryptic species. Having detected the two cryptic species in Cameroon has consequences on how managing authorities, whom rescue crocodiles from illegal trade, release these individuals back into the wild. Currently little attention is devoted to the origins and release locations of illegally traded live

crocodiles. Thus, there is potential for accidentally introducing individuals from one species into populations of the other. Even in the zoo located in the capital of the country, the two species are housed together, and potential hybridisation can occur. Given the difficulty in distinguishing these species I have suggested that managing authorities determine the origin of these seized crocodiles and release them in that same general area.

I sampled broadly across the country and found one species to be much more widely distributed than the other. With this information, conservation practitioners can identify appropriate sites for translocation and reintroduction of captive crocodiles in ex situ breeding programmes currently underway in European and American zoos.

- b) **The first documentation of the local trade of dwarf crocodiles in Cameroon.** Interviews with local hunters indicate that crocodiles are traded at the local scale more so than at regional or large urban market scales. All size classes of dwarf crocodiles are hunted for meat, but large individuals are targeted more often than smaller individuals. Depending upon road access and proximity to large villages, dwarf crocodiles will be sold to market traders that in turn sell them (usually live) in urban markets (*personal observation*). But sale to urban markets was uncommon in this study. They are usually sold live (71.4% of the hunters) but occasionally can be smoked and/or sold in parts (3.6% of hunters). Typically, studies on the impacts of hunting on wildlife focus on urban markets because the size of the consumer population is relatively larger than the rural villages where the wildlife originate. Based on my findings, assessments of hunting impacts on crocodiles conducted solely in urban markets, will likely underestimate the magnitude of hunting impacts on dwarf crocodiles.
- c) **Updated population size information of dwarf crocodiles of Cameroon.** My study represents one of only two population assessments ever conducted on the dwarf crocodiles of Cameroon. The first study was conducted more than 10 years ago (Wild 2000: CSG report). This updated information is currently being used by the World Wildlife Fund for Nature Conservation in their assessments of the potential impact that planned hydrologic dams will have on the local fauna.

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

The hunters and park guards that accompanied me in the field were trained in scientific monitoring techniques including how to conduct transects, use a Global Positioning Systems device to record the locations of animals, record morphometric measurements, determine the sex of crocodiles and collect tissue samples. Currently the conservation practitioners only hire the hunters as local guides. With this increased technical capacity, the conservation practitioners can hire these trained local hunters both as guides and technicians as opposed to hiring trained personnel from outside the communities.

5. Are there any plans to continue this work?

My project is part of a lifelong research programme investigating the natural history, ecology and use of reptiles in Cameroon. I will continue investigating the distribution of the two cryptic species of dwarf crocodiles in Cameroon. I plan on using additional molecular methods to determine the dispersal distance of crocodiles and which populations are connected by gene flow. I will also

continue my investigation of hunting impacts of dwarf crocodiles by continued assessment of dwarf crocodile population size, hunting levels, and size and location of the spatial catchments of hunters. I am also studying the feeding ecology of dwarf crocodiles to investigate their ecological roles in their ecosystem, how the reduction in their population may affect their ecosystem, and if there are any impacts of fishing on crocodile populations.

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

I have already distributed reports to local and national government and conservation offices, tailored to each site where my studies took place. The Crocodile Specialist Group of the International Union for the Conservation of Nature that regulates the international trade of these species has also received a report of my findings. I will also disseminate my results to the scientific community via publication in peer-reviewed journals. I have also presented this research at my university, at a Cameroonian wildlife center (Limbe, Cameroon), as well as national and international scientific conferences including the Joint Meetings for Ichthyologists and Herpetologist, and the World Congress for Herpetology.

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

These funds were used between September 2012 and March 2013. Having already conducted pilot studies I had a good understanding of the general timeline to conduct the research. However more time was spent at some sites than others unexpectedly due to lack of consent from local villagers for me to conduct the work. Also I was able to find a local technician willing to conduct the hunter interviews for me so I could simultaneously collect population data on the crocodiles. Therefore more time was spent in the field collecting the population and genetic data. I would meet with the technician weekly to go over the hunting data that was collected.

8. Budget: Please 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.

Based upon: 1 British Pound Sterling equals 1.54 US Dollar

Item	Budgeted Amount	Actual Amount	Difference	Comments
Airfare	2190	2630.06	+440.06	My advisors wanted to accompany me to the field for 2 weeks. The chosen dates they were available to go and their preferred airport increased the cost.
Permits and Visas	1242	669.49	-572.51	Previously I hired a local person to process my permits but this time I was able to work with a conservation entity to process my permits which was more effective in both cost and time.
Medical	758	758	0	
Food, Lodging and in-country Transport	2898	2724.36	-173.64	For the two weeks that my advisors were in the field with me I was able to cost share.
Equipment	2200	805.74	-1394.29	I was able to borrow some equipment from my university. My advisors also bought some equipment during the trip

				and left it with me to use. This had the largest effect on the entire budget.
Salaries	1066	1443.12	+377.12	Some salaries were approximately 1.5 times higher than anticipated.
TOTAL	10354	9030.77	1323.23	

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

Continued contact with the local communities, conservation practitioners and governmental officials are key to ensure conservation of these crocodile and minimise the loss of current information with the turnover in personnel at local and regional offices. Another critical step is returning to communities where field research is conducted. This fosters good rapport with the local communities and cultivates interest of conservation and investigation of the fauna when visiting scientists, such as myself, leave these sites.

Some of the conflicts I observed in the field with the local communities, conservation practitioners and government personnel stems from issues of land tenure rights, corruption and economics. These issues are multi-faceted and very difficult to address. Nonetheless it is important to work with all these groups and develop realistic plans for development and conservation with measures of enforcement and accountability for all groups. The conservation practitioners often act as a liaison between the local communities and regional government ministries serving as the most logical contact point to work on these issues.

10. Did you use the RSGF logo in any materials produced in relation to this project? Did the RSGF receive any publicity during the course of your work?

All my presentations, whether they were in oral or poster form, had RSGF logo in the acknowledgements section as a funding source. I will also include RSGF in my Acknowledgements section in my publications.

11. Any other comments?

Conducting research in Cameroon is particularly expensive and little ecological, natural history or conservation information on the local flora and fauna reaches the regional and global communities. This grant has enabled me to provide important information on the ecology and conservation of dwarf crocodiles.