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. The Final Report must be sent in **word format** and not PDF format or any other format. 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. Please note that the information may be edited for clarity. 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	Rachael Cooper-Bohannon
Project title	The distribution, ecology and conservation of cave-dwelling bats in southern Africa
RSG reference	10615-2
Reporting period	2011/2012
Amount of grant	£6,000
Your email address	rachael.cooper-bohannon@stir.ac.uk
Date of this report	23 August 2012

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
Compile database of cave roosts and identifying important roosting sites		✓		Information has been collated some cave sites and previously unexplored sink holes and abandoned mines, some of which have now been surveyed. Additional data is still being compiled although there have been slight delays with contacts sending information.
Fieldwork				
Driven transects			✓	I have completed 201 driven acoustic transects across the Northern Cape (South Africa), Namibia and Botswana. The total journey (including visits to cave sites) has been over 36,000km.
Creating call library for focal species			✓	Bats caught at cave sites and identified in the hand were released and calls recorded to add to a call library to verify call parameters of species in each region.
Morphometric measurements and DNA samples			✓	Species data (e.g. sex, weight, forearm measurements) were collected and DNA was taken from focal species caught at cave sites.
Species distribution modelling (SDM)				
Maxent training at University of Porto			✓	Training given by Dr Hugo Rebelo on Maxent and spatial analysis tools in ArcGIS 10.
Develop species distribution models and extrapolative models (based on a number of climate change scenarios)		✓		Initial models have been run for focal species and are currently being refined. Models for all bat species will be run by Oct 2012 and training on extrapolative models is being undertaken by Dr Hugo Rebelo in Sep 2012. Extrapolative models will be completed by Dec 2012.
Raising awareness of bat conservation		✓		To help develop outreach materials I attended a Communicating Science training course and am in the process of developing a website to provide more information on this research project and bat conservation. Together with my Namibian collaborator (Mr Kasaona is a Scientist at Etosha National Park); we wrote an article in a Namibian environment magazine. Throughout the fieldwork I have promoted bats to a range of people (e.g. farming community, Rangers). In Botswana I met

				with museum staff to discuss caves with bats in managed by museum staff, which was well received. Educational resources still need to be developed.

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

Vehicle hire for a 4x4 proved to be too expensive for the time needed as most of the cave sites were in remote areas. Numerous grant applications were made for vehicle funding and I approached a range of motor companies and vehicle hire companies for sponsorship of vehicle over the survey season. Unfortunately, I had no success so I had to get a loan to buy a research vehicle, which saved a lot of money in the long-term.

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

1. Completing my target of 200 driven acoustic transects;
2. Collecting sufficient DNA to carry out a population viability study (the genetic analysis for this is funding dependent); and
3. Developing promising modelling outputs and undertaking Maxent training through the University of Porto – final models will be done by October 2012.

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

a) Throughout the fieldwork, myself and the volunteer Field Assistants have spoken to people about the project; explaining what we are doing and why the work is important. This has also included landowners (particularly farmers), rangers and guides at some of the larger cave sites which are tourist attractions. There is an exciting opportunity to promote bat conservation and ecotourism at large cave sites. For example, in Botswana there are a number of San communities that are reliant on tourism for their income so an increase in ecotourism would be hugely beneficial to these communities. These sites are run through the museum and I have had a meeting with staff about the importance to these sites for bats and the benefit of promoting bats to tourists.

b) I am hoping this project will continue beyond my PhD and I will be able to dedicate more time to public engagement activities (such as giving talks to community, university and school groups) and developing educational material. In the meanwhile, I am creating a website with general information for the general public, with specific information for landowners and activities for children. I am also developing an information pack to help people set up their own local bat group (by adapting information from the Bat Conservation Trust, UK – with permission).

5. Are there any plans to continue this work?

I am hoping to get funding to carry out a population genetics study on one of my target species and to sequence another which has not been entered on GenBank. After my PhD I hope to get funding for a postdoc to build on the modelling and survey skills I have gained throughout my PhD and to be

trained in population genetics techniques and analysis through the Royal Zoological Society for Scotland to carry out further population viability studies.

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

Research findings will be shared when I complete my PhD thesis and through resulting publications, my thesis and presentations, but also through a range of other means, such as:

- Summaries of all work published in scientific papers will be made available through my webpage on the University of Stirling's website.
- Disseminating results to other southern African bat researchers, particularly my collaborators who have provided the original data to run my species distribution models but also the coordinator of the AfricanBats website (which promotes open access to data for all researchers and practical conservationists).
- The survey findings will be written up in landowner reports once call analysis has been completed. I have spoken to farmers after surveys to let them know my initial findings and answered questions about bats.
- Driven acoustic surveys across Etosha National Park will be written up and sent to Mr Martin Kasaona (Scientist, Etosha National Park). I have been invited to present my research results for Namibia to the Etosha Research Group when I am next in Namibia. I have also been invited to give a talk on bats to the local school near Etosha National Park and at two universities based in Windhoek.

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

I was in southern Africa for nearly 8 months, which was within the timescale planned (estimated between 6-8 months).

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.

Item	Budgeted Amount	Actual Amount	Difference	Comments
Field Assistant expenses	1,500.00	3,203.50	-1,703.50	Costs ran over budget due to the long length of the field season (8 months) and the nature of the work required volunteer Field Assistants for most of the field season. A number of sites charged us high rates for camping due to the remote locations and the Okavango Research Institute research camp was expensive for the month we lived there.
Vehicle	3,100.00	2839.70	+260.30	Most of the study sites required a 4x4 vehicle which are very expensive to hire in southern Africa. Despite trying a range of companies for vehicle sponsorship or long-term competitive vehicle hire rates, I got a personal loan to fund a research vehicle and

				used this funding towards vehicle services, repairs and buying new tyres.
Fuel and toll roads	1,900.00	3300.94	-1400.94	Fuel costs were higher than anticipated because of the extensive distances covered. Cave sites were all visited before starting the driven transects to ensure we reached all sites before the rains started and some areas had to be revisited to carry out the driven transects.
Courier fees	500.00	163.47	+336.53	To transport equipment and DNA samples back to the University of Stirling.
Total	**6,000.00**	**9,507.61**		

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

a. *Species distribution modelling*
Species distribution models will be run for focal species and then for all species throughout southern Africa. Once these are finalised, I will then create extrapolative models to investigate potential range shifts in response to a range of climate change scenarios.

b. *Call analysis*
I am in the process of trying to identify bat calls from the 201 driven transects carried out. The results will be used to ground-validate my modelling methods and will also be used to investigate relative bat abundance across a range of habitats.

c. *Protected areas*
The role of protected areas in terms of bat conservation is poorly understood. The species distribution models will be used with reserve planning software to better understand the significance of protected areas for bat.

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?

During my mammoth track covering over 36,000km across southern Africa I had two large magnetic strips printed with the RSGF logo on which were displayed on both sides of my 4x4 field vehicle. The logo is still on my office door at the University of Stirling, on my university webpage, presentations and will be published on the project website once it is up and running.

I continue to promote the RSGF to other PhD students working in conservation, particularly those working in Africa.

11. Any other comments?

I would like to take the opportunity to thank the RSGF for the continued generous financial support. Without this financial support my extensive field season would not have been possible. The need for more bat research worldwide has been highlighted by the UNEP (United Nationals Environment Programme) by declaring 2011-2012 the Year of the bat (www.yearofthebat.org), and in particular the African continent has largely been unstudied.