

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	8073-1
Reporting period	2010/2011
Amount of grant	£6,000
Your email address	rachael.cooper-bohannon@stir.ac.uk
Date of this report	15 June 2011

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
Obtain species occurrence data			✓	<p>My collaborators have provided me with their synthesis of over 6,000 museum record data used in the new bat book. These data have all been updated taxonomically in recent years, mostly by the authors of the book and experienced bat taxonomists.</p> <p>I have also obtained additional data from four museums in southern Africa and a two in Europe. Additional records have been given by Ernest Seamark who co-ordinates the African Chiroptera Project.</p>
Selecting focal cave-dwelling bat species			✓	<p>My southern African collaborators are the authors of the new book 'Bats of southern and central Africa' (Monadjem <i>et al.</i> 2010). There are 116 known bat species in this subcontinent, 34 of which are cave-dwelling bats. My initial priority was to select threatened species, considered to be at higher risk from human impact that could be distinguished by their echolocation calls. Five species have been selected from the initial list of 34 species, focusing on species that had a high priority for conservation (e.g. data deficient species and species with limited research) and then including other species with overlapping ranges to maximise data collection. Other considerations included the number of species occurrence data points obtained from my collaborators, being able to detect species on a bat detector therefore them having a distinct echolocation call, roost sizes and permit requirements. The final list was selected in consultation with the southern African bat researchers I am collaborating with, and my two UK supervisors.</p> <p>Four of the five species have been recorded on my Anabat detector successfully during my trial field season (doing driven transects and stationary recording) to test my methods.</p>

Select study areas and obtain relevant permits			✓	Study areas were based on the focal species known occurrence data, and areas where there has been little survey effort. Permits were obtained for the Northern Cape (South Africa) and Namibia (including export permits of tissue samples from museum specimens).
Trial field work methods (in particular driven transects)			✓	Driven transects were trialled both in the Northern Cape and Namibia (Etosha and Waterberg National Parks) to ensure the set up worked and bats were recorded on the extended microphone.
Learn modelling techniques			✓	I have spent a week at the University of Porto (Portugal) being trained by Dr Hugo Rebelo in GIS and modelling techniques to enable me to run the models.
Model species distributions		✓		An initial model has been run, showing exciting initial results indicating potentially suitable habitat outside of the known range. The model is currently being refined and will allow me to plan my field work before going back to southern Africa. This work will be completed by Aug 2011.
Raising public awareness of bat conservation		✓		I have decided to target outreach activities to areas near important roost sites. These sites are still being chosen depending on modelling outputs and field work findings. I have written two articles for a general audience about cave-dwelling bat conservation. I am also in the process of creating a website for the project to provide information to the general public. I am going on a Communicating Science training course at the end of June 2011. All delegates need to produce something to get feedback on and I will be producing an information booklet on this project, targeted towards school pupils. Outreach will be ongoing throughout the duration of this project.

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

There was a delay obtaining my Northern Cape permit which delayed the start of my field work and then the scheduled surveys were unfortunately delayed due to flooding (road closure and access difficulties which further delayed the start of the field work). Nearing the end of my field work in the Northern Cape my bat detector broke down as this was my only detector to use for the driven transects I had to finish my field work earlier than anticipated. However, as this field work was

mainly to trial the methods I was able to obtain enough data from Namibia and then the Northern Cape to achieve what I set to do and I have all permits and permissions in place for the next field season. Due to the timing of the field work rainy season will always have an impact but this field season is longer to account for downtime during heavy rains and any accessibility issues. I will also be taking a backup Anabat detector with me for my next field season.

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

This project is a three-year PhD study. The three most important outcomes from my initial field season have been:

- a) Building links with key bat researchers and other collaborators in southern Africa;
- b) Compiling an extensive database of species occurrence data to be used for the species distribution modelling, and compiling known cave roosts (particularly principle roosts that need to be resurveyed); and
- c) Successful trial of survey methods and obtaining DNA samples from museums in southern Africa for future genetic analysis

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

- a. The survey findings will be sent to the protected areas / local authorities I have been working in (in particular the ecologists I have been working with in South Africa and the Northern Cape and I will seek out suitable people in areas I survey in Botswana and Zambia).
- b. In the Northern Cape my surveys on a rare species are contributing to aims of the local authority, and I have been collaborating with their ecologist (Eric Hermann) on the surveys in this area and we will continue to collaborate on future work.
- c. I have also written an article about the bats I recorded within the Etosha and Waterberg National Parks for a Namibian conservation Journal (*Roan News*). I am nearly finished with another article for a community website in the Cape to promote bats (Scenic South).
- d. I have also been speaking the Hospitality Manager at Etosha National Park to advise them on non-lethal solutions to remove bats from some of the tourist accommodation.
- e. I am producing a poster for the De Beers (Diamond Route) conference as I am unable to attend. The conference is for all researchers carrying out work on any of the De Beers reserves.
- f. In my next two field seasons I will be more involved with the local communities through raising awareness of the benefits of and threats to bats and also through training local field assistants in bat survey methods.

5. Are there any plans to continue this work?

Yes, in total I will have three field seasons. In my second and third field seasons I plan to carry out extensive driven transects to validate my species distribution models and increase the known distribution data for the focal species. I will also be catching bats to obtain biological information and get DNA for genetic analysis. When I have validated my models, I will then be able to run models to predict range shifts in species distributions in response to a range of climate change scenarios.

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

To help achieve sustainable relations between local people and bats, an important remit of this project is about raising awareness among local communities and authorities on the conservation of bats. To-date I have published two articles (as previously mentioned). I am also in the process of developing a website and have spoken to bat researchers, bat groups and museum staff, private game reserve owners and national park authorities about the work I am doing.

By the end of the second year of the PhD (Sep 2012) I aim to publish the distribution findings in a peer reviewed scientific paper. The findings will also be disseminated to conservation agencies, bat interest groups and other stakeholders the information would be useful to.

At the end of the project it is proposed to write management guidelines for important maternity caves that are under threat.

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 5 months, which was the timescale planned. My initial priority was to decide on which species to focus on and following this there was a delay in starting field work in Northern Cape but this time was valuably spent visiting all the collaborators I am working closely with to build stronger links and to get advice on which species to focus on and on a trial visit to Namibia to establish a collaboration, trial my methods and obtain my research permit and permissions to survey in protected areas.

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	1,000	291	+709	I was fortunate enough have volunteers offering to help during this field season, so I just needed to cover expenses. Paid assistants to be used in my next field season due to the length of time I will be in the field.
Vehicle hire	1,900	2,875	-975	Some of the study sites required a 4x4 vehicle which increased the price.
Fuel and toll roads	900	707	+193	Fuel costs were decreased due to a shorter field season in the Northern Cape as I did not need to use a 4x4 (vehicle with high fuel costs) for some of my other work.
Accommodation	700	655	+45	Some slight savings made by sharing accommodation.
Subsistence	300	0	+300	Self-funded.
Flight	1,200	765	+435	The University of Stirling funded my international return flight to South Africa, so I used the RSGF funding for my flights

				to Swaziland, KwaZulu Natal and Namibia.
Courier fees	-	350	-350	Courier fees to transport large equipment (i.e. outside allowable flight items) to South Africa and to send DNA tissue samples back to the UK for genetic analysis.
Mist nets	-	425	-425	I needed additional mist nets to replace some of my damaged mist nets. I was sponsored a triple high mist net and also needed further mist nets for my new equipment.
Total	6,000	6,068		

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

- a. *Completing the modelling to predict distribution of focal species*
- b. The models will allow the identification of the major eco-geographic variables that determine a species' current range and predict areas that may be suitable or unsuitable for the species and are still to be surveyed.
- c. *Validating the model predictions using field work*
The model predictions will be validated by surveying areas predicted to be suitable, marginal and unsuitable for the selected species.
- d. *Identifying important areas for bat conservation*
Model predictions and conservation planning software will be used to help identify areas that are important for a range of cave-dwelling bat species. These findings can help to inform key stakeholders of priority areas for these bats.
- e. *Forecasting range shifts in focal bat distributions*
Once the current distribution data has been validated modelling techniques will be used to forecast potential impacts on bats under a range of climate change scenarios.

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?

Yes, I used the logo in both the articles I have written, during my departmental talk, on my webpage at the University of Stirling and will include it in my website when it has been completed.

I have had the RSGF logo printed out by the Graphics department at the University of Stirling and placed on the door to my shared office. I have also recommended the RSGF to other PhD students working in conservation.

11. Any other comments?

The funding I have received from the RSGF has made my field work for this project possible. I cannot express how incredibly grateful I am for this generous financial support. The funding for this project has gone directly towards ecology and conservation research of southern African cave-dwelling bat species. The need for more bat research has been highlighted by the UNEP (United Nations Environment Programme) by declaring 2011-2012 the Year of the bat (www.yearofthebat.org).