

The Rufford Foundation

Final Report

Congratulations on the completion of your project that was supported by The Rufford 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	Frowin Klaus Becker
Project title	Optimising the use of visual and radar observations for the mitigation of wind energy related impacts on Cape Vultures (<i>Gyps coprotheres</i>) in the Eastern Cape Province
RSG reference	
Reporting period	June 2014 – December 2015
Amount of grant	£5000
Your email address	fkbecker@sun.ac.za
Date of this report	5 February 2016

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
Assessing the limitations of both visual and radar-acoustic monitoring			X	We found considerable spatio-temporal inaccuracies associated with the visual monitoring of Cape vulture movements, while also concluding that extensive visual verification is required to confidently extract desired targets from the radar dataset.
Determining whether the desired outcome is achieved more accurately and cost-effectively by using either or both		X		While we managed to determine that supplementary visual observations were required to effectively implement radar technology. Cost effectiveness was not assessed as we had to restrict the scope of the project, in order to make it feasible as a Master’s dissertation.
Assessing the efficacy of acoustics	X			After consulting both my supervisors and other experts in the field, we agreed to exclude acoustic analyses. This was based on: (1) the relative irrelevance of acoustic monitoring of Cape vultures, as they are not known to call in flight; and (2) the time consuming exercise of analysing acoustic data, as we had time restrictions imposed by the university.

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

One major stumbling block was conflicting schedules of parties utilising the radar unit. Lacking communication between said parties resulted in irregular monitoring stints and more stringent time constraints. Another unforeseen issue was the interference of: (1) weather conditions (i.e. electrical storms, strong winds, etc.); and (2) livestock/wildlife with our equipment. This led to occasional ‘gaps’ in our data capture. Livestock-related issues were resolved by convincing land owners to relocate their animals temporarily.

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

(1) By utilising a cross-platform GIS for the visual observations, we were able to quantify the spatio-temporal margins between visual and radar observations. Following our analyses, we concluded that visual observations are inadequate as the primary technique when monitoring bird movements at particularly sensitive sites but rather as supplementation to technologies, such as radar.

(2) All Cape vultures observed were assigned corresponding radar tracks with varying degrees of confidence. This allowed us to develop an algorithm for the extraction of Cape vulture tracks from

the radar dataset, based on size (reflectivity) and airspeed of targets. While this was possible, our sample size was relatively small and compromised the identification accuracy of said algorithm. However, with a larger visual dataset, Cape vulture activity can be assessed more confidently. Depending on the site, such sampling efforts and automated target extraction exercises can greatly assist with accurate monitoring of Cape vulture (and other priority bird species') movements at proposed wind energy facilities.

(3) The two chapters comprising the research output of the thesis will be submitted to peer-reviewed journals, for publication. Moreover, a brief summary of our work was included in the January/February issue of African Birdlife Magazine of 2016. The outcomes of this study have also been shared with Birdlife South Africa, and will hopefully contribute towards the next revision of the Birds and Wind Energy Best Practice Guidelines of South Africa. Our study's relevance was also greatly enhanced by the fact that the Cape vulture is now considered to be endangered, both locally and globally.

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

N/A

5. Are there any plans to continue this work?

Future plans include using our data to ground-truth a collision risk model for Cape vultures designed by researchers at the Nelson Mandela Metropolitan University in Port Elizabeth. Moreover, our work has attracted the interest of a private statistical consultant in Cape Town, who would like to refine our algorithm for Cape Vultures, which will require more extensive field work, and has the potential to influence the quality of Cape vulture movement data at wind energy sites across the country.

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

Results of this project will be submitted to peer-reviewed journals, in the form of three scientific papers. We also hope to present these results at the next annual Birds and Renewable Energy Forum in South Africa, where representatives from governmental, environmental and industrial factions will be present.

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

The grant was used from September/October 2014 to May/June 2015. The initial duration of our data collection was an entire year, spanning from June 2014 to June 2015. However, due to licensing and importation issues related to the radar unit, as well as access to the study site, sampling only commenced in October 2014. June 2015 was set as a deadline because we had to adhere to submission dates set by the university. The submission of the thesis was essentially also delayed, as the collected data had to be shipped to Canada for processing and analysis using customised software.

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
Transport	779	3008	2229	Transport costs were substantially higher, since access to our sites required an all-wheel drive vehicle. The university has no such vehicles available, which meant that we had to source one from an independent rental company for each field trip.
Subsistence	1698	278	1420	The budget was greatly reduced, as land owners accommodated us free-of-charge, during our time in the field.
Communication	475	0	475	Communication costs were eliminated because Stellenbosch University agreed to cover them.
Equipment	770	1710	940	We underestimated these costs, because we failed to include the purchases of 2.0TB internal hard drives for the radar data capture.
Round-trip from Ottawa to Cape Town and back for Dr Millikin	566	0	556	Due to our budget adjustments, Dr Millikin agreed to fund her flights independently.
Total	4288	4997	709	

*A conversion rate of 0.056 was used to convert ZAR to GBP – the rate at the time of proposal submission.

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

As this was the first time Cape vultures had been observed with aid of radar technology, a database to build on was non-existent. Thus it is vital that further research is conducted, in order to: (1) gain more insight into the large-scale movements of Cape vultures across heterogeneous landscapes; and (2) assess the value of radar monitoring in doing so. With a greater dataset (of Cape vulture and other priority bird species), discriminating Cape vultures from other targets can be done more confidently, which automatically improves the quality of strategies implemented for the mitigation of wind energy related impacts. The Cape vulture could, in turn, also be used as an umbrella target for such mitigation strategies, depending on the species assemblages at respective sites.

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

The logo was used in all presentations of the project, which was presented at a stakeholder meeting at the WWF offices in Cape Town, as well as the annual symposium of the Southern African Wildlife

Management Association in Kimberly in September 2015. Moreover, the logo will again be displayed during the defence of my thesis in February 2016.

11. Any other comments?

I would like to take this opportunity to thank the Rufford Foundation for their support of this project, and we hope that this project has laid a solid foundation for future radar studies on Cape vultures in South Africa and the rest of southern Africa.