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	Jasper Slingsby
Project title	Management and conservation of the Critically Endangered habitat of Geometric Tortoises (*Psammobates geometricus*): impacts of alien grasses, herbivory and fire.
RSG reference	13903-1
Reporting period	October 2013 to April 2015
Amount of grant	£4525
Your email address	jasper@saeon.ac.za
Date of this report	10 April 2015

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
PRIMARY OBJECTIVES:				
Measured impacts of alien grasses and mammal herbivores on indigenous plant diversity and biomass accumulation in the two vegetation types.			X	We feel we have achieved what we set out to do in this sphere. We have been able to answer all of our primary questions.
Recommendations on desirable indigenous herbivore stocking rates in these and similar vegetation types.		X		Of course answering questions only raises new questions. Similarly, just because you've found an answer doesn't mean anyone wants to hear it. Our results suggest that relatively high indigenous herbivore stocking rates are good for plant biodiversity and the control of alien grasses in this system. While this is in line with the expectations of some, it is contrary to the expectations of others. From here we need to work on the potential caveats and on assisting land managers make the best decisions regarding stocking rates. For example, while having large herbivores may reduce alien grass impacts and boost plant species numbers, there may be some important or rare plant species that are disadvantaged. In such a case one might need to fence off and exclude herbivores from the areas where these species occur.
Recommendations on the use of indigenous herbivores for managing alien grass invasion in lowland fynbos-renosterveld.			X	See previous.
SECONDARY OBJECTIVES:				

±500 collections of plant species, many of which are of conservation concern, for the development of DNA barcodes for the Barcode of Life project.		X		We have collected the specimens, but our collaborators on the Barcode of Life project have not begun developing barcodes on this project. They are trying to resolve a funding constraint.
Input into projects investigating geometric tortoise diet for direct management of the habitat for desirable food species.			X	We are providing data on the distribution of important plant species known to be utilised by the tortoise, and have been quantifying the impact of alien grasses and large herbivores on these species.
Groundtruth data for linking vegetation data to remotely sensed imagery			X	We are already using the data in conjunction with remote sensing imagery to develop detailed habitat maps that can be used for reserve management and tortoise habitat conservation.
The establishment of a long-term vegetation monitoring site			X	This study has developed a nice baseline for future monitoring through repeat vegetation survey and monitoring biomass accumulation. It has also allowed us to develop a collection of plant specimens and digital photos for use as a field herbarium for future studies.
Training of interns and students at the postgraduate level		X		Four interns were involved in and gained valuable experience from this project, three at the MSc level and one BSc. While we did not manage to recruit a postgraduate student to work on the project, we have certainly developed a baseline that could form part of a number of MSc or PhD projects.

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

Our two biggest challenges were starting too late to do the survey in Spring 2013, and discovering that much of the baseline data that we designed the project around were not accurate.

We missed the Spring (August to November) 2013 season, because one of our referees

took too long to submit his referee report. We thus had to delay the start of the survey to August 2014, and hence I am only reporting on the project now. This delay ended out working in our favour, because when we did site visits and some preliminary surveys in November/December 2013 we realised that the vegetation type delineations bore no relation to the maps provided by the reserves (this wasn't revealed by previous visits because much of the vegetation had been too young and not many species had yet emerged after the 2012 fire). This forced us to revise our sampling design. Rather than surveying 16 large sites in a crossed design sampling two reserves (high vs low herbivory), two vegetation types (Swartland Shale Renosterveld vs Swartland Alluvium Fynbos) and two alien grass treatments (high vs low infestation), we ended out sampling many small sites on a grid in the hopes that we capture as much variation as possible. This sampling design has proven effective and has the advantages that it has good spatial coverage, allowing us to relate our ground surveys to satellite imagery and develop new maps of the vegetation types, which will be useful for reserve management.

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

1. We discovered that the tortoises appear to be almost completely restricted to only one subtype of one of the vegetation types. This has several implications:
    a. The actual suitable habitat area for the tortoise is much smaller than previously thought and tortoise management needs to focus on these sites.

    b. We can use the species lists and other characteristics of the identified habitat to map suitable tortoise habitat elsewhere.

2. We have not found any sign that the alien grasses are impacting on the diversity of indigenous plants, but they were only in low densities across most of the study area and are altering vegetation structure. We are concerned that biodiversity impacts will only become apparent when the invasion densities reach a threshold point where they are outshading indigenous species and/or altering the fire regime.

3. Alien grass species were observed at more sample sites within the reserve with high herbivore densities, implying that the herbivores may facilitate their spread, but they occurred in higher densities in the reserve with fewer herbivores, implying that the herbivores suppress their biomass.

4. Most of the alien species observed showed preference for particular vegetation types, suggesting that the management of each alien species should be habitat specific and vice versa.

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

The project involved the local conservation agency (CapeNature), staff from a private nature reserve (Elandsberg Farms), and researchers studying and trying to develop a breeding programme for the geometric tortoise. While the project has not resulted in financial benefit or upliftment of any local communities, it has provided some important answers for the conservation and management of a critically endangered tortoise species and the critically endangered vegetation types it inhabits. The project has also provided good field experience for four developing scientists who worked as interns (three South Africans) and volunteers (one MSc graduate from the United Kingdom) on the project.

5. Are there any plans to continue this work?

We would like to continue this work with a follow up survey to look at the trajectory of vegetation recovery through time, but this will only be after another year or two. We may also apply for funding if any additional questions are raised when we hold a report back and workshop with land managers, tortoise researchers and others in May 2015 (see next section).

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

We have been disseminating our findings through ongoing meetings with the land managers (CapeNature and Elandsberg Farms) and tortoise researchers. We hope to have a joint report back and workshop with land managers, tortoise researchers and others in May 2015, depending on everyone's availability.

We will report the findings of the project in a popular article in the online newsletter *SAEON eNews,* building on a previous article (http://www.saeon.ac.za/enewsletter/archives/2014/april2014/doc07).

We will also be publishing our findings in scientific journals. We envisage that we will need to split our findings into two articles, one on the vegetation survey and alien grass and herbivore impacts on biodiversity, and another on remote sensing and mapping habitats and biomass recovery.

We will present our results at the Rufford conference at Kirstenbosch in Cape Town next week.

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 RSG was used over a period of 18 months rather than the intended 12 months, see

section 2 for details of the delay.

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 assistants	1000	0	-1000	We managed to secure salaries for interns and thus did not need to use any grant money for field assistants.
Botanical consultant	2500	3810	1310	
Plot marker poles	458	0	-458	
Field equipment	142	245	103	
Transport	425	470	55	
Total	4525			

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

1. Conduct our stakeholder engagement and report back meeting and identify remaining areas of uncertainty.

2. Work with the tortoise researchers to examine the existing tortoise movement data (telemetry) in relation to our habitat maps and confirm that they are using a small subtype of the vegetation in the reserve. We would then identify and map other areas with similar vegetation composition outside of the focal reserves and motivate that they be priority areas for conservation.

3. Publish the work conducted so far.

4. Assess whether we need to apply to RSGF for further funding to answer any additional questions that may arise.

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?

We acknowledged RSGF and used the logo in a SAEON eNews article (http://www.saeon.ac.za/enewsletter/archives/2014/april2014/doc07), which is distributed directly to ~2000 people. All further outputs from the project (papers, presentations and popular articles) will be RSGF branded.