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	Gerardo E. Soto
Project title	Use of Magellanic woodpecker *Campephilus magellanicus* as a forest health indicator of the threatened Valdivian Temperate Rainforest
RSG reference	19522-1
Reporting period	August 2016 – June 2017
Amount of grant	£4714
Your email address	gerardo.soto@usach.cl
Date of this report	July 12, 2017

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
Capture of Magellanic woodpeckers				Given the reasons provided in the text below, I did not dedicate much effort in capturing activities to deploy GPS tags. I, however, tried to identify and band as many woodpeckers I could within the national parks in order to monitor them in the long term.
Point counts				I sampled woodpecker presence in 343 locations. I could detect woodpeckers in just 4% of these locations. From these points, 223 key locations were sampled in three opportunities along the breeding season.
Ground-truth samples				I sampled 582 20 m radius circular plots across the study area. In these plots, I also assessed indirect woodpecker occupancy traces (i.e. pecking marks).
Modelling				As I could not deploy GPS tags on woodpeckers, we missed a big part of the behavioural modelling part of the project. However, the amount of collected data permitted to build a good assessment of the relationships between the Magellanic woodpecker and the Valdivian rainforest through the use of a hierarchical occupancy model, instead of the previously proposed individual-based model. In addition, data allowed to build a prediction of nesting habitat and a population estimate. These results are described in the attached report and will be published as soon as possible with full detail in scientific journals and included in a formal report to be presented to the Chilean forest management agency (CONAF) this year.

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

I had one big issue that compromised the data collection for this project. We experienced the robbery of a part of our sampling tools from the lab at University of Santiago de Chile. The avian GPS devices were stolen along with banding materials. We were not able to recover them after this unfortunate event. We did our best to find other funding sources to replace them but they were not ready for deployment until it was already the end of the Austral spring, when woodpeckers are difficult to capture. Since the use of these devices is fundamental to fully understand the responses of woodpeckers to the different forest structures, we are planning to deploy them this upcoming Austral spring.

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

First, this project allowed me to work with people I could not reach in other contexts. For example, I interacted and learned from the park rangers about the opportunities and limitations they face when trying to address conservation issues (e.g. cattle, illegal firewood extraction, etc.). I also met several eco-tourism operators, landowners, and local communities, who shared with me what they considered their knowledge gaps regarding to forest processes and ways to address conservation from the landowners' perspective.

Second, I had the opportunity to participate and inform the creation of formal management criteria for one of the three administrative regions I was working on.

Third, I could quantify three key aspects about my focal species; their annual distribution, their potential foraging habitat distribution, and their potential nesting habitat distribution. In addition to its relationship with the Valdivian forests. With these results, I also quantified the first population estimate for the species in this region.

I also, quantified key parameters of the links between the species and forests attributes that are strongly related with management prescriptions. However, at large spatial scales.

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?

This project is part of my PhD dissertation, which is part of my lifelong project for the conservation of forest ecosystems. I want to keep myself investing time on exploring the patterns and processes regarding to human disturbance and its impact on these ecosystems.

In order to follow this path, I'm planning on going again to the field this year in order to complete the movement data collection with the GPS tags we acquired last year in order to have a better understanding of the patterns and mechanisms at finer spatial scales. Among them are the social rules that govern territory spatial allocation, a better assessment of foraging behaviour in non-*Nothofagus* forests and responses to landmarks within territories.

I would also like to sample bird community soundscapes in order to explore the relationships of this particular species and the bird community. To do this, I am starting a collaboration with researchers working at the Macaulay Library, at the Cornell Lab of Ornithology.

I am currently working on several different projects involving some aspects of other woodpecker-environment relationships including; nesting site selection, tree dieback process, saproxylic species effects on trees, predator-prey dynamics between saproxylic invertebrates and bird species, etc. My expectations from these projects include having a permanent research collaboration and a future research space in which researchers, students, managers, stakeholders, and the community could converge towards the conservation of the South American forests on site and from practice.

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

First, I will publish these results in scientific journals to have a formal and peer-reviewed support for my subsequent management-related actions.

Second, I would like to finish my proposed work with the Araucanía Regional Museum to develop educational materials and methods to teach children and landowners about forest conservation using the Magellanic woodpecker as a focal, indicator and charismatic species.

Third, I would like to address a formal commitment from CONAF towards the implementation of the outcomes from the activities described in the previous paragraph.

Fourth, update the actual National Conservation Plan of the species to define new priorities for future efforts.

Fifth, I will propose a new monitoring programme to CONAF, which will be based on the results of this project, with emphasis on the practical utility of monitoring effort, including the use of the tool eBird and the CONAF's ranger's time availability.

In the long term, I would like to finish writing my story of how I understood the ecology of woodpeckers from an applied point of view.

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 timescale followed the proposed schedule. There were normal and expected delays and issues which did not affect the outcomes of the project other than the mentioned before.

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
Housing	3207	2860	-347	I found very good deals of housing in some towns, which allowed me to use these towns as central bases for sampling in their neighbouring areas, despite sometimes longer travel times.
Per diem	177	550	+373	Per diem was more expensive than expected due to longer travel times, which forced me to buy prepared food more often than expected.
Gasoline	797	890	+93	I had to do more travels to some areas given access restrictions or errors in the available maps.
Vehicle maintenance	255	255	0	Used as proposed.
Banding materials	278	278	0	Used as proposed.
Total	4714	4833	+119	The difference was covered with personal funds.

I used the same rate of exchange from my proposal: £1.00=982,27CLP

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

The next steps involve the implementation of a National Monitoring Program on the Magellanic woodpecker (as birds are becoming banded) and use of the same system (e.g. eBird) to monitor other forest taxa.

The implementation of a collaborative network of theoretical and applied scientists, agency managers and stakeholders in order to start planning the implementation of actions intended to conserve and use the remnant natural resources (e.g. structured decision making, adaptive management, etc.).

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?

I used the logo in my scientific and outreach presentations, as well as in the project sticker in my motorcycle. The sticker and my helmet served as teaching materials while visiting private lands in the point count locations. Both items contained the most important tree species, the main woodpecker's prey, main woodpecker's identification attributes, and the local species name in the local native Mapuche language, Mapudungún. I found in this a very useful tool to engage local people while doing my research activities.

11. Any other comments?

This funding was extremely important for the "start kick" and realisation of my overall applied goals. This experience allowed me to travel three times along ~4,000 km of roads across most of the mountain ranges within my large study area. I met numerous people and got a much better sense of my study system in such a short amount of time.

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