

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

Your name	Dario Alejandro Moreira Arce
Project title	Identifying key habitats for the conservation of critically endangered Darwin's fox in a human-dominated landscape.
RSG reference	14165-2
Reporting period	2013-2015
Amount of grant	£5,989
Your email address	moreira.dario@gmail.com
Date of this report	October 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
To assess the spatial ecology of Darwin's fox, identifying home-ranges, pattern of movements, social organization; and		x		Even though five foxes were captured, only three of them were collared. The other two foxes were not large enough (1.9 kg) to use the purchased collars (140 g). We followed three foxes for 6 months with stored on-board GPS collars. However, dense understory forest prevents us to get a large amount of fixed points. Thus, spatial ecology information was evaluated with low data set.
To identity habitats important to Darwin's fox persistence and for structural connectivity between surrounding lands and The Nahuelbuta National Park.			x	We achieved this goal by using the information from radio collars and camera trapping. Thus, we identify suitable habitat conditions and areas important to provide structural connectivity for Darwin’s fox in Nahuelbuta Mountain Range.

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

The main difficult we found during the study was to get the permission to capture foxes within the Nahuelbuta National Park. Forestry Service of Chile denied the capture of animals within the protected. We, therefore, conducted the study around this protected area, capturing foxes in the border of national park and private lands. This allowed us to capture animals moving between the protected areas and surrounding lands.

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

Because the spatial ecology of Darwin’s fox in Nahuelbuta is almost unknown, any new ecological finding was relevant for our study. Our main findings were:

1. Darwin’s fox is patchily distributed across Nahuelbuta range reaching an ecological density of ca. 0.75ind/ha.
2. Darwin’s fox selects more undisturbed forest comprised by monkey puzzle tree and beech species (*Nothofagus* spp.).
3. Foxes display a home range (based on MCP) of ca. 4 km² .

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

We trained forest rangers of Arauco and Mininco Timber companies about the use of telemetry technique. Forest rangers were involved in the radio tracking of Darwin's foxes during the study period.



5. Are there any plans to continue this work?

We have renewed this project for 2 more years (until 2017). The goals are the following:

1. Capturing and tagging foxes in order to estimate the population density in other areas of Nahuelbuta range based on capture-recapture technique.
2. Long-term monitoring habitat use of Darwin's fox using camera trapping. Based on occupancy approach, we expect to evaluate the colonisation and extinction rate of occupied sites across the study area in order to assess the temporal component of Darwin's fox

habitat use. Moreover, we are going to run a new spatial ecology study using new collars that better perform in dense understorey.

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

Part of this study is contained in two already published papers:

1. Moreira-Arce, D., Vergara, P. M., & Boutin, S. (2015). Diurnal Human Activity and Introduced Species Affect Occurrence of Carnivores in a Human-Dominated Landscape. *PloS one*, 10(9), e0137854.
2. Moreira-Arce, D., Vergara, P. M., Boutin, S., Simonetti, J. A., Briceño, C., & Acosta-Jamett, G. (2015). Native forest replacement by exotic plantations triggers changes in prey selection of mesocarnivores. *Biological Conservation*, 192, 258-267.

In addition, we are going to share the main result in a brochure that will be spread in local communities around the Nahuelbuta National Park.

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

Grant was primarily used to purchase the GPS collars at the beginning of the project. Since we are going to continue the project until 2017, part of these GPS collars will be used during this period.

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
10 GPS collars for Darwin's fox with drop-off mechanism	11,979	12,123	-2,395	We had to pay an extra fee for custom duties so we purchased eight collars.
One high resolution satellite Image	1,165	1,450	-285	We had to include other additional services when purchasing the satellite image
Fieldwork (gas)	677	1,200	-523	We had to visit other areas that previously planned in order to increase the capture success.
Fieldwork (accommodation + food)	5625	5,370	255	We reduced this item by using the National Park cabin for free during our fieldwork.
Materials for handling Darwin's foxes	150	120	30	
Total	19,596	20,263	-667	

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

Based on our preliminary results, three main steps are necessary to address:

- Estimation of population density across the whole range of species in Nahuelbuta range.
- Darwin's fox - domestic dog spatial interaction and potential for spillover disease.
- Establishment of a long-term camera trapping and population density monitoring project.

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?

Rufford Foundation logo has been used in the all presentations we have given.

11. Any other comments?

We would like to apply for the 3rd and last grant to implement a research station in Nahuelbuta range.