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	Andrés Valenzuela Sánchez
Project title	Leaping into action: research and mitigation against chytridiomycosis in the Darwin's frog
RSG reference	23952-B
Reporting period	September 2018 to September 2019
Amount of grant	£5000
Your email address	avalenzuela@ranitadedarwin.org
Date of this report	October 18th 2019

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
Study the spatiotemporal dynamics of chytrid fungus infections in Darwin's frog metapopulations and syntopic amphibians				We have identified two Darwin's frog metapopulations (one in Contulmo and the other in Neltume). Six 20 x 20 m plots, delimited in the field using plastic strings, have been installed and the frogs inside monitored using spatial capture-recapture since October 2018
Trial a mitigation action against chytridiomycosis in local Darwin's frog populations				Three out of six exclusionary fences (see below) surrounding local Darwin's frog populations have been successfully installed and monitored.
Raise public awareness about Darwin's frog conservation				We have conducted 10 conservation talks and guided visits to the forest to show local people Darwin's frogs and their habitat. An estimated of 500 people participated during these activities. In total, we donated 20 popular science books "Discovering the Darwin's frog" to the attendants. We also made a campaign in social media to disseminate the project (see below)
Provide management guidelines				We have generated and gathered key information to provide management guidelines focused on Darwin's frogs. However, we estimate that we need 1 additional year of both field and office work to provide a robust document with recommendations that can be really useful for managers working with this species (for instance, we are still estimating movement parameters that are very important in conservation management. Additionally, we need extra time to determine the medium-term effectiveness of the enclosures).

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

The installation of the exclusionary fences was much more difficult than anticipated. The field logistics were not easy; we had to move a great number of heavy aluminium sheets and wooden stakes across dense vegetation, across streams and steep areas, many times during harsh weather (Fig. 1A). We successfully installed three exclusionary fences (Fig. 1B-D) out of six we proposed originally. These enclosures are now fully operative (i.e. putative chytridiomycosis reservoirs have been excluded and Darwin's frog populations monitored since October 2018). Although we installed half of the exclusionary fences we originally proposed, the costs related to this item were £1,896 more expensive than originally planned. This extra cost was handled by reducing other costs when possible (e.g. food, accommodation, transport) or by using additional funds provided by the NGO Ranita de Darwin (£192).

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

For the first time, we are starting to understand the metapopulation dynamics of Darwin's frogs (how frogs move across the landscape and how near local populations interact with each other), how they interact with other amphibians and with the chytrid fungus.

We installed and monitored a novel mitigation action against chytridiomycosis in the field. The management of this devastating disease has been proved to be difficult and we believe that, if successful, our mitigation action will be of great utility for several species of amphibians around the world.

We reached a large audience during our conservation talks, excursions to the forest with local people and social media campaign. We feel we are successfully spreading the message about the importance of protecting this amazing species and its habitat!

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

We have actively collaborated during this project with locally based NGOs (Huilo Huilo Foundation, Nahuelbuta Natural Foundation), local park rangers, tourist guides, and landowners.

Additionally, local people participated of the conservation talks and guided visits to the forest. We donated 20 books "Descubriendo a la Ranita de Darwin" to some of these attendants.

Figure 1. Installation of the exclusionary fences, a possible mitigation action against chytridiomycosis in Darwin's frog populations. In A) fieldworkers move the aluminium sheets used to build the enclosures. In B) a fieldworker is digging the ditch required for the fence during a day of harsh weather. Fences that have been successfully installed are shown in C and D.

5. Are there any plans to continue this work?

Yes, we have received partial funding from the National Geographic Society to continue this project for 2 additional years. We will continue the observational study (objective 1), the monitoring of the exclusionary fences (objective 2) and our outreach work (objective 3). We will install new exclusionary fences in populations threatened by the chytrid fungus. Finally, we will complete and disseminate among conservation managers the management guidelines (objective 4).

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

We have already shared our results using the website and social media of the NGO Ranita de Darwin. Additionally, during the conservation talks we presented preliminary results of the project. We are also preparing a scientific manuscript to partially present the results of this project to the scientific international community.

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 over the period originally planned, i.e. between September 2018 to September 2019.

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 (NOTE: One £ sterling is equivalent to 921 CLP).

Item	Budgeted Amount	Actual Amount	Difference	Comments
Books for outreach	400	400		Books provided by the NGO Ranita de Darwin
Food and accommodation (during fieldwork)	5900	5410	-490	We reduced accommodation costs due to the collaboration the Huilo Huilo Foundation
Transport (for fieldwork)	3540	2605	-935	
Manpower used for fences construction (enclosure experiment)	590	1000	+410	Harsh weather conditions increased the working days required to complete this task
Materials and equipment used for fences construction (enclosure experiment)	1770	3256	+1486	Fence materials and equipment required were much more expensive than originally calculated
Consumables (fieldwork materials, laboratory material and reagents, etc.)	4720	4441	-279	We reduced costs by using fieldwork materials donated by NGO Ranita de Darwin and Universidad Austral de Chile

TOTAL	16920	17112	+192	The extra cost was covered by NGO Ranita de Darwin

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

I feel that important next steps are to keep the monitoring of the observational and manipulative studies. We also need to maintain our close relationship with local communities. Importantly, it is imperative to provide useful and easy-to-understand management guidelines. During the project we also identified that local, private (and many times small) landowners are very important for the conservation of Darwin's frogs. We are working to sign voluntary conservation agreements with these people in order to enhance the protection of native forests in southern Chile. Finally, it is very important to engage more people in the conservation of this species and its habitat. For this reason, we are very involved in the implementation of the Darwin's Frog Conservation Strategy; we feel this initiative is critical to coordinate and increase the efforts devoted to the conservation of the austral temperate forest.

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

Yes, the logo was used in the website (www.ranitadedarwin.org/emerge) and conservation talks. The webpage received 10,000 visits during the duration of the project. We gave 10 conservation talks and guided visits to the forest to show local people Darwin's frogs and their habitat. In these activities participated an estimated of 500 people. In total, we donated 20 popular science books "Discovering the Darwin's frog" to the attendants. Additionally, we publicised it on social media. We made 29 publications related to the project (we called it "Proyecto Emerge" for short) in Facebook and Instagram that reached over 50,000 people and accumulated more than 4,000 likes and shares.

11. Please provide a full list of all the members of your team and briefly what was their role in the project.

Andrew A. Cunningham, Benedikt Schmidt, Claudio Soto Azat and **I** were involved in the design of this study. They also collaborated during data analyses and interpretation. Andrew and Claudio also collaborated during fieldwork.

Alejandra Valenzuela and **Soledad Delgado** were involved in the design of the outreach work. Soledad Delgado and I performed the conservation talks and guided visits to the forest. Soledad Delgado and I led all the fieldwork activities.

Soledad Delgado was also in charge of the social media releases and I designed the webpage. The complete team has participated and will continue participating in the preparation of the management guidelines.

12. Any other comments?

My team and I are very grateful to the Rufford Foundation for all the support provided to our Darwin's frog conservation projects since 2014. This has been an amazing journey that will not stop soon; there is much more to learn and to do for the conservation of this amazing species! The knowledge generated thanks to the foundation's support was critical for the development of the "Bination Conservation Strategy for Darwin's frogs", a conservation initiative that seek to save Darwin's frogs from extinction. We are very proud of leading this collaborative effort, and happy to see that awareness about the importance of Darwin's is starting to grow in Chile and elsewhere.

I want to thank all the organisations (NGO Ranita de Darwin, Fundación Huilo, CONAF, Universidad Austral de Chile, FONDECYT, Centro de Investigación para la Sustentabilidad UNAB, Zoological Society of London), researchers (Soledad Delgado, Claudio Soto, Andrew Cunningham, Leonardo Bacigalupe, Inao Vásquez) and especially to the many voluntary fieldworkers (Maricela Núñez, Diego Peñaloza, Juan Carlos Vásquez, Sebastián Villanuevas, Teresa Santelices, Victoria Concha, Fernanda Pozo, Jaime Beltrand, Daniel Navarro, Osvaldo Cabeza) that made all these amazing activities possible.

A project webpage is available at: https://www.ranitadedarwin.org/emerge. For further information please send me an email to: avalenzuela@ranitadedarwin.org.