

## Final Project Evaluation Report

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We ask all grant recipients to complete a project evaluation that helps us to gauge the success of your project. This must be sent in **MS Word and not PDF 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 – remember that negative experiences are just as valuable as positive ones if they help others to learn from them.

Complete the form in English and be as concise as you can. Note that the information may be edited before posting on our website.

Please email this report to [jane@rufford.org](mailto:jane@rufford.org).

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Your Details	
Full Name	Gonzalo Ossa
Project Title	The Next frontier of White nose Syndrome: Identifying areas of Chile vulnerable to disease transmission in order to facilitate preventive efforts
Application ID	23042-2
Grant Amount	£5000
Email Address	<a href="mailto:chalofoh@gmail.com">chalofoh@gmail.com</a>
Date of this Report	20-06-2018

1. 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
Describe environmental conditions (temperature and relative humidity) relevant to the growth of the WNS fungus, <i>Pseudogymnoascus destructans</i> (Pd), inside bat roosts, potential hibernacula, and commercial tourist caves in Chile				<p>Between December 2017 and April 2018, we searched for caves throughout Chile. We found 10 caves and mines from the Arica and Parinacota to Magallanes region, covering a latitudinal range of 33°. Caves and mines were located along the coast and in the Andes range, covering an altitudinal gradient of 2.000 m asl. At each region, we installed temperature and humidity sensors.</p> <p>The sensors will be recovered at the beginning of 2019, to download and analyse whether these caves are suitable for the growth of the fungus responsible for WNS.</p>
Repeat our fieldwork in Central Chile and Patagonia				<p>This year, we continued to collect data in Central Chile and Patagonia. We significantly expanded our dataset, especially in Patagonia, where we only captured two bats in 2016. In 2017, we captured and tracked 15 bats. Now we have enough data to understand how <i>Myotis</i> and <i>Histiotus</i> in Chile use torpor, at least at the end of their hibernation.</p>
Monitor Temperature and humidity in a landscape gradient in Central Chile and Patagonia, to know the environmental conditions in our study site.				<p>In addition to the installation of sensors in caves throughout Chile, we installed three temperature and humidity sensors in each one of our primary study sites (central Chile and Patagonia). In central Chile we installed them along an altitudinal gradient used by both species, <i>M. chiloensis</i> and <i>H. montanus</i>, which covers around 1000 m of slope. In Patagonia we installed them in three different forest environments to</p>

				understand how bats search for their roost trees. All sensors here have bluetooth, so we can download the data during the year for preliminary analyses.
Describing the WNS-status of the bats in Chile				As in 2016, we found no evidence of WNS in Central Chile or in Patagonia via UV light. Further studies using the forensic swabs (n = 101) confirm the absence of the WNS fungus in our study sites.
Show our work to the authorities and public				We presented our work in every protected area we visited, in order to include the authorities and rangers in this project. CONAF (National Forest Corporation), SAG (Wildlife and Livestock Authority) and the ISP (National Health Institute) are at this moment very interested in a workshop to understand better the disease and how to control it in case it arrives.
Show our work in an international conference				We presented a dissertation "Different climates, same answer: wide use of diurnal torpor in bats at different ecoregions of Chile" (in Spanish) at the 2 <sup>nd</sup> Latin-American bat conference in El Salvador Nov 2017

**2. Please explain any unforeseen difficulties that arose during the project and how these were tackled.**

Because of the size of the country (more than 5.000 km) it was difficult to travel to caves in order to install the temperature sensors. In addition, we also had to obtain permits from the National Forest Corporation (CONAF) for each cave or mine inside a protected area (attached), and a special permit from the National Monuments Council (CMN) to work in the Milodon's and Pali Aike caves in Magallanes (Attached), before we could travel to each site. To obtain the CMN permit we had to contact an archaeologist from Magallanes who had to go with us to the sites. This took more time than expected, but we were eventually able to deploy temperature sensors as we originally proposed.

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

- a) By 2019, we will have collected the first environmental data from caves and mines used by bats in Chile. This dataset will include sites from a wide range of latitudes and altitudes. While deploying dataloggers for this study, we discovered new and important hibernacula sites, sometimes with bats, sometimes only faeces.

- b) By increasing the number of bats we captured and radio-tagged, we have gained a better understanding of how bats regulate their body temperature during the end of winter in both sites (Central Chile and Patagonia). This year we radio-tracked five *Myotis* and six *Histiotus* in central Chile and five *Myotis* and 10 *Histiotus* in Patagonia. Combined with our data from 2016, these data will form the backbone for our hypothesis driven study which will be published in an international peer-reviewed scientific journal in the near future.
  
- c) Our research received great interest from the authorities, including the National Forest Corporation; Livestock and Agriculture Service; National Monuments Council and the National Health Institute, of which with the latter we signed an agreement to obtain skin samples from the bats they receive for rabies analysis. For RMG-1, we will use these samples to study population genetics in Chilean bats to understand the risk of WNS spreading through their populations.

**4. Briefly describe the involvement of local communities and how they have benefitted from the project.**

We gave presentations to the staff of the National Forest Corporation, in order to communicate about our project and how it is important for local conservation. They agree with us about the importance to protect caves and mines where bats hibernate, and to control the entrance of the fungus to the country.

We gave a presentation about WNS to the National Health Institute authorities, and we signed an agreement to obtain skin samples from the bats they receive for rabies studies. Those samples will help us to understand how bat populations in Chile are linked genetically, and therefore how the fungus could spread among them.

Authorities in Chile are very interested in our project at this point, because they value the preventive sense of it. Chile is considered a biogeographic island, and all the authorities are concerned about white-nose syndrome.

**5. Are there any plans to continue this work?**

Yes. We plan to continue our research to begin to study the population status of bats in our two study areas. Because the status of local populations in Chile is unknown, addressing this gap in knowledge is critical in preparation for potential spread of white-nose syndrome.

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

We plan to present our work at an International Bat Research Conference later in 2018, and submit several publications on the subject in the near future.

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

This grant was used in its entirety from October 2017 to April 2018 as anticipated in our original proposal.

**8. Budget: 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. It is important that you retain the management accounts and all paid invoices relating to the project for at least 2 years as these may be required for inspection at our discretion.**

Item	Budgeted Amount	Actual Amount	Difference	Comments
Environment Dataloggers	3943	3434	-509	Finally the dataloggers were a little more cheap, and Joseph Johnson took them to Chile
Hotel	150	20	-130	I spent several nights in my car during the installation of the dataloggers
Fuel and toll	96	197	+101	Chile is long! Most places were far away
Vehicle rental	640	708	+68	
Flight tickets (Arica)	52	184	+132	All tickets were more expensive than expected
Flight tickets (La Serena)	23	0	-23	I didn't use this place
Flight Tickets (Balmaceda)	48	105	+57	All tickets were more expensive than expected
Flight tickets (Punta Arenas)	48	220	+172	All tickets were more expensive than expected

Exchange rate used: 1GBP = 832CLP

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

The most important next step is to understand the connectedness of Chilean bat populations. This will help us estimating the potential threat WNS presents, such as the speed of transmission between these populations. This information is crucial and will assist us to inform the governmental agencies already becoming involved in our research.

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

Yes, we printed t-shirts and caps with the Rufford Foundation Logo. These were worn during all field work and presentations, as well as in a video presenting our main studied species and the importance of bat conservation in Chile (<https://www.youtube.com/watch?reload=9&v=eoxHwndSs5c>).

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

**Gonzalo Ossa (GO)**  
**Thomas Lilley (TL)**  
**Joseph Johnson (JJ)**

Preparation of the proposal for RSG-II (GO, TL, JJ)  
Coordination and preparation of field work (GO)  
Acquisition of environmental sensors and sampling equipment (GO, TL, JJ)  
Additional funding (TL, JJ)  
Participation in field work (GO, TL, JJ)  
Permit preparation to work in protected areas and national monuments (GO)  
Data retrieval and analysis (GO, JJ)  
Conference presentation preparation (GO, TL, JJ)  
Conference participation (GO)  
Coordination of bat video (GO)  
Swab quantitative PCR and data analysis (TL)  
Preparation of further publications (GO, TL, JJ)

**12. Any other comments?**

We are very grateful for the funding provided. It has helped us understand the potential of WNS occurring in Chile, and vastly increased our knowledge of Chilean bats.