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	Marco Tulio Oropeza-Sánchez
Project title	Effects of Land-Use Changes on Amphibian Diversity along an Altitudinal Gradient in Central Mexico
RSG reference	27008-1
Reporting period	February 2019-January 2020
Amount of grant	£4872.00
Your email address	mtos0290@gmail.com
Date of this report	January 2020

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 determine the patterns of amphibian species richness on riparian forest remnants at different altitudes.				We have completed the fieldwork. We did not find significant differences on amphibian species richness at different altitudes but there is a trend, of a greater number of threatened species on higher altitudes.
To determine species-specific amphibian responses to land-use change and local habitat quality.				We are analysing the data to determining amphibian species response to land-use change.
To determine the importance of riparian forest remnants for amphibian communities within landscapes encompassing different levels of urbanization.				We found that riparian remnants are very important for the survival of threatened species.
To publish the results of the research.				We have already submitted one manuscript to a scientific journal (Biological Conservation) and presented our research in one international congress (ATBC-2019, Madagascar).

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

The principal difficulty was the selection of the study sites. Originally, we suggested considering 60 riparian remnants in the Trans-Volcanic Mexican System (TVMS). Nevertheless, there were some logistic limitations such as security problems in the study region and therefore the number of study sites was reduced to 33 in the TVMS and the number of remnants were completed with 27 remnants from the Sierra Madre del Sur (SMS).

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

Our first outcome was generating occurrence data for threated species and diversity analysis. Overall, we detected 20 amphibian species within riparian forest

remnants, of which five species are catalogued in the IUCN Red List and seven are included in Mexican law NOM-059. These threatened species are more frequently found at higher altitudes. These findings are very important since we can select sites according to species extinction risk, which could be a first approach for implementing conservation strategies in the study region.

As a second outcome, we observed the presence of the salamander *Ambystoma ordinarium* in 20 sites of 60 sites. This salamander is catalogued as Endangered by the IUCN and Protected by the Mexican NOM-059. Therefore, *A. ordinarium* could be used as a flagship or umbrella species for the conservation of riparian forests remnants and their associated plant and animal species.

Thirdly, we collected information on amphibian species richness considering the detection probability leading to a more robust information regarding species incidence.

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

One objective of the project is involving local communities establishing a cordial line of communication in the course of the fieldwork. Once, we have analysed all collected data, we would provide the local people with our findings and propose together conservation strategies for amphibians and the remaining water bodies.

5. Are there any plans to continue this work?

I am very interested in to continue this project but in a lower number of sites (e.g., 20). In this region a total of 35 amphibian species have been recorded (15 more than in our study), probably due that we only sampled during the day. Considering diurnal and nocturnal species concurrently, we could determine patterns of diversity, time of activity, interactions between amphibian species that could drive the community structure and species assemblages. Additionally, I am interested in evaluating the prevalence of fungal pathogens, such as *Batrachochytrium dendrobatdis* and thoroughly monitor for the presence of *B. salamandrivorans* to prevent the spread of this pathogen if it is introduced to the country because the limited knowledge about these diseases in the amphibian populations of the study region.

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

I plan to share the results by publishing in international scientific journals and by presenting our results to the local communities. I would present the results in scientific meetings and publish the information in scientific outreach journals.

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 received at the beginning of the fieldwork. Therefore, this was a perfect timing to achieving every sampling event successfully. The grant was employed to pay for sampling equipment, food, transportation and accommodation in the study region. For the last part of the research, the work with local communities, we are searching for funding at UNAM and Universidad Michoacana.

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
Teaching materials	300		-300	This has not been expending
Food	1440	1510	+70	
Terrestrial transportation	2160	2160		
Accommodation	372	372		
Sample preservation	400	400	-	
Weathers	200		-200	Initially, it was not in stock and therefore this amount was used for the maintenance of the field vehicle
Vehicle maintenance		120	+120	
Bank fees – amount transfer		323	+323	I received a total of 4548.90 **£** due to the bank fees
Total	**4872**	**4885**	**+13**	I had to pay 13.1**£** to completing the last sampling

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

Publish our results referring about the threated amphibian species at high altitudes. I have to continue analysing the collected data. I aim to determine the community assemblage response to land-use change and evaluating the use of *A. ordinarium* to implement conservation strategies.

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?

No, I have not been using the Rufford Foundation logo but, I will mention Rufford Foundation under the acknowledgement section in the scientific publications and presentations.

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

My self, M.Sc. **Marco Tulio Oropeza-Sánchez** as a PhD student of the project, has been involved with the sampling design, fieldwork, analysis of the data and interpretation of the results, as well as drafting the scientific manuscripts.

Dr. Ireri Suazo-Ortuño, is the leading researcher of the project and member of my PhD research committee.

Dr. Julieta Benítez-Malvido and, **Dr. Roberto Munguía-Steyer** have been PhD thesis co-advisors with paramount support with the logistics of the study design and fieldwork, data analysis and interpretation.

Finally, the bachelor students, **Erandi Monroy-Hernández, Julio Rosales-Vilchiz** and, **Andony Eduardo Olmos-Mercado** have been field assistants, working under my supervision and performing fieldwork, species identification, specimen preservation, data analysis and interpretation.

12. Any other comments?

The support from The Rufford Foundation was fundamental for my PhD research fieldwork and is very much appreciated.