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	Milena Delatorre Nunes
Project title	Conserving anuran and aquatic plants in livestock-dominated Brazilian wetland landscapes
RSG reference	14569-1
Reporting period	October 2014 - October 2015
Amount of grant	£5953
Your email address	milenadelatorre@gmail.com
Date of this report	January 2016

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
Understand what are the processes that determine the formation of aquatic communities in freshwater ponds of Pantanal wetlands.		X		Our preliminary results indicate that two processes determine the assembly of plant aquatic communities in this wetland. It seems that inundation is the most important variable, which promote processes related to density-dependent interactions in larger and deeper lagoons. For shallow and smaller ponds, stochastic processes seems to be the driver of communities. Even with the measurements of impact promoted by cattle taken directly in the field have not been sufficient to detect any effect of cattle ranching on aquatic communities, apparently there are a synergy between cattle and smaller and shallower ponds, because the cattle uses theses lakes more frequently. We are working with GIS technology - Landscape Ecology - to better incorporate spatial analysis and cattle presence in our models. For anuran communities our preliminary results point that the cattle do not determine the phylogenetic and functional structure, but again the density-dependent processes act at larger and deeper lagoons and stochastic processes at shallow and smaller ponds. This last preliminary result is consistent with other results in Pantanal (please see Delatorre *et al.* 2015 - Freshwater Biology 60 (11), 2197–2207).
To evaluate the functional and phylogenetic diversity of anuran and aquatic plants in stressful environments due the livestock.		X		Our preliminary results indicate that functional and phylogenetic diversity of plant is higher at larger and deeper lagoons. Which might be associated with the higher frequency of occupancy of cattle in shallower and small ponds. The landscape ecology will help us to elucidate this issue.

Verify if the presence of the cattle may limit the occurrence of certain species or even families.			X	Our preliminary results do not point that cattle presence promotes the exclusion of any family or species.
Identify the species most sensitive to the livestock, both aquatic plant and anuran species			X	Since we fail to find strong relationship of cattle presence and plant assemblages, it is not clear, until now, which are the most sensitive species to the livestock. However, we aim to explore the data with different models (e.g. "HOF models") to check for sensitivity of species. Moreover, the know plant species preferably consumed by livestock were less frequent in ponds where these take up, but were not completely excluded by the interaction with cattle.
Selection priority areas for conservation at spatial scale of the study.		X		Based on our preliminary results, it would be interesting the design shallow and smaller ponds as priority areas for conservation. We observed high variation of species composition and community structure in such ponds, which might be associated with stochasticity promoted by the annual flood and cattle trampling.
Propose conservation and mitigation actions for federal organs responsible for environment conservation and sustainable development.		X		Since this study is still in progress, we did not proposed any possible mitigation measures for federal and state governments, as well as conservation plans.

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

We had limitations to work due the unusual persistent and powerful flooding in 2014 (please see email where I explained this situation - September 8th 2014). We proposed one fieldwork during the rainy season and a second one in the dry season. Nonetheless, the scenario found in 2014/2015 was a mixed of dried and flood period, there was no clear distinction between seasons. Because of that, we restrict our sampling to a single season and used the pond area and depth as a proxy for inundation.

Further, we had logistic problems that forced us to change our fieldwork location from the region of experimental farm of Embrapa Pantanal (federal organ at northern portion of sub region of Nhecolândia) to an ecotourism farm at southern portion of Nhecolândia (Barranco Alto farm - http://www.fazendabarrancoalto.com.br/). At the northern portion the area of ponds have an average of 3,800 m^2 and the southern portion about five times higher (20,500 m^2). Because of this enlargement of lagoons, we reduced the number of sampled ponds, since we were only able to sample two ponds per day, instead of three to four as previously thought. Moreover, such change was to allow the feasibility of the project, staying longer periods in the field was not viable because of the costs associated (e.g. car rentals, lodge, fuel, etc.). Nonetheless, this reduced number of sampling sites did not interfere on the study, because we were able to capture wide variation of cattle area use (from reserve without cattle from 30 -35 year until a lands heavy used by cattle).

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

1- Studies aimed on understanding patterns of phylogenetic and functional structure of communities of plants are very common in terrestrial temperate and tropical habitats. In aquatic environments there are some studies with aquatic insects, however, until the best of our knowledge, there are no studies with aquatic plants. Therefore, we assume that our project has contributed to the understanding and conservation of aquatic communities, which is of most importance in an ecosystem like the Pantanal wetlands.

2- The annual flood seems to be the most important driver on the structuring of aquatic communities.

3- The cattle are in the Pantanal for near two centuries, and their presence does not seems to limit the occurrence of species of aquatic plants and frogs. However, the phylogenetic and functional structure of small communities in shallow lakes appears to be somehow affected by the presence of cattle.

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

Local community benefitted less from this project than we have expected, just because the local people that we worked with was more involved with Pantanal conservation than we assumed. It was possible to notice that from the cattle manager until his children; virtually all the people associated with this activity have a rudimentary idea about biological conservation. This impression is probably biased and cannot be extrapolated to all Pantanal because we worked on an ecotourism farm, where they already have learned about the importance of conservation and maintenance of the species for the suitable functioning of the ecosystem dynamics (please see the link http://www.fazendabarrancoalto.com.br/pt/ciencia.html). Furthermore, every day in the field station we could teach them to identify some local aquatic flora and anurans (from

comparing photo and vocal register with some alive species) and its phylogenetic relationship in a simplified way, and also introduce some ideas on how the wrong cattle management can breakdown the system dynamics. However, part of our research will soon be released to the local community through the "Pantanal Science magazine" (*Revista Ciência Pantanal*, original title in Portuguese), which promotes understanding between science and man of the field.

5. Are there any plans to continue this work?

We feel that we made significant progress by assessing the susceptibility of aquatic communities with cattle. Moreover, until the best of our knowledge, this is the first attempt to correlate the effects of cattle ranching on aquatic communities, and now we would like to focus our attention towards the understanding mechanistic processes involved in these relations. We aim to explore such processes using controlled experiments with aquatic organism.

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

- These results will complement a PhD thesis.

- Meetings with local communities and local magazine ("Ciência Pantanal"), which has a partnership with WCS Brazil (Wildlife Conservation Society , please see- http://brazil.wcs.org/WCS-Brazil/News/articleType/ArticleView/articleId/2613/Ciencia-Pantanal-Magazine--Release.aspx and http://famasul.com.br/assessoria_interna/revista-especializada-levara-conhecimento-cientifico-ao-homem-pantaneiro/28821/).

- Presentations on meetings, conferences other events.

- Shared with colleagues of the scientific community through the publication of several research papers in specialised 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?

November/December 2014. We had to delay the start of the project (February 2014 according to the proposal) due to difficult to access the sampling regions as mentioned above.

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
Diesel	£1083	£438	£646	We had to change fieldwork location and consequently reduce the amount of time in the field (please see question 2 above), therefore this difference was used in the item 'Other'.
Lodging + food	£3750	£778	£2972	We had to reduce our time executing the fieldwork (please see question 2 above), and therefore this difference was used in the item 'Other'. Beyond that, the farm owner was interested on supporting research and offered us a special price for lodge and food.
Waterproof Overalls with rubber boots	£208	£208		
Gas hothouse	£56	£56		
Wooden presses	£56	£56		
Gas canister	£29	£63	-£34	We needed more gas than previously thought, and the price was more expensive either.
Head flashlight	£183	£183		
Alkaline Batteries AA	£32	£72	-£40	The flashlight used more AA batteries than expected, which make us need to buy more AA batteries.
Alkaline Batteries AAA	£85	£13	£73	We almost did not use AAA batteries, since the best flashlight used only AA batteries.
Alkaline Batteries D	£138	£31	-£107	The flashlight used more D batteries than expected, which make us need to buy more D batteries.
Primer for education plan	£333	£0	£333	Because some unforeseen difficulties we opt to use this money for the fieldwork (please see item 'other'). We do this considering that now there is a local and popular magazine

				(Called 'Ciência Pantanal') where we would like disclose the results to the local community.
'Other'(Rent Pick-up car)	£0	£4083	-£4083	Because the need of changing the sampling location, we lost the support with loan the four-wheel pick-up from Embrapa Pantanal and had to rent a car to be able to access to sampling farm. Rent day: £116,66
Total	**£5953**	**£5980**	**-£27**	**The local exchange rate was R$3,60**

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

To develop a long time monitoring programme (mechanistic studies) of aquatic communities facing the impact of cattle ranching is very important to understand specific processes (e.g. tramping and grazing intensity) involved in this relation. The understanding of such mechanisms may help to move forward to ensure success in conservation initiatives in human-dominated Brazilian wetland landscapes.

To convince the big cattle ranchers to adopt conservation actions that can reduce the impact of livestock on aquatic biological communities, mainly at shallow and smaller ponds, is our major challenge now.

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?

We constantly acknowledge the RSGF and the logo was used in slides for talks and department informal seminars delivered about the project. Acknowledgement of the RSGF for supporting the project will be listed in the appropriate section of all publications.

RSGF received publicity all the time that we explained the project to anyone.

11. Any other comments?

Projects like this are very important to know more about effect of human-land used on wildlife and local communities. However, it is very difficult to get resources to develop projects in our country, even more in an inhospitable and difficult to access region like Pantanal. Therefore, we are extremely grateful to Rufford Small Grant Foundation for funding this study and contributing for conservation initiatives in the region. Moreover, the flexibility in the use of the funds was critical to execute the project. Thank you so much RSGF.

The Rufford Foundation
www.rufford.org