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	Tiago Borges Kisaka
Project title	Trophic Structure of Invertebrate Benthic Associated with Seasonal Hydrologic and Microhabitat Variations in Cerrado Streams
RSG reference	19719-1
Reporting period	16th January 2017 - 17th February 2018
Amount of grant	£ 4056
Your email address	Tiagobk.df@gmail.com
Date of this report	17/02/2018

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
Differences in the composition of invertebrates and functional groups of benthic invertebrates as a function of habitats and along hydrological variations				I am in the step of identifying the invertebrates. The taxonomic identification for some groups I reach the level of gender and this takes a longer time because I need to make sheets for a microscope. However, the rest of the data has already been tabulated. It was characterised 524 habitats and three samplings for each season and each stream. I will finish the identification this month (February). More than 3,000 invertebrates have been identified. In April 2018, I will fully achieve this objective.
Differences in the trophic relationships of carbon and nitrogen stable isotopes as a function of habitat and due to differences in flow				The isotopic analysis will be the goal with the longest time to be fully achieved. Since after the identification is finished the samples will be weighed on an ultra-analytical scale and soon afterward they will be sent to another unit where the stable isotopes of carbon and nitrogen will be measured. This stage is expected to be completed by October 2018.
Interactions between light intensity (bottom-up) and invertebrate grazing (top-down) determined the standing stock of epilithic algae in a nutrient-enriched stream				This goal has been fully achieved. I am in the writing stage of the manuscript. I got good results. Our results demonstrate that in eutrophic, high light streams, periphyton algae can quickly accumulate to nuisance levels in the absence of invertebrate grazers. The first publication will come from these results. The suggested magazine is Freshwater Biology.

Patterns of benthic community traits in neotropical streams: relationship to mesoscale spatial variability				These results will be fully achieved in May 2018 where I will make a technical visit to the University of Lyon in the Biodiversity Laboratory of Ecosysèmes Lotiques, where Professor Sylvain Dolédec will guide me.

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

The unforeseen difficulties that I had were during the receipt of the funding. The bank branch from which I am registered has never performed this kind of exchange operation. The money eventually returned to Rufford due to the delay in carrying out the operation, but you sent it back to me. I apologise once again for all this trouble I caused to Rufford. Given this, the samplings and analyzes delayed approximately 4 months. The money foreseen for the isotopic analysis was not enough, but my advisor and I are trying to get another form of funding for these remaining analyses.

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

Previous results show that the community changes due to seasonality (rain and drought) and with different habitat structures. In the dry season, the abundance is about three times higher than in the rainy season. Areas of the stream with higher grain size, litter, and lower water velocity accumulate greater species diversity and abundance. The studied streams are not homogenous in their habitat structure (granulometry and percentage of organic matter for example) depth of the water slide and flow velocity.

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

There were no specific immediate benefits for local communities from this project. However, I have been able to measure the intrinsic biodiversity of these environments that urgently needs to be protected. The aquatic insects have important role in protecting and restoring aquatic ecosystems and their benefits and services to humans are not obvious to decision makers or the public. Insects are food for fish, amphibians, and wildlife. They are important contributors to energy and nutrient processing, including capturing nutrients and returning them to terrestrial ecosystems and purifying water. In addition, the study further shows that urban and rural planning should take into account the effects of soil impervious on the increases in intensity, magnitude and frequency of peak flow events in the rainy season. These effects will cause the loss of the ecological integrity of these ecosystems. Disorderly occupation is a recurring problem in my region where I live.

5. Are there any plans to continue this work?

Yes, after this study is concluded, we will identify the main questions that need to be addressed and delineate a new research proposal to move forward with increasing our knowledge of stream ecology for their conservation and management. My thesis will be defended in March 2019. After that date, I will have plans to continue my work, since new undergraduates and masters are joining the research group. We are also looking forward to the possibility of studying the recovery of these ecosystems.

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

We are currently working on a manuscript of the experiment which we intend to submit this year to an international peer-reviewed scientific journal with an impact factor that suggests many will access the research results. We also intend to present videos at YouTube to present the results simply with the objective to make the people aware about the importance of conservation of these ecosystems. Technical reports will also be provided for environmental agencies in Brazil. I made a brief video showing my project and how I am planning to have my results disseminated to the public. Follow the link:

https://youtu.be/SdqoYJpZH7Y

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

I received the letter of approval in January 2017 but received the money only in July 2017, because of the problems that I had with my bank. All resources from the grant were used for fieldwork from July 2017 to December 2017. Because of that I had a delay in my samplings. However, I was able to make up for lost time and this funding from Rufford helped me a lot in carrying out my project. The Brazilian Government drastically reduced funding for scientific research.

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
All-Weather Rain Gauge, Metric – Rain Monitoring meansure. Cost of six Rain Gauge	240	0	240	We opted not to purchase this item to cover the extra field expenses.
D-Net -macroinvertebrates - Cost of two nets	210	173	37	-

Plankton net - sampling of seston Cost of two nets.	260	173	87	-
Personal protective equipment (raincoat,snake gaiters, windward PVC cleated sole chest waders) – protective equipment in the field	260	332	-72	-
Lab Supplies (centrifuge tube, graduated cylinders, erlenmeyer flasks, filter flasks)	130	306	-176	-
Chemicals and Test Solutions (probes test solutions, Ethanol, hydrochloric acid)	230	30	200	-
Car fuel – Fieldwork displacement. Petrol consumption of 1 liter per 10 km traveled, and a petrol price of £0.70 per liter.	230	258	-28	-
Vacuum/Pressure Pump - Filtering the collected materials (seston and periphyton)	546	516	30	-
Filtration Systems Millipore - Filtering the collected materials (seston and periphyton)	260	337	-77	-
Glass Fibber Filters (100 un.) - Filtering the collected materials (seston and periphyton). Cost of tree boxes with 100 filters.	200	60	140	-
Spare parts (Maintenance) – costs related to the purchase of spare materials and equipment.	130	412	-282	We opted to purchase a waterproof camera. Spare parts maintenance, all-Weather Rain Gauge and Shipping money has been converted for this purchase (130+240+60= 430).
Shipping and Imports - costs related to the purchase of materials and equipment.	60	0	60	We opted not to purchase this item to cover the extra field expenses
Isotope Analysis - Total cost for the isotopic analysis of all samples (≈125). Each sample costs about 10.30 £ for analysis	1300	2574	-1274	The money foreseen for the isotopic analysis was not enough, but my advisor and I are trying to get another form of funding for these remaining analyses.
Totals	**4056**	**5171**	**-1115**	

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

We feel that it is necessary to work with an environmental education project. It is not enough to be generating science for scientists, I see that it is necessary to disseminate in a practical and easy to understand way the processes that are crucial to the maintenance of the ecological integrity of streams. The headwater streams (catchment size <10 km^2) are essentially link to terrestrial environment making them vulnerable to disturbances in the surrounding anthropogenic catchment. The importance of headwater streams for biodiversity at catchment scale and their vulnerability to anthropic disturbances are often neglected in management strategies. We hope to work in collaboration on new research for the benefit of Neotropical streams.

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?

Not yet, but the financial support by the Rufford Foundation will be properly described in the published paper, as well as in any future presentations, technical reports, and any other kind of communication. Recently I was selected for a course called "São Paulo Advanced School on Integrated Water Resources Management," where 40 Brazilian students and 40 foreign students were selected to discuss the conservation of aquatic ecosystems. I presented my project there at the poster form (picture below). I also made a brief video showing my project and how I am planning to have my results disseminated to the public as well as publications in journals of high-impact.

Follow the link:
https://youtu.be/SdqoYJpZH7Y

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

Members	**Role in the Project**
Tiago Borges Kisaka	Applicant and project coordinator
Gabriela Bielefeld Nardoto	Advisor (Identification and interpretation of Ecological Relations)
Elisa Cunha Carvalho Alvim	Master in Ecology (Taxonomic Identification of macroinvertebrates)
Andréia de Almeida	Master of Water Resources (Identification and interpretation of Hydrological processes)
João Paulo Sena Souza	Master in Geography (Data Spatialisation)

12. Any other comments?

We would like to thank the financial support received by the Rufford Foundation. With this grant, I was able to follow up on my PhD project. I will defend my thesis until March 2019 (my deadline) and any work that is published you will be warned, and there will be the name of the Rufford Foundation as a funder of my research. We would like to thank the opportunity and for their trust.