The Rufford Foundation
Final Report

Congratulations on the completion of your project that was supported by The Rufford Small Grants Foundation.

We ask all grant recipients to complete a Final Report Form that helps us to gauge the success of our grant giving. 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. 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	Tatenda Dalu
Project title	Potamonautids conservation: impacts, opportunities and challenges related to community sustainable livelihoods
RSG reference	21054-2
Reporting period	February 2017 to February 2018
Amount of grant	£4900
Your email address	dalutatenda@yahoo.co.uk
Date of this report	12 March 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
Natural resource access and utilisations by communities i.e. crab harvesting, conservation, land use practices and relations with the National Park and government agencies.				We managed to do an extensive community surveys of Chikukwa village within Chimanimani area with Dr Gregory Dowo of University of Zimbabwe and Ms Mwazvita TB Dalu of Rhodes University.
Estimate population size and distribution of freshwater crabs, assessment of environmental conditions where crabs exist and identify potential threats				We managed to do an extensive survey of three catchments (Musapa, Haroni, Nyahode) within Chimanimani and we mapped the population sizes and distribution of crabs in the Eastern Highlands using GIS working with Dr Timothy Dube of University of Western Cape, Dr Jonathan Tonkin of University of Oregon, Prof Tamuka Nhiwatiwa of University of Zimbabwe, Dr Ryan J Wasserman of Botswana International University of Science and Technology and Ms Mwazvita TB Dalu. We measured all the physico-chemical factors where the crabs were found and identified potential threats to invertebrate communities within these aquatic ecosystems.
Identify potential food sources using stable isotopes				The crabs were collected from three different land use types i.e. communal, national park and mining to identify potential food sources for freshwater crabs. More work still needs to done for us to be able to fully understand habitat partitioning due to food availability.

Create awareness on conservation of freshwater				We discussed with communities members within Chikukwa village, Rusitu and Chimanimani town in all our study sites on the importance of crabs. We will continue to create awareness until we have fully achieved our goals.

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

None, we were welcomed in the study areas as we had previously worked in the area during the last field survey.

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

We managed to find out that there is more of an intrinsic ecological value of crabs as opposed to an economic or provisional value placed on the ecosystems services provided by the identified crab species. The Chikukwa community showed a huge interest in crab conservation and wanted to learn more about the ecological role the species play within the ecosystem plus they had a community conservation group which helped in protecting the environment. A comprehensive survey of the Chimanimani region highlighted that *Potamonautes mutareensis* and *Potamonautes unispinus* which were spatially separated by physico-chemical variables and altitude/elevation were at greater risk due to illegal mining within the three river catchments studied. Extensive riparian and other terrestrial vegetation removal has resulted in considerable soil loss through erosion. Near endemics such as the freshwater crab *Potamonuates mutareensis* and other aquatic organisms are seriously affected with no life being observed in affected sections of the river systems. In many instances, harmful chemicals such as mercury and cyanide are also employed in the extraction process. We recorded mercury concentrations of 0.1–0.3 mg/kg in river sediment within the illegal mining areas, compared with 0 mg/kg mercury where there was no mining. However, there are far broader occupational safety and public health issues that deserve attention, and have resulted in this practice being considered high risk because of the many individuals who undertake it out of livelihood necessity. Findings of this research could potentially assist in the identification of future priority areas for protection of the two crab species. Similar to the previous study, population numbers for both species were significantly higher in the Chimanimani National Parks followed by the communal areas.


Impacts of illegal mining on river ecosystems within the Chimanimani area: river habitats and channel completely destroyed (*left*) and effect of gold panning on water clarity (*right*)

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

Communities were heavily involved within the study, as they were employed as research field assistants, hence they assisted in monitoring crab distributions and conducting interviews. In essence, these community members provided us with several opportunities for direct and/or indirect interaction within their villages. This project managed to raise awareness on the importance of the crabs to the aquatic ecosystems as many people had no idea of the role these magnificent creatures played in our ecosystems. Since the study covered most of Chimanimani, we managed to educate the local communities on the importance of crab conservation and we hope that the knowledge that we gave them, will assist could be critical in crab conservation. The local communities were eager to continue monitoring the crab after we had left.

5. Are there any plans to continue this work?

Yes, they are plan already afloat to extend this study to the rest of the country, since little is known about crabs in Zimbabwe as most areas remain unexplored. We intend to do sampling of the different regions of Zimbabwe so that we can have an appreciation of the various species that are present and with aid of genetic analysis tools we will be able to identify all species from Zimbabwe as we still believe new species exist in this vast unexplored country. We will continue to explore food utilisation by the freshwater crabs and assess how that is leading to habitat partitioning across the country. Also conservation awareness campaigns will be carried out across the country.

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

We started by sharing our results with the local communities of Chimanimani and we will continue to do so as we analyse the dataset. Currently we are in the processing of sharing our results with the rest of the world through writing peer reviewed journal articles and commentaries that are raising awareness on the project. We thus in the

process of writing three papers for publication with Science of the Total Environment and Conservation Biology. The project has also featured in my own personal website for all to see the crab work that we have been doing. We work was also presented at a regional conference i.e. the Namibia Rufford Conference in November 2017.

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

The RSG was used over the whole period of the study, February 2017 to February 2018:

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
Accommodation, subsistence, field assistance	1250	1400	(150)	Private accommodation was slightly expensive and economic situation even made accommodation expensive
Travel expenses	1100	1150	(50)	The cost of hiring an off-road vehicle in Zimbabwe we high due to the current economic conditions and lack of foreign currency.
Research permits, workshops/meetings	200	500	(300)	National parks permits where expensive for non-resident researchers and the mini-workshops with communities increased the costs slightly.
Satellite imagery acquisition and digital imagery processing	400	400	0	Same as we had budgeted for
Dictaphone	200	200	0	Same as we had budgeted for
Stationary	150	120	30	Printing was cheap
Stable isotope analysis	1600	1130	680	We ended up sending less samples for analysis as most money had been used for accommodation, subsistence and travels
TOTAL	**4900**	**4900**		

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

The current research concluded that at a local level, issues of effective institutions need to be addressed urgently, as the drastic recent political, economic and social changes in Zimbabwe have been a significant setback to conservation. A major goal of conservation is to identify areas where representative species can be protected. As such, we propose that conservation efforts for one species (i.e. pollution sensitive *P. mutareensis*) should be prioritised in heavily impacted areas. It is our view that the most pervasive and systematic threats to Zimbabwe's and the region's biodiversity as a whole are rooted in poor monitoring, management and legislation as institutional frameworks governing mining are normally sensitive only to formal mining operations and are blind to rapidly expanding illegal artisanal mining.

An evaluation of the associated risks, an appraisal of mining laws and monitoring protocols as well as better enforcement of current laws are required for the adequate protection of the environment and local communities. Alternative forms of control should also be considered, such as the formalisation of more sustainable small-scale practices that conform to artisanal rather than fully commercial ventures.

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

Yes, we used the Rufford logo is all our pamphlets and we always proudly highlighted our funders for project. Thus, the RSGF was duly acknowledged an all our mini-workshops and articles written for publication.

11. Any other comments?

The project achieved most of the set goals on the socio-ecological research and conservation activities on freshwater crabs within the Chimanimani area, Zimbabwe. With this in mind, we provided key ecological and conservation strategies for *P. mutareensis* and other freshwater crabs. Unless different priorities for conservation biodiversity and incentives are recognised, local communities are often bound to be perceived as "undermining" conservation, and may certainly proceed to do so. Thus, policies must help to ensure that sufficient funding is redirected to education and freshwater invertebrate species conservation, as freshwater ecosystems are undergoing rapid declines in biodiversity greater than those in the most affected terrestrial ecosystems. Thus, we already preparing for our next project of freshwater crabs across the country.