

The Rufford Small Grants 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	Ecological assessment of the recently discovered <i>Potamonautes mutarensis</i> sp. nov. in the Eastern Highlands of Zimbabwe with implications to conservation
RSG reference	16137-1
Reporting period	September 2014 to September 2015
Amount of grant	£4980
Your email address	dalutatenda@yahoo.co.uk
Date of this report	17 September 2015

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
Estimate current population size and distribution of <i>P. mutareensis</i> sp. nov. and other freshwater crabs.			X	We managed to do an extensive survey of the Eastern Highlands and we mapped the population sizes and distribution of crabs in the Eastern Highlands using GIS working with Dr Timothy Dube of University of KwaZulu Natal and Ms Mwazvita TB Sachikonye of Rhodes University
Assessment of environmental conditions where crabs exist.			X	We measured all the physical and chemical factors where the crabs were found and also measured the amount of detritus in these aquatic ecosystems
Identify potential threats			X	The crabs were found to be well protected in private farms and national parks and outside these areas, threats such as pollution and mining existed. These were potentially affecting the crab species.
Create awareness on conservation of freshwater		X		We discussed with communities in all our study sites on the importance of crabs and we have since submitted articles for publications with a local newspaper (Manica Post) in the Eastern Highlands. We will continue to create awareness until we have fully achieved our goals.
Assessment for inclusion in the IUCN Red List categories based on observed trends			X	This was carried out for the two crab species that we encountered, and we classified them as least concern.

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

One of the unforeseen difficulties we had was the verification of the identified crab species. We managed to enlist the some of the world-renowned figures in crab taxonomy, Prof Neil Cumberlidge of University of North Michigan and Prof Savel Daniels of Stellenbosch University who confirmed the identity of our crab species using genetic analysis. The guys provided invaluable help in the verification of crab species.

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

A comprehensive survey of the Eastern Highlands region yielded two freshwater species, *Potamonautes mutarensis* and *Potamonautes unispinus* which were spatially separated by physico-chemical variables and altitude/elevation. Findings of this research could potentially assist in the identification of future priority areas for protection of the two crab species. The study revealed that population numbers for both species were significantly higher in the protected areas i.e. Chimanimani and Nyanga National Parks and Tanganda Tea Estates. High levels of habitat destruction, such as illegal gold panning and pollution were observed outside these protected areas, as such, these habitat alterations were likely having an effect on population levels of both species, particularly the more sensitive *P. mutarensis*. There is, however, some evidence to suggest that *P. mutarensis* extends its distribution into Mozambique. Thus, the study gained more information on the population size and distribution of *Potamonautes* spp. within the Eastern Highlands, as well as an understanding of species' habitat ecology, conservation status, and threats, with appropriate measures to mitigate them being identified. The IUCN (2003) Red List criteria results for the Eastern Highlands found the two species, *P. mutarensis* and *P. unispinus* to be Least Concern. This is in contrast to several other aquatic species i.e. fish and amphibians within the same region which are currently considered as threatened. Although 55% of the local respondents indicated that they do exploit crabs as a food resource, this activity is limited to a very short period. Hence, the communities in the central and southern part of the Eastern Highlands are conserving the crab species without knowing, as they do not harvest crabs during the peak breeding season (i.e. summer) and with most leaving the smaller ones to breed. Moreover, it would appear that only large crabs are targeted. It would thus appear that the exploitation of crabs as a food resource poses a limited threat to the crabs.

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

The involvement of the local communities was significant during our field work as it provided us with several opportunities for direct interaction. The local communities were hired as field guides so that they could assist us in the field and naming of some of the river systems and also telling us about the do's and don'ts of the areas that we were in. 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. Most people were actually surprised that we were studying crabs and that even made them eager to learn more about these species. Most of local community members had little appreciation of our project and will just stand and watch while we were sampling without even asking questions but after interacting with them, asking them to be involved and posing questions on what they knew about crabs, they later developed an interest and started showing enthusiasm which was very encouraging. Since the crab covered the whole of the Eastern Highlands, we managed to educate the local communities in protected areas and outside environs 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, and they were willing to do counts for the crabs that they will encounter. To all the other local communities members that we did not meet during our surveys and mini workshops, we anticipate that they will gain valuable information from the local newspaper articles (Manica Post) that will be published in the coming weeks/months.

5. Are there any plans to continue this work?

Since little is known about crabs in Zimbabwe, plans are afoot to extend the project to cover to the whole of Zimbabwe as most areas have never been explored for these unique animals. We intend to do genetic analysis of all the specimens from Zimbabwe as we still believe new species exist in this vast un-explored country. We will continue writing newspaper articles not only targeting the Eastern Highlands population but the whole country so as to spread awareness and importance of these crab species. One of the most important areas that will enable this project to continue to grow and raise awareness is to target local community schools, that we educate more on crab conservation and many other species.

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

We already in the processing of sharing our results with the world and local communities through writing newspaper that are raising awareness on the project. We have also submitted a paper for publication with PLoS ONE and another is being developed on macroinvertebrates that were collected during the course of the study. The project has also featured in my own personal website for all to see the crab work. We are currently working on presenting the data at international and regional conferences. See below articles submitted or being prepared for submission:

Dalu T. Freshwater crabs: The little known and threatened ecosystems engineers. *Manica Post* (local newspaper: **SUBMITTED TO THE EDITOR**)

Dalu T, Dube T, Sachikonye MTB, Froneman PW, Manungo KI, Bepe A and Wasserman RJ. Ecological assessment of *Potamonautes* spp. in the Eastern Highlands of Zimbabwe, with implications to conservation. *PLoS ONE*. PONE-D-15-34817. **UNDER REVIEW.**

Dalu T, Robertson MP, Weyl OLF, Motitso S and Wasserman RJ. Spatial distribution of macroinvertebrate assemblages in relationship to altitude and physico-chemical variables. Target journal: *Limnologica*. **IN PREPARATION.**

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, September 2014 to August 2015, however even with funds having run out for now, we project will continue to run.

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	2300	1500	800	National parks accommodation was slightly cheaper compared to other areas which we sampled, and it lowered our costs.

Travel expenses	1300	2270	(900)	We underestimated travel costs to from South Africa to Zimbabwe and also the cost of hiring an off-road vehicle in Zimbabwe. This over-stretched our budget a bit.
Research permits, workshops/meetings	300	320	(20)	The mini workshops increased the costs slightly and National parks permits where a bit pricey for non-resident researchers
GPS monitors	250	250	0	Same as we had budgeted for
Digital camera	220	210	10	The camera slightly cheaper than previously budgeted for to cover for travel costs.
Stationery and data analysis software	210	150	60	These were cheaper than previously budgeted for. It helped us a lot in terms of our budget to cover for travel costs.
Equipment: Waders, block nets, funnel traps, meters	400	280	120	These were cheaper than previously budgeted for. It helped us a lot in terms of our budget to cover for travel costs.
TOTAL	4980	4980		

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

Even though, the effects of climate change are often difficult to assess at local scales, we anticipate that the recently discovered *Potamonautes mutarensis* is at threat during to the warming environment as it lives in high cool altitudes of the Eastern Highlands Mountains. Therefore, steps need to be put in place to continue monitoring these species in their environs. Protecting the habitat of these crabs from further habitat loss must be a priority and measures must be put in place to stop illegal mining and also assess those in the legal mines that they are adhering to environmental laws and hence are safeguarding the environment for future generations. Yearly surveys during the peak breeding seasons should be carried out so as to assess the any changes in the populations as crabs are easier to find during the period.

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?

We always highlighted were the funding for our project was coming from and we can say yes with confidence, that the RSGF was duly acknowledged an all our mini-workshops and articles written for publication. We will continue to use the logo for the conferences that we anticipate attending next year to talk more about crabs

11. Any other comments?

We hope that the monitoring and conservation of *Potamonautes mutarensis* sp. nov. and other freshwater crab species in the Eastern Highlands of Zimbabwe was a success. Thus, this project achieved all its set goals on the ecological research and conservation activities on freshwater crabs whose current IUCN Red List status is very limited or non-existent for Zimbabwe. With this in mind, we provided key ecological and conservation strategies for *P. mutarensis* and other freshwater crabs. The ecological information has conservation value for any action plans that will be developed or initiated, and we hope we were able to provide freshwater crab populations, threats, distribution, behaviour, habitats preferences and associations data. Through the involvement of local communities, we managed to develop human capital capacity that has knowledge in freshwater crab projects and conservation so that habitat loss or any associated threats can be avoided in future. Awareness campaigns provided the interaction and working together of different groups of people from the local communities, so that the conservation of these crab species to be a success. We hope that the project has gained local interest while also providing national, regional and international communities with valuable information on these species since these small organisms are often neglected in conservation plans in Zimbabwe and many other countries in preference of the big animals.