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	Issah Seidu
Project title	Combining Research and Community Education to Conserve Odonata and Freshwater Habitats in Southern Ghana.
RSG reference	20322-1
Reporting period	September 2016- November 2017
Amount of grant	£5000
Your email address	antwiseidu88@gmail.com
Date of this report	14th November, 2017

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
Determine odonata species assemblage and conservation status in the Atewa, Bobiri and Ankasa Forest Reserve.				We sampled a total of 15 streams, five rivers, 10 different ponds and eight pools in and outside the three protected areas. A total of 51 odonata species were recorded in the Atewa Range Forest Reserve, 21 species in the Bobiri Forest Reserve and 56 species in the Ankasa Conservation Area. We recorded both forest specialist and generalist species in the different water bodies sampled. The conservation status of all the species recorded were classified as least concern under the IUCN category except *Elattoneura villiersi* which has not been classified at all.
Odonata species distribution and potential indicator species in the various habitats and water types.				We found different odonata assemblages in the primary forest habitats, mining sites, human settlement habitat and the agricultural fields along the various streams and rivers sampled in the Atewa Range Forest Reserve. The primary forest habitats as expected harboured large number of forest specialist species such as *Umma cincta, Lestes dissimulans*, *Chlorocypha selysi*, *Phaon camerunensis* amongst others which have been effectively used as indicator species for monitoring freshwater habitats and their surrounding environment. The extreme degraded flanks (mining and some sites in the human settlement habitats) of the various streams and rivers were also distinguished by generalist species like *Palpopleura lucia, Palpopleura*

				portia, Chalcostephia flavifrons amongst other which showed strong affinity to complete open canopy cover. The eurytopic generalist such as *Neodythemis klingi, Orthetrum julia* which are tolerant to some shade were favoured in the agricultural fields associated with some canopy cover. A manuscript detailing the above findings is under review in the *Odonatologica* journal. In the Bobiri Forest Reserve and Ankasa Conservation Area, we classified the odonata species into lotic (streams and rivers) and lentics (ponds) species. Six odonata species were recorded exclusively in the rivers while seven were exclusive in the streams. It was interesting to note that 10 odonata species were exclusive to the lentic habitat (ponds) which reinforces the importance of conserving all type of freshwater habitats for freshwater biodiversity conservation purposes.
Developing and testing dragonfly biotic index and prioritization of habitat types for future conservation.				We have assigned each recorded species an index following Simaika and Samways, (2014). We have numerically assigned Dragonfly Biotic Index (DBI) and tested the validity in all the various sites, and prioritise some streams, rivers and ponds for immediate conservation, as these habitats harbour specialist dragonflies and higher number of odonata and other freshwater species. An intriguing finding in this objective is the difference metrics and pattern in odonata assemblages, as we relate species richness and DBI of the various streams, rivers and ponds.
Produce pictorial guide to build capacity of locals and students in odonata monitoring.				We have taken photos of most of the species recorded when possible. With assistant from some Afrotropical odonatologist, we hope to develop a full identification guide on odonata for Ghana using the pictures taken

				and what will be taken during the subsequent field surveys.
Community awareness and public education in freshwater and biodiversity conservation in fringing communities.				We have popularised conservation of freshwaters and their associated species in communities fringing the three protected areas in southern Ghana, through radio broadcast, seminars, Powerpoint presentations, video shows and documentaries and religious tailored conservation meetings.
Train students in freshwater conservation and odonata monitoring.				A total of 12 undergraduates students have been trained in odonata monitoring protocol. Of this, three students in the Department of Wildlife and Range Management of the Kwame Nkrumah University of Science and Technology (KNUST) were assisted in intensive data collection on odonata for their final year thesis work. Some of their supervisors were also engaged during the odonata sampling in the field. Through these activities, we have been able to win support and increase the enthusiasm of freshwater biodiversity research in the department.

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

Accessibilities to some of the water bodies were a problem due to the fear of attack by illegal miners and some natural barriers. Therefore we could not visit all the water bodies as initially anticipated. However, a representative number of water bodies were still sampled. We hope to visit such areas in the future projects.

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

We have increased research and conservation effort on odonata and its freshwater habitats through engaging undergraduate students and local volunteers in odonata monitoring and sampling protocol during the project. Three students from the Department of Wildlife and Range Management, of the Kwame Nkrumah University of Science and Technology (KNUST), were able to apply their skills in collecting data for their undergraduate projects highlighting the conservation impact of this project.

Secondly, through the project, we were able to popularise and win support for conservation of freshwaters and its associated species in communities fringing the

three protected areas in the southern Ghana. This was done through PowerPoint presentations, radio broadcast, video shows and documentaries and religious tailored conservation meetings. We also engaged some of the locals on the field during the odonata data collection exercise to build their capacity in sampling and monitoring techniques of odonata and freshwater habitats assessment.

Finally, we have produced the first odonata species checklist for Ankasa Conservation Area and updated the odonata checklist for the Bobiri Forest Reserve. Several species have been distinguished as indicators for various habitats types in the country. New records of odonata have been documented in all the three protected areas we surveyed. A manuscript has been submitted to *Odonatologica* journal for publication, and two other manuscripts and conference papers are in preparation.

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

During the field work, we worked with locals as guides and field assistants, and built their capacity in freshwater biodiversity monitoring protocols. As a result, several people became interested in dragonflies and they started to collect and record the dragonflies in their area and sent the data for species identification and confirmation.

5. Are there any plans to continue this work?

We hope to continue to work on the development of identification guide for odonata in Ghana and West Africa as a whole. We will liaise with other Afrotropical odonatologist to achieve this goal in future.

This project made us understand that freshwater fishes are not given any conservation attention by locals and they are heavily exploited and their habitats are also seriously threatened. Our plan is to combine research and conservation work on both odonata and freshwater fishes in the next phase of this project. A project at this scale will help protect the whole freshwater ecosystem. Most of the local communities living along the major rivers such as Densu, Pra River basin, Ankasa, Birim amongst others in southern Ghana largely depend on fish for their livelihood. Hence, project on freshwater conservation using some flagship fish species will help us garner more support for protection of these rivers and other wetlands in the region. Our ultimate goal is to protect important habitats and freshwater species, develop monitoring programme and also improve the public knowledge and awareness on the significance of these freshwater species and freshwater habitats.

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

The results of this work will be published in scientific journals and conference proceedings. One paper has been submitted to *Odonatologica* journal and is in the final review process, and two more papers are in preparation. We will also publish

some of the results in the Worldwide Dragonfly Association newsletters (Agrion) for wider readerships. Presentations of the project findings will be done at both national and international conferences. I have already presented the findings in the department of Wildlife and Range Management, KNUST during the postgraduate and undergraduates seminars. I have disseminated some of the findings to some governmental and conservation organizations in Ghana including A Rocha Ghana, Herp Conservation Ghana, Department of Wildlife and Range Management, KNUST and Department of Fisheries and Aquaculture, KNUST.

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 Rufford Foundation Grant was used for approximately 14 months, from September 2016 to November 2017 as it was anticipated.

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**
Cost of vehicle rental, fuel and lubricant	2000	2255	255	There was an unanticipated Increment in fuel price and vehicle rental.
Field equipment	1200	1000	200	The department of Wildlife and Range Management provided us with field logistic such as GPS and tent for camping in the project sites.
Conservation education	935	935	0	Fully spent
Living cost for team members during project implementation	1150	1150	0	Fully spent
Allowance for mandatory wildlife guide during survey	750	750	0	Fully spent
Accommodation during community conservation campaigns	300	300	0	Fully spent
Purchase of journals, field guides, maps, errands, photocopying and other printing materials.	215	250	35	Some journals and printing materials were purchased at a high price which was not anticipated prior the project.
TOTAL	**6550**	**6640**		

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

It is important to continue promoting freshwater conservation efforts in southern Ghana. These resources are subject to intensive degradation owing to alluvial small scale gold mining regimes, riparian logging and deforestation, bad agricultural practices, settlement encroachment and domestic sewage discharge. However, these resources especially the major rivers provide fishing industry for majority of the locals. It is very important to combine our conservation effort on odonata with fishes and using them as model organisms to stimulate the interest of the local communities in freshwater biodiversity, as their livelihood depend extensively on fishes. Through holistic community conservation campaigns using fish and odonata as model organisms, we can garner massive supports for the protection of the major riverine and wetlands ecosystems and the protection of the whole freshwater organisms in southern Ghana. We therefore want to implement a combine project on some freshwater fish species to increase conservation efforts to mitigate freshwater degradation in southern Ghana.

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?

Yes the Rufford Foundation Logo was used in all our printed materials for education and awareness creation. We also acknowledged Rufford foundation in the manuscript I submitted to *Odonatologica*, our seminar presentations, documentary and radio broadcast programs. We will also acknowledge Rufford Foundation in the subsequent conference and journal papers.

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

Issah Seidu (Principal Investigator)
Issah coordinated and oversaw the full execution of the project. He was also responsible for training students and locals in odonata monitoring and sampling protocols.

Abena Agyapona
Abena led the awareness creation and community education campaign aspects of this project

Antwi Razak
He was responsible for managing budgets and finances of the project. He was also responsible for the assessment of environmental variables in all the habitats during the project implementation.

Martin Luther King
Luther was responsible for taking diagnostic photos of the species in the field and during the conservation programs. He was also responsible for managing all project

logistics, and liaising with other partner institutions and communities. He also participated on the radio programs as well.

12. Any other comments?

We are most grateful to the Rufford Foundation for providing us funds which has made this project a success.


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