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	Pierre Armand Mvogo-Ndongo
Project title	Conservation of the Recently Re-Discovered Endangered Freshwater Crab, *Louisea edeaensis* (Bott, 1969) on Bedimet Island in the Lake-Ossa Wetlands Complex of Cameroon
RSG reference	20242-2
Reporting period	Oct. 2016 - Sept. 2017
Amount of grant	£ 5000
Your email address	mpierrearmand@yahoo.fr
Date of this report	14-10-2017

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
To develop a conservation action plan for the endangered species *Louisea edeaensis* based on first-time data on its population levels and trends, its breeding needs, and its habitat preferences.				Over a 1-year period we carried out 12 different transects (one transect per month) on Bedimet island of Lake Ossa in Cameroon. A total of 40 specimens were collected. All specimens of *Louisea edeaensis* were collected from water bodies such as puddles near small permanent streams as well as from the damp conditions under fallen leaves on land adjacent to streams, and it is noteworthy that no specimens were found in nearby streams themselves. The estimated population density of *L. edeaensis* ranged from 1 to 12 individuals/transect during our surveys, and the population consisted mostly of juvenile and sub-adult individuals, with a male to female ratio of 1:1. No ovigerous females or females carrying hatchlings were encountered during the study so there is still no basic reproductive information available on the number of eggs laid, and the number of hatchlings produced, and when the breeding season occurs. We suspected that ovigerous females of *Louisea edeaensis* may hatch inside holes in trees. But at this stage of the conservation action plan, of this species we did not risk damage to their habitat to search for ovigerous females inside tree holes. *Louisea edeaensis* performs an important ecological role in the food webs of Lake Ossa and its streams in the form of nutrient recycling in these aquatic ecosystems by these crabs that are detritus feeders that break down leaf litter. This species also feeds on live prey, such as millipedes as well

				as on plants. *Louisea edeaensis* in turn also serves as prey for other organisms such as crab-eating mammals, birds, and reptiles, as well as ants.
To collect data on the long-term threats to *L. edeaensis* from agricultural pollution and from habitat destruction despite its location in a protected area.				A number of threats to the continued survival of *L. edeaensis* were identified during the first 2 months of this project including those that impact its habitat. Many parts of Bedimet Island (including the locality where this species was collected) have been cleared of natural forest cover to make way for agriculture, with the result that the vegetation is now dominated by shade-tolerant tropical plants of the family Amaranthaceae that grow well in moist soils, cultivated fields, and wastelands. Apart from the substantial disturbance of the original vegetation on Bedimet Island, pesticides applied to the crops may drain into the aquatic habitats inhabited by *L. edeaensis*, which could well have a serious impact on this species. Furthermore, the clearing of original forest cover has exposed the aquatic systems on Bedimet Island (and the freshwater invertebrates that live there) to direct sunlight, and this is reflected in the high average daytime water temperatures of up to 30°C recorded during this study (compared to average water temperatures in streams shaded by forest cover of between 22–26°C).
To educate local people				The ongoing education component in the project was aimed at encouraging local people to become aware of the negative impact of agriculture on the freshwater ecosystems on Bedimet Island that could impact populations of crabs. Before the field studies began we met monthly with the Chiefs of the Villages in Lake Ossa (Mevia part) that includes Bedimet Island. The targets of the educational messaging were the local people who are owners whose families live on Bedimet Island in Lake Ossa where the only known extant

				populations of *Louisea edeaensis* are found. For details, see project update August, 2017.

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

Two difficulties:

1. To do accurate population estimates based on the mark recapture method *L. edeaensis*. To try to improve the accuracy of this method, we maximised the number of transects to reduce the chances of capturing the same individuals more than once.

2. To collect specimens of *Louisea edeaensis* inside tree holes where we suspected that ovigerous females may be found, due to reluctance to damage the habitat of this crab.

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

I. The habitat preferences and the population levels and trends of *Louisea edeaensis,* the endangered freshwater crab from Cameroon have been described but we still need more information on its breeding cycle.

II. The ongoing educational component was effective and gave additional experience for the educational activities of a long-term conservation project. Consequencely, the local farmers have definitively removed their farming activities from areas where we have seen specimens of *L. edeaensis* and where we are sure this species occurs. *Louisea edeaensis* is now safer from such pressures from human activities. In addition, my local field assistants are now trained on how to recognize the habitat of *Louisea edeaensis* and how to collect routine data on behalf of conservation action plan.

III. IAs explained in my research update August 2017, one of the most important outcomes of this project was the rediscovery of a second lost species of *Louisea*, *L. balssi* that is also endemic from Cameroon. This species is listed on the IUCN Red List as an endangered species.

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

The local communities involved in this project include farmers, local authorities (Chiefs of village and others organizations) and field assistants who were people originating from villages around Lake Ossa.

All of the local communities that have helped us to accomplish this project in different points described below.

In the ongoing education component, the Chiefs of village and their assistants have helped us to know exactly which people and which families are responsible for each island in the Lake Ossa complex. From that, we were able to target our activities more accurately since we discussed a lot with the families responsible in the Bedimet island of Lake Ossa where *Louisea edeaensis* is found. These families have been helped to understand the urgency and necessity of maintaining a healthy ecosystem and of saving an endangered species from extinction.

Our field research assistants and guides were very active in helping us to collect scientific data and to educate local people using local and national languages.

Local farmers provided us with constructive advice. One of their discussions helped us to rediscover the second Cameroonian endangered species, *Louisea balssi.*

Our practice was to bring supplies of food and drink to all those local people who have farms where we collected specimens of *L. edeaensis*.

My local field assistants are now well training on how to recognise the habitat of *Louisea edeaensis* and how to collect endangered species.

For long-term benefit, local communities (people around Lake Ossa) can expect to host and guide tourists and scientists from other regions of Cameroon and from all around the world that are attracted there by their interest in Lake Ossa's intact natural tropical ecosystem and the unique wildlife that is found there. In addition, the local markets and local houses for rent around the Lake Ossa will benefit from the increased flow of foreign customers and this will contribute to the development of the local community.

5. Are there any plans to continue this work?

Yes. The next step will be to follow up with a similar conservation action plan to the other wetland habitats (and small streams) of southern Cameroon which may potentially be home to other populations of *Louisea edeaensis* and to develop conservation activities for the newly rediscovered endangered freshwater crab species, *Louisea balssi*.

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

The results of this project will be presented at the national level in Cameroon (Bioscience, seminars, etc.) and at other international meetings of The Crustacean Society and the British Ecological Society. I am an active member of these organisations.

Results of part of this project have been made available to the world scientific community via a publication in *Zootaxa*:

Mvogo Ndongo P.A., von Rintelen T., Schubart C.D., Albrecht C., Tamesse J.L. & Cumberlidge N.,2017a. New data on the taxonomy, ecology, and conservation of the rediscovered *Louisea edeaensis* (Bott, 1969) (Brachyura: Potamoidea:

Potamonautidae), an endangered freshwater crab from Cameroon. *Zootaxa* 4231 (2): 273–280.
The data generated by this project will be shared with the University of Yaounde and with the Cameroonian National Red Data (the Ministry of Environment and Forest (MINEF), Watershed Task Group (WTG), Center for Biodiversity Conservation (CBC), and the International Union for the Conservation of Nature (IUCN): I will also be active in this operation.

Especially, we now intend to have discussions with the Cameroonian Government (Ministry of Forest and Wildlife) so that the areas where *L. edeaensis* occurs can become a RED ZONE and be protected by local laws.

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 ran from October 2016 to September 2017. With a series of monthly surveys (12 days per month) at Bedimet Island of Lake Ossa and additional 2 days at Manengouba ecological reserve where we rediscovered *Louisea balssi,* a second endangered species from Cameroon.

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
Compensation for two field guides for the 144 days of field research.	1728	1700	+28	The costs of the guides were as initially budgeted at Bedimet island of Lake Ossa. The surplus went to research at Lake Manengouba.
Subsistence during the fieldwork (ex. food)	1296	1296		The cost is as initially budgeted.
Common transport bus fees to attend the Lake Ossa complex in Littoral Region of Cameroon	100	100		The cost is as initially budgeted.
Field boots	16	16		The cost is as initially budgeted.
Tubes & boxes to preserve potential undescribed specimens of other freshwater crabs	80	80		The cost is as initially budgeted.
Cost of ethanol preservative (70-90%).	80	80		The cost is as initially budgeted.
Equipment	600	400	+200	The cost of the camera was lower than initially budgeted.

Education component	500	600	-100	The educational component was very important and also included some compensation to local farmers obliged to abandon active farming at places we found specimens of *L. edeaensis*
Boat hire to cross to Bedimet island	600	600		The cost is as initially budgeted.
Unforeseen expenses (Two days field trip at Lake Manengouba)		128	128	These activities became definitively important to understand the impact of our work in Bedimet island of Lake Ossa with some comparison. Then we rediscovered a second endangered species, *Louisea balssi.*
Total	5000	5000	00	

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

As mentioned above, the next step will be to follow up with a similar conservation action plan in the other wetland habitats (and small streams) of southern Cameroon which may potentially be home to other populations of *Louisea edeaensis* and to develop conservation activities for the newly rediscovered second endangered species, *Louisea balssi*.

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?

Yes, I have used the Rufford Foundation logo in my several official documents, PhD thesis document and in the materials produced for this project, and I have acknowledge the support of the RSGF in two of publications to ZOOTAXA journal:

Mvogo Ndongo, P.A., von Rintelen, T., Schubart, C.D., Albrecht, C., Tamesse, J.L. & Cumberlidge, N. (2017a) New data on the taxonomy, ecology, and conservation of the rediscovered *Louisea edeaensis* (Bott, 1969) (Brachyura: Potamoidea: Potamonautidae), an endangered freshwater crab from Cameroon. *Zootaxa*, 4231, 273–280. doi: 10.11646/zootaxa.4231.2.9.

Mvogo Ndongo, P.A., Schubart, C.D., von Rintelen, T., Tamesse, J.L. & Cumberlidge, N. (2017b) Morphological and molecular evidence for a new species of freshwater crab of the genus *Sudanonautes* Bott, 1955 (Brachyura: Potamoidea: Potamonautidae) from Cameroon, with notes on its ecology. *Zootaxa*, 4242, 161–173. doi: 10.11646/zootaxa.4242.1.8.

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

Field assistants and guides: their role was to guide me and help collect data in the field and to talk with local people on behalf of educational activities.

Dr Thomas von Rintelen (Museum für Naturkunde, Germany), and **Dr Christian Albrecht** (University of Giessen, Germany): both provided with constructive advice during fieldwork and helped analysed data reported. They also are helping me to share results with other stakeholders and other international researchers.

At the end, I got great support from the Chair of the IUCN's Freshwater Crustacean Specialist Group, **Prof. Neil Cumberlidge (**Northern Michigan University, USA). He provided with constructive advice during this project in order to respect ethical considerations and all the policy require to work with an endangered species. He also provided me with the important strategies to educate local people and bring them remove their activities on the place with found specimens of *Louisea edeaensis*. **Prof. Neil Cumberlidge** is also linking my research to IUCN society.

Other sources of input for the project were the Chiefs of villages, and other freshwater ecosystem field researchers in Cameroon. Their role was to facility the project with advices.

12. Any other comments?

The project helped to establish important links with traditional and administrative authorities around Lake Ossa and to get further experience for educational activities. Furthermore, this project helped with research for my PhD dissertation here at University of Yaounde 1 with is now completed and will be awarded soon.

Louisea balssi (Bott, 1959) a second endangered freshwater crabs from Cameroon recently rediscovered.

Louisea edeaensis (Bott, 1969) a first endangered freshwater crab from Cameroon

Louisea edeaensis (Bott, 1969) feeding a milliped in its biotope.