

Final Evaluation Report

Your Details	
Full Name	Franclin Kuate Simo
Project Title	Conservation Measures and Extinction Risk Assessment for <i>Buea nlonako</i> Mvogo Ndongo, von Rintelen & Cumberlidge, 2020, a Threatened Species of Freshwater Crab Endemic to Mt. Nlonako, Cameroon
Application ID	38347-1
Date of this Report	8/10/2023

1. 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
<p>1. To contribute first-time data on population levels and trends, distribution, reproductive cycles, predators, habitat preference, and threats of <i>Buea nlonako</i> that will permit an assessment its conservation status under the IUCN Red List protocols.</p>				<p>The water temperatures in the small stream at Eyimba Nlonoko (the only place where we found <i>B. nlonako</i>), relatively higher ranged from 26°C to 36°C compared to small streams other stream from 21°C to 22.3°C. Dissolved oxygen (DO) ranged from 5.8 mg/l to 20 mg/l with pH ranging from 5.4 to 7.3. The water conductivity at the habitat of <i>B. nlonako</i> was relatively low ranging from 80 to 95 µS/cm with a total dissolved solid (TDS) ranging from 40 to 56 ppm. A total of 180 individuals of <i>B. nlonako</i> were recorded during the sampling period. The samples comprise 110 males and 70 females. The sex ratio in the population was 1 ♂: 2 ♀ during the sampling period.</p> <p>Analysis of the population size of <i>B. nlonako</i> in the showed relatively higher abundances. The result of this project showed that Eyimba at Nlonoko provides many good habitats for this species, (most trained by human activities), thus, potentially to developed as a protecting site. It was difficult to find ovigerous female of <i>Buea nlonako</i>. But keeping some female in the aquarium in the field and stay over the whole month and very day over the year was very challenging for us. As I have also conducted research in surroundings areas to establish area of occupancy and extent occurrence of <i>B. nlonako</i>. The finding is that <i>B. nlonako</i> only occurs in a small stream in Eyimba locality in Nlonoko ecological reserve. We also rediscovered two new species of freshwater crabs confirmed by my supervisor Dr Pierre A. Mvogo Ndongo. One in the genus <i>Louisea</i> (<i>Louisea waterfall</i>) at the northern Nlonoko and water fall of Ekom Nkam. And another in the genus <i>Sudanonautes</i> (<i>Sudanonautes eyimba</i>).</p>

<p>2. To identify and quantify specific short term and long-term threats to <i>B. nlonako</i> (and to the endangered frog species, <i>Arthroleptis nlonakoensis</i>) and its habitat from human activities.</p>			<p>The main threats to <i>B. nlonako</i> are related to human activities (farmers, foresters, etc). However, in our presence and surveying of streams and crab burrows on Nlonako, the number of dead crabs (<i>Buea nlonako</i>) and specimens of the endangered frog apparently been trampled by local people (e.g., foresters and farmers) in the course of (legal) activities in the area has been reduced. Now the other threats are related to the predators because we noticed that the number of specimens of <i>B. nlonako</i> are gradually reduced.</p>
<p>3. To build capacity through community outreach that will contribute to saving both <i>B. nlonako</i> and <i>A. nlonakoensis</i> from extinction.</p>			<p>The education programme associated with this conservation project was begun by bringing together local authorities and Chiefs of villages. The meeting was discussing our project goals and address the threats faced by endemic species in Nlonako Ecological Reserve and the measures that the local community can take to mitigate the threats to these species. But giving limited funding, the education programme itself will take the form of ongoing basis through people encountered in the field. Our messaging was focused on how human activities impact the distribution of endangered and threatened endemic species (especially crabs), as part of the threat management for our conservation measures. We emphasised that sustainable conservation measures will bring broader benefits to the local community who may serve as hosts for tourists, and as guides for scientists from other regions of Cameroon and from around the world that are attracted by their interest in the Nlonako Ecological Reserve. Furthermore, the local markets, local hotels, would also benefit from the increased flow of visitors. This is how the project will contribute to the development of the local community.</p>

2. Describe the three most important outcomes of your project.

- a) The first most important outcomes are the reduction of human threats to *Buea nlonako* and the distinction between *B. nlonako* and a population of *B. bangem* (work by Mvogo Ndongo et al. 2022).

- b) The second most outcomes are the discovered of two new endemic and threatened freshwater crab species. One in the genus *Louisea* from northern part of Nlonako and in Waterfall of Ekom-kam near Nlonako. And on new species in the genus *Sudanonautes* Bott, 1955 (*S. eyimba*) endemic in a locality near Eyimba in Mt Nlonako. These new species were confirmed by Dr. Pierre A. Mvogo Ndongo and by Prof. Neil Cumberlidge.
- c). The third most outcomes are the collection of the first-time data on population levels and trends, distribution, and habitat preference, and threats of *Buea nlonako* that will permit an assessment its conservation status under the IUCN Red List protocols.

3. Explain any unforeseen difficulties that arose during the project and how these were tackled.

Although our earlier conservation interventions here have reduced the intensity of the anthropogenic threats to *Buea nlonako*, its long-term conservation needs to be informed on a more formal Species Action Plan based on a detailed knowledge of its population structure and trends (sex ratio, size, distribution, and abundance), and on its reproductive biology (breeding season, recruitment, and fecundity). I have planned to carry out these activities once I have enough resource, support and infrastructure for *in-situ* and lab research.

4. Describe the involvement of local communities and how they have benefited from the project.

The local communities involved in this project include farmers, local authorities (Chiefs of village and other organisations) and field assistants who were people originating from Nlonako. 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 reach people include those who were confused and primary reluctant to cooperate with us. 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. To try to compare threats to other localities, we visited other localities that include Mont Manengouba ecological reserve, other area in Mont Nlonako and the wetland around waterfall in Ekom-kam and Eboforest zone. We then reported important data that are necessary to be developed in the future.

5. Are there any plans to continue this work?

Yes, the next step will be to develop a conservation action plan for the discovered of the new species of *Louisea* (*L. waterfall*). The goal will be to assess red List of a new species of threatened freshwater crab genus *Louisea* Cumberlidge, 1994 (*Louisea waterfall*), discovered from northern part of Mt. Nlonako Wildlife Reserve, and in a wet area around waterfall of Ekom-kam (Fig. 1), and *Sudanonautes eyimba* from a locality near Eyimba in Nlonako. The objective would be to continue of conservation of the Nlonako's new species (and its habitat) through surveying and

monitoring that collects data on distribution, population, habitat, and threats necessary to assess its IUCN Red List. In order to maintain and/or restore the population levels of this new species and other endangered species found in this zone, community training to build awareness and involve locals in the management of their aquatic and forest resources would be also planned for a favourable conservation status and to ensure the long-term conservation.

In the perspective next step, it would also be interesting to combine of field surveys and laboratory analyses to gather relevant data to develop a conservation strategy for *Buea nlonako*, *Louisea waterfall* sp.n., *Sudanonautes eyimba* sp.n., and *Louisea nkongsamba* based on long-term studies of their reproductive biology (reproductive biology, breeding season, recruitment, and fecundity). Conservation interventions of this nature depend a lot on community involvement and cooperation in order to build a strong educational component aimed at building awareness of the advantages to the population of being involved in the management of their aquatic and forest resources.

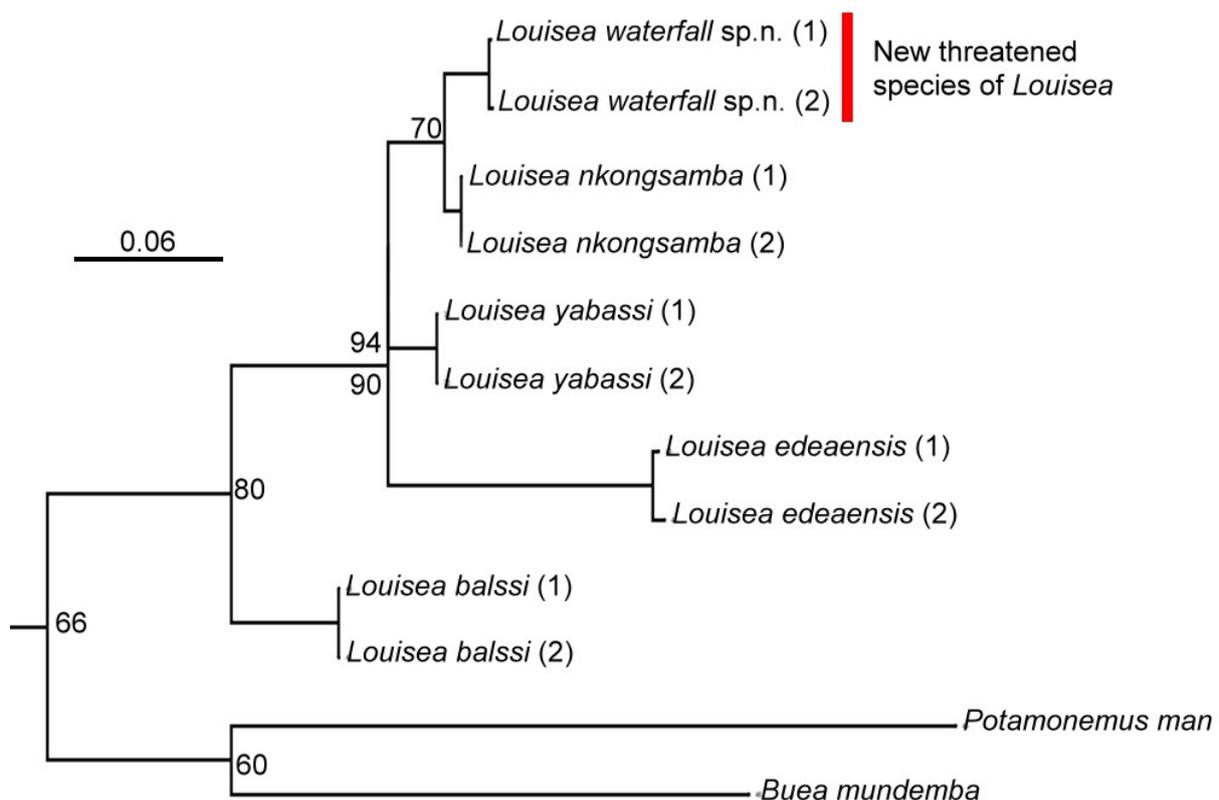


Figure 1. CO1 tree for the evidence of the new species.(Tree realised with the help by my supervisor).



Figure 2. The new threatened species of *Louisea*.

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

The results of this project are usually presented at the Cameroon Association for Research on Crustaceans and other Aquatic Resources. They will be presented at other academic institution in Cameroon (Bioscience, universities, NGOs etc) and at the international journal.

The following manuscripts related to this project are in preparation:

- I. A new species of the genus *Louisea* Cumberlandidge, 1994, and new locality for *Potamonemus mambilorum* (Crustacea: Decapoda: Potamonautidae).
- II. Phylogeographical analysis of Cameroonian populations of three species of freshwater crab of the genus *Sudanonautes* Bott, 1955 (Brachyura: Potamoidea: Potamonautidae) with description of two new species in Littoral zone of Cameroon, Central Africa.
- III. A conservation assessment for *Buea nlonako* from a small stream of Eyimba, Nlonako ecological reserve.

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

As mentioned above, the next step will be the development of a conservation action plan and Red List assessment of a new threatened species of freshwater crab, *Louisea waterfall* sp. n., (figure 1) discovered from northern part of Nlonako and water fall in Ekom-Nkam of Littoral Region of Cameroon.

8. Did you use The Rufford Foundation logo in any materials produced in relation to this project? Did the Foundation receive any publicity during the course of your work?

Yes, I have used the Rufford Foundation logo in my several official documents, in Cameroon. The Rufford will also be thanked to all other upcoming manuscripts.

9. Provide a full list of all the members of your team and 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. Pierre A. Mvogo Ndongo and Prof. Neil Cumberlidge his involving in the project was very crucial. They provided me with constructive advice during this project in order to respect ethical considerations and all the policy require to work with a threatened species. They also provided me with the important strategies to educate local people. I conducted some fieldwork research with Dr. Pierre A. Mvogo Ndongo. He taught me a lot in the field about taxonomy and conservation.

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.

All the collaborators have also helped me to share results with other stakeholders and other international researchers.

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 advice.

10. Any other comments?

The project helped to establish important links with traditional and administrative authorities around all the surveys localities and to get further experience conservation action plan. Furthermore, this project helped me to stimulate local development.