Final Evaluation Report

Your Details	
Full Name	Richard Mazebedi
Project Title	The ecology of Botswana caves; vulnerable and scientifically ignored ecosystems.
Application ID	37389-1
Date of this Report	23/08/2024

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
To characterize macroinvertebrate species distributions within the caves			☑	Seasonal data on macroinvertebrates community structure was successfully collected.
To estimate population of some arthropod groups using the mark recapture technique		☑		We could fully achieve this objective because in some sections of the cave our traps for population estimates were predated by porcupines.
To examine the cave's food web structure			☑	Stable Isotope data for characterising the cave food web was successfully collected and analysed.

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

a) The knowledge that was generated by the project on the seasonal patterns of macroinvertebrate distributions within the cave has helped to make recommendations on tourism activities in the cave, specifically the times of the year when tourism activity (volume and frequency of visits) in the cave should be reduced.

b) Networking in cave research-I have been able to meet other conservationist and scientists through this project. I have made contacts with laboratories with facilities that are relevant to my research, but which are not available in my university, I have made contacts with other cave researchers and early career ecologists though platforms that were availed by this project e.g. the Rufford training workshop in Namibia.

c) Making the cave's invertebrate diversity visible. The important output associated with analysing the cave's species-interdependencies (food web), is making the invertebrate diversity known to cave guides, cave visitors and to Botswana's Department of National Museum and Monuments.

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

1. There was a long delay in renewing the research permit for the project, the project's activities were put to halt for some months. I made consistent and submitted any additional documents that were needed for the permit renewal.
2. The laboratory which was initially contacted for stable isotope analyses of the cave samples was closed while I was still awaiting for the renewal of my research permit. I had to look for another laboratory and the analyses were undertaken at another laboratory, which we have not established working

3. Describe the involvement of local communities and how they have benefitted from the project.

The project engaged local cave guides and field assistants who are residents. During their assistantship, the participants we empowered with knowledge on the value biodiversity conservation. The major benefit of this project is contributing knowledge that ensures sustainable usage of their cave resource; the local community of Xhaxha village, through the Tsholofelo Community Trust, get proceeds from fees that tourists pay to tour the cave.

4. Are there any plans to continue this work?

Yes. This project provided baseline knowledge of Gcwihaba cave's ecology. There are other caves in Botswana who are in even closer proximity to human settlements than Gcwihaba caves. Such caves experience even more human threats such as littering that results from spiritual activities and recreational activities. The most important step to mitigate these is to make the biodiversity of the caves visible and, through workshops, educate local communities on the value of cave biodiversity.

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

1. I am yet to publish the results in a scientific journal, I anticipate that that will attract more research to the cave which ultimately will further inform sustainable use of the cave resources.
2. I am in the process of making a field guide to Gcwihaba invertebrates, which will be shared to the cave guides, the Department of museums and national monuments and Xhaxha primary school.
3. I will also share the findings through my Facebook and twitter accounts.

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

My research provided a baseline information on the trophic ecology of the cave, focusing on the invertebrates. I aim to investigate the microbiology of the cave, for example the microbes associated with cave formations and surfaces. I am also interested in the seasonal variability of stable isotope

values of bat guano to evaluate the guano's potential as indicator for past environments (e.g. as proxies for past climate reconstruction). There is need to make cave biodiversity visible to local communities, I plan to make posters of cave invertebrates and share them with schools in Ngamiland area.

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, on the project merchandise t-shirts that I shared with stakeholders during the project meetings. I also used the logo in my data collection sheets and in my power point slides when presenting about the project.

9. Provide a full list of all the members of your team and their role in the project.

Richard Mazebedi: Principal Investigator
Thomas Hesselberg: Advisor
Kefeletswe Majoka: Assistant
Jobe Marenga: Cave guide
Foster Motshola: Field assistant
Samuxaa Nkwe: Field assistant
Colby Puerio: Visiting student

10. Any other comments?

The project was a great networking opportunity! This project was also a great learning experience, in future we would want to improve on the level of local community involvement in the project.