

Final Evaluation Report

Your Details	
Full Name	Lilianna Wolf
Project Title	Assessing the Spread of the Deadly Disease White-Nose Syndrome in Texas and Northern Mexico
Application ID	30029-1
Date of this Report	5/7/2023

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
Collect microclimate samples from caves in Mexico				This was complicated by the COVID-19 pandemic, but with the help of Mexican colleagues, equipment was deployed and collected from 24 caves - sampled three distinct karst regions in the country of Mexico.
Complete analysis with collected microclimate data				The analysis for this project is completed - my colleagues and I have significant results to report. This year we plan to publish our findings in the Journal of Mammalogy
Write/Publish paper on findings				The manuscript for this work is in progress and nearly complete. I plan to submit this paper to the Journal of Mammalogy for review before the end of the summer.

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

a). We have characterised karst systems in Mexico that are most likely to sustain the growth of the fungal pathogen *Pseudogymnoascus destructans* and threaten cave-dwelling bat species with infection.

b). These areas can now be considered targets for management to stem the spread of the deadly disease white-nose syndrome in Mexico (and subsequently more southerly spread in Central and South America)

c). This research introduces an empirical approach to assessing the potential spread and landscape suitability for this particular fungal disease. These novel techniques may be useful when applied to similarly vectored diseases.

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

The Covid-19 pandemic threw a huge wrench into our plans for data collection. Over half of our equipment had been placed prior to the onset of the pandemic. International travel became very difficult during this time. I relied on my colleagues in Mexico, and friends who were able to travel to place the remaining equipment. I created materials and held virtual meetings to explain the proper way to select

placement locations and device setup. When travel restrictions lessened, I was able to collect equipment myself and analyse the collected data.

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

My Mexican colleagues (biologists) were integral to the completion of this project. We work together to understand the status of white-nose syndrome on Mexican landscapes and potential avenues for the conservation of key bat species. Likewise, the caving community in northern Mexico was very invested in this work. Recreational cavers from Monterrey and Ciudad Victoria helped in the placement and retrieval of equipment. These are people who are deeply committed to the conservation of caves and cave-dwelling species. They were excited to be made a part of a research project that could help conserve the bat species that they felt so connected to. They were well aware of the role Rufford played in funding the project.

5. Are there any plans to continue this work?

Yes. The manuscript for this project is nearly complete. The methodology for this work is novel - and I have been in communication with researchers who would like to emulate the microclimate-based karst assessment in Brazil.

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

The manuscript for this project is nearly complete. It will be submitted to the Journal of Mammalogy before the end of the summer.

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

The most important step is to publish our findings. As I mentioned above, this step is nearly complete.

The next step is to communicate these findings at conferences where the audience will be able to interpret the information for a management plan. I believe the best place for this is the North American Society of Bat Research conference - which is held annually. I am involved in this conference and will attempt to attend the meeting in October of 2023.

In terms of continuing research, I believe it is necessary for this methodology to be replicated in areas of high bat diversity where *P. destructans* may be introduced and become virulent - namely, Central and South America.

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! Of course. The Rufford Foundation is displayed on the funding page of every presentation I have given explaining the findings and progress of my research. These presentations include my thesis defence (2020), A presentation given to the National

Speleological Society in 2022 (for which I won the Mitchell Award for best student speaker), and various presentations given to non-academic audiences including three presentations given to local caving grottos in Texas and Washington DC, and one presentation given to the Boy Scouts.

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

Dr. Thomas Lacher - Graduate Advisor

Dr. Catherine Haase - Professor at Austin Peay State University who assisted in data analysis

Peter Sprouse - founder of Zara Environmental Consulting and recreational caver. Peter is deeply committed to cave conservation and maintains a database of location records for every cave he has discovered and named in Texas and Mexico. He provided this data for use in our modelling efforts. Peter makes no money from maintaining these records. He has been caving in Northern Mexico since the early 1970's and feels a responsibility to support conservation research in karst systems. Peter also organizes and leads expeditions to discover, explore, and map cave systems in the region. Accessing caves in these very remote areas would not have been possible without him.

Dr. Emma Gomez - Senior Conservation Manager at Parque Ecológico Chipinque and bat researcher with a focus on Mexican species and landscapes who contributed to the writing of the manuscript.

10. Any other comments?