

## Final Evaluation Report

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Your Details	
<b>Full Name</b>	Laura Alejandra Najera Cortazar
<b>Project Title</b>	Ecological genomics, adaptation, and species boundaries of a complex of sympatric Myotis bats in the Baja California Peninsula, Mexico
<b>Application ID</b>	25403-1
<b>Date of this Report</b>	21st April 2022

**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
Successful fieldwork				It was challenging, many problems came up during fieldwork, some which were terrible in terms of mental health of one member of the team.
Data analysis				Completed and on-going. New master's and undergraduate students are currently doing research with some of the samples that were collected during this fieldwork.
PhD studies				COVID pandemic made things horribly difficult.
Master projects				Thesis completed
Publications				On-going.
Further bat/pathogen conservation work in the Baja California peninsula				Conservation efforts have been taken into account, included in this and other projects in the peninsula. Other outcomes and follow-up projects are on hold until new resources can be allocated.
Project dissemination				Many presentations in international conferences were successfully achieved, but many were cancelled because of the pandemic situation. Currently, the lack of resources are preventing me to go to more international conferences.

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

**a).** Multiple new sites with high diversity of bats and hotspots of hybridisation. This is important for bat conservation and connectivity, as well as for disease ecology. We increased our dataset with many bats and ectoparasite new records and lineages for this under-sampled region of Mexico. So far, we have two potential new species of bats, and 21 new lineages of ectoparasites, as well as five new records of bat flies over north-western Mexico.

**b).** This project increased the network of researchers and stakeholders that are willing to collaborate for further projects, and that have already included me in new

projects after we met. This is not only for research but also in terms of involving local communities that now see bats as a very important natural resource, non-invasive, and that could even be of touristic importance.

c). The amount of data collected will be used by many other students in future projects, which means that all the resources allocated for from this grant will be for the profit of future generations of students, and for future projects I will be collaborating with.

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

There were the "usual" difficulties that comes with sampling in isolated places, like difficulties for arriving to certain sites, sampling nights with few individuals or with too many individuals. However, this field season was extremely challenging for two main reasons: one was the multiple malfunctions that we experienced with our working truck, and some mental health issues with one of the volunteers.

Truck issues: after two seasons of heavy use work through the desert, this time we had multiple failures. The truck was very well cared, and had the proper revisions, so many of these issues were unexpected and sometimes very stressing, as we were stuck in remote places that sometimes were so isolated that we had no communication signal nor other human fixed interaction. We solved the urgent issues on site, using our own tools and occasional help from trailer drivers, for then have a proper evaluation from mechanics along our way. And despite these issues delayed our schedule, it was possible to catch up and continue with sampling, sometimes even sampling the sites where we were stuck waiting for the truck repairs. This was very well done, and we got the best out of those times.

Mental health issues: My team was integrated by two master students, my PhD supervisor (just for a short period of the sampling) and a volunteer, which in this case was my cousin. He was a very talented and experienced biologist, with many years of experience doing fieldwork in Mexico, working with bats. He had a very stressful period while doing his PhD abroad (Spain) and had a short hospitalization back then. By the time he joined me (after a year of that), he was fine, "normal" and enthusiastic to volunteer for this project. Unfortunately, I wasn't aware he was taking medications, and at the middle of the trip, he started behaving very paranoid, angry at the job and to my leading. I talked to him multiple times, until I convinced him to trust in me again. That's when he told me he stopped taking his medications, because he wanted to be awake and that was difficult while taking them. We talked, and he started taking his medications again, but his behaviour suddenly changed, now in a very worrying matter, because instead of being paranoid and confronting, he became afraid and insecure about his abilities. Isolation made him suffer, at the point of I had to re-assess the schedule to go back to the city so he could be better. He and I were the only ones allowed to drive, but he couldn't manage to do that anymore as he became extremely afraid of not been capable to do it, so I did all the driving from then. He was on pain, afraid of his status and deeply depressed to not been "normal", and thinking he wasn't going to be normal ever again. He had periods of lucid thinking, but mostly he was now totally sad and

afraid of his own behaviour. I decided it was safer for all, especially for him, to be back to his house with his parents, so I bought an urgent flight ticket and made sure he arrived ok. All the team was supportive and comprehensive, trying to show him empathy and smiles. It was personally and professionally very difficult for the whole project, but specially for me, as it was very difficult to understand what was going on, as his behaviour was gradually changing, and it took me a while to understand the reason of that. I had to continue the trip improving security and decreasing time of driving and sampling, as I lost the other one most experienced handling bats and the regular tasks of fieldwork. I also modified isolated sites, as I considered it wasn't no longer safe to sample alone with my students, while my supervisor was already gone back. All went ok, and I managed to successfully finalise my sampling, obtaining very good results despite re-arranging tie and sites. This has been the most horrible episode of my entire career and life. My cousin is no longer with "us", he decided to go. I apologise to fully described all this in here, but it was so difficult that I hope other people having the same issues could access to some sort of extra support for things like this.

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

Local community was always involved in each one of the samplings performed. Usually, there were people acting as guides, but the main involvement was to procure some accommodation, and then a diverse audience of local people, especially children. People was ready to listen and see how the sampling was carried out, to see for the first-time bats in close, to ask as much as they could about them and their myths, and to discuss about potential ideas of how to protect their bats. There were also multiple indirect benefits from the current sampling, as that we would bring money to their communities by hiring guides, buying food and accommodation. This was a very nice experience, where there were amazing interchanges of culture between my students, my supervisor, the local people, and me. It was also inspiring for young people, as they had the chance to see what research is and how approachable could be for them as well.

#### **5. Are there any plans to continue this work?**

Yes, we discovered this is a very important region, particularly as a biodiversity hotspot and gene flow connectivity, therefore is highly important to pursuit research around here. For now, the ongoing work is to analyse the data collected, but we expect to get the resources to do more fieldwork sampling, as for such a rich and immense region, plenty more work is needed.

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

Mainly by presentations over international conferences and journal publications. I have presented these results in at least five conferences, and I have two publications in preparation. I have also contributed to local and regional publications that speaks about bat richness of the peninsula, as well as their importance for the ecosystem. As another side project, is the construction of a

webpage that contains photography of the amazing journey, landscapes and of course, biodiversity.

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

To increase sampling efforts. The region of Baja California peninsula is large and highly biodiverse. Because of its complex geological history, it has unique flora and fauna diversity, which complemented with its current isolation, makes it a source of endemism, including many species that are under continuous evolutive processes. It is extremely important to keep discovering new species around, documenting the status of its biodiversity and to keep developing conservation efforts for the peninsular diversity. We just undertook a relatively small survey of peninsular bats and ectoparasites, and more of those are expected to be found, as well as the study of pathogens related, which is relevant for disease ecology studies and potential zoonosis.

Another important step is to keep analysing the data obtained, and to present all this in both academic and non-academic conferences, as is important to show its biodiversity to the world, but also, to show the local communities how to protect their lands and its natural resources.

**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 logo and acknowledge Rufford Foundation in my thesis, each one of my presentations since I obtained the grant, webpages and/or any other media used, and will be acknowledged in every publication that results from the data collected during this project.

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

**Laura Alejandra Najera Cortazar**

Planned, coordinated, and developed thesis project ("Ecological genomics, adaption and species boundaries of a complex of sympatric Myotis bats (Vespertilionidae) in the Baja California Peninsula, Mexico"), all the fieldwork, sampling, budget, logistics and supervision of the team.

**Simon Goodman**

Supervisor of PhD studies. Helped with the coordination of the fieldwork and sampling. Participated on the general sampling and contributed with all the activities before and during fieldwork.

**Sergio Ticul Alvarez Castaneda**

Provided vital information for sampling and fieldwork details, equipment and logistics support.

**Alejandro Perez Najera**

Volunteer. Helped with fieldwork logistics, sampling, and all the general activities performed during half of the trip.

**Haley O'Connor**

Master student. Realised her Master project under my supervision, working with the geospatial data of bats and ectoparasites. Contributed with sampling bats and ectoparasites, and fieldwork logistics.

**Natasha Kebala**

Master student. Realised her Master project under my supervision, working with bat ectoparasites collection. Contributed with sampling and some fieldwork logistics.

**10. Any other comments?**

The funding granted by The Rufford Foundation helped in many different levels. It allowed me to achieve my last sampling season, to provide other master's project opportunities, and to be part of the many other researchers and naturalist that have been conceded with this prestigious grant. It was and still is my pleasure to have been awarded with this funding, and I am still proudly acknowledging it every time I have an opportunity of it. I will do my best to assist to at least one of the Rufford conferences, I have had not the chance for it, but I am keen to keep trying.

I just want to say thanks for this and for the extra time I was given for submitting this report. After I finished fieldwork, the last stage of my PhD was there, and I had to process and analyse data, and write my whole thesis, for which I was granted this extra time. Then, the COVID19 pandemic happened, and everything went to chaos. I am utterly thankful of what The Rufford Foundation team made for me, not only for the economic support but also for the time and kind consideration I got during all these years. Thank you very much, I hope this keeps going for a very long time.