

## The Rufford Foundation Final Report

Congratulations on the completion of your project that was supported by The Rufford Small Grants Foundation.

We ask all grant recipients to complete a Final Report Form that helps us to gauge the success of our grant giving. 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. 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](mailto:jane@rufford.org).

Thank you for your help.

**Josh Cole, Grants Director**

Grant Recipient Details	
<b>Your name</b>	Minerva Angela Uribe Rivera
<b>Project title</b>	Guidelines for the evaluation and impact mitigation of wind farms on bats at Mexico
<b>RSG reference</b>	18109-1
<b>Reporting period</b>	October 2015 to October 2016
<b>Amount of grant</b>	£5000
<b>Your email address</b>	minerva.uribe@uabc.edu.mx
<b>Date of this report</b>	November 3rd 2016

**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
Document bat species			X	
Update the bat inventory			X	
Make a map of bat species			X	
Identify bat species that can be affected			X	
Estimation of annual bat fatality rates		X		We documented bat mortality during one year, however, to estimate an accurate mortality rate it is necessary to adjust carcass search interval according with carcass removal and searchers efficiency
Analyse national and international guidelines			X	
Describe elements that have to be considered to evaluate and mitigate the impact of wind farms on bats			X	
Scientific divulgation			X	

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

We had technical difficulties because one of the bat detectors stopped working. To solve this we used another kind of equipment during 2 months of monitoring.

Beside this, we could not do monitoring in December 2015 because of weather conditions, but we restarted monitoring on January 2016.

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

**1) First guideline for evaluation and mitigation of impacts on bats of wind projects for Baja California State and Mexico:** This work represents the first proposal of guidelines for conserving bats at wind farms in Mexico. In October 2016 we shared the results of this project at the first National Symposium of the Impact of wind farms on bats in Mexico ("Simposio: Impacto de los Parques Eólicos sobre los murciélagos en México"). In that symposium we gathered with all researchers that are working with bats at wind farms in Mexico and we agreed to use this proposal as a basis to be presented to the authorities in Mexico.

**2) First workshop about impacts of wind energy on bats and implementation of mitigation measures in Baja California:** We organised a workshop to share the results of this project with staff of La Rumorosa wind farm, developers of wind energy, locals from La Rumorosa, students and professors from Baja California. Here we talked about the impacts of wind farms on bats, and trained the attendees on the use of techniques for monitoring bats at wind farms and carcass search.

Besides, we gathered with authorities of Baja California Energy Commission and personnel from la Rumorosa wind farm to propound mitigation measures. As a result, for the first time in Mexico, mitigation measures during the operation of wind farms will be implemented. La Rumorosa Wind Farm agreed to take the following measures based on the results of this study:

- 1) Changing wind turbine cut-in speed to reduce bat fatalities during summer, when we recorded the highest mortality.
- 2) Reducing activities of turbines on summer. This is the season with highest mortality of bats and lowest energy production because of low winds. Because of this, staff of the wind farm will give maintenance to turbines on this period.
- 3) Carcass search programme in charge of la Rumorosa wind farm staff. We trained the staff at the wind farm to develop a permanent monitoring of bat mortality at the wind farm.

**3) Identification of bat species that can be affected by turbines at the study area:**

With this study we were able to have the first report of bat mortality in wind farms at the north of Mexico. We found mortality of four species. One of them, the greater mastiff bat (*Eumops perotis*) was never reported before as part of mortality of bats at wind farms. This result is in revision to be published as a scientific note (Uribe – Rivera M.A, Guevara - Carrizales A.A, Leyva – Aguilera J.C. (2016). First mortality record of greater mastiff bat *Eumops perotis* in a wind farm. Western North American Naturalist (in revision).

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

We involved local community of La Rumorosa by organising the workshop mentioned above. Here we gave them information about wind energy production and its derived impacts on the environment, including effects on vegetation, landscape, humans and wildlife. Additionally we taught them to identify the main species of bats at the area and the importance of their conservation. Finally we trained them on basic activities for monitoring bats so they can be involved on wildlife conservation at wind farm projects.

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

Yes. Baja California Energy Commission is interested on signing a convention with Autonomous University of Baja California. With this agreement, we can continue the research at La Rumorosa Wind Farm and develop a permanent acoustic monitoring programme of bats, document mortality and evaluate the effectiveness of mitigation measures. We also will work together with researchers at other wind farms to adapt the guidelines we propounded to be applicable in other states of Mexico.

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

1) We shared the results of this project by attending to **national and international conferences and symposia** including the following:

- XIII CONGRESO NACIONAL DE MASTOZOLOGÍA. Simposio: Impacto de los Parques Eólicos sobre los murciélagos en México. Chiapas, México. As speaker with the conference: *Proposal of Guidelines for the evaluation and*

*mitigation of the impact of wind farms on bats of Baja California, Mexico.*  
October 2016

- 3rd International Meredith Gould Conference, Baja California, Mexico. Presentation of the poster titled *Wind energy and bats of Baja California.* October, 2015
  - The NWCC Wind Wildlife Research Meeting X, Broomfield, Colorado. Presentation of the poster titled: *The impact of wind energy facilities on bats: case study Sierra de Juarez, Baja California.* Available in: [https://www.nationalwind.org/wp-content/uploads/2014/04/22\\_Uribe.pdf](https://www.nationalwind.org/wp-content/uploads/2014/04/22_Uribe.pdf) December, 2014
- 2) **Workshop** with authorities of Baja California Energy Commission, staff from La Rumorosa Wind Farm and students from Autonomous University of Baja California:
- *Bats and wildlife monitoring and evaluation at wind farms.* Baja California, Mexico. October, 2016.
- 3) **Conferences** to students:
- Academic conferences at Engineering Science and Technology School, UABC. With the conference: *The impact of wind farms on bats.* May, 2015
- 4) **Scientific publications:**
- Guevara - Carrizales A.A, Uribe – Rivera M.A, Leyva – Aguilera J.C., Martínez – Gallardo R. (2015). *Parques eólicos y murciélagos: Una experiencia en Baja California, México.* Revista CIENCIA UANL (in revision).
  - Uribe – Rivera M.A, Guevara - Carrizales A.A, Leyva – Aguilera J.C. (2016). *First mortality record of greater mastiff bat *Eumops perotis* in a wind farm.* Western North American Naturalist (in revision).
  - Publication in a special number of *Therya Journal* that will include all works with bats at wind farms in Mexico.
  - We are working on an article that includes the results of acoustic monitoring and mortality of bats of one year of work.
- 5) **Future conferences.** We plan to attend to the next meeting of Asociación Mexicana de Mastozoología on 2016.

**7. Timescale: Over what period was the RSG used? How does this compare to the anticipated or actual length of the project?**

We used RSG from October 2015 to October 2016. We were able to accomplish one year of monitoring as planned as the beginning (August 2015 to August 2016). We

started monitoring in August with other funds and used RSG for the rest of fieldwork and for organising the workshop.

**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
Scholarship for student	763	763	0	
Accommodation	1782	1782	0	
Travel allowance	1350	1350	0	
Gas	850	935	85	We made one extra trip for the workshop and got funds from the University.
Mist nets	255	255	0	
<b>TOTAL</b>	5000	5085	85	

*\*The assumed rate of exchange was one Mexican peso equal to 23.5 pounds sterling.*

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

- Continue working with Baja California Energy Commission to achieve the implementation of this guidelines at La Rumorosa wind farm and other wind projects in Baja California.
- Evaluate the effectiveness of mitigation measures that are going to be implemented at la Rumorosa wind farm.
- Attend to next meeting of Asociación Mexicana de Mastozoología to present this proposal to the authorities and propound it as mandatory guidelines for wind farms in Mexico.
- Continue acoustic monitoring of bats using automated methods at La Rumorosa Wind Farm.
- Continue bat mortality monitoring adjusting the interval search time.



**10. Did you use the RSGF logo in any materials produced in relation to this project?  
Did the RSGF receive any publicity during the course of your work?**

Yes. We used it on the following events:

- Conference at XIII CONGRESO NACIONAL DE MASTOZOOLOGÍA. Simposio: Impacto de los Parques Eólicos sobre los murciélagos en México at Chipas, Mexico.
- Poster for Workshop *Bats and wildlife monitoring and evaluation at wind farms* at La Rumorosa, Mexico.
- Presentation of Master Thesis: *Propuesta de guía para la evaluación y mitigación del impacto de los parques eólicos sobre la quiropterofauna en Baja California, México* at Autonomous University of Baja California.
- Video for The Rufford Foundation.

**11. Any other comments?**

We consider the results of this work are very valuable for mitigating the impact of wind farms on bats in Mexico. However it is necessary to continue working to fully achieve the implementation of guidelines we are propounding.