

The Rufford Foundation

Final Report

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

We ask all grant recipients to complete a Final Report Form that helps us to gauge the success of our grant giving. The Final Report must be sent in **word format** and not PDF format or any other format. 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. Please note that the information may be edited for clarity. 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.

Thank you for your help.

Josh Cole, Grants Director

Grant Recipient Details	
Your name	Luz Adriana Pérez-Solano
Project title	Spatial and behavioural ecology of the mule deer in the Chihuahua Desert, México
RSG reference	15937-1
Reporting period	December 2014-January 2016
Amount of grant	£4986
Your email address	basilisco_azul@hotmail.com
Date of this report	January 19, 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
To estimate the mule deer (<i>Odocoileus hemionus</i>) home range		X		A total of eight mule deer home range were estimated during the rainy and dry seasons. We couldn't estimate the home ranges during the three physiological stages because we didn't have enough records of location in the three stages.
Characterisation of the vegetation			X	I characterized an area of 65 km ² where I obtained an image of plant cover representative of the 10 plant associations.
To determine the habitat use of mule deer			X	We chose variables related to the topography of the land and types of plant associations to evaluate habitat use.
Characterization of the habitat according to the daily activities of the deer		X		This objective will be complete at the first half of 1026. We obtained records of behaviour (movement, feeding and resting) of eight mule deer. These registers together with habitat variables obtained in the above objectives will be used to characterise the habitat according to the daily activities of the deer.

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

When our project development began, we intended to capture and monitor 20 deer, including males and females; however, capturing the individuals was complicated due to their elusiveness, mainly the males. In order to increase our chances of capturing deer, we worked with two drop-nets simultaneously. We managed to secure nine mule deer, among them only one young male; one of the females died 2 months after its capture, and so it was not possible to include this individual's information into the habitat use analysis. Our analyses were adapted to explore differences in home range, habitat use and behaviour among females, and the young male was included in these analyses.

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

Nine mule deer individuals from the Chihuahua Desert, Mexico, were monitored during our study. This research describes for the first time data on home range, habitat use and behaviour obtained using a direct method such as radiotelemetry.

1. The mean (\pm SD) home range size for females over the course of the study was 14.70 km² (\pm 5.89. Range = 6.16 - 25.45 km²) with a core area of 1.74 km² (\pm 0.50. Range = 1.13-2.49 km²). The home range of the male was 18.05 km² with a core area of 3.24 km². The home range obtained by our study is within the estimated ranges for the species, although close to the lower limits.

During the dry season the home range of the females (mean \pm SD) was 11.92 km² (\pm 4.47. Range = 6.16-17.66 km²), and the home range of the male was 15.29 km². During the rainy season the mean (\pm SD) home range size for the females was 19.11 km² (\pm 9.37. Range = 4.93-27.98 km²) and the home range size of the male was 25.63 km². Individual deer used different areas between seasons, and their home ranges only overlapped by a mean of 22.35% with respect to the entire area occupied each season.

2. Over the course of the study the mean distance between the deer and the nearest body of water was 1052.79 m, mean slope was 2.39°, sun exposure was 336° (northwest) and elevation was 1162.79 m asl. Use and selection of habitat by individual deer that make up a population differ even when they occupy the same area.

During the dry season, the use of topographic features (distance to the nearest body of water, elevation, slope, and sun exposure), among our deer was more homogeneous than during the rainy season. Differentiation in habitat use between each deer also can be affected by belonging to different family groups. We found that the plant associations affected the distribution of deer throughout their habitat.

3. The male deer in our study was young, we started tracking him before he was 1 year old, when he was still in a family group and tracking ended in approximately his 3rd year. Our results showed that his habitat use was similar to that of the females during these first years of his life. Our study presents the first information on habitat use for a young male.

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

The area where the study was conducted is located inside the Mapimí Biosphere Reserve, where resource management programs include the mule deer. We consider that the information obtained through this study will be most useful for the local authorities, whose preservation efforts regarding this species are currently aimed at maintaining and increasing population densities. This year, we are planning to have a meeting with members of the “La Flor” *ejido* (located within our studied area). These people are in charge of the “Museum of the Desert” and various ecotourism activities in the reserve, and our intention is to share the results of our study and provide them with products derived from it (informative posters, photographs, etc.) for the museum, where visitors from this region and other parts of the country may know more about the mule deer and its habitat.

5. Are there any plans to continue this work?

This study is part of my thesis research, and it also belongs to a larger project that has been focusing on mule deer populations at the Mapimí Biosphere Reserve for several years, and so the intention is to continue monitoring the species at the site and to address other matters in the future, such as metapopulation and genetic aspects.

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

An academic paper has been prepared to be published this year in a scientific journal, and there are at least two other papers planned. I have attended two conferences specialised in ecology and wild mammals, where some of the results from this study were presented, and I have plans to attend other events of this kind specialised in cervid management. Full research information will be shared with Mapimí Biosphere Reserve authorities as well as the local population, and dissemination products from the study will also be shared with them.

7. Timescale: Over what period was The Rufford Foundation grant used? How does this compare to the anticipated or actual length of the project?

The Rufford Foundation grant was used from December 2014 to December 2015. The time allocated to the study accounts for one quarter of the total project scope. It is the second part of the entire field sampling effort, during which deer monitoring and habitat characterisation were accomplished.

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
1 vehicle rent (£230.2 per field trip x 6 field trips)	276	-	-	
Accommodation on field station (£14.74 per 4 persons x 90 days stay)	682	682	-	
Field Expenses (£460.49 per 4 persons x 6 field trips)	1381	1381	-	
Road toll (£92.10 per field trip x 6 field trips)	276	345	69	Road toll costs increased during the year.
Fuel (£138.17 per field trip x 6 field trips)	415	689	274	We used more fuel than expected, and its costs continually increased during the year.
1 Deer drop-net, for Capture	1496	1557	61	The drop-net cost rose, since we changed field equipment suppliers.
Digital Cameras with night vision	460	-	-	This sampling technique was abandoned, since there were difficulties to acquire the equipment. Part of this money was used on other items.

Scientific divulgation	-	56	-	We utilized a spare amount of money to create and print posters and photographs to disseminate the results of the study among the local population.
Total	4986	4986	404	

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

The next important step for studying mule deer is to work on a species habitat management approach that considers the cattle inhabiting the reserve, so that the species is not harmed by its presence and the local breeders are not affected by the deer habitat management.

Studying this species throughout the Chihuahua Desert is important in order to find out whether the populations are behaving as metapopulations, as some studies have suggested, and to map the species movement across adequate habitat fragments.

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

I used the RSGF logo on different lectures and documents derived from my research. I also included appreciation notes for the Foundation in published papers. I have recommended the Foundation to other colleagues seeking support for their research projects; three of these colleagues have already applied for a grant.

11. Any other comments?

I would like to express my gratitude to the Rufford Small Grants Foundation for supporting the development of my research, which has served to gather data on mule deer.