The Rufford Small Grants 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. 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	Ramiro Ovejero
Project title	The importance of social and environmental stressors for the conservation of wild guanacos (*Lama guanicoe*) in Argentina
RSG reference	12.06.08
Reporting period	September 2008- September 2009
Amount of grant	£5700
Your email address	rovejero@mendoza-conicet.gov.ar
Date of this report	September 2009

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
The main objective of this project is to evaluate the social and physiological effects of environmental and anthropogenic factors on wild guanacos			x	For this, we measured the relation between climate, food availability, social status, hunting, livestock and profit gained from guanaco wool, with cortisol level modulation. This study will contribute to the understanding of the role that the physiological and ethological factors play in the natural history of these wild camelids (see full version of the final report).
Determine stress generated by seasonal variations in climate and food availability.			x	The objective was to quantify any variation in levels of cortisol in function of seasonality and food availability. This objective was partially achieved; I collected 400 faecal samples. Each sample was collected immediately after an animal's defaecation; date, time, identity (age, gender, dominance status and reproductive state) of the donor animal were recorded, together with habitat description and food availability. At the laboratory, we freeze-dried faecal samples by lyophilization and then make a powder of the sample. Because steroids are often not evenly distributed within faecal samples we homogenised the powder. We tested different protocols of extraction with several solvents (in different concentration) to extract faecal glucocorticoids (GCs) and then to quantify the concentration of GCs we test several commercial radioimmunoassay kits (DSL-MP-DPC, etc.) (See full version of the final report).
Evaluate the management impact on physiological and population parameters in wildlife guanacos.			x	We measured stress of guanacos during shearing by analyzing plasma cortisol levels, and after their release with cortisol levels in faeces collected in the field. Each sample was collected immediately after an animal's defaecation (date, time and identity of the donor animal were recorded). Wild guanacos were captured by means of a horse round up driving them toward a corral trap (CT). The CT has two arms forming a ''V'' shape, one corral for pre-capture, one capture corral, three successive corrals, a contact structure and a shearing corral. A total

				of 255 different free-ranging guanacos were captured and 128 blood samples were collecting during 2007-2009. Collections were made during September-October of each year. We collected 14 samples during 2007, 51 samples in 2008 and 61 samples in 2009. We found significant differences in the plasma levels of cortisol between 2008 and 2009 experiences (see full version of the final report)
Compare levels of cortisol between age classes, genders and social structure.			x	This objective was fully achieved. To achieve this objective, we identified the animals when they were being sheared and registered age and sex class, tags, group composition and general condition of the animals. We also found significant differences in the plasma levels of cortisol between sexes. However, we did not find differences between age classes (see full version of the final report)
Evaluate the management actions in density and group size.			x	This objective was fully achieved. To achieve this objective, we evaluated Guanaco population density by setting up total of ten 5 km-long transects before and after the management actions. Transects were done in a 4x4 pick up truck by two observers with binoculars. We recorded the distance and bearing from the transect line of different herds or individuals detected, as well as date and time, habitat and herd size. Density estimates were carried out with the DISTANCE 5.0 programme (Thomas et al., 2005). We found a dispersal effect in function of management actions (see full version of the final report).
Evaluate the rate of mortality in function of the management actions.			x	After the shearing had finishes, we walked a line transect and recorded dead animals (see full version of the final report).
Determine the heart frequency and corporal temperature in guanacos under management.			x	(see full version of the final report)
Compare these parameters with other management experiences.			x	To achieve this objective, we compared the management actions between Payunia and Alicura. The management actions are similar if we only considered the kind of management, but differ in climate, food availability and the guanaco population in Alicura is sedentary. To

				compare these two places, we used the time of management as a predictor variable. We did not find significant differences between Alicura and Payunia in the levels of cortisol in the 60 minutes temporal range. However, above this time the hormones levels increase in function of the herd and shearing time (see full version of the final report).

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

The unforeseen difficulty that arose during the project was the time that we needed for measuring any values of the levels of the hormone because we needed too much time for get a clean powdered fecal sample. On the other hand, with each RIA-Kit we can measure 40 samples per time, so actually we were quantifying a whole set of fecal samples.

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

This is the first research that evaluated the impact of natural and anthropological factors in the physiological parameters of wild guanacos.

The guanacos, like other wild and domestic camelids (vicuñas 10.82 ng/ml; llamas 14.65 ng/ml), have a stress response as a function of management actions. But we found that this hormone level is lower than other sites with different handling methods. These results suggest being careful with the handling method selected will improve the animal's wellbeing, because the time of handling is very important.

The management actions produce a dispersal effect in the density population and in the group size, but this effect in not constant in time because the density increased a month after the shearing actions.

In conclusion we saw a stress response due the management actions, but these effects are not detrimental for the viability of the programme and of the population, suggesting that the management of the species could be possible.

We recommend that the best handling method is with horses, but more long-term studies are necessary to evaluate population viability (PVA) and this differential response between sexes. Population viability analysis (PVA) is widely applied in conservation biology to predict extinction risks for threatened species and to compare alternative options for their management. This could be because with this data we can know the most important vital rate that contributes to population growth. So we can determine if we can do management actions before or during the breeding season and if we manage adults, juveniles or chulengos or only adults.

The sustainable use of the wild camelids has the potential to add a renewed activity for the local community in the reserve, avoiding the migration of the rural settlers to the city. Moreover, this activity can improve the conservation opportunities of the population, because we can change the negative perception that the rural people have of the species (see full version of the final report).

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

Local communities have benefited from this project through an improved interaction between the project members and corresponding local authorities/managers.

Payún Matrú Cooperative
This is a group of local people, with scarce resources; their principal economy comes from goat ranching. The Payún Matrú Cooperative members are carrying out the annual roundup and live shearing of guanacos in the Payunia reserve. These activities contribute to the integration of the local communities in development of the Reserve.

Students training
Besides rangers and wardens, during the sampling period we have trained 5 undergraduate students and 5 volunteers in population surveys, whose help has been invaluable. One of them, Pablo Moreno, is now actively working with us on parasite-guanaco interactions and gaining experience in his first research project.

Education / Communication Diffusion
Based on the information that we get in this project we contribute to preserve the biodiversity of the Payunia Reserve. Through presentations in school classes, university students and general public could now refer to the importance of the Guanaco in the Reserve and what is the role of this native camelid.

5. Are there any plans to continue this work?

I plan to keep on working in the field of ecology and physiology, focusing on regional biodiversity conservation plans and changes in land use patterns in rangelands. At the same time, I hope to contribute to the professional development of new young researchers and conservationists that are willing to work in the conservation of nature.

This report only contains preliminary results of the data collected in the period September 2008 - September 2009. We plan to continue our studies on the effect of management of wild guanacos in this reserve; particularly we aim to collect more data about survival, movement and group formation. Analysis of the potential effects of capture-handling and shearing or extracting individuals has usually been conducted over a short time frame. Our study intends to evaluate mid- and long-term effects of management mainly through the continuation of the fieldwork already under course.

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

Besides the corresponding reports to local authorities and NGOs involved in this project, these results will be shared with the local community through the open meetings that the biodiversity research group organizes periodically. To share these results with the scientific community I will try to make public major findings through academic meetings and scientific journals.

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

RSGF grant was used during a 17 months period, which was approximately the anticipated length of the fieldwork. Although I thought that data processing and analysis would have been finished almost at the same time than the fieldwork, it took longer than expected.

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
Fuel	1000	1500	-500	More fuel was used with respect to the calculated
Food in the field	700	700	0	
Equipment	1000	1000	0	
LABORATORY				
Cortisol RIA Kits	2000	2000		
Drugs and reagents	1000	1500	-500	More reagents were used than calculated
Total	**5700**	**6700**	**-1000**	

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

The important next steps, after finishing extra data analysis and reinforcing the main conclusions, are to elaborate the baseline of a future project to understand how the ecological and human factors identified during this study actually affect guanaco numbers in time, to provide essential information needed to plan sustainable use programmes. Understanding population dynamics and demographic processes will be decisive in the near future as the political pressure to exploit the remaining guanaco populations is increasing and official culling programmes are imminent.

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 already used the RSGF logo in all the presentations that we gave. We presented the results obtained with this RSG to the XXI Argentinean Mammalogical congress:

- Effects of the management actions in serum cortisol levels of free-ranged guanacos. 6-9 November 2008, Tafí del Valle, Tucumán.

- Dispersal Effects of the management in wildlife Guanacos. 6-9 November 2008, Tafí del Valle, Tucumán.

- In Situ Determination of Physiological Parameters in management of guanaco population. 6-9 November 2008, Tafí del Valle, Tucumán.

Sustainable use of free-ranged guanacos: which factors are critical to animal well-being? 10-13 August 2009, Villa Giardino Córdoba, Argentina.

Guanacos Management: Current State and Challenges to Future. SSC South American Camelids Special Group – IUCN, workshop in the International Nature Congress in Barcelona, Spain.

We will also submit the following manuscript to a scientific journal (*Journal of Wildlife Management* or *Biological Conservation*):

- Carmanchahi, Pablo; Ovejero, Ramiro; Marull, Carolina; Lopez, Carina; Schroeder, Natalia; Jhan, Graciela; Novaro, Andres; and Somoza, Gustavo. Physiological response characterization to the capture and shearing stress in guanacos (*Lama guanicoe*).