

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	Sofia Nanni
Project title	Influence of humans and domestic animals on vertebrate trophic cascades in forest remnants of the Argentine Chaco: implications for their long-term conservation
RSG reference	24797-B
Reporting period	May, 2018-April 31st, 2019
Amount of grant	£9,932
Your email address	sofiananni@gmail.com
Date of this report	May, 17 th , 2019

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
Influence of surrounding land uses on trophic cascades in Argentine Dry Chaco agroecosystems				Field data (more than 5000 camera-trap days) has been acquired and data analyses to address trophic cascade changes among different land uses are currently taking place. However, we decided to focus only on medium-large mammal sampling and at this stage, excluded vegetation sampling, since this would have implied a larger amount of time and effort than that available. To that end, we redesigned field sampling and included the installation of 20-30 camera-traps separated every 3 km in a grid design, for a robust assessment of medium-large mammals in the region and their occupancy patterns.
Influence of domestic dogs on trophic cascades in Argentine Dry Chaco agroecosystems				Field data has been acquired and data analyses to address trophic cascade changes among different land-uses are currently taking place. Several direct observations, however, indicate that dogs are a serious, yet previously overlooked issue for medium-large mammal conservation in dry chaco agroecosystems
Influence of hunting pressure and surrounding population density on trophic cascades in Argentine Dry Chaco agroecosystems				We acquired camera-trap data and performed interviews (~100) to the different social actors at 4 ~50000-ha sites throughout the north-south gradient covered by the Argentine dry chaco. From the surveys we identified that one aspect seriously threatening medium-large mammal conservation in the region as well as local livelihoods well-being was livestock depredation by medium and large carnivores. Thus, we

			<p>incorporated as an objective of this problem to quantify the prevalence of this issue in the study sites.</p> <p>To achieve these interlinked objectives, we are now processing the data and performing statistical analyses.</p>
4- education and outreach through educational workshops at local schools			<p>During the development of our project, we incorporated this objective since we realised that the local communities were interested and involved in our project, and that many aspects of the conservation of medium-large mammals in agroecosystems were influenced by local population's attitudes and perceptions towards them. So far, we performed two educational workshops at the local rural schools of two study sites. Visits to the two remaining sites will be performed in the next month. Additionally, we plan to hold participatory workshops with the local actors of the region to inform them about the main results of our project, and to co-design conservation strategies that can promote medium-large mammal conservation in the region and reduce conflicts between humans and wildlife in chaco agroecosystems.</p>

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

During the project we had trouble with camera-trap preservation in the field. In many cases, cameras were exposed and visible, and five camera-traps were taken away during our field surveys, which implied both the loss of the equipment and data.

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

The three most important outcomes of my project are:

1- The assessment of the potential of agroecosystems to harbour medium-large mammals in the Argentine dry chaco (both in terms of individual species and the whole community); and the main factors promoting and limiting it, from landscape

configuration within agroecosystems (e.g. presence and size of forest patches), to anthropic uses (e.g. extensive cattle ranching, hunting) within and around them). In a context of agriculture expansion in the region, agroecosystems become increasingly common and occupy large areas. Thus, understanding the potential of these socioecological systems to conserve medium-large mammals is key for their persistence in the long-term.

2- The integration of social and ecological dimensions to address medium-large mammal conservation in agroecosystems of the Argentine dry chaco. In these landscapes, traditional land-uses such as hunting and extensive cattle ranching coexist with intensive land-use practices, including intensive agriculture and cattle ranching. It is still unclear how the coexistence of both land uses affects medium-large mammals, and how such coexistence affects the interactions between human and wildlife. However, our preliminary results show that conflicts, such as livestock depredation by carnivores (mainly the puma, the only top predator of the region) seem to increase, very likely due to natural prey abundance reduction and habitat fragmentation. Our definitive results will throw light on this very relevant issue for medium-large mammal conservation in the long term, including possible mechanisms to mitigate these conflicts between local populations and wildlife.

3- A fine scale assessment of the frequency and habitat occupancy of medium-large mammal species within agroecosystems in the Argentine dry chaco (including several threatened species), and its association with landscape variables, which can derive in management recommendations for small and large landowners of the area.



Figure 1. Giant Anteater (*Myrmecophaga tridactyla*) with cub at one of the study sites.



Figure 2. Camera-trap installation at one of the study sites. April, 2019.

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

While at the beginning, working with local communities was not an explicit part of the project, as our project progressed, we realised that it was absolutely necessary. To different degrees (depending on the specific study sites,) the social actors of the region perform many activities that impact on medium-large mammals, including hunting, wood extraction, extensive cattle ranching, and having many dogs per household (mean number=3). Conflicts with carnivores were also widespread, especially due to livestock depredation, which in two study sites was a serious issue and derived both in retaliation hunting and the loss of many livestock heads by the puma. We therefore incorporated: 1. evaluating the attitudes, perceptions and conflicts with wildlife by the different social actors of the region, incorporating questions related to these items in the surveys (with special emphasis on the particularities among study sites, and generalities for agroecosystems of the region); and 2. holding educational workshops at a local school of each study site, to talk and discuss the value of the local fauna, and its importance for nature and people (using pictures derived from the camera traps); and to show children how to use camera traps and perform an activity with them in the field, including taking photos, which were (and will be in the case of the two schools where we did not hold the workshops yet) printed and given to them.

Also, large and small landowners also collaborated in this project, both by allowing the installation of camera traps within their fields, and by checking on the camera traps and providing reports on their status (e.g. at times cameras were moved by cows or wind). A report of the findings within their field will be provided to them as the data is processed.



Figure 3. Camera-trap installation activity held at one of the rural schools (Anta, Salta) in November, 2018.



Figure 4. Children identifying the medium-large mammals captured by the camera-trap pictures obtained in the study area, at one of the educational workshops (Anta, Salta), held in November, 2018.

5. Are there any plans to continue this work?

Yes. Our work will continue. We have completed sampling (both surveys and camera-trap sampling) at four study sites, but we will add one more study site this year (in July 2019, to encompass a larger study area within the Argentine dry chaco), and 3-4 sites next year, to extend our study area both north (at the upper limit of the Argentine dry chaco, in Salta province) and south (at the southernmost limit of the Argentine dry chaco, in San Luis province). One of our objectives for this later stage of the project is to hold participatory workshops at each study site, to co-design a protocol for maximizing medium-large mammal conservation in agroecosystems, and to explore possible mechanisms to reduce livestock depredation by carnivores at the sites where this is a serious issue. We also want to explore how climatic factors associated to the north-south gradient of the Argentine dry chaco (e.g. higher drought towards the south) combine with anthropic factors and how these affect medium-large mammal species presence and abundance. The expansion of our study site will derive in a very robust assessment of the potential of dry chaco agroecosystems to harbour medium-large mammals in the whole ecoregion, and conservation strategies that can contribute to enhance such potential at different scales.

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

We are now analysing the data to elaborate two manuscripts: one about medium-large mammal ecology in agroecosystems of the Argentine dry chaco, and one about perceptions and attitudes of the social actors of the region towards wildlife, including the quantification and description of human-wildlife conflicts in the region, a very novel issue that has not been explored to date. For the later, the responsible of this project (Dr. Sofía Nanni) will be holding a short research stay at the Human Dimensions of Wildlife Department, Colorado State University (USA) under the supervision of Dr. Manfredo (one of the leading institutions on Human-Wildlife conflicts), where she will analyse the survey data derived from the field trips held between June, 2018 and June, 2019, to derive the proposed manuscript. During that research stay, she will attend the PATHWAYS (Human Dimensions of Wildlife) 2019 Conference on September, 2019, to give an oral presentation of the project, with titled "Human-carnivore conflicts in Argentine Dry Chaco agroecosystems". To the non-academic public, the results are and have been shared through the educational workshops, and in the future participatory workshops with the social actors of the different sampled sites.

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

Our Rufford Foundation grant was used between May, 2018 and late April, 2019. This is within the anticipated length of the project, although to date we are still performing data analyses, which will finish in August-September, 2019, and we have not submitted a manuscript yet. However, we submitted an oral presentation to the Pathways Conference mentioned above (already accepted). Such delay occurred due to the modification of field sampling design, and the incorporation of a higher

number of camera-traps (20-30 per site) that formerly suggested, for which more field trips had to be made, especially at the beginning of the project when we only counted with 16 camera traps. We also made more frequent field trips to hold the educational workshops and perform the surveys to the social actors of the region, (i.e., an average of three field trips were made per site). Thus, field trips were held until April, 2019, which delayed data analyses.

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
ArcGIS license	1000		-1000	We obtained the ArcGIS license through other means. Funding from RSG was not destined for this.
1 Notebook for data analysis and 2 external memories for photo and video storage	1300	300	-1000	Due to high field costs, the purchase of the notebook was not prioritized, and only the 2 external memories were purchased.
Field materials (2 GPS, materials for 20 exclusion fences, 2 sleeping bags)	570	600	+30	The materials for the exclusion fences, which were not used, were instead replaced by materials for the educational workshops (£150). The other items were purchased as formerly indicated.
Food/per diems for 4 people in the field (50 days x £40/day)	2000	2400	+400	Field days were 60, for which we spent an additional amount to cover these expenses.
Gasoline and vehicle maintenance (50 days x 100 km/day x £0.14/km)	750	1000	+250	We spent an extra amount on gasoline due to trips including more than 100 km/day and to the extra 10 days that we spent in the field.
Vehicle rent (50 days x £28/day)	1400	2564	+1164	We spent an extra amount on this item because vehicle rent in Argentina increased from £28/day to £55/day within the project period. When possible, we rented our institutional vehicle (£23/day, rented 23

				days).
10 16 gig SD cards	110	110		
80 rechargeable batteries	340	450	+110	We purchased 106 rechargeable batteries, since 40 were lost when the camera-traps were taken.
10 camera-traps, shipment and customs.	2462	2500	+38	Customs were more expensive than previously budgeted.
TOTALS	9932	9924	-8	Current conversion rate: £1 equals 57.26 Argentine Pesos.

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

I feel the most important next steps in relation with the project are:

- Putting efforts on the participatory and educational workshops at the study sites and the future study sites, since much of the future of biodiversity in agroecosystems is associated to the decisions and attitudes of the social actors involved (e.g. conserving the forest patches within agroecosystems, enriching forest strips to provide better refuge for the medium-large mammals inhabiting the area; or trying to modify certain deep-rooted traditions such as hunting; management of dogs within agroecosystems).
- Further understanding of the effects of time since deforestation on the abundance and presence of medium-large mammals, and of the synergic effect of traditional and modern land-uses on their conservation.
- Further understanding of the influence of modern land use change (specifically agriculture expansion and intensification) on human-wildlife conflicts in the surrounding area, since fragmentation can derive in higher livestock depredation by carnivores, due to absence or reduction of natural prey, while also it might enhance hunting accessibility.
- Participatory discussion of ways and strategies to reduce or mitigate livestock depredation by medium and large carnivores, which can also serve to revalue these and other species of the region (including threatened and flag species, such as the giant anteater).

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

Yes. The Rufford Foundation logo was used in the Fullbright application for my short research stay at Colorado State University, and will be used in the oral presentation I will hold in September, 2019. The logo will also be used in the local reports to the small and large landowners of the field where we worked, and Rufford Foundation

support will be mentioned in the acknowledgment section of the manuscripts that we generate.

11. Please provide a full list of all the members of your team and briefly what was their role in the project.

Dr. Mauro Lucherini: Dr. Lucherini is a carnivore ecologist, specialized in carnivores and human-carnivore conflicts. He participated in 2 of the field trips, and designed the surveys used for the assessment of human-carnivore conflicts in the region. Also, he suggested the use of a larger number of cameras in the field sampling design, and helped with their installation in the first field trip.

BSc. José Luis Tisone is a technician at my institution, and collaborated in every field trip. Additionally, he was in charge of the generation of photos and videos for later coverage, and participated in the educational workshops.

Miss Yesmin Seiffe is a biology student at Universidad Nacional de Tucumán, and she participated in one educational workshop and two field strips as an intern/field assistant.

Miss Melisa Cordero is a biology student at Universidad Nacional de Tucumán, and she participated in two field strips as an intern/field assistant.

12. Any other comments?

I am very grateful to The Rufford Foundation, for the support that allowed the development and growth of this project, which I believe has a lot of future and potential and that otherwise could not have been held.