

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.

Grant Recipient Details					
Your name	Ninon Meyer				
Project title	Movement and conservation of large endangered ungulates in the Darién: The Tapir and the White-lipped peccary				
RSG reference	21030-2				
Reporting period	January 2017-December 2017				
Amount of grant	£4980				
Your email address	ninonmeyer@gmail.com				
Date of this report	December 2017				

Josh Cole, Grants Director



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
Build up a large camera trap database in the Darien to see the population trend of the Tapir and WLP in the area				2017 was the fourth season we deployed cameras (39 stations for an effort of 2911 trapping nights) in the Darien. I could infer some trend of the populations of WLP and tapirs and it remained stable.
Determine the habitat use and home range				Two WLP were radio-tagged, but I was not able to capture and collar any tapir, so I still don't know how big their home range is; tapirs' habitat use was inferred from the camera data.
Maintain/increase awareness of local people towards wildlife conservation through involvement and collaboration				A strong and successful component of the project is the active participation of the Embera people of the neighbouring community. This year 15 people (out of 150) worked for the project

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

Unlike last year just a station, hence two cameras, were stolen this time, and that is probably because we shifted the surveyed area towards a safer spot. The major problem remains poaching and I was directly confronted by it. As we were looking for herds of white-lipped peccaries (WLP) with my assistants, we came across a group that had just run away, and because we saw human footprints behind, we understood it was poachers. After inspecting the photos from the camera traps, we realised the poachers were just 1 hour ahead of us (see photos below), and were following the group of Serafina, a female that we captured. As we stayed in the field for a couple of days more to continue our capture expedition, the poachers sold the meat in the villages for just \$2/lb. That is extremely cheap and a waste for such a highly endangered species. It was even more worrying that the hunters were not indigenous but farmers from another village. WLP is the favoured game species in Panama and it would be unrealistic to aim for a complete halt of hunting. We rather see a solution in promoting sustainable hunting.





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

(1) Collection of additional ecological information about the mammals in the Darien. During the fourth season of the camera trapping survey, we captured many rare species such as jaguars, giant anteaters, tapirs and white-lipped peccaries. The populations of these species was stable over the years even though 4 years are not enough to depict the long-term population trends. Interestingly, tapirs started to be photographed in the lowlands close to the village again where they had not been detected since the first year of the survey in 2014.









(2) First spatial ecology data of white-lipped peccary in Panama: Cachito, a male that weighted 36 kg and Serafina, a female from another group were radio-tagged and named after my assistants. The collar of the male failed after 40 days, but its grouped roamed in area of 13 km² during that time (based on the Minimum Convex) Polygon - MCP). The female's group has a home range of 52 km². I plan to do home range analysis using the semi-variance approach in the ctmm R package (Fleming et al. 2014) that allows to detect if there is a home range behaviour and the home range size. Nevertheless, for now the size of the polygon gives an idea of the area the group uses. It is surprisingly small in comparison with other sites where whitelipped peccaries were studied using the same method (i.e. iridium collars). For example, in the Lagung del Tigre National Park, in the Maya Forest, northeastern Guatemala, the home range of a white-lipped herd varied between 24 and 138 km² during the dry and wet season respectively (J. Moreira, unpub. data). There, the groups size usually averages 30 individuals, while I estimated the group size of Serafing and Cachito to be close to 80-100 individuals based on the tracks they left, the direct observation of the group during the captures, and the opinions of my assistants who are hunters. Hofman (2016) reported a home range of 55 km² for a group of around 60 individuals in southern Belize. One would expect a larger group to exhibit a larger home range. The higher availability of water and fruiting trees in my study area may explain this pattern. In fact, the group of Serafina is moving principally along a ridge that local indigenous call 'Camino Trupal' because it is covered of the palm tree (Oenocarpus bataua Mart) which fruit constitutes a major food source for white-lipped peccaries. Interestingly, the two groups are neighbours but their range did not overlap, indicating a possible behaviour of territoriality little reported before. For example, in Calakmul, up to four different groups had home ranges overlapping (Reyna-Hurtado et al. 2009). Nevertheless, I collected to little data to make any conclusion.



Data from two white-lipped peccaries in Darien. The pink points are from Serafina and the blue points are from the male.



(3) Last but not least, I forged a very good relationship with the local Emberas that I hope will last for a long time. They are sharing now very valuable information about the distribution of the species, for example where the animals often go (e.g. remote ponds), detailed hunting stories from their dads, uncles and other older hunters about WLP, tapirs and other species that are useful to understand the life history and ecology of the species. Moreover, they also inform me about poaching events in the area. They were trained so they are now able to place cameras on their own, choose the best spot for specific species we want to target, and know how to proceed during capture-collaring. They are very proud and motivated about this work and succeeding to capture a tapir has become their 'quest'.

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

Involving local people is vital for the success of the project, otherwise it would be very difficult to capture the WLP. I almost completely rely on the skills of my three principal assistants to find tracks of WLP and tapirs, and be able to follow them until we encounter the herd (we have never successfully found tapir). They are also essential in the field because they can solve any situation (they build the camp, make fire, fish etc.). During the camera trapping we also hire other assistants, 10 in total, and we try to rotate so more people can benefit from the project. When I am in the field I also live with them in their houses which gives ample opportunity to discuss, understand their way of living and point of view, as regards nature conservation. By working a long time in that project, they spontaneously (meaning without asking them) told me that they now understand better the value of preserving the rare species and that over hunting is not a good strategy on the long-term for them. My assistants who are hunters were upset about the poaching event because they got attached to Serafina and Cachito, the two peccaries we captured together.

Besides gaining awareness, the local people get direct benefits from the project because it provides them a direct source of income, which on the short-term is the most important to them. They would rather buy chicken or pork in town because it is much easier than having to go hunting for several days to feed their kids.





5. Are there any plans to continue this work?

Yes. Since I started working in the Darien in 2014, I have seen a progressive change in the reasoning and way of thinking of people. The aim is to establish a long term monitoring program and research project on the ecology of large mammals in the area.

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

The results from the project were presented this year at three different congresses (International Mammal Congress, Australia; International Congress for Conservation Biology; International Tapir Symposium). I am finalising a manuscript about mammal occupancy in Panama that includes the Darien data, and will prepare another one about the movement data.

Furthermore, the information from the project is also used to convince the ministry of environment to include tapirs and WLP as species of interest in other conservation program throughout the country.

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 grant was used from March to December 2017. We will go back to Darien end of December 2017 – early January 2018 to try to capture more WLP. This specific subpart of the project was supposed to last for 1 year, but because I have not managed to capture as many individuals as I wanted, I will go again soon. Moreover, I plan to extend this project for as long as possible (minimum a few more years), and hopefully find students and Panamanian (darienistas) to take over.

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8. Budget: Please provide a breakdown of budgeted versus actual expenditure and

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2 GPS collars	4107	4107		
Batteries for camera trap	400			
Salaries for assistants	5020	4000		I have not used everything yet, and the rest will be used now in December and January for a new expedition.
Veterinary	600			Not covered by the Rufford
Food during field work	1000	2500	1500	The cost of living rose in Panama. To



	feed a field team of 12 people for 10
	days is more costly than I had
	expected.

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

First, I plan to continue the monitoring of the mammals in Pirre, Darien together with the assistance of the Emberas people, and Yaguara Panama (wildcats conservation NGO) using camera traps because it is very important from a scientific and conservation point of view. Darien's forests are threatened by construction of roads, timber logging, land use change (cattle) and we aim at putting in evidence of the value of the forest for the biodiversity; the monitoring will allow us to quantify the impact of such threats on the populations of the species. Continuing that monitoring is a way to keep on involving local indigenous people: they need to gain benefits from such project and must be involved as partners if the forest of Darien and its biodiversity is to be preserved.

I also want to radio-tag more individuals of WLP to answer ecological questions such as the size of home range, overlap of home range, and investigate whether there is behaviour of fission-fusion as displayed in other biomes (e.g. Pantanal) by capturing several individuals from the same herd.

We are making efforts to work hand in hand with the ministry of environment in Darien and other parts of Panama. For example, I am trying to put the WLP and tapir under the spotlight to promote their inclusion in conservation program. They remain largely neglected partly because of lack of awareness about their critical situation. Darien is a stronghold for the tapirs and WLP but in most of the rest the country, they are much less abundant or even extinct. Therefore, I want to use the information from the Darien study to understand how much space and resources they need, while gathering more data from other sites to work on a strategic plan to enhance their conservation in Panama.

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?

The Rufford was acknowledged and the logo used in all of my presentations at the three congresses I attended (see photo of the last slide below). Rufford will be mentioned in the acknowledgment of the manuscripts and in my PhD dissertation.

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

Tilson Contreras, Arkinio Chami and **Ulises Contreras** are my assistants/guides and always accompany me in the field, whether it is for camera trapping or capture-collaring. They guide, look for fresh tracks and follow them to reach the herds, make bivouacs in the forest, help setting up cameras and retrieve them.

Edgar Sanches is a qualified assistant leading part of the team because we split in sub-groups when we do camera trapping.



Ricardo Moreno is a Panamanian biologist specialised in wildcats conservation and founder of Yaguara Panama; he is my colleague for this project and helps to coordinate this project. We share the data.

Josue Ortega, John Cleghorn and Jorge Padilla are Panamanian students who have been coming with us to the field to help and learn. We often share data from the project to students who are doing their thesis (John Cleghorn and Alexis Moreno).

Leo Pretelet is our veterinary.

12. Any other comments?

Thank you very much for the support!

Acknowledgments

Ricardo Moreno Antonio de la Torre **Christopher Jordan** Patrick Jansen **Rafael Reyna** Helen Esser



















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