

## Final Evaluation Report

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Your Details	
<b>Full Name</b>	Jorge Mario Becoche Mosquera
<b>Project Title</b>	Contribution to the management of the Andean bear-human interactions in the influence area of Puracé national natural park, southwestern Colombia
<b>Application ID</b>	28471-2
<b>Grant Amount</b>	5000
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<b>Date of this Report</b>	13/02/2022

**1. 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
Work with local community				<p>We worked with three communities prioritised by Puracé National Park and CAM. The three communities were trained in management of camera traps and their use for the study of biodiversity. One community shared the experience through one audio-visual material loaded in YouTube (<a href="https://www.youtube.com/watch?v=FZD9xqRmSwk">https://www.youtube.com/watch?v=FZD9xqRmSwk</a>). The second community participated in a local festival organised by Puracé National Park, our team, rural and indigenous communities of Valencia in the southwestern area of Puracé National Park (<a href="https://www.youtube.com/watch?v=41tKmzdHdFo">https://www.youtube.com/watch?v=41tKmzdHdFo</a>). The third community shared the experience in the IV national congress of mammalogy through the presentation "RNSC Merenberg: una estrategia para la conservación de los mamíferos en el Macizo Colombiano" in the symposium "community experiences in knowledge management and conservation of mammals".</p>
Distribution and natural history				<p>We identified 42 locations of negative interactions between Andean bear and local communities in the last five years, prioritising two municipalities where there are rural and indigenous communities. The Sotará rural community was supported with this project, due to the fact that they present less support from the Colombian state for this type of problem. One manuscript was published about ecological interactions between Andean bear and Andean tapir *. We achieved an occupancy model of Andean bear in the Puracé National Park and influence area with the support of WCS, where we obtained an occupancy probability of 98,95% (Standard error: 0.0349) and detection probability of 26,96% (0.0255). The protected area presents a good conservation condition for the Andean bear.</p>
Aspects of conservation				<p>Two pilot experiences focused on management of livestock was implemented, achieving one more farm that we proposed in the project. Two conservation agreements were reached where the habitat and individuals of the Andean bear is being</p>

			protected with 50 ha (123.5 acres) in private land. One pilot experience had the support of CRC (regional environmental authority).
Socialization			We socialise with the three prioritised communities and the environmental institutions. Video films were made to have a broader dissemination of the activities and were done by one of the trained monitoring groups.

\*[https://www.researchgate.net/publication/348479366What's\\_on\\_the\\_menu\\_A\\_presumed\\_attack\\_of\\_Andean\\_bear\\_on\\_a\\_Mountain\\_tapir\\_at\\_the\\_Purace\\_National\\_Natural\\_Park\\_Colombia](https://www.researchgate.net/publication/348479366What's_on_the_menu_A_presumed_attack_of_Andean_bear_on_a_Mountain_tapir_at_the_Purace_National_Natural_Park_Colombia)

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

The first difficulty was standardising the information about negative interactions between Andean bear and rural communities because the environmental institutions don't have an organised database with the reports. Also, we have to adjust the methodology of Andean bear occupancy using the WCS and Colombian National Natural Parks proposal, where they don't use camera traps due to logistical and public order problems, mainly the topography. We observed that this methodology is less expensive, and we obtained good results to understand the conservation condition of Andean bear in this zone.

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

Three local communities near Puracé National Park were trained in wildlife monitoring for the conservation of the Andean bear and other endangered species. Also, two conservation agreements of approximately 50 ha (123.5 acres) of native forest were established with peasant families.

A probability of occupation of the Andean bear was estimated at 98.95% (Standard error = 0.0349) and a probability of detection of 26.96% (Standard error = 0.0255, AIC = 394.80). Within the models generated with the sampling covariates, the presence of food was related to species detection (AIC = 375.17;  $\beta$  = 24.493181, Standard error = 0.874240). Within site covariates, livestock ( $\beta$  = -3.274000, Standard Error = 1.250397) and crops ( $\beta$  = -6.143312, Standard Error = 3.906361) were the site covariates that most influenced Andean bear occupancy ( $\psi$  = 53.04). It was also observed that the covariates of people presence and livestock showed a high correlation ( $c$  = 0.7152).

A short communication about a possible attack of the Andean bear (*Tremarctos ornatus*) on the mountain tapir (*Tapirus pinchaque*) was published, providing information of the trophic ecology of both endangered species.

**4. What do you consider to be the most significant achievement of this work?**

**5. Briefly describe the involvement of local communities and how they have benefited from the project.**

Three local communities in the influence area of Puracé National Park participated in the development of the project. First, these communities were trained by the team work to recognise and protect the wildlife in their territories. Two conservation agreements were established with two families affected by attacks of Andean bear to livestock where sustainable livestock management practices were made focusing in protect the Andean bear habitat isolating the grasslands of the forest. We trust that this strategy reduced the risk of attacks. Also, an Andean bear festival was made with one of the communities to show the importance of Andean bear and associated species in nature and to empower children and adults about ecological conservation in their territories. Finally, we support a local radio station to diffuse radio programs related to the Andean bear, nature conservation and provide contacts of environmental authorities in case of Andean bear negative interactions.

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

Yes, we will continue this work, where we consider that anti-predatory strategies should be developed to avoid possible retaliatory measures towards the Andean bear and improve the habitat conditions of this species in the area of influence of Puracé National Park. The effectiveness of these strategies can be corroborated in the evaluation of the Andean bear occupancy in the next season that is estimated to be in 4 years. Also, we observed the intention of new local groups to strengthen their territory conservation capabilities using new technologies for the study of Andean bear.

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

First, the results of this work were presented in the communities where the work was carried out and it was presented to the Puracé National Park staff. Second, a scientific publication about a possible attack of Andean bear (*Tremarctos ornatus*) on the mountain tapir (*Tapirus pinchaque*) was published during the development of this work, providing information of the trophic ecology of both threatened species. Third, a part of the results were presented at IV Colombian Congress of Mastozoology with the project "RNSC Merenberg: A strategy for the conservation of mammals in the Colombian Massif" in the Symposium of community experiences in knowledge management and conservation of mammals. Fourth, the work was presented at the RSG – CONFERENCE NICARAGUA 2022 to the entire scientific community invited. Finally, another publication with the results of the occupancy obtained is also planned.

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

The project was developed in the period 2021 to 2022 over 12 months. All activities carried out were in accordance with the schedule established at the beginning of the project.

**9. Budget: 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. It is important that you retain the management accounts and all paid invoices relating to the project for at least 2 years as these may be required for inspection at our discretion. Exchange rate used: 1£=4869 COP 11/02/2021**

Item	Budgeted Amount	Actual Amount	Difference	Comments
1 laptop Lenovo		300	+300	Item co-financed
Lodging (4 people-8 times/10 days)	150	350	+200	Item co-financed
Feeding and transportation (4 people-8 times/10 days)	400	900	+500	Item co-financed
Complement for land planning materials (wood, workers, cattle, counterpart)	300	800	+500	Item co-financed
Electric Fence Impeller Solar Kit 80 Kms 12v Battery Included	200	500	+300	Item co-financed
Wire Puas Motto 16.5 * 400 Mt 16 Kilos Triple Galvanized	200	500	+300	Item co-financed
Design and printing of 100 flyers and posters	80	188	+108	Item co-financed
2 Metric cintra	10	10		
2 compasses	63	63		
100 Ziploc bags (3x4)	1	6	+5	Item co-financed
1 Canon PowerShot SX60 HS Digital Camera (Black)	483	483		Item co-financed
60 Flash Memory 16 GB SD	100	200	+100	Item co-financed
20 AA Energizer Ultimate Rechargeable L91 Package of 24 lithium batteries, 1.5 volts	722	722		
2 Garmin eTrex 20 Worldwide Handheld GPS Navigator	121	242	+121	Item co-financed
5 Bushnell H2O Waterproof/Fog proof Roof Prism Binocular	312	518	+206	Item co-financed
30 Camera Traps Bushnell 6 mp trophy cam essential	1858	4122	+2264	Item co-financed
<b>TOTAL</b>	<b>5000</b>	<b>9904</b>	<b>+4904</b>	

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

It is important to identify more families in conflict with Andean bear in order to establish more sustainable production strategies and conservation agreements that can contribute to the protection of this species. It is also necessary to continue with

the formation and linking of more communities through citizen science, festivals and others conservation strategies that can contribute to the protection of Andean bear and their habitat. Finally, it is necessary to evaluate the population dynamics of this species within Puracé National Park and influence area through genetic, ecological, and remote sensing studies.

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

The Rufford Foundation logo was only used in slides to give credits and thanks for the support received in this project when the results were presented at the IV Colombian Congress of Mastozoology with the project "RNSC Merenberg: A strategy for the conservation of mammals in the Colombian Massif" in the Symposium of community experiences in knowledge management and conservation of mammals. Also, when the results were presented at the RSG - CONFERENCE NICARAGUA 2022 and in the promotional poster for the Andean bear festival held in one of the communities involved in the project. Finally, thanks were also expressed for the support received from the Rufford Foundation in the publication (<https://neotropical.pensoft.net/article/57140/>). We printed flyers with the Puracé National Park and the Paletara indigenous community to avoid interactions between humans and the mountain tapir that is sighted on one of the roads that crosses the protected area, knowing that this is a potential prey of Andean bear.

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

**Gustavo Pisso Flórez, Biologist. Role:** Charge of field data collection, and data processing.

**Jorge Mario Becoche Mosquera, Biologist, Magister. Role:** charge of field data collection and data processing.

**Puracé National Natural Park staff. Role:** Providing access to the protected area, accompaniment to field activities and linking with the communities involved in this project.

**WCS-Colombia. Role:** Providing support in the data collection of occupancy model of Andean bear in the study area

**CRC. Role:** Providing information about negative interaction and supporting one sustainable antipredatory strategy.

**RNSC Merenberg: Origins community monitoring group and Agricultural Educational Institution Valencia in charge of providing support in the field, installation of trap cameras and collection of primary information.**

**Ecohabitats Foundation:** in charge of all administrative aspects of the project.

**13. Any other comments?**

Special thanks to the communities that wanted to be part of this project, to Puracé National Park, to the Ecohabitats Foundation, but above all to The Rufford Foundation, without whose support it would not have been possible to carry out this work.