

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	Mariana Bueno Landis
Project title	Lowland Tapir (<i>Tapirus terrestris</i>) conservation in Carlos Botelho State Park and Buffer Zone, São Paulo, Brazil
RSG reference	19574-2
Reporting period	January, 2016 – May, 2017
Amount of grant	£ 4678
Your email address	marianalandis@gmail.com
Date of this report	May 26, 2017

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
Estimate the population density of lowland tapir in Carlos Botelho State Park (CBSP)				A total of 75% of the camera trap data has already been collected and the analysis will take place when I finish this step. A pilot to identify the tapirs has been performed, an important step for the analysis in the Spatially Explicit Model Capture and Recapture (SECR).
Understand and map the threat factors in the CBSP and its Buffer Zone				The interviews will allow a large part of the accomplishment of this objective and will be carried out in the next semester, after the approval of the Ethics Committee. The threat factors identified in the field during the installation of the photographic traps were mapped.
Compare population density of lowland tapir in areas with different environmental characteristics and threat factors				So far it has been possible to perform comparisons only on the basis of frequency of occurrence, a density proxy. The density comparison will occur after analysis in the SECR.
Analyse the probability of occupation by lowland tapir according to environmental variables and threat factors				A total of 75% of the camera trap data has already been collected. Besides the conclusion of this collection will be necessary the collection of environmental variables, which should occur in the next semester. The occupation analysis will occur when all data is collected.
Evaluate the effectiveness of the capture-recapture method to estimate population of tapirs				Will start after completion of goal 1.
Develop recommendations for the conservation of the species in CBSP and its				Will be done after the conclusion and discussion of the analyses.

Buffer Zone				
Provide data to the Action Plan for the Conservation of Lowland Tapir, aimed at the dissemination of knowledge to the conservation of the species				Will be done after the conclusion and discussion of the analyses.

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

(1) With the installation of camera traps in places never before accessed by researchers, the first campaign resulted in the steal of two of them. A wide stretch of the study area is used by hunters and illegal palm harvesters, so these traps are a concern to these people, who probably has removed the equipment. From this fact, I adopted a new strategy: I identified palm harvesters who widely knew the area and would be interested in helping us in the execution of the work. Since the beginning of this association, we have not had any further trap removal and we have established an important relationship with the palm harvester's community.

(2) The interviews that were scheduled to begin in the beginning of 2017 were delayed by the difficulty in obtaining all necessary documentation for submission to the Ethics Committee. All documentation was submitted in May 2017 so this stage of the project will remain on hold until approval. The forecast is to be held in the next semester.

(3) The camera traps are being installed in 60 different locations in the study area, and in order to achieve the objectives proposed in this study, it is necessary to access quite remote areas of the forest. Thus, the physical effort of the field activity is quite intense and requires an excellent physical conditioning to cover the long trails in the rugged relief. These factors generated some difficulty in obtaining people (field assistants, trainees and volunteers) to assist in the field. Despite this difficulty the execution of the field activities are being made possible thanks to the field team of the Manaca Institute, which became essential for the accomplishment of the activities.

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

This research project was planned to be carried out for a period of 34 months, as the data collection has not yet been finalised, the main analyses have not yet been performed. However, it is possible to detect some points already observed in descriptive analyses resulting from two camera trap campaigns that I completed:

(1) The target species presented a higher relative abundance index in Area 1, intermediate in Area 2 and lower in Area 3 (Figures 1 and 2). These data

indicate a clear difference in abundance (density proxy) of the species between the northern and southern regions of CBSP. In addition, the species was recorded in 95% of the sample stations of Area 1, 50% of Area 2 and 35% of Area 3, also showing a greater distribution in the northern region of CBSP (Figure 3). This abundance and distribution gradient may be related to the higher incidence of anthropogenic pressures in the southern region of the park, such as illegal extraction of juçara palm and hunting pressure. The environmental factors can also influence this difference since there are quite different areas, but only the occupation models and the population density estimation will allow a greater understanding of the influence of these factors, since these incorporate the environmental variables and the anthropic pressures in the analyses.

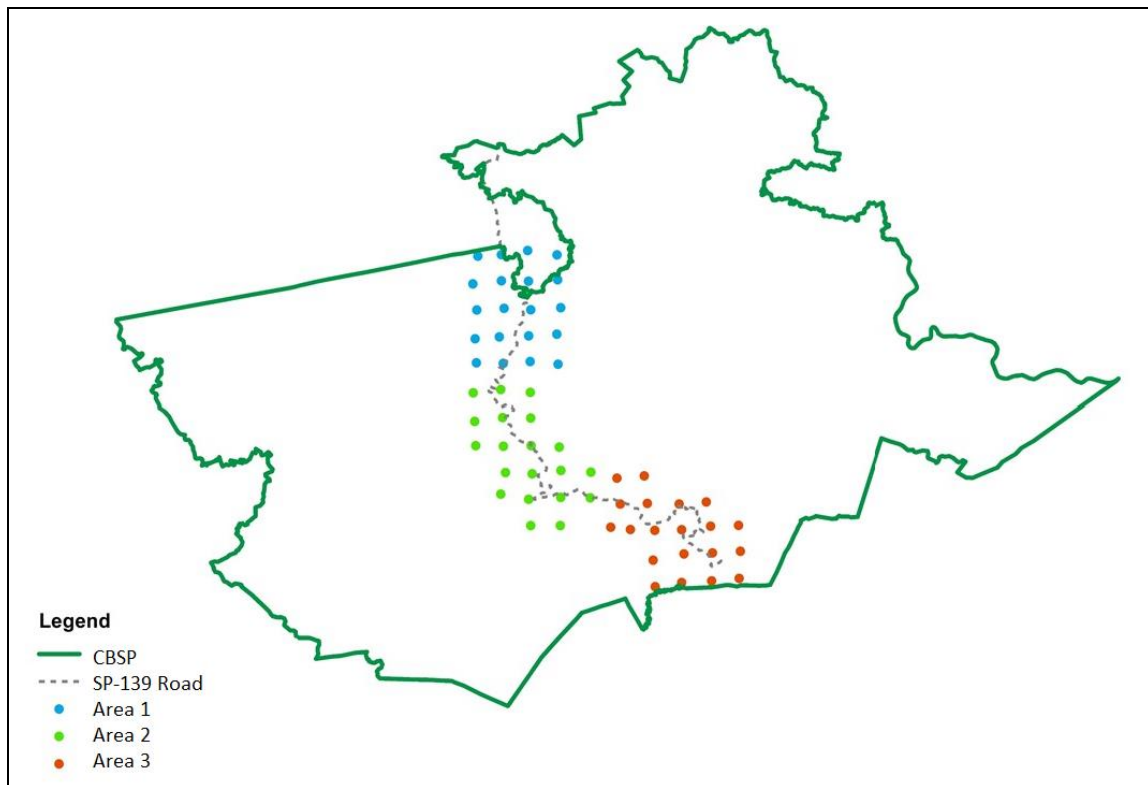


Figure 1. Distribution of the sample stations in the study area divided into three areas. At each point a couple of camera traps are installed.

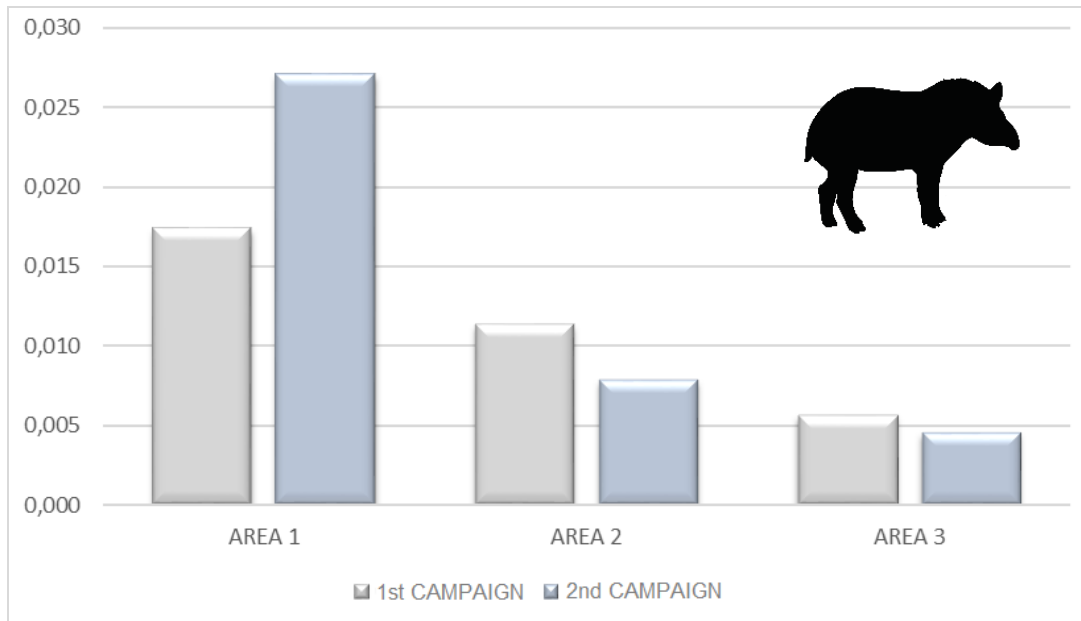


Figure 2. Relative abundance index (number of records * 100 / sample effort) of *Tapirus terrestris* recorded in first and second campaign of camera trap

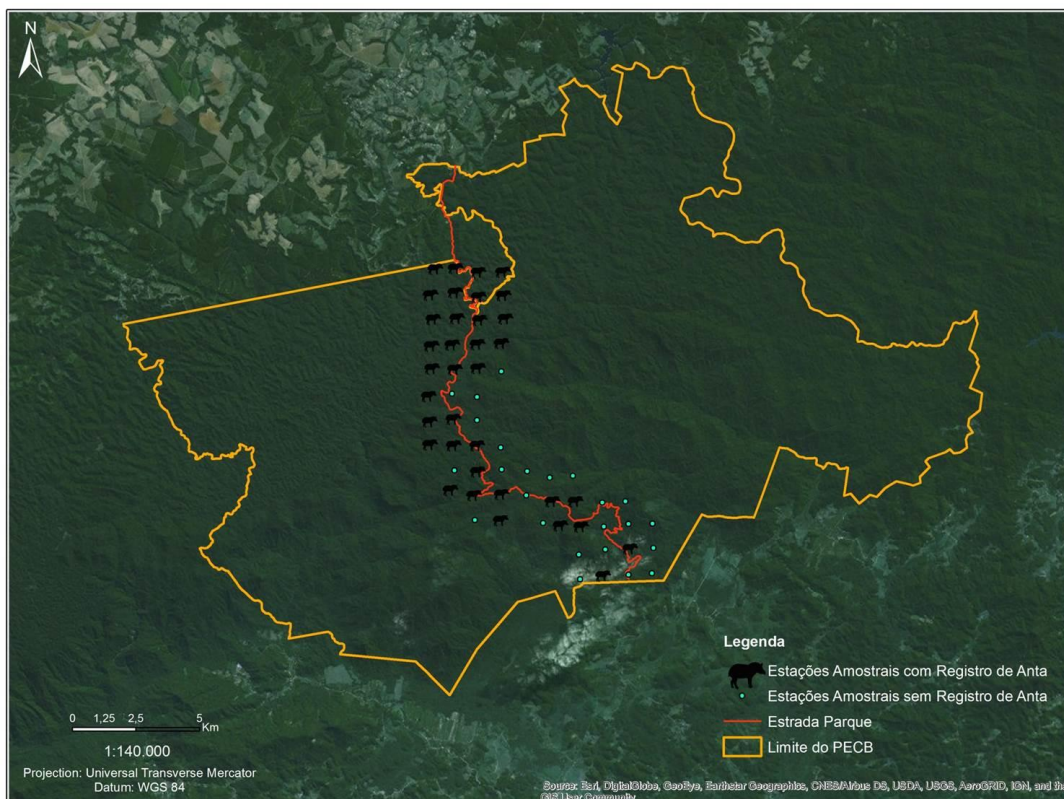


Figure 3. Study area with indication of the sampling stations where the target species was recorded (black silhouette), the sampling station without tapir registration (light blue dot).

(2) In the tapir individualisation pilot, it was possible to identify some individuals through the characteristics used in the studies already carried out with the genus *Tapirus*, such as scars, ear cuts, presence of white spots on the bellies and legs, tail length and thickness, mane size and format, body structure, hair colour and gender. (Noss et al., 2003; Troll et al., 2008; Tobler et al., 2013) (Figures 4 and 5), thus demonstrating the possibility of differentiating individuals through the records obtained. Additional characteristics were identified that is differed between some individuals and could complement the process of individualisation: lactating female, offspring list and spot pattern, presence / absence of belly button hernia, nose shape, size and shape of male genitalia. The set of characteristics identified in each individual may enable the identification of each of them, a process that is in progress. After the identification of the individuals, it will be possible to estimate the population density of the tapir in the CBSP using the Especially Explicit Capture and Recapture Model.



Figure 4. Two adult males with different characteristics: A) Cut in the internal part of the right ear, long tail. B) Tear on the outside part of the right ear, short tail.

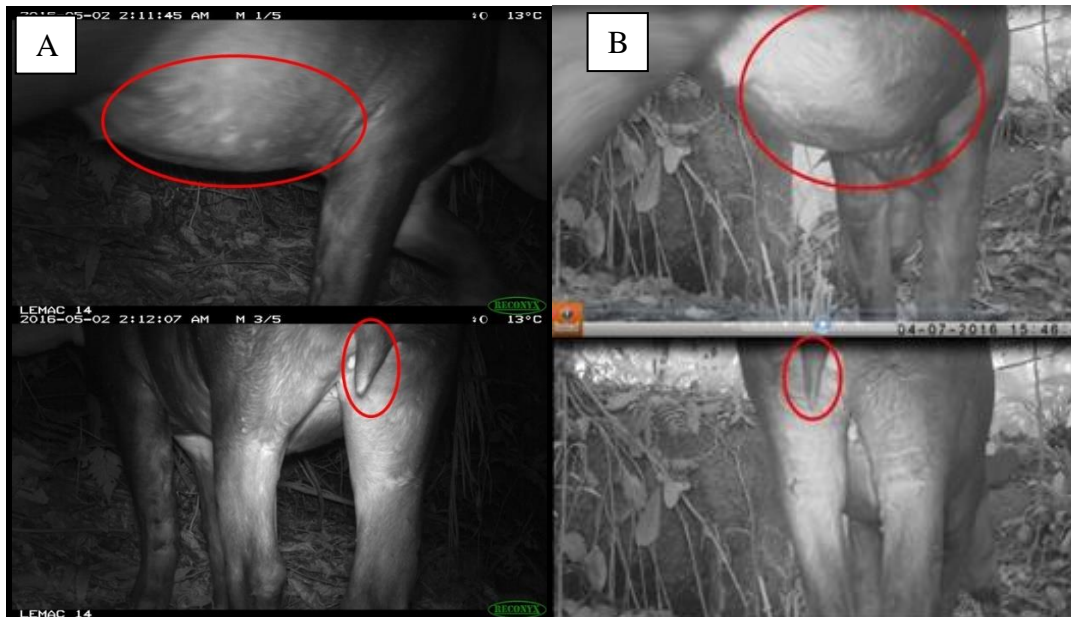


Figure 5. Two adult females with different characteristics. A) Presence of spots on the belly and thick and short tail. B) Belly without pints and tail tuned and long.

(3) To date, a total of 24 species of mammals have been identified through photographic trapping (Table 1), indicating the high species richness. Among the most abundant are: *Cuniculus paca*, *Mazama sp.* and *Tapirus terrestris* (Figure 6). We highlight the record of *Myrmecophaga tridactyla* species rarely recorded in Atlantic forest and *Speothos venaticus*, allusive species with low incidence of records. The species *Tayassu pecari*, one of the most vulnerable in the Atlantic Forest, presented an abundance greater than *Pecari tajacu*, which belongs to the same family but is less vulnerable. In a survey carried out for another project in the northern region of CBSP, *T. pecari* was not recorded and, therefore, was considered at the time an indication of local extinction (Brocardo et al, 2012). Although there is a possibility of fluctuations in the populations, the present work is the first one that covers the whole extension of the CBSP, with a sample area of 30 km², in addition to a great sampling effort in data collection days and number of camera traps. All these issues favour a broad and more concise understanding of the status of mammalian populations, generating more robust data for the development of conservation strategies.

Table 1. List of mammal species recorded by camera trapping in the study area

ORDEM	FAMILY	SPECIE
DIDELPHIMORPHIA	DIDELPHIDAE	<i>Didelphis albiventris</i>
		<i>Didelphis aurita</i>
		<i>Chironectes minimus</i>
PILOSA	MYRMECOPHAGIDAE	<i>Myrmecophaga tridactyla</i>

ORDEM	FAMILY	SPECIE
		<i>Tamandua tetradactyla</i>
CINGULATA	DASYPODIDAE	<i>Dasypus novemcinctus</i>
		<i>Cabassous tatouay</i>
PERISSODACTYLA	TAPIRIIDAE	<i>Tapirus terrestris</i>
ARTIODACTYLA	CERVIDAE	<i>Mazama spp.</i>
	TAYASSUIDAE	<i>Pecari tajacu</i>
		<i>Tayassu pecari</i>
PRIMATES	CEBIDAE	<i>Sapajus nigritus</i>
CARNIVORA	CANIDAE	<i>Speothos venaticus</i>
	FELIDAE	<i>Leopardus pardalis</i>
		<i>Leopardus guttulus</i>
		<i>Puma concolor</i>
		<i>Puma yagouaroundi</i>
	MUSTELIDAE	<i>Eira barbara</i>
	PROCYONIDAE	<i>Nasua</i>
		<i>Procyon cancrivorus</i>
RODENTIA	CAVIIDAE	<i>Hydrochoerus hydrochaeris</i>
	CUNICULIDAE	<i>Cuniculus paca</i>
	DASYPROCTIDAE	<i>Dasyprocta azarae</i>
	SCIURIDAE	<i>Guerlinguetus brasiliensis</i>
TOTAL: 24		

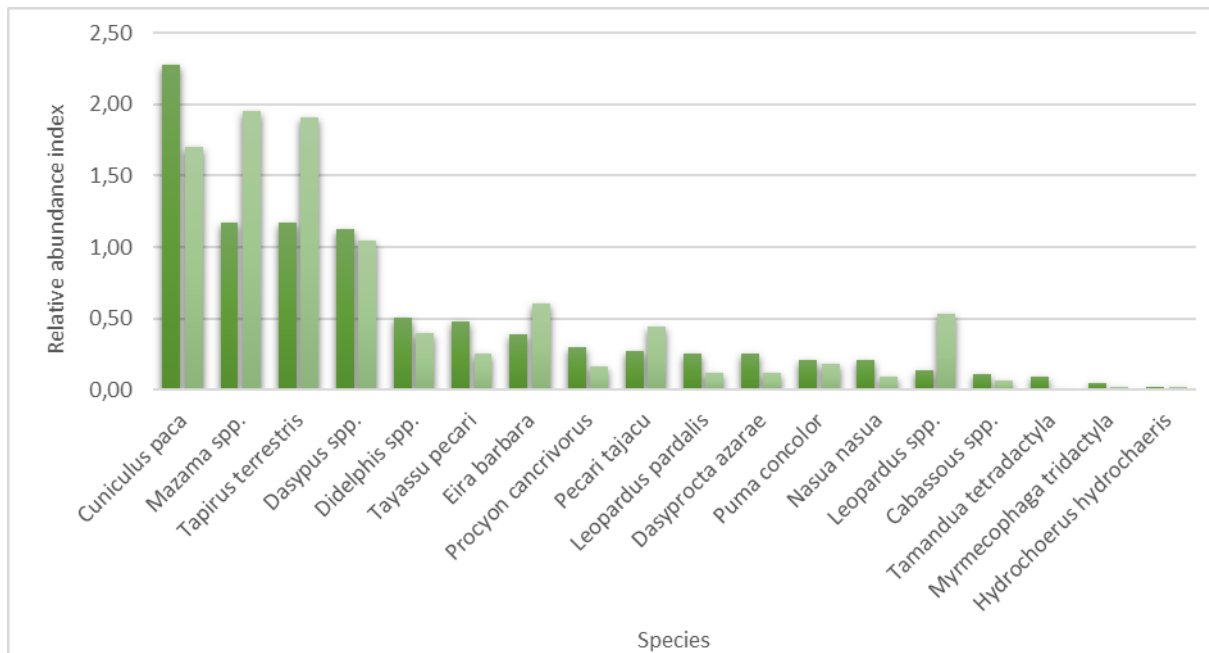


Figure 6. Relative abundance index (number of records * 100 / sample effort) of the species recorded in first (dark green) and second campaign (light green) of camera trap (sample effort: 1st campaign = 4347; 2nd campaign = 4301 traps/day).

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

The involvement of local communities has occurred in two different situations:

- Community of the Southern Region:

In this community, about 90% of the residents live by illegal extraction of juçara palm. After the occurrence mentioned in item 2 (1), a more intense involvement with the community was initiated. This action has benefits for both sides: (1) the safety of researchers in the field, since meeting with harvesters may offer a risk and the presence of a community agent can reduce any conflict; (2) The safety of the equipment, since the auxiliaries involved can communicate about our project to the community and help us identify points less vulnerable to robberies; (3) an approach to the community aiming at the dissemination of the project, opening an important door to the next stage of this work: interviews; and (4) most importantly, the income generation and training for people who live in the region of lower Human Development Index of the State of São Paulo, for people currently survive through illegal activities.

- Northern Region Communities:

This region is characterised by family farming, where much of the livelihood comes from the production of grapes. In the small properties located in the direct surroundings of the CBSP there is the occurrence of tapirs attacking the production, and with that, some cases of hunting were identified, as a way to mitigate the damages caused. In this way, we are in direct contact with the community, to evaluate together effective measures to reduce these conflicts.

5. Are there any plans to continue this work?

This work has been carried out through my doctoral project in ESALQ / USP (LEMaC) with the Manaca Institute. It is inserted in two partners projects (1) "Trophic ecology, functional diversity and occurrence of terrestrial mammals in the Atlantic Forest" coordinated for PhD Kátia Ferraz, from LEMaC (ESALQ/USP) and the "Lowland Tapir Conservation Program in the Paranapiacaba Ecological Continuum", developed for Manaca Institute. The proposal is that it be a long-term project, thus allowing the deepening of the knowledge of tapirs and the promotion of an effective conservation. Therefore, the next steps we are planning is are the capture and installation of tracking collars, to obtain ecological, behavioural, genetic and health data about the population we are studying, as well as environmental education actions with the communities inserted in the buffer zone of the study areas.

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

The results will be disseminated to the following sectors:

- (1) Responsible for the National Action Plan and IUCN / SSC Tapir Specialist Group: a report will be sent in order to subsidize established goals and contribute to the database;
- (2) Scientific community: through publication of scientific papers, doctoral thesis and oral and poster presentation at scientific events (workshops, congresses and conferences);
- (3) Management of CBSP, Forest Foundation and Military Environmental Police: a report will be sent containing anthropic threats assessments and recommendations in order to contribute to mitigation actions of threats in CBSP and its buffer zone;
- (4) Farmers: a manual will be developed and distributed to the farmers living in the buffer zone of CBSP, with the objective of raising awareness and helping to manage fruit production to reduce the damage caused by the wild species;
- (5) Surrounding community: it will be disseminated through exhibitions, lectures and folders, exposing relevant data that contribute to the community's awareness and appreciation of the Protected Area.

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

From May 2016, Rufford's grant was initially used to acquire the equipment needed to start collecting data. In the course of the project, it has been used monthly for field activities, where resources are spent on car rental, field assistant daily rate, fuel and food. The resource still available will allow the execution of the last camera trapping campaign, which will occur between June and September.

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
Bushnell TrophyCam	2088	1817	271	The value saved in the traps will be reversed to field assistant daily rate of the last campaign.
Rechargeable batteries	114	200	-86	For easier field logistics were bought twice the amount originally planned
SD Memory Card - 8 giga	43	0	43	The traps have already come with a memory card
Battery charger	50	50	0	
Organizer box	28	8	20	
Rain cover	18	18	0	
External Hard Drive	53	53	0	
Carvin knife	16	19	-3	
Tape measure - 50 meters	8	0	8	
Rubber boots	11	11	0	
Flagging tape	18	18	0	
Notebook (rite in the rain)	22	22	0	
Mould Removal	32	32	0	
Printing ink	16	4	12	Available for the last campaign of camera trapping
Field assistant daily rate	710	700	10	
Daily vehicle rental	782	626	156	
Fuel	384	300	84	
Food	285	250	35	
Total	4678	4128	550	

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

- (1) Completion of camera traps data collection.
- (2) Conduct the interviews.
- (3) Data analysis.
- (4) Share results as described in item 6.

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?

Situation	Local	Data
Folder – Manaca Institute	Distributed in events and meetings	Since may, 2016
Site – Manaca Institute	http://institutomanaca.org.br/projetos.html	Since may, 2016
Oral presentation - Association for Tropical Biology and Conservation	Hawaii, USA	July 13, 2016
Lecture – biology students from ESALQ/USP	Carlos Botelho State Park	March 27, 2016
Publicity scheduled for 2017		
Lecture – Environment week	Juquiá, São Paulo	June 6
Poster presentation - International Congress for Conservation Biology	Cartagena, Colombia	July 23
Poster and oral presentations - Seventh International Tapir Symposium	Texas, USA	November 15

11. Any other comments?

I would like to thank the Rufford Foundation immensely for the support given to this project, which will bring important data and proposals for the conservation of lowland tapir in the Atlantic Forest.

Follow the link of a national report announcing the project:

<http://g1.globo.com/sao-paulo/sorocaba-jundiari/nosso-campo/videos/v/pesquisa-monitora-presenca-da-anta-em-area-de-mata-atlantica/5677370/>

