

Final Evaluation Report

Your Details	
Full Name	Elaine Rios da Silva
Project Title	Effects of Forest Loss and Hunting on Midsized and Large-Bodied Mammals in Southern Bahia and its Consequences on Ecological Processes
Application ID	24655-1
Grant Amount	£5,000
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Date of this Report	February 2021

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
Evaluate the effects of habitat loss and anthropogenic pressures on diversity patterns of midsized and large mammal assemblages (richness, composition, and abundance of species).				We have already identified that richness and abundance of mammals have not been affected by the loss of forest cover in the landscape, however, we are still carrying out data analyses to identify whether there is an effect of anthropic pressures on mammal assemblages. The COVID-19 pandemic has affected our initial timetable, but this goal will be fully achieved sooner.
Evaluate the effects of defaunation and reduction of forest cover on seed predation and dispersal in forest remnants of southern Bahia				Although part of the experiment was lost due to the pandemic, we believe that we have enough data to answer that goal. However, the data analyses are still being carried out.

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

Throughout the project we had to deal with some situations that, unfortunately, partially compromised the development of field activities. Below I describe these difficulties and how we have dealt with them.

1. Camera traps - we had several camera traps stolen in the field, mainly in protected areas. Even using chains and locks on the camera traps, these did not prevent them from being stolen. To minimise the chances of theft, we avoided installing cameras in locations frequently used by hunters, following the guidelines provided by local residents who accompanied us as field assistants. In addition, we requested support from protected areas to increase surveillance in those areas in which cameras were deployed.

2. Seed availability - due to the asynchrony in the fruiting of *Virola gardneri* and the unavailability of its seeds in the nurseries of the region, we had to change the timeline of field activities and replace the species with *Spondias velunosa*, another species that bears large seeds. However, we were able to conduct only one out of two planned field campaigns, due to the necessity of both obtaining a large number of seeds to carry out the experiments and the readjustment in the activity's timeline as a result of the COVID-19 pandemic.

3. Pandemic - this was certainly the main difficulty of our project. All field activities were suspended for months. Campaigns with camera traps, experiments with *S. venulosa* seeds and interviews with local residents had to be stopped. After a few months, we were able to recover most of the cameras that were in the field, but a part of the experiment with *S. venulosa* was lost, since it is not possible to compare the data between the study areas due to the time that the experiments remained in the field. In addition, for obvious reasons, it was not possible to continue with the interviews.

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

1. We recorded 35 species of mammals with richness ranging from seven to 22 species per sampling site (Figure 1). Only one forest fragment presented more than 78% of the species expected to occur at the site, while the majority (N=13 forest fragments) presented about 50% of the expected species, indicating that forest remnants from southern Bahia has been facing a severe defaunation.

2. We filled the knowledge gap by identifying which species still persist in the studied landscapes. In particular, the most abundant species were collared peccary (*Pecari tajacu*) and South American coati (*Nasua nasua*), whereas jaguarundi (*Herpailurus yagouaroundi*) and lesser grison (*Galictis cuja*) presented the lowest number of records. We recorded endangered species following IUCN Red List, such as buff-headed capuchin (*Sapajus xanthosternos*), golden-headed lion tamarin (*Leontopithecus chrysomelas*), white-lipped peccary (*Tayassu pecari*) and lowland tapir (*Tapirus terrestris*), the last two being recorded in only one and two forest fragments, respectively. These species have already become extinct in almost their entire range within our study region, demonstrating the importance of these areas in maintaining these species and the key ecological roles they play.

3. We found that forest cover was a weak predictor explaining patterns of richness and abundance of mammals and rates of seed predation by vertebrates. This evidence may indicate that in our study region, other factors (e.g., hunting) may have a greater influence on the persistence of species and on ecological processes. However, we are still conducting data analyses to better assess this effect.

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

We gathered robust information about a group that plays a critical functional role for ecosystem functioning, but which is still poorly studied in the study region - considered a global biodiversity hotspot. Although we have not fully completed our project, we are sure that the results will be able to subsidise conservation actions aiming to ensure the persistence of mammals and the ecological roles they play, especially in the protected areas.

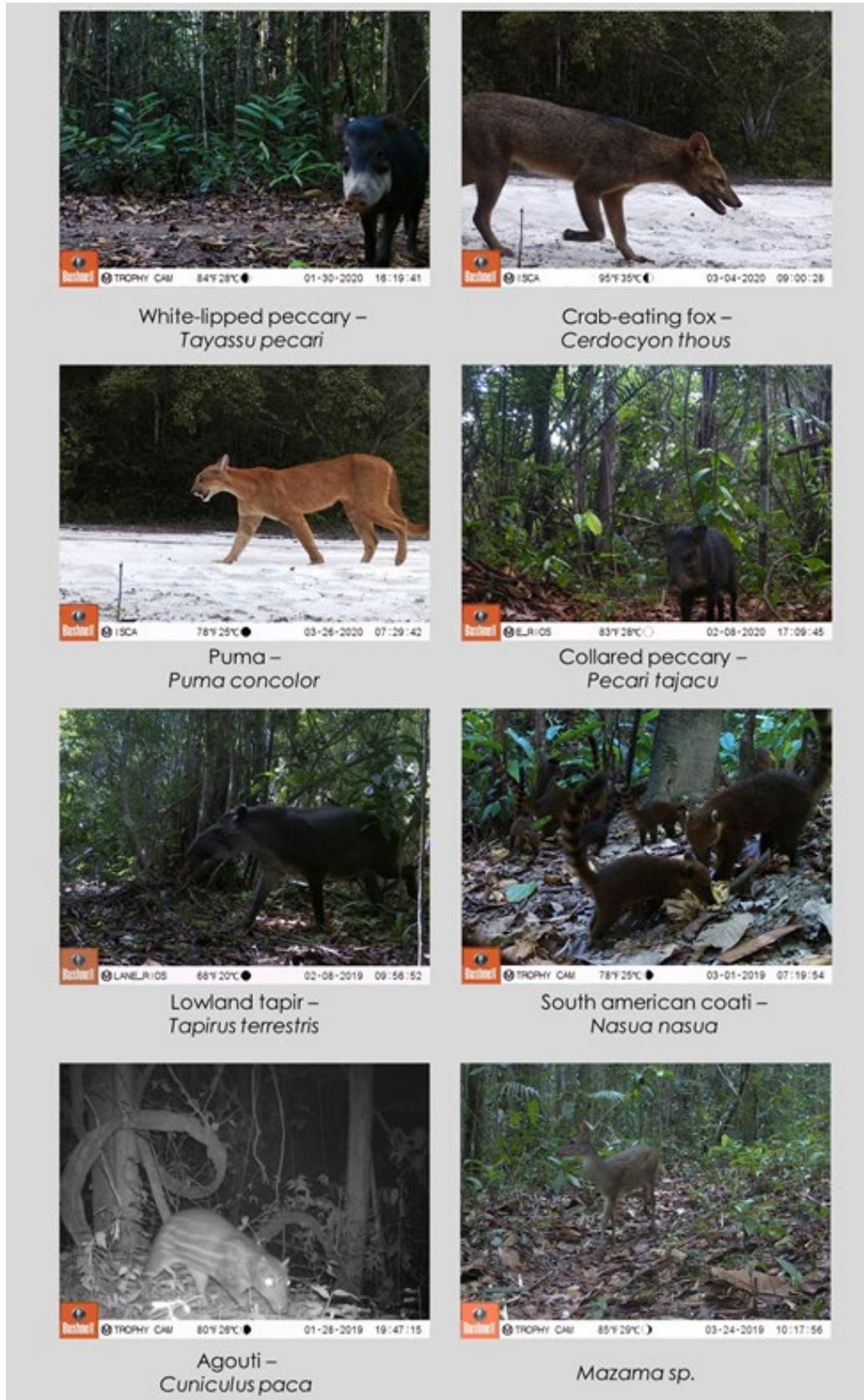


Figure 1. Mammals recorded in forest fragments of the Atlantic Forest in southern Bahia, Brazil

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

The local communities were very welcoming. Whenever possible, we prioritised the hiring of local people to assist in field activities, since they knew the region where they live and the locations of studied forest fragments. A significant part of the study area was located close to small villages, which we used as support, and our presence aroused the curiosity of the residents who always showed interest in understanding the work we were doing. We used these moments of conversation to explain the objectives of our research and exchange knowledge. Talking about mammals, including several species that were unknown to many people, and explaining the role they play in forest ecosystems through these conversations were gratifying.

6. Are there any plans to continue this work?

Yes. After completing the doctorate, we intend to continue developing other research in the same study areas, monitoring the mammal community and assessing the influence of anthropogenic impacts on this group and the ecosystem services performed by them.

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

The results will be shared and disseminated mainly through scientific publications, in addition to the doctoral thesis. The first scientific article, carried out in collaboration with other researchers, has already been published in *Mammalian Biology* (<https://link.springer.com/article/10.1007/s42991-020-00056-4>), and another has been accepted for publication in the *Landscape Ecology*. We have also received a 'major review' outcome from an article submitted to *Biological Conservation*, in which we are currently working on to submit a revised version. Others scientific publications are being prepared. Furthermore, we highlight that partial results have been already disseminated at scientific events (for example, X Brazilian Congress of Mastozoology, held in Águas de Lindóia/São Paulo, in September 2019), through banner presentation and lectures, and for the local community (Figure 2). This dissemination to the community is being carried out in partnership with an extension project conducted by researchers from the Universidade Estadual de Santa Cruz in addition to the BioBrasil project, entitled *Aliança dos Saberes*. We presented the partial results of the research in a rural municipal school, located in the city of Una, which is part of our study area. The results could be incorporated into the construction of a card game about mammals, entitled 'Which animal is this? Also, in partnership with the *Aliança dos Saberes* project, we presented the results in a school event, entitled Science Popularization Week, which was held at the same school mentioned above (Figure 3). Finally, we had the opportunity to show partial results to some residents who lived in the vicinity of the study areas and to field assistants (Figure 4). Our goal is to continue disseminating the results in the most diverse media and whenever the pandemic finishes, continue to disseminate the results to the local community.

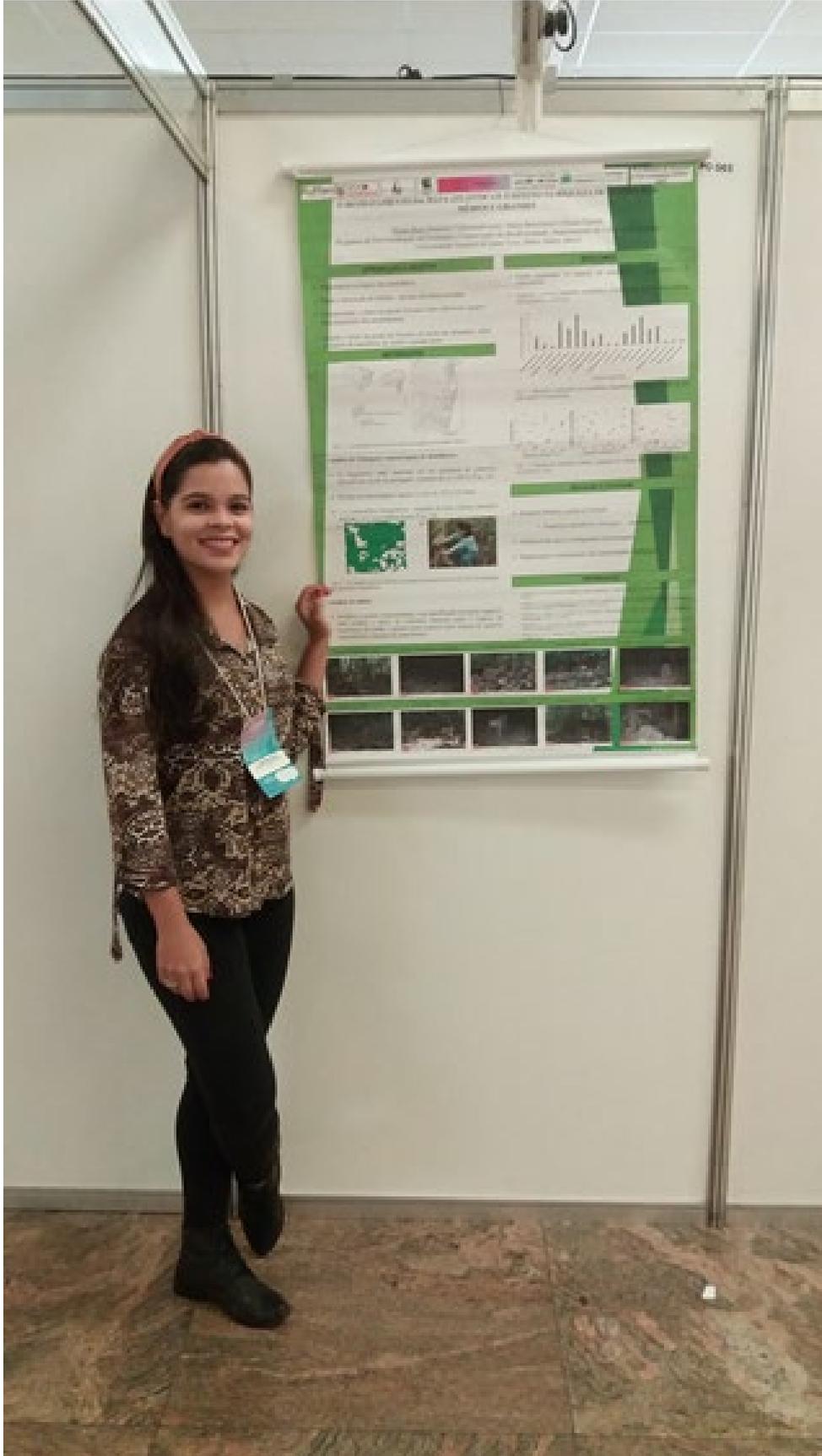


Figure 2. Presentation of Banner in X Brazilian Congress of Mastozoology in 2019.



Figure 3 – Science Popularization Week held at a rural municipal school in the municipality of Una, Bahia, Brazil.



Figure 4 - Presentation of the partial results of the work to residents who live in the vicinity of the studied forest fragments.

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

The grant was used during the term of the project. The project needed to be extended due to schedule changes, mainly because of the suspension of activities due to the Covid-19 pandemic.

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.

Item	Budgeted Amount	Actual Amount	Difference	Comments
Digital camera	224			*Resource relocated
Nylon	27	116	+89	Nylon has been replaced by other field materials (e.g., lines, tape, marking tapes and measuring tape)
Field Shirt with University and Project Financiers ID	67	67		
Cages for the seed removal experiment	132	132		
AA Duracell Batteries (for GPS and camera trap)	39	367	+328	
Memory cards (for cameras traps and digital camera)	68	233	+165	
Garmin GPS MAP	327			* Resource relocated
Camera trap	2489	545	-1944	** Part of the resource was reallocated to other expenses.
Fieldwork food supplies	188	475	+287	
Fuel (gasoline)	892	646	-246	
Daily car rental	547	1237	+690	
Accommodation		467	+467	
Field assistant		630	+630	
Padlock		84	+84	
TOTAL	5000	4999	-1	The amount applied for is £ 5,000, where R\$1 = £ 0.21

* We received a donation of a digital camera and a GPS, and the resources that would be used to purchase these materials could be used to finance accommodation during data collection and other materials used in the field.

** We obtained camera traps borrowed from the Institute for the Conservation of Neotropical Carnivores (Pró-Carnívoros) [<https://procarnivoros.org.br/o-instituto/>], which is also developing a project in the southern region of Bahia. Thus, we relocated part of the resource that would be used to purchase cameras to hire field assistants, which was indispensable in field activities, and to purchase camera supplies, rent car, obtain food supplies that had higher expenses than expected in the initial budget, as detailed in the budget.

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

Finalise data analyses, manuscript productions and disseminate the final results through social media, meetings with local people and managers of protected areas. Subsequently, continue the project with other graduate students.

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?

We used the logo to make t-shirts that were used during field activities (Figure 5). In addition, the logo was used in all presentations made so far (for example, banner, lectures). The Rufford foundation was also acknowledged in scientific articles.



Figure 5 - Field shirts produced with the logo of The Rufford Foundation.

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

The team is composed by me, Elaine Rios da Silva, responsible for planning, organising and carrying out the activities. In addition, the doctors Eliana Cazetta, Máira Benchimol and Kristel De Vleeschouwer are part of the team, and were responsible for planning and supervising all activities.

13. Any other comments?

Funding was essential for carrying out the research. Unfortunately, Brazil has suffered from cuts and little investment in science, making it increasingly difficult to obtain resources to carry out the research. Thus, seeking partnerships has been extremely necessary for the production of scientific knowledge in this megadiverse country. We would like to thank you for the confidence and the opportunity to achieve our goals.