



The Rufford Foundation

Final Report

Congratulations on the completion of your project that was supported by The Rufford Small Grants Foundation.

We ask all grant recipients to complete a Final Report Form that helps us to gauge the success of our grant giving. 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. 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	Everton Miranda
Project title	Building a conservation strategy for the Harpy Eagle in the Amazon Forest
RSG reference	Jane Raymond
Reporting period	December 2015 to December 2016
Amount of grant	£5000
Your email address	mirandaebp@gmail.com
Date of this report	20/12/2016

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
Human-harpy eagle conflict				<p>From all aims this one shown the best result: I was able to interview more than four dozen land owners who confessed killing harpy eagles. This will probably give me the best paper of all in this project and – most importantly – the one of widest potential to improve harpy eagle conservation. I hope to finish the analysis on this paper and submit it in the first quarter of 2017. The eagles were killed by retaliation after livestock predation, prevention of livestock predation and a not negligible amount of 15 individuals were killed for reasons like “I never saw such a large raptor in my life” and “I want to see such a large animal in my hands”. People only agreed to talk with me about such a legally sensible issue after a local habitant hired by me assured them that it would not lead to legal prosecutions. Interviews were very hard to me, and listening to someone happily telling that it needed four sequential shots to kill such an enormous raptor required the best of my forces to play Mr. Nice Guy and don't ruin the interview. In a few occasions people had maintained parts of the killed animal, which were</p>

			collected and will offer opportunity to further analysis on genetics (fig. 1). In one case, I arrived in the moment where a young individual was expiring (fig 2).
Diet divergence caused by sexual dimorphism.			When I was an undergraduate student I worked as a trainee on a large project lead by The Peregrine Fund. In this year, they surprisingly remembered me, offering a data set that I could never collect within my project, even in my wildest dreams. This allowed me to answer the set of questions related with sexual dimorphism, building up a pretty nice paper that is already submitted and contains answers to questions related with sexual dimorphism and diet. You can find it at Appendix I, and Rufford was naturally included in the acknowledgements. I later learned that it would never be possible to answer these questions with my sampling design because most of times after the female leave the nest; food hunted by the male is passed to her and later arrives on the nest. When we see it in the camera trap, always in female's feet, therefore I cannot attribute it to one of the sexes.
Harpy eagle effects on the activity pattern of their main prey.			Given a shortage of camera traps caused by my limited funding, I delayed this aim at the very beginning of our field activities. Whereas we have the cameras, I gave priority to monitoring nests. I do intend, in the future, to accomplish this aim when I have a sufficient number of cameras

			coming down from nests already monitored. The most important part of the question regarding this subject is already done: finding the nests. If undisturbed, harpy eagles will continue to nest on them for decades and we can later install cameras on canopy.
Harpy eagle nests as carrion hotspots.			For the same reasons exposed above, we did not implement this aim, whereas the nests are found and we'll be able to do so in 2017.
Harpy eagle ecotourism as a tool for conservation in the Amazon			Three of the five nests found by us until now are inside forest management areas. The last thing we want is a distracted birder walking by falling logs and giant trucks. Therefore, they were not invited to any of those nests. A further nest was found in an indigenous community and Brazilian law forbidden the presence of tourists in such areas. One nest is inside a private property is current receiving few, but very enthusiastic birders. Unfortunately I have no picture of this but will provide some as soon as possible. Our new aim regarding this subject is putting northwest Mato Grosso in the first place regarding harpy eagle sites in Brazil's largest birding site, wikiaves.com.br . Regarding this project objective, I have a deep sense of happiness that this proceeding slowly, but naturally gaining its own momentum. In fact, I'm currently exchanging e-mails with one of the associates of Brazilian largest jaguar-watching company regarding exactly this subject.

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

The climber I initially was willing to work with us (Lucas Buttura) didn't show the guts necessary for the project, and threw up before first nest climbing when we were just under nest tree. I found a local worker that is an awesome climber (and boat driver, field guide, porter, etc.), Roberto Stofel (fig. 3), and then we begin to work together. The climbing gear I received from Idea Wild was retained at frontier (an issue I'm still trying to solve) so I had to buy another one for the project. Roberto is a highly skilled climber and has been doing an awesome work with us.

I was convinced that, having learning how to drive and with money to hire a four wheeled vehicle, I could easily go around Amazonia performing the activities necessary to the project. I was completely wrong. Driving through local roads required outstanding levels of ability during the rainy season. Quagmires of Homeric proportions form everywhere. Year round we cross herds of cattle that are thousands strong, and they must be crossed without destroying the cowboys work. Wood bridges are constantly falling or being damaged, and we may need to cross them even if they are half torn. Wind make 60 meters tall trees fall on roads, and everyone here must know how to operate a chainsaw to solve this situations, and also carry one in the car trunk. Fires make everything harder with smoke. Obviously, I'm not such a jack-of-all-trades. Bud I did found one, and he is the most awesome guy I meet on this project. He is named Gilberto Araújo, and has acted as my driver, camera man, photographer, lobbyist, and many other activities besides being a great personal friend. Is thank to him that local people agreed to be interviewed and he saved me from many bad situation, has the day when we eventually needed to cross a wood bridge on fire (fig. 4).

It is noteworthy that whereas I planned to make my work by car or boat, in many occasion we needed to use both (in fig. 5, you can see one of such occasions, with Gilberto ahead and the ONF truck that came on our rescue). I finally emphasise that no trainee was able to perform field work with us, mostly because of lack of physical fitness to perform long trails and climbing (the record is hold by two girls that quitted in 36 hours). I have been working 7 days a week, 12 hours a day to be able to cope with field, office and laboratory work. And I must say: this have been the happiest year of my life.

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

- (1) While analysing effects of sexual dimorphism on diet we show that: (a) foraging traits of harpy eagle males are different from females, and make males more efficient foragers; (b) foraging traits of breeding individuals differs from that of non-breeding, as they are free of costs related to carrying prey to the nest.
- (2) While analysing the effects of seasonality on harpy eagle diet, we discovered that it is different between the wet and dry season. This difference is related with increased sloth predation during the dry season, when deciduousness increases sloth detectability.
- (3) Regarding livestock predation and the consequent conflict, we collected a very extensive list of variables that will allow inference to be made about a variety of topics. They go from landscape to livestock management to social norms regarding the killing of predators. This data weren't analysed yet, but will afford meaningful discoveries about this subject. We feel that the perception of harpy eagles as vermin is changing after our extensive advertising about our nest search and the associated reward. The former institutional denial of the ability of harpy eagles to prey on pigs, lambs and dogs corrode conservation efforts and our initiative is changing thing in both research and local people. This give us the courage to think that there are a few things to be positive about.

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

During the first phase of this project (2015 to 2016), we developed a strategy based on a strong collaboration network with local people to be able to find nests of harpy eagles. Being inspired in the several conservation projects that combine species management guidelines with management planning and its practical application, we located and are currently protecting five nests of the species. All them have been found by local people (as for instances João Bocão, the nut collector in fig. 6). With this, we are learning about its basic biology, with emphasis on livestock predation, allowing refining the livestock management and identifying solutions to avoid negative impacts of wildlife in local people economy.

An important issue raised in this earlier work is the necessity for strong involvement of stakeholders as local people (farmers and traditional communities) and practitioners (counties environmental secretariat and rangers) to be engaged with helping in finding and protecting nests of this elusive species. We ensure so by sharing an understanding of the conservation status of the species, as well as offering a concrete value for anyone able to point the location of a nest specimen, in order to produce better conservation outcomes. The values and priorities that local people attribute to predators are generally in conflict with conservation, and as conservation professionals we try to facilitate a resolution that is in the interest of conservation. We are implementing proven strategies for negotiation, paying payout for killed livestock thus building consensus on the species conservation, resolving conflicts, and ultimately reaching lasting agreements. This is resulting in a small – but consistent – initiative in harpy eagle-based birding. We are doing this alongside local people – the only ones that can warrant the species persistence outside parks – through education with lectures on schools (fig. 7), and also providing technical training on birding tourism, cooperativism and associativism adding a concrete financial value to the species preservation.

5. Are there any plans to continue this work?

We certainly will continue to be on the field next year. In fact, I'm currently doing bank bureaucracy to receive our first grant for 2017 – granted by Sheik MBZ Species Conservation Fund. We need to find more nests to confirm several of our discoveries as well as to make the region more attractive to birders. Furthermore, finding extra nests will allow us to find an appropriate area where we can build a platform for nest watching from the canopy. In 2017 we will also be able to begin modification in livestock management to test technics to avoid eagle predation. Finally, we aim to raise more funds and then be able to buy more cameras and monitor prey species on the canopy and scavengers on the ground.

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

Beside the submission of three scientific papers were Rufford is mentioned on the acknowledgements, they are:

- Miranda et al 2017 Sexual dimorphism and breeding affects Harpy Eagle predation patterns
- Miranda et al 2017 Seasonality modifies prey composition in Harpy Eagles (Harpia harpyja)

- Miranda & Peres 2017 Harpy Eagle (*Harpia harpyja*) nest tree selection: how logging threatens Earth largest bird of prey

We used a number of information dissemination methods. Mostly by pasting poster and distributing pamphlet on nest searching (fig. 8). Interviewees receive a manual about how to deal with wild predators (fig. 9). We also had a note posted in a small media outlet when first nest was found. It was completely unplanned at beginning (I used to hate children) but I have given several school presentations about our project, at ONF Brasil requests (fig. 7), raising awareness between kids.

We plan to make popular news reports of our papers as soon as they get published, in channels like "mogabey.com" and "oeco.com.br". I personally prefer to make these popular pieces after a paper is accepted because our discoveries can change a lot after peer review.

Some media links

News on first nest found

<http://reflorestamentoecarbono.com.br/2016/06/13/a-maior-aguia-do-mundo-recebe-protecao-de-pesquisadores-no-mato-grosso/>

Young Harpy Eagle on nest during tree climbing

<https://www.youtube.com/watch?v=dITDo41FxC4>

Ferry over Juruena River, MT, Brazil

https://www.youtube.com/watch?v=u_Ppq-CRbAs

Tapir in São Nicolau farm Cotriguaçu, MT, Brazil

<https://www.youtube.com/watch?v=35tQE9Vn18>

Collared peccary in São Nicolau farm Cotriguaçu, MT, Brazil

<https://www.youtube.com/watch?v=9jer99vyaio>

Tarantula in São Nicolau farm Cotriguaçu, MT, Brazil

<https://www.youtube.com/watch?v=zPEwNQQB45s>

"Grilo" - Amazonia illegally burned to implant pasture for cattle

<https://www.youtube.com/watch?v=KeFoUHethWE>

Tayra in São Nicolau farm Cotriguaçu, MT, Brazil
<https://www.youtube.com/watch?v=R0tikGuNMoA>

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

As RSG was our largest grant (70% of our 2016 budget), it was used from March 2016 to September 2016. Thereafter we relied on funds from Rainforest Biodiversity Group and The Explorer's Club.

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
Daily wage	1618	1400	-218	Small variations in the daily wages of diverse workers.
Fuel (liters)	335	400	+65	Small variations on fuel price for different vehicles.
Car rental (\$10)	1151	1200	+49	Small variations in prices of different vehicles rental.
Fedex	100	0	-100	We bought all equipment in Brazil.
Reconyx HC500	1171	1100	-71	We preferred to use two Bushnell cameras per nest (fig. 10, 11).
Moultrie D-444	507	0	-507	We didn't bought any cameras for monitoring prey on canopy or on the ground (see text for details)
Climbing gear	0	848	+848	Our Idea Wild equipment never crossed aduana (a problem we are still trying to solve).
TOTAL	4884	4948		

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

Improve the social outcomes of our project, with emphasis on bird tourism and livestock management to avoid predation.

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

We use Rufford logo in the large version of our poster advertising the reward for nest finding (Fig. 8) as well as in pamphlets, and Rufford was acknowledged in absolutely all our communications and submitted scientific papers (see result sharing section).

11. Any other comments?

Rufford was my first grant was approved, I was told by Jane Raymond: "Rufford is more like a large grant for a small project than a small grant for a larger one". At time, I didn't believe on this statement and went on a pursuit for further funding. Nowadays I realised how right she was. I have been unsuccessful in many grant application and all funding I achieved at beginning, like Rufford, The Explorer's Club and Rainforest Biodiversity Group was highly valuable. I had some setbacks and wasn't able to accomplish all my aims in time. In some occasions this was caused by fund shortage. Science is a field that definitely pushes for constant success, but sometimes setbacks, as frustrating as they can be, just mean that we are getting closer to figuring out the solution. However, with this project, I had the opportunity to address big questions for predator conservation for the first time:

- How do we reduce impacts of wildlife on local people's economy?
- To which extent can predators support habitat loss and degradation?
- Can we build bridges between nature-related business and the conservation world?

Not only are the right questions being asked, but there is recognition that there is no simple answer. We have the courage to think that there are a few things to be positive about; tempered with a hunger to address these threats in order to positively impact harpy eagle conservation. And this would not be possible without the support of the Rufford Small Grants.