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	Marina Albuquerque Regina de Mattos Vieira
Project title	Interactions between hunters and wildlife in the use of salt licks at the SDR Piagaçu-Purus, Amazonas State, Brazil.
RSG reference	14918-2
Reporting period	11th April 2014 – 15th July 2015
Amount of grant	£5999
Your email address	maaavieira@yahoo.com.br and marina@socioambiental.org
Date of this report	31st July 2015

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
To compare lowland tapirs occurrence at licks with different manipulation levels (regarding frequency of use by hunters, salt input and its formation process – natural or artificial).			X	From the 12 salt licks we planned to sample, we managed to enlarge to 15 salt licks, being seven artificial and eight natural. We analysed wildlife richness and occurrence of the most expressive species in both categories of salt licks.
To describe management measures taken by hunters at licks and local ecological knowledge about licks.			X	We interviewed key hunters in three communities close to the salt licks sampled and described social norms and management measures taken by them. These key hunters also collaborated installing camera-traps and recovering memory cards during the project.
To compare the floristic composition surrounding the licks and outside the licks.	X			This objective would be completed in partnership with a research team from INPA. However, the budget scheduled by them for this activity was cut and prevented its realisation, as we didn´t include its specific cost in the RSG budget.

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

Access to salt licks is possible only between April to September (flooding season). Although RSG grant was released to buy equipment already during the flooding season, we managed to start the survey in the beginning of the season counting with camera traps provided by WCS through an institutional partnership for this project. However, it wasn´t sufficient for starting the survey in both planned areas at the same time. Also, additional funding scheduled to cover most of the logistics costs was inaccessible until September 2014, making it difficult to develop activities especially in the Jari area, where natural salt licks are concentrated and access is more complicated. To conduct the fieldwork we developed partnerships with other ongoing projects in the same area, so the camera trap survey began at different dates in the different planned study sites. Due to these both unforeseen difficulties artificial and natural salt licks have different capture effort.

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

3.a. Description of the normative universe and management strategies of hunters regarding the use of salt licks by themselves and by wildlife.

We interviewed four hunters in Itapuru, where natural salt licks don´t occur leading hunters to create their own; and five hunters in Jari, where natural salt licks are abundant and are actually being used by them for hunting activities. In both areas, interviewers were asked about hunt and management strategies, rules, social norms, prohibitions, process of creation (being artificial or natural) and wildlife occurrence at salt licks. All hunters consider salt licks as important areas in maintaining wildlife and although they are under hunting pressure, this is a regulated pressure: there are rules of access agreed among users and a rich symbolic universe which limits the presence of hunters in these areas. In the salt licks, it is forbidden urinating, spitting, dumping the hunting blood, speak loudly, smoking. When the wife of the hunter is pregnant, the tapir it's not expected to be encountered. Menstruating woman cannot step in a salt lick under any circumstances. These are all measures to respect "the salt licks' owner", which besides avoiding that wildlife departs, protects hunters from spirits of the forest. Hunters believe that all salt lick has an owner, an entity of the forest who cares for animals at these sites and any disrespect can make it turn against the hunter.

Salt licks are considered sacred places by many Native American cultures and between riverine communities also exist care. Being places of high concentration of hunting and zeal, hunters control access to those who know do not respect these social norms and only share knowledge about the location of new licks with those they trust. The main target is the tapir, but red brocket deer, white-lipped peccary and collared peccary can also be hunted if the hunter does not get any tapir. They describe that tapir and deer alternate daily frequency in the licks, usually tapir appears first and deer appears later. Aware of the power of attraction of wildlife that salt offers, hunters have developed techniques for creating artificial salt licks, true attractor's hunting grounds. They choose places where they identify tapir footprints or roots eaten by tapirs, dig the soil and pour salt on it. Afterwards, hunters hang punctured bottles with salt in it in a way it will drop on ground as it gets wet. At these artificial salt licks hunters fallow the same social norms of respect and use as in the natural ones.

3.b. Differences in wildlife occurrence between natural and artificial salt licks.

We sampled 15 salt licks being seven created by hunters and eight naturals, from now on mentioned as ASL and NSL, respectively (Figure 1). Straight-line distance from community varied from 3.8 to 24.3 km (M=13.6, SD=6.7). ASLs are considerably smaller than NSLs: ASLs' areas varied from 1 to 60 m^2 (M=19, DP=20.8) while NSLs' areas varied from 300 to 700 m^2 (M=400, SD=150). At the ASLs camera traps were positioned looking straight to where salt was poured. At the NSLs, as hunters also poured salt at specific portions of them, the position of the camera-traps fallowed the same criteria.

All salt licks were located at the margin of first to second order streams and were in current use by a small group of a maximum of five hunters, inhabitants from the closer community. Frequency of visit by hunters is focused during flooding season (usually from April to August). The age of the ASL varied from 1 to 50 years old (M=16, SD=18). Hunters who created these sites, camp close to them for almost one week once a month when they are accessible by small motorized canoes. The same five hunters always visit the NSLs sampled at least for the last 3 years. This group is used to hunt together and to take care of these places controlling access of outsiders who disrespect social norms. At the flooding season, the sampled NSLs are visited twice a week. Considering that each time hunters go at one different salt lick (being artificial or natural), each salt lick was visited at least

five times during our study. We registered only two tapirs hunted at one of the ASL, which didn't affect the analysis and any tapir was hunted at NSL during our study.

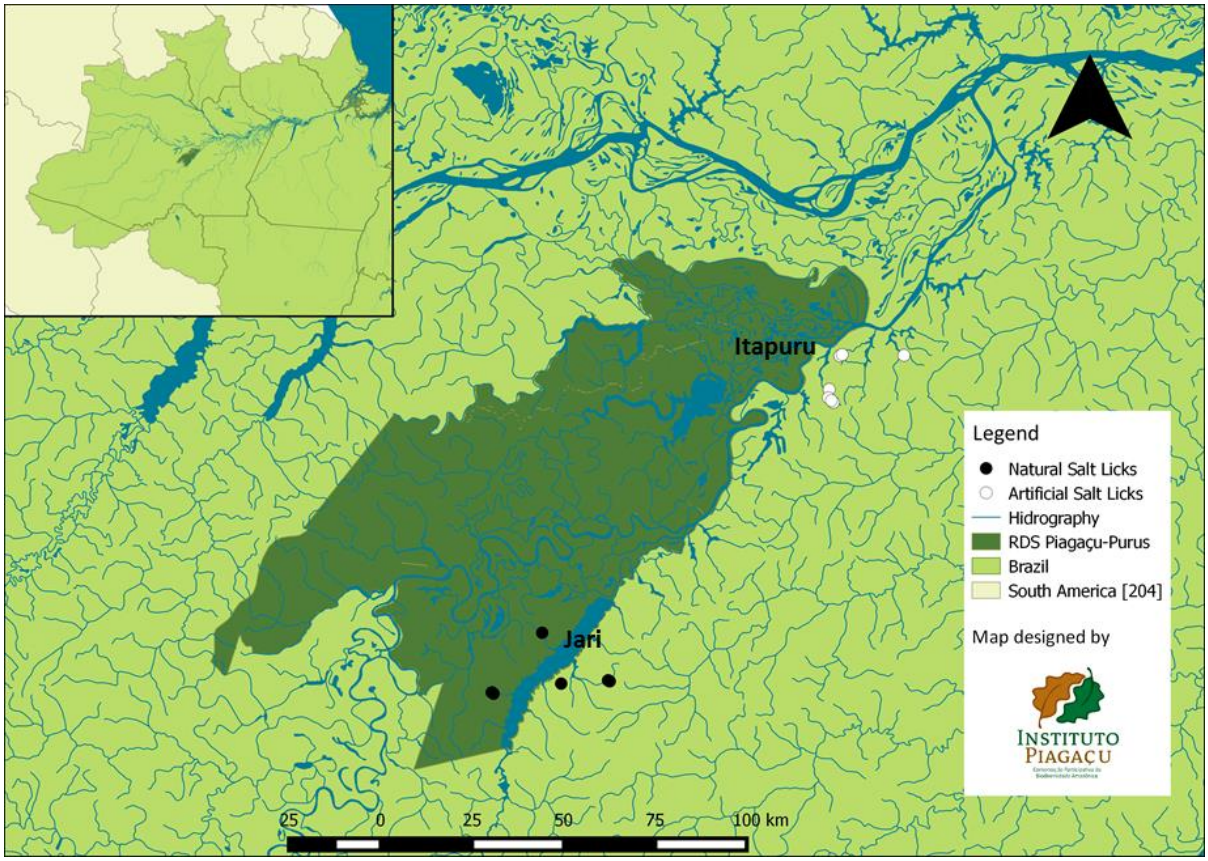

Figure 1: Localization of the salt licks sampled in the RDS Piagaçu-Purus, Brazil.

ASL were sampled for 638 cameras*days while NSL were sampled for 387 cameras*days. In total, we registered 964 independent records (307 in ASL and 657 in NSL), considering intervals of 30 minutes between photographs. We identified 14 species of mammals and 15 species of birds (Table 1). We also registered rats, marsupials and bats with pending identification, which were not included in the analysis (n = 33 records).

Table 1: Number of relative records per sampling effort (100 cameras*days) and of independent records in total (between parenthesis) by species registered in the two categories of salt licks (ASL: artificial and NSL: natural).

	Species	**N records per 100 camera*days (n independent records in total)**		
		NSL	**ASL**	**Total**
Mammals	*Mazama* sp.	66,1 (256)	6,3 (40)	72,4 (296)
	Tapirus terrestris	56,1 (217)	12,7 (81)	68,8 (298)
	Cuniculus paca	5,9 (23)	14,6 (93)	20,5 (116)
	Dasyprocta fuliginosa	8,5 (33)	0,3 (2)	8,8 (35)
	Tayassu pecari	4,4 (17)	3,8 (24)	8,2 (41)

	Pecari tajacu	4,9 (19)	2,4 (15)	7,3 (34)
	Sciurus Igniventris	2,1 (8)	3,8 (24)	5,8 (32)
	Alouatta puruensis	2,1 (8)	1,6 (10)	3,6 (18)
	Procyon cancrivorus	1,3 (5)	0,0	1,3 (5)
	Sapajus macrocephalus	0,5 (2)	0,0	0,5 (2)
	Leopardus pardalis	0,5 (2)	0,0	0,5 (2)
	Panthera onca	0,5 (2)	0,0	0,5 (2)
	Nasua nasua	0,0	0,5 (3)	0,5 (3)
	Total	**153,0**	**45,8**	**198,7 (884)**
Birds	*Myiothlypis fulvicauda*	5,4 (21)	0,0	5,4 (21)
	Aramides cajanea	3,9 (15)	0,0	3,9 (15)
	Mitu tuberosa	2,3 (9)	1,3 (8)	3,6 (17)
	Leptotila rufaxilla	1,8 (7)	0,0	1,8 (7)
	Psophia leucoptera	1,0 (4)	0,2 (1)	1,2 (5)
	Eurypyga helias	0,5 (2)	0,2 (1)	0,7 (3)
	Thamnophilus amazonicus	0,5	0,0	0,5 (2)
	Turdus albicollis	0,5	0,0	0,5 (2)
	Tigrisoma lineatum	0,3 (1)	0,2 (1)	0,4 (2)
	Cairina moschata	0,3 (1)	0,0	0,3 (1)
	Mirmotera campanisona	0,3 (1)	0,0	0,3 (1)
	Leucopternis sp.	0,0	0,2 (1)	0,2 (1)
	Mesembrinibis cayennensis	0,0	0,2 (1)	0,2 (1)
	Patagioenas subvinacea	0,0	0,2 (1)	0,2 (1)
	Tinamous major	0,0	0,2 (1)	0,2 (1)
	Total	**16,8**	**2,4**	**19,1 (80)**
	Grand total	**169,8**	**48,1**	**217,9 (964)**

Wildlife occurrence was significantly higher in the NSL (Figure 2). Difference might be related to the larger size of the NSLs and longer process of its formation, to larger continuous portions of highlands where NSL occur and to physico-chemical characteristics of the soil which enable the presence of NSL in the southern RDS-PP. The most frequently hunted species at salt licks are tapir, red brocket deer, white-lipped peccary and collared peccary. When we have a closer look on the differences by species, *Mazama* sp. and *Tapirus terrestris* represent 61% of the records and also correspond to the major difference between the two categories of salt licks (Figure 3 a-b) while the two species of peccaries didn't show difference in occurrence between salt licks (Figure 3 c-d). For all records, NSL presented higher variation on data, which suggests that other environmental characteristics and human activities might influence wildlife occurrence rather than only presence or absence of mineral salt. As well as the mineral composition of the soil should be considered. On the other hand, as variation in ASL is small, salt input might be more determinative for wildlife occurrence in areas where mineral salt in soil is poor.

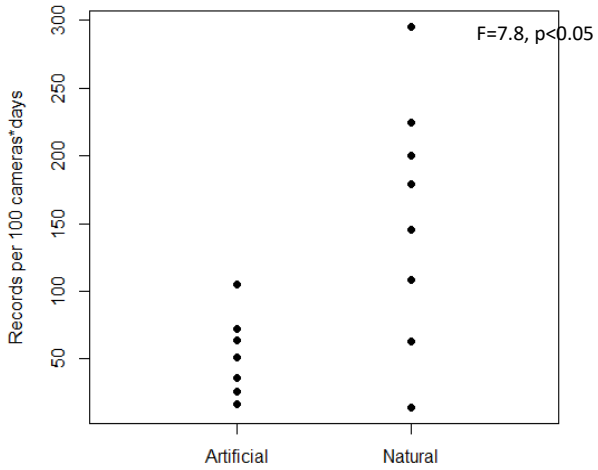

Figure 2: Number of relative records per effort (100 cameras*days) in each salt lick sampled.

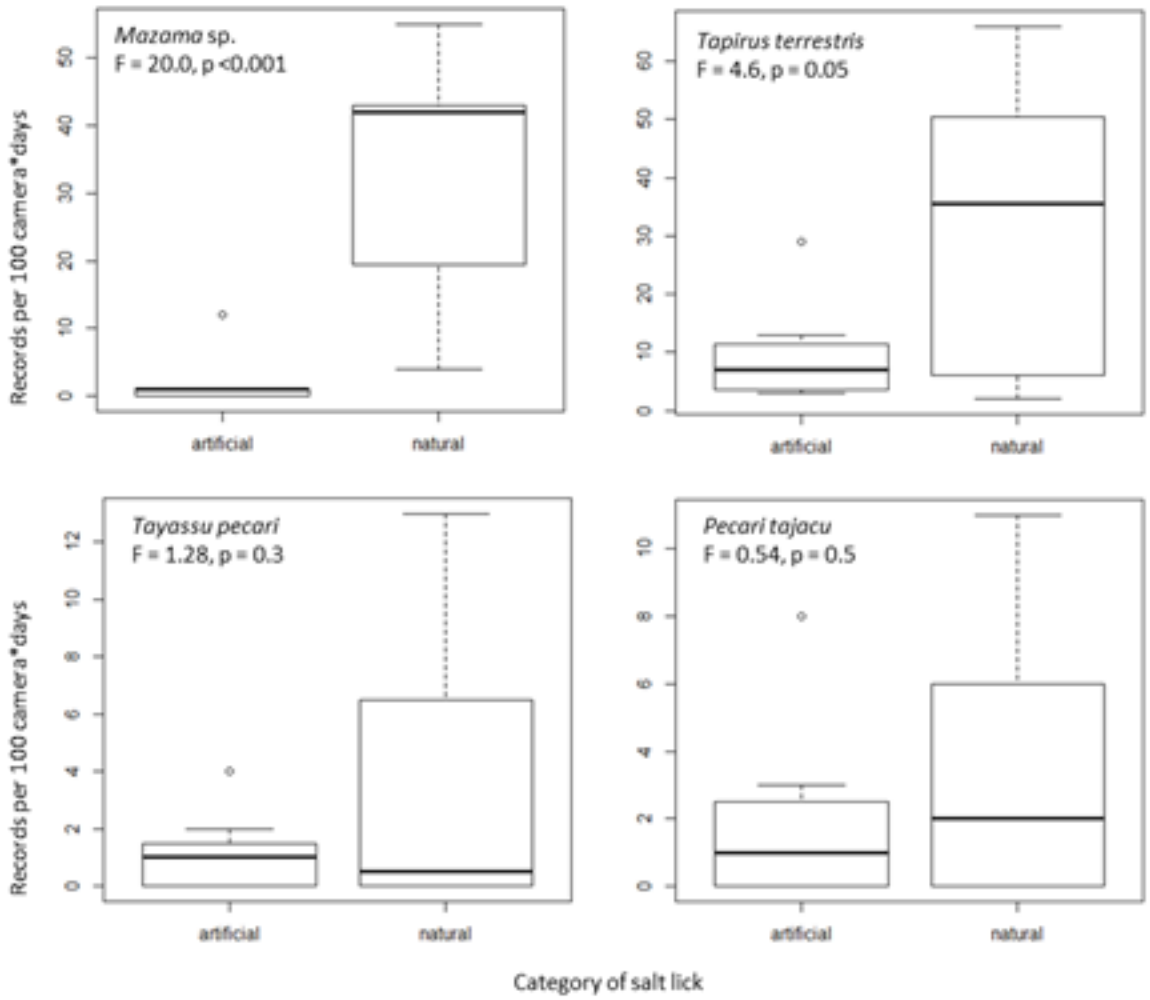

Figure 3: Number of relative records by effort (100 cameras*day) in each category of salt lick. a) *Mazama* sp.; b) *Tapirus terrestris*; c) *Tayssu pecari*; and d) *Pecari tajacu*.

3.c. Local capacity building on camera-trap survey.

Participatory monitoring may shorten decision-making time frames, promote local autonomy in resource management and strengthen community resource rights. Capacity building on wildlife monitoring methods, especially using camera traps, engages participants in discovering the richness in the area of their own community, where they are the most interested in conserving food resources. Camera-traps offer the opportunity to actually watch biodiversity in their home range. In this case, records of *Procyon cancrivorus* were a big novelty for hunters. Also, the high number of tapir's records (including more than one individual in the same record) called their attention even more for the importance of these areas for the maintenance of this species.

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

Key hunters from three communities were involved from the choice of the salt licks to be surveyed to data collection. The opportunity of seeing photographs and films of the animals at salt licks brought them closer to the conservation goals of the project as they consider the camera trap survey a way to show to the outsiders the richness of their area, which is consequence of their own care. In this way, the project turned out to be an opportunity for them to show how their management in salt licks is important for wildlife occurrence, which must be considered by decision makers regarding wildlife conservation and Protected Areas management in a broader level.

5. Are there any plans to continue this work?

Yes. Salt licks, being attractive wildlife grounds in the same time as being sink areas, are key places to assess wildlife to comprehend populations' information important to design management measures.

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

We presented the main results at the communities where the work was completed and in the RDS Piagaçu-Purus management council meeting. We presented part of the results in the X Neotropical Ornithological Congress & XXII Congresso Brasileiro de Ornitologia in July 2015, with the title: "*Community of birds visiting salt licks at the Lower Purus River in the Brazilian Central Amazon*". We are also preparing a scientific paper to submit for publication in a peer-review journal in 2016.

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 gross amount was scheduled to buy camera traps and other equipment, so it was used mainly at the beginning of the project. Nonetheless, as the additional funding was not accessible by September 2014, RSG grant was also saved and used during the second semester of 2014 to cover some fieldwork expenses.

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.

Local exchange rate: £1.0 = R$4.92 (rate of 15th July 2015).

Item	Budgeted Amount	Actual Amount	Difference	Comments
Post and bank services	200	156,2	43,8	--
16 Bushnell Trophy Cam HD	2618	1899,5	718,5	Instead of 12 cameras, we bought 16 for almost the same amount budgeted.
32 Memory Card micro SD 8GB	155	138,8	16,2	We planned to buy 12 Memory Cards of 32 GB, but more cards were better to change while checking their results and keep the cameras working.
Batteries	333	137,7	195,3	We did a partnership with another project going on at the same study site, which provided us with batteries in counterpart.
3 digital cameras (2 Nikon Coolpix and 1 Sony waterproof)	300	254,6	45,4	The digital cameras were used by the local assistants when checking the cameras.
Food	0	270,7	-270,7	We expected the support of IDSM as additional funding mostly for logistics expenses. IDSM holds partnership with IPI since 2010 and had already approved the 2014 budget in January 2014. IDSM grant wasn´t accessible until September 2014 and we had to rearrange the RSG budget to enable the work during the flooding season, when salt licks are accessible. IPI provided us the GPS for mapping the salt licks, so we rearranged this amount to cover part of the expenses with fuel, food, local transportation and additional field assistant.
Fuel	310	1672,0	-1362,0	
Field assistant	736	1078,0	-342,0	
Local transportation	0	122,0	-122,0	
2 GPS	867	0,0	867,0	
Outboard motor maintenance	130	130,0	0,0	--
Field equipment (headlight, cases and boxes for the cameras)	200	120,0	80,0	--
Boat	0	0,0	0,0	Counterpart from Instituto Piagaçu.
Feedback material	150	20,0	130,0	--
Total	**5999**	**5999,4**	**-0,4**	**--**

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

We have important findings and descriptions regarding how hunters manage and care these areas of "special" use by them and by wildlife. As so, the next important steps are to publicise this work in a manner to provide information for decision makers involved in protected areas co-management to develop strategies of territorial zoning considering salt licks as areas of special management. Data also show how these areas are relevant to register game animals occupancy and behaviour, so others next steps should include studies on wildlife populations, such as home range and movement patterns, to enlarge knowledge on hunting consequences over some species.

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?

10.a. In a poster presentation in the **X Neotropical Ornithological Congress & XXII Congresso Brasileiro de Ornitologia** in July 2015, Manaus, Brazil, with the title: "*Community of birds visiting salt licks at the Lower Purus River in the Brazilian Central Amazon*", Carolina Bertsch and Marina A.R.M. Vieira;

10.b In a poster presentation in the **X Neotropical Ornithological Congress & XXII Congresso Brasileiro de Ornitologia** in July 2015, Manaus, Brazil, with the title: "*Why birds are common on caiman nests*", B. Marioni, C. Bertsch and R. Da Silveira;

10.c. In an oral presentation in the **XI International Congress on Management of Amazonian and Latin American Wildlife (XI CIMFAUNA)**, in August 2014, Saint Augustine, Trinidad e Tobago, with the title: "*Do local ao legal: interações entre sistemas institucionais da caça na RDS Piagaçu-Purus, AM, Brasil*", Marina A.R.M. Vieira, Fábio de Castro and Glenn H. Shepard. Results from the previous RSG grant;

10.d. In a poster presentation in the **XI International Congress on Management of Amazonian and Latin American Wildlife (XI CIMFAUNA)**, in August 2014, Saint Augustine, Trinidad e Tobago, with the title: **"***Participatory Monitoring and Management of Subsistence Hunting in the Piagaçu-Purus Reserve, Brazil*", Marina A.R.M. Vieira, Eduardo M. Muhlen and Glenn H. Shepard. Results from the previous RSG grant.

11. Any other comments?

We are very grateful for RSG offering the opportunity to continue our work on wildlife management over the past 3 years and especially for the completion of the current project. The material acquired was also helpful for parallel projects that always support and participate in this study. We expect to continue raising new questions and findings to improve wildlife management in Brazil with the support of RSG.