

## **Conservation Leadership Programme: Final Report**

**Project Title:** Conservation status of the Red-handed Howler Monkey in Amapá, Brazil

**ID:** 02327917

**Location:** Forest patches within the Amapá's Savannas, Brazil

**Dates in the field:** october and november/2017; february/2018; july/2018 to june/2019

**Institutions involved:** Federal University of Amapá, Instituto Mapinguari (NGO)

**Overall aim:** assess the necessary information to promote the conservation of *Alouatta belzebul* in Amapá

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<https://labecoap.wixsite.com/projetoguariba-ap>

**Date when the report was completed:** July 31, 2019

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## Project Partners & Collaborators

Felipe Todeschini - provided support on the educational activities as well as assisting on field trips.

Instituto Chico Mendes de Conservacao da Biodiversidade (ICMBio) - provided logistical support to conduct the final interviews.

## Section 1:

### Summary

*Alouatta belzebul* is a vulnerable primate which occurs, among other regions, in Amapá. The lack of knowledge about the species in Amapá hinders conservation actions. Our project aimed to assess the necessary information to promote the conservation of *A. belzebul* in Amapá. To achieve this, we located populations and identified biogeographical limits of the species, investigated the environmental, landscape and socioeconomic attributes that affect its occurrence, and carried environmental education activities to raise awareness about the species in local communities. We located 26 forest patches with *Alouatta belzebul* and identified the Araguari river and the large block of forest as the northern and western limits for the species in Amapá, respectively. Anthropogenic cover in the landscape and distance to the city affected the presence of the species within forest patches, however, we also predict that species may be influenced by vegetation structure (analysis is still ongoing). We identified socioeconomic factors (age, access to other protein sources and distance to the city) related to hunting, which is one of the threats for the species. We carried environmental education activities with 139 children and 8 teachers in three schools in the occurrence zone of the species. The project successfully generated necessary information about the species, although we still need additional knowledge to improve a conservation strategy for the red-handed howler.

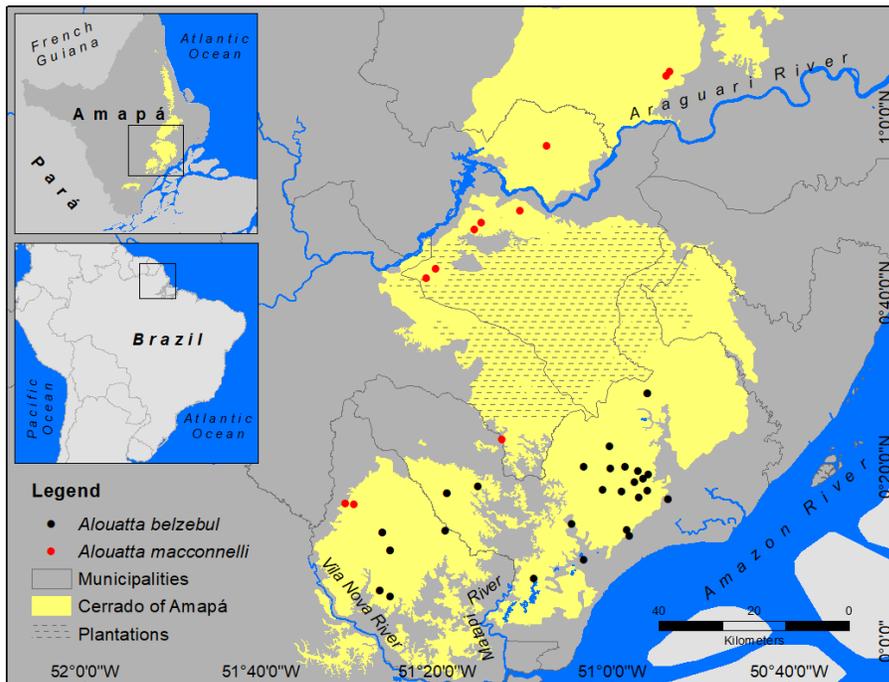
### Introduction

Many species are threatened of extinction nowadays, and most of them demand management actions to continue existing (Maxwell et al. 2016). These actions may include protecting habitats, reducing hunting or overexploitation, establishing habitat corridors, translocations, *ex situ* reproduction, among others (Marsh 2003; Fernandes et al. 2008). However, to select the correct conservation strategy, first we need to have some knowledge about the species and its environmental context.

*Alouatta belzebul*, commonly known as red-handed howler, is a primate endemic to Brazil and occurs in three regions: the northernmost part of the Atlantic Forest; the Amazon region at the southern margin of the Amazon river; and in the state of Amapá, at the northern margin of the Amazon river (Silva Jr. et al. 2008; Veiga et al. 2008). *Alouatta belzebul* is threatened of extinction (vulnerable) due to habitat loss and hunting (Veiga et al. 2008). In the Atlantic forest, the species is restricted to 10 small and isolated populations and in the southern margin of the Amazon River, it occurs in a region in which deforestation is ongoing rapidly (Veiga et al. 2008). Therefore, the occurrence of the species in Amapá seems to be the best opportunity to conserve the species.

Amapá is the most preserved and protected Brazilian state (Drummond et al. 2008; SEMA-AP 2011). However, this protection does not include the Amapá's Savannas region, which is highly populated and is pointed as the last frontier for the expansion of soybean plantations in Brazil (Mustin et al. 2017). For decades, this region has been occupied by traditional populations that rely on farming, fishing and hunting for subsistence (Hilário et al. 2017). In Amapá, *A. belzebul* occurs exactly in this region (see Fig. 1), where its conservation is not assured. Moreover, we do not know the exact forest patches in which *A. belzebul* occurs in Amapá, its biogeographic limits, and which environmental factors predict the species occurrence. This knowledge is essential for planning the conservation of the species, especially considering the rapid spread of soybean plantations throughout the region (Hilário et al. 2017). In addition, *A. belzebul* may be a flagship species for the conservation of Amapá's Savannas, which are unique and unprotected. The conservation of Amapá's Savannas is also needed to maintain the way of life of the traditional populations, which are also threatened by the expansion of the soybean plantations since this activity will affect the natural resources that these populations rely on for subsistence (Hilário et al. 2017; Mustin et al. 2017).

The Federal University of Amapá is the main research institution of the state, and due to the local government's plan to expand soybean plantations over the savannas of the state (Governo do Estado do Amapá et al. 2016), some researchers of this institution started projects to conserve at least part of this unique environment. Instituto Mapinguari is a local NGO focused on promoting nature conservation. Considering the urgent need to conserve *A. belzebul* and its environment, the Laboratory of Ecology of the Federal University of Amapá created the 'Projeto Guariba' (Red-Handed Howler Monkey project), with the support of Instituto Mapinguari, aiming to produce and spread the basic knowledge necessary to plan the conservation of *A. belzebul* in Amapá, which includes locating populations of the species, identifying its biogeographic limits, identifying the landscape, vegetation and socioeconomic drivers of the species occurrence and raising awareness about the species in local populations.



**Fig. 1** Map of the sites in which we gathered information on the occurrence of *Alouatta belzebul* (our target species) and *Alouatta macconnelli* (the other species of *Alouatta* that occurs in the region).

### **Project members**

Renato Richard Hilário (age 34): Biologist, professor at the Federal University of Amapá, has been working with primate conservation since 2009, during his PhD. Acted as coordinator of the project and advisor of Bayron and Saulo.

José Júlio de Toledo (age 37): Biologist, professor at the Federal University of Amapá, has been working with conservation since 2005, during his PhD. Acted as advisor of Bayron and Saulo.

Bayron Rafael Calle Rendón (age 32): Forest Engineer, PhD candidate at the Federal University of Amapá. Worked in a turtle conservation project in Colombia. Carried most of the project's activities, including searching for populations in the field, environmental education, and landscape analyses.

Saulo Meneses Silvestre de Sousa (age 27): Biologist, PhD candidate at the Federal University of Amapá. Carried most of the project's activities, including searching for populations in the field, environmental education, and vegetation sampling/analyses.

Angélica Alfonso Martínez (age 30): Photographer. Worked in a primate conservation project in Colombia. Elaborated environmental education material, carried environmental education activities and made the documentary to reach a wider audience. Also helped to raise the infant howler monkey that was recently released in the nature.

Adriane Formigosa (age 24): Biologist. Works in the Instituto Mapinguari, a local NGO focused on promoting environmental conservation. Participated in the elaboration of the environmental education material.

## **Section 2:**

### **Aim and objectives**

#### Original overall goal

Assess the number of populations of *Alouatta belzebul* and the ecological and social factors related to the species presence in the Brazilian state of Amapá, proposing management actions to preserve the species through environmental education in local communities, establishment of corridors and/or the creation of protected areas.

#### Original project purpose

Assess information about the conservation status of the vulnerable *Alouatta belzebul* in Amapá, identifying biogeographical limits of the species, sites in which the species occurs, and evaluating the main ecological and social characteristics of the landscape, as well as vegetation attributes that influence its occurrence.

### Original project objectives

1. Locate populations and identify biogeographical limits of the species in Amapá
2. Identify the vegetation structure attributes that influence the species presence
3. Investigate the effects of landscape attributes and social factors on the species occurrence
4. Raise awareness of local communities, developing a strategy of communication to disseminate knowledge about biodiversity and the need to conserve it
5. Assess the hunting pressure on *Alouatta belzebul*

Among the objectives, the single change was the inclusion of the fifth objective, which we felt was a necessary step during the first phase of the project.

### **Changes to original project plan**

We changed the method to survey the red-handed howler monkey (Activity 1.2). Walks within forest fragments were replaced by playback sampling, with a field effort per forest that varied from 2 to 5 days, according to the size of the forest patch. Additionally, our communication strategy (Activity 4.2) had some changes. We carried out the workshops and used education material designed by ourselves (a quiz game, a booklet and posters). We decided to create these new products after receiving the funds, aiming to strengthen our education activities. The assessment of the success of this activity changed from a questionnaire to a quiz game with the children. Moreover, we also added an extra activity, since hunting is one of the main threats for the species, we started a program to monitor hunting activity on local communities that is based on hunting reports provided by local hunters. Finally, in September 2018, an infant howler monkey was delivered in a park in Macapá, and Instituto Mapinguari and Projeto Guariba joined forces to raise this infant until the age it could be released in the wild. Although this is not a change in the project plan, it was an unforeseen situation in which the project was involved aiming to promote the conservation of the species.

### **Methodology**

To locate populations of the species and identify its biogeographical limits, we carried interviews with residents that live close to forest patches in the study region. To confirm if the interviews were reliable, we carried playback sessions and walks within 22 forest patches. We also searched for populations away from the suspected biogeographical limits to identify the limits of the species distribution. We also assessed vegetation structure through transects (100 m x 2 m) in 38 forest patches, the number of transects varied from 4 to 20, according to the area of the forest patch. We measured the diameter at breast height (DBH) of every tree with a  $DBH \geq 10$  cm within the transects. We also quantified the understory density through pictures of a 2 m x 1.45 m white canvas put 4.5 m from the camera, and the Canopy Closure index through hemispheric photographs of the canopy. Photographs for both variables were obtained every 25 m per transect. We also evaluated landscape and socioeconomic variables, including road distance to the city, human population density, anthropogenic, forest and savanna cover inside buffers, patch area and shape index. All these variables were obtained through Geographic Information Systems. We analyzed the effects of vegetation structure and landscape variables in the occurrence of *A. belzebul* through Logistic Regression.

During the interviews, we asked some questions about hunting and invited the hunters to fill a hunting calendar with the species they would kill in the following 12 months. Then, we analyzed the hunting profile and the environmental and socioeconomic drivers of hunting in the region.

To raise awareness in the local population about *A. belzebul*, we chose three schools in rural communities near forest patches in which the species occurs. We prepared educational activities designed to make the children understand some sustainability issues. For example, one game showed that hunting can occur sustainably when each hunter has a limit in the number of animals killed, but when hunting is intensive, it may drive species to extinction. Another game showed that habitat loss can also cause species extinction. We told them stories to teach that caring for the environment is necessary in order to have access to natural resources in the future. We interacted with them to make them think about all the natural resources that they use daily. We told them about the unique environment in which they live, about the threatened species and about nature conservation. We also played a quiz game designed to measure the knowledge of the children about the environment, the threatened species and nature conservation. During the field activities, we recorded videos of the environment and interviews with locals. This material was used to make a documentary about the project and about the savannas of Amapá. This documentary was uploaded on Youtube to divulge the project and raise awareness about *Alouatta belzebul* and the savannas of Amapá. The video was also shown to locals, as a feedback of our activities. We also created a website and social network profiles (Facebook, Instagram and Youtube) to divulge the project.

### **Outputs and Results**

We located 26 populations of *Alouatta belzebul* in the 44 forest patches surveyed. We identified that *A. belzebul* does not occur in the large eucalyptus plantations to the north, and many interviewees pointed the Araguari river as the limit of the species distribution. Indeed, the occurrence of *Alouatta macconnelli* at the southern margin of this river and in forest patches within the eucalyptus plantations suggest that the northern limit of *A. belzebul* in the western part of its distribution might be the eucalyptus plantations. The western limit of the species distribution was identified as the large block of continuous tropical forest, in which *A. macconnelli* occurs. Indeed, we detected two *A. macconnelli* populations in forest patches close to this large block of forest, and no population of *A. belzebul* was detected there (Fig. 1).

We interviewed 72 people, and delivered 46 hunting calendars. We identified that hunting in the region has a subsistence component, being more frequent in areas with fewer fishing resources (river availability), and in families of lower income. However, the negative relationship with distance to the city showed that hunting may also have a commercial component. Hunting was also more frequent in regions with higher forest cover and younger men hunted more frequently (Table 1). This results are accepted for publishing in *Oryx* (Silvestre et al. in press).

**Table 1** Count model coefficients of the Zero-Inflated Negative Binomial model assessing the drivers of the hunting frequency of the hunters in the Cerrado do Amapá, Amapá, Brazil.

Variable	Estimate	SE	z	Pr(> z )
Age	-0.0674	0.0106	-6.35	<0.0001
Forest cover	0.0379	0.0133	2.84	0.0045
River availability	-0.0338	0.0114	-2.96	0.0030
Distance to urban centre	-0.0257	0.0066	-3.87	0.0001
Log <i>per capita</i> monthly income	-0.5847	0.1784	-3.28	0.0010

Although several landscape variables were important for *A. belzebul*, only anthropogenic cover and distance to the city were significant predictors of its presence within forest patches (Table 2). These results, together with an analysis about the occurrence of other primates of the region were recently submitted to Biodiversity and Conservation (Bayron R. Calle-Rendón; José Julio de Toledo; Karen Mustin; Renato R. Hilário. Drivers of primate richness and occurrence in a naturally patchy landscape). We are still analyzing the vegetation structure data, and we expect that some of the vegetation variables will successfully predict *A. belzebul* occurrence.

**Table 2** Model-average coefficients of Logistic Regression assessing the landscape<sup>A</sup>, site<sup>B</sup> and social<sup>C</sup> drivers of *Alouatta belzebul* occurrence in the Cerrado do Amapá, Amapá, Brazil.  $\sum w_i$  is the importance of each variable.

Variable	Estimate	SE	Pr(> z )	$\sum w_i$
Anthropogenic cover <sup>A</sup>	-5.56	2.77	0.04	1
Forest height <sup>B</sup>	-0.22	0.42	0.60	0.71
Distance to block of forest <sup>A</sup>	-0.19	0.41	0.63	0.72
Distance to the city <sup>C</sup>	1.261	0.59	0.03	1
Forest cover <sup>A</sup>	0.91	0.69	0.18	1
Water bodies <sup>A</sup>	-0.07	0.69	0.91	1
Savanna cover <sup>A</sup>	-0.73	0.56	0.19	1
Shape index <sup>B</sup>	0.17	0.39	0.66	0.45

We carried environmental education activities during 12 days, with 139 children and 8 teachers in three schools. The proportion of right answers to the quiz game rose slightly after the educational activities (from 55.4% to 62.2%). We produced 24 sets of cards for the quiz games and 200 booklets, which were delivered to the children and teachers for the continuity of the activities. We also put 50 posters with information about *A. belzebul* throughout the region. By the time we concluded this report, our documentary had 634 views and 57 likes on Youtube. We have 495 followers on Facebook, 533 on Instagram and 38 on Youtube.

### Communication & Application of results

We have participated twice in radio programs to broadcast the project's activities. Additionally, we socialized our results regarding environmental education in the "2<sup>nd</sup> Meeting of Education, Culture and Diversity: Resistance Voices in Amapá", in the Federal University of Amapá in October 2018. The central point was the recognition of our project as an example for other initiatives about biodiversity conservation and education in Amapá.

Also, we developed educational material (a booklet, a quiz game), which we distributed in schools in the area of occurrence of *A. belzebul*. This material and the environmental activities were carried to raise awareness in the children about the species, expecting the children to sensitize their parents. We also made posters, which we have put in key places among the communities in the area of occurrence of *A. belzebul*. The goal of the poster is to maintain the idea that the species is threatened in the mind of the people that live nearby *A. belzebul* populations. During the project, we maintained a close contact with local populations. We delivered hunting calendars and revisited the communities a few times to talk about the calendars, howler monkeys and conservation in the region.

We also made a documentary about the project and about the Amapá's Savannas, which was uploaded to Youtube. We showed the documentary to the communities and the feedback was very positive. This close contact with the communities must make it easier to achieve success in future conservation activities. Finally, we created profiles in Facebook, Instagram and Youtube, and a website to divulge the project among a wider audience.

### **Monitoring and Evaluation**

We can divide the project in two different parts. The first one is about generating the necessary knowledge for a conservation plan of *Alouatta belzebul*. The second one is raising awareness about the species situation, to promote its conservation. For the first part, the evaluation of the achievement of our goals is straightforward, since we can consider the number of population located, the identification of the biogeographic limits, and the identification of the drivers of the species occurrence. For the second part, we have some ways of monitoring the success of our strategies. Regarding the environmental education activities carried at the schools, we created a quiz game to assess children's knowledge about the local environment, threatened species and conservation attitudes prior to and after our environmental education activities. We carried this quiz before and after the activities in which we could evaluate the learning success. We have also means of verifying the project outreach in the social networks through the number of followers, views and likes.

### **Achievements and Impacts**

- We located 26 populations of the species and identified its biogeographic limits. These results are essential, because we know where to focus our project future efforts, such as estimating population densities and effective numbers. This estimates should indicate if populations are viable in the long term and what management actions should be taken. We also have a baseline for comparison and detection of eventual local extinctions.

- We tested the effects of landscape and socioeconomic variables on the occurrence of *Alouatta belzebul* and found that anthropogenic cover (landscape attribute) and distance to the city (socioeconomic factor) were significant predictors of its occurrence. This indicates that hunting may influence the occurrence of the species in forest patches, as hunting is higher closer to the city. Additionally, anthropogenic cover represents a less permeable matrix that may prevent dispersal and make howler monkeys more vulnerable to hunting, attack of domestic animals and persecution by humans.

- We are still evaluating the effects of vegetation structure on the species occurrence. The identification of the effects of vegetation structure on the species will allow us to verify if the

use of forest resources, such as timber, can have negative impacts in the species (and therefore recommend the protection of the forest patches), and also identify the vegetation profile of the best sites for the species, where we should focus our conservation efforts.

- We found a slight change in the proportion of right answers to the quiz (55.4% to 62.2%) after the environmental education activities with the children. Thus, we concluded that future environmental activities with children should take a few more days in each school, to make sure our messages are transmitted more effectively to the children.

- We have 495 followers on Facebook, 533 on Instagram and 38 on Youtube. Our main outreach product, the documentary, reached 634 views and 57 likes by the time this report was concluded. Note that this is an underestimation of the total number of people reached, since many locals downloaded the video and shared it in their communities through messaging apps (i.e.: Whatsapp) which is not quantifiable. These numbers are not massive, but indicate that the project is slowly becoming known and recognized by the local population, what may facilitate more effectiveness in future outreach activities.

### **Capacity Development and Leadership capabilities**

The project undoubtedly allowed significant improvements in the carrier of team members. Bayron and Saulo are concluding their PhD, and improved their knowledge about conservation science and other scientific issues. Saulo also had the opportunity to develop his abilities on how to approach and communicate with local communities and to establish a communication channel between them and the project team. Angélica had developed environmental education material, such as the booklet, the poster, and the quiz game, and also a documentary. Besides the experience gained in this process, she enhanced her curriculum. Renato Hilário gained experience in coordinating the team and the project, and also gained skills related to environmental education. Lastly Renato Hilário participated in the CLP training course in Indonesia, where he learned about project design, fundraising, leadership, among other issues. All the team members benefited from this, as Renato replicated the training when returned to Amapá.

## **Section 3:**

### **Conclusion**

We were successful in identifying populations and biogeographical limits of the species, which were previously unknown. This information is crucial to know where to focus our conservation efforts. Indeed, the distribution of *A. belzebul* is narrower than we thought and concentrated in the most populated region of the state. This is the region where soybean plantations are spreading quickly, highlighting the need for conservation efforts towards *A. belzebul* in the state. Given that *A. belzebul* occurs in forest patches with less anthropogenic cover in the landscape, the conversion of savannas into soybean plantation may increase the threats to the species. The fact that *A. belzebul* occurs in forest patches farther from the city indicates that hunting is probably reducing the occurrence rate of *A. belzebul*. The successful identification of drivers of hunting is important because we can suggest government policies aiming on food security as a measure to achieve both social welfare and reduce hunting. However, fiscalization may be necessary to prevent commercial hunting in regions closer to the city. During the environmental

education activities we felt that more days of activities were necessary to reinforce the communication of our messages. Nevertheless, we feel that the project is relatively known by local communities in the distribution area of *A. belzebul* given our frequent field trips to these communities. Also, the knowledge about the project is slowly increasing due to our social network and participation in radio programs. This shall make our future actions even more impactful.

### **Problems encountered and lessons learnt**

Our methodology to locate populations and identify the species biogeographical limits was successful. Interviews were confirmed by playbacks and walks within the forest patches and allowed a much faster survey. Also, the communication with local communities was successful, since locals considered the project trustworthy, giving sensible information about hunting and being willing to fill hunting calendars.

However, the environmental education with children was not as successful as we wished. We learned that such activities must be longer in order to be successful. Since we had a trustful relationship with hunters, we think more direct approaches aiming these hunters will be more efficient in outreach activities. We learned that this close relationship with locals is important, not only for the promotion of behavior change, but also to make viable field activities. Since we work in remote areas, we had to spend some days in local houses during fieldwork and had the cooperation of the local people.

We had a problem to actually receive the funds to start the project. Indeed, we are currently suing the bank for those problems. This delay in receiving the funds postponed the beginning of the project. However, we adjusted our timeline and concluded the project successfully. In future instances, we will try to receive the funds through other bank.

Overall, the best achievements of the project was generating important scientific information to base conservation plans and establishing a communication network with local communities, which will be crucial for future outreach activities.

### **In the future**

Although there is a clear improvement in the knowledge about *Alouatta belzebul* in Amapá, we still need to get a better knowledge about the species. For example, we need to know its diet in order to evaluate the possibility of habitat supplementation. Also, the knowledge about which seeds are ingested by *A. belzebul* will help us to assess the role of the species as a seed disperser. We also need to know the typical density of *A. belzebul* populations in Amapá. This will allow us to estimate the total population of the species in the state, and to estimate the viability of separate populations, thus evaluating the need for management actions towards making populations viable in the long term. The identification of drivers of higher densities will also allow us to evaluate possible habitat and landscape interventions to increase the density of some populations. Since the sinuous and seasonally flooded forest patches are inadequate for traditional density assessments, we are already making collaborations to create a survey design to estimate population density through passive detection of vocalizations. Then, we will search for additional funds to support the study of the species diet and densities, including trying a CLP follow-up grant. We will also apply for other grants, such as Rufford Foundation's Booster Grant,

Mohamed Bin Zayed Species Conservation Fund, National Geographic Early Career Grants, Margot Marsh Biodiversity Foundation, among others.

### Financial Report

At the end of the project, we used the 99.7% of funds. (Table 3). The greatest part of the funds were used in travel and local transportation and some funds were re-allocated to cover other expenses.

<b>Table 3</b> Project financial report.			
Itemized expenses	Total Requested (USD)*	CLP	Total Spent (USD)
<b>PHASE I - PROJECT PREPARATION</b>			
Communications (telephone/internet/postage)	60.60		
Field guide books, maps, journal articles and other printed materials	0.00		
Insurance	0.00		
Visas and permits	0.00		
Team training	0.00		
Reconnaissance	0.00		
Other (Phase 1)	0.00		
<b>EQUIPMENT</b>			
Scientific/field equipment and supplies	0.00		
Photographic equipment	0.00		

Camping equipment	0.00	
Boat/engine/truck (including car hire)	0.00	
Other (Equipment)	0.00	
PHASE II - IMPLEMENTATION		
Accommodation for team members and local guides	742.00	158.10
Food for team members and local guides	2,184.00	664.85
Travel and local transportation (including fuel)	4,740.40	6429.52
Customs and/or port duties	0.00	
Workshops	273	
Outreach/Education activities and materials (brochures, posters, video, t-shirts, etc.)	1,043.00	1551.50
Other (Phase 2)	1,515.00	941.68
PHASE III - POST-PROJECT EXPENSES		
Administration	100.00	52.08
Report production and results dissemination	1,320.00	3.41
Other (Phase 3)	228.00	2370.29
Total	12,206.00	12,171.43

## Section 4:

### Appendices

Output	Number	Additional Information
Number of CLP Partner Staff involved in mentoring the Project	0	
Number of species assessments contributed to (E.g. IUCN assessments)	1	Recently ICMBio, which is responsible for making the Brazilian redlist started the consultations for updating the list. The information produced in our project was included in this consultation and will be important for the assessment of the threat level of <i>Alouatta belzebul</i>
Number of site assessments contributed to (E.g. IBA assessments)	0	
Number of NGOs established	0	
Amount of extra funding leveraged (\$)	5000 GBP	Amount granted by the Rufford Foundation
Number of species discovered/rediscovered	0	
Number of sites designated as important for biodiversity (e.g. IBA/Ramsar designation)	0	
Number of species/sites legally protected for biodiversity	0	The protection of part of Amapá's Savannas is a goal of the project, since it will contribute for the conservation of <i>Alouatta belzebul</i> together with its environment. However, it should take a longer time to

		achieve this goal. Indeed, Renato Hilário is participating of a zoning process that can lead to the protection of part of the savannas, although it may need some negotiation with other stakeholders.
Number of stakeholders actively engaged in species/site conservation management	0	In a future phase of the project, we are planning to engage locals in a fauna monitoring program carried by themselves
Number of species/site management plans/strategies developed	0	It is still premature for developing a conservation plan for <i>Alouatta belzebul</i> in the state. However, we have a much better knowledge now, and with the continuation of the project, soon we will be able to identify the main strategies for the conservation of the species.
Number of stakeholders reached		
Examples of stakeholder behaviour change brought about by the project.		
Examples of policy change brought about by the project	-	Renato Hilário, together with other researchers of the state avoided the implementation of a zoning proposal in which 40% of the Amapá's Savannas would be designated to mechanized soybean plantations and another 40% would be designated to other plantations. Now, the

		government has to make another zoning proposal in which Renato Hilário is participating. Although it is not directly related to the project, the project generates knowledge that is important for the zoning proposal and the zoning proposal is essential for achieving the goals of the project.
Number of jobs created	0	
Number of academic papers published	1	<p>SILVESTRE, S. M. ; CALLE-RENDON, B. R. ; Toledo, JJ ; HILÁRIO, R. R. . Drivers of hunting in the savannas of Amapá: implications for conservation. <i>Oryx</i>, In press.</p> <p>We have recently submitted another paper (Drivers of primate richness and occurrence in a naturally patchy landscape from Brazil) and will submit another one, regarding the vegetation drivers of the occurrence of <i>Alouatta belzebul</i>, by the end of the year</p>
Number of conferences where project results have been presented	2	<p>The Brazilian Primatological Congress will take place in November and we will present the project results there (2 abstracts)</p> <p>2<sup>nd</sup> Meeting of Education, Culture and Diversity: Resistance Voices in Amapá</p>

	(October 9 <sup>th</sup> - 2018)
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#### Appendix 4.1 CLP M&E measures



Environmental education activities in the Curiaú school . Here, children are playing the first round of the quiz game in which we aim to assess their knowledge about the local environment and species.



Photo at the end of the environmental education activities in the Igarapé do Lago school.



Photo: Angélica Martínez Alfonso

Children from the Teixeira de Freitas School (São Pedro dos Bois community) with the booklet that tells the story of an infant red-handed howler monkey that had his mother killed by a hunter.



Children from the Curiaú school with the booklet that tells the story of an infant red-handed howler monkey that had his mother killed by a hunter.



Cards used to play the quiz game to test the children's knowledge about the local environment, threatened animals (including red-handed howler monkeys) and conservation attitudes.



Poster with information about *A. belzebul*. Photo from the Igarapé do Lago school.



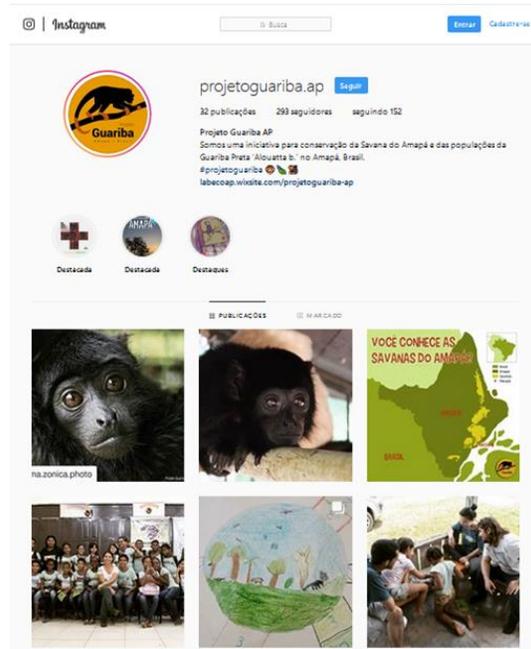
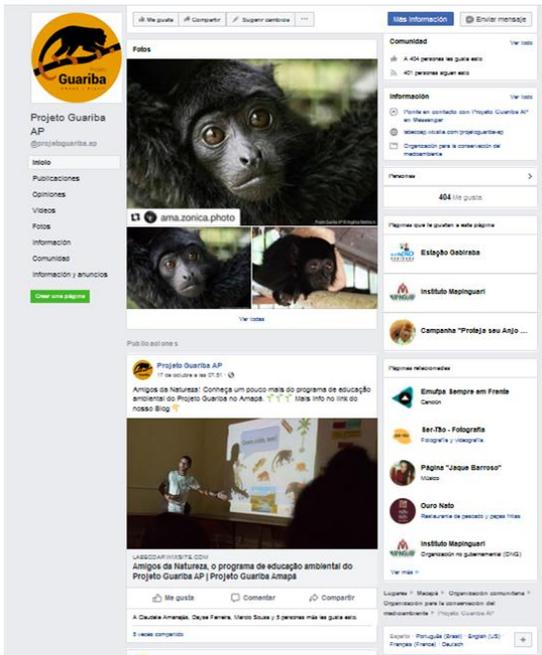
The project team in an interview in the local radio station.



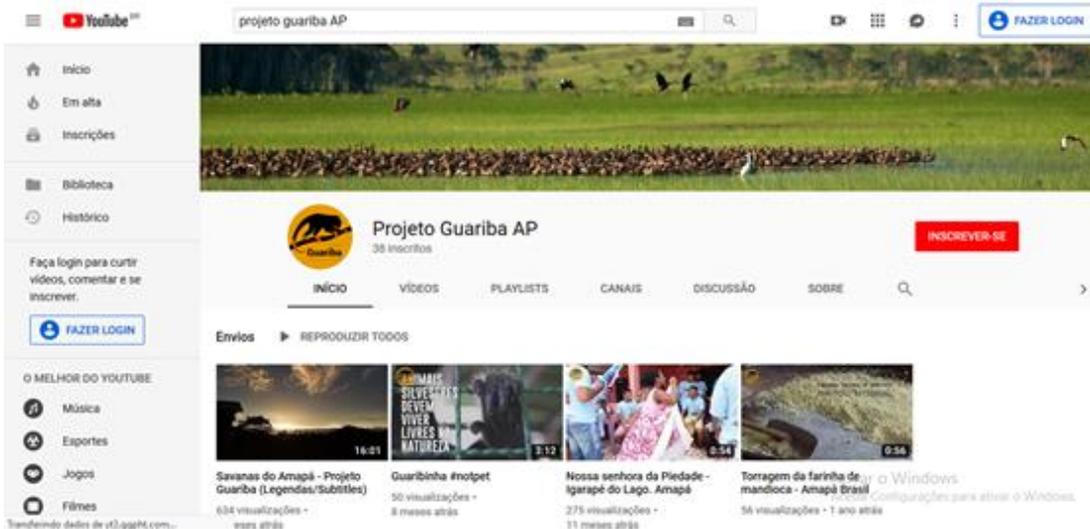
Socialization of our results regarding environmental education in the “2<sup>nd</sup> Meeting of Education, Culture and Diversity: Resistance Voices in Amapá”.



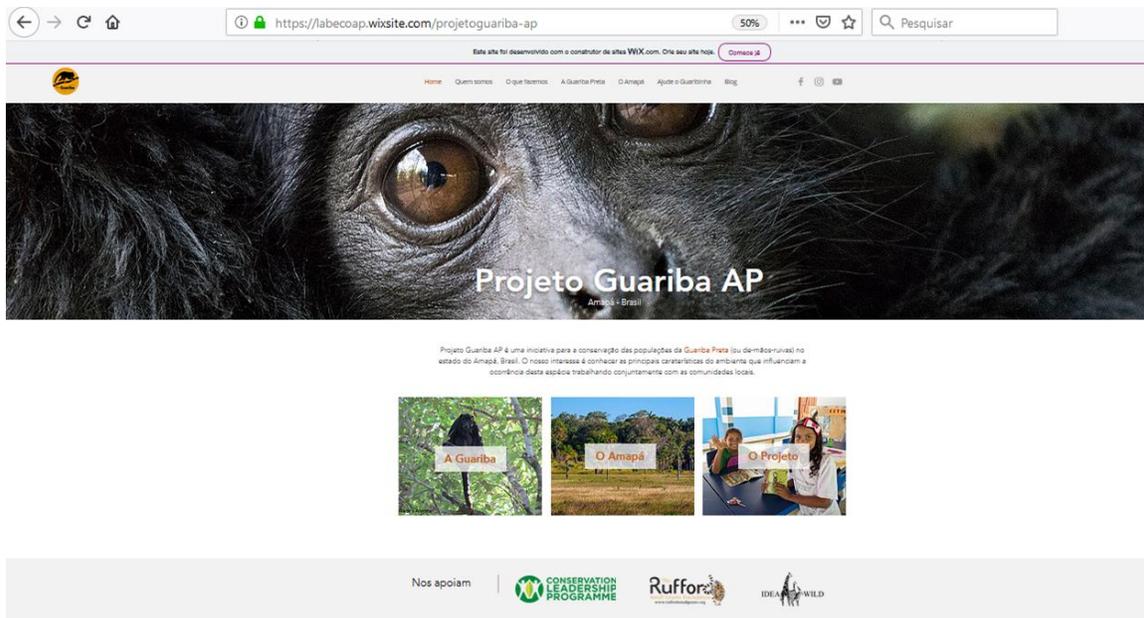
Interview in a local community (Igarapé do Lago).



Fan page on Facebook and Instagram profile where we share information, photos and videos about the project



YouTube channel used to upload short videos. We will use this platform to upload a documentary about the conservation of red-handed-howler-monkeys and the Savannas of Amapá.



Our web page used to share general information, for example, who is the team, what are our activities and general aspects of our target species and its habitat. This web page contains a blog where we constantly share news about our activities. Additionally, we acknowledge our partners and funders, including the Conservation Leadership Programme.



A newspaper article, from October 2018, in which we, together with Instituto Mapinguari, tried to obtain funds to take care of a *Alouatta belzebul* infant until it reached an age in which it could be released in the nature. Although we did not obtain all the funds we expected, the infant was successfully released in the nature in June 2019.

# Oryx

The International Journal of Conservation



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**Drivers of hunting in the savannas of Amapá: implications  
for conservation**

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Silvestre, S. M., Calle-Réndón, B. R., Toledo, J. J., Hilário, R. R. *in press*. Drivers of hunting in the savannas of Amapá: implications for conservation. *Oryx*.

Calle-Réndón, B. R., Toledo, J. J., Mustin, K., Hilário, R. R. Drivers of primate richness and occurrence in a naturally patchy landscape from Brazil. Paper submitted to *Biodiversity and Conservation*.

#### Address list and web links

- The project's website: <https://labecoap.wixsite.com/projetoguariba-ap>
- The booklet that tells the story of an infant red-handed howler monkey: <https://labecoap.wixsite.com/projetoguariba-ap/amigos-da-natureza>
- The project's Facebook fanpage: <https://www.facebook.com/projetoguariba.ap/>
- The project's instagram profile: <https://www.instagram.com/projetoguariba.ap/>
- The project's Youtube channel: [https://www.youtube.com/channel/UCOA6sRWLq6vvGxi1MxoMh-g?view\\_as=subscriber](https://www.youtube.com/channel/UCOA6sRWLq6vvGxi1MxoMh-g?view_as=subscriber)
- Link to the documentary on Youtube: <https://www.youtube.com/watch?v=xJfhmUpNT4>
- Instituto Mapinguari's website: <https://www.imapinguari.com.br/>
- Website of the Laboratory of Ecology of the Federal University of Amapá: <https://labecoap.wixsite.com/labeco-unifap-br>