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Overall Aim: Promote the recovery of the Caatinga Howler Monkey through habitat conservation and community involvement

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SECTION 1.

SUMMARY

The Caatinga Howler Monkey Conservation project aims to Promote the recovery of the Caatinga Howler Monkey through habitat conservation and community involvement. In this sense we identified and evaluated the main threats and conservation issues concerning the species in the State of Piauí, assessing the local communities about their relationships with the species and its habitat through interviews; The main threats to the species are the poaching and habitat loss.

We gathered new ecological data about the species ecological requirements: the species home range had a media of 13.85 hectares, the diet was composed of 23 plant species, the main habitats utilized by the species were the dry forests with trees of 10-30m height. The mean group size was of 5.6 individuals.

The priority conservation action to this primate is the establishment of new protected areas in this region and to advertise about its conservation status among the local communities. In this sense we disseminate the concept of private protected areas and identified ten local land owner that want to create RPPNs in their lands, creating a network of approximately 1.500 hectares of protected area for the conservation of the Caatinga Howler Monkey and its habitat.

INTRODUCTION

Alouatta ululata, classified as Endangered (EN) (IUCN, 2008), is one of the least known species in the howler monkeys group. There is a great lack of information about the species' natural history and major threats.

The known geographical range of the *A. ululata* is situated in one of poorest areas in Brazil, where the growing human communities still depends on natural resources for their subsistence. However, there is virtually no information about the interactions and conflicts between the species and the local human population, and the factors that are driving the species near extinction.

Our long term goal is to promote the recovery of the species through habitat conservation and community involvement. We expect to achieve three main outputs: to identify and evaluate the threats for the conservation of the species, increase our current knowledge about its ecological requirements, and stimulate the creation of private protected areas in the region.

The local communities along species range in northern portion of Piauí are the main focus of this proposal, and they will be actively involved in the construction of the Community-based conservation Plan for the species.

The study sites are located inside a protected area of sustainable use designation (APA Serra da Ibiapaba) and the managers of this protected area have been involved in this process since the preliminary field surveys conducted previously. The results will be shared with these managers and we will conduct discussion to include the information related to the conservation of this endangered species in the management plans and conservation strategies for the area.

We have been discussing with a local NGO (Associação Asa Branca) that is specialized in creating formally designated private protected areas, in order to identify critical areas for the creation of private protected areas.

PROJECT MEMBERS

Thieres Pinto

Feb-21-1982

Current occupation: Researcher and Conservation biologist

Qualifications: B.Sc. degree in Biology. Experience in Conservation Planning activities, bird conservation projects, mammal species assessments, mammal conservation activities and GIS skills.

Main role in the project: team leader

Igor Joventino Roberto

Feb-04-1982

Current occupation: Researcher and Conservation biologist

Qualifications: B.Sc. degree in Biology. Experience in amphibian and reptile conservation planning activities, reptile and amphibian assessments in the state of Ceará, mammal conservation activities.

Main role in the project: Biologist, community assessment

SECTION 2.

AIMS AND OBJECTIVES

The project's overall aim is to promote the Caatinga Howler Monkey population recovery through habitat conservation and community involvement.

Goal-1. Identify and evaluate the main threats and conservation issues concerning the species in the State of Piauí.

- a. Assess the perception of the local communities about the importance of natural resource and *Alouatta ululata* conservation;
- b. Identify the major human-related interactions and pressures on the species and its habitat;

Goal-2. Increase our knowledge on the species ecological requirements;

- a. Determine the species habitat preferences, diet, and home range;

Goal-3. Identifying and stimulate the creation of private protected areas in the region.

- a. Propose to the local land owners the creation of private protected areas in the region.

METHODOLOGY

Goal-1: a survey questionnaire was developed to interview local residents. Interviews will be performed by four researchers in 3-day trips in the communities around the study site. Each interview will be recorded with digital recorder. The previously tested questionnaire is aimed at identifying the local people's socio-economic situation, their main activities, their perception about the environment and the Caatinga Howler Monkey; gathering ethnobiological information about the species ecology, habitat preferences, threats and conservation problems.

Goal-2: field surveys consisting of ten 5-day fieldtrips will be made. During each trip, a team of four researchers will search a Caatinga Howler Monkey group, in order to observe, record, photograph, and film their activities such as feeding, playing and social interactions, and collecting sample of plants used in the diet. The group trajectory will be recorded using a GPS, the landscape will be characterized and photographed. Habitat preference will be identified by the analysis of the habitat descriptions, videos and photos from field. The GPS data will be inserted in a GIS database and the home range and

the area used by the groups will be calculated with aid of the ESRI ArcView® extension Animal Movement Analysis.

Goal-3: field surveys and interviews with the local land owners in order to identifying the presence of the caatinga howler monkey in the properties, will be made. Once the species was recorded, the team will explain the importance of the habitat conservation in the area and propose the creation of private protected areas in the property.

OUTPUTS AND RESULTS

Goal 1 (A): Determine the interactions between the local communities and the Caatinga Howler Monkey and its habitat



Were accomplished nine field trips during the project. In those campaigns interviews with local communities to characterize the interactions between human communities and the howler monkeys, and to obtain ethnobiological records about the biology of this species were conducted.

The interviews were driven by a questionnaire and recorded on spreadsheets. One hundred interviews were conducted in the area surveyed.

Figure 1 - Fisherman

Fifty interviews were made in the local communities in the municipalities of Caxingó, Caraúbas, Buriti dos Lopes and Murici dos Portelas, in the State of Piauí. These municipalities have the worst Human Development Index (IDH) in Brazil. According to our preliminary results from the interviews and analyzing them with the social-economic context in the region we were able to identify the main interactions between the local communities and the Caatinga Howler Monkey and its habitat.

Interviews were conducted with people between ages from 17 to 84 years, with 66% in the interval of 31 to 60 years old. 70% of the interviewed were agriculturists, 7.8% housemaids, 7.8% fishermen, 5.8% health agents, 5.8% farmers and 3.9% students. The main agricultures activities were the cultivation of rice crops (25.4%), been (25.4%), corn (25.4%) and cassava (16.4%). These crops cultures are made with manual handwork without the use of industrial equipment and are most for subsistence. Regarding the educational framework, 50% of the interviewees are illiterate, 37.5% have been in the elementary school, 8.3 junior high, 2% high school and 2% attended university.

To verify the interactions between the interviewers and the local fauna, we asked them what were their reactions when they face these animals: birds, snakes, monkeys, agouti and caimans. The results are expressed in Table 7.

Table 1 – Interviewers reactions to the local fauna in the Caxingó Region.

	Capture to have as a pet	Capture to sell	Kill and leave	Kill to eat	Just look	Other
Birds	12,5%	-	-	-	87,5%	-
Snakes	-	-	54,1%	4,1%	41,6%	-
Monkeys	2,8%	-	-	2,8%	95,8%	-
Agouti	-	-	-	22,9%	77,8%	-
Caimans	-	-	10,4%	6,2%	83,3%	-

According to table 7, we realized that the illegal fauna trade apparently is not a common activity in the region, and few of them said that had captured animals for pets. Despite the results, we observed several houses with illegal pets, including a pup of Caatinga Howler Monkey, and even we didn't saw any sign of trade its known that it happens according to the environmental agency (IBAMA), but its not the major problem in the region, unlike the poach that was cited by all the animals above. This illegal activity is widespread in the region and it is inserted in the culture of many families.

Regardless many people avoid to say that they were poachers, for fear of prosecutions or retaliation, 39.6% of the interviewees say that the at least once had poach, 25% of them said that they hunt for leisure, 12.5% had hunt for sport recreation or competition and 62.5% said that was for food. Among the interviewees that hunt for food, 44% said that they hunt due to preference for bush meat and 55.5% said that was for need because they don't have money to buy other protein supply. When we asked them if they quit hunting and why, 94.7% said yes, specially because of the fear of the environmental agency

(IBAMA) prosecutions (26.3%), because of lack of time (21%), because they were old or sick (10.5%), because of the disarmament act (5.2%), because they don't want to hunt anymore (5.2%), and 5.2% said that they would only stop hunting if they lived in a area that don't have any animals to hunt. 5.2% of the declared hunters said that they will never stop hunting. 94% of the interviewees knew that the poaching was illegal in Brazil and that they could be arrested.



Figura 2 –Researcher interviewing in the Caxingó region.

The most hunted animals in the region, according to the interviewees were armadillos (*Dasypus* spp and *Euphractus sexcinctus*) (25.8%), deers (*Mazama* sp) (12.9%), guans (*Penelope* spp) (10.6%), doves (*Leptotila* spp) (9.1%), agoutis (*Dasyprocta* spp) (6.8%), tinamous (Tinamidae Family) (3%), capybaras (*Hydrochoerus hydrochaeris*) (2.2%), lowland Pacas (*Cuniculus paca*) (1.5%), ducks (Anatidae family) (1.5%), pumas (*Puma concolor*) (0.7%), cavies (*Galea spixii*) (0.7%), red-foot tortoises (*Geochelone carbonaria*) (0.7%), buff-browed Chachalaca (*Ortalis superciliaris*) (0.7%).

Most of the interviewers (98%) affirm to know the Caatinga Howler Monkey, describing the species precisely. 83% said that had saw the species in is natural habitats, 5.6% saw in the television, 3.7% from the conversations with the older people, 1.8% in zoos and 3.7% didn't know. When we questioned them if they already ate the Caatinga Howler Monkey, 36% affirm positively and 62% said no, 2% didn't answered. According to the people who ate the species, 74.6% liked the taste of the meat and 18.7% said that the meat was used to treat diseases like asthma and rheumatism. Some said that they used the meat for feeding the dogs.

Goal 1 (B.1): Evaluate the perception of the local communities regarding the importance of environmental resources and the conservation of the Caatinga Howler Monkey.

Fifty local people were questioned to evaluate their perception on the environmental resources and the caatinga howler monkey conservation. We asked them if they considered themselves granted by nature, 79% said "yes", 12.5% said "no" and 8.33 didn't answered. Among the people who said "yes" (58.4%) had a predatory vision about it, they seen nature only with a purpose to provide hunt, crops, wood and water. 18.4% cited the environmental services that nature provides, like maintenance of the water resources, the clime and the beauty. 1.5% talked about the benefits to provide medicines, and 1.5% didn't know. When we questioned them about the disadvantages that nature may provide, 81.2% said that nature never causes injuries, 14.5% said that nature also provides disadvantages, 62.5% such as phenomenon caused by weather like flooding, 25% said that nature provides crop plagues and 12.5% attested diseases like dengue fever and malaria.

We also asked them about their relationships with the animals, 60.4% affirm that the animals in the region were beneficial and 20.2% said that they weren't. 18.7% didn't know. Among the people who think animals were beneficial, 24.1% because of the contemplative aspect, 20.6% because they have ecological functions, such as dispersal of seeds and plague control. The others 20.6% had a predatory view and attest that the major benefits of the animals were to serve as food. 20.6% were indifferent. Questioned about the malefactions that animals may brought, 45.8% said that the animals don't cause any damage, while 45.8 said the opposite, 8.3% didn't

Figura 3 – Rice crops damaged by capybaras (*Hydrochoerus hydrochaeris*)

respond. Among the harms that animals can bring 54.8% of the interviewees said that damages in their crops and livestock are the big disadvantages, caused by pumas, foxes, capybaras. 45.1% considered the animals dangerous to their lives because of the venomous snakes and pumas.



The local people were also evaluated regarding their perception about the species extinctions. 52% answered that any species population were decreasing or increasing, 4.1% didn't know how to answer and 43.7% said that several species were increasing their populations, like the guans and caimans cited in 10.8% of the interviews; the howler monkeys, armadillos, doves in 8.1% of the interviews; other species like deer (5.4%), snakes (5.4%), red-cowled cardinals (*Paroaria dominicana*) (2.7%), gallinules (*Gallinula* sp.) (2.7%), eared doves (*Zenaida auriculata*) (2.7%), blue-fronted parrots (*Amazona aestiva*) (2.7%), trushes (*Turdus* spp.) (2.7%), tinamous (2.7%), capybara (2.7%), agouti (2.7%), ducks (2.7%) and the little spotted cat (*leopardus tigrinus*) (2.7%) also were cited.

Fifty two percent of the interviewees didn't know why the animals population increased, 30.4% said that they increased because of the poaching reduction, 8.6% due to the protected areas, 4.3% said that this phenomenon was due the increase of native forests and 4.3% due the decrease of forest fires.

Regarding the Caatinga Howler Monkey, 46.8% of the interviewees said that the species population decreases in the last ten years, 6.3% believes in the stability of the populations, and 46.8% think that the populations of *Alouatta ululata* increases in the last ten years. When we asked about the estimation of population size, 40.4% didn't know the answer, 21.2% thought that exists around 500 individuals in nature, 12.7% believed in less than 100 individuals, 12.7% think thousands of them exists, 8.5% in millions and 4.2% in less than one thousand.

When asked about where the Caatinga Howler Monkey occurs, 51% thought it occurs in the state of Piauí and the neighboring regions, 22.4% believed that it occurs all over the forests and hills in the world, 8.1% think that *Alouatta ululata* occurs anywhere in the world, 8.17% anywhere in Brazil and 10.2% didn't answered.

Questioned about the importance of the Caatinga Howler Monkey for the local people, 57.4% said that the species was important, 21.2% said that the species wasn't important for anything and 42.4 didn't answered. Among the people who said that the species is important, 67.7% believed that is because of the seed dispersal and a contemplative role, 16.1% because it is a good rain predictor, 12.9% said that's because the species don't cause any harm and 3.2% didn't know how to answer.

We asked if they were aware of any protected area in the region, 39.5% said "no", 21.9% said "yes" and 31.2% didn't know. Then we asked about the Ibiapaba Environmental Protection Area (APA da Ibiapaba) the largest Sustainable Use Protection Area of in the region, 70.9% never heard about it and 29.1 said they knew. Then we asked the people who heard about the APA, where the APA were localized, and 92.9% didn't know, 7.1% affirm that were in the State of Ceará. 85% of the interviewees didn't know the importance of an APA, and their functions. These results show the lack of knowledge of the local people about the protected areas in the region and their importance.

The local people were asked about the environmental problems in the region, 50% said that there isn't any problem at all, 39.5% said that are problems and 10.5% didn't answered. All interviewees point out the problems as poaching, deforestation and forest fires.

We desired to know the population view about the entities that work in the region. The board 1 summarizes their perception about it. 32% believes that any institution develops a good work with the local communities, 24% didn't answered and 14% thinks that the National Institute of colonization and land reform (INCRA) is the best institution that acts in the region. This institute (INCRA) is responsible for the human settlements, and was the most conceptualized institute in terms of social work according to the local people. We then asked if there was institutes who does a good work for the protection of the environment, 52% said that there isn't such institute, 34.5 didn't know, 6.5% said that was the IBAMA and 4.1% said that was the local people who protect their land and the nature.

Board 1 – Local people perception about the local entities who worked in the region.

IBAMA Knows? Yes No 98.0% 2.0%			County Environment Bureau Knows? Yes No 12.5% 85.5 %			Aquasis Knows? Yes No 2.0% 98.0 %		
Good 59.5%	Bad 25.5 %	Neutro 14.8%	Good 0.0%	Bad 100.0 %	Neutro 0.0%	Good 100.0 %	Bad 0.0%	Neutro 0.0%
EMBRAPA Knows? Yes No 86.0% 14,%			SESC Knows? Yes No 44.0% 56.0 %			INCRA Knows? Yes No 96.0% 4.0%		
Good 9.7%	Bad 7.3%	Neutro 82.9%	Good 4.7%	Bad 9.5%	Neutro 85.7%	Good 39.1%	Bad 39.1%	Neutro 21.7%
Associação Caatinga Knows? Yes No 2.0% 98.0 %								
Good 100.0 %	Bad 0.0%	Neutro 0.0%						

When asked about the ways were they get information about nature, 56.1% said that their knowledge was gain through direct observation in the forest, 26% conversations with parents and friends 12.3% television, 2.7% readings, 2.7% specialized professionals. They didn't mentioned lectures, courses, school or any kind of educational tools.

Goal 1 (C): Identify the anthropic threats to the Caatinga Howler Monkey and its habitat conservation.

In this goal we look for identify the direct and indirect threats to the species survival, through field observations and interviews with the local people (n=50).

The interviewees point out the main problems for the environment have been the Forest fires (27.5%); deforestation (20.6%); poaching (20.6%); illegal wood trade (6.8%), indiscriminate use of pesticides (6.8%);



illegal coal production (3.4%); animal trade (3.4%); diseases caused by disturbed environments (3.4%); and lack of protected areas (3.4%).

Concerning the Caatinga Howler Monkey 51.8% of the interviewees believe that the main threat for the species decline is poaching, 25.9% deforestation and 11.1% forest fires.

We also observed these same threats to *Alouatta ululata* in the field expeditions. The species meat is one the most appreciate bush meats in the region, and is also used as medicine, and despite the increase of prosecutions by the environmental agencies, poaching still remains one of the most common practices in the region

The slash and burn agriculture was observed specially in the dry season, for the harvests of corn, rice, been and cassava. The illegal wood trade was also verified in the region.

The indiscriminate use of pesticides in the field crops is a disturbing factor, resulting in soil and water bodies' contamination, driving the local people to abandon their crops and deforest new areas for the installation of new crop fields

Goal 2: Increase our knowledge on the species ecological requirements (habitat preferences, diet, and home range)

Likewise the **Goal 1** nine trips were conducted during the project period, in order to obtain data on the species' habitat, its diet, determine its home range and record the daily activities of groups.

For this purpose, transects and observation at distance with the aid of scopes and binoculars were conducted. The tracks and geographical points were recorded on GPS and information on activity and composition of flocks in a digital recorder. The plant species observed being eaten by howler monkeys were collected.

In this goal we sought to sample as many environments as possible to verify the presence of *Alouatta ululata*. In order to guide the searching effort, interviews with local residents indicate in which environments and localities was possible to find this species. The vegetation and land use of the savanna biome were used as a base map (MMA, 2006). Thereby we were able to identify the most significant vegetational complexes in study areas and its surroundings. These complexes are often composed of blocks of more than one vegetation type, for example, associations of *Caatingas* and Dry forests.

Aiming to identify and characterize the habitats used by the species, walking transects were conducted in the sampling areas. The environments where the groups were sighted were characterized by *in situ* observation, and documented through records in voice recorder, video and photos.

We evaluated seven types of forest remnants in the areas of project influence (Appendix I and BOX 1). The species was found in three vegetation complexes in the study region.



Figure 2 – Caatinga Howler Monkey (*Alouatta ululata*)

Box 1 – Forest Remnant kinds in the study region. # means the species presence

- Savanna Woodland-Steppe (TA) #
- Savannah / Steppe Savannah (ST) #
- Savannah / Steppe Savannah +Agriculture (ST+AG or AG+ST)
- Forested Steppe Savannah (TD)
- Wooded Steppe Savannah + Agriculture (TA+AG)
- Savannah /Seasonal Dry Forest (SN) #
- Agriculture + Savannah /Seasonal Dry Forest (AG+SN)



Figure 6 – Team member monitoring Caatinga Howler Monkeys through a scope.

In the study region, the presence of *A. ululata* is related to vegetation complexes of forest physiognomy with low human influence. Of the seven vegetation complexes in the region, three are related to the agriculture (Savannah / Steppe Savannah + Agriculture; Wooded Steppe Savannah + Agriculture; and Agriculture + Savannah / Seasonal Dry Forest). These three types of vegetation dominate a large portion of this region, but the species was not recorded there. The remaining vegetation types are well represented in the region, except the Savanna Woodland-Steppe, which appears only in small fragments.

Steppe; Savannah / Steppe Savannah; and Savannah / Seasonal Dry Forest), all with a lower anthropic impacts indexes and patches of arboreal vegetation, with the occurrence of trees that can reach up to thirty meters tall, although with the predominance of smaller species with an average height between five and seven meters. It is also characterized by high density of lianas and herbs in the understory and by the heavy leaf shedding during the dry months of the year (October to December).

In fact, the presence of the species was observed only in forest fragments, and the open environments are apparently avoided by the species.

The Caatinga Howler Monkey was recorded in only three vegetation complexes (Savanna Woodland-

Figure 7 - Appearance of vegetation in Santo Antonio Farm, left the dry season (December) and below the same area in the rainy season (February).



Figure 8 – Caatinga Howler Monkey feeding on leaves (above). Left, seed found in a fecal sample.



The Caatinga Howler Monkey is an herbivorous species that eat mostly leaves, flowers, buds and fruits. The team recorded 23 plant species belonging to 22 genera distributed among 19 families that comprise the diet of *A. ululata*. These data were obtained through feeding behavior observations and fecal samples. The TABLE 1 lists the species recorded in the diet of *A. ululata*.

We could to identify the species *Anadenanthera colubrina*, *Struthanthus* sp. and *Pisonia tomentosa* as key feeding resources to the Caatinga howler Monkey groups. In December, almost all plants have lost their leaves. In this same time these species flowers and its fruits are a major food resource for this primate. These species were considered essential to the survival of the Caatinga Howler Monkey.

Table 2 – Checklist of the plant species found in the diet of the Caatinga Howler Monkey.

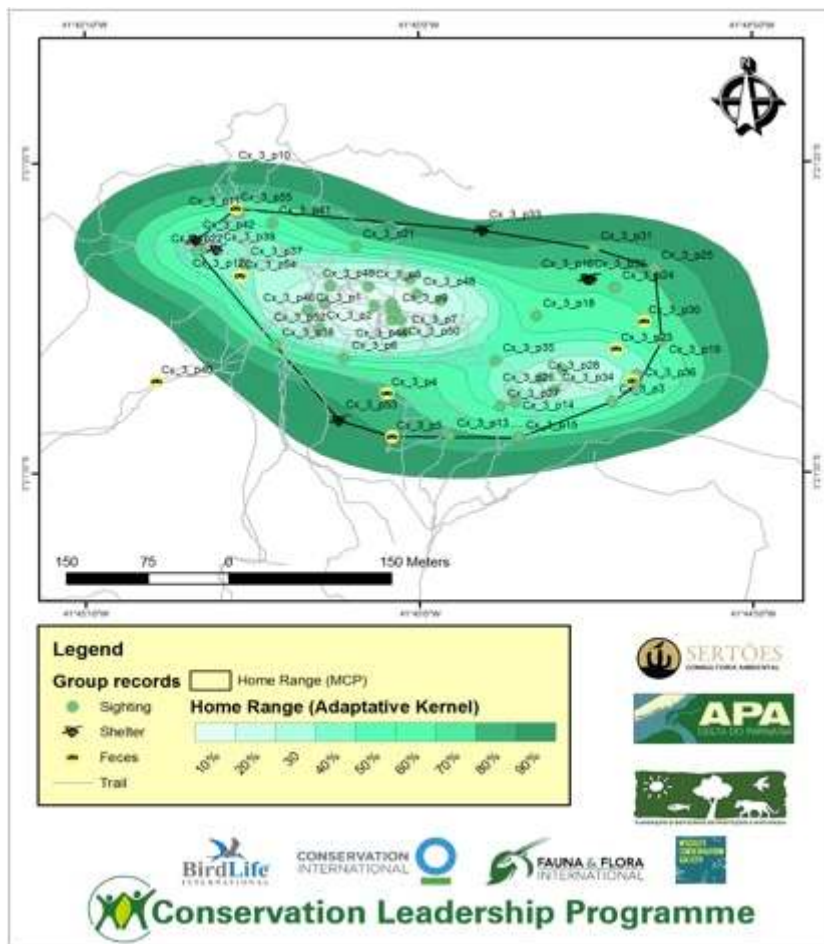
Family	Local Names	Latin Names
Anacardiaceae	Cajazeira	<i>Spondias mombin</i>
Anacardiaceae	Cajuí	<i>Anacardium microcarpum</i>
Sapotaceae	Taturubá	<i>Pouteria</i> sp.
Arecaceae	Tucum	<i>Astrocaryum</i> sp.
Sapindaceae	Pitomba	<i>Talisia esculenta</i>
Myrtaceae	Guabiraba	<i>Campomanesia</i> sp.
Bignoniaceae	Pau d'arco roxo	<i>Tabebuia impetiginosa</i>
Fabaceae	Angico branco	<i>Albizia niopoides</i>
Bignoniaceae	Pau d'arco amarelo	<i>Tabebuia serratifolia</i>
Fabaceae	Angico preto	<i>Anadenanthera colubrina</i>
Dilleniaceae	Sambaiba	<i>Curatella americana</i>
Nyctaginaceae	João mole	<i>Pisonia tomentosa</i>
Loranthaceae	Enxerco (erva-de-passarinho)	<i>Struthanthus</i> sp.
Lecythidaceae	Sapucaia	<i>Lecythis pisonis</i>
Anacardiaceae	Gonçalo Alves	<i>Astronium fraxinifolium</i>
Combretaceae	Mirindiba	<i>Buchenavia capitata</i>
Rubiaceae	Angelica	<i>Guettarda</i> sp.
Olacaceae	Ameixa	<i>Ximenia americana</i>
Opiliaceae	Marfim	<i>Agonandra brasiliensis</i>
Rhamnaceae	Juazeiro	<i>Ziziphus joazeiro</i>
Loganiaceae	Fruta do jacú	<i>Strychnos</i> sp.
Simaroubaceae	Paraíba	<i>Simarouba versicolor</i>
Boraginaceae	Frei-jorge	<i>Cordia</i> sp.

In order to characterize the species' home range team performed walking transects and long distance watching. The location, number of individuals, number of males, females, young, adults and subadults were taken into account to distinguish the groups found. Consequently it was possible to map the different locations where each group was found. The spatial arrangement of records were analyzed by the Home Range extension(Rodgers & Carr, 1998) for Software ArcGIS © 9.2 in order to estimate the species' home range. Data were analyzed using two methods, the Minimum Convex Polygon (MCP) and the Adaptive Kernel Method.

We observed a total of nine groups of howler monkeys in the region. Among them only five groups were registered more than once, for a total of 106 records. Of this total, 86 record were related to only two of the groups, the groups called CX3 (N=55) and CX7 (N=31). This represents approximately 81% of group records. Because of this greater number of encounters, these groups were selected as the model to estimate the home range of this species in the region.



Figure 9 – Team member monitoring a Caatinga Howler monkey Group.



The home range of the group CX3 was estimated to be around seven hectares by the method of Minimum Convex Polygon with 95% of the points. The 90% Adaptive Kernel method estimated an area of 13.85 hectares (Figure 4).

The home range of the group CX7 was estimated in 18.69 hectares by the method of Minimum Convex Polygon with 95% of the points. The 90% Adaptive Kernel method estimated an area of 35.62 hectares (Figure 5).

Figure 10 – Map showing the home range of the group CX3.

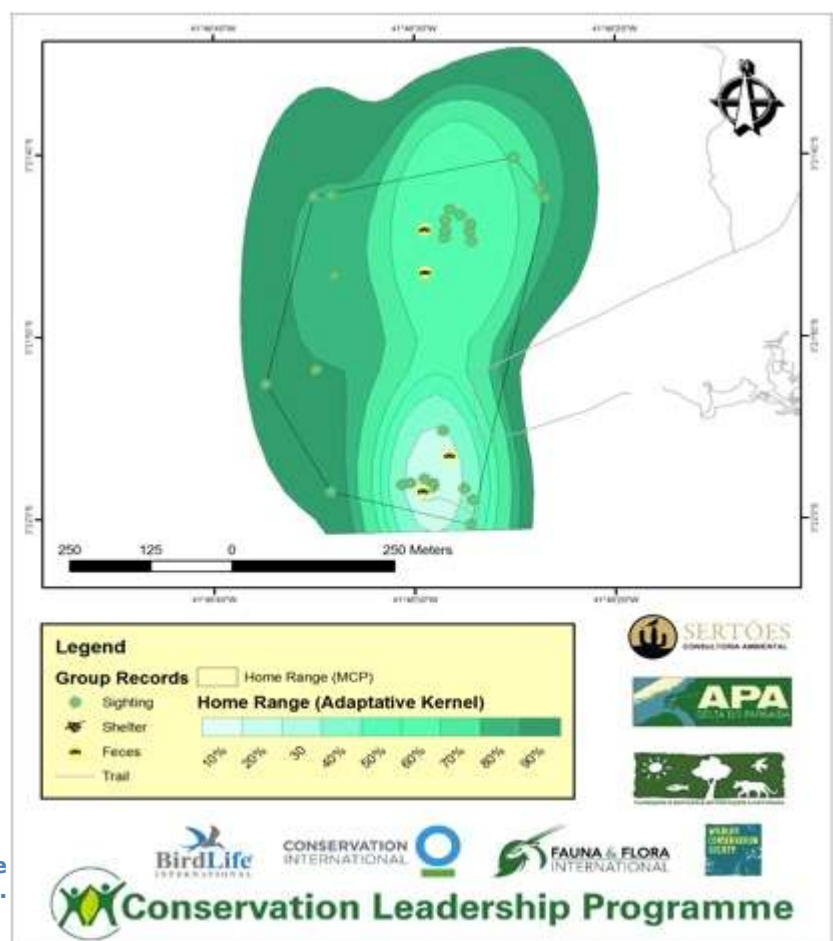


Figure 11 – Map showing the home range of the group CX7.



Figure 12 – Group of Caatinga Howler Monkeys.

Based the observation of these nine groups of howler monkeys, we gathered behavioral data about feeding social structure and age of the groups, as well as social interactions.

The classification of individuals according to age classes was made from an adaptation of the classes proposed by Neville (1972). We defined three age classes: puppy, individuals still being carried by their mothers; juveniles, animals that are no longer carried by the parents, but still have no color or size of an adult animal; and adults, those who already reach the typical size and colors of this age.

For each group, the sex ratio was calculated, defined here as the total of adult males divided by the total adult females. The reproductive rate was also calculated by dividing the total number of offspring of the group by the total number of adult females.

Among the nine observed groups, three were identified through indirect records. Due to this incomplete sample these three groups are not being analyzed in this section. The other six-recorded groups have a larger number of records and its composition is represented in TABLE 2.

The composition of the six troops studied varied between seven and ten individuals with an average of 8.33 (± 1.36) individuals; these values were obtained from 41 sightings. Local residents said in interviews that 29.7% of the troops were formed by one to six individuals, 27.6% reported troops of six to 12 individuals, 17% of the interviewees spoke in groups larger than 13 individuals and 25.5% did not know. In all flocks, puppies were observed in their composition. One of the troops contained three adult females, each accompanied by a cub.

Table 3 - Age and gender structure of the birds sighted in the region. The term "N.O." means that no animals were observed in this age group or sex.

	Number of individuals	Adult males	Adult females	Juveniles	Puppies	Adults/juveniles uncertain sex	Sex Ratio	Reproductive rate	Number of counts
Group CX2	8	2	2	2	2	N.O.	1	1	1
Group CX3	10	2	3	2	3	N.O.	0,66	1	34
Group CX5	7	2	2	2	1	N.O.	1	0,5	3
Group CX7	7	1	2	N.O.	2	2	0,5	1	1
Group CX8	8	4	2	1	1	N.O.	2	0,5	1
Group CX9	10	3	3	N.O.	3	1	1	1	1

Most of the time, the troops were resting refugees amid the foliage. The time of day of greatest feeding activity occurred during the early morning hours, between 6:00 am and 8:00 am in the morning and late afternoon, around 4:00 p.m. to 5:30 p.m. Were also recorded vocalization activity in all months sampled.

We found structures formed by branches and leaves that villagers attribute to the howler monkeys and claim to serve as a bed for them.

We registered a wide range of behaviors, all typical of the species of this genus of primates. These behaviors are described below and classified according to Albuquerque & Codenotti (2006) (See **APENDIX III**).

GOAL 3: Identifying and stimulate the creation of private protected areas in the region.

The RPPN (**Reserva Particular do Patrimônio Natural**) – “Natural Patrimony Private Reserve” is a Brazilian particular type of Conservation Unit. It’s a private protected area with perpetuated character in order to preserve the biological diversity of a particular area. The only activities allowed in the RPPNs are scientific research, visitation for tourism and educational purposes that helps to improve the knowledge about the importance to protect the biodiversity of the area.

The advantages for the land owners to create a RPPN in their properties are taxes exemptions, priority in analyses of projects sent to the National Fund of Environment of Brazil (FNMA), preference in the concession of credits for the implementation of activities inside the RPPN and in the buffer zones, cooperation from the Brazilian Environmental Protection Agencies and the Federal Police in order to help the supervision, protection and management of the Private Protected Area.

At the region of occurrence of the Caatinga Howler Monkey, in the north of Piauí State in northeastern Brazil, the main areas of preserved forests are inside private properties. These forests with high canopy are the habitat of *Alouatta ululata*, with high diversity of trees that offers fruits, leaves flowers and seeds to this endangered Neotropical primate.



Figure 13 – Meeting with landowners.

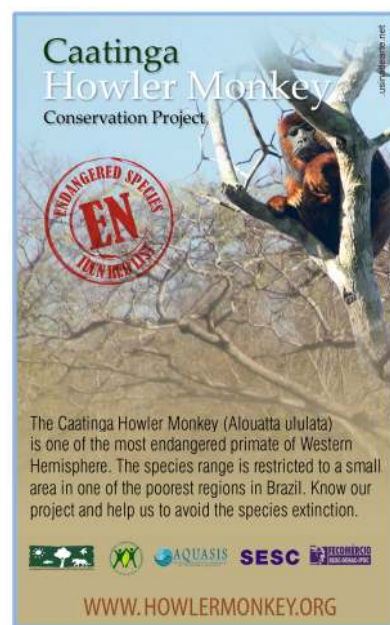
For centuries these forests have been cut down for the slash and burn agriculture. And for the last decade the soy and eucalyptus plantations are decimating the natural vegetation of the region, associated with the poaching and consequently extinction of Caatinga Howler Monkey populations.

One of the major goals of the Caatinga Howler Monkey conservation Project is to protect the species and its habitat. In order to do that we identify that some of the major local actors were the landowners that posses pristine areas of *Alouatta ululata*’s habitat and healthy populations of the species.

After the local landowners were identified we explained the principles of RPPN, the advantages and the importance of the creation of protected areas to preserve the Caatinga Howler Monkey populations and its habitat. The RPPN protected area was chosen because of its restricted use, its perpetuity and the advantages for the landowners to conserve the local biodiversity.

We made five trips visiting local landowners in the municipalities of Caxingó, Caraúbas do Piauí, Buriti dos Lopes and Murici dos Portelas, totalizing 25 (Figure 13) meetings. To disseminate and explain the Caatinga Howler Monkey Conservation Project and the RPPN concepts we made folders and flyers (Figure 14) to distribute among the local communities.

We identify 12 local landowners with populations of Caatinga Howler Monkey in their properties, eight of them were excited in participate of the Project and wants to create Private Protected Areas (Table 4).



We also helped them to gather all the documentation, producing the maps and georeferencing of the areas and the Reserves; and began the legal process with the Environmental Agencies responsible for the creation of the RPPNs. In this process we verify that only six of them have the total and proper documentation of the properties. So we decided to assure those six new Private Protected Areas and in the future help to create new ones in the region.

There is a total of approximately 1.500 ha Hectares that will become RPPN. This is an important accomplished to preserve the Caatinga Howler monkey, especially because the search for lands to produce eucalyptus. This is one of the eminent threats for the species' conservation.

Table 4 – List of the landowners protecting the species in te region.

Land owners	Municipality	Presence of <i>A. ululata</i>	Intends to Create RPPN
Livio Freitas	Caxingó	Yes	Yes
Livio Freitas Junior	Caxingó	Yes	Yes
Prentice Borges	Caxingó	Yes	Yes
Carlos Borges	Caxingó	Yes	Yes
Gil Borges	Caxingó	Yes	Yes
Paulo Jorge	Murici das Portelas	Yes	Yes
Antônio de Padúa	Caxingó	Yes	Yes
Francisco Freitas	Buriti dos Lopes	Yes	Yes
Paulo José Freitas	Buriti dos Lopes	Yes	No
Chico Bodegueiro	Caxingó	Yes	No
Joaquim Caboclo	Caxingó	Yes	No
Nonato Ovelha	Caxingó	Yes	No

The aid of the local landowners the Caatinga Howler Monkey Conservation Project was fundamental and extremely important for the development the project. People like Prentice Borges and Livio Freitas and Livio Freitas Jr (Figure 15) allow and motivates the monitoring of the *Alouatta ululata* groups in their properties; and help us to divulgate and disseminate the Project and the importance of Conservation the biodiversity of the region, they became members of our team and important local actors for the conservation of this endangered primate.



Figure 14 – Caatinga Howler Monkey Conservation Project Team: (Igor Roberto, Lívio Freitas Jr. Lívio Freitas and Thieres Pinto (Left to right)).

ACHIVEMENTS AND IMPACTS

Goal 1 (A): Determine the interactions between the local communities and the Caatinga Howler Monkey and its habitat

The poaching is the main negative interaction between the local people and the Caatinga Howler Monkey, one of the reasons for that is the poverty in the region resulting in the use of bush meat as a

food item due to necessity needs. However the hunting activity for sport or leisure is also common in the region. This practice deserves to be eliminated through law enforcement and education. Educational activities also is needed to demonstrate the ecological importance of those species considered dangerous to the local people, specially to the agricultures and fisherman who are the main social actors in the region, showing and capacitating them in sustainable economic activities, like ecotourism, minimizing the poaching in the region.

Fortunately the illegal animal trade not represents a major issue in the region, however preventive actions needs to be carried out in order to avoid the establishment of this practice.

Regarding the most hunted species we conclude that the majority is formed by common species, with the exception of the Caatinga Howler Monkey and the agouti, they have been hunted near local extinction, and today the lower numbers of poaching records for those species are duo the difficult to find them in the forest. We noted a change in the bush meat preference according to the level of facility to find the species in the wild.

Most interviewees demonstrated to know the Caatinga Howler Monkey, showing that the species have a close relationship with the local people. Some people feel related to the species due to the similarities with the human behavior, such as the parental care with the cubs. Some old hunters tell us that they even stop hunt the Caatinga Howler Monkey when they face this particular behavior. An old hunter in the region that was killing a group of howler monkeys when the adult female show him a young pup that she was carrying. The hunter said that he was impressed by this behavior and never hunted again. These particular stories can help to bring a level of proximity between the people and the animal, demonstrate how close we are to them, and that we need to protect them as part of our family. The local people are aware of the benefits the species bring such as seed dispersal, this allied to the appeal that the species have can help to define conservation strategies in the region

The consumption of Howler monkey meat as medicine is also a concerning activity, the people needs to realize through educational orientation the harms that this practice could bring to their health. In addition, they don't take the appropriate drugs to cure their diseases.

Goal 1 (B): Evaluate the perception of the local communities regarding the importance of environmental resources and the conservation of the Caatinga Howler Monkey.

We noted a predatory view regarding the benefits that nature can provide for the local people; few people had idea of the environmental services that nature can provide us, and how to use them in a sustainable way helping to conserve the local biodiversity.

The people also are aware of the main causes that drive the decline and extinction of species, however they need to know how to avoid them and that they need to be part of the process to prevent this to happen. Once again they are open to discuss and learn new sustainable activities; the problem is the lack of institutions governmental or not starts to develop these strategies in the region. Ecotourism and the organic agriculture, and apiculture seem to be a great potential in the region.

The majority of people in the region are not familiar with the concept of protected areas, neither this importance nor objectives. They don't know the Protected Areas that exists in the region; the lack of proximity with the managers of these Units, associated with a bad management of the areas makes the scenario even worst. It is important to establish a close relationship between the local people, the stakeholders and the managers of these Protected Areas helping them to planning together the conservation of the local biodiversity. Most of the local people are aware of the conservationist actions of local landowners that protects the biodiversity of their lands, seen this actions as the main conservationist actions in the region. This could help to stimulate a program of private protected area in the region transforming the local people in to social actors for the conservation of the local biodiversity.

Goal 1 (C): Identify the anthropic pressures suffer by the Caatinga Howler Monkey and its habitat.

The main threats to the Caatinga Howler Monkey are the poaching and the habitat loss, with influence of the pollution and pesticide use. These two problems are recognized as the major threats to all Howler Monkeys (Crockett, 1998), driving to the fast extinction of local species. In protected areas the level of these impacts is much lower, and the populations tend to increase, this is what is happening in the local farms where the Caatinga Howler Monkey is protected, we identify most of these local land owners and disseminate the concept of the RPPNs.

All this information is a keystone to improve conservation planning and to carry on conservation actions in the region.

Goal 2: Increase our knowledge on the species ecological requirements (habitat preferences, diet, and home range)

- HABITAT

In the region that is two main factors that determine the suitable habitat for the species

1. Arboreal vegetation (10 to 30m of height);
2. Reduced presence of anthropic activities, such as field crops.

The genus *Alouatta* is widely related to Forest environments, however the relative lack of specialization in a particular habitat permits the species to occur in a several variety of vegetation types, such as mangroves, dry forests, humid forests, gallery forest (Neville et al. 1988).

- DIET

Diet studies about *Alouatta belzebul*, the sister species of *A. ululata*, recording 47 plant species for the species (Bonvicino, 1989). These animals occur in the Amazon Rain Forest and Atlantic Rain Forests, sometimes in drier deciduous forests like the Piauí region. From the 47 species registered for *A. belzebul*, five of them were recorded for *A. ululata* in the present study. Neville et al. (1998) did a research about all the plant items recorded in the *Alouatta* diet, of the 22 genus recorded in our study, ten of them were never been recorded as food item for the Howler Monkey species.

Bonvicino (op. cit) observed an increase of leaves consumption in *A. belzebul* diets in the dry season, in the Piauí region we also observed that, the trees lose almost their entire leafage in the dry season and the species is forced to increase the leaf ingestion in their diet, in the wet season is more common to see fruits and flowers ingestion by the Caatinga Howler Monkey. In our study three species were the most key food items for *A. ululata*, *Anadenanthera colubrina*, *Struthanthus* sp and *Pisonia tomentosa*, these species need to be considered in reforestation projects in the region, once they represent an important resource for *A. ululata* in the dry season.

- HOME RANGE

The species of the *Alouatta* genus are considered low metabolism animals; their home range is relatively small and less susceptible to habitat fragmentation (Crockett, 1988). Studies with other species of Howler monkeys show a home range varying from one to 76 hectares (Neville et al. 1988). *A. belzebul* had a home range of 4.5-9.5 hectares in an Atlantic Rain Forest area in northeastern Brazil (Bonvicino, 1989).

The present study found a home range of 13.85 ha for *A. ululata*, very similar to the home range of *A. belzebul*. This biggest home range for the Caatinga Howler Monkey can be due to the fact that the region is a dry forest area and in the dry season the individuals need to search for food over long distances. This represents how this species needs a preserve territory and the conservation of big patches of forests is essential to their survival.

- POPULATION DYNAMICS

The size and composition of the Howler monkey groups in the present study is typical of the *Alouatta* genus, specially the species that occurs in the Cerrado and Atlantic Rain Forest habitats, like *Alouatta caraya*, *A. seniculus*, *A. fusca* and *A. belzebul*.

In the Piauí region we noted that few groups had more than one adult male, in some cases four males in a group of eight individuals. This may happens due to territorial defense.

Regarding the behaviors observed for *A. ululata*, one of them seem to be new for the genus, the construction of arboreal beds made out of sticks and leaves as protection against the sun and rain, and also rest. We didn't saw the construction of these beds, but local people tell us about it, and we saw the species using this particular construction.

GOAL 3: Identifying and stimulate the creation of private protected areas in the region.

We were able to disseminate the concept of protected areas in the region, especially among the local farmers. Creating a group of local land owners interested in creating RPPN in their lands, all of them had populations of Caatinga Howler Monkey and a total of 1.500 hectares of protected area may be created in the future. These open a series of possibilities to explore sustainable activities in the RPPNs such as ecotourism and educational activities, through local people involvement. This is an important accomplished to preserve the Caatinga Howler monkey, especially because the search for lands to produce eucalyptus.

All these results were spread among the local people and are helping to increase the peoples conservationist view.

SECTION 3.

CONCLUSIONS

This project has gathered inedited and unique information about the ecology and the interactions of local people and the Caatinga Howler Monkey and its habitat. We identify the diet, habitat requirements and diet of several groups, identify the main threats and purpose some of the sustainable activities that may be implemented in the region.

We disseminate the concept of protected areas (RPPN) and gathered a network of local land owners interested in create this Conservation Units in their farmers, helping the conservation of the Caatinga Howler Monkey and its habitat.

PROBLEMS ENCOUNTERED AND LESSONS

Which project activities and outcomes went well and why?

Every activity were possible to accomplish, it is probably due to the previous project planning.

Please detail any problems that the project encountered or deviations from original project plans. Describe how these problems were addressed and what solutions were found to deal with these issues.

Few team members: Only two team members participate of the Project witch difficult and delay the project. To deal with that, the two members became overload with activities but managed to finish the project because of the compromising with the conservation of the species.

Distrust of the local people regarding our conservation project: Several people thought we are from fiscalization Agencies (IBAMA) and didn't want to talk with us or were afraid of us. We have to talked to them and explain our situation gain their trust and making them part of the process. This was

extremely important to disseminate and create a network of local land owners interested in create protected areas (RPPN) in their lands.

Briefly assess the specific project methodologies and conservation tools used.

Our methodology of interviews and monitoring of the *Alouatta ululata* groups were successful in obtain our results.

Please state important lessons which have been learnt through the course of the project and provide recommendations for future enhancement or modification to the project activities and outcomes.

The most important lesson was to respect, gather the confidence of the local people and bring them to be part of our conservation Project, without their help we won't be able to accomplish our results.

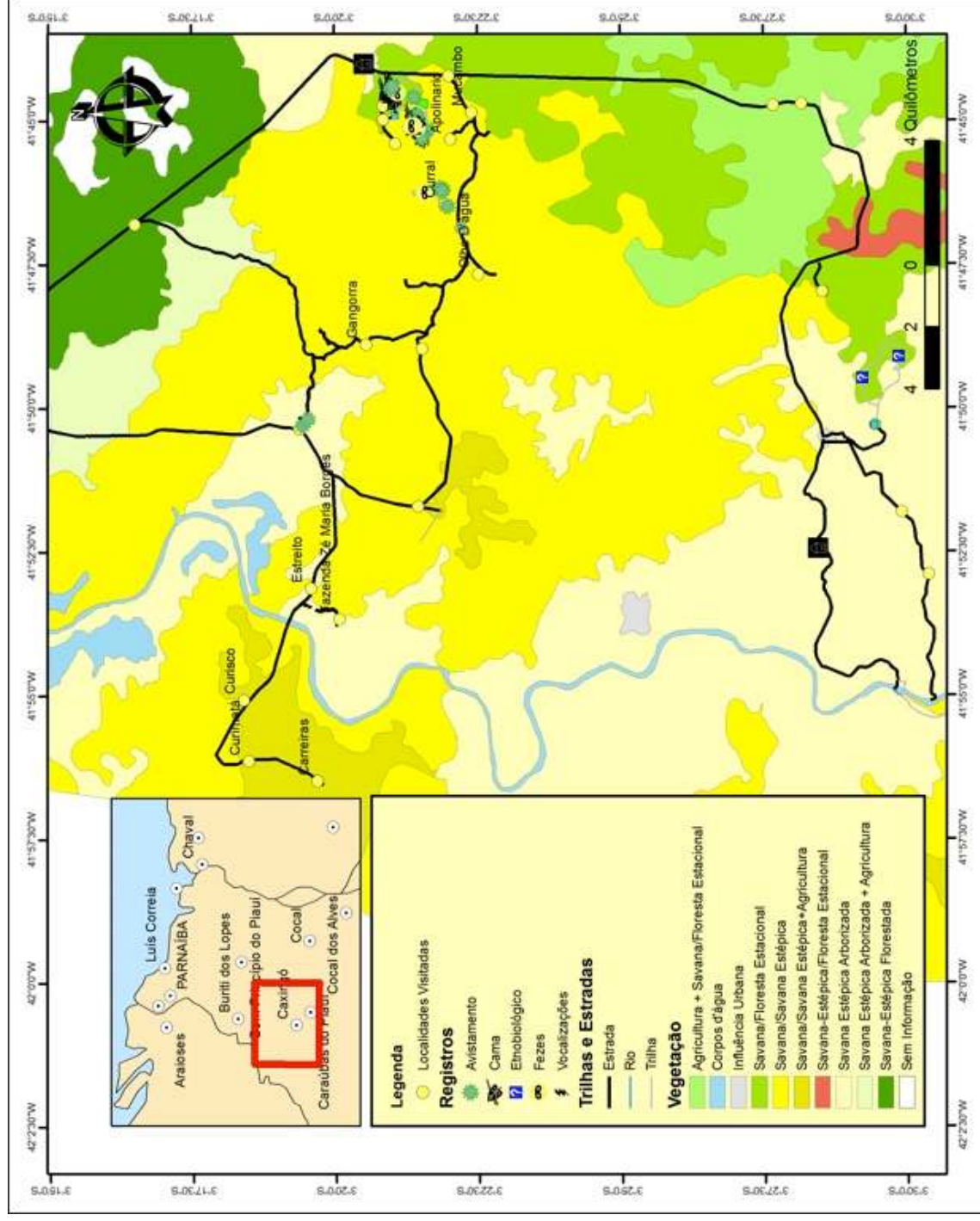
IN THE FUTURE.

The objectives of this Project were to obtain basic information about the Caatinga Howler Monkey, in a way that they could be used in the management of conservation actions to preserve the species. Our team still working in the data analyzes to published them in a periodic journal, we also still working and helping the local land owners of Caxingó in the creation of a network o private protected areas, of almost 1.500 hectares, we already had ten land owners interested. We also pretend to develop educational activities with the local people, showing them the sustainable activities that could be implemented in the region and that will bring another economic income to the communities.

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Appendix I Project Region's Forest Remnants Map.



- Abstract of the 10th. International Mammalogical Congress em Medonza, Argentina, from august 9 to 14, 2009.

73 CONSERVATION OF THE CAATINGA HOWLER MONKEY (*ALOUATTA ULULATA*): STARTING TO KNOW THE SPECIES' ECOLOGY.

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The Caatinga Howler Monkey, *Alouatta ululata*, is an endangered primate and probably the least known howler monkey of the world. It is an endemic primate of the northern portion of the states of Ceará, Piauí and Maranhão (NE Brazil). The known geographical range of *A. ululata* is situated in one of the poorest areas in Brazil, where the growing human communities still depend on natural resources for their subsistence. However, there is virtually no information about the interactions and conflicts between the species and the local human population, and the factors that are driving the species to near extinction. In order to answer basic questions about the species' natural history, threats and conservation priorities a one year research project was developed in the region. This study was made based on direct observations of several groups of *Alouatta ululata*, in two distinct environments, mangrove and Caatinga. Additionally, interviews with local communities were conducted intending to understand their relationship with this primate species, its habitat and to collect information about the species ecology and threats. Twenty-five plant species were observed as part of the species alimentary diet, the species home-range was estimating varying between 0.544 ha and 10.528 ha in the caatinga areas, and from 0.034 ha to 3.412 ha in mangrove areas. The mean group size was of 5.6 in caatinga areas and 5.2 in mangrove areas. The main threats to the species are the poaching and habitat loss. The priority conservation action to this primate is the establishment of new protected areas in this region and produce a conservation plan evolving the local stakeholders and the Governmental Environmental Agencies.

74 CONSERVATION OF THE EURASIAN LYNX IN FRAGMENTED HABITAT – AN EAST EUROPEAN PERSPECTIVE

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The Eurasian lynx living in NE Poland are on the westernmost limit of the natural range of the species and they occupy highly fragmented habitat. Research conducted in Białowieża Primeval Forest (BPF) showed that the lynx population is highly vulnerable to exploitation by humans. Their current range in Poland also contracted during recent 20 years despite of strict protection. Data on lynx ecology in BPF showed that these felids rely specifically on roe deer as its staple food, utilize large (up to 300 km²) home ranges, are dependent on forest habitat and the maintenance of its population should be supported via dispersal among neighbouring forest patches. We hypothesized that the ecological circumstances for lynx in NE Poland (low population size, habitat limitations) may create obstacles for their population genetic diversity. To test it, the samples were collected in a peripheral (fragmented) population of the species (NE Poland, including BPF) and compared using microsatellite and mtDNA genetic markers with those in the core range (Baltic states), where lynx occur in a nearly continuous habitat. Lynx from NE Poland had lower allelic richness than those from continuous range. There was also significant genetic structuring among the populations (F_{ST} : 0.11 – 0.15). The lynx shared most of mtDNA haplotypes throughout their range, however its diversity tended to be lower in the NE Poland with one haplotype being unique to the BPF population. The genetic results are also supported by pelage characteristics of the lynx as the individuals from NE Poland were morphologically less diverse than the cats from the continuous range. The results suggest that the Eurasian lynx may show limited gene flow between its peripheral and core populations, thus being exposed to decrease of their genetic variability and the increased risk of extinction.

Appendix III

REST

Seated. Supported by a branch, the animal has the body leaning forward, members close to the chest (on days of low temperature) and the arms stretched sideways (on hot days). The tail remains coiled on the branch or around the animal's body.

Lying laterally. The animal is lying on the branch, the hind limbs flexed. The forelimbs may be close to the body or placed on the hind limbs. The tail is coiled around the branch, and may also be under the head.

Lying on your back: The animal rests with the dorsal region on a branch and stretches all the four members.

Lying prone: the animal is resting on its ventral region on a branch, keeping arms and legs hanged vertically, close to the body or stretched horizontally, his hands clutching a on a branch nearby and curly tail in this or another nearby on a branch.

Hanging by the tail: The tail is curled on a branch, hind limbs also attached to a branch, the animal remains motionless for a moment. The monkey may release the four members and swinging.

Clean the fur: Seated, the animal examines his hair, stroking, fingering and picking.

Yawning. In a neutral posture, the animal opens its mouth, head slightly tilted back, sometimes with his tongue hanging out. The behavior can precede to stretch out.

Scratching: Head, arms and back are scratched with hands or feet, or the body is rubbed on the branch.

Defecate: Sitting with its tail wrapped around a parallel branch or slightly rose laterally with the looped end on the same branch that offers support, members supported in this branch. The animal can move walking during the defecation.

Urinate: It usually happens during defecation, or following, sitting or quadruped posture.

LOCOMOTION

Walking on the vegetation: The howler monkey uses the four members to supporting and advance slowly, the tail slightly raised.

Run: Sometimes includes small skydiving jumps.

Skydiving: The animal leaps with limbs and tail free.

Semi-Skydiving: It is accomplished with the forelimbs, or all members free and tail wrapped around a branch.

FEEDING

Eat sitting down: Seated, the animal pulls the food to the mouth selecting what appears most attractive (leaf, petiole and bark). He can pluck the leaves of the tree, holding it with one hand or both together, keeping them closer to the mouth while chewing.

Eat lying down: Lying the animal takes the leaves near the mouth biting them, pulling them up or eating them.

Eat stretched: When the food of interest is difficult to reach, the animal's body stretches horizontally supporting the forelimbs on a branch other than where it lies, keeping them away from the to, thus forming a bridge.

Hanging by the tail: With its tail coiled on a branch, stretching the forelimbs to reach the branch and pull the food, leading to the mouth. The hind legs can also be used in the task of clinging a branch.

Drinking: It was observed licking the wet leaves, by the rain or dew.

DEFENSE AND WARNING

Escape: Facing a potential danger, the animal moves away, running and jumping.

Shaking branches. Looking at the opponent or predator, the animal holds and moves the branches, sometimes breaking down and letting them fall to the ground or on who threatens.

Excreting in group: In the presence of outsiders in their area of use, the howlers put themselves next to each other, while defecating and urinating on them. It is also performed individually at moments of stress or escape.

Watch: The animal seated or lying down, staring around, turning, raising or lowering the head to the site to be focused.

Growling: When threatened the animal began to emit a series of grunts and roars against the predator.

SOCIAL BEHAVIOR

Play: During social play, animals simulate fights; clap their hands to the head and body of another individual, they nibbled, accompanied by low growls. They can run one after another and try to cling to.

Grooming: The animal searches for bugs or parasites through the pelage of others who are close to him.

Grouping: The animal is placed leaning against another individual, forming groups to rest. The adults put themselves at the edges, while young and infants are at the center of the group in contact with the abdomen of adults. It's a formation that normally occurs in the rain or when going to sleep.

Smell mark: rubbing the neck or the belly on a branch or trunk to mark territory

PARENTAL CARE

Breastfeed: When seated, the mother embraces the infant or just puts his arms about him. The small infant clinging to her belly to belly, the baby can sit while breastfeeds.

Carrying on the back: When carried in the middle of the mother's back, clinging, the

infant may occupy an upright or lateral position and put the tail around her body. When carried at the base of the tail, stands erect, with his tail curling tail of the mother.

Carrying on the belly: The mother carries the infant clinging to her belly, as it clings firmly with your hands and feet in her fur.

Playing with adults. In play with adults, infants give light bites, pulling his beard and hit the mother or father or even put their hands into the mouth of the parents when they yawn. Parents return with nibbling, soft growls and jerks.

Bridging. The mother's body stretching with hands grasping the branches of a tree and with the tail and feet of the other branches: the puppy goes from tree to tree on your back.

REPRODUCTIVE BEHAVIOR

Sniff out the genitalia. In the quadruped position, as the female, the male quickly smells her genitalia.

ACOUSTIC COMMUNICATION

Vocalizing. Sounds ranging from small to medium range, emitted during feeding, locomotion and alertness, by all ranges of animals when sitting, lying, resting on the bridge, on the move.

Roar. Performed mainly by adult males for marking and defense of territory, are long-range vocalizations. The individuals stare into the animal whom they lead the roar, moving the head slightly forward when emitting strong roars. The mouth is open, with the upper lip forming a diamond.

Appendix IV – Summary Financial Statement

Itemized expenses	Total CLP requested	(USD)	Total CLP used	(USD)
PHASE I - PROJECT PREPARATION				
Administration				
Communications (telephone/internet/postage)	600,00		540,00	
Books and printing journal articles/materials	200,00		140,00	
Insurance	0,00		0,00	
Visas and permits	0,00		0,00	
Team training (Please detail:)	0,00		0,00	
Reconnaissance				
Medical supplies/first aid	0,00		0,00	
Equipment				
Scientific/field equipment and supplies (Please detail:	0,00		0,00	
Photographic equipment (Please detail: Batteries)	0,00		0,00	
Camping equipment (Please detail main items:)	0,00		0,00	
Field guides	0,00		0,00	
Maps	600,00		510,00	
Boat/engine/truck	0,00		0,00	
Fuel	0,00		0,00	
Other (Please detail:)			0,00	
PHASE II - IMPLEMENTATION EXPENSES				
Administration				
Insurance	0,00		0,00	
Transportation				
Fuel	1.650,00		1.402,50	
Field vehicle maintenance	1.000,00		850,00	
Accommodation for team members(3 members x 10 days x 5 trips)	3.200,00		2.720,00	
Food for team members and local guides (3 members x 10 days x 5 trips)	3.200,00		2.720,00	
Transportation	0,00		0,00	
Customs and port duties	0,00		0,00	
Workshops				
Outreach/education activities and materials (Flyers and website)	500,00		425,00	
PHASE III - POST-PROJECT EXPENSES				
Administration				
Report production and results dissemination				
Other (Please detail:)	600,00		510,00	
Total	11.550,00		9.817,50	

