



**PROJECT DESIGN DOCUMENT
ZERO2NATURE - PREFOR**

Version 1.0



ASPERAM AD ASTRA - PREFOR



Scope	scope_17
Project Title	ASPERAM AD ASTRA - PREFOR
Project Proponent(s)	Associação dos Produtores Extrativistas da Região Amazônica - ASPERAM
Host Country	Brazil
Other Involved Countries	No other countries involved
Ex-Ante Annual Average Negative Emissions Reduction	422,223

Goals & Description of Project Activity

Per Asperam Ad Astra. Freely translated from Latin, is the difficult path that leads to the stars. Difficulty surely is the reality of the Amazon. It is difficult to transport goods from one place to the other, for distances are incredibly long and road conditions terrible. Furthermore, exposition to tropical disease is a constant threat, for mosquitoes are relentless and overwhelming. Besides these natural factors are the difficulties related to preserving the Amazon biome from fierce human exploitation of its riches. As a rule, human actions are devastating the Amazon Forest without regard for the complex balance structures existing within an already delicate system of natural processes and cycles.

In terms of the Amazon region, the following data is relevant:

- The Amazon River represents about 18% of all available fresh water on the planet;
- The mouth of the Amazon is so vast, that the island of Marajo, located at the river's exit to the ocean, is roughly the size of Switzerland;
- The muddy waters of the Amazon River produce a visible trail penetrating hundreds of miles into the Atlantic Ocean;
- Hundreds of millions of years ago, there was a single "protocontinent" known as Pangaea, which covered half of the Earth. During the Triassic Age, Pangaea divided into two continents: the northern part known as Laurasia and the southern part as Gondwana. About 90 million years ago, Gondwana split creating the continents of Africa, South America, Australia and Antarctica. This occurrence created the Indian peninsula and forced the South American mass to slide westward, reaching the Nazca plate. The collision between the two tectonic plates



pushed the western coast of South America on top of the Nazca plate, forming the Andes Mountains.

Consequently, the newly formed mountain ridge extending from the southern tip of Chile to the northern tip of Colombia dramatically changed the weather pattern and the river system of South America.

Before the advent of the Andes, the Amazon River used to flow into the Pacific Ocean and there was no connection with the Atlantic. Following the rise of the Andes, the water route to the Pacific was blocked and during millions of years, the Amazon River became an inland sea, covering the center of the continent. Finally, during the Pleistocene Age, rising waters broke through the eastern barrier overflowing into the Atlantic, creating the largest river system of our planet. As a result, the soil of the former inland sea became a huge basin of sediments, compounded of rich and fertile plains supporting an incredible abundance of unique fauna and flora.

The project area of ASPERAM AD ASTRA lies exactly in the heart of South America; a region full of natural riches.

Another point that brings great visibility and appeal to project ASPERAM AD ASTRA is the fact that a part of the project site accompanies the Roosevelt River, also known as the River of Doubt.

In 1913, Brazil's population lived practically entirely on the coastline regions. Communication with the inland hardly existed. Before leaving Brazil for exile in Paris, Pedro II (Emperor of Brazil) ordered his army to the arduous and monumental task of linking the Brazilian coastal region to the inhospitable inlands, through the telegraph.

The commanding officer of the Strategic Committee of the Brazilian Telegraph was Coronel Candido Mariano da Silva Rondon. While performing his function in 1909 he discovered a strange river full of twists and turns. On that occasion, having only a fraction of the troops he started out with due to the difficulties of the forest, he could no longer proceed with exploring the rivers' course and all he could do was to baptize her as the "River of Doubt".

Sometime thereafter (1913), in North America, former President Theodore Roosevelt embittered by his election defeat, as was customary, decided to pursue a challenge to quell his sorrows. In a conversation with Lauro Muller, Foreign Minister of Brazil at the time, Roosevelt became intrigued with the possibility of exploring an unknown river, recently detected. Given the enthusiasm shown by the former US president and his sense of responsibility, Müller imposed that the guide would be none other than Candido Rondon.

The "Roosevelt-Rondon Scientific Expedition" was -according to experts- the most difficult and dangerous expedition ever to occur in South America and it was motivated both by Rondon's greatest ambition to include the River of Doubt on the world map and Roosevelt's immense desire for utmost challenge.

Commencing by navigating the Paraguay River, it took two months before the expedition



reached Tapirapua. From there, they traveled another 650km through the central highlands on mules, until they reached the headwaters of the River of Doubt.

Rondon believed that the River of Doubt flowed into the Madeira River. Based on this assumption, he sent a group of men beforehand to ascend the Madeira River to the point where he believed the expedition would eventually arrive. This site was the confluence of two tributaries of the Madeira River, one of which known as Aripuana. If Rondon was correct, after two to three months after starting the descent of the River of Doubt, the expedition would appear on the envisioned crossing, which would give the river the following factual status: firstly, its inclusion on the South American map spanning a distance of 1.600km, a river as long as the Rhine. Furthermore, it would mean that the men under the command of Roosevelt and Rondon had survived one of the most treacherous journeys through the Amazon. By proving that the difficult path lead to the stars, Rondon's forecast came true and in a noble gesture, he renamed the river as the Roosevelt River.

At the confluence of the Roosevelt and Aripuana Rivers, exactly where Rondon and Roosevelt triumphed, lays the ASPERAM AD ASTRA project site.

The main objective of ASPERAM AD ASTRA project is the monitored preservation of 222,991.88ha of Amazon rainforest area. The Amazon encompasses 6.9 million km², covering nine countries: Brazil, Bolivia, Colombia, Venezuela, Ecuador, Peru, Guyana, Suriname and French Guyana. From this total, 4.2 million km² or 61%, are in Brazil. The Amazon is home to half of all terrestrial species on the planet. The region has more than five thousand species of trees, in excess of three hundred kinds of mammals, over thirteen hundred types of birds and a countless number of insect species, reaching far over the millions. There are twenty-three thousand miles of inland waters, home to over three thousand species of fish.

Around 220,000 indigenous people live in the Brazilian Amazon, divided into one hundred and eighty ethnic groups. Besides the Brazilian indigenous population, the Amazon is home to around 20 million. Amongst them are the riparian people, maroons (African refugees that escaped slavery and formed independent settlements) and forest extractivists.

The Amazon possesses the largest watershed on the planet and has the capacity to influence the global climate. This information alone should be more than enough to ensure the monitored preservation of this corner of the Earth. Yet, the Amazon unfortunately remains abandoned to its own fate.

Between the date of the Portuguese discovery of Brazil and 1970, deforestation of the Amazon forest represented only 1%. Over the last 40 years, there has been a detected deforestation of 17%. Paired with deforestation is the exponential increase of water and air pollution in addition to unregulated hunting/poaching/fishing/mining etc.

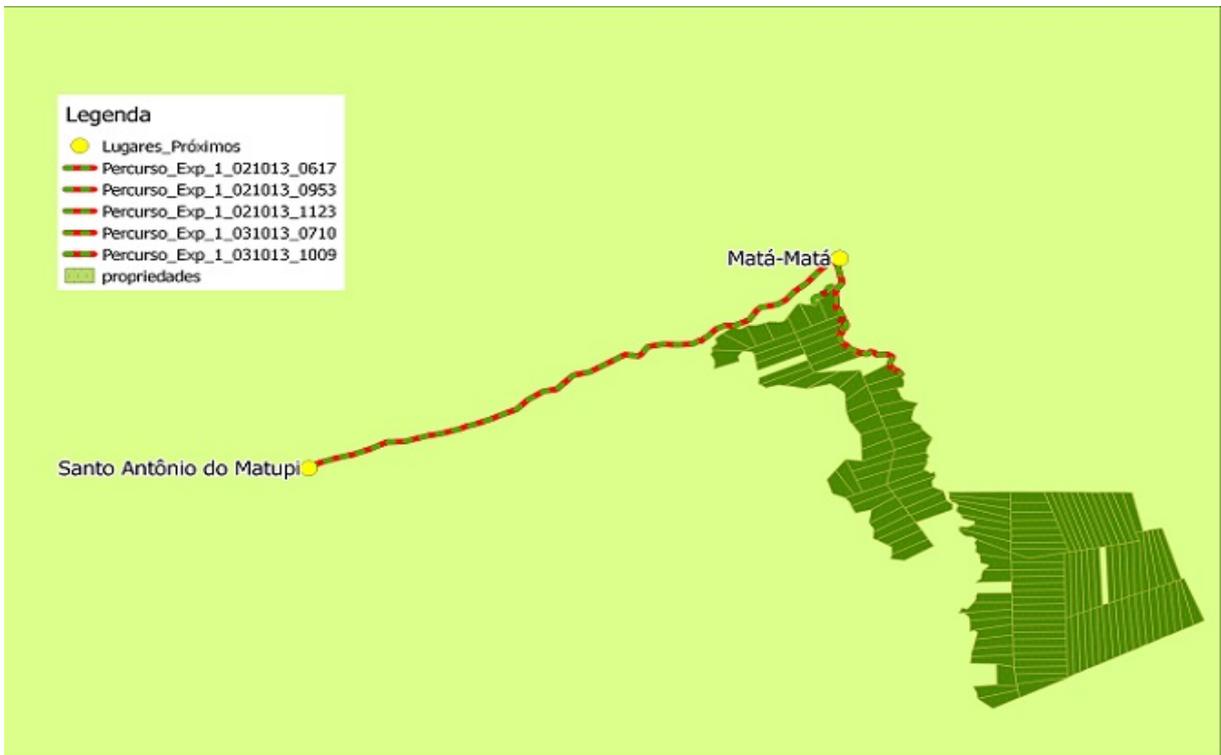
To ensure the accuracy of the data presented in this PDD, an expedition was organized to the ASPERAM AD ASTRA project site, the results of which are demonstrated throughout this document.



The first expedition to the ASPERAM AD ASTRA project site took place between September 30 and October 4, 2014. All negative emissions related to the expedition were accounted for and will become deducted from the ecological credits generated by the project. Any action related to the implementation of ASPERAM AD ASTRA shall be described in a DATABOOK which, once completed, will have the original, as well as the electronic version available to the public.

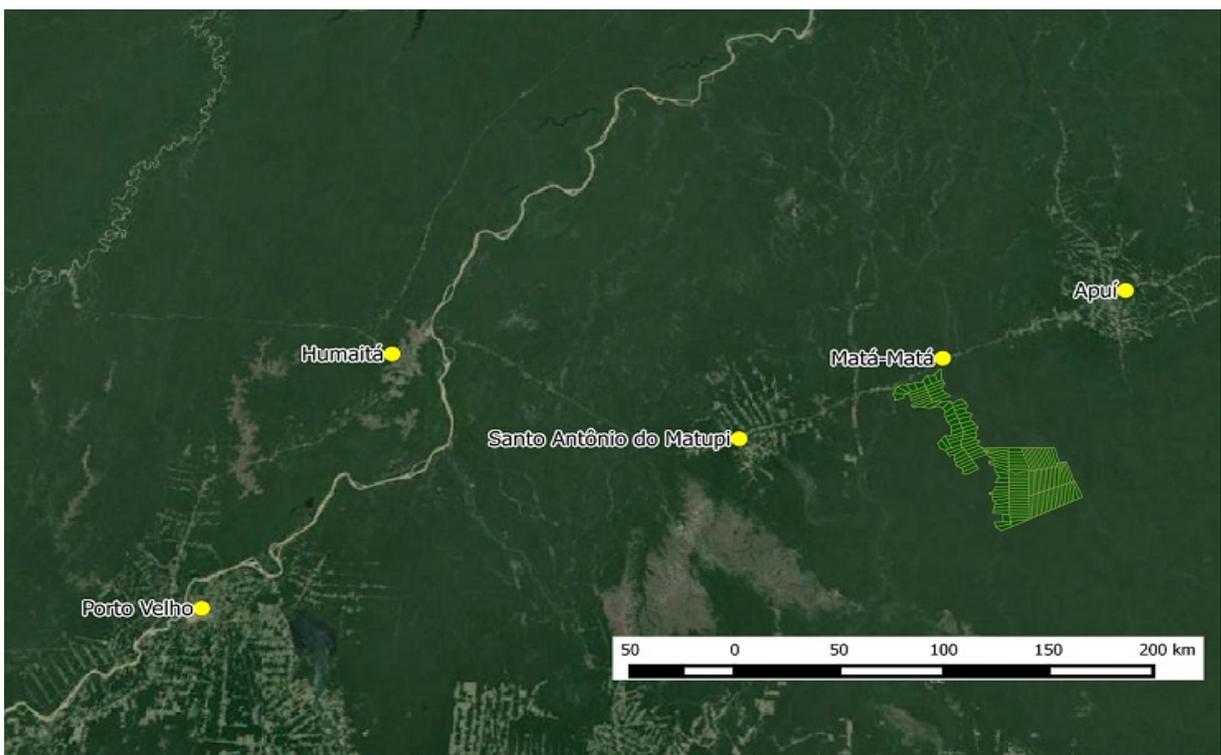
The objectives of the first expedition were the collecting of soil and water samples; determination of CO₂ levels, CH₄, luminosity (light incidence) and temperatures (air and water) at defined perimeters within the project site. The first expedition also aimed to assess the extent of anthropic activities within the region, with special emphasis on deforestation, as detailed in this PDD. The project site is virtually an intact portion of the Amazon biome and there is hard evidence of serious threatening human activity around the perimeter. A third goal of the expedition was to initially assess and establish the different points of the observation system which will permit the most effective monitoring plan for ASPERAM AD ASTRA.

Below is the route traveled by the first expedition to ASPERAM AD ASTRA:



Location of Project Activity

The total area of the project is 221,991 hectares. Please view map for location:



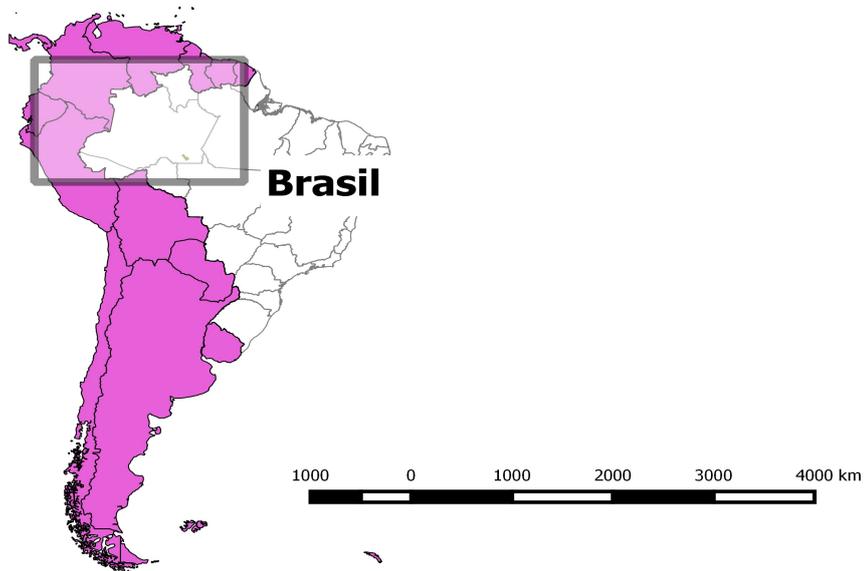


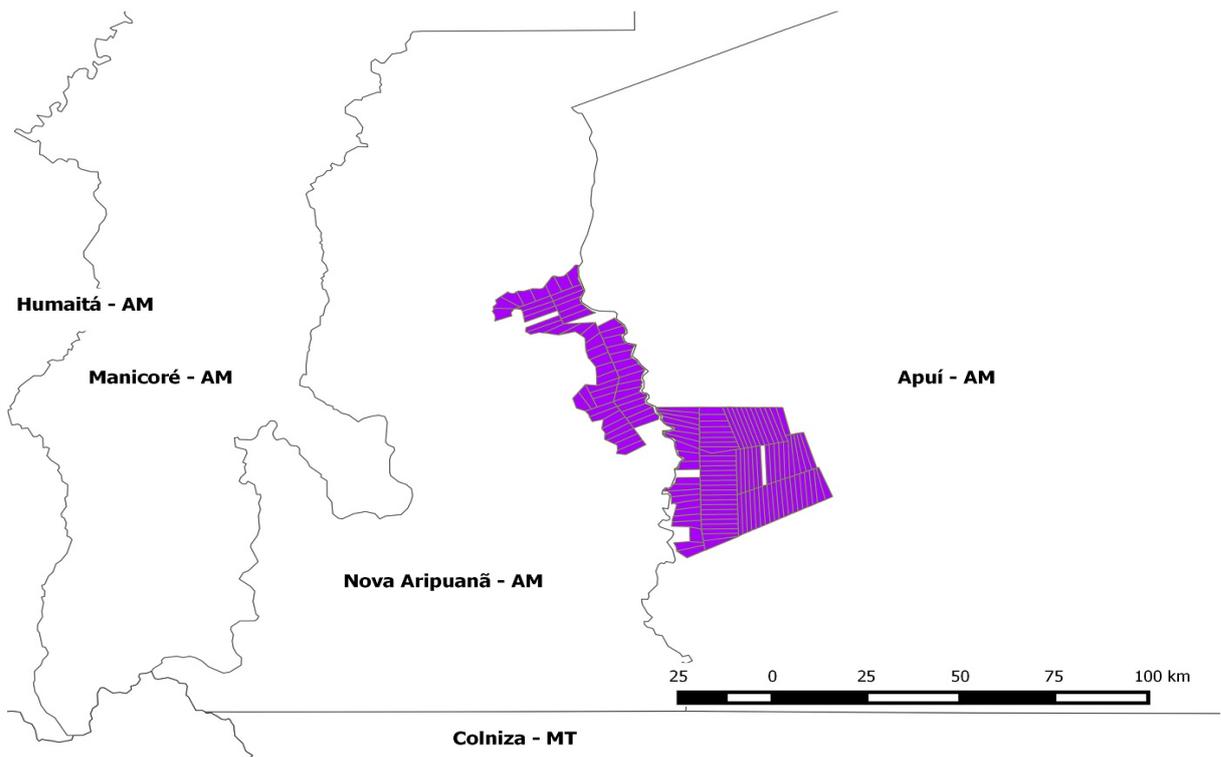
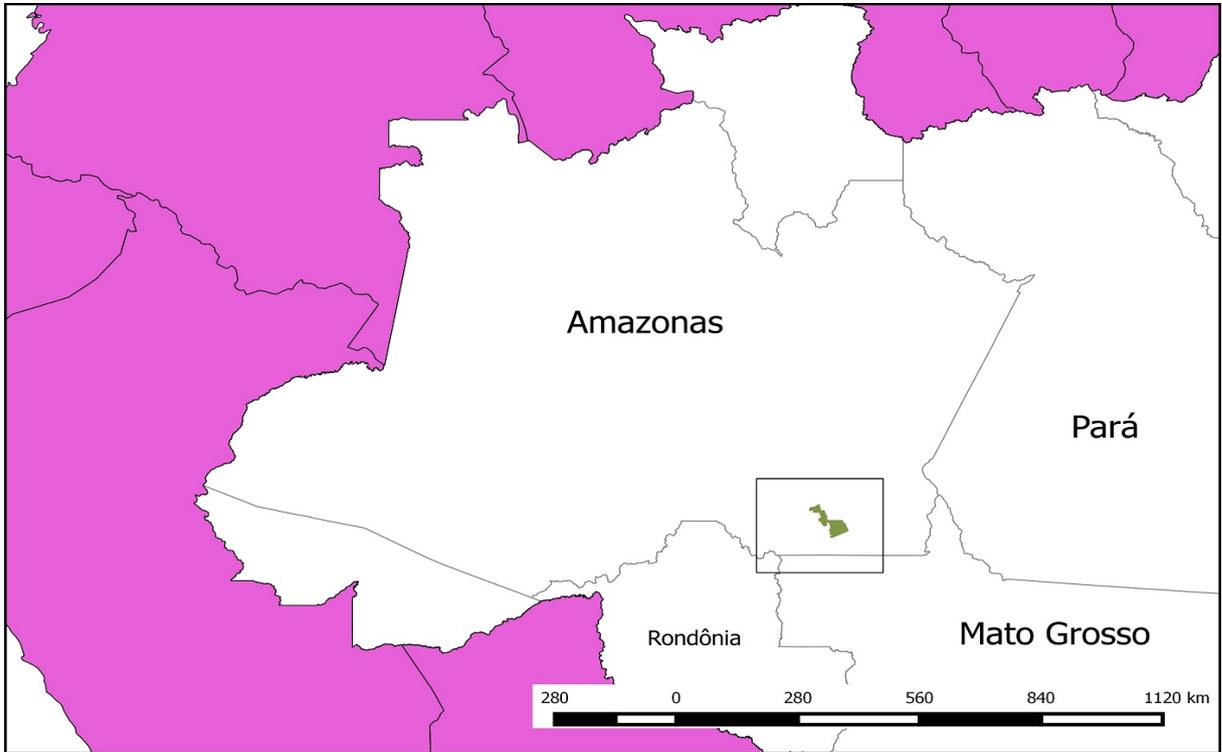
Complete Address

Street	Rua Antonieta Ataide
Number	1446
City	Humaita
State	Amazonas
Country	Brazil
Zip Code	69800-000
Telephone	+55 69 3521-1431

Geographical Location of PA

Area of project relative to host country







Geographical Boundaries of PA

The project site can be identified within the Brazilian Institute of Agrarian Reform and Colonization (INCRA), under the following references:

- (1) Federal Plots *Glebas Federais* gid 420, under the name Guariba;
- (2) Federal Plots *Glebas Federais* gid 424, under the name Sucuriju;
- (3) Federal Plots *Glebas Federais* gid 423, under the name Monte Cristo;

Environmental Conditions of PA

Despite the fact that the project area is virtually an untouched zone of nature, there are serious visible threats. Human activity detected at the project site during the expedition, suggests potential rapid deterioration of the forest in case an effective monitoring plan does not prosper.

Objective evidence observed at longitude 7036.443'S and latitude 60042.964'O, establishes an illegal logging operation, as shown in the photos below:

Photos 1 and 2



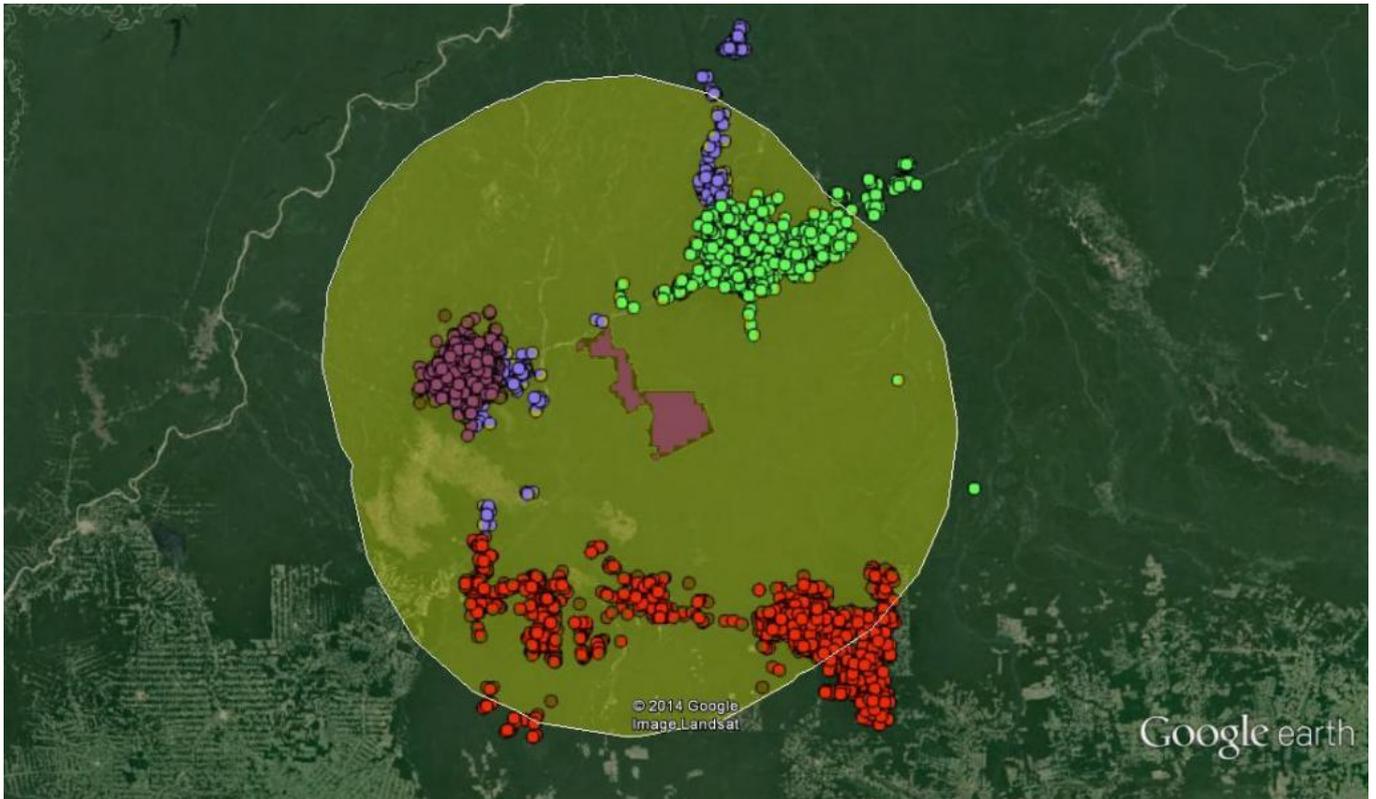
According to woodsmen accompanying the expedition, fifteen minutes would be enough to cause the damage observed at the location. The overthrown area covers approximately 500m². Photo number 3 highlights the illegality of the action: the emblem is a phony permission of logging. The fourth photo evidences complete disregard for any procedure or respect towards nature.

Photos 3 and 4





The following map illustrates the current situation regarding deforestation surrounding the project site.



Source: INPE DETER (Brazilian Agency for Spatial Studies) - Detection of deforestation in real time within a radius of approx. 170km from the ASPERAM AD ASTRA project site.

The ASPERAM AD ASTRA project site is located in the tropical monsoon climate zone (Koppen climate classification and Geiger). During a large proportion of the year there is significant rainfall. The average annual temperature in the region is 26.6 C. The average annual rainfall is 2550mm.

HIDROLOGY According to the Brazilian Water Agency (ANA) and the Geological Survey of Brazil (CPRM), data collected at the Humaita monitoring station, located by the Madeira Basin, on 15/12/2014 the level of the Madeira River was 21cm above the December/2013 level.

Dados climatológicos (SIPAM)

Anomalia e Acumulado de Precipitação

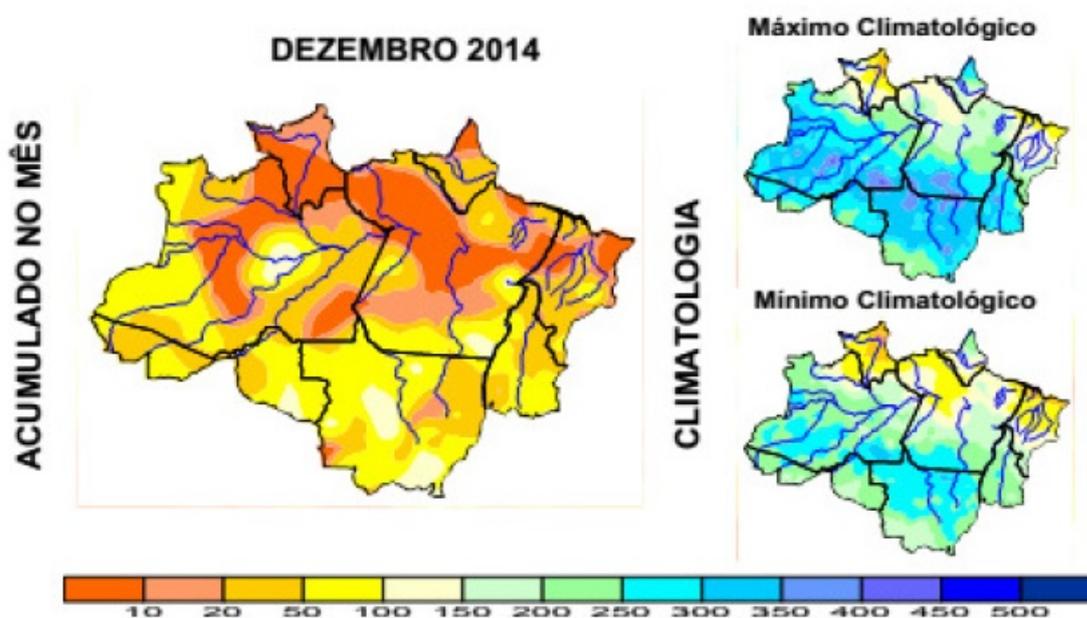
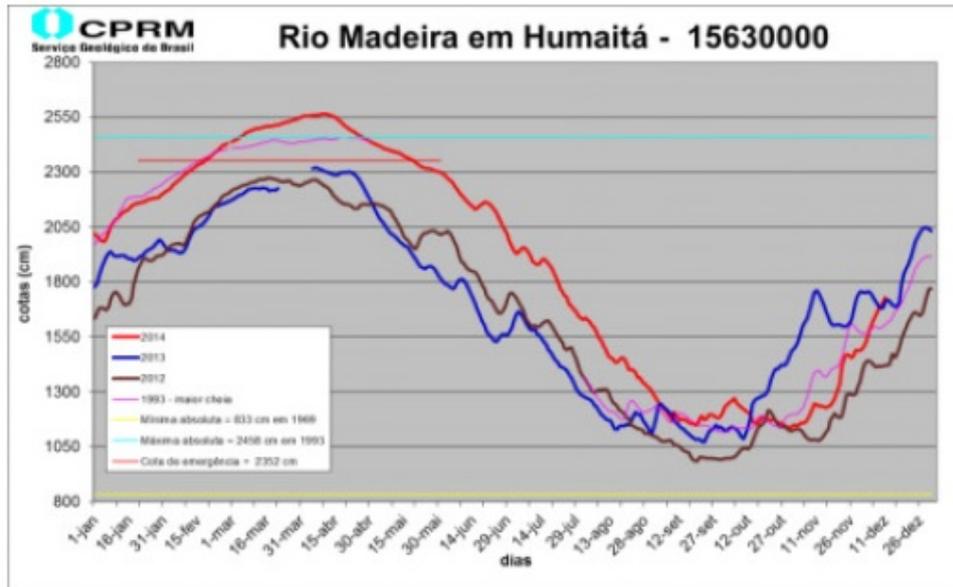


Figura 02 (a, b, c) – Precipitação acumulada para 09 dias do mês de dezembro na Amazônia Legal.

Fonte: <http://www.cpc.ncep.noaa.gov> (dados processados na DivMet –MN)

The Amazon region precipitation climatology shows maximum rainfall values during the months of December in the northwestern, central and southern part of the states of Amazonas and Roraima. This pattern recurs due to a major weather system located in the extreme northern part of the region, the ITCZ (Intertropical Convergence Zone). The map shows a gradual increase in rainfall from the northwest towards the central and southeastern parts of the Amazonian region. The image shows accumulated precipitation during 9 days of December 2014 for the region known as Amazonia Legal (which comprises the Brazilian states of Amazonas, Para, Acre, Roraima, Amapa, Rondonia, Mato Grosso, Tocantins and a part of Maranhao), with values ranging between 50 and 150 mm. Lesser values of rainfall (Figure 2b and 2c) were observed in the northern and northeastern part of the Amazonia Legal, where they range below 10mm.

Bacia do Rio Madeira



Cota em 11/12/2014: 17,30 m

According to the Center for Ocean Land Atmosphere Studies - COLA the prognosis for precipitation during the period, between December 11 and December 19, indicated precipitation for the whole region, with larger accumulations in the eastern and southern sections of the Amazonia Legal. This occurrence is probably due to the passage of two frontal systems between the southern and southeastern regions of Brazil, occasioning a South Atlantic Convergence Zone (SACZ), which is responsible for assisting in the formation of nebulosity and precipitation in the region.

During the period between December 19 and December 27, the prognosis of COLA indicated the possibility of a Humidity Convergence Zone, generating possible precipitation over the southeastern sections of the Amazonia Legal.

SOIL - The layer of the Earth's surface essential for plant life is sensitive to the action of rain, wind and heat which may culminate in erosion. Deforestation also damages the soil, removing its natural protection. The main soil types found at the project site are:

- (1) Sandy - Composed of grains of sand, suitable for the preparation of cement, is found next to rivers and streams.
- (2) Clay - Used for manufacture of bricks, tiles, water filters, construction of houses, walls, dams etc. Mixed with limestone, its use is beneficial for agriculture. The clay is found almost throughout the entire project region.
- (3) Humus - Decomposition of dead plant and animal material causing complex organic



oxidized compounds. Found in great quantities below the forests' surface.

(4) Alluvial - Madeira River-borne debris that accumulated on its banks, serving for the subsistence of short-cycle farming and riparian subsistence until the next cycle of floods.



Technologies and/or Measures

The intensive observation of the ASPERAM AD ASTRA project site will occur according to the monitoring plan, incorporated in this PDD. Video cameras will be strategically positioned at access points along the Roosevelt and Aripuanã Rivers, allowing control over any activity that may occur in the area. The riparian people living on the project site will have the opportunity to work on the project activity, receiving a monthly salary. Activities to be performed by those employees and/or new hires, will range from maintenance of video cameras to patrolling of the area. In case any illegal activity is observed, project members will be instructed to leave the detected area, ensuring the safety of their physical integrity and trigger the appropriate security and environmental protection channels within the Brazilian public service.

Eligibility of the Land

According to methodology ZNP0001, paragraph 2.2 (a): In case of a ZERO2NATURE-PREFOR project activity, the project area may include different types of forests, provided they meet the following criteria: 'area measuring more than 0.5 hectare with trees higher than 5m and a crown coverage larger than 10%, or trees with potential to achieve these parameters in situ, excluding land that is predominantly under agricultural or urban use.' Moreover, the ZERO2NATURE standard states that a PREFOR project activity is eligible for areas classified as a forest for a minimum period of 10 years.

As attested by various maps of the project location included in this PDD:

- a) The project area is 222,991.88 ha;
- b) The vegetation of the project area is typical of the Amazon forest, with trees higher than 5m and over 20% crown coverage;
- c) There is no agriculture or urbanization at the project site;
- d) The project site is composed of almost intact Amazonian biome.

Considering all the requirements of the ZERO2NATURE Standard and the 'Procedures to demonstrate the eligibility of lands for ZERO2NATURE-PREFOR/PREBIO project activities', the ASPERAM AD ASTRA project site is eligible as a ZERO2NATURE monitored preservation project activity.

Reference of Methodology

The 'Methodology for developing ZERO2NATURE projects to reduce negative emissions through afforestation, reforestation, changes in land use or monitored conservation of forest-ZERO2NATURE-PREFOR' was employed in this project. As required by the methodology, the following tools, guidelines, references and documents were also used:

- (a) Tool to identify the baseline scenario and demonstration of additionality in the ZERO2NATURE-PREFOR project activities;
- (b) ZERO2NATURE Glossary of terms;
- (c) ZERO2NATURE Standard;



- (d) Harvard Atmospheric Chemistry Modeling Group - www.acmg.seas.harvard.edu;
- (e) IPCC Guidelines for LULUCF, 2003;
- (f) Procedures to demonstrate the eligibility of lands for ZERO2NATURE-PREFOR project activities;
- (g) Tool for estimation of carbon stocks and change in carbon stocks in trees and shrubs in the ZERO2NATURE-PREFOR project activities.

Applicability of Methodology

The proposed ZERO2NATURE-PREFOR project activity meets the requirements of the chosen methodology for the following reasons:

- a) The PDD is generated through the ZERO2NATURE project design platform;
- b) The proposed ZERO2NATURE-PREFOR project activity adopts both foreseen and unforeseen deforestation in the baseline scenario;
- c) The proposed ZERO2NATURE-PREFOR project activity will not alter more than 10% of the contemplated baseline scenario;
- d) The area where the proposed ZERO2NATURE-PREFOR project activity will be implemented is not a swamp.



Sinks and Negative Emission Sources

Emission Sinks	Yes or No	Rationale
Above soil carbon sink	yes	Primary source of carbon reservoir object of the ZERO2NATURE-PREFOR ASPERAM AD ASTRA project activity.
Below soil carbon sink	yes	Primary source of carbon reservoir object of the ZERO2NATURE-PREFOR ASPERAM AD ASTRA project activity.
Dead wood	no	The ZERO2NATURE-PREFOR ASPERAM AD ASTRA project activity does not include changes related to dead wood.
Waste material	no	The ZERO2NATURE-PREFOR ASPERAM AD ASTRA project activity does not include changes related to waste material.
Organic carbon on soil	no	The ZERO2NATURE-PREFOR ASPERAM AD ASTRA project activity does not address changes related to the organic carbon stored in the soil.



Strata Identification

According to item 5.3 of the adopted and applied methodology, the soil types of the ZERO2NATURE-PREBIO project site, are highlighted in the table below:

SOILS FROM AMAZON		
CLASS OF SOILS	AREA (km ²)	%
Latosoil	2.103.440	41,05
Argisil	1.687.880	32,94
Plinthosil	376.260	7,34
Gleysoil	314.450	6,14
Quartzarenic Neosil	246.540	4,81
Lithic Neosil	133.150	2,6
Spodosil	99.950	1,95
C. Lateritic	74.480	1,45
Cambisil	40.250	0,79
Nitosil	23.900	0,47
Other soils	23.380	0,46
Total	5.123.680	100

Source: Embrapa

According to EMBRAPA, a technology development agency subordinated to the Brazilian Ministry of Agriculture, the following aquatic strata can be observed in the Amazon region:

- (1) White waters - pH 6.5 to 7 and transparency 0.10 to 0.50 m.
- (2) Black waters - pH 3 to 5 and transparency 1.30 to 2.90 m.
- (3) Clear waters - pH 4.5 to 7 and transparency 1.10 to 4.5 m.

During the first expedition to the ASPERAM AD ASTRA project site, water samples were collected from the Roosevelt and Aripuana Rivers. The results are consistent with the EMBRAPA definitions for Black waters and Clear waters, as expressed in the table below:

ASPERAM AD ASTRA WATERS								
Area coordinates	Suspended Solids	Air Temp.	Water Temp.	Conductivity	Hydrogenionic Potential	Dissolved Oxygen	Dissolved Oxygen Saturation	Number of Samples
	mg.L ⁻¹	°C	°C	µS.cm ⁻¹	pH	mg.L ⁻¹	%	n
Igarapé Santa Cruz 7°44'55"7S/60°34'25"20	298	35.5	31.5	83.4	6.8	7.0	99.0	1
Igarapé do Cemitério 7°35'30"2S/60°41'93"20	30	28.1	25.7	7.1	5.2	3.6	64.0	1
Roosevelt River 7°35'39"8S/60°42'22"00	8	29.3	25.1	100.3	5.0	3.7	44.0	1
Igarapé da Sereia 7°36'44"1S/60°42'96"30	10	31.0	28.4	19.0	4.8	5.5	79.0	1



The results of the soil samples collected during the first expedition to the ASPERAM AD ASTRA project site are listed in the table below:

ASPERAM AD ASTRA SOIL								
Area coordinates	Hydrogenionic Potential	Air Temp.	Soil Temp.	Organic Matter	CH ₄	CO ₂	Organic Carbon	Humidity
	pH	°C	°C	g/kg	ppb	ppm	g/kg	%
7035'30"2S 60041'93"2O	5.8	28.3	30.2	45.6	1,740	377	26.5	67.2
7035'30"3S 60041'93"2O	5.7	33.2	30.0	44.9	1,740	377	25.8	48.2
7043'74"2S 60035'31"1O	6.1	30.5	25.4	45.2	1,741	380	25.6	80.4
7043'74"2S 60035'31"8O	6.1	30.5	25.2	45.0	1,741	380	25.5	80.4
7038'41"3S 60040'21"1O	5.8	26.9	25.7	44.7	1,741	378	26.1	85.2
7038'41"4S 60040'20"7O	6.0	26.9	25.9	44.8	1,741	378	26.3	85.2

Adopted methodology for the collection of data during the first expedition to the ASPERAM AD ASTRA project site

According to the following graphs, three data collection perimeters were determined for the complete surveyal of plant species. In every demarcated area, two soil samples were collected. For better precision purposes, the samples were gathered in new PVC tubes, with a diameter of 2 inches and a width of 0.60m, being closed on both ends by fitting caps.

The water samples were collected in the direction of the water flux, at approximately 0.20m from the surface. Temperatures of the soil and water were measured by a rod thermometer (Minipa MV-361) with a 1/10 degrees quartz precision. The levels of CO₂, CH₄, humidity and air temperature were measured with the Futurlec MG811, Futurlec MQ135 and SHT15 (hum. and temp.) sensors respectively.

Campsite between October 2 and 4, 2013



Coordinates of campsite: 7 39'17'8S and 60 39'88'40

Area I - Start of data collection on October 3, 2013 at 11:04AM



7 43'74'2S and 60 35'32'00

Perimeter: 65.97m



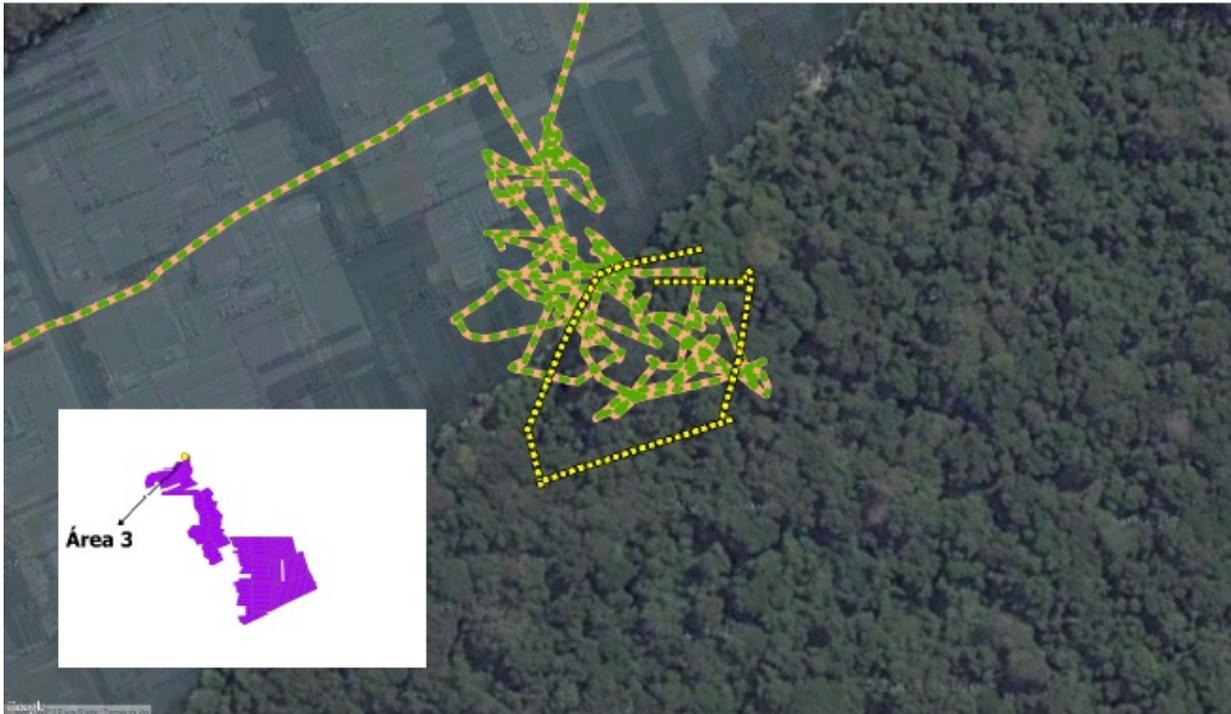
Area II - Start of data collection on October 3, 2013 at 4:59PM



7 38'40'9S and 60 40'20'20

Perimeter: 84.67m

Area III - Start of data collection on October 4, 2013 at 9:12AM



7 38'41'3S and 60 40'21'10

Perimeter: 88.78m

Establishment of Baseline Scenario

As a requirement of the applied methodology, the setting of the most plausible baseline was determined using the 'Tool to identify the baseline scenario and demonstration of additionality in ZERO2NATURE-PREFOR project activities'.

In accordance with item 7 of the 'Tool to identify the baseline scenario and demonstration of additionality in ZERO2NATURE-PREFOR project activities ', there are three steps to follow:

Step 1: Preliminary triage based on the beginning of the activities that resulted in the proposed ZERO2NATURE-PREFOR project activity, showing that the sale of 02NCs (Zero2Nature Eco-credits) was of fundamental importance in the realization and implementation of the project.

Consistency: According to the attached documentation, the Association of Extractivist Producers of the Amazon Region (ASPERAM) has 149 members and although the acquisition of land and the idea of transforming the area into a preservation sanctuary for the Amazon biome happened over 6 years ago, due to a restricted budget, it only recently became possible to amass sufficient amounts to fund the first expedition to the ASPERAM AD ASTRA project site and meet the requirements of the ZERO2NATURE Standard.

With the contribution of a small monthly stipend, collected from each member, ASPERAM has been able to fund the ASPERAM AD ASTRA ZERO2NATURE-PREFOR project activity until



registration and implementation of the first phase of the monitoring plan. However, the continuation of the monitoring plan, from the second year onwards, depends entirely on the sales of 02NCs.

Step 2: Identification of alternative scenarios to the one that should occur with the ZERO2NATURE-PREFOR proposed project activity, in detailed and credible manner, through objective evidence.

Consistency: Without implementation of the ASPERAM AD ASTRA project activity, there are four possible identified baseline scenarios in the region:

(i) Legal deforestation of 20% of the area where the project activity will be implemented, according to Brazilian Law number 12,651 signed in May 25, 2012;

(ii) Illegal deforestation, according to item 6 (b) of the 'Tool for estimation of carbon stocks and change in carbon stocks in trees and shrubs in ZERO2NATURE-PREFOR project activities' may be the average deforestation rate observed in the region, over a period of ten years prior to the start of the project activity, beyond the 20% deforestation permitted by law;

(iii) Forest management or

(iv) A combination of scenarios (i) and (ii) above.

Analysis of the proposed alternative scenarios

(i) According to Brazilian law, the owner of the land in the Amazon region has the right to deforest 20% of his/her property. Considering the quality of wood in the region, market prices and available finance, the removal of 20% of the forest is quite an attractive possibility and therefore a credible baseline scenario.

Investment in the exploration of timber revolves around US\$18/ha, or about US\$ 0.50/m², while the selling price of wood, in an absolutely conservative estimate revolves around US\$160/ha. For this reason, it is realistic to assume a 2% per annum deforestation rate in the project area during a ten-year period. In such a case, the area chosen for the project site would incur a legal deficit of 35,000.00ha. In an ultra-conservative approach, this scenario represents nearly US\$5.000,000 immediate earnings in favor of the project proponent.

(ii) Illegal deforestation in the Amazon is a reality, as pointed out in section 'Goals and Description of Project Activity' of this project design document. In accordance with item 13 (b) of the 'Tool for estimation of carbon stocks and change in carbon stocks in trees and shrubs in ZERO2NATURE-PREFOR project activities', official data related to the deforestation rate of the region is presented below.

Relationship between the total forest area and deforestation within the confines of municipalities that border or contain the ASPERAM AD ASTRA project site:



Municipality of Manicoré - State of Amazonas

Total Area 4.869.140,64 hectares

Year	Deforested Area (hectares)	Deforestation Rate(%)	Relative to previous year (%)
2004	3546,74500	0,08	
2005	3607,33300	0,08	1,71
2006	5357,71900	0,12	48,52
2007	1926,06400	0,04	64,05
2008	3434,14100	0,08	78,30
2009	1677,60000	0,04	-51,15
2010	3785,46500	0,08	125,65
2011	2473,11900	0,06	-34,67
2012	4409,96400	0,10	78,32
2013	4001,25800	0,09	-9,27
Average		0,08	19,26

Municipality of Novo Aripuanã - State of Amazonas

Total Area 4.145.146,53 hectares

Year	Deforested Area (hectares)	Deforestation Rate(%)	Relative to previous year (%)
2004	4016,24220	0,11	
2005	4130,53342	0,10	-6,67
2006	3991,22974	0,05	-47,80
2007	3954,05177	0,08	52,09
2008	4086,12718	0,13	67,99
2009	4331,77433	0,03	-81,02
2010	3827,81581	0,04	62,84
2011	4029,49445	0,01	-71,94
2012	4030,27770	0,03	125,39
2013	4002,13326	0,07	177,44
Average		0,06	30,92

Municipality of Colniza - State of Mato Grosso

Total Area 2.812.263,94 hectares

Year	Deforested Area (hectares)	Deforestation Rate(%)	Relative to previous year (%)
2004	757,37367	8,14	
2005	175,82923	1,85	-76,78
2006	125,29756	1,30	-28,74
2007	112,09989	1,15	-10,53
2008	75,55292	0,77	.32,60
2009	26,15073	0,27	-65,39
2010	37,17806	0,38	42,17
2011	33,17461	0,34	-10,77
2012	70,22470	0,70	111,68
2013	26,72206	0,27	-61,95
Average		1,52	-14,77



Municipality of Apuí - State of Amazonas			
Total Area 5,448,337.77 hectares			
Year	Deforested Area (hectares)	Deforestation Rate(%)	Relative to previous year (%)
2004	17605,02600	0,35	
2005	7107,14200	0,14	-59,63
2006	8001,84800	0,16	12,59
2007	3752,11700	0,08	-53,11
2008	4191,97900	0,08	11,72
2009	4970,01900	0,10	18,56
2010	3321,72300	0,07	-33,16
2011	4247,29100	0,09	27,86
2012	3280,55600	0,07	-22,76
2013	2912,91100	0,06	-11,21
Average		0,12	-12,13

The calculation of ecological credits generated with respect to the preservation of 222,991.88ha, resulting from the ASPERAM AD ASTRA project activities, according to the ZNP0001 methodology, considers the average annual deforestation rate of the bordering or containing municipalities of Novo Aripuanã, Apuí, Manicoré and Colniza, over a period of 10 years, prior to the start of the project activity. The result of the mathematical average of deforestation, within these 4 municipalities, over the established period is 0.4445% per year.

(iii) Forest management is presented here as a possible but remote alternative baseline scenario. Forest management is a silvicultural system and depends on knowledge, action of competent professionals and ethics. Unfortunately, few people/companies, who live off Amazonian forest resources, are able to fulfill the above-mentioned criteria. Ethical and properly planned forest management improves the quality of the flora, since the increase in luminosity allows a better development for many tree sorts. Since methodology ZNP0001 and the 'Tool to perform forest management within the ZERO2NATURE Standard' allows forest management, this alternative scenario analysis contemplates forest management related values.

The cost of eco-sustainable logging in the Amazon rainforest is around US\$72/ha, or between \$1.75 to 2.15/m² considering a normal exploration volume between 35 to 40 m²/ha. Over 90% of these costs relate to the mapping of trees, vine cutting, planning of logging operations and timber displacement. The sales price of wood is around US\$ 6.00/m³. Forest management brings long-term benefits while improving the life of the remaining trees. In addition, greater accumulation of wood in managed areas is an economical benefit to the landowner. Studies show that the available volume for a second selective harvesting of wood would be 68% higher than in an unmanaged forest. Over a 30 years cutting cycle, the NPV of two crops of managed wood would be between 38 to 45% higher than in an unmanaged operation. This scenario represents around US\$1.5MM to US\$2MM in earnings in favor of the project proponent.

(iv) The most likely alternative baseline scenario to the one proposed by the ASPERAM AD ASTRA project activity is a combination of legal and illegal deforestation. As is known, the



Brazilian Amazon has 5,500,000km². In addition to the typical difficulties of accessing a jungle, the Amazon region is characterized by vast distances without any type of adequate infra-structure, low social income, ignorance and fierce corruption. The Brazilian culture of immediacy is also an important component in the equation. The idea that a project can last over forty years and reward yearly upon measured preservation, is new for the most part of Brazilians. In most cases, the difficulty in obtaining knowledge about eco-credit generation, capital requirement and the implementation of a project according to strict rules, are all strong reasons for the unaware to deforest 20% of their land and eventually much more, since the mathematical expectation of a fine is largely favorable to offenders in remote regions of the Amazon. Therefore, the ASPERAM AD ASTRA project site can conservatively expect a forest depletion rate in excess of 2.5% per annum.

Step 3 - Considering the presented baseline scenarios and the proposed monitoring plan, the ASPERAM AD ASTRA project activity breaks the following barriers:

(a) Economic - The monitored preservation of the area in which the ASPERAM AD ASTRA project activity will be implemented requires significant monitoring equipment and manpower investment as can be attested in the monitoring plan;

(b) Institutional - Brazilian law is poorly enforced in the region. The ASPERAM AD ASTRA project activity will carry out measures much beyond those enforced by the country's mechanisms and in addition remain far below the permitted deforestation rate of 20%;

(c) Local Tradition - Unplanned deforestation is a common business practice in the Amazon region. ASPERAM AD ASTRA project activity proposes to train and prepare the ASPERAM associates and members of the local community, opening them to new perspectives and attitudes related to the forest, transforming them into citizens aware of the importance of the Amazon to the world, eventually curbing the practice of illegal forest activities in the region;

(d) Social - Although the region is immensely rich, the general population living in and from the Amazon rainforest lives in extreme poverty. By hiring local labor to carry out various tasks related to the ASPERAM AD ASTRA project activities, social barriers are broken.

Demonstration of Additionality

Brazilian Law number 12,651 of May 25, 2012 allows the deforestation of 20% of a property located in the Amazon. The ZERO2NATURE-PREFOR ASPERAM AD ASTRA project activity site will be fully preserved, with forest management occurring in 10% of the total project area. As previously demonstrated, the most likely alternative base line scenario to that proposed by the ASPERAM AD ASTRA project activity would be a combination of legal and illegal deforestation. From the original 222,991.81ha, the ASPERAM AD ASTRA project activity will avoid 36,288ha of deforestation, which equates to the sequestration of 14,740,380tCO₂e. Furthermore, as stated in the section 'Establishment of Baseline Scenario' of this PDD, the project activity breaks barriers related to economic, institutional, local tradition and social aspects. Moreover, from an economic perspective, monitored preservation only brings some



financial compensation in the form of ecological credits. In view of the above, it is concluded that the project is additional.

Sink Removal Method

The negative emissions of the ZERO2NATURE-PREFOR ASPERAM AD ASTRA, refer only to carbon sequestration through the conservation of a monitored area of 222,991.88ha. Investments in the monitoring system will prevent the deforestation of 36,288.00ha and as a result will avoid the emission of 14,740,380tCO₂e.



Fixed Ex-Ante Data and Parameters

Data or Parameter.	Baseline deforestation rate
Measuring Unit	% year
Description	The rate of deforestation refers to the arithmetic mean of the annual deforestation rates, for the last 10 years, of the surrounding and containing municipalities of the ZERO2NATURE-PREFOR project activity.
Data Source	Instituto Nacional de Pesquisas Espaciais (INPE) or Brazilian Agency for Spatial Research
Applied Value	0,4445
Choice of Data or Measurement, Method and Procedure	The data represents the reality of deforestation in the Amazon region, from an official and recognized source.
Purpose of Data	Establishment of the deforestation rate to be applied in the emission reduction calculation of the project activity.
Comments	



Data or Parameter.	Average weight of the living biomass (green biomass) of the Amazon
Measuring Unit	ton/ha
Description	The data represents the average weight of the living and green biomass of the Amazon, in dry state, above and below the ground, 50% of which refers to sequestered carbon
Data Source	Instituto Nacional de Pesquisas da Amazônia (INPE) or the Brazilian Agency for Research in the Amazon Region
Applied Value	247
Choice of Data or Measurement, Method and Procedure	The datum originates from INPE, one of the most renowned research institutions in Brazil
Purpose of Data	To establish the amount of sequestered carbon in living and green biomass related to the ASPERAM AD ASTRA project activity
Comments	



Data or Parameter.	Estimated rate of deforestation for the first ten years of the project
Measuring Unit	%/year
Description	The datum represents the rate of estimated deforestation due to the project activity and unforeseen events
Data Source	ASPERAM AD ASTRA project activity monitoring plan
Applied Value	0.005
Choice of Data or Measurement,	Safety margin
Purpose of Data	To maintain a conservative approach in view of possible deforestation even within a monitored condition
Comments	



Data or Parameter.	Estimated rate of deforestation for the last thirty years of the project
Measuring Unit	%/year
Description	The datum represents the rate of estimated deforestation due to the project activity and unforeseen events
Data Source	ASPERAM AD ASTRA project activity monitoring plan
Applied Value	0.0025
Choice of Data or Measurement,	Safety margin
Purpose of Data	To maintain a conservative approach in view of possible deforestation even within a monitored condition
Comments	



Data or Parameter.	Average carbon stock of intact forest above ground in project area
Measuring Unit	tCO ₂ e/ha
Description	Data represents the average carbon concentration found in an untouched forest type of the Amazon region.
Data Source	Instituto Nacional de Pesquisas da Amazônia - (INPA) or Brazilian Research Agency for the Amazon Region
Applied Value	412
Choice of Data or Measurement, Method and Procedure	The data originates from INPA, one of the most credible institutions of Brazil
Purpose of Data	To measure the amount of carbon stored in the area
Comments	



Data or Parameter.	Average carbon stock of intact forest below ground in project area
Measuring Unit	tCO2e/ha
Description	Data represents the average carbon concentration found in an untouched forest type of the Amazon region.
Data Source	Instituto Nacional de Pesquisas da Amazônia - (INPA) or Brazilian Research Agency for the Amazon Region
Applied Value	176.8
Choice of Data or Measurement, Method and Procedure	The data originates from INPA, one of the most credible institutions of Brazil
Purpose of Data	To measure the amount of carbon stored in the area
Comments	



Ex-Ante Calculation of Anthropogenic Emissions Reduction by Sinks

According to the adopted methodology, the net removal of anthropogenic emissions must be calculated using the following formula:

$$\Delta E_{RA_02NATURE,y} = \Delta E_{EFFECTIVE,y} - \Delta E_{BL,y} - LEAKAGE_y$$

Where:

$\Delta E_{AR_{02NATURE},y}$ = Net anthropic removals by sinks of negative emissions, in year y, in tEIP

$\Delta E_{EFFECTIVE,y}$ = Effective net removals through sinks, in year y, in tEIP

$\Delta E_{BL,y}$ = net removals baseline through sinks, in year y, in tEIP

$LEAKAGE_y$ = Negative emissions due to leakages, in year y, in tEIP



Summary of Ex-Ante Negative Emissions Removal by Sinks

Year	Estimation of baseline net GHG removals by sinks	Estimation of actual net GHG removals by sinks	Estimation of leakage	Estimation of net anthropogenic GHG removals by sinks
	tEIP	tEIP	tEIP	tEIP
1	0	466,002	6,232	459,770
2	0	463,929	6,205	457,724
3	0	461,864	6,177	455,687
4	0	459,809	6,150	453,659
5	0	457,762	6,122	451,640
6	0	455,725	6,095	449,630
7	0	453,697	6,068	447,629
8	0	451,678	6,041	445,637
9	0	449,668	6,014	443,654
10	0	447,667	5,987	441,680
11	0	445,937	5,964	439,973
12	0	443,954	5,938	438,016
13	0	441,979	5,911	436,068
14	0	440,013	5,885	434,128
15	0	438,056	5,859	432,197
16	0	436,108	5,833	430,272
17	0	434,168	5,807	428,361
18	0	432,237	5,781	426,456
19	0	430,315	5,755	424,559
20	0	428,401	5,730	422,671
21	0	426,495	5,704	420,791
22	0	424,598	5,679	418,919
23	0	422,710	5,654	417,056
24	0	420,830	5,629	415,201
25	0	418,958	5,603	413,354
26	0	417,093	5,579	411,515
27	0	415,239	5,554	409,685
28	0	413,392	5,529	407,863
29	0	411,553	5,504	406,049
30	0	409,723	5,480	404,243
31	0	407,900	5,456	402,444
32	0	406,086	5,431	400,654
33	0	404,279	5,407	398,872
34	0	402,481	5,383	397,098
35	0	400,691	5,359	395,332
36	0	398,908	5,335	393,573
37	0	397,135	5,312	391,823
38	0	395,368	5,288	390,080
39	0	393,610	5,265	388,345
40	0	391,858	5,241	386,617



Monitoring Plan

(a) The entire project, including geographic coordinates of the border area will be monitored with the use of georeferenced spatial data, supplemented with measurements made during annual expeditions (at least once per year) and GPS coordinates. All data collected will be recorded and archived, including a fully documented databook.

(b) Widely accepted principles will be used in the inventory and management of the project area, which are:

(i) Application of Standard Operating Procedures-SOPs and Quality Control/Quality Assurance-QA/QC for forest inventory, including collection of field data;

(ii) Related to the field SOPs, checks were conducted during the first expedition to the project site of ASPERAM AD ASTRA and the documented practice in this PDD was confirmed.

During the first year of the project activity, 3 Bushnell camera-traps (trail camera brand and model type Natureview CamHD Max) will be installed on the confluence of the River Aripuana and Roosevelt, where human presence is more constant; on the end of a trail originating at the Transamazonica Highway and around a natural salt deposit, which usually attracts hunters. The project activity members will be responsible for the maintenance of cameras and data collection. In order to become guardians of the project activity, members will undergo training where they will learn to operate necessary monitoring equipment and become fully instructed about guidelines in case of project area invasion.

The monitoring plan evolves according to the financial availability of the project proponent and will be updated on a monthly basis.



Data and Parameters to be Monitored

Data or Parameter.	Anthropic activity within the project site
Measuring Unit	Dimensionless
Description	Installed cameras and appointed project participants will monitor human presence within the project site
Data Source	Direct observation
Applied Value	n.a.
Choice of Data or Measurement,	On-site observation, data collection and maintenance of video cameras
Monitoring Frequency	The cameras will operate non-stop and in-situ monitoring and data collection will be conducted on a monthly basis
QA/QC Procedures	Workers employed by the ASPERAM AD ASTRA project activity will be trained and the presentation and content of the training will be attached to objective evidence available during the checks/certifications
Purpose of Data	To ensure the integrity of the site where the project activity will be implemented, in order to ensure the generation of ecological credits
Comments	



Stratification and Sampling Plan

Annual expeditions will follow the same pattern of data collection applied in the first expedition to the project site ASPERAM AD ASTRA, detailed in section 'Identification of strata' of this PDD.

Other Elements of Monitoring Plan

There are no further elements to add to the monitoring plan.

Start Date of Project Activity

September 30, 2013

Expected Operational Lifetime of Project Activity

40 years

Start Date of Crediting Period

January 1, 2014

Length of Credit Period

15 years, renewable.

Analysis of Environmental Impact

Considering the start of a deforestation trend within the region, the environmental impact caused by the ASPERAM AD ASTRA project activity can only be categorized as positive.

Environmental Impact Assessment

The ASPERAM AD ASTRA project activity aims to preserve 222,991.88ha of the Amazon rainforest. With respect to possible risks:

Risk of Fire - Action: training of team members of the ASPERAM AD ASTRA project activity will diminish the risk of a fire and increase the chance of fire contention;

Project implementation - all involved participants of the ASPERAM AD ASTRA project activity will have to undergo training emphasizing the need to comply with all requirements of the Zero2Nature Standard. Project implementation must occur without the production or disposal of waste in the area.



Analysis of Social Economic Impacts

As previously mentioned, the existing riparian population within the project site boundaries live in conditions of extreme poverty. The ASPERAM AD ASTRA project activity, besides ensuring the preservation of the forest will provide socio-economic benefits, since project members hired to work in the implementation and maintenance of the project will have the opportunity to further their overall education and improve their economic and social status.

Social Economic Impact Assessment

According to item 'Analysis of Socio-Economic Impact' of this PDD, the socio-economic impact of the ASPERAM AD ASTRA project activity is positive.

Solicitation of Comments from Local Stakeholders

On October 3, 2013, a meeting was held in Porto Velho-RO, open to the general public, to present the ASPERAM AD ASTRA-PREFOR project activity, as demonstrated in the photo below:



Summary of the Comments Received

No comments were received.



Report on Considerations on Comments Received

Not applicable.



Estimated Project Flow

Year	Area of remaining forest without project activity	Area of remaining forest with project activity	Cumulative area of avoided deforestation due to project activity	Annual area of avoided deforestation due to project activity	Emission reductions	Eco-Credits deposited in non permanency fund	Total generated eco-credits
	hectares	hectares	hectares	hectares	tCO2eq	O2NCs	O2NCs
2014	222,000	222,991	990	990	483,968	24,198	459,770
2015	221,014	222,990	1,976	986	481,815	24,091	457,724
2016	220,031	222,989	2,957	981	479,670	23,984	455,687
2017	219,053	222,986	3,934	977	477,536	23,877	453,659
2018	218,080	222,986	4,907	973	475,411	23,771	451,640
2019	217,110	222,985	5,875	968	473,295	23,665	449,630
2020	216,145	222,984	6,839	964	471,189	23,559	447,629
2021	215,184	222,983	7,799	960	469,092	23,455	445,637
2022	214,228	22,982	8,754	955	467,004	23,350	443,654
2023	213,276	222,981	9,705	951	464,926	23,246	441,680
2024	212,327	222,980	10,653	947	463,129	23,156	439,973
2025	211,384	222,980	11,596	943	461,069	23,053	438,016
2026	210,444	222,979	12,535	939	459,019	22,951	436,068
2027	209,509	222,979	13,470	935	456,977	22,849	434,128
2028	208,577	222,978	14,401	931	454,944	22,747	432,197
2029	207,650	222,977	15,327	927	452,921	22,646	430,275
2030	206,727	222,977	16,250	922	450,906	22,545	428,361
2031	205,808	222,976	17,168	918	448,901	22,445	426,456
2032	204,893	222,976	18,082	914	446,904	22,345	424,559
2033	203,983	222,975	18,993	910	444,917	22,246	422,671
2034	203,076	222,975	19,899	906	442,938	22,147	420,791
2035	202,173	222,974	20,801	902	440,967	22,048	418,919
2036	201,274	222,973	21,699	898	439,006	21,950	417,056
2037	200,380	222,973	22,593	894	437,053	21,853	415,201
2038	199,489	222,972	23,483	890	435,109	21,755	413,354
2039	198,602	222,972	24,370	886	433,174	21,659	411,515
2040	197,719	222,971	25,252	882	431,247	21,562	409,685
2041	196,841	22,971	26,130	878	429,329	21,466	407,863
2042	195,966	222,970	27,005	874	427,420	21,371	406,049
2043	195,094	222,970	27,875	871	425,518	21,276	404,243
2044	194,227	222,969	28,742	867	423,626	21,181	402,444
2045	193,364	222,968	29,605	863	421,741	21,087	400,654
2046	192,504	222,968	30,464	859	419,866	20,993	398,872
2047	191,649	222,967	31,319	855	417,998	20,900	397,098
2048	190,797	222,967	32,170	851	416,139	20,807	395,332
2049	189,949	222,966	33,018	848	414,288	20,714	393,573
2050	189,104	222,966	33,861	844	412,445	20,622	391,823
2051	188,264	222,965	34,701	840	410,610	20,531	390,080
2052	187,427	222,965	35,538	836	408,784	20,439	388,345
2053	186,594	222,964	36,370	833	406,966	20,348	386,617



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Appendix 1 - Applicability of Selected Methodology

Appendix 2 - Further Background Information on Ex-Ante Calculation of ER by Sinks

Appendix 3 - Summary of Post Registration Changes

Appendix 4 - Property Rights and 02NC Rights

Available for consultation upon written request to the project proponent.