PROJECT DESCRIPTION "FORTALEZA ITUXI REDD PROJECT"

Document Prepared By CARBONEXT

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1 PROJECT DETAILS

1.1 Summary Description of the Project

Project Activity and Location

The FORTALEZA ITUXI REDD PROJECT aims at protecting forests located in one of the regions having the highest deforestation rate in the Amazon Biome: the municipality of Lábrea. The South of the municipality of Lábrea has already been reached by the “Arc of Deforestation”: since the last 10 years, Lábrea has been one of the most deforested municipalities in the Amazon Biome. Beside the damage caused to natural ecosystems, the land-use changes have provoked severe social conflicts through processes of land-grabbing and installation of agriculture and cattle ranching activities, contributing to expulsion of family-scale forest extractives from that region. In Lábrea region, the deforestation pressure is originated from neighbouring States of Acre and Rondônia. These States have already undergone intense deforestation processes in the past, mainly due to the expansion of agriculture and cattle ranching. According to Vitel (2009), the deforestation in Lábrea is highly related to the proximity of roads: the increase in deforestation rate observed in recent years is mainly attributed to the “Jequitibá” and “do Boi” (or “do Baiano”) Roads. The “do Boi” Road (Ramal do Boi), is about 100 km long and reaches the “Ituxi” waterfalls, which are located inside the Project Area (“Fazenda Nossa Senhora das Cachoeiras do Ituxi”). In the specific case of the Project Area (“Fazenda Nossa Senhora das Cachoeiras do Ituxi”), professional land-grabbers, and even politicians have already organized illegal occupation that has been denounced by the landowner and controlled by authorities. Under deforestation pressure and financial difficulties in activities in the Project Area, farm sale to private investors is considered the most plausible baseline scenario. In recent years, Project Area landowner has already been approached to sell the farm (some offers are documented). In this scenario, the regional BAU is probably the most plausible future scenario (deforestation above Brazilian Forest Code limits for implementation of cattle ranching). With project activity approval, the landowner intends to improve the mechanisms of surveillance inside the Project Area, as well as implement activities that will result in climate, community and biodiversity benefits. The project area holds sustainable forest management activities, which also help to maintain the areas under supervision of the farm staff. The harvest activities are predominantly carried out by clients, who possess all equipment and personnel needed to perform low-impact logging/harvesting activities.

Project’s expected climate, community and biodiversity benefits

- Estimated net GHG emission reductions: 4,267,919 tCO_2e, corresponding to avoidance of deforestation of 5.391,6 hectares over 30-years;

- Sustainable forest management is the main tool to guarantee the surveillance in the Project Area. The presence of workers in management activities is the first factor to inhibit the pressures of invasions inside the Project Area. Coupled with sustainable forest management, the project activity has increased surveillance to avoid further invasions in the Project Area. Additionally, two surveillance posts will also be placed around the farm and new motorcycles will be purchased, with a view to ensuring security at the project site and surrounding areas;

- Technical training on sustainable cattle raising and forest management, fire brigades, study for a small non-wood product processing plant, production of Brazil-nuts (already in place) etc.;

- Seedling Production Nursery: capacity of 50,000 native-species seedlings per year and donation for neighbors wishing to plant.

- Implementation of technical education frameworks;

- Complementary monitoring of labor conditions in Project Area;

- Monitoring the attendance of young in schools;

- Commercial activity in “Castanhal Fortaleza” company (job generation beyond timber management).

1.2 Sectoral Scope and Project Type

Sectoral Scope: 14 - Agriculture, Forestry, Land Use

Project Category: Avoided Unplanned Deforestation (AUD project activity)

This is not a grouped project.

1.3 Project Proponent

Organization name	Fazenda Nossa Senhora das Cachoeiras do Ituxi
Contact person	Ricardo Stoppe Júnior
Title	Project Proponent (Landowner)
Address	Estrada da Fazendinha, 5640 Centro, Carapicuíba – SP, Brazil
Telephone	55 (92) 3634-7521
Email	aamericardo@ig.com.br

1.4 Other Entities Involved in the Project

Organization name	Carbonext

Role in the project	Technical advisory in project development
Contact person	Janaína Dallan & Luiz Fernando de Moura
Title	Project Designer
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Organization name	Geowiki Engenharia Ltda
Role in the project	Satellite imagery analysis for baseline assessment
Contact person	Renan A. Kamimura & Bruno M. da Matta
Title	Project Advisor
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1.5 Project Start Date

15/12/2013 (Start of the implementation of Forest Management Plan; Equipments for Forest Management have been placed in the Project Area and first presence for preliminary studies on operations have been performed in this period: it is assumed that the presence of personnel for these first forest management activities has created a perception in deforestation agents that the Project Area was being under increased surveillance by the Project Proponent.)

1.6 Project Crediting Period

Start date: 15/12/2013

End date: 14/12/2043

Project duration: 30 years

Date of the historical Reference Period: 15/12/2003 to 14/12/2013

Date of the first fixed baseline period: 15/12/2013 to 14/12/2023

1.7 Project Scale and Estimated GHG Emission Reductions or Removals

Project Scale	
Project	X
Large project	

Years	Estimated GHG emission reductions or removals (tCO2e)
2013	0
2014	836,911
2015	63,370
2016	-57,704
2017	75,060
2018	-45,137
2019	87,396
2020	-32,573
2021	102,476
2022	-19,979
2023	110,880
2024	-7,434
2025	112,111
2026	-7,106
2027	210,384
2028	90,492
2029	214,514
2030	101,475
2031	224,846
2032	112,420
2033	233,371
2034	123,387
2035	243,083
2036	134,345
2037	255,764
2038	145,316
2039	262,177
2040	156,315
2041	182,121
2042	69,713
2043	289,927
Total estimated ERs	4,267,919
Total number of crediting years	30
Average annual ERs	137,675

1.8 Description of the Project Activity

The FORTALEZA ITUXI REDD PROJECT aims at protecting forests located in one of the regions having the highest deforestation rate in the Amazon Biome: the municipality of Lábrea. As the southernmost municipality in the Brazilian state of Amazonas, Lábrea is geographically located nearby the "Arc of Deforestation" (Figure 1a) and neighbours other highly deforested municipalities (i.e. Rio Branco, State of Acre; and Porto Velho, State of Rondônia; Figure 1b).

According to IPAM/ISA/IMAZON (2014)[1], in 2012-2013, the deforestation rate in the Amazon increased significantly by 28% (Figure 2 shows deforestation location in 2013 nearby the Project Area). The authors suggest that such an increase in deforestation coincided with several factors that have traditionally encouraged cutting of forests: i) the increase in prices for agricultural products, for example, have historically spurred deforestation for both productive and speculative purposes; ii) major infrastructure works, such as hydroelectric projects, paving of highways (BR-163, Transamazon) and construction of ports, change the dynamics in the region and may have contributed in part to the recent increase in felling of forests; iii) the government has been weakening environmental regulations: the new Forest Code approved in 2012 allowed the consolidation of a significant portion of area illegally deforested in the past, which created expectations that new deforestation may be amnestied in the future.

Furthermore, the government also reduced Conservation Units (responsible for only 3% of deforestation, although covering 25 % of Brazilian Amazon territory) and the National Congress (PEC 215) is threatening to weaken indigenous rights. The pattern of deforestation suggests that deforestation is increasing in public lands that: i) are not designated for specific purposes ("Non-designated public land") and ii) those for which land title information is lacking ("Land lacking land title information"). Around 37% of deforestation occurred in areas included in these two categories (IPAM/ISA/IMAZON, 2014; see (Table 1).

The South of the municipality of Lábrea has already been reached by the "Arc of Deforestation": since the last 10 years, Lábrea has been one of the most deforested municipalities in the Amazon Biome. Beside the damage caused to natural ecosystems, the land-use changes have provoked severe social conflicts through processes of land-grabbing and installation of agriculture and cattle ranching activities, contributing to expulsion of family-scale forest extractives from that region. In addition, as part of the Brazilian Program for the Acceleration of Growth ("Programa de Aceleração do Crescimento" - PAC), the Ministry of Transportation plans to reconstruct the BR-319 (Porto Velho-Manaus) Highway (which has been abandoned since 1988) and to recuperate a part of the marginally passable Transamazon Highway (BR-320) that connects the BR-319 to Lábrea. To avoid the environmental consequences of these projects, in 2006 the government proposed the institution of a series of protected areas in the region of influence of the BR-319, four of which have been recently created in the municipality of Lábrea. In this context, in 2008,

[1] IPAM/ISA/IMAZON (2014). The Increase in Deforestation in the Amazon in 2013: a point off the curve or out of control? (Available at http://imazon.org.br/publicacoes/the-increase-in-deforestation-in-the-amazon-in-2013-a-point-off-the-curve-or-out-of-control/?lang=en; last visited in 18/July/2017)

the Extractive Reserves (RESEX) of “Ituxi” and “Médio Purus”, the National Forest (FLONA) of “Iquiri”, and the National Park (PARNA) of “Mapinguari” were created (VITEL, 2009).

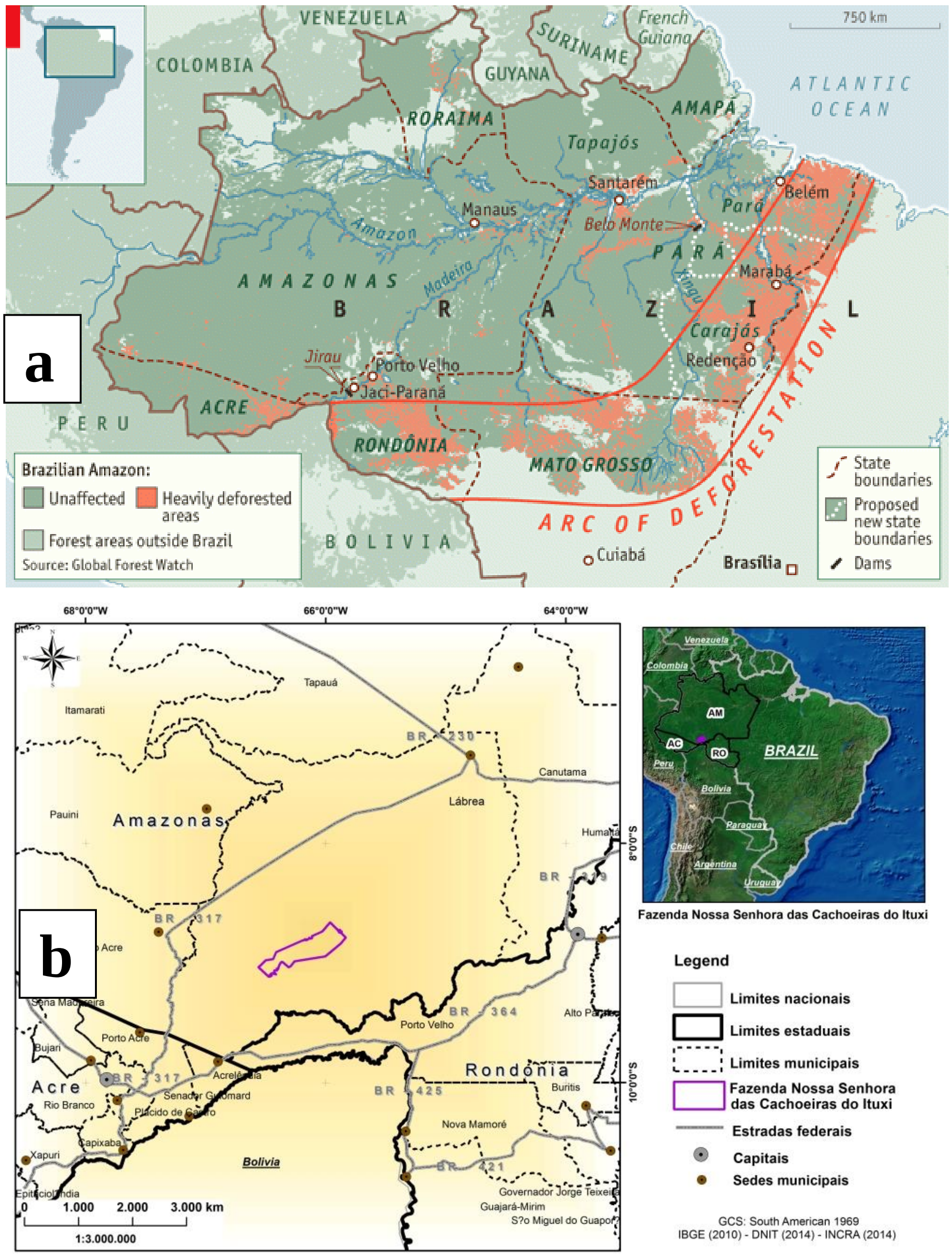


Figure 1. a. Location of the “Arc of Deforestation”. Source: The Economist (2011)[2]. b. Overview of the location of FORTALEZA ITUXI REDD PROJECT. The main deforestation risks are located from the western and southern regions of the Project Area.

[2] http://www.economist.com/node/21541033 (last visited in 18/July/2017)

Table 1. Deforestation in 2013 by land title category in the Brazilian Amazon. Source: IPAM/ISA/IMAZON (2014)

Land title category	Area deforested in 2013 (km^2)	% of the total deforested
Indigenous Land *	148.04	3
Conservation Unit *	312.18	6
Environmental Protection Area (APA) **	234.01	5
Settlement §	1,399.86	29
Private property ¥	994.02	20
Non-designated public land &	665.20	14
Land lacking land title information #	1,121.45	23
Total	**4,874.76** ‡	

* Socioenvironmental Institute 2011 – Geographic database; ** Considered separately from the other UCs because it does not present restrictions on use - Socioenvironmental Institute 2011 – Geographical database; § Land Reform settlements - National Institute for Colonization and Agrarian Reform 2013 – Geographic database; ¥ Properties with boundaries identified, recorded or not; & Federal and State Lands with defined boundaries (SFB, 2011); # Group of public and private lands for which there is no land title information available, either because of the lack of a rural registry or lack of allocation by the government; ‡ The total area deforested is different (smaller) than that estimated by (5,843 km^2), since accounting of deforestation by land title category in this paper was done only with raw data obtained from shapefile records provided by Prodes/2013, which do not include estimates of the deforested areas that are, for example, under cloud cover.

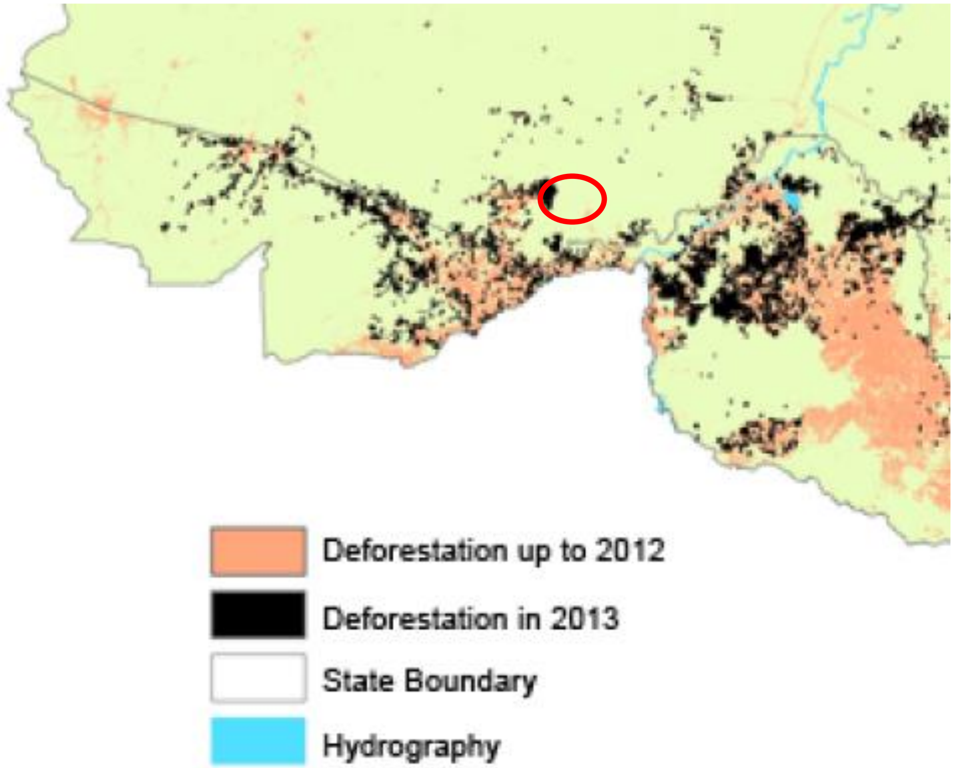


Figure 2. Map of recent deforestation in the region of Project Area (Source: IPAM/ISA/IMAZON, 2014)

In Lábrea region, the deforestation pressure is originated from neighbouring States of Acre and Rondônia. These States have already undergone intense deforestation processes in the past, mainly due to the expansion of agriculture and cattle ranching. According to Vitel (2009), the deforestation in Lábrea is highly related to the proximity of roads: the increase in deforestation rate observed in recent years is mainly attributed to the "*Jequitibá*" and "*do Boi*" (or "*do Baiano*") Roads. The "*do Boi*" Road (*Ramal do Boi*), is about 100 km long and reaches the "Ituxi" waterfalls, which are located inside the Project Area ("*Fazenda Nossa Senhora das Cachoeiras do Ituxi*").

The "Ramal do Boi" passes through several private properties: a field survey performed by Vitel (2009) indicated that deforestation in private properties nearby the "Ramal do Boi" is predominantly attributed to cattle ranching (Figure 3). Along the road, the author mentions an 8,000-hectares property having 4,000 hectares of pasture and 7,000 cattle heads. The landowner (Mauro Barros or "Baiano") was murdered in 2007, which testifies the social tensions for land grabbing in the region. Since the last decade, there is a major governmental concern on social issues related to land tenure in Lábrea: in 2007, former Minister Márcio Thomaz Bastos coordinated an urgent operation of federal police agents in the municipality, to guarantee security of rural workers during negotiations. During that period, the Brazilian Federal Police Intelligence performed a deep investigation in the region, to provide information to the Brazilian Ministry of Justice for implementation of an emergency plan.

Although IBAMA's (*Instituto Brasileiro do Meio Ambiente e dos Recursos Naturais Renováveis*; Brazilian Institute for Environment and Renewable Natural Resources) monitoring has been intensified since 2006, when Lábrea was indicated among the 36 municipalities with highest deforestation rates in the Legal Amazon, some wood producers perform more intense illegal logging during the rainy season, when clouds hinder identification of deforestation by satellite imaging (VITEL, 2009).

In the specific case of the Project Area ("*Fazenda Nossa Senhora das Cachoeiras do Ituxi*"), professional land-grabbers, and even politicians have already organized illegal occupation: in July 2005, assistants of former Rondonia State Governor Ivo Cassol and company "*Eletrossol Hidrelétricas Cassol*", together with Rodonia State Civil Police, invaded the Project Area. The criminal act has been registered in photographs and Police Report (*Boletim de Ocorrência* – B.O.), which are available for consultation by the audit team. The Police Report has been registered in the Federal Police Office of Acre, and former Governor Ivo Cassol was publicly condemned by the Amazon State Secretariat of Public Security.

Figure 3. Region of "Ramal do Boi" (road) visited in August 2008, with photographs taken in the field representing the main land uses: cattle ranching and forest management. The same land-use pattern was reported to "Ramal do Jequitibá" (Source: VITEL, 2009).

In that occasion, INCRA (*Instituto Nacional de Colonização e Reforma Agrária*; National Institute for Colonization and Agrarian Reform) agents were performing a great operation in Lábrea to fight land grabbing and falsification of land tenure documents in private and State lands. Those INCRA agents witnessed and documented the invasion of the Project Area, where Ivo Cassol coworkers were equipped with hard machines and implements, to construct an illegal hydropower plant in waterfalls located inside the project farm. After denouncement by INCRA, the former Governor publicly informed that he had authorization from ANEEL (*Agência Nacional de Energia Elétrica*; National Agency of Electric Energy) for building power plants, and published a faked authorization. That affirmation was publicly denied by ANEEL's superintendent, Mr. Gladstone Alvim and by Press Assessor, Ms. Salete Cangussu. INCRA's superintendent also informed that environmental crimes and illegal wood extraction from the Project Area were visible and, for that reason, the occurrence was registered in photos and an official report was presented to the Amazonas State Government and Brazilian Ministry of Environment.

Due to the repercussion of these denouncements all over the country, the Amazonas State Government started a mission in that area: the so-called Uiraçu Mission. This operation was coordinated by the Military Police of the municipality of Manaus-AM. In that occasion, a team of reporters from the municipality of Porto Velho-RO, visited the Project Area, together with ABIN's (*Agência Brasileira de Inteligência*; National Intelligence Agency) authorities, when they could found out and document a great wood traffic scheme. It was proved that the wood was being transported in trucks by Ivo Cassol's coworkers, and commercialized in Rodonia State using faked invoices.

Due to the undisputed evidence presented, the landowner filed the lawsuit repossession and prohibitory interdict in Lábrea County, where after detailed documentary and procedural analysis conducted by Judge Katteling dos Santos, the reintegration of ownership was established. At the time of reintegration of ownership, the landowner could witness on his farm the devastation left by the invaders, including about 3,000 ha of forest cleared and burned, characterizing environmental crimes.

Between 20:30 and 21:30 (Brasília time) of December 21, 2005, there was an attempted repossession that almost became a moderately serious conflict, where the Claimant identified as Carlos Henrique Alves, along with the bailiff of Lábrea, reinforced by military police, falsely used the respected name of Judge Yedo Simões to coerce, intimidate and expel the farm staff, relying on a supposed "express order" passed by said Judge to Colonel Picolloto of the city of Humaita, ordering the repossession. Despite the numerous irregularities committed by a Head of State and his advisors, using an immeasurable political and economic power to corrupt, defraud, coerce, threaten and practice numerous crimes (widely proven and documented) on January 9, 2006 by omission and falsification of documents, the criminals were able to confuse the Honorable Judge of the Amazon Court, Yedo Simões de Oliveira, who ended up granting the injunction of repossession to the invaders. On January 10, 2006, the landowner could be received by Judge Hosannah Florencio de Menezes (chairman) and by the Judge Yedo Simões de Oliveira, who humbly and professionally heard the landowner and found the evidences of fraud carried out by the invaders. On January 11, 2006, the Judge Yedo Simões, demonstrating to be a cleared representative of Brazilian Law, analyzed the 600 sheets of incontrovertible evidence of land grabbing with the involvement of Governor Ivo Cassol and granted suspensive effect to the repossession, which lost its effect.

According to testimony of the landowner: "*Due to the financial, moral and all kinds of prejudice… Aware again of being the victim of a dangerous criminal gang, I represented against the counsel of Ivo Cassol, still requiring the summons of the Notary of Lábrea and Candeias do Jamari to provide clarification on the reported facts*".

Given the context above, the baseline may involve the following non-excluding baseline scenarios:

i) SCENARIO 1: <u>Continuation of the pre-project land use</u>: It is clear that the Project Area landowner will not be able to afford large long-term costs and efforts for vigilance of land property, mainly considering past deforestation pressures experienced in the Project Area. The business currently administrated in the Project Area is not financially attractive without complementary incentives (ex. carbon credits), as demonstrated in this VCS-PD. Thus, this is not the most plausible scenario.

ii) SCENARIO 2: Project activity on the land within the project boundary performed without being registered as the VCS AFOLU project: The Project Proponent will not be able to afford costs to implement the proposed Project Activity. For this purpose, the Project Proponent is pleading to include this Project Activity in a Carbon Market platform, to obtain supplementary financial resources. The proposed Project Activity is not financially feasible without carbon credits.

iii) SCENARIO 3: Planned deforestation and logging of the area permitted by Law: This option would generate supplementary incomes to financially support long-term vigilance system; this would correspond to active deforestation of the property by landowner in the future.

iv) SCENARIO 4: Adoption of common land-use practices in the region (business as usual - BAU): This scenario includes deforestation beyond the limits established by Brazilian Forest Code (generalized non-compliance, typically observed in the farm region); this would be the probable scenario, if no additional environmental values are attributed to the farm operation.

v) SCENARIO 5: Unplanned deforestation caused by uncontrolled invasions: This scenario is derived from the lack of ability to control borders in case of the current cash-flow scenarios with logging operations alone, which indicates the need for additional sources of income in the overall operation of the farm.

vi) SCENARIO 6: Farm sale to private investors (in this case, the regional BAU is probably the most plausible future scenario): In recent years, Project Area landowner has already been approached to sell the farm (some offers are documented). Registered evidences of the interest of land purchase (e.g. purchase proposals) are available for consultation by auditors. All documents and records will be kept in a secure retrievable manner for at least two years after the end of the project crediting period.

Given that SCENARIO 6 would be the most profitable and would save the landowner from current expenses on the Project Area, it can be regarded as the most plausible baseline scenario.

Corroborating the statements about the deforestation pressure on the Project Area, as mentioned above, Vitel (2009) presented projections of deforestation patterns for the municipality of Lábrea to year 2040. In these projections, the Project Area is strongly affected by deforestation. Through deforestation modeling, the author clearly demonstrates that the Project Area could not stand the growing deforestation pressure over time.

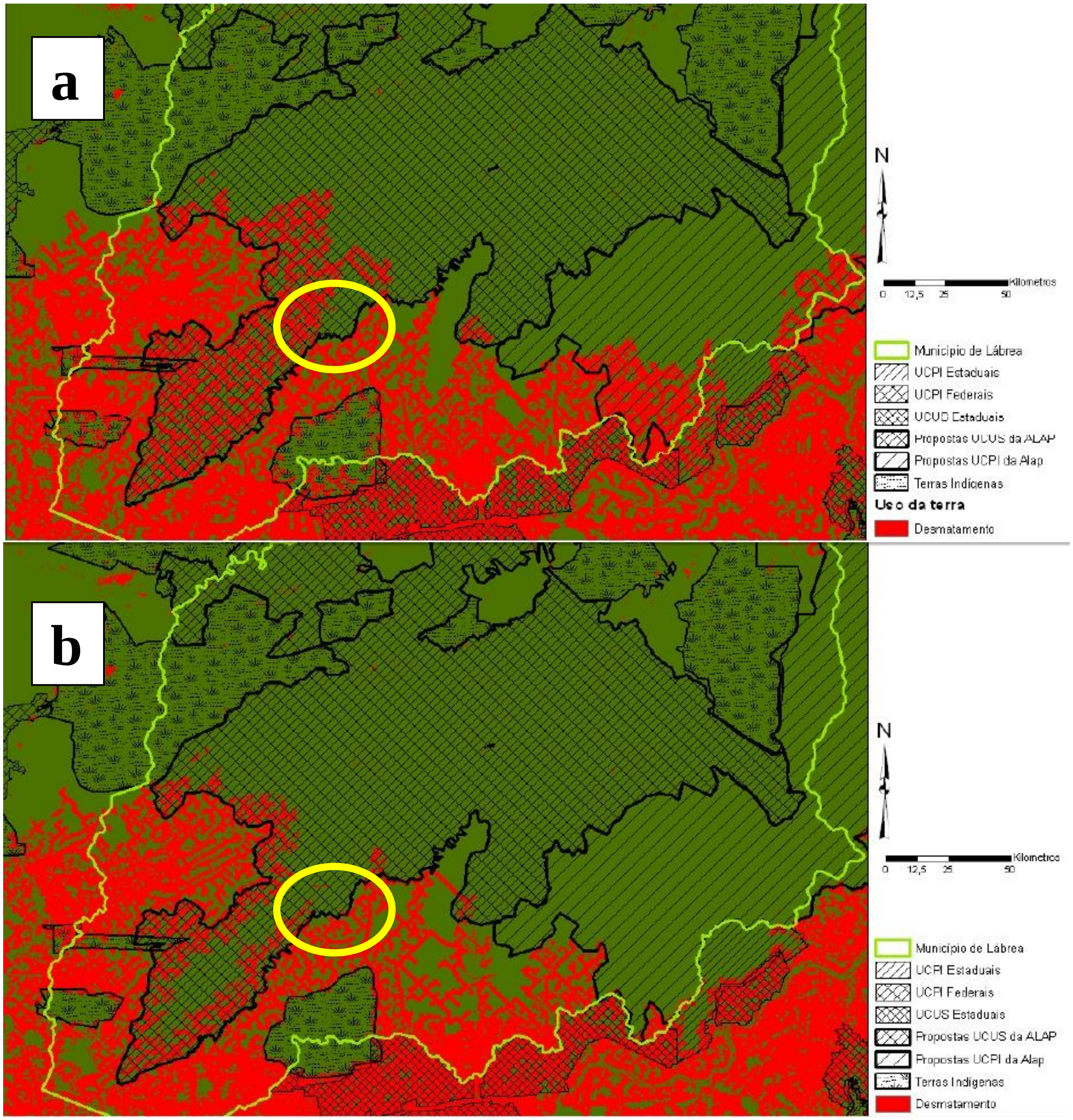


Figure 4. Maps of land cover representing deforestation in the municipality of Lábrea in 2040. a. Scenario not considering the recently-created conservation areas. b. Scenario considering the recently-created conservation areas (Source: VITEL, 2009).

Project's major climate, community and biodiversity objectives

Regarding the major climate objectives, as explained above, the FORTALEZA ITUXI REDD PROJECT aims at protecting forests located in the municipality of Lábrea. The project's estimated net GHG emission reductions are 4,267,919 tCO_2e, corresponding to avoidance of deforestation of 5,391.6 hectares over 30-years.

The project will also include the implementation of certain activities with a view to obtaining the necessary instruments and institutional support to ensure that sustainable forest management continues in the property and that leakage will be mitigated. Some activities are already quantified in the Project budget available to auditors. Other activities will depend on agreements with governmental and educational entities, and/or NGOs. For these latter activities, the project proponent will make its best efforts to convince these entities to collaborate in the Project, but cannot participate in direct funding. The project proposes the implementation of the following activities in favor of community and biodiversity (see chronogram as follows):

Communities

- Fire brigades: Fire brigades will be organized from local labor. Those in favour of the objectives put forward by the project (preservation of natural resources and the continuation of forest management) will be included in training courses and may become a source of income for the local community. The Project budget foresees investments in vehicles and monitoring agreements of park frontiers nearby farm limits. All neighbors will be invited to participate in these training sessions promoted by the Project, all costs will be covered by the project proponent. It is expected that these training sessions will involve from 15 to 20 neighbors.

- Technical Training on Sustainable Cattle Raising: Project participants, in partnership with the local city hall and IFAM (Instituto Federal de Ciência e Tecnologia; Federal Institute of Science and Technology; Campus Lábrea), will structure a new technical training to qualify those neighbours involved in cattle ranching. The objective of this initiative will also be qualifying labor that finds little opportunity to work in the region and ends up taking part in illegal settlements and land occupation. It is expected that this initiative will benefit 15 students every year. Students and technicians of both sexes will be eligible for registrations, with the previous requirement of having finished the basic studies (middle school). This activity involves an agreement with the Municipal Secretariat of Education (*Secretaria Municipal de Educação*), including practical classes.

- Forest management courses: Courses on forest management methods will be offered to the local community. This may lead to the qualification of people who can work in the proposed project.

- Support to SEMA - AM (*Secretaria de Estado do Meio Ambiente do Amazonas*; Amazonas State Secretariat of Environment): SEMA will benefit from having, under its jurisdiction, an innovative model that can be replicated in other properties. It will provide the current administration with more visibility and methodological advances in environmental preservation. Two surveillance posts will also be placed around the farm and new motorcycles will be purchased, with a view to ensuring security at the project site and surrounding areas. The main objective of this support is mitigating illegal logging and land occupation in the region, by promoting incentives to increase the number of sustainable forest management plans authorized, as well as promoting an increase in the number of REDD Projects in the region, whenever feasible. This process will only be feasible by means of a combination of efforts with private and governmental entities, and NGOs. In this context, the project proponent will be in charge of political mobilization of forest sector in the region and, in the long term, the establishment of solid bases for engagement of all sectors involved in deforestation issues. The main condition for execution of this activity is the approval and validation of the Fortaleza Ituxi REDD Project, which will be one of the most important benchmark for engagement of all potential private landowners in the region.

- Potential Roll-out to Other Areas: Other areas with the potential to be included in REDD projects have already been identified around the project site, which will favour and encourage forest conservation by means of financial incentives obtained from reduced emission sales and provide social and environmental benefits to neighbouring communities.

- Fight against illegal land occupation: The local community will be strategic in monitoring illegal land occupation and potential illegal logging. Those who are favourable to being trained and conducting local monitoring will be included in the project: this activity may also become a new source of income for local communities.

- Feasibility study for a small non-wood product processing plant: This initiative will measure the property's potential to produce non-wood products (such as fruit, oils and essences). If this activity is proven to be feasible, additional labor will be added, creating new income opportunities for the local population and developing new forest-use methods. After approval of the business plan, the company will be formally engaged to implement the commercial exploitation of these non-wood products by using local labor. It is expected that this activity will involve the following labor: 10 men in forest exploitation inside the farm; 20 to 30 women in the processing plant. The implementation of this business also comprises selection, recruitment, training of personnel etc.

- Production of Brazil-nuts: the farm already holds a company for harvest of Brazil-nuts, which is called "Castanhal Fortaleza". The families and communities involved in "Castanhal Fortaleza" business will receive additional benefits due to implementation of this Project Activity: i) complementary monitoring of labor conditions (monthly internal audits for health and security assessments, nutrition aspects, personal care and hygiene etc.); ii) monitoring the attendance of young in schools.

- Seedling Production Nursery: capacity of 50,000 native-species seedlings per year and donation for neighbors wishing to plant.

Biodiversity

- Biomass inventory will be performed, as well as fauna and flora assessment;

- A survey on the occurrence of High Conservation Values in the Project Area will be carried out after the first verification period;

- Forest conservation practices will be disseminated as a means for increase value of standing forests;

- Forest management: the project area holds sustainable forest management activities, which also help to maintain the areas under supervision of the farm staff. The harvest activities are predominantly carried out by clients, who possess all equipment and personnel needed to perform low-impact logging/harvesting activities. Timber harvesting will take place during 13 years intervals (from 2014 to 2026), restarting from 2041 on.

Activities dependent on the completion of the Validation process

		Year																													
Activity	**Scope**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**
Training of fire brigades	Project Area	1					1					1					1					1					1				
Training on forest management	Project Area	1			1			1			1			1			1			1			1			1			1		
Health internal audits	Project Area	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
Security internal audits	Project Area	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
Advice on nutritional aspects	Project Area	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
Advice on personal care and hygiene	Project Area	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
Monitoring the attendance in schools	Project Area	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
Dissemination of forest conservation practices	Project Area	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
Data sharing to SEMA - AM	Regional	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Coordination with public agencies	Regional	■	■	■	■	■																									
Neighbors mobilization for surveillance	Regional	■	■																												

■ Continuous activity 1 Annual event M Monthly event B Bimonthly event

Activities dependent on carbon credits sales

		Year																													
Activity	**Scope**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**
Training on sustainable cattle raising	Regional		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Training on forest management	Regional		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Study for non-wood products plant	Project Area		■																												
Seedling production nursery	Project Area		■	■																											
Biomass, fauna and flora inventory	Project Area		1					1					1					1					1					1			
Survey on High Conservation Value areas	Project Area		1					1					1					1					1					1			
Dissemination of forest conservation practices	Regional		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Installation of 2 new guard posts	Project Area		■	■																											
Purchase of motorcycles for surveillance	Project Area		■																												

■ Continuous activity 1 Annual event

The FORTALEZA ITUXI REDD PROJECT will reduce GHG emissions by stopping deforestation of degraded to mature forests at the frontier that has been expanding historically and will continue to expand in the future, as a result of improved access to forests, while regional development continues. The lifetime of the project activity is 30 years.

The FORTALEZA ITUXI REDD PROJECT aims at assuring the continuation of ongoing activities for forest protection plus the implementation of the following actions, among others:

(i) Qualification of the local community to engage in the activities related to forest management within the farm;

(ii) Long-term protection of the area of the property and opposition to invasion by land grabbers;

(iii) Improvement in local security through project monitoring and public sharing of documentation;

(iv) Organization and training of forest fire brigades;

(v) Creation of incentives to recover degraded areas surrounding the property (donation of native seedlings), and

(vi) Conduction of a feasibility study to set up a small plant for processing non-wood products, as well as organizing technical trainings in the municipality of Lábrea, and districts of Porto Velho (Nova Califórnia and Extrema).

Furthermore, efforts will be made with SEMA - AM (*Secretaria de Estado do Meio Ambiente do Amazonas*; Amazonas State Secretariat of Environment) in order to create an environment management model highly replicable in other previously identified areas with potential to receive future REDD projects.

Another fundamental point to ensure the success of this project is the monitoring strategy to be implemented. The approach adopted by the project will involve a system combining satellite images with field visits. INPE has made available tools for monitoring the deforestation of the Amazon region, such as the PRODES and the DETER systems, to which the participants in the project will have access over the Internet. The project proponent will organize a regional effort in order to train and share information with local stakeholders.

In addition to a regular revision by satellite images of the area covered by the project, there will be a team stationed within the property, which will conduct on-site surveillance of deforestation within and on the borders of the property, to ensure the maintenance and preservation of the forest.

In this manner, a new development model may be created in the region of Lábrea and Porto Velho (districts of Nova Califórnia and Extrema), based on a new model of exploitation of forest potential in the region, associated with the preservation of natural resources and sustainable economic activities (e.g. sustainable forest management and non-wood products).

Monitoring carbon inventories within the limits of the project

The average carbon stock of local forest was conservatively estimated in 749 tCO_2/ha (575 tCO_2/ha aboveground; 174 tCO_2/ha belowground), according to literature data explained in item 1.10 of this VCS-PD.

Among the proposed activities, a biomass inventory will be set up to obtain local carbon stock data.

Leakage management

The main leakage causes manifest as land-use changes (cattle, wood exploitation etc.) in Project surroundings. These changes in land use became more economically attractive than sustainable management of forest resources, owing to the following factors: market pressure; colonization in borderlines and areas where law enforcement and command and control approaches are not effective; increase or decrease of investments in the area. These are the main factors, among secondary others.

Project proponents clearly comprehend the conceptual complexity and difficulties for implementing a policy for preventing potential leakage. Therefore, the Project proponents will adopt a proactive initiative for fighting leakage sources. This adoption will be based on a cooperative effort with local stakeholders to promote a new approach to forest use and land use in the region.

In order to mitigate leakage, the Project proponents foresee continuous monitoring and interventions on areas surrounding the Project (Leakage Belt), which were mapped by satellite. This project will hold programs within the region of its influence for education of local communities, seeking to create culture and policies for sustainable development.

Although there is a risk of leakage, the proponents believe that the Project will have positive impacts on surrounding areas. This Project might be a well-succeeded example of the following technical and economical aspects:

(i) Management of forest resources with success and profit;

(ii) Additional return to forest management, due to REDD incentives, which can compensate avoiding deforestation for other activities;

(iii) Maintenance of real estate (land acquisition and grabbing dynamics), in addition to profits with sustainable management plus REDD.

According to reasons above, the Project might probably stimulate other landowners to adhere to this Project concept. The communication with landowners might be performed by means of associative actions and environmental education, which will be part of an overall policy.

As the Project will be implemented in a single sustainable management Farm (and not in a spread management area), the generation of incomes will be sustainable and permanent, creating new jobs in the whole supply chain and fixating people in the area influenced by the Project, thus decreasing the need for deforestation in new areas.

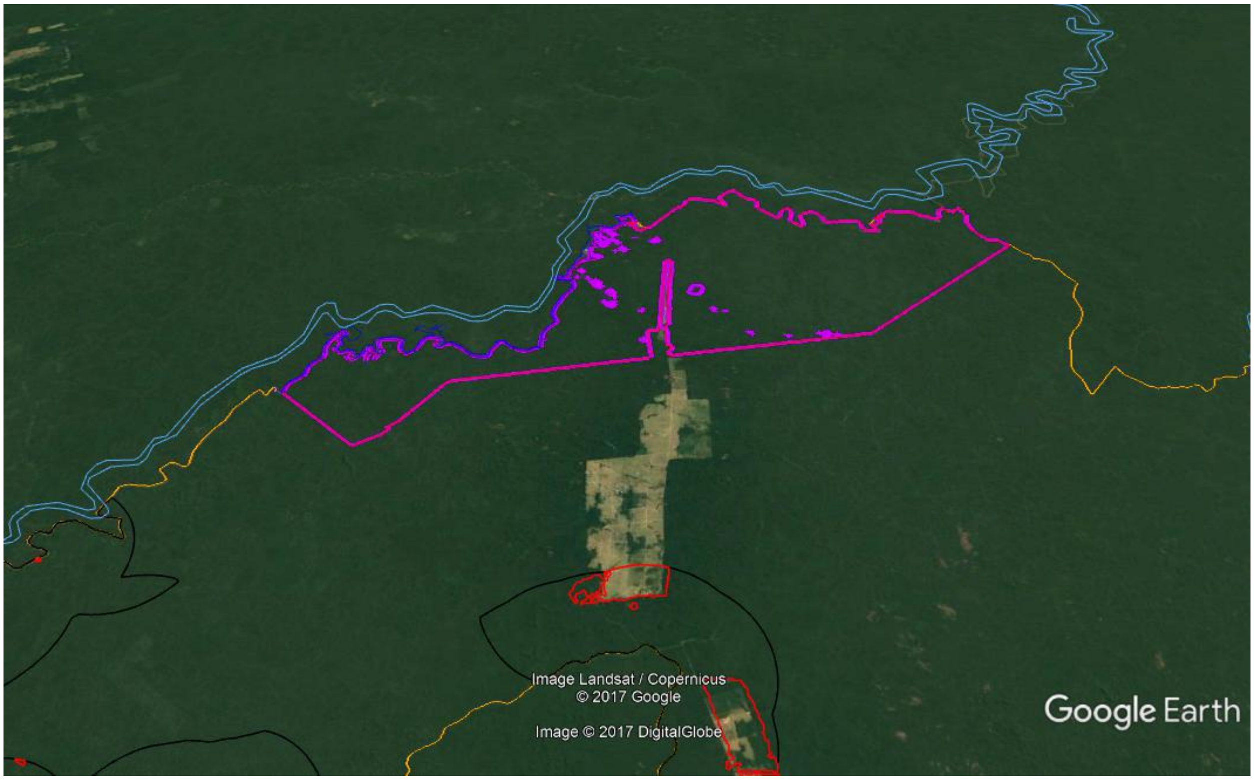
REDD incomes will increase economical attractiveness of sustainable management, which should become a feasible alternative to other land uses in neighbouring farms, and will also benefit the economical use of non-timber forest products.

By means of Project monitoring activities, satellite imaging, and social, local and regional cooperation for monitoring areas surrounding the Project; we believe that the well-succeeded example of this business plan will generate an increased number of sustainable managed areas, which will create ancillary benefits around the Project boundary.

1.9 Project Location

1) Name of the project area: “*Fazenda Nossa Senhora das Cachoeiras do Ituxi*"

2) Map of the project area:

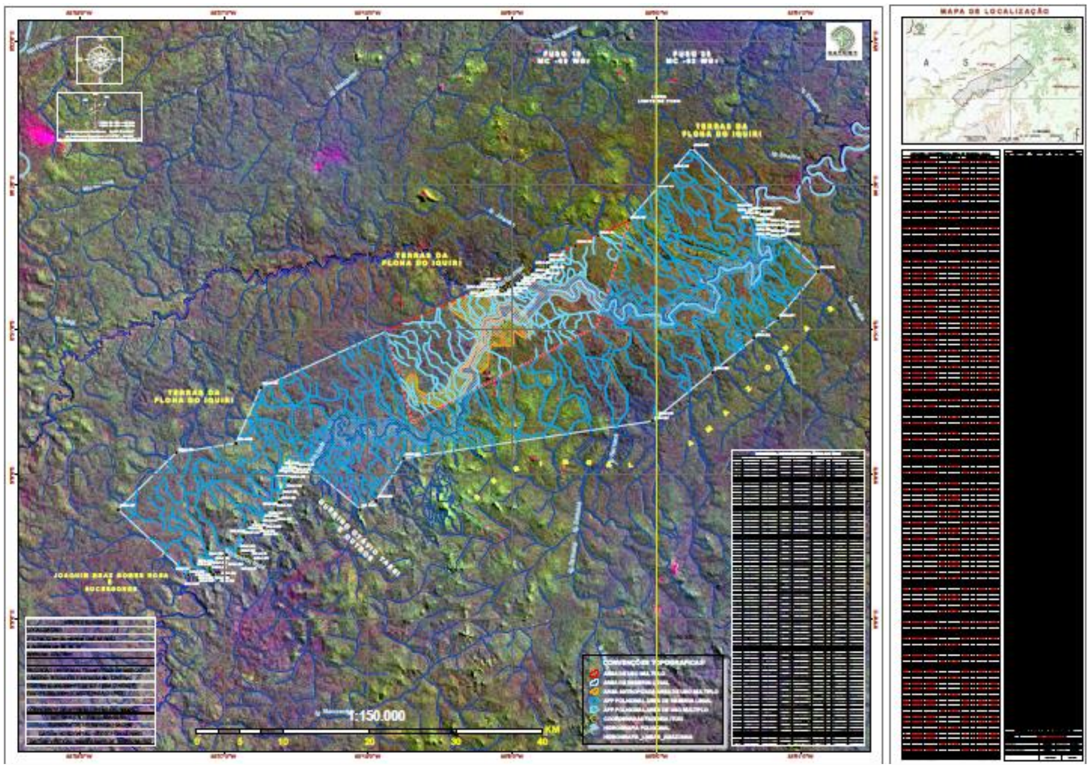


3) Geodetic coordinates of the project area boundary:

Country: Brazil

State: Amazonas

Municipality: Lábrea



The "*Nossa Senhora das Cachoeiras do Ituxi*" farm has its geodetic coordinates officially registered in notary office. The Project Area corresponds to the portion of the farm at the South of Ituxi River. The geodetic coordinates of the Project Area boundary are as follows:

FID	Shape *		X	Y
0	Point ZM	0	831302,623926	9021825,64363
1	Point ZM	0	833510,407888	9023373,87284
2	Point ZM	0	837317,012382	9023659,92579
3	Point ZM	0	839342,396499	9020416,9082
4	Point ZM	0	840974,471399	9019405,72682
5	Point ZM	0	838238,679199	9017029,56302
6	Point ZM	0	834027,605846	9013663,29523
7	Point ZM	0	829360,29816	9009885,15948
8	Point ZM	0	825253,695385	9009249,26298
9	Point ZM	0	820196,603919	9008465,61536

10	Point ZM	0	815668,787096	9008257,70544
11	Point ZM	0	815919,588537	9012436,65325
12	Point ZM	0	816059,310495	9017065,2545
13	Point ZM	0	815304,066281	9013578,98748
14	Point ZM	0	814283,701682	9009329,3662
15	Point ZM	0	811066,168985	9007049,1634
16	Point ZM	0	806028,772389	9006270,6451
17	Point ZM	0	801099,739656	9005330,86216
18	Point ZM	0	798615,199218	9002256,13912
19	Point ZM	0	795923,535014	9000094,50842
20	Point ZM	0	790733,34372	9004617,25589
21	Point ZM	0	792777,956601	9007942,04395
22	Point ZM	0	793420,247965	9008422,00412
23	Point ZM	0	795976,446522	9008196,66348
24	Point ZM	0	796274,358365	9009467,81548
25	Point ZM	0	799564,036172	9009644,37635
26	Point ZM	0	803097,761964	9007794,14897
27	Point ZM	0	806738,796557	9008602,14855
28	Point ZM	0	807807,486924	9012183,61616
29	Point ZM	0	807925,889725	9015775,20095
30	Point ZM	0	810156,310256	9018473,307
31	Point ZM	0	811257,299384	9021560,67751
32	Point ZM	0	812592,943299	9021994,83343
33	Point ZM	0	813138,20387	9021878,94055
34	Point ZM	0	816098,590023	9023236,96031

35	Point ZM	0	820158,982627	9024508,33929
36	Point ZM	0	821347,412599	9026205,63963
37	Point ZM	0	822946,229945	9024817,07656
38	Point ZM	0	825437,902183	9023736,80974
39	Point ZM	0	827272,251415	9023360,31219
40	Point ZM	0	811320,302436	9019297,80029
41	Point ZM	0	809618,645766	9017789,54282

4) Total size of the project area: 46,592 hectares

5) Details of ownership: Private land: Landowner: Ricardo Stoppe Junior

The entire Project Area is under the control of the project proponent at the time of validation.

a) According to the rural property documentation and project design, it is demonstrated that the project will not encroach uninvited on private property, community property, or government property. It is also demonstrated that project activities do not lead to involuntary removal or relocation of Property Rights Holders from their lands or territories, and does not force them to relocate activities important to their culture or livelihood.

b) No property rights are affected by this project activity.

c) No restitution or compensation is owned to any parties, given that no other lands have been or will be affected by this project in terms of land tenure and property rights.

The item "**3.1.2.2 Identification of deforestation drivers**" of this PD has a more detailed description of the municipality of Lábrea in terms of population growth, land use and timber supply, including some statistical projections made by the project developers.

1.10 Conditions Prior to Project Initiation

Pasture accounts for virtually all the deforested land occupation in the project region[3]. The implementation of this BAU activity is usually financed by means of initial capital obtained in wood logging. It is believed that the same pattern of deforestation and land uses observed in the Reference Area might be fairly replicated into the Project Area in the absence of this REDD Project.

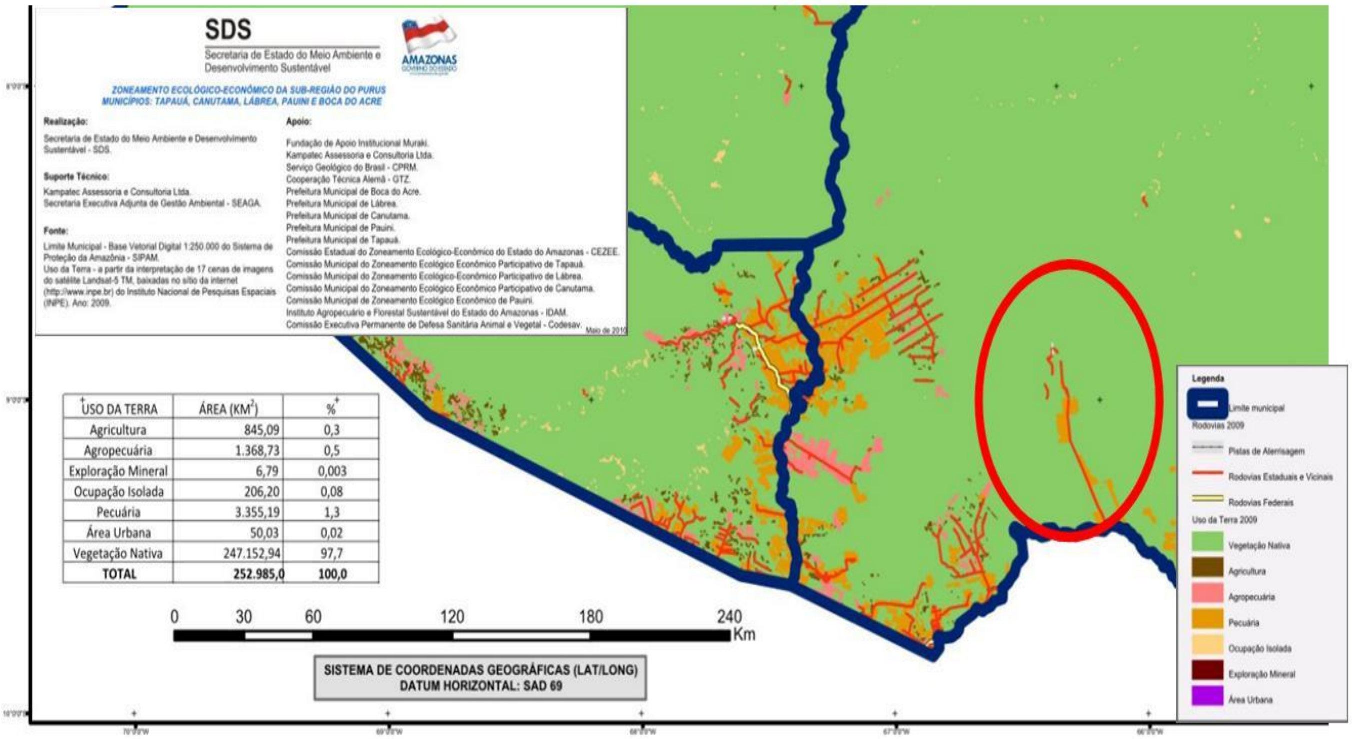


Figure 5. Map of land use in the project region in 2009, showing predominance of pasture as final land use in deforested areas (Source: MMA, 2009).

The Project Area has a forest cover characterized as Open ombrophylous forest (As, according to Brazilian Vegetation Map, IBGE). The following tables have a compilation of data on the content of biomass in this typology of vegetation, according to forest inventories performed in the region.

[3] http://www.mma.gov.br/port/conama/processos/A29EB9BD/Resumo_PropZEE_SubRegiaoPorus.pdf (pg. 73). Last visited in 18 July, 2017.

Table 2. Total above and belowground biomass (t/ha) estimated from data of forest biomass, collected from academic studies in the region of the Project Area, specifically for the forest typology present in the Project Area

Typology and Location	Source	Total aboveground biomass (t/ha)	Comments	Total above and belowground biomass (t/ha)
Open tropical forest Submontane (As) Longitude 65°39′0.6″ latitude 9°39′34.9″ 345.7 Longitude 63°15′9.9″ latitude 9°2′30.1″ 294.7 Longitude 63°9′15.1″ latitude 9°18′7.4″ 311.5 Longitude 63°3′16.4″ latitude 9°36′56.0″ 310.8, Longitude 62°15′36.7″ latitude 9°41′47.6″ 299.4 Longitude 62°20′51.7″ latitude 10°11′2.1″ 320.9	Cummings et al. (2002), Table 1, pg. 296[4]	313.8	Sampling in 6 regions; 75 m x 105 m plots, divided in 2 transects	**408.6**

Premises:
0.31 root-shoot ratio (R) was applied (average of following references: 0.37 root-shoot ratio (R), according to “2006 IPCC Guidelines for National Greenhouse Gas Inventories”, V. 4, Ch. 4, AFOLU, pg. 4.49, Table 4-4; and 0.24 root-shoot ratio, according to VM0015, Appendix 3, Table 2. Root to shoot ratios)

Based on the above data and in compliance with the directives of the methodology applied (VM0015), including the discounts for uncertainties, the above and belowground carbon stocks used in calculations for this Project Activity are compiled in item “3.1.6.1 Estimation of baseline carbon stock changes” of this VCS-PD.

The Project Area is located at the South portion of Ituxi River, inside “*Fazenda Nossa Senhora das Cachoeiras do Ituxi*” (rural property), with a total area of 46,592 hectares, as shown in the following map.

The Project Area has the second biggest Operation License (*Licença de Operação*) approved in the State of Amazonas. This license allows the landowner to harvest wood logs at left and right sides of Ituxi River. The Sustainable Forest Management area involves 24,295.68 hectares of the farm, which will be divided in Units of Forest Production (*Unidades de Produção Florestal* – UPF) of 3,663.47 hectares (1,831.74 hectares harvested per year). The allowed harvest rate is 23.28 m^3/hectare. The Operation License estimates 16.240 trees to be harvested using sustainable management practices.

[4] CUMMINGS et al. (2002). Aboveground biomass and structure of rainforests in the southwestern Brazilian Amazon. Forest Ecology and Management, (163): 293-307.

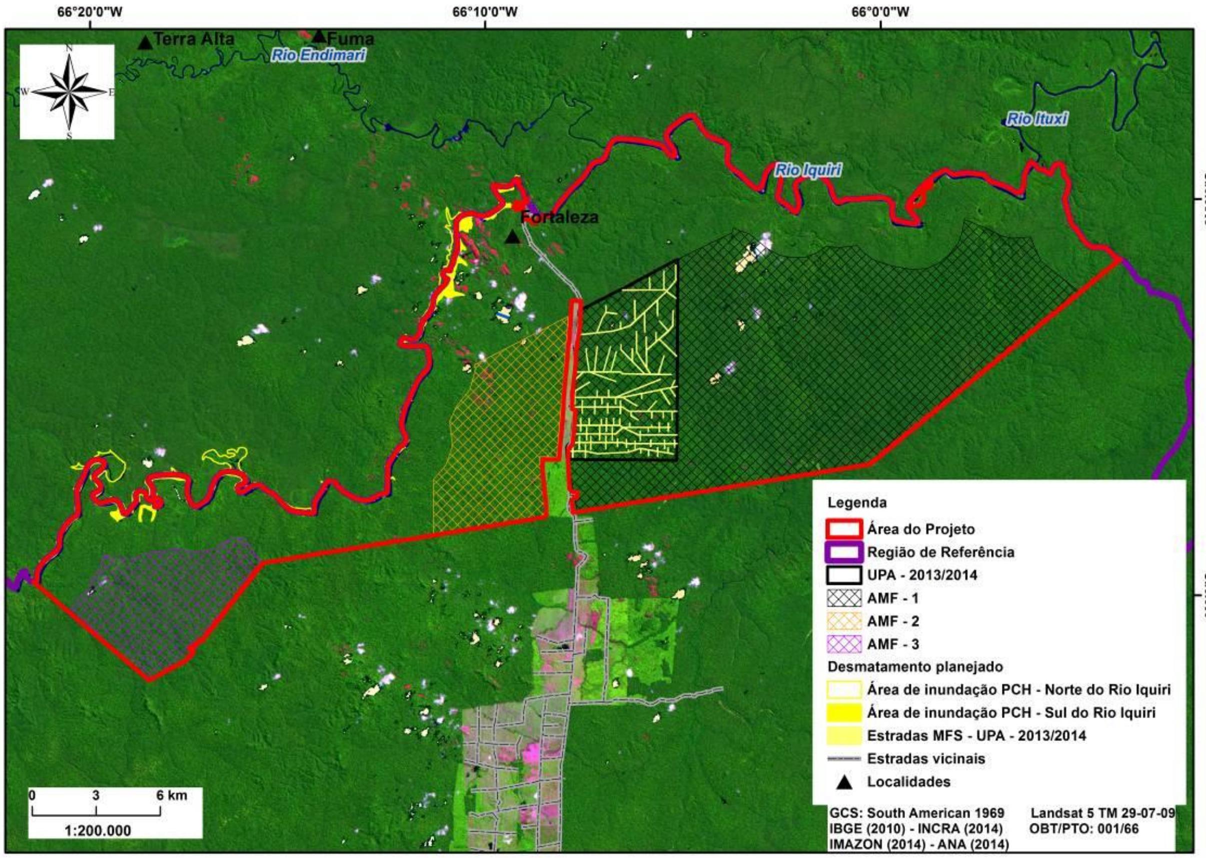


Figure 6. Project Area, Sustainable Forest Management areas (AMF-1, AMF-2, AMF-3) and planned deforestation areas (solid yellow areas)

1.11 Compliance with Laws, Statutes and Other Regulatory Frameworks

The following documents demonstrate compliance of the project with all and any relevant local, regional and national laws, statutes and regulatory frameworks.

Regulatory Frameworks: Operation License (*Licença de Operação*)

The Project Area holds the second biggest Operation License (*Licença de Operação*) of the State of Amazonas. The Operation License is the document attesting that wood extraction performed inside the Project Area is in compliance with State Laws. Only first and last pages of the Operation License are presented in this VCS-PD (the whole document is available for consultation by the audit team).

GOVERNO DO ESTADO AMAZONAS

LICENÇA DE OPERAÇÃO – L.O. Nº 028/17

O INSTITUTO DE PROTEÇÃO AMBIENTAL DO AMAZONAS – IPAAM, no uso das atribuições que lhe confere a Lei nº 3.785 de 24 de Julho de 2012, expede a presente Licença que autoriza a:

Interessado: Ricardo Stoppe Júnior		
Endereço para correspondência: Rua das Orquídeas, nº 155, Araçatuba-SP		**CEP:**
CNPJ/CPF: 199.891.288-47		**Inscrição Estadual:**
Fone: (92) 3534-7521	**Fax:**	**e-mail:**
Registro no IPAAM: 0603.3406	**Processo nº:** 4461/11/V6	**Município:** Lábrea-AM
Atividade: Exploração Florestal - **PMFS Maior Impacto de Colheita**		
Localização da Atividade: Margem direita e esquerda do Rio Ituxi, Ramal do Marmelo, km 100, "Fazenda Nossa Senhora das Cachoeiras do Ituxi, Zona Rural, Lábrea-AM		
Coordenadas geográficas do imóvel: EM ANEXO		
Finalidade: Autorizar a exploração florestal por meio de **Plano de Manejo Florestal Sustentável de Maior Impacto**, com área total de **133.107,41 ha**, UPF 2 de **5.014,23** ha, com Área de Efetiva Exploração Florestal de **4.456,3796 ha,** cujo volume a ser explorado é de **111.340,1038 m³** de madeira em tora.		
Pot. / Poluidor/Degradador: Pequeno	**Porte:** Excepcional	**Validade:** 02 Anos
Responsável Técnico pela Elaboração do PMFS: Eng. Ftal Renivaldo Rodrigues Rocha – CREA 17821-D/AM		
Anotação de Responsabilidade Técnica nº		AM20160049162 e AM 20160065165
Responsável Técnico pela Execução do PMFS: Eng. Ftal Ronivaldo Rodrigues Rocha – CREA 17821-D/AM		
Anotação de Responsabilidade Técnica nº		AM20160049162

Manaus, 08 FEV 2017

Artemisia Souza do Valle
Diretora Técnica

Ana Eunice Aleixo
Diretora Presidente

Av. Mario Ypiranga Monteiro, 3280 – Parque 10 de Novembro
Fone: (92) 3123-6760 / Fax: 3123-6756
Manaus - AM - CEP: 69.050-030
web: www.ipaam.am.gov.br

IPAAM

GOVERNO DO ESTADO AMAZONAS

ANEXO DA LICENÇA DE OPERAÇÃO – L.O. Nº 028/17

O INSTITUTO DE PROTEÇÃO AMBIENTAL DO AMAZONAS – IPAAM, no uso das atribuições que lhe confere a Lei nº 3.785 de 24 de Julho de 2012, expede a presente Licença que autoriza a:

Interessado: Ricardo Stoppe Júnior			
Endereço para correspondência: Rua das Orquídeas, nº 155, Araçatuba-SP			**CEP:**
CNPJ/CPF: 199.891.288-47		**Inscrição Estadual:**	
Fone: (92) 3634-7521	**Fax:**	**e-mail:**	
Registro no IPAAM: 0603.3406	**Processo nº: 4461/11/V6**	**Município: Lábrea-AM**	
Localização da Atividade:	**Margem direita e esquerda do Rio Ituxi, Ramal do Marmelo, km 100, "Fazenda Nossa Senhora das Cachoeiras do Ituxi, Zona Rural, Lábrea-AM**		

Coordenadas Geográficas da propriedade

PONTO	LATITUDE	LONGITUDE
P-1	8° 15' 9,029" S	65° 52' 11,834" W
P-2	8° 47' 18,420" S	65° 50' 0,788" W
P-3	8° 50' 18,841" S	65° 52' 27,341" W
P-4	8° 56' 30,097" S	66° 0' 1,932" W
P-5	8° 56' 42,874" S	66° 0' 17,591" W
P-6	8° 59' 12,313" S	66° 15' 38,855" W
P-7	9° 1' 38,359" S	66° 17' 32,961" W
P-8	9° 2' 10,248" S	66° 18' 32,112" W
P-9	8° 59' 29,413" S	66° 21' 41,466" W
P-10	8° 59' 32,221" S	66° 21' 44,685" W
P-11	8° 59' 36,272" S	66° 21' 51,527" W
P-12	8° 59' 31,760" S	66° 21' 57,481" W
P-13	8° 59' 28,803" S	66° 22' 2,443" W
P-14	8° 59' 29,204" S	66° 22' 8,461" W
P-15	8° 59' 32,393" S	66° 22' 13,280" W
P-16	8° 59' 39,165" S	66° 22' 14,049" W
P-17	8° 59' 46,221" S	66° 22' 18,154" W
P-18	8° 59' 49,694" S	66° 22' 26,243" W
P-19	8° 59' 56,844" S	66° 22' 34,502" W
P-20	9° 0' 8,568" S	66° 22' 41,256" W

PONTO	LATITUDE	LONGITUDE
P-49	9° 3' 52,173" S	66° 25' 38,915" W
P-50	9° 3' 54,864" S	66° 25' 42,299" W
P-51	9° 4' 13,631" S	66° 25' 46,387" W
P-52	9° 4' 28,116" S	66° 25' 52,339" W
P-53	9° 4' 44,917" S	66° 25' 59,158" W
P-54	9° 4' 48,150" S	66° 26' 0,869" W
P-55	9° 4' 56,945" S	66° 26' 2,509" W
P-56	9° 5' 0,267" S	66° 25' 58,459" W
P-57	9° 5' 4,594" S	66° 25' 49,297" W
P-58	9° 5' 6,249" S	66° 25' 34,786" W
P-59	9° 5' 8,928" S	66° 25' 22,592" W
P-60	9° 5' 16,372" S	66° 25' 12,687" W
P-61	9° 5' 27,706" S	66° 25' 9,890" W
P-62	9° 5' 36,737" S	66° 25' 3,606" W
P-63	9° 5' 40,454" S	66° 25' 0,208" W
P-64	9° 5' 47,360" S	66° 24' 53,580" W
P-65	9° 5' 49,673" S	66° 24' 52,844" W
P-66	9° 5' 41,285" S	66° 25' 11,887" W
P-67	9° 5' 36,953" S	66° 25' 20,362" W
P-68	9° 5' 33,676" S	66° 25' 30,663" W

Manaus, 08 FEV 2017

Artemisia Souza do Valle
Artemísia Souza do Valle
Diretora Técnica

Ana Eunice Aleixo
Diretora Presidente

Av. Mario Ypiranga Monteiro, 3280 - Parque 10 de Novembro
Fone: (92) 2123-6760 / Fax: 2123-6764
Manaus - AM - CEP: 69.050-030
web: www.ipaam.am.gov.br

IPAAM

GOVERNO DO ESTADO AMAZONAS

ANEXO DA LICENÇA DE OPERAÇÃO – L.O. Nº 028/17 fls. 02

O INSTITUTO DE PROTEÇÃO AMBIENTAL DO AMAZONAS – IPAAM, no uso das atribuições que lhe confere a Lei nº 3.785 de 24 de Julho de 2012, expede a presente Licença que autoriza a:

Interessado: Ricardo Stoppe Júnior		
Endereço para correspondência: Rua das Orquídeas, nº 155, Araçatuba-SP		**CEP:**
CNPJ/CPF: 199.891.288-47		**Inscrição Estadual:**
Fone: (92) 3634-7521	**Fax:**	**e-mail:**
Registro no IPAAM: 0603 3406	**Processo nº: 4461/11/V6**	**Município: Lábrea-AM**
Localização da Atividade:	**Margem direita e esquerda do Rio Ituxi, Ramal do Marmelo, km 100, "Fazenda Nossa Senhora das Cachoeiras do Ituxi, Zona Rural, Lábrea-AM**	

Coordenadas Geográficas da propriedade

PONTO	LATITUDE	LONGITUDE
P-21	9° 0' 25,311" S	66° 22' 48,694" W
P-22	9° 0' 39,865" S	66° 22' 55,101" W
P-23	9° 0' 50,049" S	66° 23' 4,484" W
P-24	9° 1' 2,325" S	66° 23' 10,874" W
P-25	9° 1' 13,420" S	66° 23' 15,736" W
P-26	9° 1' 37,067" S	66° 23' 24,531" W
P-27	9° 2' 1,957" S	66° 23' 34,366" W
P-28	9° 2' 9,398" S	66° 23' 37,748" W
P-29	9° 2' 24,665" S	66° 23' 43,758" W
P-30	9° 2' 40,015" S	66° 23' 43,156" W
P-31	9° 2' 44,305" S	66° 23' 42,635" W
P-32	9° 3' 0,274" S	66° 23' 46,807" W
P-33	9° 2' 58,164" S	66° 24' 1,127" W
P-34	9° 2' 51,326" S	66° 24' 13,902" W
P-35	9° 2' 49,946" S	66° 24' 15,744" W
P-36	9° 2' 50,483" S	66° 24' 18,915" W
P-37	9° 2' 54,422" S	66° 24' 28,508" W
P-38	9° 3' 3,780" S	66° 24' 31,648" W
P-39	9° 3' 10,566" S	66° 24' 34,348" W
P-40	9° 3' 19,143" S	66° 24' 23,651" W

PONTO	LATITUDE	LONGITUDE
P-69	9° 5' 32,151" S	66° 25' 40,525" W
P-70	9° 5' 33,149" S	66° 25' 52,857" W
P-71	9° 5' 22,307" S	66° 26' 9,625" W
P-72	9° 5' 13,629" S	66° 26' 20,358" W
P-73	9° 5' 9,832" S	66° 26' 35,604" W
P-74	9° 5' 12,014" S	66° 26' 49,859" W
P-75	9° 5' 16,788" S	66° 27' 2,721" W
P-76	9° 5' 22,361" S	66° 27' 13,417" W
P-77	9° 5' 35,308" S	66° 27' 13,423" W
P-78	9° 5' 37,617" S	66° 27' 13,342" W
P-79	9° 5' 34,380" S	66° 27' 24,951" W
P-80	9° 5' 34,698" S	66° 27' 33,230" W
P-81	9° 5' 37,768" S	66° 27' 39,590" W
P-82	9° 5' 41,757" S	66° 27' 42,443" W
P-83	9° 5' 50,368" S	66° 27' 46,406" W
P-84	9° 5' 59,866" S	66° 27' 45,523" W
P-85	9° 6' 7,553" S	66° 27' 42,195" W
P-86	9° 6' 12,347" S	66° 27' 34,600" W
P-87	9° 6' 14,674" S	66° 27' 27,776" W
P-88	9° 6' 22,364" S	66° 27' 6,348" W

Manaus, 08 FEV 2017

Artemisia Souza do Valle
Diretora Técnica

Ana Eunice Aleixo
Diretora Presidente

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IPAAM

GOVERNO DO ESTADO AMAZONAS

ANEXO DA LICENÇA DE OPERAÇÃO – L.O. Nº 028/17 fls. 03

O INSTITUTO DE PROTEÇÃO AMBIENTAL DO AMAZONAS – IPAAM, no uso das atribuições que lhe confere a Lei nº 3.785 de 24 de Julho de 2012, expede a presente Licença que autoriza a:

Interessado: Ricardo Stoppe Júnior		
Endereço para correspondência: Rua das Orquídeas, nº 155, Araçatuba-SP		**CEP:**
CNPJ/CPF: 199.891.288-47		**Inscrição Estadual:**
Fone: (92) 3634-7521	**Fax:**	**e-mail:**
Registro no IPAAM: 0603.3406	**Processo nº: 4461/11/V6**	**Município: Lábrea-AM**
Localização da Atividade:	**Margem direita e esquerda do Rio Ituxi, Ramal do Marmelo, km 100, "Fazenda Nossa Senhora das Cachoeiras do Ituxi, Zona Rural, Lábrea-AM**	

Coordenadas Geográficas da propriedade

PONTO	LATITUDE	LONGITUDE
P-41	9° 3' 31,819" S	66° 24' 17,538" W
P-42	9° 3' 36,427" S	66° 24' 15,967" W
P-43	9° 3' 48,130" S	66° 24' 33,130" W
P-44	9° 3' 51,128" S	66° 24' 47,737" W
P-45	9° 3' 49,207" S	66° 25' 1,300" W
P-46	9° 3' 48,505" S	66° 25' 7,785" W
P-47	9° 3' 44,682" S	66° 25' 23,815" W
P-48	9° 3' 45,558" S	66° 25' 32,809" W
P-97	9° 6' 46,063" S	66° 28' 23,297" W
P-98	9° 6' 50,208" S	66° 28' 34,626" W
P-99	9° 6' 48,254" S	66° 28' 43,674" W
P-100	9° 6' 40,665" S	66° 28' 47,099" W
P-101	9° 6' 29,501" S	66° 28' 46,228" W
P-102	9° 6' 21,257" S	66° 28' 49,003" W
P-103	9° 6' 20,496" S	66° 28' 56,602" W
P-104	9° 6' 14,501" S	66° 28' 59,950" W
P-105	9° 6' 15,101" S	66° 29' 6,754" W
P-106	9° 6' 16,273" S	66° 29' 6,811" W
P-107	9° 6' 20,534" S	66° 29' 11,462" W
P-108	9° 2' 12,258" S	66° 33' 37,886" W
P-109	8° 38' 40,339" S	66° 30' 0,268" W

PONTO	LATITUDE	LONGITUDE
P-89	9° 6' 24,196" S	66° 27' 3,193" W
P-90	9° 6' 27,940" S	66° 27' 17,502" W
P-91	9° 6' 37,408" S	66° 27' 27,026" W
P-92	9° 6' 43,350" S	66° 27' 34,643" W
P-93	9° 6' 51,154" S	66° 27' 48,172" W
P-94	9° 6' 54,204" S	66° 27' 56,334" W
P-95	9° 6' 50,382" S	66° 28' 3,398" W
P-96	9° 6' 46,628" S	66° 28' 10,953" W
P-145	8° 47' 33,566" S	66° 7' 40,251" W
P-146	8° 47' 35,540" S	66° 7' 36,851" W
P-147	8° 47' 38,439" S	66° 7' 33,101" W
P-148	8° 47' 47,510" S	66° 7' 24,171" W
P-149	8° 47' 41,149" S	66° 7' 4,668" W
P-150	8° 47' 30,676" S	66° 6' 51,868" W
P-151	8° 47' 19,005" S	66° 6' 48,362" W
P-152	8° 47' 6,196" S	66° 6' 48,951" W
P-153	8° 46' 54,539" S	66° 6' 47,211" W
P-154	8° 46' 35,454" S	66° 6' 52,197" W
P-155	8° 45' 47,094" S	66° 5' 6,584" W
P-156	8° 45' 8,620" S	66° 3' 42,544" W
P-157	8° 44' 13,043" S	66° 1' 46,023" W

Manaus, 08 FEV 2017

Artemísia Souza do Valle
Diretora Técnica

Ana Eunice Aleixo
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IPAAM

GOVERNO DO ESTADO AMAZONAS

ANEXO DA LICENÇA DE OPERAÇÃO – L.O. Nº 028/17 fls. 04

O INSTITUTO DE PROTEÇÃO AMBIENTAL DO AMAZONAS – IPAAM, no uso das atribuições que lhe confere a Lei nº 3.785 de 24 de Julho de 2012, expede a presente Licença que autoriza a:

Interessado: Ricardo Stoppe Júnior		
Endereço para correspondência: Rua das Orquídeas, nº 155, Araçatuba-SP		**CEP:**
CNPJ/CPF. 199.891.288-47		**Inscrição Estadual:**
Fone: (92) 3634-7521	**Fax:**	**e-mail:**
Registro no IPAAM: 0603.3406	**Processo nº: 4461/11/V6**	**Município: Lábrea-AM**
Localização da Atividade:	**Margem direita e esquerda do Rio Ituxi, Ramal do Marmelo, km 100, "Fazenda Nossa Senhora das Cachoeiras do Ituxi, Zona Rural, Lábrea-AM**	

Coordenadas Geográficas da propriedade

PONTO	LATITUDE	LONGITUDE	PONTO	LATITUDE	LONGITUDE
P-110	8° 58' 5,237" S	66° 26' 17,231" W	P-158	8° 42' 13,751" S	66° 0' 1,822" W
P-111	8° 54' 36,940" S	66° 24' 43,394" W	P-159	8° 42' 5,009" S	65° 59' 54,309" W
P-112	8° 48' 39,375" S	66° 11' 23,638" W	P-160	8° 41' 4,138" S	65° 59' 2,142" W
P-113	8° 48' 41,806" S	66° 11' 22,475" W	P-161	8° 39' 40,886" S	65° 57' 51,567" W
P-114	8° 48' 43,356" S	66° 11' 20,952" W	P-162	8° 43' 23,257" S	65° 54' 3,085" W
P-115	8° 48' 44,308" S	66° 11' 17,878" W	P-163	8° 43' 30,200" S	65° 54' 5,184" W
P-116	8° 48' 42,485" S	66° 11' 13,249" W	P-164	8° 43' 38,723" S	65° 54' 1,284" W
P-117	8° 48' 38,234" S	66° 11' 5,891" W	P-165	8° 43' 46,158" S	65° 53' 52,208" W
P-118	8° 48' 33,070" S	66° 10' 58,148" W	P-166	8° 43' 46,589" S	65° 53' 41,419" W
P-119	8° 48' 31,419" S	66° 10' 50,575" W	P-167	8° 43' 40,371" S	65° 53' 36,536" W
P-120	8° 48' 33,998" S	66° 10' 34,533" W	P-168	8° 43' 32,629" S	65° 53' 24,246" W
P-121	8° 48' 15,831" S	66° 10' 27,707" W	P-169	8° 43' 27,472" S	65° 53' 6,052" W
P-122	8° 48' 7,960" S	66° 10' 27,799" W	P-170	8° 43' 25,922" S	65° 52' 55,443" W
P-123	8° 48' 4,924" S	66° 10' 26,286" W	P-171	8° 43' 29,424" S	65° 52' 58,290" W
P-124	8° 48' 3,887" S	66° 10' 22,370" W	P-172	8° 43' 32,090" S	65° 53' 2,124" W
P-125	8° 48' 4,535" S	66° 10' 17,722" W	P-173	8° 43' 36,027" S	65° 53' 14,348" W
P-126	8° 48' 19,816" S	66° 9' 59,818" W	P-174	8° 43' 51,162" S	65° 53' 35,956" W
P-127	8° 48' 36,362" S	66° 9' 45,600" W	P-175	8° 43' 58,717" S	65° 53' 41,221" W
P-128	8° 48' 38,834" S	66° 9' 41,330" W	P-176	8° 44' 13,449" S	65° 53' 37,536" W
P-129	8° 48' 39,010" S	66° 9' 38,779" W	P-177	8° 44' 38,682" S	65° 53' 17,782" W
P-130	8° 48' 27,699" S	66° 9' 26,898" W	P-178	8° 44' 47,379" S	65° 53' 7,676" W
P-131	8° 48' 16,263" S	66° 9' 19,890" W	P-179	8° 44' 51,037" S	65° 52' 53,820" W

Manaus, 08 FEV 2017

Artemisia Souza do Valle
Diretora Técnica

Ana Eunice Aleixo
Diretora Presidente

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GOVERNO DO ESTADO AMAZONAS

ANEXO DA LICENÇA DE OPERAÇÃO – L.O. Nº 028/17 fls. 05

O INSTITUTO DE PROTEÇÃO AMBIENTAL DO AMAZONAS – IPAAM, no uso das atribuições que lhe confere a Lei nº 3.785 de 24 de Julho de 2012, expede a presente Licença que autoriza a:

Interessado: Ricardo Stoppe Júnior		
Endereço para correspondência: Rua das Orquídeas, nº 155, Araçatuba-SP		**CEP:**
CNPJ/CPF: 199.891.288-47		**Inscrição Estadual:**
Fone: (92) 3634-7521	**Fax:**	**e-mail:**
Registro no IPAAM: 0603.3406	**Processo nº: 4461/11/V6**	**Município: Lábrea-AM**
Localização da Atividade:	**Margem direita e esquerda do Rio Ituxi, Ramal do Marmelo, km 100, "Fazenda Nossa Senhora das Cachoeiras do Ituxi, Zona Rural, Lábrea-AM**	

Coordenadas Geográficas da propriedade

PONTO	LATITUDE	LONGITUDE
P-132	8° 48' 8,924" S	66° 9' 17,167" W
P-133	8° 48' 18,304" S	66° 9' 6,044" W
P-134	8° 48' 12,962" S	66° 8' 52,058" W
P-135	8° 47' 57,650" S	66° 8' 35,827" W
P-136	8° 47' 45,312" S	66° 8' 25,688" W
P-137	8° 47' 23,313" S	66° 8' 15,460" W
P-138	8° 47' 24,016" S	66° 8' 9,602" W
P-139	8° 47' 28,701" S	66° 8' 9,729" W
P-140	8° 47' 34,305" S	66° 8' 6,842" W
P-141	8° 47' 39,041" S	66° 8' 0,855" W
P-142	8° 47' 42,379" S	66° 7' 55,042" W
P-143	8° 47' 40,541" S	66° 7' 48,648" W
P-144	8° 47' 37,259" S	66° 7' 44,684" W

PONTO	LATITUDE	LONCITUDE
P-180	8° 44' 49,977" S	65° 52' 43,566" W
P-181	8° 44' 47,020" S	65° 52' 35,943" W
P-182	8° 44' 34,032" S	65° 52' 22,455" W
P-183	8° 44' 15,298" S	65° 52' 17,970" W
P-184	8° 44' 7,984" S	65° 52' 14,240" W
P-185	8° 44' 12,572" S	65° 52' 2,861" W
P-186	8° 44' 17,040" S	65° 52' 4,490" W
P-187	8° 44' 29,054" S	65° 52' 6,318" W
P-188	8° 44' 43,768" S	65° 52' 4,430" W
P-189	8° 44' 50,059" S	65° 52' 6,339" W
P-190	8° 44' 57,028" S	65° 52' 15,432" W

Manaus, 08 FEV 2017

Artemisia Souza do Valle
Diretora Técnica

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IPAAM

GOVERNO DO ESTADO AMAZONAS

ANEXO DA LICENÇA DE OPERAÇÃO – L.O. Nº 028/17 fls. 06

O INSTITUTO DE PROTEÇÃO AMBIENTAL DO AMAZONAS – IPAAM, no uso das atribuições que lhe confere a Lei nº 3.785 de 24 de Julho de 2012, expede a presente Licença que autoriza a:

Interessado: Ricardo Stoppe Júnior		
Endereço para correspondência: Rua das Orquideas, nº 155, Araçatuba-SP		**CEP:**
CNPJ/CPF: 199.891.288-47		**Inscrição Estadual:**
Fone: (92) 3634-7521	**Fax:**	**e-mail:**
Registro no IPAAM: 0603.3406	**Processo nº: 4461/11/V6**	**Município: Lábrea-AM**
Localização da Atividade:	**Margem direita e esquerda do Rio Ituxi, Ramal do Marmelo, km 100, "Fazenda Nossa Senhora das Cachoeiras do Ituxi, Zona Rural, Lábrea-AM**	

Coordenadas Geográficas da UPF2 – UT 1

PONTO	LATITUDE	LONGITUDE
UPF02_UT01-01	8° 53' 3.97" S	66° 8' 6.64" W
UPF02_UT01-02	8° 56' 17.06" S	66° 8' 21.87" W
UPF02_UT01-03	8° 56' 19.26" S	66° 8' 45.21" W
UPF02_UT01-04	8° 57' 22.97" S	66° 8' 46.37" W
UPF02_UT01-05	8° 57' 41.51" S	66° 11' 21.04" W
UPF02_UT01-06	8° 57' 5.60" S	66° 11' 20.63" W
UPF02_UT01-07	8° 56' 44.19" S	66° 11' 1.83" W
UPF02_UT01-08	8° 56' 15.38" S	66° 10' 51.74" W
UPF02_UT01-09	8° 55' 38.31" S	66° 10' 56.03" W
UPF02_UT01-10	8° 55' 14.78" S	66° 10' 45.57" W
UPF02_UT01-11	8° 54' 49.40" S	66° 10' 25.48" W
UPF02_UT01-12	8° 54' 18.95" S	66° 10' 16.74" W
UPF02_UT01-13	8° 54' 12.12" S	66° 10' 18.22" W

Manaus, 08 FEV 2017

Artemisia Souza do Valle
Diretora Técnica

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Brazilian Forest Code has the following definitions:

"III – Legal Reserve (LR): area located inside a rural estate, excluding the Area of Permanent Preservation, necessary to sustainable use of natural resources, to conservation and rehabilitation of ecological processes, to conservation of biodiversity and to shelter and protection of native fauna and flora.

VI – Legal Amazon: the States of Acre, Pará, Amazonas, Roraima, Rondônia, Amapá and Mato Grosso, and the regions located to the North of parallel 13º S, in States of Tocantins and Goiás, and to the West of meridian 44º W, of the State of Maranhão."

Figure 7. Brazilian Legal Amazon: Legal Amazon States: Acre (AC), Amapá (AP), Amazonas (AM), Maranhão (MA), Mato Grosso (MT), Pará (PA), Rondônia (RO), Roraima (RR), Tocantins (TO) (ancient North of Goiás). Source: Leal et al. (1990)

The Legal Reserve (LR) must be registered in property deed in the Real Estate Registry Office: its location must be publicly known, and future landowners must know where it is located, its boundaries and frontiers. The LR can be located anywhere inside a rural estate. Brazilian Forest Code determines that, once allocated, LR may not be changed even in cases of real estate transfer, land dismembering or area rectification.

The LR allocation is a pre-requirement to obtaining permission to exploitation of the native vegetation existing inside the rural estate. In order to obtain this Permit for Forestry Stewardship, the landowner must previously register the location of the LR in land property documents through the Real Estate Registry Office, before suppressing any kind of native vegetation.

According to Provisory Measure No. 2166-67 (*Medida Provisória* nº 2.166-67) of August 24, 2001:

“Article 16. The forests and other types of native vegetation, excepting those located in Areas of Permanent Preservation, as well as those not subject to the politics of restricted use or subject to specific legislation, are susceptible to suppression, as long as a portion of vegetation is preserved, as Legal Reserve, at a minimum:

I – eighty percent (80%), in rural estates located in forest zones located in the Legal Amazon.”

Thus, in compliance with Brazilian Forest Code, the farm has officially allocated 80% of its total area as LR.

In spite of the legal provisions intended to preserve at least 80% of the Amazon Forest coverage, lack of law enforcement by local authorities along with public policies seeking to increase commodities production and encourage land use for agricultural, bio energy and cattle breeding purposes created a scenario of almost complete disregard of the mandatory provisions of the Forest Code. High rates of criminality associated with land disputes usually jeopardize efforts concerning law enforcement improvement. In addition to that, to cover vast distances of areas with low demographic density makes tracking of illegal activities and land surveillance very difficult for the authorities. Accordingly, policies implemented to address illegal deforestation only by means of command and control approaches have proven to be ineffective so far[5].

Given the permanent attempts against the Project Area, the project proponent uses its best efforts to prevent property invasion and to remain in compliance with Brazilian Forest Code. The farm holds sustainable logging activities. These activities are carried out according to a Sustainable Forest Management Plan previously approved by the Amazonas State Government. This management plan was conceived in accordance with Brazilian Forest Code and local regulation. As previously shown, the project proponent holds the second greatest Operation License (*Licença de Operação*) approved in the State of Amazonas.

1.12 Ownership and Other Programs

1.12.1 Project Ownership

The Full Content Certificate (*Certidão de Inteiro Teor*), presented below, is the document where the history of the rural property is compiled. The document indicates that Ricardo Stoppe Júnior (project proponent) has purchased the entire rural property in 2004 (110,372 hectares) and is the current landowner. The project area is the portion of the rural land at the South of Iquiri River.

[5] REDD no Brasil: um enfoque amazônico: fundamentos, critérios e estruturas institucionais para um regime nacional de Redução de Emissões por Desmatamento e Degradação Florestal – REDD. – Brasília, DF: Centro de Gestão e Estudos Estratégicos, 2011, pages 31 and 34-35.

Property Rights and Compliance with Laws
(Certidão de Inteiro Teor; Whole Content Certificate)

REPÚBLICA FEDERATIVA DO BRASIL

CARTÓRIO 1º OFÍCIO DE LÁBREA - AMAZONAS

Avenida 14 de Maio, nº 2242 – Centro
Fone Fax (097) 3331 – 1195
e-mail: [illegible]

LÁBREA - AMAZONAS

LUCIANA DA CRUZ BARRONCAS - OFICIALA
SEBASTIÃO BARBOSA FARIAS – ESCREVENTE AUTORIZADO
RENATA LIMA MAIA – ESCREVENTE AUTORIZADA

CERTIDÃO DE INTEIRO TEOR

CARTÓRIO 1º OFÍCIO DE LÁBREA
Luciana da Cruz Barroncas
Escrivã Tabeliã-Oficiala
CPF: 808.573.574-87
Sebastião Barbosa Farias
Escrevente Autorizado
CPF: 207.726.492-04
Renata Lima Maia
Escrevente Autorizada
CPF: 525.754.842-53

LUCIANA DA CRUZ BARRONCAS, Oficiala do Registro de Imóveis da Comarca de Lábrea, Estado do Amazonas, em pleno exercício do cargo, na forma da lei, etc....,

Certifica

em virtude de atribuições que lhe são conferidas por Lei e a requerimento verbal de pessoa interessada, que revendo neste **ARQUIVO** e **CARTÓRIO**, os livros competentes, deles verifiquei constar no Livro **2-E**, de Registro Geral de Imóveis, às fls. **90**, o registro do teor seguinte: **MATRÍCULA: 1.285. DATA**: 01 de julho de 1986. **IMÓVEL**: Uma área situada na Gleba Ituxi, neste Município e Comarca de Lábrea, Estado do Amazonas, denominada por "**Quinhão número Dois (02)**", com 113.372 has (cento e treze mil, trezentos e setenta e dois hectares) e 783,50 m² (setecentos e oitenta e três metros quadrados e cinqüenta centímetros), com os seguintes limites: começando no marco 1, cravado na margem esquerda do Rio Ituxi e comum com terras da Gleba do condomínio Dirio Ricartes de Oliveira e segue por uma linha de 10.000 metros ao rumo magnético 70°00'NW até o marco 2, igual ao marco 12 do perímetro; daí, passa a confrontar com a Gleba Redenção por uma linha de 33.400 metros ao rumo magnético 37°30'NE até o marco 3; daí, por uma linha de 17.300 metros ao rumo magnético 46°00'NE - até o marco 4; daí, por uma linha de 6.900 metros ao rumo magnético 81°15'SE até o marco 5; daí, por uma linha 7.00 metros ao rumo magnético 24°30'NE até o marco 6; daí, passa a confrontar com a Gleba

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Sepatini de Trajano Alves da Costa ou sucessores por uma linha de 29.200 metros ao rumo magnético - 66°12'NE cruzando o Rio Antimari ou Endimari até o marco 7; daí, por uma linha de 17.000 metros ao rumo magnético 65°40'NE até o marco 8; daí, por uma linha de 4.300 metros ao rumo magnético 70°00'NE até o marco 9, igual ao marco 19 do perimetro; daí, por uma linha de 20.500 metros ao rumo magnético 45°12'SE até o marco 10; daí, passa a confrontar com o Seringal Amazonas por uma linha de 18.600 metros ao rumo magnético 51°05'SW até o marco 11; daí, por uma linha de 29.000 metros ao rumo magnético 83°34'SE até o marco 12; daí, por uma linha de 6.300 metros ao rumo magnético 27°20'SW até o marco 13; daí, por uma linha de 16.840 metros ao rumo magnético 62°35'SW até o marco 14; daí por uma linha de 14.300 metros ao rumo magnético 33°45'SW até o marco 15; daí, por uma linha de 7.350 metros ao rumo 33°00'SW até o marco 16; daí, por uma linha de 4.000 metros ao rumo magnético 23°00'SE até o marco 17 cravado com terras da Gleba Ituxi, segue pela divisória numa distância de 3.740 metros ao rumo magnético 64°55'NW até o marco 18; daí, por uma linha divisória com terras de parte da Gleba Ituxi, numa distância de 13.700 metros ao rumo magnético 50°00'NW até o marco 19, cravado na margem direita do Rio Ituxi; daí em diante sobe pelo mesmo rio, servindo de limites o seu leito com rumos e distâncias diversas até o marco 1 ou ponto de partida. <u>CONFRONTAÇÕES</u>: Ao Norte com terras da Gleba Novo Axioma, Gleba Redenção e Gleba Sepatini de Trajano Alves da Costa ou sucessores; ao Sul, com parte da Gleba Ituxi, Rio Ituxi e Seringal Amazonas; ao Nascente, com a gleba desmembrada e ao Poente, com o Quinhão de Dirio Ricartes de Oliveira e sua mulher (resultante da divisão amigável entre os 2 (dois) condomínios). <u>PROPRIETÁRIOS</u>: **IRINEU DE PAULA PIRES**, RG. nº 3.055.059/SP, proprietário e sua mulher dona **ALBERTINA ROSA DE OLIVEIRA LINO PIRES**, RG. nº 3.56020-SSP/SP., professora, residentes nesta cidade, à Rua Júlio Prestes nº 1.109, possuidores do CPF 312.531.138-15; **MOACYR TRENTIN**, RG. nº 5.316.795-SP., proprietário, e sua mulher dona **ANY PENTEADO TRENTIN**, RG. nº 4.909.340-SP., do lar, residentes em Presidente Prudente-SP., à Rua General Osório nº 315, possuidores do CPF 436.387.918-15; **JOAQUIM BRAZ GOMES ROSA**, RG. nº 2.359.269-SP., proprietário, e sua mulher dona **FILISMINA TEIXEIRA ROSA**, RG. nº 3.747.469-SP., do lar, residentes em Tupã, Estado de São Paulo, possuidores do CPF 013.107.988-34. <u>REGISTRO ANTERIOR</u>: Matrícula 763, fls. 191/192, Livro 2-B, deste Cartório. Lábrea, 02 de julho de 1986. (a) Escrevente Juramentado. <u>AV-1/1.285 - DESMEMBRAMENTO</u>: Nos termos da Escritura Pública de Dação em Pagamento, lavrada nas Notas do 3º Cartório de Notas da Comarca de Presidente Prudente - São Paulo, em 19 de junho de 1986, fls. 197, Livro 183, pelo Oficial Maior, Bel. Paulo Roberto Ramos, do imóvel objeto da presente matrícula foi desmembrada uma área de 3.000 ha (três mil hectares), pelos proprietários: **IRINEU DE PAULA PIRES**, e sua mulher **ALBERTINA ROSA DE OLIVEIRA LINO PIRES**; **MOACYR TRENTIN**, e sua mulher **ANY PENTEADO TRENTIN**; e **JOAQUIM BRAZ GOMES ROSA**, e sua mulher **FILISMINA TEIXEIRA ROSA**, acima qualificados, em favor de <u>**JOAQUIM VILLAS BOAS**</u>, brasileiro, administrador de fazendas, residente e domiciliado em Campo Grande-MS., à Rua dona Henriqueta de Almeida nº 109 - Vila Leda, conforme matrícula 1.286, Livro 2-E, fls. 91, ficando uma área remanescente de 110.372 ha e 783,50 m². Lábrea, 03 de julho de

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1986. Escrevente Juramentado. AV-2/1.285 - TERMO DE RESPONSABILIDADE DE AVERBAÇÃO DE RESERVA LEGAL - TRARL: De acordo com o Termo de Responsabilidade de Averbação de Reserva Legal, firmado aos 18 de novembro de 1997, junto ao IBAMA, firmado pelo proprietário e pelo Superintendente do IBAMA/AC, Antonio Paceya Ihauraqui, se comprometem os proprietários da matrícula supra, perante a autoridade florestal, tendo em vista o que dispõe a Portaria nº 48/95, em atendimento ao que determina o parágrafo único do artigo 44 de Lei nº 4771/65 e inciso 1º do artigo 8º do Decreto nº 1282/94, que a floresta ou forma de vegetação existente, com a área de **110.372 ha**, não inferior a 80% (oitenta por cento) do total da propriedade, fica gravada como de utilização limitada, não podendo nela ser feito qualquer tipo de exploração sem autorização do IBAMA. Comprometem-se os atuais proprietários por si, seus herdeiros e sucessores, fazerem o presente gravame sempre bom, firme e valioso. **Declaram, ainda, possuirem pleno conhecimento das sanções que ficará sujeito nas transgressões dos dispositivos capitulados pelas normas legais, sem prejuízo das demais sanções legais cabíveis. Fica a área vinculada ao Instituto Brasileiro do Meio Ambiente e dos Recursos Naturais Renováveis - IBAMA - a contar desta data.** **AV-3/1.285:** Nos termos do requerimento o proprietário dirigido a este Cartório e pelo levantamento planimétrico efetuado pelo Engenheiro Agrimensor Dr. Dirio Ricartes de Oliveira - CREA 43.199/D, que juntou o respectivo Memorial Descritivo e Mapa Demarcatório, o imóvel objeto da presente matrícula, passa a ter a **DENOMINAÇÃO, LOCALIZAÇÃO, ÁREA E LIMITES E CONFRONTAÇÕES** seguintes: **DENOMINAÇÃO:** **"FAZENDA FORTALEZA"**, **LOCALIZAÇÃO:** - parte da Gleba Ituxi, situada às margens do rio Ituxi ou Aquiri neste Município e Comarca de Lábrea, Estado do Amazonas, **ÁREA:** 110.372 ha e 0,780 m² (cento e dez mil, trezentos e setenta e dois hectares e setecentos e oitenta metros quadrados). **LIMITES E CONFRONTAÇÕES:** **Ao Norte**, com a Gleba Redenção e terras de Trajano Alves da Costa ou sucessores; **Ao Sul**, com Guerino Otávio Tassi e outros, Nery Constante de Oliveira e Seringal Amazonas; **Ao Este**, com Frederico Nicolau Scheffer; **Ao Oeste**, com Joaquim Villas Boas e rio Ituxi ou Aquiri. **DESCRIÇÃO DO PERÍMETRO:** Começando no **MARCO 01** (M1), na margem esquerda do rio Ituxi ou Aquiri, com coordenada de U.T.M E- 8.992.154,102 m e N-779.206,409 m e 09º05'31"E e 66º27'37"N geográficas referenciadas ao Meridiano de 69º00'00" e ao Equador, segue por uma linha de 8.321,473 m e azimute verdadeiro de 285º05'32" até a ESTACA E02 ou **MARCO 02** (M2); daí, por uma linha de 11.665.177 m e azimute verdadeiro 36º07'11" até a ESTACA 03 ou **MARCO 03** (M3), dividindo com a Gleba Redenção; daí, por uma linha de 17.508,689 m com azimute verdadeiro 42º34'21" dividindo com a mesma Gleba Redenção até a ESTACA E03 ou **MARCO 04** (M4); daí, por uma linha de 6.860,780 m e azimute verdadeiro 96º26'02", dividindo com a Gleba Redenção até a ESTACA 05 ou **MARCO 05** (MP5); daí, por uma linha de 7.900,00 m e azimute verdadeiro 58º14'57" dividindo com terras da Gleba Sepatini de Trajano Alves da Costa ou sucessores até a ESTACA E06 ou **MARCO 06** (M6); daí, pela divisa dos mesmos confrontantes numa linha de 23.507,780 m e azimute verdadeiro 58º14'57" até a ESTACA 07 ou **MARCO 07** (M7); daí, ainda pela divisa do mesmo confrontante por uma linha de 7.900,00 m e azimute verdadeiro 81º20'12" dividindo com os mesmos confrontantes até a ESTACA E08 ou **MARCO 08** (M8); daí, por uma

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linha de 4.480,966 m com azimute verdadeiro de 58°34'47" dividindo com a mesma Gleba Redenção até a ESTACA E09 ou **MARCO 09** (*M9*) na divisa das terras de Frederico Nicolau Scheffer; daí, pela divisa desse confrontante numa linha de 19.033,742 m e azimute verdadeiro de 136°36'14" até a ESTACA E10 ou **MARCO 10** (M10); daí, por uma linha de 6.855,724 m e azimute verdadeiro 216°09'40" até a ESTACA E11 ou **MARCO 11** (M11); daí, por uma linha de 26.700,00 m e azimute verdadeiro 264°32'29" dividindo com terras do Seringal Amazonas até a ESTACA 12 ou **MARCO 12** (M12); daí, por uma linha de 6.280,871 m e azimute verdadeiro 210°03'36" até a ESTACA E13 ou **MARCO 13** (M13); daí, por uma linha de 16.978,240 m e azimute verdadeiro 243°16'46", dividindo com terras do Seringal Amazonas e terras de Nery Constante de Oliveira até a ESTACA E14 **MARCO 14** (M14); daí, por uma linha de 2.983,580 m e azimute verdadeiro 202°08'25" dividindo com terras desse último confrontante até a ESTACA E15 ou **MARCO 15** (M15); daí, por uma linha de 10.517,355 m e azimute verdadeiro 307°26'46" dividindo com terras de Nery Constante de Oliveira e Guerino Otávio Tassi e outros, até a ESTACA E16 **MARCO 16** (*M16*) na margem direita do rio Ituxi ou Aquiri a 187,030 m do seu leito; daí, numa linha resultante de 16.271,024 m e azimute verdadeiro 220°13'55" até a ESTACA 01, **MARCO 01** (M1), ou ponto de partida desta descrição. Lábrea, 31 de Março de 2000. (a) Antonio Luiz Mendes da Silva, O Oficial. Era o que se continha em o referido registro do que bem e fielmente extraí este traslado. **AV-4/1.285**: Nos termos do OFÍCIO/GAB-DRF/PPE/SP/Nº 334/2001, datado de 27 de novembro de 2001, firmado por Ivan Silveira Malheiros - Delegado da Receita Federal em Presidente Prudente, Estado de São Paulo - Matrícula 25.143, e nos termos do § 5º, do art. 64, da Lei nº 9.532, da 10 de dezembro de 1997, procedo a presente averbação, para ficar constando que fica vedada a alienação, transferência ou oneração do imóvel objeto desta matrícula, cuja ocorrência tão somente poderá ser processada mediante autorização da Delegacia/Inspetoria da Receita Federal em Presidente Prudente, Estado de São Paulo. Lábrea, 08 de janeiro de 2002. (a) Antonio Luiz Mendes da Silva, O Oficial. **R-5/1.285**: **FORMAL DE PARTILHA**: Nos termos do Formal de Partilha, passado pela 5ª Vara Cível da Comarca de Presidente Prudente, Estado de São Paulo, extraído dos Autos de Arrolamento - Convertido em Inventário de bens por falecimento de **MOACYR TRENTIN** (Processo nº 1552/2001), e por sentença prolatada pelo *Meritíssimo* Juiz de Direito, Doutor Sérgio Elorza Barbosa de Moraes, em data de 20 de dezembro de 2003, que a área de ***73.581,3320 has (setenta e três mil, quinhentos e oitenta e um hectares, trinta e três ares e vinte centiares)*** equivalente a 2/3 (dois terços) do imóvel objeto desta matrícula, em comum com **JOAQUIM BRAZ GOMES ROSA**, acima qualificado, pessou a pertencer a **MARCOS PENTEADO TRENTIN**, brasileiro, casado, comerciante, portador da Cédula de Identidade Registro Geral número 11.512.967-4, expedida pela Secretaria de Segurança Pública do Estado de São Paulo e do Cartão de Pessoa Física (CPF) número 054.122.638-01, domiciliado e residente à Rua Quincas Vieira, 928 - Vila Dubus, na cidade Presidente Prudente, Estado de São Paulo, avaliada para efeitos fiscais, pelo Setor de Terras e Tributos da Prefeitura Municipal desta cidade, em R$ 550.000,00 (quinhentos e cinquenta mil reais). O Imposto "*causa mortis*", foi recolhido através do Documento de Arrecadação Estadual (DAEMS), conforme Guia BB02201 105 610

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190402**************** 72.250,00R AR21, autenticada mecanicamente pelo Banco Bradesco S/A. Foram-me apresentadas, em cópias, as certidões exigidas por Lei. Lábrea, 09 de novembro de 2006. (a) Antonio Luiz Mendes da Silva, O Oficial. **R-6/1.285: CONTRATO PARTICULAR DE COMPRA E VENDA DE IMÓVEL RURAL**: Nos termos do Contrato Particular de Compra e Venda de Imóvel Rural, datado de 12 de novembro de 2004, devidamente com firma reconhecida e registrado em Títulos e Documentos nesta Serventia, sob número de ordem 1.505, às fls. 047 e verso, do Livro 26, a área de ***73.581,3320 has (setenta e três mil, quinhentos e oitenta e um hectares, trinta e três ares e vinte centiares)*** equivalente a 2/3 (dois terços) do imóvel objeto desta matrícula, que em sua totalidade possui 110.372 ha e 0,780 m² (cento e dez mil, trezentos e setenta e dois hectares e setecentos e oitenta metros quadrados) e cujo 1/3 (um terço) pertence a **JOAQUIM BRAZ GOMES ROSA**, acima qualificado, foi por seus proprietários: **MARCOS PENTEADO TRENTIN**, comerciante, portador da Cédula de Identidade Registro Geral número 11.512.967-4, expedida pela Secretaria de Segurança Pública do Estado de São Paulo e do Cartão de Pessoa Física (CPF) número 054.122.638-01 e sua esposa **DENISE GREGORY TRENTIN**, psicóloga, portadora da Cédula de Identidade nº 13.929.839-3-SSP/SP e do CPF/MF nº 561.563.329-87, brasileiros, casados entre si sob o regime de comunhão parcial de bens, domiciliados e residentes à Rua Quincas Vieira, 928 - Vila Dubus, na cidade Presidente Prudente, Estado de São Paulo, pela "Cláusula Segunda" do mencionado instrumento foi vendida ao promissário comprador: **RICARDO STOPPE JÚNIOR**, brasileiro, casado, médico, portador da Cédula de Identidade RG. nº 13.2851.787 (SSP - SP) e do CPF/MF nº 199.891.288-47, residente e domiciliado na cidade de Carapicuíba, Estado de São Paulo, à Estrada da Fazendinha, 5.640, pelo valor de R$ 1.700.000,00 (hum milhão e setecentos mil reais), a serem pagos da seguinte forma: R$ R$ 695.000,00 (seiscentos e noventa e cinco mil reais), no dia 20 de novembro de 2004; R$ 200.000,00 (duzentos mil reais), em 20 de janeiro de 2005; R$ 400.000,00 (quatrocentos mil reais) em 20 de janeiro de 2006; R$ 200.000,00 (duzentos mil reais), em 20 de janeiro de 2007; R$ 205.000,00 (duzentos e cinco mil reais), em 20 de janeiro de 2008. O não pagamento pelo comprador nas datas dos respectivos vencimentos de qualquer das parcelas e dos encargos a que está obrigado por força deste instrumento, e interpelado judicialmente ou notificado através de Cartório de Títulos e Documentos, não pagar a mora no prazo de 15 (quinze) dias, contados do recebimento da interpelação ou da notificação, acarretará de pleno jure, a rescisão deste contrato, rescisão essa que se operará em favor dos vendedores, perdendo o comprador como conseqüência, desde logo, a posse dos bens objeto desta transação, descrito na cláusula 1 retro sem direito a retenção por benfeitorias úteis, necessárias ou voluptuárias e ou indenização de qualquer natureza, o qual deverá ser restituído incontinente, sob pena de não o fazendo caracterizar esbulho possessório, conforme disposições contidas nos artigos 1.210 e seguintes do Código Civil, ensejando aos vendedores o direito de postularem a reintegração da posse do aludido imóvel, que se processará na forma estabelecida nos artigo 926 e seguintes do Código de Processo Civil e demais disposições afetas à matéria. O comprador entra na posse precária do imóvel transacionado, nela permanecendo enquanto adimplidas as condições avençadas neste

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instrumento, o qual fica fazendo parte integrante deste registro, formando um todo único e indivisível. Lábrea, 14 de novembro de 2006. (a) Antonio Luiz Mendes da Silva, O Oficial. **AV-7/1.285: RETIFICAÇÃO DE AVERBAÇÃO**: Procedo a presente averbação "ex officio", para ficar constando que a AVERBAÇÃO de que se trata o **AV-4/1.285**, passa a ter a seguinte redação: **Nos termos do OFÍCIO/GAB-DRF/PPE/SP/Nº 334/2001, datado de 27 de novembro de 2001, firmado por Ivan Silveira Malheiros - Delegado da Receita Federal em Presidente Prudente, Estado de São Paulo - Matricula 25.143, e nos termos do § 5º, do art. 64, da Lei nº 9.532, de 10 de dezembro de 1997, procedo a presente averbação, para ficar constando que na ocorrência de alienação, transferência ou oneração do imóvel objeto desta matricula, será "incontinenti" informada a Delegacia/Inspetoria da Receita Federal em Presidente Prudente, Estado de São Paulo, em face do caráter acautelatório do Arrolamento de Bens, no que se refere a Lei supra mencionada.** Lábrea, 23 de março de 2007. (a) Antonio Luiz Mendes da Silva, O Oficial, conforme Sentença prolatada pela M.M. Juíza de Direito, Dra. Kathleen dos Santos Gomes, nos autos da Ação de Restauração de Dados com o Pedido de Tutela Antecipada (Processo n.º 066/2008), procedo a restauração do Av-7/1.285. Lábrea, 23 de setembro de 2008. (a) Luciana da Cruz Barroncas, a Oficiala. **AV-8/1.285: GEORREFERENCIAMENTO:** Nos termos do requerimento do proprietário **MARCOS PENTEADO TRENTIN**, comerciante, portador da Cédula de Identidade Registro Geral número **11.512.967-4**, expedida pela Secretaria de Segurança Pública do Estado de São Paulo e do Cartão de Pessoa Física (CPF) número 054.122.638-01, domiciliado e residente à Rua Quincas Vieira, 928 - Vila Dubus, na cidade Presidente Prudente, Estado de São Paulo e pelo Georreferenciamento, efetuado pelo Engenheiro Agrimensor Laurionor Thadeu Barbosa - CREA - 59.727-D/SP, que juntou o respectivo Memorial Descritivo e Mapa Demarcatório, que a área correspondente a ***2/3 (dois terços)*** do imóvel objeto da presente matricula, passa a ter a **DENOMINAÇÃO, ÁREA, LIMITES E CONFRONTAÇÕES**: seguintes: **DENOMINAÇÃO**: **"FAZENDA NOSSA SENHORA DAS CACHOEIRAS DO ITUXI"**, situada neste Município e Comarca de Lábrea, Estado do Amazonas. **ÁREA**: ***73.581,4507 há (setenta e três mil, quinhentos e oitenta e um hectares, quarenta e cinco ares e sete centiares)***, e um perimetro de: 220.424,6650 mls. (duzentos e vinte mil quatrocentos e vinte e quatro metros lineares,sessenta e seis mil, vinte e sete metros lineares e quarenta e nove centimetros). **DESCRIÇÃO DO PERÍMETRO**: Inicia-se a descrição deste perimetro no vértice **BX3-M-073** de coordenadas **N= 9.042.063,62m** e **E= 834.713,07m** representadas no Sistema UTM, referenciadas ao Meridiano Central nº 69° WGr tendo como datum o UGGI-67/SAD69, situado na extremidade nordeste do referido imóvel, local onde este limita com a GLEBA SEPATINI - TRAJANO ALVES DA COSTA E SUCESSORES e com TERRAS COM QUEM DE DIREITO; deste segue confrontando com TERRAS DE QUEM DE DIREITO com azimute plano de 134°46'21" e distância de 8.789,07m até o vértice **BX3-M-074** de coordenadas **N= 9.035.873,530m** e **E= 840.952,510m**; local onde este limita com TERRAS COM QUEM DE DIREITO E SUCESSORES e com a margem esquerda do RIO ITUXI; deste segue pela margem esquerda do RIO ITUXI a montante com os seguintes azimutes e distâncias: 194°03'15" e 69,96m até o vértice **BX3-P-189** de coordenadas **N= 9.035.805,660m** e **E=**

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840.935,520m; 169°11'20" e 260,81m até o vértice BX3-P-190 de coordenadas N= 9.035.549,480m e E= 840.984,440m; 151°47'47" e 269,17m até o vértice BX3-P-191 de coordenadas N= 9.035.312,270m e E= 841.111,650m; 112°34'05" e 148,34m até o vértice BX3-P-192 de coordenadas N= 9.035.255,340m e E= 841.248,630m; 64°08'04" e 239,24m até o vértice BX3-P-193 de coordenadas N= 9.035.359,710m e E= 841.463,900m; 45°47'15" e 447,13m até o vértice BX3-P-194 de coordenadas N= 9.035.671,500m e E= 841.784,380m; 75°56'07" e 395,90m até o vértice BX3-P-195 de coordenadas N= 9.035.767,710m e E= 842.168,410m; 86°02'18" e 549,27m até o vértice BX3-P-196 de coordenadas N= 9.035.805,660m e E= 842.716,370m; 113°18'50" e 191,78m até o vértice BX3-P-197 de coordenadas N= 9.035.729,760m e E= 842.892,490m; 195°26'26" e 110,24m até o vértice BX3-P-198 de coordenadas N= 9.035.623,500m e E= 842.863,140m; 231°52'51" e 273,63m até o vértice BX3-P-199 de coordenadas N= 9.035.454,590m e E= 842.647,870m; 252°05'16" e 339,35m até o vértice BX3-P-200 de coordenadas N= 9.035.350,220m e E= 842.324,970m; 237°37'27" e 602,46m até o vértice BX3-P-201 de coordenadas N= 9.035.027,620m e E= 841.816,160m; 221°44'50" e 396,78m até o vértice BX3-P-202 de coordenadas N= 9.034.731,590m e E= 841.551,970m; 165°32'38" e 274,36m até o vértice BX3-P-203 de coordenadas N= 9.034.465,920m e E= 841.620,460m; 141°45'07" e 964,15m até o vértice BX3-P-204 de coordenadas N= 9.033.708,740m e E= 842.217,330m; 132°57'03" e 334,21m até o vértice BX3-P-205 de coordenadas N= 9.033.481,020m e E= 842.461,950m; 117°20'51" e 330,49m até o vértice BX3-P-206 de coordenadas N= 9.033.329,200m e E= 842.755,500m; 107°08'50" e 225,28m até o vértice BX3-P-207 de coordenadas N= 9.033.262,780m e E= 842.970,770m; 70°00'58" e 249,89m até o vértice BX3-P-208 de coordenadas N= 9.033.348,180m e E= 843.205,610m; 47°16'36" e 574,61m até o vértice BX3-P-209 de coordenadas N= 9.033.738,030m e E= 843.627,740m; 33°55'33" e 829,37m até o vértice BX3-P-210 de coordenadas N= 9.034.426,210m e E= 844.090,630m; 43°27'01" e 107,21m até o vértice BX3-P-211 de coordenadas N= 9.034.504,040m e E= 844.164,360m; 92°56'05" e 159,97m até o vértice BX3-P-212 de coordenadas N= 9.034.495,850m e E= 844.324,120m; 135°44'41" e 223,05m até o vértice BX3-P-213 de coordenadas N= 9.034.336,090m e E= 844.479,780m; 153°26'06" e 174,03m até o vértice BX3-P-214 de coordenadas N= 9.034.180,430m e E= 844.557,610m; 171°40'25" e 339,48m até o vértice BX3-P-215 de coordenadas N= 9.033.844,530m e E= 844.606,770m; 190°32'08" e 246,44m até o vértice BX3-P-216 de coordenadas N= 9.033.602,250m e E= 844.561,710m; 180°59'19" e 237,63m até o vértice BX3-P-217 de coordenadas N= 9.033.364,660m e E= 844.557,610m; 190°18'20" e 274,79m até o vértice BX3-P-218 de coordenadas N= 9.033.094,300m e E= 844.508,450m; 233°21'56" e 199,08m até o vértice BX3-P-219 de coordenadas N= 9.032.975,510m e E= 844.348,700m; 244°25'59" e 355,29m até o vértice BX3-P-220 de coordenadas N= 9.032.822,180m e E= 844.028,200m; local onde este limita com a margem esquerda do RIO ITUXI e com a margem do RIO ITUXI na confluência dos mesmos; deste segue transpondo o RIO ITUXI com azimute plano de 134°46'17" e distância de 180,85m até o vértice BX3-M-075 de coordenadas N= 9.032.694,810m e E= 844.156,590m; local onde este limita com o RIO ITUXI e com TERRAS COM QUEM DE DIREITO; deste segue confrontando com TERRAS COM QUEM DE DIREITO com azimute plano de 134°46'21" e distância de 6.866,17 m até o vértice BX3-M-076 de coordenadas **N= 9.027.859,000m e E= 849.030,940m**; local onde este limita com TERRAS DE QUEM DE DIREITO e com SERINGAL AMAZONAS; deste segue confrontando com SERINGAL AMAZONAS com os seguintes azimutes e distâncias: 220°20'19" e 7.332,09m até o vértice **BX3-M-077** de coordenadas **N= 9.022.270,250m e E= 844.284,850m**; 231°04'59" e 3.319,81m até o vértice **BX3-P-221** de coordenadas **N= 9.020.184,770m** e **E= 841.701,840m**; 231°05'55" e 40,00m até o vértice **BX3-P-222** de coordenadas **N= 9.020.159,650m** e **E= 841.670,710m**; 231°05'00" e 15.240,19m até o vértice **BX3-M-078** de coordenadas **N= 9.010.585,930m** e **E= 829.812,920m**; 263°34'00" e 29.000,00m até o vértice BX3-M-079 de coordenadas **N= 9.007.336,560m** e **E= 800.995,540m**; 207°20'00" e 6.300,00m até o vértice **BX3-M-080** de coordenadas **N= 9.001.739,950m** e **E= 798.102,790m**; 242°35'00" e 1.995,75m até o vértice **BX3-M-081** de coordenadas **N= 9.000.820,990m** e **E= 796.331,200m**; local onde este limita com SERINGAL AMAZONAS e com a propriedade do Sr. GUERINO OTÁVIO TASSI E OUTROS; deste segue confrontando com a propriedade do Sr. GUERINO OTÁVIO TASSI E OUTROS com azimute plano de 307°26'46" e distância de 8.263,35m até o vértice **BX3-M-082** de coordenadas **N= 9.005.845,230m** e **E= 789.770,720m**; local onde este limita com a propriedade do Sr. GUERINO OTÁVIO TASSI E OUTROS e com a margem esquerda do RIO ITUXI; deste segue pela margem esquerda do RIO ITUXI a montante com os seguintes azimutes e distâncias: 203°44'03" e 359,21m até o vértice **BX3-P-223** de coordenadas **N= 9.005.516,400m** e **E= 789.626,140m**; 275°19'01" e 90,54m até o vértice **BX3-P-224** de coordenadas **N= 9.005.524,790m** e **E= 789.535,990m**; 333°48'14" e 168,74m até o vértice **BX3-P-225** de coordenadas **N= 9.005.676,200m** e **E= 789.461,500m**; 304°05'25" e 109,17m até o vértice **BX3-P-226** de coordenadas **N= 9.005.737,390m** e **E= 789.371,090m**; 266°16'28" e 464,94m até o vértice **BX3-P-227** de coordenadas **N= 9.005.707,180m** e **E= 788.907,130m**; 229°10'04" e 441,04m até o vértice **BX3-P-228** de coordenadas **N= 9.005.418,810m** e **E= 788.573,430m**; 202°57'21" e 228,12m até o vértice **BX3-P-229** de coordenadas **N= 9.005.208,760m** e **E= 788.484,460m**; 218°51'43" e 286,22m até o vértice **BX3-P-230** de coordenadas **N= 9.004.985,890m** e **E= 788.304,870m**; 201°28'08" e 245,33m até o vértice **BX3-P-231** de coordenadas **N= 9.004.757,580m** e **E= 788.215,080m**; 219°30'37" e 397,58m até o vértice **BX3-P-232** de coordenadas **N= 9.004.450,840m** e **E= 787.962,130m**; 212°48'13" e 278,74m até o vértice **BX3-P-233** de coordenadas **N= 9.004.216,550m** e **E= 787.811,120m**; 198°37'39" e 1.060,63m até o vértice **BX3-P-234** de coordenadas **N= 9.003.211,480m** e **E= 787.472,340m**; 210°15'32" e 908,26m até o vértice **BX3-P-235** de coordenadas **N= 9.002.426,960m** e **E= 787.014,660m**; 205°28'26" e 591,52m até o vértice **BX3-P-236** de coordenadas **N= 9.001.892,950m** e **E= 786.760,250m**; 196°51'23" e 911,57m até o vértice **BX3-P-237** de coordenadas **N= 9.001.020,550m** e **E= 786.495,920m**; 208°33'29" e 226,07m até o vértice **BX3-P-238** de coordenadas **N= 9.000.821,990m** e **E= 786.387,850m**; 198°04'07" e 357,60m até o vértice **BX3-P-239** de coordenadas **N= 9.000.482,030m** e **E= 786.276,940m**; 178°38'49" e

620,88m até o vértice **BX3-P-240** de coordenadas **N= 8.999.861,320m** e **E= 786.291,600m**; 199°20'56" e 204,43m até o vértice **BX3-P-241** de coordenadas **N= 8.999.668,440m** e **E= 786.223,870m**; 243°09'11" e 219,11m até o vértice **BX3-P-242** de coordenadas **N= 8.999.569,490m** e **E= 786.028,380m**; 276°14'01" e 203,62m até o vértice **BX3-P-243** de coordenadas **N= 8.999.591,600m** e **E= 785.825,960m**; 290°05'50" e 535,60m até o vértice **BX3-P-244** de coordenadas **N= 8.999.775,640m** e **E= 785.322,970m**; 254°44'18" e 203,36m até o vértice **BX3-P-245** de coordenadas **N= 8.999.722,110m** e **E= 785.126,780m**; 218°39'13" e 261,83m até o vértice **BX3-P-246** de coordenadas **N= 8.999.517,640m** e **E= 784.963,240m**; 202°39'35" e 341,38m até o vértice **BX3-P-247** de coordenadas **N= 8.999.202,610m** e **E= 784.831,720m**; 184°56'33" e 248,61m até o vértice **BX3-P-248** de coordenadas **N= 8.998.954,920m** e **E= 784.810,300m**; 128°14'13" e 279,99m até o vértice **BX3-P-249** de coordenadas **N= 8.998.781,630m** e **E= 785.030,220m**; 136°12'50" e 289,41m até o vértice **BX3-P-250** de coordenadas **N= 8.998.572,700m** e **E= 785.230,480m**; 179°55'55" e 353,38m até o vértice **BX3-P-251** de coordenadas **N= 8.998.219,320m** e **E= 785.230,900m**; 229°21'10" e 245,12m até o vértice **BX3-P-252** de coordenadas **N= 8.998.059,650m** e **E= 785.044,920m**; 245°54'03" e 288,97m até o vértice **BX3-P-253** de coordenadas **N= 8.997.941,660m** e **E= 784.781,140m**; 265°46'48" e 548,48m até o vértice **BX3-P-254** de coordenadas **N= 8.997.901,300m** e **E= 784.234,150m**; 277°52'07" e 290,43m até o vértice **BX3-P-255** de coordenadas **N= 8.997.941,060m** e **E= 783.946,460m**; 285°09'21" e 716,51m até o vértice **BX3-P-256** de coordenadas **N= 8.998.128,390m** e **E= 783.254,870m**; 242°18'38" e 193,47m até o vértice **BX3-P-257** de coordenadas **N= 8.998.038,490m** e **E= 783.083,560m**; 228°26'53" e 339,41m até o vértice **BX3-P-258** de coordenadas **N= 8.997.813,360m** e **E= 782.829,560m**; 212°39'50" e 173,93m até o vértice **BX3-P-259** de coordenadas **N= 8.997.666,940m** e **E= 782.735,690m**; 202°36'28" e 1.479,24m até o vértice **BX3-P-260** de coordenadas **N= 8.996.301,370m** e **E= 782.167,040m**; 182°38'08" e 269,02m até o vértice **BX3-P-261** de coordenadas **N= 8.996.032,640m** e **E= 782.154,670m**; 171°00'10" e 142,98m até o vértice **BX3-P-262** de coordenadas **N= 8.995.891,420m** e **E= 782.177,030m**; 147°46'02" e 152,56m até o vértice **BX3-P-263** de coordenadas **N= 8.995.762,370m** e **E= 782.258,400m**; 126°25'33" e 177,00m até o vértice **BX3-P-264** de coordenadas **N= 8.995.657,270m** e **E= 782.400,820m**; 101°47'02" e 222,16m até o vértice **BX3-P-265** de coordenadas **N= 8.995.611,900m** e **E= 782.618,300m**; 97°00'37" e 430,09m até o vértice **BX3-P-266** de coordenadas **N= 8.995.559,410m** e **E= 783.045,170m**; 107°54'33" e 292,93m até o vértice **BX3-P-267** de coordenadas **N= 8.995.469,330m** e **E= 783.323,910m**; 129°02'11" e 195,26m até o vértice **BX3-P-268** de coordenadas **N= 8.995.346,350m** e **E= 783.475,580m**; 142°21'37" e 247,39m até o vértice **BX3-P-269** de coordenadas **N= 8.995.150,450m** e **E= 783.626,660m**; 157°50'05" e 215,57m até o vértice **BX3-P-270** de coordenadas **N= 8.994.950,810m** e **E= 783.707,990m**; 149°14'23" e 372,96m até o vértice **BX3-P-271** de coordenadas **N= 8.994.630,320m** e **E= 783.898,740m**; 137°40'59" e 310,86m até o vértice **BX3-P-272** de coordenadas **N= 8.994.400,460m** e **E= 784.108,020m**; 184°04'08" e 94,43m até o vértice **BX3-P-273** de coordenadas **N= 8.994.306,270m** e **E= 784.101,320m**; 248°30'19" e

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110,37m até o vértice **BX3-P-274** de coordenadas **N= 8.994.265,830m** e **E= 783.998,630m**; 296°55'15" e 863,13m até o vértice **BX3-P-275** de coordenadas **N= 8.994.656,620m** e **E= 783.229,030m**; 275°55'37" e 383,79m até o vértice **BX3-P-276** de coordenadas **N= 8.994.696,250m** e **E= 782.847,290m**; 280°06'48" e 125,57m até o vértice **BX3-P-277** de coordenadas **N= 8.994.718,300m** e **E= 782.723,670m**; 296°49'26" e 605,74m até o vértice **BX3-P-278** de coordenadas **N= 8.994.991,640m** e **E= 782.183,110m**; 269°14'53" e 270,53m até o vértice **BX3-P-279** de coordenadas **N= 8.994.988,090m** e **E= 781.912,600m**; 304°06'32" e 357,89m até o vértice **BX3-P-280** de coordenadas **N= 8.995.188,780m** e **E= 781.616,280m**; 288°24'47" e 549,28m até o vértice **BX3-P-281** de coordenadas **N= 8.995.362,280m** e **E= 781.095,120m**; 264°38'19" e 342,37m até o vértice **BX3-P-282** de coordenadas **N= 8.995.330,290m** e **E= 780.754,250m**; 254°55'04" e 526,59m até o vértice **BX3-P-283** de coordenadas **N= 8.995.193,270m** e **E= 780.245,800m**; 244°36'54" e 199,58m até o vértice **BX3-P-284** de coordenadas **N= 8.995.107,710m** e **E= 780.065,490m**; 229°34'31" e 324,44m até o vértice **BX3-P-285** de coordenadas **N= 8.994.897,330m** e **E= 779.818,510m**; 211°21'46" e 219,87m até o vértice **BX3-P-286** de coordenadas **N= 8.994.709,590m** e **E= 779.704,080m**; 235°28'48" e 220,00m até o vértice **BX3-P-287** de coordenadas **N= 8.994.584,920m** e **E= 779.522,820m**; 252°34'14" e 419,72m até o vértice **BX3-P-288** de coordenadas **N= 8.994.459,200m** e **E= 779.122,370m**; 235°10'56" e 221,40m até o vértice **BX3-P-289** de coordenadas **N= 8.994.332,790m** e **E= 778.940,610m**; 201°53'47" e 223,90m até o vértice **BX3-P-290** de coordenadas **N= 8.994.125,040m** e **E= 778.857,110m**; 172°22'47" e 322,53m até o vértice **BX3-P-291** de coordenadas **N= 8.993.805,360m** e **E= 778.899,880m**; 134°24'00" e 197,18m até o vértice **BX3-P-292** de coordenadas **N= 8.993.667,400m** e **E= 779.040,760m**; 120°10'11" e 379,00m até o vértice **BX3-P-293** de coordenadas **N= 8.993.476,930m** e **E= 779.368,420m**; 106°10'22" e 588,36m até o vértice **BX3-P-294** de coordenadas **N= 8.993.313,050m** e **E= 779.933,500m**; 124°44'20" e 163,35m até o vértice **BX3-P-295** de coordenadas **N= 8.993.219,970m** e **E= 780.067,730m**; 168°10'25" e 115,10m até o vértice **BX3-P-296** de coordenadas **N= 8.993.107,310m** e **E= 780.091,320m**; 211°37'37" e 279,95m até o vértice **BX3-P-297** de coordenadas **N= 8.992.868,940m** e **E= 779.944,520m**; 230°22'26" e 852,10m até o vértice **BX3-P-298** de coordenadas **N= 8.992.325,490m** e **E= 779.288,210m**; 255°31'02" e 141,63m até o vértice **BX3-P-299** de coordenadas **N= 8.992.290,070m** e **E= 779.151,080m**; 282°42'39" e 1.034,86m até o vértice **BX3-P-300** de coordenadas **N= 8.992.517,770m** e **E= 778.141,580m**; 267°56'58" e 235,87m até o vértice **BX3-P-301** de coordenadas **N= 8.992.509,330m** e **E= 777.905,860m**; 259°53'14" e 421,21m até o vértice **BX3-P-302** de coordenadas **N= 8.992.435,370m** e **E= 777.491,190m**; 285°18'22" e 134,18m até o vértice **BX3-P-303** de coordenadas **N= 8.992.470,790m** e **E= 777.361,770m**; 310°32'10" e 191,98m até o vértice **BX3-P-304** de coordenadas **N= 8.992.595,560m** e **E= 777.215,870m**; 337°26'51" e 509,89m até o vértice **BX3-P-305** de coordenadas **N= 8.993.066,460m** e **E= 777.020,310m**; 317°20'00" e 188,61m até o vértice **BX3-P-306** de coordenadas **N= 8.993.205,150m** e **E= 776.892,480m**; 284°10'49" e 180,39m até o vértice **BX3-P-307** de coordenadas **N= 8.993.249,340m** e **E= 776.717,590m**; 237°14'34" e

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169,16m até o vértice **BX3-M-106** de coordenadas **N= 8.993.157,810m** e **E= 776.575,330m**; local onde se limita com o rio Ituxi e a GLEBA DESMEMBRADA de 1/3; deste segue confrontando com a GLEBA DESMEMBRADA de 1/3 com azimute plano de 318°41'14" e distância de 11.129,38m até vértice **BX3-M-107** de coordenadas **N= 9.001.517,260m** e **E= 769.228,040m**; local onde se limita com a GLEBA DESMEMBRADA de 1/3 e a GLEBA SEPATINI - TRAJANO ALVES DA COSTA E SUCESSORES; deste segue confrontando com a GLEBA SEPATINI - TRAJANO ALVES DA COSTA E SUCESSORES com os seguintes azimutes e distâncias: 46°00'00" e 8.434,86m até o vértice **BX3-M-098** de coordenadas **N= 9.007.376,610m** e **E= 775.295,570m**; 81°15'00" e 6.900,00m até o vértice **BX3-M-099** de coordenadas **N= 9.008.426,260m** e **E= 782.115,260m**; 24°30'00" e 7.000,00m até o vértice **BX3-M-100** de coordenadas **N= 9.014.795,990m** e **E= 785.018,120m**; 66°12'00" e 29.200,00m até o vértice **BX3-M-101** de coordenadas **N= 9.026.579,510m** e **E= 811.734,940m**; local onde este limita com a GLEBA SEPATINI - TRAJANO ALVES DA COSTA E SUCESSORES e com a margem direita do RIO ENDIMARI; deste segue pela margem direita do RIO ENDIMARI a jusante com os seguintes azimutes e distâncias: 146°53'36" e 493,76m até o vértice **BX3-P-426** de coordenadas **N= 9.026.165,910m** e **E= 812.004,630m**; 93°03'07" e 78,51m até o vértice **BX3-P-427** de coordenadas **N= 9.026.161,730m** e **E= 812.083,030m**; 38°57'34" e 174,64m até o vértice **BX3-P-428** de coordenadas **N= 9.026.297,530m** e **E= 812.192,840m**; 28°07'04" e 764,59m até o vértice **BX3-P-429** de coordenadas **N= 9.026.971,880m** e **E= 812.553,180m**; 56°53'30" e 218,83m até o vértice **BX3-P-430** de coordenadas **N= .027.091,410m** e **E= 812.736,480m**; 102°11'08" e 291,31m até o vértice **BX3-P-431** de coordenadas **N= 9.027.029,920m** e **E= 813.021,230m**; 69°08'43" e 330,54m até o vértice **BX3-P-432** de coordenadas **N= 9.027.147,590m** e **E= 813.330,110m**; 50°26'01" e 726,12m até o vértice **BX3-P-433** de coordenadas **N= 9.027.610,110m** e **E= 813.889,870m**; 40°41'34" e 628,08m até o vértice **BX3-P-434** de coordenadas **N= 9.028.086,330m** e **E= 814.299,380m**; 36°32'18" e 526,44m até o vértice **BX3-P-435** de coordenadas **N= 9.028.509,300m** e **E= 814.612,800m**; 91°16'35" e 155,79m até o vértice **BX3-P-436** de coordenadas **N= 9.028.505,830m** e **E= 814.768,550m**; 125°00'33" e 90,85m até o vértice **BX3-P-437** de coordenadas **N= 9.028.453,710m** e **E= 814.842,960m**; 153°26'36" e 307,53m até o vértice **BX3-P-438** de coordenadas **N= 9.028.178,630m** e **E= 814.980,450m**; 130°49'27" e 186,45m até o vértice **BX3-P-439** de coordenadas **N= 9.028.056,740m** e **E= 815.121,540m**; 82°47'00" e 228,15m até o vértice **BX3-P-440** de coordenadas **N= 9.028.085,400m** e **E= 815.347,880m**; 28°27'02" e 316,29m até o vértice **BX3-P-441** de coordenadas **N= 9.028.363,490m** e **E= 815.498,560m**; 93°32'56" e 159,78m até o vértice **BX3-M-102** de coordenadas **N= 9.028.353,600m** e **E= 815.658,030m**; local onde este limita com a margem direita do RIO ENDIMARI e com a GLEBA SEPATINI - TRAJANO ALVES DA COSTA E SUCESSORES; deste segue confrontando com a GLEBA SEPATINI - TRAJANO ALVES DA COSTA E SUCESSORES com os seguintes azimutes e distâncias: 65°40'00" e 9.048,92m ate o vertice **BX3-M-103** de coordenadas **N= 9.032.082,160m** e **E= 823.903,080m**; 65°39'52" e 49,43m até o vértice **BX3-M-104** de coordenadas **N= 9.032.102,530m** e **E= 823.948,120m**; 65°40'00" e 3.596,06m até o vértice **BX3-M-105** de

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coordenadas **N= 9.033.584,270m** e **E= 827.224,720m**; 41°26'55" e 11.312,59m até o vértice **BX3-M-073**; ponto inicial da presente descrição. Todas as coordenadas aqui descritas estão georreferenciadas ao Sistema Geodésico Brasileiro, a partir da estação SAT-RO-17 do IBGE, localizada nas instalações do 5º Batalhão de Engenharia de Construção, na vila Abunã-RO, de coordenadas E= 239.477,017 e N= 8.927.876,144 , representadas no Sistema UTM, referenciadas ao Meridiano Central nº 63 WGr, tendo como datum o UGGI-67/SAD69. As distâncias, área e perímetro foram calculados no plano de projeção UTM. Lábrea, 28 de maio de 2007. (a) Antonio Luiz Mendes da Silva, O Oficial. Conforme sentença prolatada pela MMª Juíza de Direito Dra. Kathleen dos Santos Gomes, nos autos da Ação de Restauração de Dados com Pedido de Tutela Antecipada (Processo n.º 066/2008), procedo a restauração do AV-8/1.285. Lábrea, 23 de setembro de 2008. (a) Luciana da Cruz Barroncas, a Oficiala. **AV-9/1.285: RETIFICAÇÃO DE ÁREA**: Nos termos do requerimento do proprietário dos ***2/3 (dois terços)*** do imóvel objeto da presente matrícula, que juntou o respectivo Memorial Descritivo e Mapa Demarcatório, bem como, as peças técnicas firmadas e elaboradas pelo Engenheiro Agrimensor Laurionor Thadeu Barbosa - CREA 59.727/D-SP, Código de Credenciamento junto ao INCRA - BX3 - Anotação de Responsabilidade Técnica (ART) nº 0001922/2006 (georreferenciamento), do Conselho Regional de Engenharia, Arquitetura e Agronomia do Estado do Amazonas e cumpridas todas as exigências documentais previstas nos artigos 212 e 213 da Lei nº 10.931/04, que alterou a Lei nº 6.015/73 dos Registros Públicos, procedo a presente retificação consensual "***intramuros***", para ficar constando que a área ao que se refere a ***AV-8/1.285***, passa a ter uma área total de ***131.357,6617 ha (cento e trinta e um mil, trezentos e cinquenta e sete hectares, sessenta e seis ares e dezessete centiares)***, e um perímetro de 3295.562,890 metros lineares, permanecendo inalterado o Memorial Descritivo, bem como, as suas indicações de rumos, ângulos de deflexão e coordenadas georeferenciadas. Lábrea, 03 de setembro de 2007. (a) Antonio Luiz Mendes da Silva, O Oficial. Era o que se continha em o referido registro do que bem e fielmente extraí este traslado. Oficial do Registro de Imóveis da Comarca de Lábrea, Estado do Amazonas, a digitei, conferi, subscrevi e assino. Conforme sentença prolatada pela MMª Juíza de Direito Dra. Kathleen dos Santos Gomes, nos autos da Ação de Restauração de Dados com o Pedido de Tutela Antecipada (Processo n.º 066/2008), procedo a restauração do AV-9/1.285. Lábrea, 23 de setembro de 2008. (a) Luciana da Cruz Barroncas, a Oficiala. **R-10/1.285 - ESCRITURA PÚBLICA DE COMPRA E VENDA**: Nos Termos da Escritura Pública de Compra e Venda, lavrada às fls. 189 a 194 do Livro E-014, pela Tabeliã Luciana da Cruz Barroncas, datada de 21 de fevereiro de 2011, o objeto da presente matrícula foi transferida a área total de 131.357,6617 ha (cento e trinta e um mil, trezentos e cinquenta e sete hectares, sessenta e seis ares e dezessete centiares), e um perímetro de 3295.562,890 metros lineares pelos Proprietários: **RICARDO STOPPE JÚNIOR**, brasileiro, casado, médico, portador da Cédula de Identidade RG. n.º 13285178-7 - SSP/ SP e inscrito no Cadastro de Pessoa Física do (CPF/MF) nº 199.891.288-47, sua mulher **BLANCHE SIQUEIRA VILLARES STOPPE**, brasileira, casada, profissão, portadora da Cédula de Identidade Registro Geral número 22843281-9 - SSP/SP e inscrita no Cadastro de Pessoa Física (CPF/MF) n.º 158.104.388-

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06, domiciliados e residentes na cidade de Carapicuíba, Estado de São Paulo, na Rua Correia de Andrade, n.° 179 - Brás, neste ato representada pelo Sr. RICARDO STOPPE JÚNIOR, brasileiro, casado, médico, portador da Cédula de Identidade RG. n.° 13285178-7 - SSP/ SP e inscrito no Cadastro de Pessoa Física do (CPF/MF) nº 199.891.288-47, domiciliado e residente na cidade de Carapicuíba, Estado de São Paulo, na Rua Correia de Andrade, n.° 179 - Brás, através da **Procuração** lavrada nas Notas do 2° Tabelião de Notas e de Protestos de Letras e Títulos da Cidade de Birigui, Estado de São Paulo, às fls. 127/128, do Livro n.° 328, em data de 14 de fevereiro de 2011, em favor de NOSSA SENHORA DA CACHOEIRA DO ITUXI EMPREENDIMENTOS LTDA., sociedade empresaria limitada, inscrita no CNPJ/MF sob n.° 10.329.193/0001-82, com sede na Rua Correia de Andrade, n.° 179 - Brás, na cidade de São Paulo, Estado de São Paulo, representada por seus sócios MARILDA APARECIDA LOT STOPPE, brasileira, casada em comunhão de bens, comerciante, portadora da Cédula de Identidade Registro Geral número 3.744.249 - SSP/SP e inscrita no Cadastro de Pessoa Física (CPF/MF) n.° 063.704.288-33 e RICARDO STOPPE, brasileiro, casado em comunhão de bens, cirurgião dentista, portador da Cédula de Identidade Registro Geral número 2.607.524 - SSP/SP e inscrito no Cadastro de Pessoa Física (CPF/MF) n.° 107.663.758-20, domiciliados e residentes na cidade de Birigui, Estado de São Paulo, na Rua Bento da Cruz, n.° 209 - Centro; neste ato representada pelo Sr. RICARDO STOPPE, brasileiro, casado em comunhão de bens, cirurgião dentista, portador da Cédula de Identidade Registro Geral número 2.607.524 - SSP/SP e inscrito no Cadastro de Pessoa Física (CPF/MF) n.° 107.663.758-20, domiciliados e residentes na cidade de Birigui, Estado de São Paulo, na Rua Bento da Cruz, n.° 209 - Centro, através da **Procuração** lavrada nas Notas do 2° Tabelião de Notas e de Protestos de Letras e Títulos da Cidade de Birigui, Estado de São Paulo, às fls. 125/126, do Livro n.° 328, em data de 14 de fevereiro de 2011, pelo valor de R$ 800.000,00 (oitocentos mil reais). O Imposto de Transmissão de Bens Imóveis (ITBI), foi recolhido aos Cofres da Tesouraria da Prefeitura Municipal de Lábrea, através da Autenticação BBD 3723 100 339 21022011C***************12.800,00R CB05, valor R$ 12.800,00 (doze mil e oitocentos reais), autenticada mecanicamente pelo Banco Bradesco S.A, Agência de Lábrea. Foram apresentados os seguintes documentos: a) Os cinco últimos anos do Imposto sobre a Propriedade Territorial Rural, administrado pela Secretaria da Receita Federal, no qual o imóvel está matriculado sob o n.° 0.740.332-1, não constando débitos com relação ao ITR; b) Certificado de Cadastro de Imóvel Rural (CCIR), referente aos Exercícios 2006/2007/2008/2009: Nome do Imóvel Fazenda: Nossa Senhora da Cachoeira do Ituxi. Código do Imóvel: 950.084.767.875-0. Identificação do Imóvel: Margem Esquerda e Direita do Rio Ituxi, Município do Imóvel: Lábrea/Amazonas, Módulo Fiscal (HA): 100,0, N.° de Módulos Fiscais 1.313.5766, Fração Máxima de Parcelamento (HA) 4,0000, Classificação Fundiária: Grande Propriedade, Área Total (HA): 131.357,6617, Nome do Proprietário: Ricardo Stoppe Junior, Código da Pessoa: 05.941.729-3, Número do CCIR: 03951868092, conforme Certificado de Cadastro de Imóvel Rural, expedido pelo Ministério do Desenvolvimento Agrário em data de 22/09/2010. Escritura Pública e Documentação arquivadas nesta Serventia. Lábrea, 21 de fevereiro de 2011. (a) Luciana da Cruz Barroncas, A Oficiala. AV-11/1.285 - MEMORIAL DESCRITIVO/GEORREFERENCIAMENTO: Nos

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termos do requerimento do proprietário do imóvel, dirigido a este Cartório, datado de 23 de outubro de 2013, procedo a presente averbação para constar o Georreferenciamento/Memorial Descritivo, conforme Memorial Descritivo elaborado pelo Engenheiro Agrimensor, Sr. Marcos Paulo Bertolo - CREA/RN 2302492870 - CREA/RO 3211 - Visto/MT 13.043/VD, com área total de **133.107,4146 ha (cento e trinta e três mil, cento e sete hectares, quarenta e um ares e quarenta e seis centiares)**, com perímetro de **224.771,6301 m (duzentos e vinte e quatro mil, setecentos e setenta e um metros e sessenta e três centímetros)**. **DESCRIÇÃO DO PERÍMETRO:** Inicia-se a descrição deste perímetro no vértice, CB7-M-5388, de coordenadas E=184.367,340m. e N=9.031.300,081m. Fuso 20, deste segue com azimute de 135°15'53" e distância de 5.649,28m., confrontando neste trecho com TERRAS DE DOMÍNIO DA UNIÃO, até o vértice CB7-M-5380, de coordenadas E=188.343,490m. e N=9.027.287,035m. Fuso 20, deste segue com o último confrontante por vários azimutes e distâncias, azimute de 219°25'02" e distância de 7.134,06m., até o vértice CB7-M-5378, de coordenadas E=183.813,625m. e N=9.021.775,669m. Fuso 20, azimute de 231°04'53" e distância de 17.990,24m., até o vértice CB7-M-5363, de coordenadas E=829.880,585m. e N=9.010.251,469m. Fuso 19, azimute de 231°04'03" e distância de 619,42m., até o vértice CB7-M-5398, de coordenadas E=829.398,750m. e N=9.009.862,226m. Fuso 19, azimute de 261°10'55" e distância de 28.537,11m., até o vértice CB7-M-5395, de coordenadas E=801.198,946m. e N=9.005.487,567m. Fuso 19, azimute de 218°15'58" e distância de 5.685,33m., até o vértice CB7-M-5444, de coordenadas E=797.677,944m. e N=9.001.023,769m. Fuso 19, azimute de 241°56'14" e distância de 2.056,80m., até o vértice CB7-M-5445, de coordenadas E=795.862,959m. e N=9.000.056,169m. Fuso 19, azimute de 310°55'29" e distância de 7.612,59m., até o vértice CB7-M-5307, de coordenadas E=790.111,112m. e N=9.005.042,930m. Fuso 19, deste segue com azimute de 229°13'25" e distância de 130,61m., confrontando neste trecho com RIO ITUXÍ, até o vértice CB7-V-A143, de coordenadas E=790.012,206m. e N=9.004.957,628m. Fuso 19, deste segue com o último confrontante por vários azimutes e distâncias, azimute de 239°31'44" e distância de 243,58m., até o vértice CB7-V-A144, de coordenadas E=789.802,265m. e N=9.004.834,105m. Fuso 19, azimute de 307°44'10" e distância de 229,01m., até o vértice CB7-V-A145, de coordenadas E=789.621,157m. e N=9.004.974,263m. Fuso 19, azimute de 301°20'48" e distância de 176,72m., até o vértice CB7-V-A146, de coordenadas E=789.470,734m. e N=9.005.066,195m. Fuso 19, azimute de 266°43'15" e distância de 184,43m., até o vértice CB7-V-A147, de coordenadas E=789.286,107m. e N=9.005.055,645m. Fuso 19, azimute de 236°33'01" e distância de 177,04m., até o vértice CB7-V-A148, de coordenadas E=789.138,394m. e N=9.004.958,062m. Fuso 19, azimute de 186°56'31" e distância de 209,13m., até o vértice CB7-V-A149, de coordenadas E=789.113,117m. e N=9.004.750,462m. Fuso 19, azimute de 210°15'17" e distância de 250,56m., até o vértice CB7-P-0614, de coordenadas E=788.986,875m. e N=9.004.534,032m. Fuso 19, azimute de 247°15'09" e distância de 269,59m., até o vértice CB7-V-A150, de coordenadas E=788.738,258m. e N=9.004.429,790m. Fuso 19, azimute de 229°15'17" e distância de 334,61m., até o vértice CB7-V-A151, de coordenadas E=788.484,750m. e

N=9.004.211,390m. Fuso 19, azimute de 209°56'57" e distância de 418,19m., até o vértice CB7-V-A152, de coordenadas E=788.275,978m. e N=9.003.849,045m. Fuso 19, azimute de 204°24'37" e distância de 559,36m., até o vértice CB7-P-0615, de coordenadas E=788.044,812m. e N=9.003.339,682m. Fuso 19, azimute de 204°05'46" e distância de 488,88m., até o vértice CB7-V-A153, de coordenadas E=787.845,219m. e N=9.002.893,404m. Fuso 19, azimute de 222°56'26" e distância de 424,52m., até o vértice CB7-V-A154, de coordenadas E=787.556,018m. e N=9.002.582,628m. Fuso 19, azimute de 207°40'56" e distância de 424,94m., até o vértice CB7-V-A155, de coordenadas E=787.358,604m. e N=9.002.206,326m. Fuso 19, azimute de 204°00'13" e distância de 372,03m., até o vértice CB7-V-A156, de coordenadas E=787.207,264m. e N=9.001.866,467m. Fuso 19, azimute de 200°40'40" e distância de 775,30m., até o vértice CB7-V-A157, de coordenadas E=786.933,494m. e N=9.001.141,107m. Fuso 19, azimute de 201°52'26" e distância de 821,76m., até o vértice CB7-P-0616, de coordenadas E=786.627,333m. e N=9.000.378,509m. Fuso 19, azimute de 204°47'34" e distância de 250,68m., até o vértice CB7-V-A158, de coordenadas E=786.522,214m. e N=9.000.150,934m. Fuso 19, azimute de 201°42'44" e distância de 504,03m., até o vértice CB7-V-A159, de coordenadas E=786.335,750m. e N=8.999.682,659m. Fuso 19, azimute de 178°15'44" e distância de 472,49m., até o vértice CB7-P-0617, de coordenadas E=786.350,079m. e N=8.999.210,385m. Fuso 19, azimute de 173°13'08" e distância de 133,14m., até o vértice CB7-V-A160, de coordenadas E=786.365,800m. e N=8.999.078,172m. Fuso 19, azimute de 194°58'25" e distância de 506,89m., até o vértice CB7-P-0618, de coordenadas E=786.234,833m. e N=8.998.588,496m. Fuso 19, azimute de 278°48'38" e distância de 442,43m., até o vértice CB7-V-A161, de coordenadas E=785.797,623m. e N=8.998.656,262m. Fuso 19, azimute de 298°41'49" e distância de 443,58m., até o vértice CB7-P-0619, de coordenadas E=785.408,528m. e N=8.998.869,257m. Fuso 19, azimute de 307°27'39" e distância de 70,98m., até o vértice CB7-V-A162, de coordenadas E=785.352,189m. e N=8.998.912,426m. Fuso 19, azimute de 260°46'06" e distância de 98,15m., até o vértice CB7-V-A163, de coordenadas E=785.255,308m. e N=8.998.896,680m. Fuso 19, azimute de 247°57'17" e distância de 316,75m., até o vértice CB7-V-A164, de coordenadas E=784.961,718m. e N=8.998.777,792m. Fuso 19, azimute de 198°52'21" e distância de 303,23m., até o vértice CB7-V-A165, de coordenadas E=784.863,633m. e N=8.998.490,862m. Fuso 19, azimute de 202°04'10" e distância de 224,81m., até o vértice CB7-V-A166, de coordenadas E=784.779,166m. e N=8.998.282,527m. Fuso 19, azimute de 129°15'44" e distância de 419,99m., até o vértice CB7-V-A167, de coordenadas E=785.104,349m. e N=8.998.016,725m. Fuso 19, azimute de 154°49'48" e distância de 432,40m., até o vértice CB7-P-0620, de coordenadas E=785.288,251m. e N=8.997.625,384m. Fuso 19, azimute de 161°31'06" e distância de 149,76m., até o vértice CB7-V-A168, de coordenadas E=785.335,726m. e N=8.997.483,344m. Fuso 19, azimute de 235°59'34" e distância de 635,99m., até o vértice CB7-P-0621, de coordenadas E=784.808,508m. e N=8.997.127,633m. Fuso 19, azimute de 258°39'52" e distância de 455,58m., até o vértice CB7-V-A169, de coordenadas E=784.361,816m. e N=8.997.038,086m. Fuso 19, azimute de 278°31'55" e distância de

418,51m., até o vértice CB7-V-A170, de coordenadas E=783.947,941m. e N=8.997.100,175m. Fuso 19, azimute de 276°46'59" e distância de 200,12m., até o vértice CB7-P-0622, de coordenadas E=783.749,227m. e N=8.997.123,811m. Fuso 19, azimute de 283°55'11" e distância de 503,72m., até o vértice CB7-V-A171, de coordenadas E=783.260,297m. e N=8.997.244,987m. Fuso 19, azimute de 264°37'08" e distância de 276,31m., até o vértice CB7-V-A172, de coordenadas E=782.985,208m. e N=8.997.219,076m. Fuso 19, azimute de 222°57'04" e distância de 274,98m., até o vértice CB7-P-0623, de coordenadas E=782.797,845m. e N=8.997.017,808m. Fuso 19, azimute de 231°55'06" e distância de 133,13m., até o vértice CB7-V-A173, de coordenadas E=782.693,054m. e N=8.996.935,696m. Fuso 19, azimute de 192°35'33" e distância de 590,76m., até o vértice CB7-V-A174, de coordenadas E=782.564,260m. e N=8.996.359,150m. Fuso 19, azimute de 202°40'29" e distância de 480,28m., até o vértice CB7-P-0624, de coordenadas E=782.379,113m. e N=8.995.915,990m. Fuso 19, azimute de 202°19'19" e distância de 557,13m., até o vértice CB7-P-0625, de coordenadas E=782.167,508m. e N=8.995.400,606m. Fuso 19, azimute de 208°07'57" e distância de 111,91m., até o vértice CB7-V-A175, de coordenadas E=782.114,740m. e N=8.995.301,915m. Fuso 19, azimute de 190°53'00" e distância de 275,85m., até o vértice CB7-V-A176, de coordenadas E=782.062,656m. e N=8.995.031,025m. Fuso 19, azimute de 129°51'37" e distância de 159,93m., até o vértice CB7-P-0626, de coordenadas E=782.185,416m. e N=8.994.928,526m. Fuso 19, azimute de 115°53'26" e distância de 310,36m., até o vértice CB7-V-A177, de coordenadas E=782.464,626m. e N=8.994.793,005m. Fuso 19, azimute de 96°55'05" e distância de 446,27m., até o vértice "CB7-V-A178, de coordenadas E=782.907,651m. e N=8.994.739,252m. Fuso 19, azimute de 102°46'25" e distância de 381,78m., até o vértice CB7-V-A179, de coordenadas E=783.279,979m. e N=8.994.654,842m. Fuso 19, azimute de 127°37'32" e distância de 379,22m., até o vértice CB7-P-0627, de coordenadas E=783.580,328m. e N=8.994.423,329m. Fuso 19, azimute de 166°38'52" e distância de 358,40m., até o vértice CB7-P-0628, de coordenadas E=783.663,096m. e N=8.994.074,620m. Fuso 19, azimute de 145°43'25" e distância de 337,26m., até o vértice CB7-P-0629, de coordenadas E=783.853,035m. e N=8.993.795,932m. Fuso 19, azimute de 137°56'24" e distância de 154,88m., até o vértice CB7-P-0630, de coordenadas E=783.956,791m. e N=8.993.680,941m. Fuso 19, azimute de 136°54'26" e distância de 293,10m., até o vértice CB7-P-0631, de coordenadas E=784.157,034m. e N=8.993.466,902m. Fuso 19, azimute de 162°48'59" e distância de 75,15m., até o vértice CB7-P-0632, de coordenadas E=784.179,235m. e N=8.993.395,107m. Fuso 19, azimute de 294°20'27" e distância de 635,93m., até o vértice CB7-V-A180, de coordenadas E=783.599,836m. e N=8.993.657,213m. Fuso 19, azimute de 297°41'40" e distância de 291,41m., até o vértice CB7-V-A181, de coordenadas E=783.341,814m. e N=8.993.792,646m. Fuso 19, azimute de 288°02'53" e distância de 330,52m., até o vértice CB7-V-A182, de coordenadas E=783.027,556m. e N=8.993.895,047m. Fuso 19, azimute de 279°20'49" e distância de 305,08m., até o vértice CB7-V-A183, de coordenadas E=782.726,529m. e N=8.993.944,595m. Fuso 19, azimute de 265°42'14" e distância de 377,90m., até o vértice CB7-V-A184, de coordenadas E=782.349,687m. e

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N=8.993.916,286m. Fuso 19, azimute de 302°44'14" e distância de 606,37m., até o vértice CB7-V-A185, de coordenadas E=781.839,634m. e N=8.994.244,201m. Fuso 19, azimute de 310°28'53" e distância de 428,69m., até o vértice CB7-V-A186, de coordenadas E=781.513,563m. e N=8.994.522,508m. Fuso 19, azimute de 284°25'27" e distância de 479,75m., até o vértice CB7-V-A187, de coordenadas E=781.048,932m. e N=8.994.642,014m. Fuso 19, azimute de 261°45'08" e distância de 441,03m., até o vértice CB7-V-A188, de coordenadas E=780.612,461m. e N=8.994.578,746m. Fuso 19, azimute de 249°55'13" e distância de 419,75m., até o vértice CB7-V-A189, de coordenadas E=780.218,230m. e N=8.994.434,633m. Fuso 19, azimute de 242°39'03" e distância de 368,66m., até o vértice CB7-P-0633, de coordenadas E=779.890,773m. e N=8.994.265,267m. Fuso 19, azimute de 180°26'42" e distância de 397,79m., até o vértice CB7-P-0634, de coordenadas E=779.887,683m. e N=8.993.867,491m. Fuso 19, azimute de 178°41'36" e distância de 70,90m., até o vértice CB7-V-A190, de coordenadas E=779.889,300m. e N=8.993.796,605m. Fuso 19, azimute de 286°05'10" e distância de 368,04m., até o vértice CB7-V-A191, de coordenadas E=779.535,675m. e N=8.993.898,582m. Fuso 19, azimute de 268°14'24" e distância de 253,44m., até o vértice CB7-V-A192, de coordenadas E=779.282,359m. e N=8.993.890,798m. Fuso 19, azimute de 244°23'28" e distância de 216,09m., até o vértice CB7-V-A193, de coordenadas E=779.087,501m. e N=8.993.797,400m. Fuso 19, azimute de 215°52'53" e distância de 150,22m., até o vértice CB7-P-0635, de coordenadas E=778.999,454m. e N=8.993.675,686m. Fuso 19, azimute de 204°23'54" e distância de 296,80m., até o vértice CB7-V-A194, de coordenadas E=778.876,852m. e N=8.993.405,391m. Fuso 19, azimute de 175°01'23" e distância de 287,31m., até o vértice CB7-V-A195, de coordenadas E=778.901,777m. e N=8.993.119,162m. Fuso 19, azimute de 157°08'13" e distância de 256,61m., até o vértice CB7-V-A196, de coordenadas E=779.001,478m. e N=8.992.882,712m. Fuso 19, azimute de 122°55'55" e distância de 274,70m., até o vértice CB7-V-A197, de coordenadas E=779.232,036m. e N=8.992.733,375m. Fuso 19, azimute de 109°11'10" e distância de 220,60m., até o vértice CB7-P-0636, de coordenadas E=779.440,387m. e N=8.992.660,876m. Fuso 19, azimute de 110°19'33" e distância de 696,18m., até o vértice CB7-P-0637, de coordenadas E=780.093,219m. e N=8.992.419,052m. Fuso 19, azimute de 120°16'10" e distância de 111,96m., até o vértice CB7-V-A198, de coordenadas E=780.189,918m. e N=8.992.362,614m. Fuso 19, azimute de 255°41'14" e distância de 452,67m., até o vértice CB7-V-A199, de coordenadas E=779.751,302m. e N=8.992.250,709m. Fuso 19, azimute de 225°25'14" e distância de 411,60m., até o vértice CB7-V-A200, de coordenadas E=779.458,131m. e N=8.991.961,811m. Fuso 19, azimute de 232°06'23" e distância de 295,80m., até o vértice CB7-V-A201, de coordenadas E=779.224,697m. e N=8.991.780,130m. Fuso 19, azimute de 240°20'29" e distância de 478,00m., até o vértice CB7-V-A202, de coordenadas E=778.809,322m. e N=8.991.543,602m. Fuso 19, azimute de 249°47'25" e distância de 266,56m., até o vértice CB7-V-A203, de coordenadas E=778.559,172m. e N=8.991.451,516m. Fuso 19, azimute de 299°02'42" e distância de 245,14m., até o vértice CB7-V-A204, de coordenadas E=778.344,860m. e N=8.991.570,531m. Fuso 19, azimute de 297°01'03" e distância de

258,37m., até o vértice CB7-V-A205, de coordenadas E=778.114,682m. e N=8.991.687,901m. Fuso 19, azimute de 272°58'10" e distância de 377,61m., até o vértice CB7-V-A206, de coordenadas E=777.737,581m. e N=8.991.707,462m. Fuso 19, azimute de 250°11'17" e distância de 368,40m., até o vértice CB7-P-0638, de coordenadas E=777.390,984m. e N=8.991.582,599m. Fuso 19, azimute de 282°32'22" e distância de 283,48m., até o vértice CB7-V-A207, de coordenadas E=777.114,268m. e N=8.991.644,145m. Fuso 19, azimute de 336°20'26" e distância de 256,28m., até o vértice CB7-V-A208, de coordenadas E=777.011,422m. e N=8.991.878,884m. Fuso 19, azimute de 4°54'22" e distância de 343,59m., até o vértice CB7-V-A209, de coordenadas E=777.040,806m. e N=8.992.221,212m. Fuso 19, azimute de 341°52'19" e distância de 267,58m., até o vértice CB7-V-A210, de coordenadas E=776.957,551m. e N=8.992.475,513m. Fuso 19, azimute de 276°06'06" e distância de 233,57m., até o vértice CB7-V-A211, de coordenadas E=776.725,307m. e N=8.992.500,339m. Fuso 19, azimute de 331°28'55" e distância de 210,80m., até o vértice CB7-V-A212, de coordenadas E=776.624,663m. e N=8.992.685,562m. Fuso 19, azimute de 265°17'28" e distância de 208,42m., até o vértice CB7-P-0639, de coordenadas E=776.416,948m. e N=8.992.668,452m. Fuso 19, azimute de 183°42'26" e distância de 36,32m., até o vértice CB7-M-5379, de coordenadas E=776.414,600m. e N=8.992.632,212m. Fuso 19, azimute de 227°58'13" e distância de 193,25m., até o vértice CB7-V-A060, de coordenadas E=776.271,056m. e N=8.992.502,829m. Fuso 19, deste segue com azimute de 313°32'35" e distância de 11.158,01m., confrontando neste trecho com FLONA DO IQUIRI (FLORESTA NACIONAL DO IQUIRI), até o vértice CB7-V-A061, de coordenadas E=768.183,097m. e N=9.000.189,576m. Fuso 19, deste segue com o último confrontante por vários azimutes e distâncias, azimute de 45°58'45" e distância de 9.309,35m., até o vértice CB7-V-A062, de coordenadas E=774.877,325m. e N=9.006.658,832m. Fuso 19, azimute de 81°24'26" e distância de 6.902,09m., até o vértice CB7-V-A063, de coordenadas E=781.701,943m. e N=9.007.690,070m. Fuso 19, azimute de 24°31'27" e distância de 7.015,90m., até o vértice CB7-V-A064, de coordenadas E=784.614,074m. e N=9.014.073,038m. Fuso 19, azimute de 66°12'34" e distância de 26.812,17m., até o vértice CB7-V-A065, de coordenadas E=809.147,929m. e N=9.024.888,880m. Fuso 19, deste segue com azimute de 154°59'57" e distância de 82,72m., confrontando neste trecho com IGARAPÉ JURENÉM, até o vértice CB7-V-A066, de coordenadas E=809.182,889m. e N=9.024.813,911m. Fuso 19, deste segue com o último confrontante por vários azimutes e distâncias, azimute de 137°47'07" e distância de 65,82m., até o vértice CB7-V-A067, de coordenadas E=809.227,111m. e N=9.024.765,166m. Fuso 19, azimute de 107°19'07" e distância de 100,43m., até o vértice CB7-V-A068, de coordenadas E=809.322,989m. e N=9.024.735,269m. Fuso 19, azimute de 68°31'30" e distância de 151,89m., até o vértice CB7-V-A069, de coordenadas E=809.464,331m. e N=9.024.790,874m. Fuso 19, azimute de 60°24'03" e distância de 260,43m., até o vértice CB7-V-A070, de coordenadas E=809.690,778m. e N=9.024.919,509m. Fuso 19, azimute de 56°36'04" e distância de 285,00m., até o vértice CB7-V-A071, de coordenadas E=809.928,713m. e N=9.025.076,392m. Fuso 19, azimute de 77°59'15" e distância de 236,67m., até o vértice CB7-V-A072, de coordenadas

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E=810.160,202m. e N=9.025.125,649m. Fuso 19, azimute de 99°37'19" e distância de 496,78m., até o vértice CB7-V-A073, de coordenadas E=810.649,995m. e N=9.025.042,614m. Fuso 19, azimute de 20°59'49" e distância de 596,13m., até o vértice CB7-V-A074, de coordenadas E=810.863,598m. e N=9.025.599,157m. Fuso 19, azimute de 359°42'04" e distância de 242,09m., até o vértice CB7-V-A075, de coordenadas E=810.862,335m. e N=9.025.841,239m. Fuso 19, azimute de 26°52'37" e distância de 104,13m., até o vértice CB7-V-A076, de coordenadas E=810.909,411m. e N=9.025.934,124m. Fuso 19, azimute de 75°19'10" e distância de 123,78m., até o vértice CB7-V-A077, de coordenadas E=811.029,151m. e N=9.025.965,494m. Fuso 19, azimute de 98°33'07" e distância de 143,47m., até o vértice CB7-V-A078, de coordenadas E=811.171,028m. e N=9.025.944,159m. Fuso 19, azimute de 131°01'16" e distância de 722,21m., até o vértice CB7-V-A079, de coordenadas E=811.715,908m. e N=9.025.470,148m. Fuso 19, azimute de 139°55'51" e distância de 668,90m., até o vértice CB7-V-A080, de coordenadas E=812.146,487m. e N=9.024.958,259m. Fuso 19, azimute de 120°47'10" e distância de 150,93m., até o vértice CB7-V-A081, de coordenadas E=812.276,147m. e N=9.024.881,009m. Fuso 19, azimute de 93°56'37" e distância de 78,52m., até o vértice CB7-V-A082, de coordenadas E=812.354,477m. e N=9.024.875,609m. Fuso 19, azimute de 46°42'59" e distância de 503,28m., até o vértice CB7-V-A083, de coordenadas E=812.720,852m. e N=9.025.220,665m. Fuso 19, azimute de 31°48'18" e distância de 411,50m., até o vértice CB7-V-A084, de coordenadas E=812.937,724m. e N=9.025.570,377m. Fuso 19, azimute de 20°36'57" e distância de 240,05m., até o vértice CB7-V-A085, de coordenadas E=813.022,247m. e N=9.025.795,059m. Fuso 19, azimute de 130°40'17" e distância de 445,34m., até o vértice CB7-V-A086, de coordenadas E=813.360,016m. e N=9.025.504,824m. Fuso 19, azimute de 69°26'59" e distância de 458,86m., até o vértice CB7-V-A087, de coordenadas E=813.789,674m. e N=9.025.665,897m. Fuso 19, azimute de 46°57'39" e distância de 683,61m., até o vértice CB7-V-A088, de coordenadas E=814.289,316m. e N=9.026.132,459m. Fuso 19, azimute de 39°40'19" e distância de 490,20m., até o vértice CB7-V-A089, de coordenadas E=814.602,253m. e N=9.026.509,770m. Fuso 19, azimute de 25°15'51" e distância de 745,22m., até o vértice CB7-V-A090, de coordenadas E=814.920,307m. e N=9.027.183,707m. Fuso 19, azimute de 97°23'40" e distância de 180,73m., até o vértice CB7-V-A091, de coordenadas E=815.099,536m. e N=9.027.160,447m. Fuso 19, azimute de 182°01'21" e distância de 144,27m., até o vértice CB7-V-A092, de coordenadas E=815.094,444m. e N=9.027.016,263m. Fuso 19, azimute de 153°21'45" e distância de 193,32m., até o vértice CB7-V-A093, de coordenadas E=815.181,120m. e N=9.026.843,458m. Fuso 19, azimute de 128°58'19" e distância de 234,10m., até o vértice CB7-V-A094, de coordenadas E=815.363,123m. e N=9.026.696,223m. Fuso 19, azimute de 120°23'46" e distância de 205,87m., até o vértice CB7-V-A095, de coordenadas E=815.540,698m. e N=9.026.592,056m. Fuso 19, azimute de 74°02'37" e distância de 203,28m., até o vértice CB7-V-A096, de coordenadas E=815.736,148m. e N=9.026.647,939m. Fuso 19, azimute de 50°49'07" e distância de 157,46m., até o vértice CB7-V-A097, de coordenadas E=815.858,204m. e N=9.026.747,419m. Fuso 19, azimute de 69°13'58" e

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distância de 145,41m., até o vértice CB7-V-A098, de coordenadas E=815.994,164m. e N=9.026.798,976m. Fuso 19, azimute de 90°26'23" e distância de 104,64m., até o vértice CB7-V-A099, de coordenadas E=816.098,804m. e N=9.026.798,173m. Fuso 19, azimute de 128°12'42" e distância de 144,42m., até o vértice CB7-V-A100, de coordenadas E=816.212,278m. e N=9.026.708,840m. Fuso 19, azimute de 136°05'06" e distância de 391,21m., até o vértice CB7-V-A101, de coordenadas E=816.483,620m. e N=9.026.427,023m. Fuso 19, azimute de 72°15'10" e distância de 627,47m., até o vértice CB7-V-A102, de coordenadas E=817.081,228m. e N=9.026.618,287m. Fuso 19, azimute de 51°00'15" e distância de 507,53m., até o vértice CB7-V-A103, de coordenadas E=817.475,673m. e N=9.026.937,656m. Fuso 19, azimute de 17°03'29" e distância de 373,83m., até o vértice CB7-V-A104, de coordenadas E=817.585,333m. e N=9.027.295,042m. Fuso 19, azimute de 357°51'08" e distância de 394,44m., até o vértice CB7-V-A105, de coordenadas E=817.570,551m. e N=9.027.689,209m. Fuso 19, azimute de 8°55'41" e distância de 362,19m., até o vértice CB7-V-A106, de coordenadas E=817.626,761m. e N=9.028.047,007m. Fuso 19, azimute de 345°53'43" e distância de 606,84m., até o vértice CB7-V-A107, de coordenadas E=817.478,877m. e N=9.028.635,547m. Fuso 19, deste segue com azimute de 65°43'35" e distância de 3.556,32m., confrontando neste trecho com FLONA DO IQUIRI (FLORESTA NACIONAL DO IQUIRI), até o vértice CB7-V-A108, de coordenadas E=820.720,791m. e N=9.030.097,536m. Fuso 19, deste segue com o último confrontante por vários azimutes e distâncias, azimute de 65°43'50" e distância de 2.829,84m., até o vértice CB7-V-A109, de coordenadas E=823.300,536m. e N=9.031.260,685m. Fuso 19, azimute de 64°49'59" e distância de 3.953,47m., até o vértice CB7-V-A110, de coordenadas E=826.878,715m. e N=9.032.941,923m. Fuso 19, azimute de 41°26'55" e distância de 4.859,60m., até o vértice CB7-V-A111, de coordenadas E=830.095,525m. e N=9.036.584,432m. Fuso 19, azimute de 40°59'35" e distância de 2.809,27m., até o vértice CB7-V-A112, de coordenadas E=171.874,245m. e N=9.038.927,277m. Fuso 20, azimute de 40°32'40" e distância de 3.353,60m., até o vértice CB7-V-A113, de coordenadas E=174.054,212m. e N=9.041.475,680m. Fuso 20, azimute de 134°49'36" e distância de 9.780,12m., até o vértice CB7-V-A114, de coordenadas E=180.990,696m. e N=9.034.581,050m. Fuso 20, deste segue com azimute de 197°13'11" e distância de 223,03m., confrontando neste trecho com RIO ITUXÍ, até o vértice CB7-V-A115, de coordenadas E=180.924,670m. e N=9.034.368,015m. Fuso 20, deste segue com o último confrontante por vários azimutes e distâncias, azimute de 157°41'58" e distância de 283,94m., até o vértice CB7-V-A116, de coordenadas E=181.032,415m. e N=9.034.105,311m. Fuso 20, azimute de 129°05'07" e distância de 367,32m., até o vértice CB7-V-A117, de coordenadas E=181.317,535m. e N=9.033.873,723m. Fuso 20, azimute de 92°43'37" e distância de 330,66m., até o vértice CB7-V-A118, de coordenadas E=181.647,817m. e N=9.033.857,992m. Fuso 20, azimute de 38°27'41" e distância de 241,94m., até o vértice CB7-V-A119, de coordenadas E=181.798,299m. e N=9.034.047,435m. Fuso 20, azimute de 58°09'08" e distância de 445,56m., até o vértice CB7-V-A120, de coordenadas E=182.176,777m. e N=9.034.282,539m. Fuso 20, azimute de 74°29'47" e distância de 578,41m., até o vértice CB7-V-A121, de coordenadas

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E=182.734,139m. e N=9.034.437,146m. Fuso 20, azimute de 82°07'31" e distância de 328,38m., até o vértice CB7-V-A122, de coordenadas E=183.059,424m. e N=9.034.482,137m. Fuso 20, azimute de 219°26'58" e distância de 138,48m., até o vértice CB7-V-A123, de coordenadas E=182.971,433m. e N=9.034.375,203m. Fuso 20, azimute de 235°16'02" e distância de 143,32m., até o vértice CB7-V-A124, de coordenadas E=182.853,647m. e N=9.034.293,544m. Fuso 20, azimute de 252°36'16" e distância de 393,47m., até o vértice CB7-V-A125, de coordenadas E=182.478,173m. e N=9.034.175,909m. Fuso 20, azimute de 235°19'08" e distância de 808,24m., até o vértice CB7-V-A126, de coordenadas E=181.813,529m. e N=9.033.716,012m. Fuso 20, azimute de 215°15'33" e distância de 282,63m., até o vértice CB7-V-A127, de coordenadas E=181.650,374m. e N=9.033.485,232m. Fuso 20, azimute de 166°28'25" e distância de 466,92m., até o vértice CB7-V-A128, de coordenadas E=181.759,582m. e N=9.033.031,266m. Fuso 20, azimute de 142°35'04" e distância de 984,26m., até o vértice CB7-V-A129, de coordenadas E=182.357,612m. e N=9.032.249,515m. Fuso 20, azimute de 131°20'25" e distância de 408,28m., até o vértice CB7-V-A130, de coordenadas E=182.664,148m. e N=9.031.979,834m. Fuso 20, azimute de 105°16'47" e distância de 439,28m., até o vértice CB7-V-A131, de coordenadas E=183.087,903m. e N=9.031.864,068m. Fuso 20, azimute de 84°35'07" e distância de 315,42m., até o vértice CB7-V-A132, de coordenadas E=183.401,911m. e N=9.031.893,832m. Fuso 20, azimute de 69°06'10" e distância de 249,83m., até o vértice CB7-V-A133, de coordenadas E=183.635,309m. e N=9.031.982,945m. Fuso 20, azimute de 46°21'48" e distância de 574,48m., até o vértice CB7-V-A134, de coordenadas E=184.051,079m. e N=9.032.379,385m. Fuso 20, azimute de 13°55'57" e distância de 592,25m., até o vértice CB7-V-A135, de coordenadas E=184.193,681m. e N=9.032.954,214m. Fuso 20, azimute de 27°18'08" e distância de 252,11m., até o vértice CB7-V-A136, de coordenadas E=184.309,322m. e N=9.033.178,242m. Fuso 20, azimute de 112°32'58" e distância de 375,50m., até o vértice CB7-V-A137, de coordenadas E=184.656,118m. e N=9.033.034,243m. Fuso 20, azimute de 200°04'20" e distância de 146,35m., até o vértice CB7-V-A138, de coordenadas E=184.605,891m. e N=9.032.896,785m. Fuso 20, azimute de 189°07'14" e distância de 373,54m., até o vértice CB7-V-A139, de coordenadas E=184.546,679m. e N=9.032.527,965m. Fuso 20, azimute de 173°10'38" e distância de 456,20m., até o vértice CB7-V-A140, de coordenadas E=184.600,874m. e N=9.032.075,000m. Fuso 20, azimute de 197°24'19" e distância de 202,41m., até o vértice CB7-V-A141, de coordenadas E=184.540,326m. e N=9.031.881,853m. Fuso 20, azimute de 232°55'14" e distância de 351,33m., até o vértice CB7-V-A142, de coordenadas E=184.260,034m. e N=9.031.670,028m. Fuso 20, azimute de 163°49'30" e distância de 385,19m., até o vértice CB7-M-5388, ponto inicial da descrição deste perimetro. Todas as coordenadas aqui descritas estão georreferenciadas ao Sistema Geodésico Brasileiro, a partir da estação ativa da RBMC de Porto Velho (POVE), de coordenadas E= 401.400,675 e N= 9.037.165,721 e encontram-se representadas no Sistema UTM, referenciadas ao **Meridiano Central -63° EGW** e o de Rio Branco (RIOB), de coordenadas E= 631.229,338 e N= 8.898.169,188 e encontram-se representadas no Sistema UTM, referenciadas ao **Meridiano Central -69°**

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EGW, tendo como o Datum o **SIRGAS2000**. Todos os azimutes e distâncias, áreas e perímetros foram calculados no plano de projeção UTM. Requerimento e Documentação arquivados nesta Serventia. Lábrea, 23 de outubro de 2013. (a) Sebastião Barbosa Farias, Escrevente Autorizado. **AV-12/1.285 - AVERBAÇÃO DE RETIFICAÇÃO:** Conforme documentação apresentada pelo proprietário do imóvel, procedo a presente averbação para constar a **Certificação/INCRA nº 1511306000003-03; Processo nº 54270.000073/2013-73** - Memorial Descritivo elaborado pelo Engenheiro Agrimensor, Sr. Marcos Paulo Bertolo - Anotação de Responsabilidade Técnica nº/CREA nº 2135/2013 / 3211-D/RO - Visto/MT 13.043/VD. Documentos devidamente arquivados nesta Serventia. Lábrea, 18 dezembro de 2013. (a) Sebastião Barbosa Farias, Escrevente Autorizado. Era o que se continha no referido registro do que bem e fielmente extraí este traslado. Eu ________ (SEBASTIÃO BARBOSA FARIAS), Escrevente Autorizado do Registro de Imóveis da Comarca de Lábrea, Estado do Amazonas, conferi, subscrevi e assino.

O referido é verdade e dou fé.

Lábrea, 18 de dezembro de 2013.

SEBASTIÃO BARBOSA FARIAS
Escrevente Autorizado

Sebastião Barbosa Farias
Escrevente Autorizado
CPF: 587.782.492-04

Cartório da Comarca de Lábrea
Lábrea - AM
7BC9-DDA1-F491-D434

1.12.2 Emissions Trading Programs and Other Binding Limits

Not applicable: the project is not engaged to other emissions trading program and the host country has not binding limits on GHG emissions.

1.12.3 Other Forms of Environmental Credit

The project neither has nor intends to generate any other form of GHG-related environmental credit for GHG emission reductions or removals claimed under the VCS Program. The VCS Program has a central project database, which lists each approved project. The VCS Project Database is the central storehouse of information on all projects validated to VCS criteria and all Verified Carbon Units issued under the program. Every VCU can be tracked from issuance to retirement in the database, allowing buyers to ensure every credit is real, additional, permanent, independently verified, uniquely numbered and fully traceable online. This project has not been registered in any other credited activity, and no VCUs have been assigned to the project area so far. Thus, any possibility of double counting of credits is eliminated.

1.12.4 Participation under Other GHG Programs

The project has not been registered, and it is not seeking registration under any other GHG programs.

1.12.5 Projects Rejected by Other GHG Programs

Not applicable: this project has not been rejected under any other GHG program.

1.13 Additional Information Relevant to the Project

Eligibility Criteria

This is not a grouped project

Leakage Management

Although there is a risk of leakage, the proponents believe that the Project will have positive impacts on surrounding areas. This Project might be a well-succeeded example of the following technical and economical aspects:

(i) Management of forest resources with success and profit;

(ii) Additional return to forest management, due to REDD incentives, which can compensate avoiding deforestation for other activities;

(iii) Maintenance of real estate (land acquisition and grabbing dynamics), in addition to profits with sustainable management plus REDD revenues.

According to reasons above, the Project might probably stimulate other landowners to adhere to this Project concept. The communication with landowners might be performed by means of associative actions and environmental education, which will be part of an overall project policy.

By means of Project monitoring activities, satellite imaging, and social and governmental cooperation for monitoring areas surrounding the Project; we believe that the well-succeeded example of this business plan will generate an increased number of sustainable managed areas.

The main leakage management activities are proposed below:

• Technical Training on Sustainable Cattle Raising: Project participants, in partnership with the local city hall and IFAM (Instituto Federal de Ciência e Tecnologia; Federal Institute of Science and Technology; Campus Lábrea), will structure a new technical training to qualify those neighbours involved in cattle ranching. The objective of this initiative will also be qualifying labor that finds little opportunity to work in the region and ends up taking part in illegal settlements and land occupation. It is expected that this initiative will benefit 15 students every year. Students and technicians of both sexes will be eligible for registrations, with the previous requirement of having finished the basic studies (middle school). This activity involves an agreement with the Municipal Secretariat of Education (Secretaria Municipal de Educação), including practical classes.

• Forest management courses: Courses on forest management methods will be offered to the local community. This may lead to the qualification of people who can work in the proposed project.

• Support to SEMA - AM (Secretaria de Estado do Meio Ambiente do Amazonas; Amazonas State Secretariat of Environment): SEMA will benefit from having, under its jurisdiction, an innovative model that can be replicated in other properties. It will provide the current administration with more visibility and methodological advances in environmental preservation. Two surveillance posts will also be placed around the farm and new motorcycles will be purchased, with a view to ensuring security at the project site and surrounding areas. The main objective of this support is mitigating illegal logging and land occupation in the region, by promoting incentives to increase the number of sustainable forest management plans authorized, as well as promoting an increase in the number of REDD Projects in the region, whenever feasible. This process will only be feasible by means of a combination of efforts with private and governmental entities, and NGOs. In this context, the project proponent will be in charge of political mobilization of forest sector in the region and, in the long term, the establishment of solid bases for engagement of all sectors involved in deforestation issues. The main condition for execution of this activity is the approval and validation of the Fortaleza Ituxi REDD Project, which will be one of the most important benchmark for engagement of all potential private landowners in the region.

• Potential Roll-out to Other Areas: Other areas with the potential to be included in REDD projects have already been identified around the project site, which will favour and encourage forest conservation by means of financial incentives obtained from reduced emission sales and provide social and environmental benefits to neighbouring communities.

• Fight against illegal land occupation: The local community will be strategic in monitoring illegal land occupation and potential illegal logging. Those who are favourable to being trained and conducting local monitoring will be included in the project: this activity may also become a new source of income for local communities.

• Feasibility study for a small non-wood product processing plant: This initiative will measure the property's potential to produce non-wood products (such as fruit, oils and essences). If this activity is proven to be feasible, additional labor will be added, creating new income opportunities for the local population and developing new forest-use methods. After approval of the business plan, the company will be formally engaged to implement the commercial exploitation of these non-wood products by using local labor. It is expected that this activity will involve the following labor: 10 men in forest exploitation inside the farm; 20 to 30 women in the processing plant. The implementation of this business also comprises selection, recruitment, training of personnel etc.

At the State level, Amazonas has been negotiating Long-term Collaborative Action (LCA) with the State of California (USA) to mitigate deforestation. LCA initiatives were agreed under the United Nations Framework Convention on Climate Change (UNFCCC) during COP-13 (Bali Plan). Within the framework of the UNFCCC, while discussing the theme of forests and LULUCF (Land Use, Land Use Change), it was inserted in the Bali Plan that the issue of standing forest should be discussed and solutions should be proposed. REDD was for the first time mentioned and included in the perspective of solutions for the objectives of the UNFCCC. This REDD Project is, thus, in accordance and aligned with political and legislative interests of the State of Amazonas, as well as with premises of the AWG-LCA (Ad-hoc Working Group – Long-term Collaborative Action) of UNFCCC.

Therefore, in addition to the measures described in other sections of this document, mitigation of Leakage is further strengthened by government initiatives and/or legislation at Federal, municipal, State and ecosystem levels, once the LCA involves neighbouring States within the Amazonia biome.

Commercially Sensitive Information

No commercially sensitive information has been excluded from the public version of the project description.

Sustainable Development

The FORTALEZA ITUXI REDD PROJECT complies with the logic of the environmental priorities defined by the Brazilian Federal Administration, which, in the course of COP 14 Conference held in Poznan, Poland, in December, 2008, declared a deforestation reduction goal of 70% up to year 2018. In order to attain this goal, it will be necessary to join government initiatives with independent actions (such as that proposed under the FORTALEZA ITUXI REDD PROJECT).

The map below shows the strategic zone for “Containment of the expansion fronts with protected areas and alternative uses”, which was established by the MacroZEE/AL (*Macrozoneamento Ecológico-Econômico da Amazônia Legal*; Ecological and Economic Macro-zoning of Amazon) of the Brazilian Ministry of Environment[6], involving de Project Area. The MacroZEE/AL aims to establish strategic indications of occupation and use of land on a sustainable basis to guide, at the regional scale, the development and spatial distribution of public development policies, territorial and environmental planning, as well as the decisions of private agents. Due to its shield function for the heart forest protection, this territorial unit deserves strengthening policies. In this context, the FORTALEZA ITUXI REDD PROJECT converges with the strategies set up by the MacroZEE/AL of the Brazilian Ministry of Environment.

[6] http://www.mma.gov.br/component/k2/item/8200-figuras, last visited in 28/08/2015

Figure 8. Containment of the expansion fronts with protected areas and alternative uses (Source: Brazilian Ministry of Environment)

Due to the increase in deforestation in the Legal Amazon, came into effect the Action Plan for the Prevention and Control of Deforestation in the Legal Amazon (PPCDAm; Plano de Ação para a Prevenção e Controle do Desmatamento na Amazônia Legal), starting mitigation and ongoing actions to reduce deforestation. The Deforestation Alert System (SAD) (Imazon, 2014), pointed out that the Lábrea municipality had the highest deforested area of the state, and was the fourth municipality in the Amazon with the largest deforested area (1,070.0 hectares), in October 2014, further demonstrating a common and usual practice of the municipality's dynamics. In this context, the Fortaleza Ituxi REDD Project is in line with main PPCDAm premises.

This project has therefore an enormous potential to assist the Federal Administration and state agencies to attain these goals and leverage pilot REDD projects on the municipal level, ensuring priority for the municipalities facing a critical deforestation process, as in the case of Lábrea and Porto Velho's districts of Nova Califórnia and Extrema.

Further Information

This project is conceived to attain the requirements of CCB certification during the crediting period.

2 APPLICATION OF METHODOLOGY

2.1 Title and Reference of Methodology

Approved VCS Methodology VM0015 "Methodology for Avoided Unplanned Deforestation", Version 1.1, 3 December 2012. At: http://www.v-c-s.org/methodologies/VM0015 (last visited in 20/05/2014)

VT0001 "Tool for the demonstration and assessment of additionality in VCS agriculture, forestry and other land use (AFOLU) project activities", Version 3.0, 1 February 2012. At: http://www.v-c-s.org/methodologies/VT0001 (last visited in 20/05/2014)

AFOLU "Non-Permanence Risk Tool", VCS Version 3, Procedural Document, 4 October 2012, v3.2. At: http://www.v-c-s.org/program-documents (last visited in 20/05/2014)

CDM – Executive Board "Tool for testing significance of GHG emissions in A/R CDM project activities (Version 01)" EB 31. At: https://cdm.unfccc.int/methodologies/ARmethodologies/tools/ar-am-tool-04-v1.pdf (last visited in 25/08/2018)

2.2 Applicability of Methodology

The Approved VCS Methodology VM0015 "Methodology for Avoided Unplanned Deforestation", Version 1.1, is for estimating and monitoring GHG emissions of project activities that avoid unplanned deforestation (AUD). The forest landscape configuration can be mosaic, frontier or a transition between the two. Carbon stock enhancements in forests that would be deforested in the baseline case can also be accounted under this methodology. However, credits for reducing GHG emissions from avoided degradation are excluded.

Baseline activities involve unplanned deforestation for logging and grazing activities. Project activities may include some level of planned deforestation, but planned deforestation is excluded from the baseline. In the case of this Project Activity, the landowner has an Operation License for sustainable forest management and is currently harvesting timber from the property.

The eligible categories of project activity covered by this methodology are represented with the letters A to H in Table 3. This Project Activity falls into category B, as it involves protection of forest with controlled logging (sustainable forest management), and the baseline consists of deforestation in old-growth forests without logging (performing clear cut). For this type of project activity, the carbon balance is represented as shown in Figure 9.

Table 3. Scope of the VM0015 methodology

			PROJECT ACTIVITY	
			Protection without logging, fuel wood collection or charcoal production	Protection with controlled logging, fuel wood collection or charcoal production
BASELINE	Deforestation	Old-growth without logging	A	B
		Old-growth with logging	C[1]	D[1]
		Degraded and still degrading	E[1]	F[1]
		Secondary growing	G[1]	H[1]
	No-deforestation[2]	Old-growth without logging	No change	Degradation
		Old-growth with logging	IFM	IFM-RIL
		Degraded and still degrading	IFM	IFM
		Secondary growing	No change	Degradation

1. Accounting for carbon stock increase in the project scenario is optional and can conservatively be omitted.
2. If the baseline is not deforestation, the change in carbon stocks is not covered in this methodology.

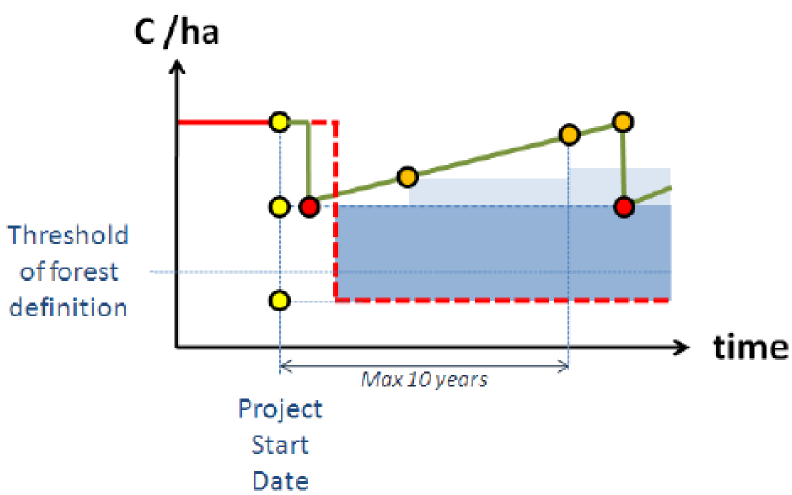


Figure 9. Carbon balance in project category B of VM0015 methodology

The VM0015 methodology has no geographic restrictions and is applicable to this Project Activity due to the following conditions:

a) Baseline activities include unplanned deforestation for timber and grazing activities, where forest lands are converted to non-forest lands.

b) The Project Activity includes eligible category B, as defined in the description of the scope of the methodology.

c) The Project Area includes old-growth forest, meeting the definition of "forest".

d) At project commencement, the Project Area includes only land qualifying as “forest” for a minimum of 10 years prior to the project start date.

e) The Project Area does not include forested lands growing on peat.

In this context, it is demonstrated that the VM0015 methodology is applicable to the proposed AUD project activity.

2.3 Project Boundary

Spatial Boundaries – PROJECT AREA

Geographic project boundary is defined by the geographic limits of the Project Area, as mentioned in “1.9 Project Location”.

The project area, according to VM00015, is an area covered only by forest for at least 10 years before the "start date" of the Project: is where protection activities are performed with the potential risk of future deforestation.

The northern part of the "Nossa Senhora das Cachoeiras do Ituxi" farm, located north of the river Iquiri / Ituxi, was excluded from the Project Area, as there is an overlap of the rural property bordering the protected area of sustainable use, National Forest (FLONA) of Iquiri. The Project Area was defined, thus, by excluding the overlapping area with FLONA of Iquiri. The procedure also excluded the deforested areas inside the Project Area and considered only the 2013 forest cover within the property area. As a result, we obtained an area of 46,592 hectares of remaining forest (Project Area).

It is noteworthy that the areas of future deforestation planned inside the Project Area were also excluded. Therefore, the flood area of the future "small hydropower plant" (only the southern area of the Iquiri River, totaling 701 hectares) and forecasted deforestation areas planned due to the activities of sustainable forest management (roads and stations, yards, and other infrastructure) were discounted, in a total of 47 hectares.

Spatial Boundaries – REFERENCE REGION

For delimitation of the Reference Region boundary and future deforestation projection, the main drivers of deforestation were defined:

• Accessibility to forests: The Reference region has a vast and dense network of primary, secondary and tertiary roads, as well as navigable rivers. The nearest locations of these paths will have a greater potential of deforestation;

• Distance from Deforestation (Proximity to forest edges): Given the accessibility and physiographic conditions, regions near the ancient deforestation and communities, districts, municipal centers also tend to have a higher probability and risk of future deforestation.

• Drivers related to the dynamics of land use change for cattle ranching;

• Demography dynamics (e.g. changes in population density).

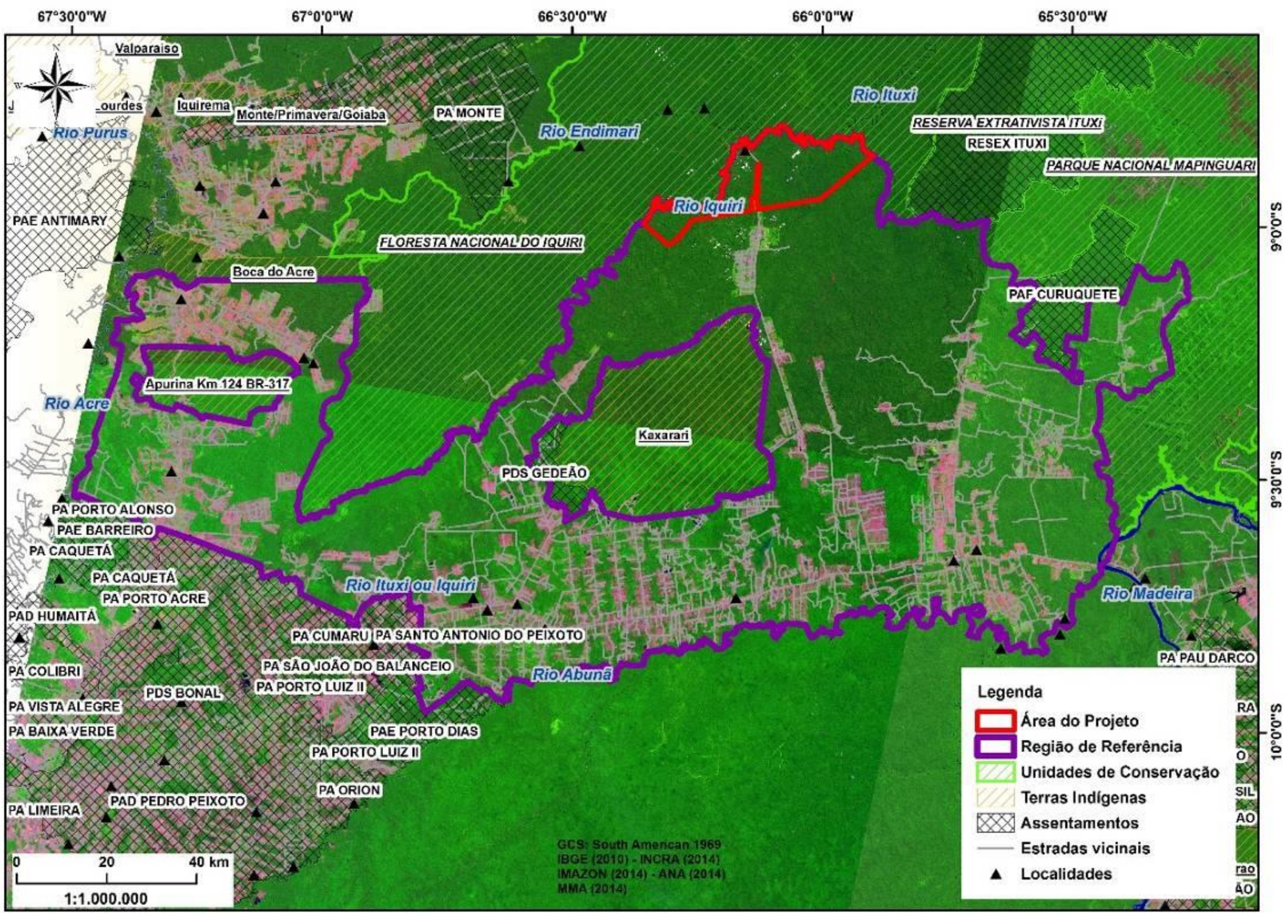


Figure 10. Location of the Reference Region and Project Area

The Reference Region is the spatial demarcation where information on rates, agents and patterns related to deforestation will be used for historical analysis of land use change and projection of future deforestation, and its monitoring.

The Reference Region was defined based on the dynamics of deforestation as well as physical and biotic aspects of the landscape and its similarity to the Project Area. To define its spatial boundaries, protected areas (indigenous lands and protected areas) and INCRA settlements were excluded from the Reference Region, considering that these are public areas with different agrarian and legal characteristics compared to a private property.

Below are the main criteria used in defining the Reference Region:

a) Lack of a national or sub-national baseline in the region of the Project Area;

b) In view of the item a), the municipal boundaries of greater influence to the regional context were used to define the boundaries of the Reference Region;

c) Information on the agents, patterns, land ownership and other drivers of deforestation in the region were used to delimit the Reference Region;

d) Reference Region encompasses an area larger than the Project Area;

e) The existing baseline covers at least the length of the baseline period (10 years) and is not outdated;

f) The existing baseline shows the location of deforestation annually;

g) The spatial resolution of existing baseline is equal to the smallest mappable unit considered in the monitoring period (1 hectare);

h) The methods used are transparent, free for consultation and following the precepts of VM00015 methodology in its version 1.1.

Another assumption adopted was related to the reference period for temporal analysis and establishment of baseline, being selected the years 2005, 2009 and 2013; the Start Date of the Project was considered as the last year of the reference period.

As a result, we obtained a Reference Region of 1,439,765 hectares. This region includes the Project Area of 46,592 hectares. The VM0015 recommends that when the Project Area is less than 100,000 hectares, the Reference Region must be equivalent between 20 and 40 times the Project Area. In this study the Reference Region is equal to 30 times the Project Area.

The deforestation is likely to occur in the Project Area in a manner similar to that observed in the Reference Region.

Similarity analysis between Reference Region and Project Area

Agents and drivers

In absence of REDD project, it is assumed that the property would certainly undergo the same deforestation intensity, carried out by the same agents and motivated by the same drivers, as occurring in the Reference Area. There are historical evidences (described previously in this VCS-PD) proving that the same deforestation pressures applied on the Reference Region are acting on the Project Area.

Land Occupation

The Figure below shows the land use of the Reference Region, spatially illustrating the main legally-established protected areas. The following areas were considered: Federal, State and Municipal Protected Areas, Indigenous Lands recognized by FUNAI, legally approved settlement projects, and private land certified by INCRA. The Figure also presents the specific case of "Nossa Senhora das Cachoeiras do Ituxi" farm and its overlap with FLONA of Iquiri, which is the only protected area that has boundaries with the Project Area.

Due to the large land and territorial complexity, the Reference Region was delimited in an attempt to broadly encompass as much of the territory, considering the similarity of the landscape and of the drivers of deforestation, in relationship with the Project Area.

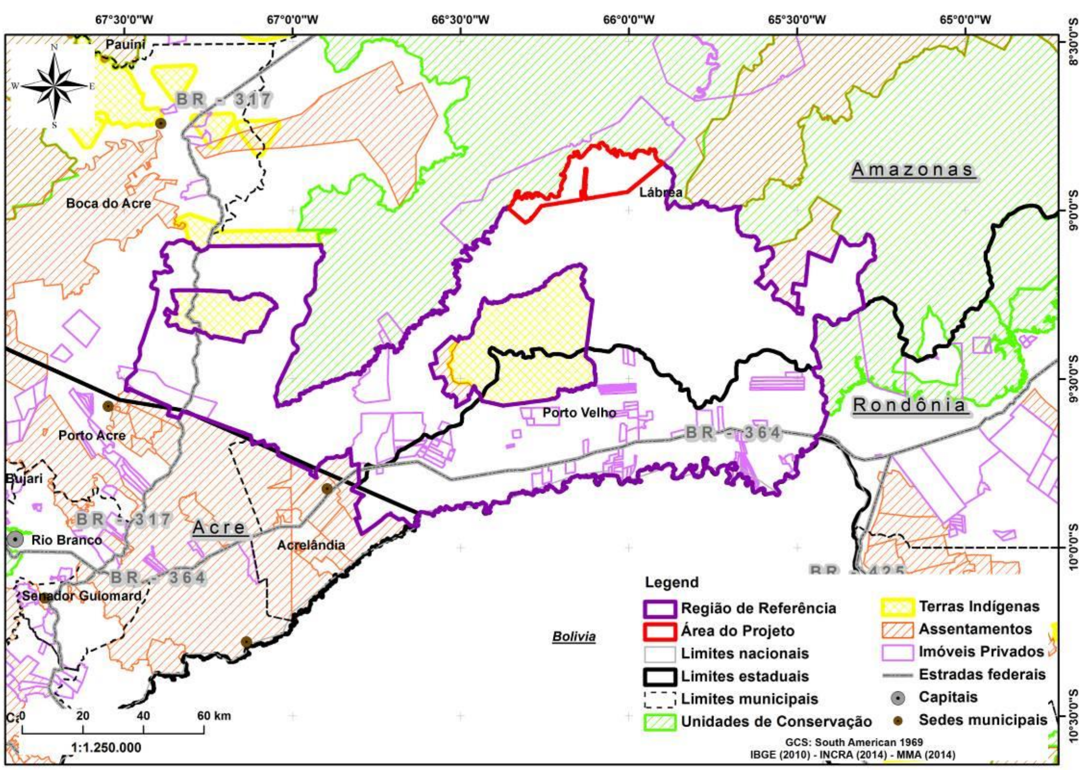


Figure 11. Characterization of land occupation in the Reference Region and Project Area

Conclusion on Land Occupation Similarity: 100% of Project Area is similar to Reference Region in Land Occupation and meets methodology requirements. The project proponent has intentionally kept private properties in 100% of the RR to guarantee Land Occupation similarity.

Forest Typologies

The dominant forest types in the Reference Region are the Open Ombrophylous Forest and the Dense Ombrophylous Forest, according to the classification of MMA (2014). The Figure below shows the spatial representation of these vegetation types in the Project Area and Reference Region. According to MMA data, the Project Area has 100% of its forest cover corresponding to Open Ombrophylous Forest. In the Reference Region, this forest typology covers approximately 71% of the territory.

In this context, it can be considered that the Reference Region presents suitable similarity of forest typologies, in comparison with the Project Area.

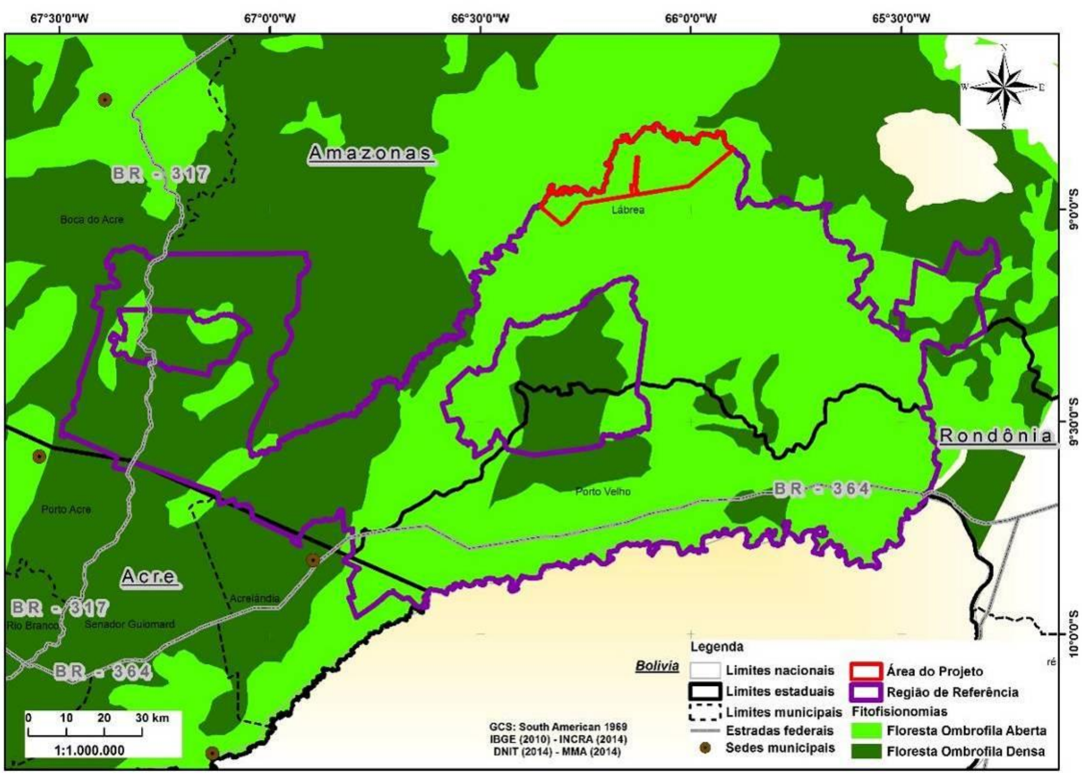


Figure 12. Characterization of forest typologies in the Reference Region and Project Area

Conclusion on Forest Typologies Similarity: only 71% of PA is similar to RR and does not meet methodology requirements for this specific similarity criterion. However, the vegetation type inside the Project Area is less dense and has less biomass than that observed in 29% of the Reference Region: this fact can be regarded as conservative, as deforestation agents would have to explore more areas to obtain the same amount of timber, and land clearance would be predominantly easier inside the Project Area than in the Reference Region.

Altimetry characterization

To characterize the altitudes of the Project Area and the Reference Region, and in compliance with methodology criteria, requiring similarity of 90% between both areas, a mosaic of digital elevation models was prepared using scenes 09S66_ZN, 08S66_ZN, 09S675_ZN, and 08S675_ZN; in TIFF format, provided by Topdata - INPE.

The map below shows the altimetry gradient of the Reference Region and Project Area. The following graphs show the altimetry distribution (No. of pixels X Altitudes) in the Project Area and Reference Region, demonstrating the similarity between them.

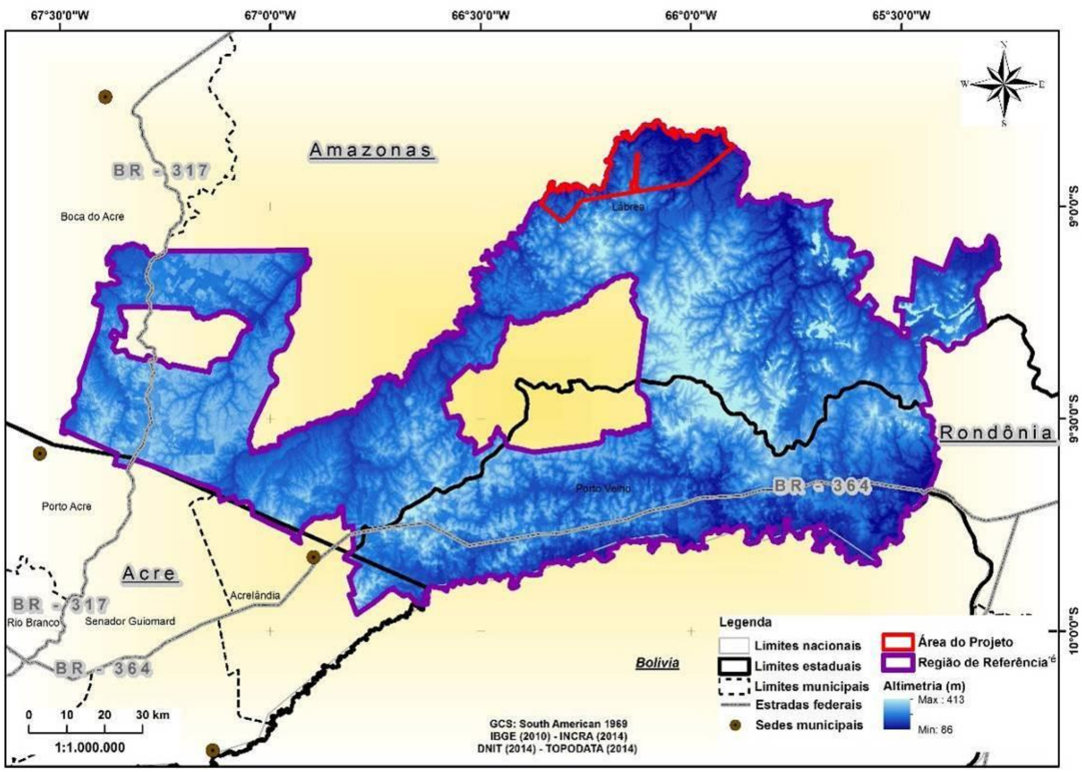
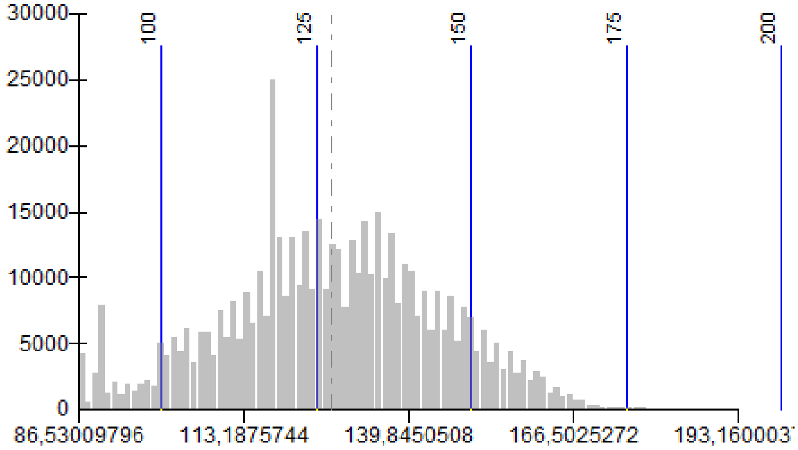
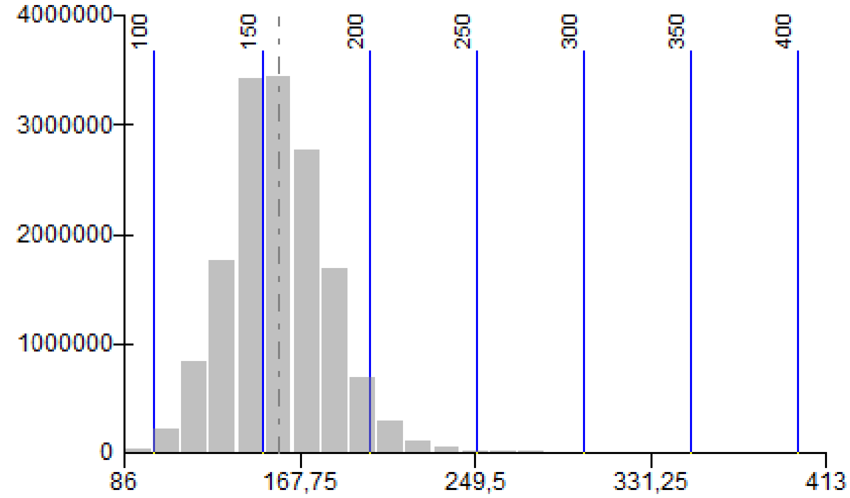


Figure 13. Altimetry characterization for the Reference Region and Project Area



Count:	507926
Minimum:	86,53009796
Maximum:	193,1600037
Mean:	127,502234
Standard Deviation:	17,34077882

Figure 14. Distribution of altimetry in the Project Area



Count:	15346110
Minimum:	86
Maximum:	413
Mean:	158,3291376
Standard Deviation:	23,82611477

Figure 15. Distribution of altimetry in the Reference Region

Conclusion on Altimetry Similarity: 100% of the Project Area has altimetry ranging between 86 and 200 meters, while more than 90% the Reference Region is located in altitudes between 86 and 200 meters. Thus, Altimetry Similarity is superior to 90% and meets methodology requirements. Moreover, the average altitude in the Project Area is 127 m, while it is 158 m in the Reference Region, which suggests that accessibility would be slightly higher inside the Project Area in comparison to the Reference Region.

Declivity characterization

To characterize the landscape slope of the Project Area and the Reference Region, and in compliance with methodology criteria, requiring similarity of 90% between both areas, a mosaic of digital elevation models was prepared using scenes 09S66_SC, 08S66_SC, 09S675_SC, and 08S675_SC; in TIFF format, provided by Topdata - INPE, where each pixel represents the average slope of the land.

In the map below, it may be noted the similarity of the spatial slope classes in the Reference Region and Project Area; and through the following Tables, such classes were quantified for both delimitations. For both the Project Area and Reference Region, more than 98% in area are represented by the following classes: Flat, Slightly sloped, Sloped; the most representative class was "Slightly sloped", which covered up to 70% of area in both delimitations.

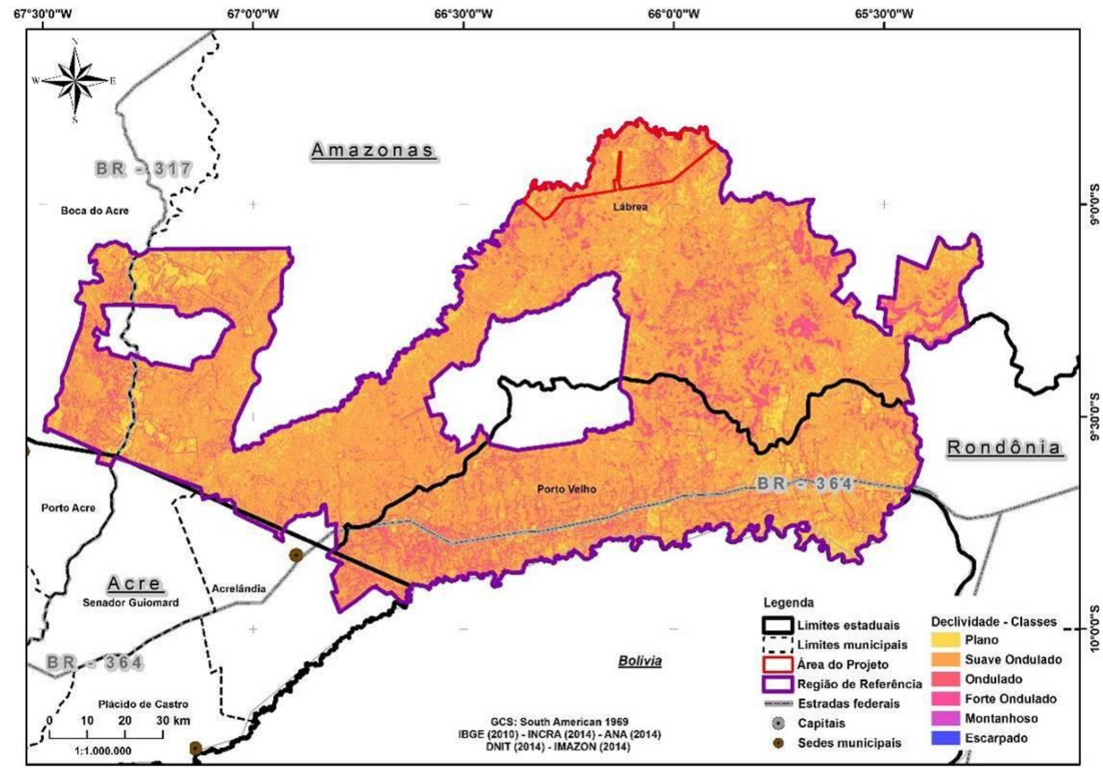


Figure 16. Characterization of landscape relief in the Reference Region and Project Area

Table 4. Distribution of landscape relief classes for the Reference Region and Project Area

Project Area

Declivity	Area (ha)	Area (%)
Flat	5,527.51	11.58%
Slightly sloped	33,871.17	70.96%
Sloped	8,182.67	17.14%
Strongly sloped	151.52	0.32%

Reference Region

Declivity	Area (ha)	Area (%)
Flat	171,490.48	11,90%
Slightly sloped	1,031,262.19	71,59%
Sloped	220,436.25	15,30%
Strongly sloped	16,655.52	1,16%
Mountainous	677.23	0,047%
Steep	6.49	0,00045%

Conclusion on Declivity Similarity: A Student t-test has been performed to compare declivity percent distributions between Project Area and Reference Region. The statistical test indicates that both declivity percent distributions are identical at 98.5% probability. Complementarily, a 99.9% correlation coefficient (r) has been estimated between both series. Thus, Declivity Similarity is statistically proved to be 100% between the Project Area and the Reference Region, and meets methodology requirements.

Climate characterization

To evaluate the climatology and its similarity between the Project Area and the Reference Region, we used the study of Alvarez et al. (2013), which suggest a new map of Koppen classification to Brazil, using monthly and annual historical temperature and precipitation series. The Figure below shows a map of this new classification for the region of the Project.

Both the Reference Region and the Project Area show no distinctions as to climatic variables, such as rainfall and temperature. Both are classified as Tropical monsoon climate (Am) with annual average temperature above 18°C and monthly rainfall above 60 mm.

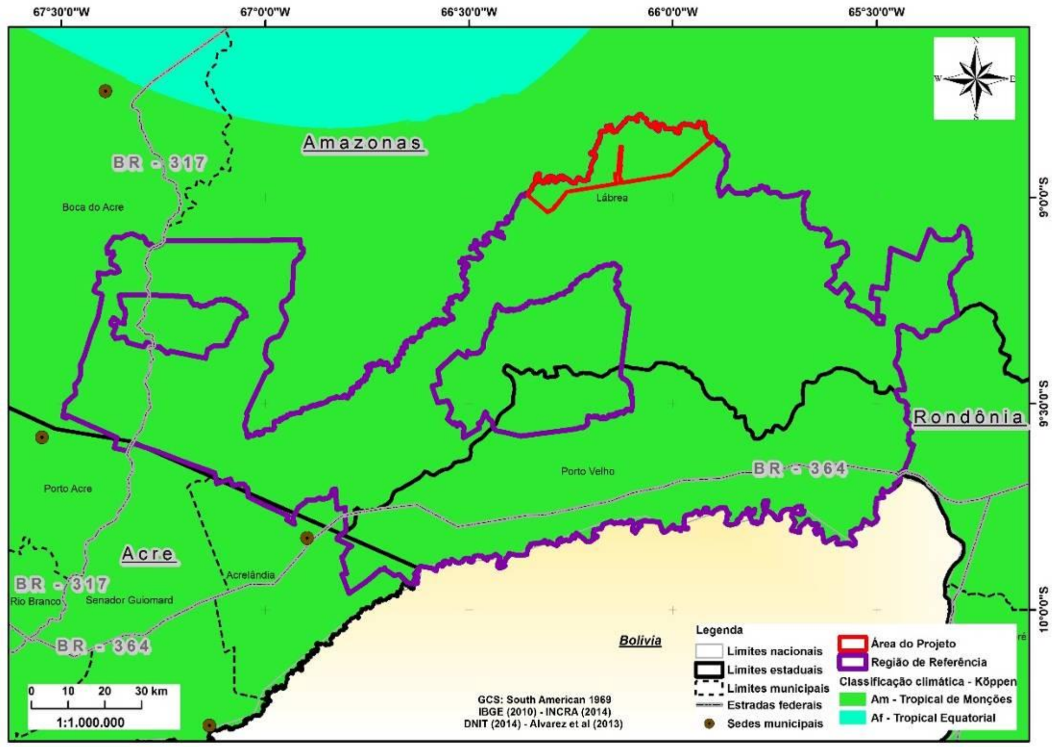


Figure 17. Characterization of climate in the Reference Region and Project Area

Conclusion on Climate Similarity: 100% of Project Area is similar to Reference Region in Climate characteristics and meets methodology requirements.

General Conclusion on Similarity between PA and RR

The similarity between the Project Area and the Reference Region has been proved according to the requirements of VM0015. The similarity has been superior to 90% for more than three criteria: Land Occupation (100%), Altimetry (more than 90%), Declivity (100%), and Climate (100%). Although similarity has not been attained for vegetation, it can be regarded as a conservative aspect, as explained earlier in this topic.

Spatial Boundaries – LEAKAGE BELT

The leakage belt is the land area or land areas surrounding or adjacent to the project area in which baseline activities could be displaced due to the project activities implemented in the project area.

To define the boundary of the leakage belt, Opportunity cost analysis (Option I) was tested, in conformity with Approved VCS Methodology VM0015 “Methodology for Avoided Unplanned Deforestation”, Version 1.1, 3 December 2012, Sectoral Scope 14.

The boundary of the leakage belt will be revisited at the end of each fixed baseline period, as opportunity costs are likely to change over time. In addition, this boundary of the leakage belt may have to be revisited if other VCS-AFOLU projects are registered nearby the project area.

Opportunity cost analysis (Option I) is applicable where economic profit is an important driver of deforestation. To test the applicability of Option I, historical records have shown that at least 80% of the area deforested in the reference region (or some of its strata) during the historical reference period has occurred at locations where deforesting was profitable for cattle ranching activities. In this context, literature studies, surveys and other credible and verifiable sources of information were used to demonstrate profitability of the main products of deforestation in the region: wood and cattle.

Based on Opportunity cost analysis (Option I) rationale, leakage can only occur on land outside the project area where the total cost of establishing and growing cattle and transporting the products to the market is less than the price of the products (i.e. opportunity costs are > 0). To identify this land area, the following steps where applied:

a) List the main land-uses that deforestation agents are likely to implement within the project area in the baseline case: in the baseline case of this project, deforestation is carried out to obtain timber to finance cattle ranching.

b) Find credible and verifiable sources of information on the following variables:

S$x = Average selling price per ton of the main product (living cattle) that would be established in the project area in the baseline case:

Considering that the volume of timber from illegal deforestation is not reliably registered in any country statistics, living cattle was considered as the main and final product of deforestation in this assessment. Living cattle is usually sold and transported to slaughterhouses in the region.

The average selling price of living cattle was obtained from Instituto Matogrossense de Economia Agropecuária (IMEA): **R$ 8,905 / ton**. Nevertheless, there is a great variety of fees and taxes that must be discounted from the selling price, corresponding up to 41.2% of the total selling price[7]. Owing to a 50% “clandestinity index” (rate of cattle sold without any selling documentation and taxation), the discount on total selling price has been reduced to 20.6%, resulting in a total of **R$ 7,073 / ton** return on selling price after taxes. Assuming that cattle sellers will keep a minimum of 10% as profit, the remaining of selling price would be **R$ 6.456 / ton**.

SPxi = Most important selling points (spatial locations) for each main product Px in the reference region.

[7] https://www.campograndenews.com.br/artigos/produtor-rural-pessoa-juridica-x-pis/pasep-e-cofins; http://g1.globo.com/ac/acre/noticia/2016/09/no-acre-decreto-reduz-icms-na-venda-de-gado-para-abate-ao-am-e-ro.html; http://ageconsearch.umn.edu/bitstream/147509/2/506.pdf (last visited in 08/June/2018)

In this assessment, it was considered that the most important selling points are slaughterhouses in the region.

The spatial locations of the main companies are indicated in the map. The main slaughterhouses are located in neighboring towns inside the reference region.

PCxi = Average in situ production costs per ton of product.

The average production costs of living cattle was obtained from Instituto Matogrossense de Economia Agropecuária (IMEA): **R$ 6.171 / ton**. In this context, the margin remaining for transportation costs is the difference between the net selling price (**R$ 6.456 / ton**) and the production cost (**R$ 6.171 / ton**), which results in **R$ 285 / ton** for transportation.

TCv = Average transport cost per kilometer for one ton of product using the most typical transport technology available to the producer.

The most typical mean of transportation available for cattle producers in the region is road transport in trucks.

Transportation costs in the region are estimated as **R$ 3.95/t.km**[8] [9]. This cost indicates that cattle could be transported to a road distance of approximately **72.1 km**.

Option I is based on the assumption that deforestation agents in the project area will not displace their activities beyond the reference region. Additionally, Option I requires to demonstrate that at least 80% of the area deforested in the reference region during the historical reference period has occurred at locations where deforesting was profitable.

According to TERRACLASS (2002) data, the total area of pasture is 313,337 hectares in the Reference Region. A belt has been mapped in the Reference Region, starting at the main consumption centers at the South and extending to a 72.1-km radius: 272,449 hectares of pasture have been mapped inside this belt. Thus, it can be assumed that at least 86% of deforestation in the Reference Region has been motivated by profitability in cattle ranching (only considering consumption from the Southern region).

[8] https://cloud.cnpgc.embrapa.br/sac/2012/10/16/prezados-senhores-busquei-no-site-a-embrapa-e-nao-obtive-exito-1-onde-posso-obter-o-peso-medio-de-um-novilho-2-onde-posso-obter-o-peso-medio-de-um-boi-com-45-meses-3-um-novilho-e-considerado-no/ (last visited in 11/June/2018)
[9] https://www.legisweb.com.br/legislacao/?id=241224 (last visited in 11/June/2018)

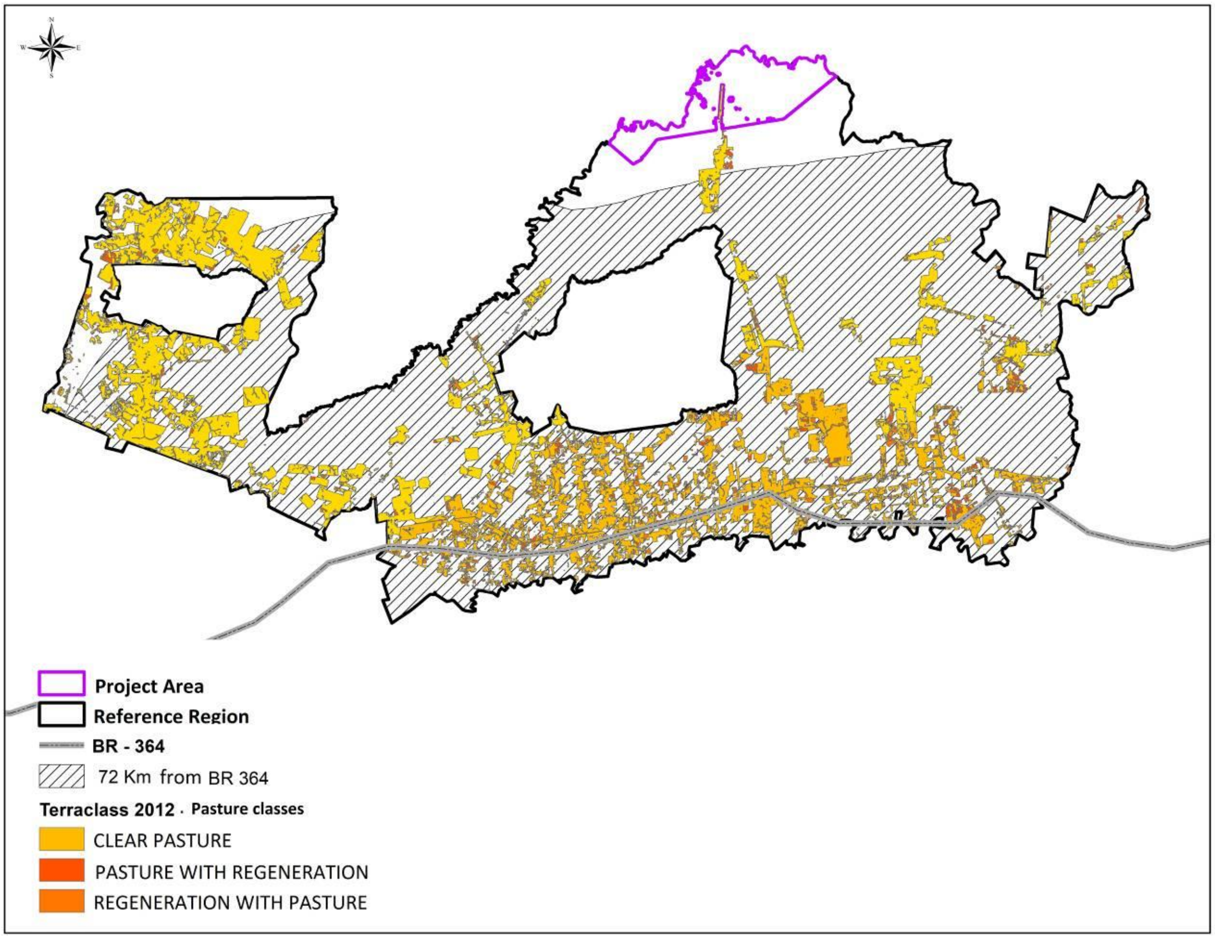


Figure 18. Location of the Leakage Belt area

The Leakage Management Areas are non-forest areas located outside the project boundary, in which the project proponent intends to implement activities that will reduce the risk of activity displacement leakage. The boundary of leakage management areas is clearly defined using the common projection and GIS software formats used in the project.

The location of Leakage Management Areas considered the deforested areas of private lands neighboring the “do Boi” Road (Ramal do Boi) and the BR364 Road. The following spatial criteria have been used for delimitation:

i) non-forest classes;

ii) logistical proximity for the Project Proponent to operate near the REDD project, considering the main access point to the Project Area, in attempt to impose a barrier to deforestation from the Reference Region to the Project Area;

iii) high potential of land-use change nearby these areas, considering their proximity to roads and other deforested areas.

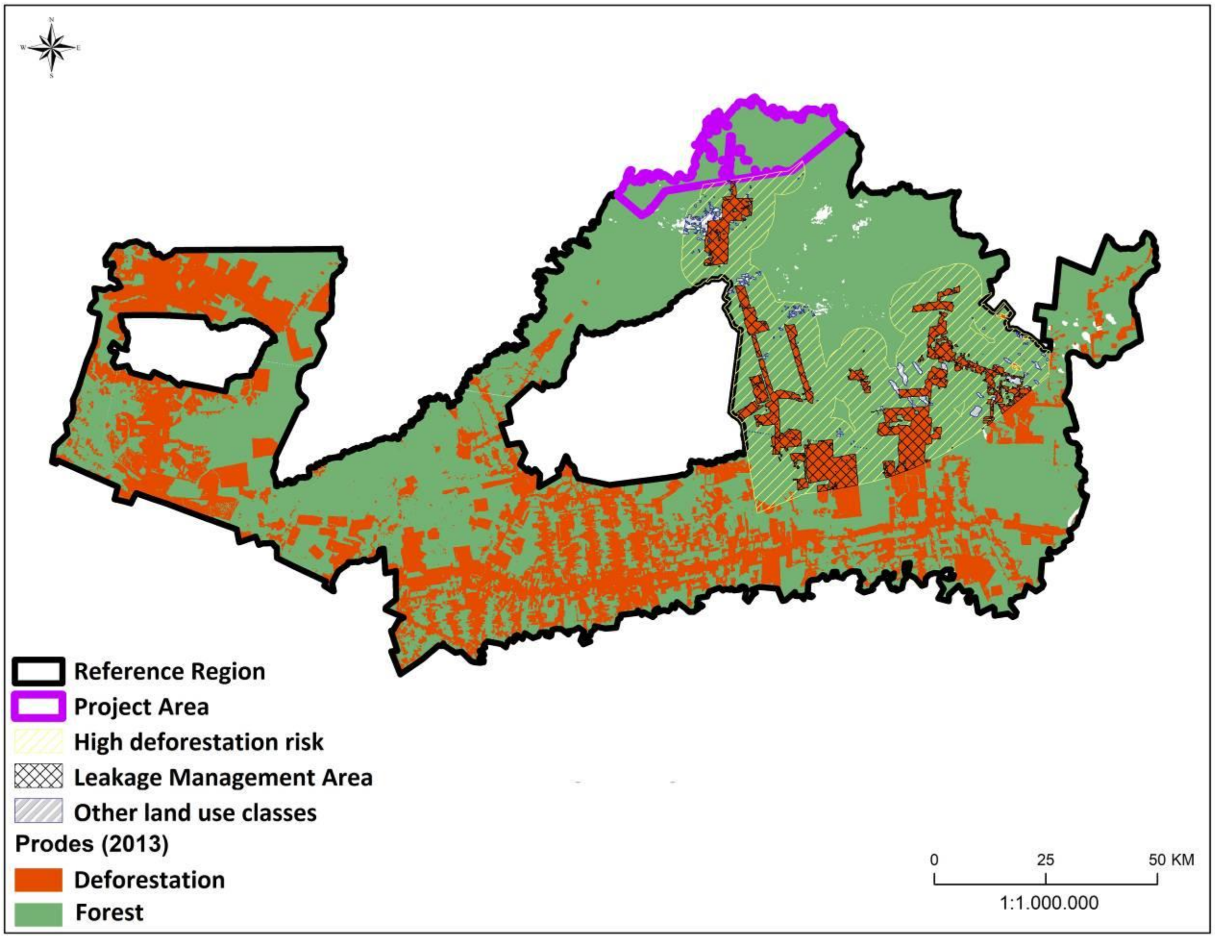


Figure 19. Location of the Leakage Management areas

Gases included in quantifications

Source		Gas	Included?	Justification/Explanation
Baseline and Leakage Belt	Unplanned deforestation	CO_2	Yes	Carbon emitted in unplanned deforestation
		CH_4	No	
		N_2O	No	
		Other	-	
	Biomass burning	CO_2	No	
		CH_4	Yes	Methane emissions during burning of biomass for land clearance
		N_2O	No	
		Other	-	
	Livestock emissions	CO_2	No	
		CH_4	Yes	Significant source of livestock emissions
		N_2O	Yes	Significant source of livestock emissions
		Other	-	
Project	Forest Management	CO_2	Yes	Carbon emitted in extraction of timber logs
		CH_4	No	
		N_2O	No	
		Other	-	

Avoiding conversion of forests to pasture can reduce emissions of N_2O and CH_4 that are associated with biomass burning used to clear the land. These emissions have been included in emission reduction calculations. However, emissions attributed to fertilizer use, and other agricultural practices that would have occurred if the forests had been converted, were conservative omitted in quantifications.

Carbon Pools included in quantifications

The following table indicates the recommendations of carbon pool inclusion, as mentioned in "AFOLU Requirements, v3.4":

		Above-ground tree* biomass	Above-ground non-tree* biomass	Below-ground biomass	Litter	Dead wood	Soil	Wood products
REDD	Planned or unplanned deforestation/degradation (APD or AUDD) with pasture grass as the land cover in the baseline scenario	Y	O	O	N	O	N	S

Y: Carbon pool shall be included in the project boundary.
S: Carbon pool shall be included where project activities may significantly reduce the pool, and may be included where baseline activities may significantly reduce the pool.
N: Carbon pool does not have to be included, because it is not subject to significant changes or potential changes are transient in nature.
O: Carbon pool is optional and may be excluded from the project boundary.
* For ARR, ALM and ACoGS projects, in place of "Aboveground tree" and "Aboveground non-tree", these two carbon pool categories should be read as "Aboveground woody" and "Aboveground non-woody" respectively.

Carbon pools were elected in a conservative manner. Conservative numbers and approaches were adopted to obtain 0% uncertainty in this component. The following carbon pools were hence involved in quantifications, in compliance with "AFOLU Requirements, v3.4":

- Aboveground biomass – trees (Mandatory),
- Belowground biomass (Optional), and
- Harvested wood products.

Deforestation emissions were estimated for all forest strata (conservatively excluding non-tree biomass), whose above- and belowground carbon pools were previously determined by means of a survey of literature data from the region of the Project Area. It is considered that a certain portion of logged wood is converted in long-term wood products, which serve as carbon pools after deforestation. This content of carbon fixed into long-term wood products was considered in calculation of net deforestation emissions.

Justification for not including dead wood carbon pool

The omission of the dead wood carbon pool was determined for a matter of conservativeness, given that in the deforested baseline scenario this carbon pool is likely to be much less than in the project scenario. Even if the dead wood carbon pool is significantly lower in the baseline than in the project scenario, the project proponent opted not to include this carbon pool in accounting of VCU benefits.

2.4 Baseline Scenario

Forest land is expected to be converted to non-forest land in the baseline case. Landowner cannot afford efforts and costs to keep long-term vigilance of frontiers to avoid unplanned deforestation from uncontrolled invasions. In this context, the project falls within the category AFOLU – REDD - Avoiding unplanned deforestation (AUD).

Selection of the most reasonable baseline scenario for the project

The project farm will not be able to afford large long-term costs and efforts for vigilance of land property. The landowner has registered a series of denouncements before the local Police Station (B.O.) and filed lawsuits against land-grabbers and criminal organizations that issued adulterated land documents.

Moreover, the sustainable forest management conducted at the property is under great pressure from other economic activities conducted in the area bordering the property, related to land-grabbing and to extensive cattle-raising, in addition to the difficulties inherent to the development of forestry stewardship, currently undergoing a crisis in Brazil.

As the landowner has recently received some offers for land purchase, and considering difficulties faced with sustainable forest management and land tenure at present, land selling can also be an alternative way to alleviate expenses on land vigilance and juridical assistance. In this latter case, it is highly probable that new landowners will prioritize activities involving deforestation and installation of the most common land uses in the region (i.e. pasture for cattle ranching).

Description of baseline scenario adopted

According to descriptions above, it is expected that unplanned deforestation is most likely to occur in the Project Area in case of absence of the REDD Project. The rate of deforestation adopted for calculation of REDD Project benefits was obtained from PRODES database.

In absence of REDD project, it is assumed that the property would certainly undergo the same deforestation intensity as other neighbouring lands.

Above- and belowground carbon pools were previously determined by means of a survey of literature data from the region of the Project Area. Considering that the baseline process of deforestation involves timber harvesting for commercial markets, the content of carbon fixed into long-term wood products was also considered in calculation of net deforestation emissions.

It is assumed that the Project Activity preserves soil organic carbon and litter pools, if compared with BAU activities. In this context, for conservativeness purposes, project proponents decided not to account soil carbon pool and litter carbon pool in REDD Project benefits.

Fossil fuel emissions were not accounted for the Reference (Baseline) Area or for the Project Activity. It is assumed that the Project Activity also reduces emissions from fossil fuel burning, in comparison with BAU activities. However, this factor was not accounted for conservativeness purposes and difficulties in monitoring during the project period.

2.5 Additionality

Project additionality is demonstrated below, according to "VT0001 Tool for the demonstration and assessment of additionality in VCS agriculture, forestry and other land use (AFOLU) project activities", Version 3.0, 1 February 2012, Sectoral Scope 14.

The tool is applicable to this project, according to statements below:

a) The project activity does not lead to violation of any applicable law, even if the law is not enforced;

b) There is a baseline methodology to provide for a stepwise approach justifying the determination of the most plausible baseline scenario.

STEP 1. Identification of alternative land use scenarios to the AFOLU project activity

Sub-step 1a. Identify credible alternative land use scenarios to the proposed VCS AFOLU project activity

a) The identified credible non-excluding alternative land use scenarios to the proposed VCS AFOLU project activity include:

i) SCENARIO 1: Continuation of the pre-project land use: It is clear that the Project Area landowner will not be able to afford large long-term costs and efforts for vigilance of land property, mainly considering past deforestation pressures experienced in the Project Area. The business currently administrated in the Project Area is not financially attractive without complementary incentives (ex. carbon credits), as demonstrated in this VCS-PD. Thus, this is not the most plausible scenario.

ii) SCENARIO 2: Project activity on the land within the project boundary performed without being registered as the VCS AFOLU project: The Project Proponent will not be able to afford costs to implement the proposed Project Activity. For this purpose, the Project Proponent is pleading to include this Project Activity in a Carbon Market platform, to obtain supplementary financial resources. The proposed Project Activity is not financially feasible without carbon credits.

iii) SCENARIO 3: Planned deforestation and logging of the area permitted by Law: This option would generate supplementary incomes to financially support long-term vigilance system; this would correspond to active deforestation of the property by landowner in the future.

iv) SCENARIO 4: Adoption of common land-use practices in the region (business as usual - BAU): This scenario includes deforestation beyond the limits established by Brazilian Forest Code (generalized non-compliance, typically observed in the farm region); this would be the probable scenario, if no additional environmental values are attributed to the farm operation.

v) SCENARIO 5: Unplanned deforestation caused by uncontrolled invasions: This scenario is derived from the lack of ability to control borders in case of the current cash-flow scenarios with logging operations alone, which indicates the need for additional sources of income in the overall operation of the farm.

vi) SCENARIO 6: Farm sale to private investors (in this case, the regional BAU is probably the most plausible future scenario): In recent years, Project Area landowner has already been approached to sell the farm (some offers are documented). Registered evidences of the interest of land purchase (e.g. purchase proposals) are available for consultation by auditors. All documents and records will be kept in a secure retrievable manner for at least two years after the end of the project crediting period.

b) All identified land use scenarios above may be deemed realistic and credible, as they currently exist and are technically feasible in the project region. For all land use scenarios, credibility is justified by current BAU practices attested by the literature and local observations.

c) Outcome of Sub-step 1a: The most credible alternative land use scenarios that could have occurred on the land within the project boundary are SCENARIOS 3 to 6, described above.

Sub-step 1b. Consistency of credible land use scenarios with enforced mandatory applicable laws and regulations

a) The following procedure was applied:

i) Demonstration that all land use scenarios identified in the sub-step 1a are in compliance with all mandatory applicable legal and regulatory requirements:

SCENARIO 3: Planned deforestation and logging of the area permitted by Law: In compliance with Brazilian Forest Code, the farm can officially allocate 80% of its total area as LR (Legal Reserve) for conservation. The remaining 20% of land could be deforested by license. Thus, this scenario is in compliance with legal and regulatory requirements.

SCENARIO 4: Adoption of common land-use practices in the region (business as usual - BAU): This scenario would not be in compliance with the Law if landowners surpass the limit of 20% of deforestation in a given property, which is not expected to occur in the project area during the project lifetime, according to deforestation projections. Thus, this scenario is in compliance with legal and regulatory requirements.

SCENARIO 6: Farm sale to private investors (in this case, the regional BAU is probably the most plausible future scenario): This scenario is in compliance with Brazilian property laws, as the landowner can sell and transfer land rights to any other person or private company. Thus, this scenario is in compliance with legal and regulatory requirements.

ii) Demonstration that applicable mandatory legal requirements are systematically not enforced and that non-compliance with requirements is widespread:

SCENARIO 5: Unplanned deforestation caused by uncontrolled invasions: This scenario does not comply with all mandatory legislation and regulations. In the project region, it has been historically proved that governmental resources for fighting land invasions by squatters are not effective. In this context, land-grabbing is a widespread practice. As a matter of fact, the Project Area has been invaded by squatters some years ago. The occurrence has been registered in Brazilian media (newspapers, radio and internet) and the evidences are available for auditors. The increasing pressure on the Project Area by squatters is the primary reason why the Project Proponent is seeking for complementary financial resources to improve land protection. Thus, it is demonstrated that SCENARIO 5 is valid in the context of this project activity.

b) Outcome of Sub-step 1b: Is has been demonstrated that SCENARIOS 3 to 6 are plausible alternative land use scenarios to this VCS AFOLU project activity. Given that SCENARIO 6 would be the most profitable and would save the landowner from current expenses on the Project Area, it can be regarded as the most plausible baseline scenario.

Sub-step 1c. Selection of the baseline scenario

For additionality analysis, Step 2 (Investment analysis) has been chosen.

STEP 2. Investment analysis

Sub-step 2a. Determine appropriate analysis method

The investment comparison analysis (Option II) has been chosen, given that project generates economic benefits other than VCS related income.

Sub-step 2b. Option II. Apply investment comparison analysis

The project proponent considers that the Investment Rate of Return (IRR) is the most suitable financial indicator for the project type and decision-making context. The Internal Rate of Return (IRR) is the discount rate that makes the net present value (NPV) of a project zero. In other words, it is the expected compound annual rate of return that will be earned on a project or investment[10].

$$\text{IRR} = \text{NPV} = \sum_{t=1}^{T} \frac{C_t}{(1+r)^t} - C_0 = 0$$

Where: C_t = Net cash inflow during the period t; C_0 = Total initial investment costs; r = the discount rate; t = the number of time periods.

Sub-step 2c. Calculation and comparison of financial indicators

For this analysis, the project scenario has been compared with the financially worst baseline scenario, which is low technology cattle ranching. In this context, the evaluation of scenarios 3 (planned deforestation permitted by Law) and 6 (farm sale followed by BAU) would be redundant, given that they are more financially interesting than cattle ranching.

- Thus, IRR calculations are presented below:As required by "VT0001 Tool for the demonstration and assessment of additionality in VCS agriculture, forestry and other land use (AFOLU) project activities", Version 3.0, 1 February 2012, Sectoral Scope 14, the IRR of the proposed VCS AFOLU project, with forest management and without VCU revenues has been calculated: **-64%**. (The spreadsheet used for this calculation is available for the audit team and any stakeholder willing to reproduce the analysis. Tables below present the raw data used in calculation and the IRR formula shown above.)

- IRR for cattle ranching: **4%**[11]. This is an IRR obtained from a publication approved by the WORLD BANK and IMAZON (Brazilian NGO). The details on calculation may be found in ANNEX I of this publication (sub-section "C. Pecuária").

[10] https://corporatefinanceinstitute.com/resources/knowledge/finance/internal-rate-return-irr/
[11] SCHNEIDER et al. Amazônia Sustentável: limitantes e oportunidades para o desenvolvimento rural. Brasília: World Bank; Belém: Imazon, 2000. 58 pp. (http://documents.worldbank.org/curated/en/964821468232758110/pdf/311960PAPER0Amazon01see0also0WTP5151.pdf, visited in 01/07/2019)

	FOREST MANAGEMENT CASHFLOW - FORESEEN											
	Month											
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Actual expenses	193.189	193.189	193.189	193.189	193.189	193.189	193.189	193.189	193.189	193.189	193.189	193.189
Actual earnings					250.937	250.937	250.937	250.937				
Total Forest Management Expenses (R$)	-193.189	-193.189	-193.189	-193.189	-193.189	-193.189	-193.189	-193.189	-193.189	-193.189	-193.189	-193.189
Project Proponent Expenses (R$)	-15.450	-15.450	-15.450	-15.450	-15.450	-15.450	-15.450	-15.450	-15.450	-15.450	-15.450	-15.450
Total Net Revenues (R$)	-208.639	-208.639	-208.639	-208.639	42.298	42.298	42.298	42.298	-208.639	-208.639	-208.639	-208.639

	FOREST MANAGEMENT CASHFLOW - FORESEEN												
Project Design (Year 1)	96000												REDD PROJECT EXPENSES (R$)
Project Design (Year 2)	72000												
Project Design (Year 3)	72000												
	Month												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Forest Monitors Salary (6)	10.800	10.800	10.800	10.800	10.800	10.800	10.800	10.800	10.800	10.800	10.800	10.800	
Infrastructure (bases, maintenance, internet etc.)	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	
Fuel	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	
Motocycles (financing, maintenance) (6)	300	300	300	300	300	300	300	300	300	300	300	300	
Carbon Consultancy	1.500	1.500	1.500	1.500	1.500	1.500	1.500	1.500	1.500	1.500	1.500	1.500	

	PROJECT WITH FOREST MANAGEMENT WITHOUT VCUs			
	Annual net revenue (R$)	IRR (%)	NPV (R$)	Break Even
SCENARIO WITHOUT VCUs	-1.747.122	-64,0	-9.871.631,37	N/A

a) The project IRR has been obtained from current data from the last harvest period in the Project Area, which is facing cash-flow issues, as the total annual investment is estimated in R$ 2,750,870, while the current annual revenue is estimated in R$ 1,003,748 (spreadsheet is available for consultation by auditors). For the alternative land use (pasture), the publication of SCHNEIDER et al. (2000) has been consulted, which describes all the details and assumptions of calculation methods. For the project scenario with forest management, it has been estimated that the IRR can only become positive as the credit price reaches R$ 40.00 per VCU.

b) It can be assumed that the comparison between the current revenues inside the Project Area and the revenues of pasture lands is reliable, given that real data were used for estimates in both cases, and in the case of pasture data, the technical article has been peer-reviewed prior to publication. Given that the prices of cattle have been increasing from the last decade (CEPEA, 2017), it can be considered that the use of data from year 2000 is conservative, given that IRR of pasture tends to be higher at present.

c) The activities in the Project Area are currently operating with a negative balance, which could be mitigated by VCU revenues to reach a positive IRR, indicating that it is a more risky economic activity if compared with pasture for cattle ranching. Although pasture has a low

IRR, it allows more stable revenues, and can be financed by previous revenues obtained with logging for land clearing. Then, this Project Activity cannot be considered as the most financially attractive: it is less attractive than the most common baseline land-use scenario, which is pasture for cattle ranching.

It is concluded that the proposed project is not the most financially attractive, then Step 2d (Sensitivity Analysis) is applied.

Sub-step 2d. Sensitivity analysis

This sensitivity analysis was performed to show whether the conclusion regarding the financial attractiveness is robust to reasonable variations in the critical assumptions. The investment analysis provides a valid argument in favor of additionality only if it consistently supports (for a realistic range of assumptions) the conclusion that the proposed project is unlikely to be financially attractive. Thus, this sub-step seeks to prove that the Project Activity without VCU revenues would not be more financially attractive than the baseline, even if the market becomes more favorable in different scenarios (sensitivity analysis).

For sensitivity analysis, IRR and NPV were estimated for the Project Activity as a function of an optimistic level of wood price (R$ 160.00/m^3, which is twice the current price), and reduction of 30% in forest management expenses (line "Optimistic Scenario"). Considering a 4% IRR as benchmark (i.e. comparing with cattle-ranching IRR as baseline land use scenario), this analysis has allowed for estimating the break even of the project, as a function of of wood price (R$ 228.00/m^3) (line "Wood Price of R$ 228.00/m^3"), and as a function of management cost reduction (77.04% reduction) (line "Cost Reduction of 77.04%"), as demonstrated below (calculation worksheet is available for auditors).

	PROJECT WITH FOREST MANAGEMENT WITHOUT VCUs		
	Annual net revenue (R$)	**IRR (%)**	**NPV (R$)**
CURRENT SCENARIO	-1,747,122	-64.0	-9,871,631.37
OPTIMISTIC SCENARIO	-1,747,122	-2.3	-270,607.82
WOOD PRICE OF R$ 228.00/M3	109,811	**4.0**	620,458.75
COST REDUCTION OF 77.04%	38,873	**4.0**	219,641.74

According to the sensitivity analysis, the project activity with forest management would reach a 4% IRR reported by SCHNEIDER et al. (2000) for cattle ranching only when wood price increases by 185% or management cost reduction reaches 77.04%. Given the great variation needed to obtain the 4% IRR, both scenarios are very improbable in the current economic context..

After this sensitivity analysis, it is concluded that the proposed project is unlikely to be financially most attractive, then Step 4 (Common practice analysis) is applied.

STEP 4. Common practice analysis

According to T-ADD “Tool for the Demonstration and Assessment of Additionality in VCS Agriculture, Forestry and Other Land Use (AFOLU) Project Activities”, the previous steps are complemented with an analysis of the extent to which similar activities have already diffused in the geographical area of the proposed VCS AFOLU project activity. This test is a credibility check to demonstrate additionality that complements the investment analysis (Step 2). Other registered VCS AFOLU project activities shall not be included in this analysis.

This analysis involved a survey of similar activities in the region of the proposed Project Activity, according to the following characteristics in a same project: large scale operations (the Project Area has the second biggest Operation License (*Licença de Operação*) in the State of Amazonas); operations with a valid and licensed Sustainable Management Plan (i.e. legal wood producers); operations providing logs to local sawmills (i.e. local generation of jobs and revenues); operations with investments in forest conservation and community enhancement.

In a survey performed by IEB (2014)[12], the offer of legal logs was the main restraint in Lábrea’s supply chain, as mentioned by 56% of stakeholders interviewed. In 2014, four Small Scale Sustainable Forest Management Plans (SFMP) were licensed for processing organizations. However, the volume of logs supplied by these SFMP is insufficient to fill the municipality demand, representing only 8% of total volume consumed yearly. According to data provided by IPAAM, between 2011 and 2013, five SFMPs of major impact were licensed in the South region of Lábrea, which would be able to supply legal wood in 2013 (licenses expire in 2 years). Among these SFMPs, only one had been licensed in 2011, with a total area of 928.85 ha and 3,457 m^3 of licensed wood.

Other four SFMPs, licensed in 2013, involve a total area of 6,732 ha, which represents an average of 1,346 ha per SFMP, being able to provide 58,871 m^3 of legal wood (average of 11,774 m^3 per SFMP). The logs produced by these SFMPs supplied two licensed wood industries in the South of Lábrea, which had a total yearly wood consumption of 30,000 and 14,400 m^3, respectively. According to IPAAM, these were the only licenses issued in 2013.

According to the City Hall Lábrea, it is estimated that 78,000 m^3 of illegal wood logs are monthly harvested and sold to the States of Rondônia and Acre.

The development of forestry stewardship is currently undergoing a crisis in Brazil. Forest management itself poses several difficulties, which implicates in the economic viability of the operation. To take all the measures and steps to achieve a sound business operation, the Project

[12] Diagnóstico da cadeia produtiva da madeira no município de Lábrea-AM - Brasília: IEB, 2014. 70p

Proponent has encountered challenges that indicate risks. These risks can be considered barriers to the continuation of the forest management project itself, and resources from the sales of carbon credits would be a very important component of the operation today and years to come.

The survey presented above indicates that large-scale operations with valid licensed SFMPs are not the common practice in the region of this Project Activity, mainly when supply of logs to local sawmills is considered (i.e. local generation of jobs and revenues). The lack of similar projects in the region would be even more evidenced when considering operations with investments in forest conservation and community enhancement, which is the case of this Project Activity.

Given that no activities similar to the proposed VCS AFOLU project activity were identified, then Step 4 is satisfied (i.e. similar activities are not likely to be made in the project region). Thus, the proposed VCS AFOLU project activity is not the baseline scenario and, hence, it is additional.

Additional community and biodiversity benefits

Peace and social development will only be possible by means of creation of formal employment and the legal benefits related to them. This is exactly one of the purposes of Project Proponent's Sustainable Forest Management Plan. Creating consistency of the wood supply through all its productive chain (total chain), from census/extraction until the final processing in the plant, this already in the city.

The whole family will have opportunities: the father employed by one position in the productive chain, the mother in non-wood forest products, and the young in professional education courses, which aims at meeting the Market requirements with their certifications.

So, the project has the potential to provide its participants with new sources of income, besides stimulating the generation of jobs linked to the forest management, generating a new demand for products originated within the boundaries of the project, and expanding the conditions for improved education and health services to the neighbouring community, with greater access to other development centres thanks to a more adequate transportation structure.

The project will involve several inclusion actions for the neighbouring communities, by means of a partnership to be established with Lábrea and Porto Velho (districts of Nova Califórnia and Extrema) Municipal Administrations, in order to implement technical education schemes. These actions might be communicated by means of conventional media (i.e. telephone, internet, newspapers etc.).

Technical qualification, training in forest management, community development in the form of participative workshops may increase the collective understanding of climate change and the importance of the forest. This understanding is essential for each individual in the process of a collective transformation of cultural relations and of the lifestyle of the local community.

The FORTALEZA ITUXI REDD PROJECT is committed to conduct social-environmental activities linked to the preservation of the forest stewardship and maintaining the integrity of the project proponent's farm.

Among the proposed activities, the project proponent forecasts the organization of trainings focusing on sustainable cattle ranching, which intend to train workers to apply the knowledge for a sustainable meat production chain. Furthermore, fire brigade teams will be trained, a biomass inventory will be set up, and new income opportunities will be created in the Municipalities of Lábrea and Porto Velho (both in terms of wood products and in terms of the sustainable exploitation of non-wood products, e.g. Brazil nuts).

The model proposed by this project includes its replication in areas with a potential to receive REDD projects. The central idea is to multiply preserved areas in the surrounding region adopting sustainable practices, converting the region into a model for sustainable development and with the benefits of the income arising from the reduction in emissions.

Community and biodiversity benefits that would not have occurred in the absence of the project activity are summarized as follows:

Communities:

- Organization of trainings focusing on sustainable cattle ranching;
- Training of fire brigade teams;
- Development and incentives to sustainable exploitation of non-wood products (e.g. Brazil nuts).

Biodiversity:

- Biomass inventory will be performed, as well as fauna and flora assessment;
- A survey on the occurrence of High Conservation Values in the Project Area will be carried out after the first verification period;
- Forest conservation practices will be disseminated as a means for increase value of standing forests.

2.6 Methodology Deviations

In this project activity, the development of the first local biomass inventory has been conditioned to the first sales of carbon credits. The use of secondary biomass data for estimation of avoided emissions is permitted by the methodology VM0015. However, this methodology mentions the use of biomass inventory data obtained for less than 10 years. As a methodology deviation, the project proponent used biomass inventory data older than 10 years. This deviation might be justified by the fact that forest biomass in the Amazon Biome is increasing, as stated in scientific literature[13] [14], which implies more conservative data (i.e. lower biomass estimates) in older inventories, compared with newer inventories. The project proponent opted for using the scientific study made by Cummings et al. (2002), which was considered as a reliable source of information by the validation audit team, whose data have been derived from multiple inventory parcels, installed in the forest class similar to that observed in the Project Area. The proponent is adopting a methodological deviation to use these forest inventory data, justifying that authors have sampled areas very near the Project Area, inside the forest type that represents the vegetation inside the Project Area, which was published 11 years prior to the project start date. In this case, it can be assumed that the methodological deviation corresponds to 1 year, given that, according to VM0015, data should be published from 2003 (10 years before the project start date), to be eligible in conformity with the methodology without deviations. Thus, considering that 6 parcels were taken from inventory measurements made by Cummings et al. (2002) (which are the closest to the Project Area as shown by coordinates, in addition to represent the same type of vegetation), the proponent used the standard deviation among these parcels, for determining the 90% confidence interval, for uncertainty analysis.

Another methodology deviation is regarding the method to calculate the carbon pool in forest products: although data on timber harvest plans are available for the Project area (allowing the use of Method 1), Method 2 has been applied for conservativeness purposes. This is considered a deviation, because Method 1 is usually applicable when data on timber harvest plans are available for the Project area: in the case of this project, timber harvest data are available, but Method 2 has been applied.

3 QUANTIFICATION OF GHG EMISSION REDUCTIONS AND REMOVALS

3.1 Baseline Emissions

3.1.1 STEP 2: ANALYSIS OF HISTORICAL LAND-USE AND LAND-COVER CHANGE

3.1.1.1 Definition of classes of land-use and land-cover

The time series analysis of land use, based on secondary information from PRODES Digital (INPE, 2014), refers mainly to the classes "Non-Forest Land" and "Forest Land".

The map below shows the dynamics of use and occupation of land, considering the historical series for the years 2000-2013, plus the accumulated deforestation since 1997, as well as other mapping classes.

[13] Baker, T.R. et al. (2004). Increasing biomass in Amazonian forest plots. Phil. Trans. R. Soc. Lond. B (2004) 359, 353-365. DOI 10.1098/rstb.2003.1422
[14] Phillips, O.L. et al. (1998). Changes in the Carbon Balance of Tropical Forests: Evidence from Long-Term Plots. SCIENCE VOL 282 16, 439-442.

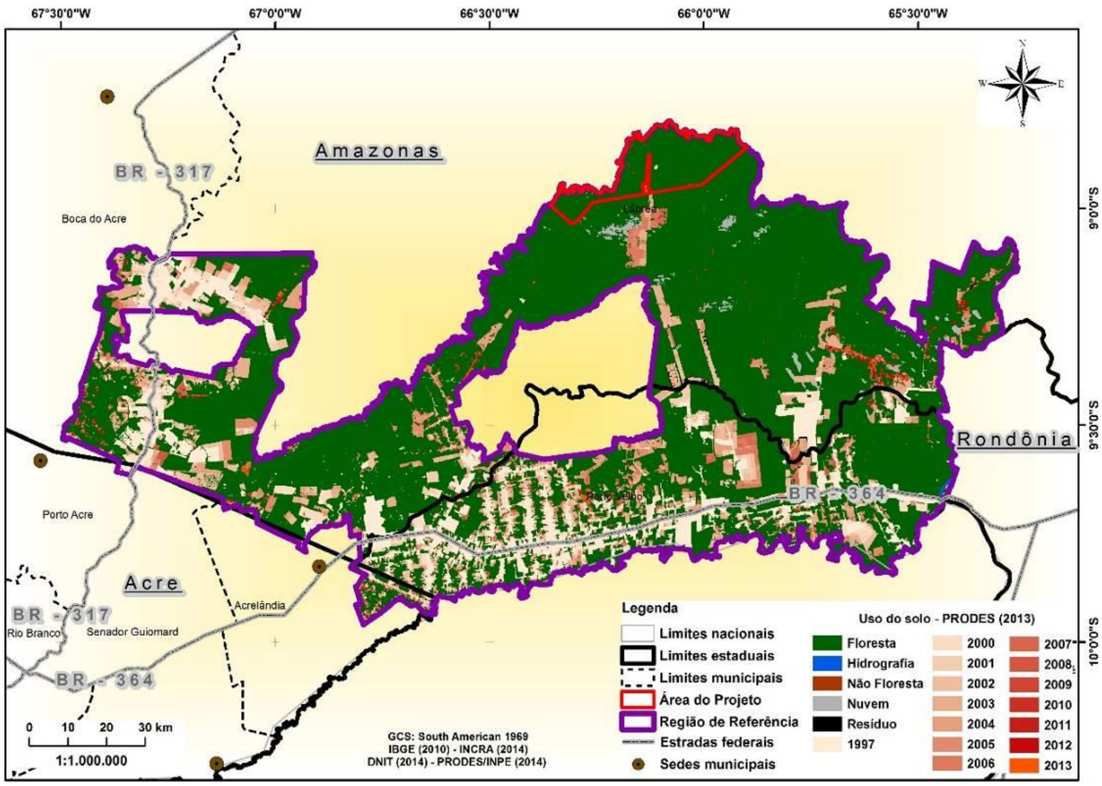


Figure 20. Mapping of land use in 2013, for the Reference Region and Project Area. Source: PRODES Digital (2013)

The validation of land-use data used for modelling of land use was performed by using the confusion matrix, in order to calculate the overall index of success by period and by class. Three specific classes were used: forest, accumulated deforestation and other (hydrography, not forest, clouds, roads, residues, unclassified objects, and others).

The validation was performed using the land use mapping PRODES Digital (2014) and a set of satellite images for each year of the reference period (2005, 2009 and 2013). The satellite images used were four scenes of satellite Landsat 8 TM (orbits 001/65, 001/66, 233/65, and 233/66) to the total geographic scope of the Project Area and Reference Region. Only for the year 2013, two scenes were used from the Landsat 8 and 2 other scenes from the satellite LISS ResourceSat, given the lack of cloudless pictures in the period.

With the help of the "Create Random Points" tool in ArcGIS 10.0, 100 random points were generated for each class / year as samples for evaluation, using satellite images as reference, making it possible to generate a confusion matrix for calculation of the accuracy indexes, and the Kappa index (indicators for validation of mapping accuracy).

Table 5. PRODES 2013 data evaluation confusion matrix.

		VALIDATED REFERENCE DATA			
		Forest	Deforestation	Others	Total
CLASSIFIED	Forest	98	2	0	**100**
	Deforestation	1	99	0	**100**
	Others	5	9	86	**100**
	Total	**104**	**110**	**86**	**300**

Kappa (k) = 0.915

For all reference periods, existing land use classes had higher values than 90% accuracy for the accuracy and Kappa index, as required in VM00015 1.1 methodology. In this sense, the reliability of land use class maps was validated, and data was applied as input for the modelling and projection of future deforestation.

Table 6. Data used for historical LU/LC change analysis

Vector (Satellite or Airplane)	Sensor	Resolution		Coverage	Aquisition date	Scene or Point identifier	
		Spatial	Spectral	(km2)	(DD/MM/YY)	Path / Latitude	Row / Longitude
Satellite	Landsat 5 TM	30 x 30	0.50 - 2.35 µm	34.25	4/9/2005	001	66
Satellite	Landsat 5 TM	30 x 30	0.50 - 2.35 µm	34.25	20/9/2005	001	67
Satellite	Landsat 5 TM	30 x 30	0.50 - 2.35 µm	34.25	12/8/2005	233	66
Satellite	Landsat 5 TM	30 x 30	0.50 - 2.35 µm	34.25	29/9/2005	233	67
Satellite	Landsat 5 TM	30 x 30	0.50 - 2.35 µm	34.25	29/07/2009	001	66
Satellite	Landsat 5 TM	30 x 30	0.50 - 2.35 µm	34.25	15/09/2009	001	67
Satellite	Landsat 5 TM	30 x 30	0.50 - 2.35 µm	34.25	07/08/2009	233	66
Satellite	Landsat 5 TM	30 x 30	0.50 - 2.35 µm	34.25	07/08/2009	233	67
Satellite	Landsat 8 TM	30 x 30	0.50 - 2.35 µm	34.25	18/08/2013	233	66
Satellite	Landsat 8 TM	30 x 30	0.50 - 2.35 µm	34.25	18/08/2013	233	67
Satellite	Resourcesat-2	23.5 x 23.5	0.52 - 1.70 µm	26.80	25/7/2013	309	0831
Satellite	Resourcesat-2	23.5 x 23.5	0.52 - 1.70 µm	26.80	25/7/2013	309	0821

For evaluation of land use changes, Resourcesat and Landsat 8 images have been used as reference. In addition, the evaluations have been validated with 2013 SPOT/IKONOS images, using Google Earth.

Table 7. List of all land use and land cover classes existing at the project start date within the reference region

Class Identifier		Trend in Carbon stock[1]	Presence in[2]	Baseline activity[3]			Description (including criteria for unambiguous boundary definition)
ID_{cl}	Name			LG	FW	CP	
1	Forest Land	decreasing	RR; LK; LM; PA	yes	no	no	Determined by automated classification methods
2	Non-Forest Land	increasing	RR; LK; LM; PA	yes	no	no	Determined by automated classification methods

1. Note if “decreasing”, “constant”, “increasing”
2. RR = Reference region, LK = Leakage belt, LM = Leakage management Areas, PA = Project area
3. LG = Logging, FW = Fuel-wood collection; CP = Charcoal Production (yes/no)
4. Each class shall have a unique identifier (IDcl). The methodology sometimes uses the notation icl (= 1, 2, 3, … Icl) to indicate “initial” (pre-deforestation) classes, which are all forest classes; and fcl (= 1, 2, 3, … Fcl) to indicate final” (post-deforestation) classes. In this table all classes (“initial” and “final”) shall be listed.

3.1.1.2 Definition of categories of land-use and land-cover change

The potential LU/LC-change categories that could occur within the Project Area and Leakage Belt during the project crediting period, in both the baseline and project case, are presented below.

Table 8. Potential land-use and land-cover change matrix

			Initial LU/LC class (2003)		Total (ha)
			Forest	***Pasture***	
		ID_{cl}	***I1***	***I2***	
Final LU/LC class (2013)	**F1**	***Forest***	1.036.867,70	0,00	**1.036.867,70**
	F2	***Pasture***	60.118,57	342.778,73	**402.897,30**
Total (ha)			**1.096.986,27**	**342.778,73**	**1.439.765,00**

Table 9. List of land-use and land-cover change categories

IDct	Name	Trend in Carbon stock	Presence in	Activity in the baseline case		
				LG	FW	CP
I1/F1	Forest / Pasture	Decrease	RR; LK; LM; PA	yes	no	no

3.1.1.3 Analysis of historical land-use and land-cover change

For the acquisition, preprocessing, classification, post-classification, and evaluation of the accuracy of satellite images, for projection of changes in land use and land cover during the Project duration, the following steps have been performed:

a) Data Acquisition: satellite images should have a spectral resolution between 0.5 and 2.35 µm (for Landsat 5 TM and Landsat 8 TM) and between 0.52 and 1.70 µm (for Resourcesat-2). Land use and land cover mapping has been assessed using images with spatial resolution superior to 30 meters. Image acquisition has been performed during the period of low incidence of clouds and rainfall in the region, within July and September. The scenes used for monitoring were: 01, 66, 67, and 233 (Landsat); and 309 and 0821 (Resourcesat).

b) Pre-processing: images have undergone geometric correction by means of geo-referencing in ArcGIS 10, using topographic maps as reference in the scale 1:100,000 or USG-NASA orthorectified images in MrSID format. The geo-referencing RMS has been lower than 1 pixel for optical images and approximately 1.5 pixel for radar image. All data are expressed in the UTM coordinate system, Zone 20S and Datum WGS 1984.

c) Classification: use the optical images to transform the digital numbers value in scene components (vegetation, soil, and shade) through the spectral mixture algorithm. Select images of the soil and shade component and apply the segmentation technique through the regions increasing algorithm, with threshold parameters of similarity equal to 8 and area threshold equal to 4. The classification is performed using ISOSEG unsupervised algorithm with 90% acceptance threshold for classes: forest, new deforestation, nonforest vegetation, hydrography, and clouds. These segmentation and classification algorithms may be applied using the image processing software such as SPRING 5 and TerraView 4. The mapped change of category is from forest class to deforestation class.

d) Post-classification: the classification result in raster format will be transformed in vector format for classification audit in ArcGIS 10. For analysis of areas with cloud cover, use the visual interpretation of radar image.

e) Evaluation of classification accuracy: performed by analyzing the overall accuracy and kappa index obtained from a confusion matrix (CONGALTON, 1999). At least 50 points randomly distributed derived from high spatial resolution satellite imagery (≤5 meters). The minimum accuracy of the classification mapping should be 80%.

In a brief analysis of deforestation location, it can be seen the existence of the deforestation pattern known as "fish spine", which refers to the opening of secondary and tertiary roads, mainly from the two major federal highways (BR-364 and BR-317) in the Reference Region.

Data of deforestation history show a cumulative deforestation of 407,722.68 hectares, equivalent to more than 28% of the Reference Region. It is perceived a non-compliance on the Reference Region in regard to "Law No. 12,651", which requires a Legal Reserve of 80% in each rural property of the Amazon Biome. This is a strong argument regarding the additionality of this REDD project, because it demonstrates a strong trend change in the dynamics of land use in the Reference Region.

According to the analysis of the annual rate of deforestation in the Reference Region, obtained from historical deforestation data, it can be seen that 2003 and 2010 recorded, respectively, the highest and lowest annual rate of deforestation within the reporting period. For the reference years 2005, 2009 and 2013, it were registered rates of deforestation of 27,622.05; 4,268.86, and 6,136.66 hectares, respectively. The 2005-2009 period showed a considerable downward trend in deforestation, followed by an increase in the 2009-2013 period.

3.1.2 STEP 3: ANALYSIS OF AGENTS, DRIVERS AND UNDERLYING CAUSES OF DEFORESTATION AND THEIR LIKELY FUTURE DEVELOPMENT

3.1.2.1 Identification of agents of deforestation

As previously mentioned in “1.10 Conditions Prior to Project Initiation” of this VCS-PD, pasture accounts for virtually all the deforested land occupation in the project region.

The following information is provided for the identified agent of deforestation:

a) Name of the main agent: Cattle Ranchers;

b) Description of the main features of the main agent of deforestation: Cattle ranching (pasture) is usually financed by means of initial capital obtained in wood logging. Deforestation is considered to occur through clear-cutting of forests for logging followed by pasture installation. A field survey performed by Vitel (2009) throughout the “Ramal do Boi”, which passes through several private properties in the Reference Region and in the project property, indicated that deforestation in private properties nearby is predominantly attributed to cattle ranching. This deforestation pattern may be caused by private landowners themselves and also by professional land-grabbers, by means of invasions in unguarded areas. As stated earlier in this PD, in the specific case of the Project Area, professional land-grabbers (even politicians), have already organized illegal occupation in the property, together with colligated members of the police. The final use of virtually all occupied lands would be cattle ranching (pasture). Thus, it can be affirmed that the deforestation agent group is composed by large and small-scale cattle ranchers supported by land-grabbers and loggers in the initial stage of deforestation. This group is composed by private owners and itinerant land-grabbers. It can also be affirmed that this group of deforestation agents is culturally and economically adapted to this “business cycle” of deforestation, whose results are clearly demonstrated in the Reference Region during the reference period.

c) Assessment of the most likely development of the population size of the deforestation agent group in the Reference Region, Project Area and Leakage Belt: As the main deforestation agent in the region, cattle ranching (pasture) is expected to increase in the project region. This increase is inferred from the increase of cattle livestock in the municipality of Lábrea. From 2006 to 2007, cattle livestock has strongly increased from 7,027 to 285,519, according to official IBGE data. The livestock has increased 20% from 2008 to 2013. The number of livestock in the municipality of

Lábrea is projected to increase up to 100% during the project period (2013-2043), according to statistical projections made by linear regression on official data obtained from IBGE for the last 7 years prior to the project start date. This linear regression has been made for the last 7 years, as this period has presented a steady increase in livestock (i.e. the use of 2006 data in linear regression would render non-realistic and overestimated projection of the increase in livestock). This strong pace of growth in cattle-related land uses, observed during the last years, will certainly impose considerable deforestation pressures in the future.

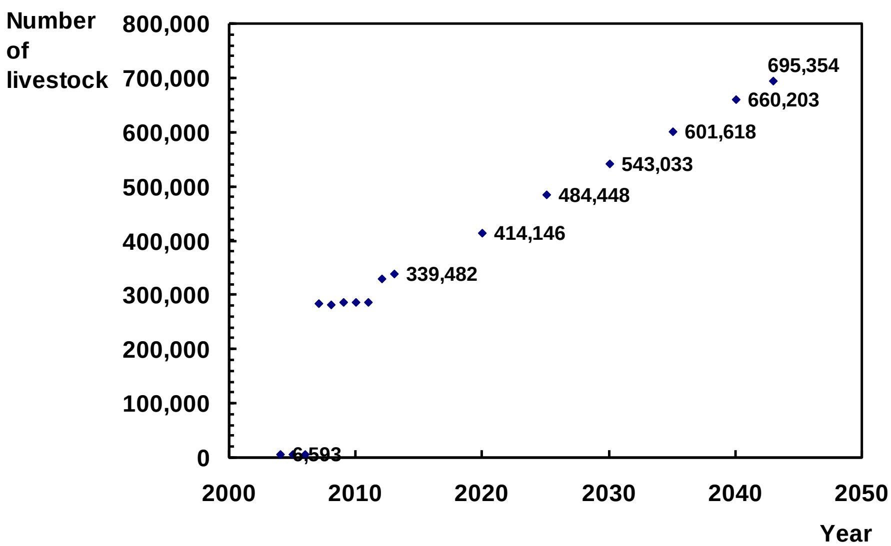


Figure 21. Number of livestock projected to the municipality of Lábrea, State of Amazonas, considering the project duration period (adapted from IBGE, 2014)

Wood harvest can be regarded as the first approach in deforestation activity, as it is the precursor of cattle ranching implementation. Official registration of wood logging production for sawmills has been decreasing during the past 10 years, according to IBGE's official data. For 2013, there was no registration of wood log production for sawmills. This might corroborate the fact that the project region is facing a crisis of legal wood supply. Data related to wood supply also seems to be associated with the behavior of the group of deforestation agents described in (b). Both graphs show increases in cattle production at the same time the supply of legal wood is decreasing in the region. Thus, the trend of reduction in legal wood supply might be closely related to the increase in activities of illegal wood logging, promoted by cattle ranchers as final users of land. All the collected data allows to infer that the activity of cattle ranchers, supported initially by illegal logging agents, is increasing in the region.

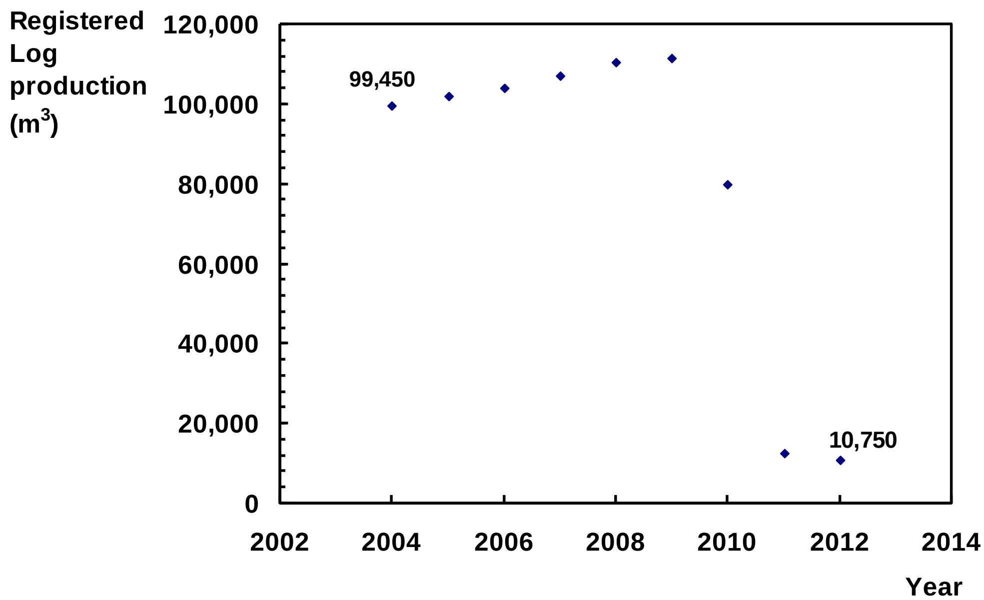


Figure 22. Production of sawmill logs in the municipality of Lábrea, State of Amazonas (IBGE, 2014)

d) Statistics on historical deforestation attributable to the agent group: In 2003 and 2010, the highest and the lowest deforestation rates were registered, respectively, during the reference period. In 2005, 2009 and 2013, the deforested areas were of 27.622,05, 4.268,86 and 6.136,66 hectares, respectively. Thus, from 2005 to 2009, a decrease in deforestation rate was observed; while from 2009 to 2013, the deforestation rate lightly increased. Analysis of land use obtained in Terra Class database indicates that 13% of the Reference Region is covered by pasture lands located in the State of Rondonia, while 14% of the Reference Region is covered by pasture lands located in the State of Amazonas. All the other land uses in deforested lands (including urban areas) in the Reference Region sum less than 1% of the total deforested area. This corroborates the strong activity of cattle ranchers in the Reference Region. Thus, it is confirmed that virtually all deforestation in the Reference Region is attributed to the group of deforestation agents related to conversion of forest to pasture for cattle ranching, as indicated in items (a) and (b).

3.1.2.2 Identification of deforestation drivers

In this step, the factors that drive the land-use decisions of the agent group are analyzed to identify the immediate causes of deforestation.

For this analysis, two sets of driver variables are distinguished:

a) Driver variables explaining the quantity (hectares) of deforestation:

* Prices of cattle:

1) According to CEPEA (2017), the price of cattle has gradually increased from 2003 to 2013. This economic phenomenon is observed throughout the country. Young (1998) apud Rivero et al. (2009), evaluating the mechanisms that cause deforestation in the Legal Amazon, verified a positive relation between the expansion of agricultural areas and the variation of prices of agricultural products. For Margulis (2001) apud Rivero et al. (2009), the higher are the agricultural prices the higher is the migration to rural lands, which results in deforestation[15];

2) This key driver variable is likely to have a major impact on cattle ranchers' decision to deforest. Considering that the higher is the cattle price, the higher are the profits obtained with pasture for cattle ranching, instead of maintaining standing forests;

3) The figure below (CEPEA, 2017) clearly shows that the cattle price tends to continue to increase along the next years;

4) The dynamics of cattle prices are regulated by micro and macroeconomic scenario throughout the country, and there are no applicable project measures that can be implemented to address this driver.

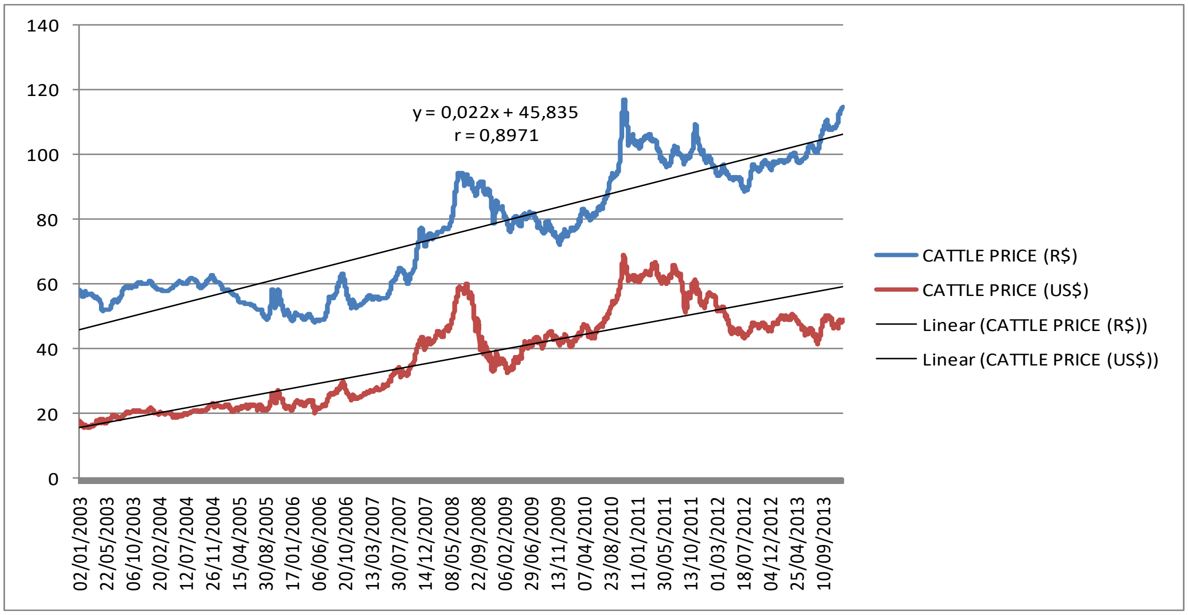


Figure 23. Cattle prices in Brazil (CEPEA, 2017)

* Population density:

[15] Sérgio Rivero; Oriana Almeida; Saulo Ávila; Wesley Oliveira. Pecuária e desmatamento: uma análise das principais causas diretas do desmatamento na Amazônia. Nova econ. vol.19 no.1 Belo Horizonte Jan./Apr. 2009. (Available in: http://www.scielo.br/scielo.php?script=sci_arttext&pid=S0103-63512009000100003; last visited in 26-11-2017)

1) This deforestation driver is associated with the increase in local cattle market, as well as with the increase of potential deforestation agents working in the region. Several authors include the population density as a prediction variable in deforestation models, which demonstrates that this driver has important impact on deforestation trends (Reis and Margulis, 1991; Reis, 1996; Andersen and Reis, 1997 apud Rivero et al. 2009);

2) This key driver variable provides an increasing pressure of deforestation by cattle ranchers, avid for mitigating poverty by means of a profitable business;

3) The population of Lábrea (municipality where the Project Area is located) is expected to grow approximately 80% during the project period. This estimate was made by means of a linear regression based on the past 5 years of population growth, according to official IBGE data. This population growth rate could represent a major driver to increase the deforestation in the region for the next decades;

4) Considering that the project activity cannot regulate the population density, there will not be project measures to address this driver.

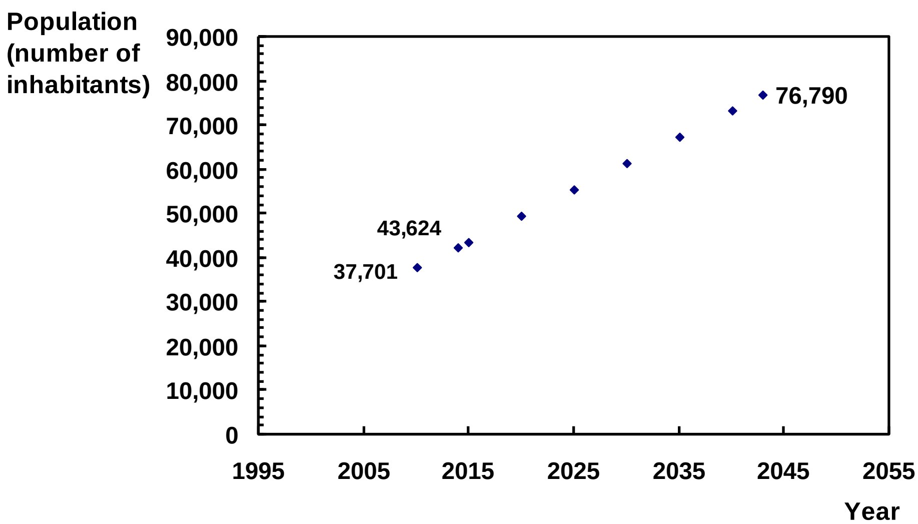


Figure 24. Population growth projected to the municipality of Lábrea, State of Amazonas, considering the project duration period (adapted from IBGE, 2014)

b) Driver variables explaining the location of deforestation, also called "predisposing factors" (de Jong, 2007). These driver variables have been used in deforestation projection modeling. The modeling results show that these driver variables can suitably predict the location of deforestation:

* Access to forests (existing roads and navigable rivers):

1) The studies on historical location of deforestation in the Reference Region can evidence that this has been a driver for deforestation during the historical reference

period. It is broadly recognized that deforestation is more accelerated in regions that have denser road networks (IMAZON[16], 2014);

2) The presence of roads and navigable rivers is a logical deforestation driver, since it facilitates the flow of wood and other products extracted from the forest. The facility to transport wood logs, rapidly clear the land for pasture and place wood logs in sawmills, obtaining fast revenues, has certainly a major impact on cattle ranchers' decision to deforest the most accessible forest areas;

3) The Reference Region holds a dense network of primary, secondary, and tertiary roads. The lands placed near these roads have a greater potential for deforestation, generating a progressive "fish spine" effect. This deforestation pattern might increase even exponentially in some cases, given that a single road may originate several other transversal roads in the future, and so on. In a brief analysis of deforestation location, it can be seen the existence of the deforestation pattern known as "fish spine", which refers to the opening of secondary and tertiary roads, mainly from the two major federal highways (BR-364 and BR-317) in the Reference Region. BARBER et al. (2014)[17], in a study on deforestation drivers in the Amazon, conclude that proximity to transportation networks, particularly the rapidly growing unofficial road network, is a major proximate driver of deforestation in the Amazon. Thus, it can be expected that the growth of unofficial road network will be increasingly affecting the dynamics of deforestation during the project period. A similar reasoning is applicable to the navigable rivers nearby the Project Area: the Iquiri River is a navigable river that has been used to access the northern portion of the Project Area, and can be a valuable way to land-grabbers to easily invade the property and clear forests for logging and pasture. In the case of navigable rivers, the number of paths will be the same along the project life, as no new navigable paths are foreseen to be created;

4) The project activity foresees the increase of the intensity of surveillance activities during the crediting period, in a manner that the main paths for access to the Project Area will be continuously monitored and controlled.

* Proximity to forest edges:

1) The studies on historical location of deforestation in the Reference Region can evidence that this has also been a driver for deforestation during the historical reference period. Similarly to the proximity to roads and navigable rivers, the effect of this driver on the deforestation decisions is also related to easier logistics to clear areas and obtain rapid revenues with logs. The proximity to forest edges has been used in this type of study in other REDD projects, as the "The Suruí Forest Carbon Project", the "RMDLT Portel-Pará REDD Project", the "Florestal Santa Maria REDD Project", and others. This deforestation driver has historically been used to explain the dynamics of deforestation in

[16] ImazonGeo
[17] Christopher Barber; Mark A. Cochrane; Carlos M. Souza Jr.; William F. Laurance. Roads, deforestation, and the mitigating effect of protected areas in the Amazon. Biological Conservation, Volume 177, September 2014, Pages 203-209.
(Available at: http://www.sciencedirect.com/science/article/pii/S000632071400264X. Last visited in 28/11/2017)

other similar analyses (LAURANCE et al. 2009[18]; ROSA et al. 2013[19]). According to ROSA et al. (2013), deforestation is contagious, such that local deforestation rate increases through time if adjacent locations are deforested;

2) The impact of this driver on cattle ranchers' decision to deforest is similar to that explained for roads and navigable rivers: this proximity facilitates the logistics of wood and other products extracted from the forest;

3) This key driver variable will have increased impact during next years, owing to the advance of deforestation in the region, which will bring deforestation pressures gradually closer to the boundaries of the Project Area. As stated in several parts of this PD, deforestation for logging and cattle ranching is a common practice in the project region, and this behavior tends to continue in the future. Thus, it is expected that deforested areas will attract deforestation agents continuously, in a growing deforestation trend, provoked by a "contagious" process, as stated by ROSA et al. (2013);

4) The project measures that will be implemented to address this driver are the same measures that are being adopted to manage leakage in this project. These measures are described in detail in "5.2 Leakage Management" of this PD, and involve Technical Training on Sustainable Cattle Raising, Forest Management Courses, and others.

3.1.2.3 Identification of underlying causes of deforestation

According to literature surveys and local interviews, it is concluded that the underlying causes of deforestation are as follows:

- Land-use policies and their enforcement;

- Poverty and wealth.

Land-use policies and their enforcement:

1) As previously mentioned in this PD, in spite of the legal provisions intended to preserve at least 80% of the Amazon Forest coverage, the lack of law enforcement by local authorities along with the increase in production and prices of cattle has created a scenario of almost complete disregard of the mandatory provisions of the Forest Code. High rates of criminality associated with land disputes usually jeopardize efforts concerning law enforcement improvement. In addition to that, to cover vast distances of areas with low demographic density makes tracking of illegal activities and land surveillance very difficult for the authorities. Accordingly, policies implemented to address illegal deforestation only by means of command and control approaches

[18] William F. Laurance; Miriam Goosem; Susan G.W. Laurance. Impacts of roads and linear clearings on tropical forests. Trends in Ecology & Evolution, Volume 24, Issue 12, December 2009, Pages 659-669. (Available at: https://www.sciencedirect.com/science/article/pii/S0169534709002067; Last visited in: 28/11/2017)

[19] Rosa IMD, Purves D, Souza C Jr, Ewers RM (2013) Predictive Modelling of Contagious Deforestation in the Brazilian Amazon. PLoS ONE8(10): e77231. https://doi.org/10.1371/journal.pone.0077231. (Last visited in: 28/11/2017)

have proven to be ineffective so far[20]. Data of deforestation history show a cumulative deforestation of 407,722.68 hectares, equivalent to more than 28% of the Reference Region. It is perceived as non-compliance on the Reference Region, in regard to "Law No. 12,651", which requires a Legal Reserve of 80% in each rural property of the Amazon Biome.

2) This key underlying cause has a strong effect on the decisions of the main deforestation agents, as they can continue their illegal business activities with very low probability to be detained by authorities.

3) The problem of lack of command and control for detain deforestation in the Amazon Biome is a widespread issue, which has been historically complicating year over year, due to lack of personnel and infrastructure of legal authorities, in addition to schemes of corruption and violence established by illegal agents to keep the *status quo*. In this context, the lack of law enforcement can be assumed to be a constant underlying cause during the project lifetime.

4) Although the project activity cannot resolve the problem of lack of enforcement in Brazil, it can serve as a success case to stimulate neighbors to adopt sustainable practices as a profitable land-use alternative.

Poverty and wealth:

1) According to statistics for the municipality of Lábrea-AM (IBGE, 2017), the average monthly wage of formal workers in 2015 was of 1.7 minimum salaries. Formal workers represent only 4.6 % of total Lábrea population, and 52.7% of the population lived with half a salary per month in 2010. These data show that the region faces poverty issues.

2) This key underlying cause has a major impact on deforestation decisions, as the main agents (cattle ranchers, operationally supported by loggers and land-grabbers) can easily recruit cheap manpower, composed by workers that are seeking to sustain their families by means of this profitable activity, even if it is illegal and without consistent law enforcement.

3) For the next years, it is not expected that the region will rapidly solve the poverty issue, as it has been historically rooted in the region. In this context, poverty can be assumed to be a constant underlying cause during the project lifetime.

4) Although the project activity cannot resolve the poverty issue, it can guarantee new job posts for local agents, who will be able to generate revenues for their families by means of a legal and sustainable initiative.

[20] REDD no Brasil: um enfoque amazônico: fundamentos, critérios e estruturas institucionais para um regime nacional de Redução de Emissões por Desmatamento e Degradação Florestal – REDD. – Brasília, DF: Centro de Gestão e Estudos Estratégicos, 2011, pages 31 and 34-35.

3.1.2.4 Analysis of chain of events leading to deforestation

Based on the historical evidence collected, it is concluded that the implementation of BAU activity (pasture) is usually financed by means of initial capital obtained in wood logging. Official data from IBGE (2014) clearly indicates that the registration of legal wood log production is facing a crisis in the region. This crisis reflects the lack of supply of legal wood to the local market, mainly composed by local sawmills.

The lack of enforcement of policies and laws also affects land tenure and property rights. This aspect stimulates the action of land grabbers and squatters. Ineffective legal land registration and documentation is also a barrier to official registration of timber production from natural forests. In this scenario, a great portion of harvested wood logs can be regarded as illegal and official registration is not technically feasible.

All the above factors conduce to uncontrolled land invasions and deforestation, followed by cattle ranching activities. The main proof of this scenario is the invasion of the Project Area in 2006, which is thoroughly documented and had great repercussion in Brazilian media.

3.1.2.5 Conclusion

Available evidence about the most likely future deforestation trend within the Reference Region and Project Area is “Conclusive”. It means that the hypothesized relationships between agent groups, driver variables, underlying causes and historical levels of deforestation can be verified at hand of literature studies and other verifiable local sources of information.

The weight of the available evidence conservatively suggests that the overall trend in future baseline deforestation rates will be “About Constant”. During the reference period, the deforestation rate in the Reference Region has increased and decreased, while presenting an overall trend to oscillate around a constant average. In this context, the deforestation rate used in the projections was the average historical rate (see step 4.1.1).

3.1.3 Projection of the quantity of future deforestation (Step 4.1.1: Selection of the baseline approach; Step 4.1.2: Quantitative projection of future deforestation)

This step is carried out to determine the quantity of baseline deforestation (in hectares) for each future year within the Reference Region.

The Modelling approach “c” has been chosen to project future deforestation. With this approach, the rate of baseline deforestation has been estimated using a model that expresses deforestation as a function of driver variables.

This baseline approach has been chosen given thatthe deforestation rates measured in the reference period in the Reference Region do not reveal any trend (decreasing, constant or increasing deforestation) as a function of time and there is at least one variable that can be used to project the deforestation rate (as demonstrated by ROC assessments shown in the next topic of this VCS-PD).

3.1.4 Projection of the location of future deforestation (Step 4.2)

The basic tasks to perform this analysis are:

- Preparation of factor maps;
- Preparation of risk maps for deforestation;
- Selection of the most accurate deforestation risk map; and
- Mapping of the locations of future deforestation.

Table 10. List of variables, maps and factor maps

Factor Map		Source	Variable represented		Meaning of the categories or pixel value		Other Maps and Variables used to create factor map		Algorithm or Equation used	Comments
ID	*File Name*		Unit	Description	Range	Meaning	ID	File name		
1	dist_desmatamento05.rst	INPE (2014)	meters	Distance to old deforestation	0 - 0.42	Values close to 0 are closer to the deforestation	1A	Prodes_2005_RR.shp	Euclidean Distance - IDRISI Taiga	PRODES - Historical Land Use (Forest, Deforestation and Others)
2	dist_estradas.rst	DNIT (2014)	meters	Distance to main roads	0 - 0.48	Values close to 0 are closer to main roads	2A	estradas_federais_DNIT.shp	Euclidean Distance - IDRISI Taiga	
3	estradas_novo1.rst	IMAZON (2014)	meters	Distance to secondary roads	1 - 3	Values closer 3 is more likely to linear growth	3A	estradas_vicinais_imazon.shp	Euclidean Distance - IDRISI Taiga	
4	dist_hidro.rst	ANA (2014)	meters	Distance to hidrography	0 - 0.40	Values close to 0 are closer to hidrography	4A	hidrografia_ANA.shp	Euclidean Distance - IDRISI Taiga	
5	dist_localidades.rst	IBGE (2014)	meters	Distance to villages	0 - 0.94	Values close to 0 are closer to villages	5A	localidades_ibge.shp	Euclidean Distance - IDRISI Taiga	

Determination of the Model

The chosen tool for the analysis of Fortaleza Ituxi REDD Project baseline is the Land Change Modeler, LCM (Eastman, 2009), available at 16.0 IDRISI Taiga Edition software.

The LCM evaluates the relationship between drivers of deforestation (human and biophysical), restrictions (Protected Areas) and changing areas of land use derived from two maps of use and occupation of land. The tool projects changes for the future at intervals set by the user based on past patterns of change (AMUCHÁSTEGUI and FORREST, 2013).

This study considered the following drivers: distance from deforestation, distance from roads, distance from communities and localities, and distance from hydrography. These drivers, selected as explanatory variables of deforestation dynamics, have a history of use in similar analyses in other projects registered in the VCS, although they are from different regions.

In deforestation dynamics analysis in the Reference Region, input data (explanatory variables) of model of neural networks were all analysed, even with the possibility of correlation and redundancy of information between them.

The variables "distance from deforestation" and "distance from localities ", as well as the linear "distance from hydrography" were considered in the final model selected for establishment of project baseline.

The model selected with the best potential to explain the future of deforestation dynamics in the Reference Region presented a value of AUC = 0.935. Location analysis of future deforestation within the Reference Region was performed to determine the annual areas of deforestation within the Project Area and Leakage Belt (step 4.2). Once location analysis has been completed, the portion of annual areas of baseline deforestation within the project area and leakage belt was determined using a GIS.

Table 11. Sensitivity analysis results to choose the model with the greatest potential for explanation of land use changes in the analysed period

Variable/ Model	Distance from localities	Distance from deforestation 2005	Distance from static roads	Distance from hydrography	Distance from dynamic roads	Value of AUC ROC
Model 1	X					0.885
Model 2		X				0.935
Model 3			X			0.925
Model 4				X		0.837
Model 5	X	X	X	X		0.935
Model 6	X	X	X			0.935
Model 7		X	X	X		0.935
Model 8	X		X	X		0.924
Model 9	X	X		X		0.935
Model 10		X	X			0.935
Model 11		X	X		X	0.935
Model 12					X	0.773
Model 13	X	X	X	X	X	0.935

Quality Control of the Model

To evaluate the model and the variables that best explain the dynamics of deforestation, the sensitivity analysis "Jacknife" and the ROC (Relative Operating Characteristic) analysis were used, as in SANGERMANO et al. (2012) and MATTA (2015).

To evaluate the accuracy of the models, it was necessary to compare the map obtained by the prediction model with actual data. For this analysis, two land use maps were compared: i) Estimated / modeled map to the year 2013, and ii) actual deforestation map observed in 2013.

Projected Results from the Model

The accumulated baseline deforestation projected to occur within the Reference Region was estimated as 253,465.65 hectares over the 30-years project lifetime. The estimated average annual rate of deforestation is 8,448.85 hectares for the Reference Region.

Table 12. Annual areas of baseline deforestation in the reference region (Table 9.a of VM0015)

Year	Project year	Total - RR	
		annual $ABSLRR_t$ ha	cummulative ABSLRR ha
2013	0	0.0	402,708.1
2014	1	14,090.9	416,744.1
2015	2	11,026.2	427,816.3
2016	3	10,818.3	438,637.6
2017	4	10,625.8	449,257.5
2018	5	10,414.4	459,677.2
2019	6	10,221.4	469,893.8
2020	7	10,012.2	479,908.3
2021	8	9,815.4	489,720.7
2022	9	11,528.1	501,251.3
2023	10	9,027.7	510,279.2
2024	11	8,859.3	519,139.7
2025	12	8,695.6	527,834.1
2026	13	8,529.9	536,364.0
2027	14	8,364.1	544,727.9
2028	15	8,199.9	552,927.6
2029	16	8,033.2	560,961.4
2030	17	9,440.7	570,402.3
2031	18	7,389.8	577,790.9
2032	19	7,253.4	585,045.0
2033	20	7,118.9	592,163.5
2034	21	6,982.7	599,148.4
2035	22	6,848.2	605,996.9
2036	23	6,712.1	612,709.7
2037	24	6,577.7	619,287.1
2038	25	7,727.7	627,015.8
2039	26	6,050.8	633,065.5
2040	27	5,936.3	639,002.9
2041	28	5,854.7	644,830.4
2042	29	5,689.1	650,546.2
2043	30	5,621.3	656,165.6
TOTAL		**253,465.6**	

The accumulated baseline deforestation projected to occur within the Project Area was estimated as 5,391.6 hectares over the 30-years project lifetime. The estimated average annual rate of deforestation is 179.7 hectares for the Project Area.

Table 13. Annual areas of baseline deforestation in the project area (Table 9.b of VM0015)

Year	Project year	Total - PA	
		annual $ABSLPA_t$ ha	cummulative ABSLPA ha
2013	0	-	0.0
2014	1	1,748.25	1,748.3
2015	2	244.00	1,992.3
2016	3	-	1,992.3
2017	4	242.31	2,234.6
2018	5	-	2,234.6
2019	6	241.87	2,476.4
2020	7	-	2,476.4
2021	8	246.66	2,723.1
2022	9	-	2,723.1
2023	10	238.68	2,961.8
2024	11	-	2,961.8
2025	12	237.54	3,199.3
2026	13	-	3,199.3
2027	14	238.86	3,438.2
2028	15	-	3,438.2
2029	16	225.66	3,663.8
2030	17	-	3,663.8
2031	18	224.42	3,888.3
2032	19	-	3,888.3
2033	20	219.81	4,108.1
2034	21	-	4,108.1
2035	22	217.42	4,325.5
2036	23	-	4,325.5
2037	24	220.70	4,546.2
2038	25	-	4,546.2
2039	26	212.02	4,758.2
2040	27	-	4,758.2
2041	28	213.97	4,972.2
2042	29	-	4,972.2
2043	30	419.42	5,391.6
TOTAL		**5,391.6**	

Table 14. Annual areas of baseline deforestation in the leakage belt (Table 9.c of VM0015)

Year	Project year	Total - LK annual $ABSLLK_t$ ha	Total - LK cummulative ABSLLK ha
2013	0	0.0	0.0
2014	1	9,824.5	9,824.5
2015	2	9,550.7	19,375.2
2016	3	10,816.8	30,192.0
2017	4	8,854.7	39,046.7
2018	5	10,414.4	49,461.1
2019	6	8,464.0	57,925.1
2020	7	10,012.1	67,937.2
2021	8	8,358.8	76,296.0
2022	9	11,309.6	87,605.6
2023	10	7,678.3	95,283.8
2024	11	8,632.8	103,916.6
2025	12	7,620.2	111,536.8
2026	13	8,142.8	119,679.6
2027	14	7,435.6	127,115.2
2028	15	7,759.2	134,874.4
2029	16	7,194.7	142,069.1
2030	17	9,005.5	151,074.6
2031	18	6,466.6	157,541.3
2032	19	6,958.6	164,499.9
2033	20	6,291.9	170,791.8
2034	21	6,668.8	177,460.6
2035	22	6,039.0	183,499.6
2036	23	6,427.9	189,927.5
2037	24	5,778.2	195,705.7
2038	25	7,492.6	203,198.3
2039	26	5,144.3	208,342.7
2040	27	5,857.8	214,200.5
2041	28	8,801.2	223,001.7
2042	29	1,792.8	224,794.4
2043	30	4,774.6	229,569.0
TOTAL		**229,569.0**	

3.1.4.1 Location of future deforestation: Conclusion

The location of deforestation in the Reference Region was characterized by the strong influence of the accessibility to forests, contributing to the expansion and opening of new areas in the region as a whole, mainly as extensions from the BR-364 along its length in the states of Acre and Rondônia into the Amazon. It is assumed that “Ramal do Boi” road would also be a driver to facilitate deforestation.

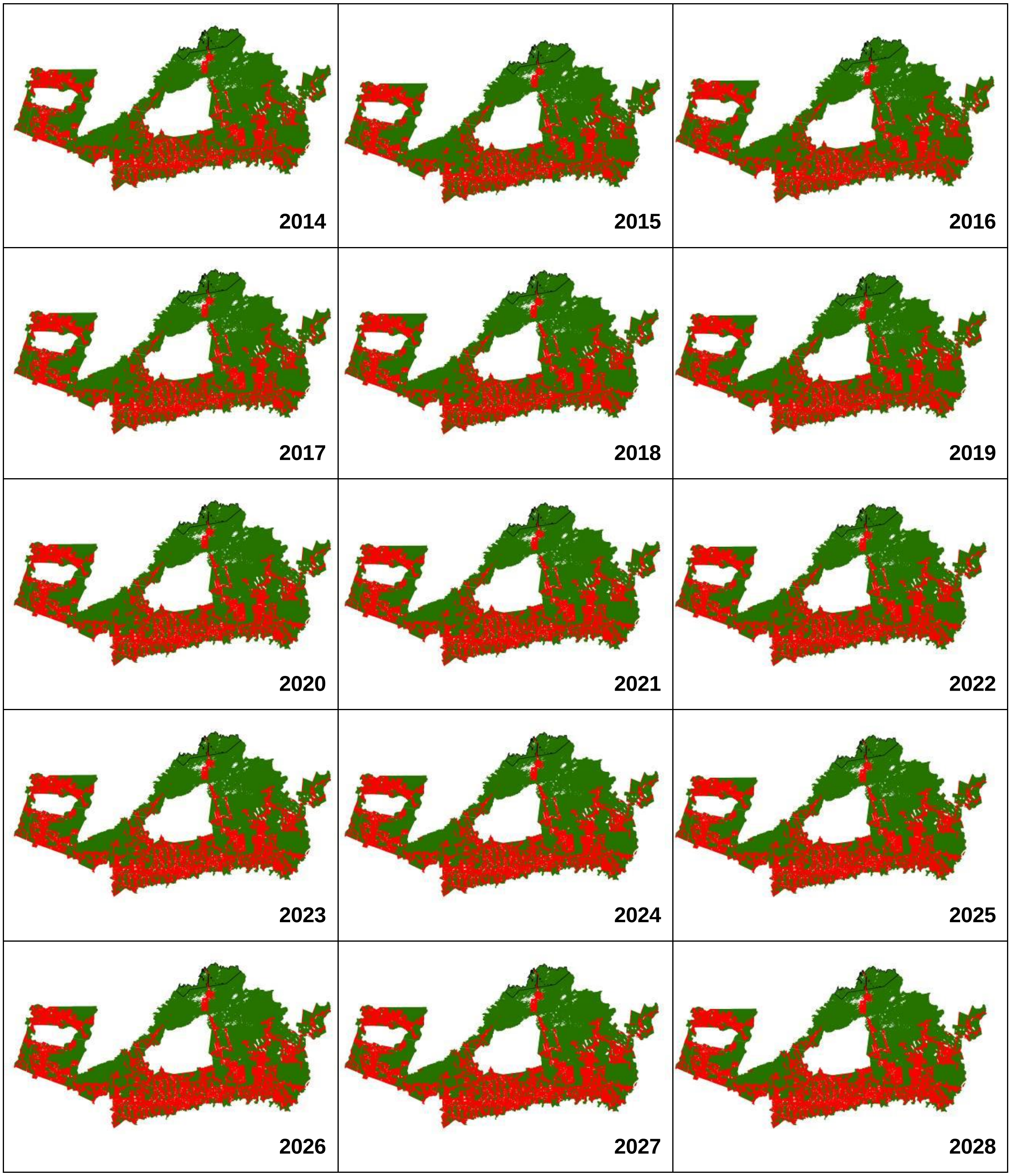
The Reference Region has a vast and dense network of primary, secondary and tertiary roads, as well as navigable rivers. Rivers have also been considered as paths to facilitate deforestation: the maps of projection of deforestation location indicate a consistent occurrence of future deforestation nearby water bodies. Thus, the nearest locations to these paths will have a greater potential of deforestation.

The distance from previous deforestation (i.e. proximity to forest edges) has also be an important deforestation driver: regions near the ancient deforestation and communities, districts, municipal centers tend to have a higher probability and risk of future deforestation.

All drivers related to the dynamics of land use change for cattle ranching may increase the potential of above-mentioned deforestation drivers. Thus, every enhancement in the market of livestock-related products may affect the deforestation in the region as a whole, mainly in locations nearby consumption clusters.

Complementarily, the demography dynamics (i.e. changes in population density) is also a driver to interact and potentialize all other above-mentioned drivers, as it leads to increase in food consumption and availability of labor for deforestation schemes.

The following figure shows the yearly projection of deforestation location until 2043.


2014
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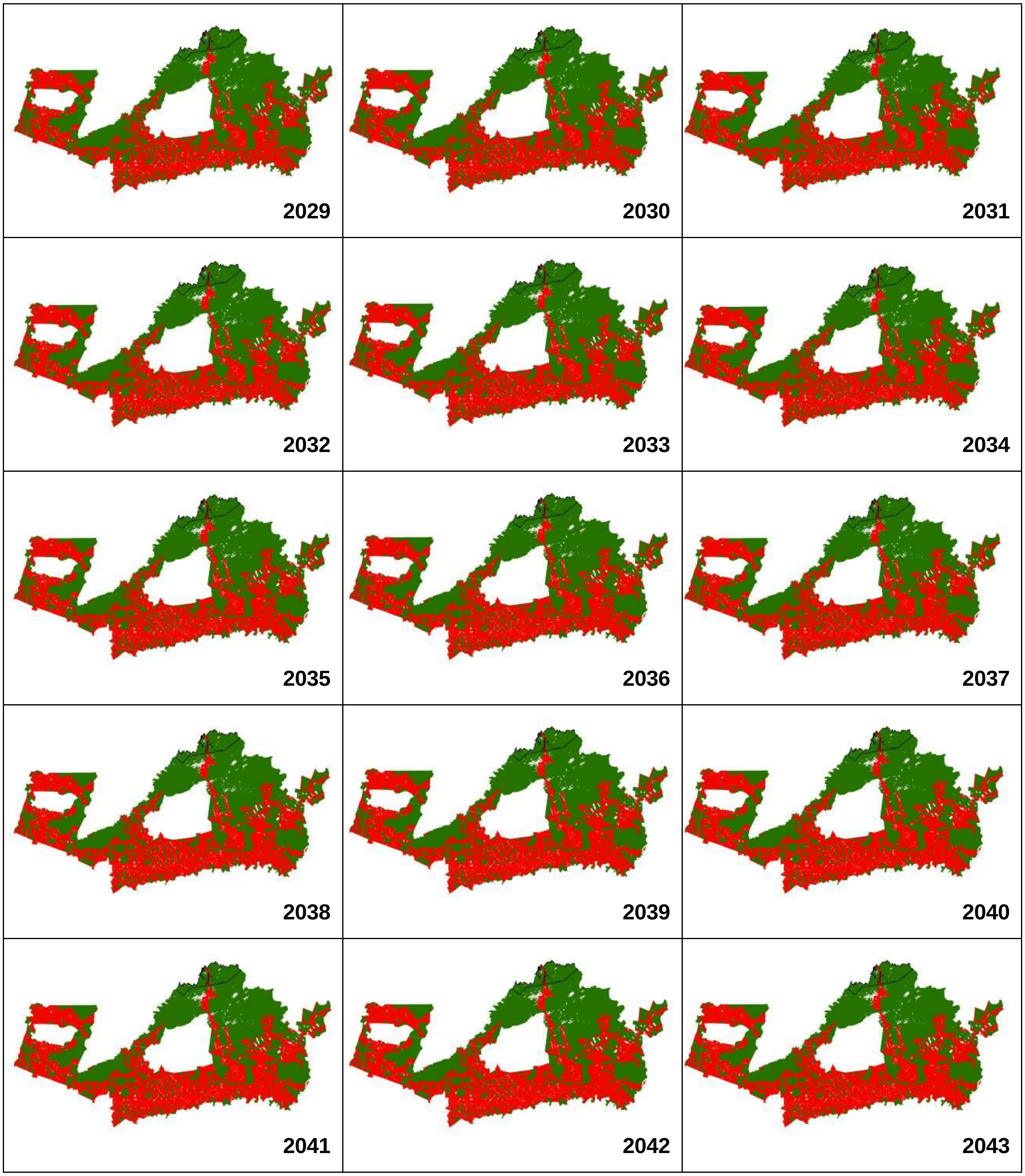


Figure 25. Mapping of cumulative yearly deforestation projected to 2043, for the Reference Region and Project Area

Figure below shows the location of deforestation within the Project Area, highlighting the strong deforestation pressure near the "Ramal do Boi" road, increasing in length and width, contributing to new areas to be deforested along its route.

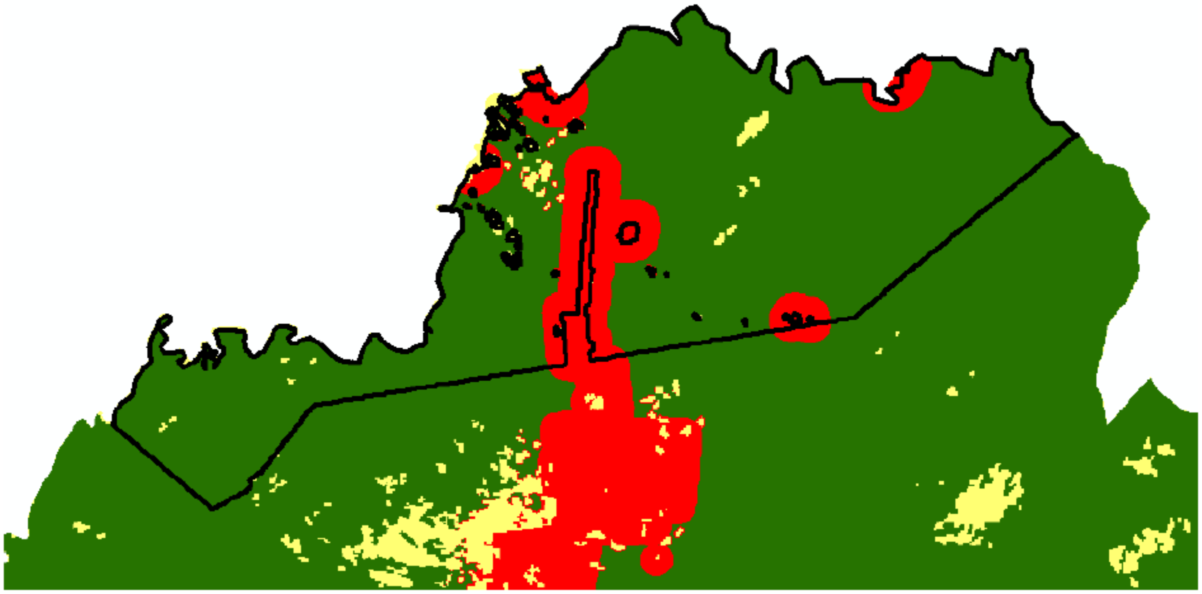


Figure 26. Mapping of cumulative deforestation projected to 2043, for the Project Area

3.1.5 STEP 5: DEFINITION OF THE LAND-USE AND LAND-COVER CHANGE COMPONENT OF THE BASELINE

The goal of this step is to calculate activity data (hectares per year) of the initial forest classes (icl) that will be deforested and activity data of the post-deforestation classes (fcl) that will replace them in the baseline case.

After step 4, the area and location of future deforestation are both known and pre-deforestation carbon stocks were determined by matching the predicted location of deforestation with the location of forest classes with known carbon stocks.

3.1.5.1 Calculation of baseline activity data per forest class (Step 5.1)

According to MMA data, the Project Area has 100% of its forest cover corresponding to Open Ombrophylous Forest (Submontane open ombrophylous forest – As). The data processing in this step was the same as performed and explained in previous steps.

The following table shows the annual estimates of deforestation within the Project Area, obtained by means of modelling.

Table 15. Annual areas deforested per forest class icl within the project area in the baseline case (baseline activity data per forest class) (Table 11.b of VM0015)

	ID_{icl} >	1	Total baseline deforestation in the project area	
	Name >	Submontane open ombrophilous forest (As)		
Year	Project year *t*	ha	annual $ABSLPA_t$ ha	cummulative ABSLPA ha
2013	0	0.0	0.0	0.0
2014	1	1,748.3	1,748.3	1,748.3
2015	2	244.0	244.0	1,992.3
2016	3	0.0	0.0	1,992.3
2017	4	242.3	242.3	2,234.6
2018	5	0.0	0.0	2,234.6
2019	6	241.9	241.9	2,476.4
2020	7	0.0	0.0	2,476.4
2021	8	246.7	246.7	2,723.1
2022	9	0.0	0.0	2,723.1
2023	10	238.7	238.7	2,961.8
2024	11	0.0	0.0	2,961.8
2025	12	237.5	237.5	3,199.3
2026	13	0.0	0.0	3,199.3
2027	14	238.9	238.9	3,438.2
2028	15	0.0	0.0	3,438.2
2029	16	225.7	225.7	3,663.8
2030	17	0.0	0.0	3,663.8
2031	18	224.4	224.4	3,888.3
2032	19	0.0	0.0	3,888.3
2033	20	219.8	219.8	4,108.1
2034	21	0.0	0.0	4,108.1
2035	22	217.4	217.4	4,325.5
2036	23	0.0	0.0	4,325.5
2037	24	220.7	220.7	4,546.2
2038	25	0.0	0.0	4,546.2
2039	26	212.0	212.0	4,758.2
2040	27	0.0	0.0	4,758.2
2041	28	214.0	214.0	4,972.2
2042	29	0.0	0.0	4,972.2
2043	30	419.4	419.4	5,391.6
TOTAL			**5,391.6**	

The following table shows the annual estimates of deforestation within the Leakage Belt, obtained by means of modelling.

Table 16. Annual areas deforested per forest class icl within the leakage belt area in the baseline case (baseline activity data per forest class) (Table 11.c of VM0015)

Year	ID_{icl} > / Name > / Project year *t*	1 / Submontane open ombrophilous forest (As) / ha	Total baseline deforestation in the leakage belt / annual $ABSLLK_t$ ha	cummulative ABSLLK ha
2013	0	0.0	0.0	0.0
2014	1	9,824.5	9,824.5	9,824.5
2015	2	9,550.7	9,550.7	19,375.2
2016	3	10,816.8	10,816.8	30,192.0
2017	4	8,854.7	8,854.7	39,046.7
2018	5	10,414.4	10,414.4	49,461.1
2019	6	8,464.0	8,464.0	57,925.1
2020	7	10,012.1	10,012.1	67,937.2
2021	8	8,358.8	8,358.8	76,296.0
2022	9	11,309.6	11,309.6	87,605.6
2023	10	7,678.3	7,678.3	95,283.8
2024	11	8,632.8	8,632.8	103,916.6
2025	12	7,620.2	7,620.2	111,536.8
2026	13	8,142.8	8,142.8	119,679.6
2027	14	7,435.6	7,435.6	127,115.2
2028	15	7,759.2	7,759.2	134,874.4
2029	16	7,194.7	7,194.7	142,069.1
2030	17	9,005.5	9,005.5	151,074.6
2031	18	6,466.6	6,466.6	157,541.3
2032	19	6,958.6	6,958.6	164,499.9
2033	20	6,291.9	6,291.9	170,791.8
2034	21	6,668.8	6,668.8	177,460.6
2035	22	6,039.0	6,039.0	183,499.6
2036	23	6,427.9	6,427.9	189,927.5
2037	24	5,778.2	5,778.2	195,705.7
2038	25	7,492.6	7,492.6	203,198.3
2039	26	5,144.3	5,144.3	208,342.7
2040	27	5,857.8	5,857.8	214,200.5
2041	28	8,801.2	8,801.2	223,001.7
2042	29	1,792.8	1,792.8	224,794.4
2043	30	4,774.6	4,774.6	229,569.0
TOTAL			**229,569.0**	

3.1.5.2 Calculation of baseline activity data per post-deforestation forest class (Step 5.2)

To project the LU/LC classes that will replace forests in the baseline case, Method 1 “Historical LU/LC-change” has been chosen, since historical LU/LC-changes are assumed to be representative for future trends. Hence, post-deforestation land-uses are allocated to the projected areas of annual deforestation in same proportions as those observed on lands deforested during the historical reference period in the Reference Region.

As previously mentioned in “1.10 Conditions Prior to Project Initiation” of this VCS-PD, pasture accounts for virtually all the deforested land occupation in the project region. Thus, the post-deforestation class is considered as “pasture”.

The following table shows the annual estimates of deforestation within the Project Area, obtained by means of modelling.

Table 17. Annual areas deforested in each zone within the project area in the baseline case (baseline activity data zone) (Table 13.b of VM0015)

	ID_z >	1	Total baseline deforestation in the project area	
	Name >	Pasture		
Year	Project year *t*	ha	annual $ABSLPA_t$ ha	cummulative ABSLPA ha
2013	0	0.0	0.0	0.0
2014	1	1,748.3	1,748.3	1,748.3
2015	2	244.0	244.0	1,992.3
2016	3	0.0	0.0	1,992.3
2017	4	242.3	242.3	2,234.6
2018	5	0.0	0.0	2,234.6
2019	6	241.9	241.9	2,476.4
2020	7	0.0	0.0	2,476.4
2021	8	246.7	246.7	2,723.1
2022	9	0.0	0.0	2,723.1
2023	10	238.7	238.7	2,961.8
2024	11	0.0	0.0	2,961.8
2025	12	237.5	237.5	3,199.3
2026	13	0.0	0.0	3,199.3
2027	14	238.9	238.9	3,438.2
2028	15	0.0	0.0	3,438.2
2029	16	225.7	225.7	3,663.8
2030	17	0.0	0.0	3,663.8
2031	18	224.4	224.4	3,888.3
2032	19	0.0	0.0	3,888.3
2033	20	219.8	219.8	4,108.1
2034	21	0.0	0.0	4,108.1
2035	22	217.4	217.4	4,325.5
2036	23	0.0	0.0	4,325.5
2037	24	220.7	220.7	4,546.2
2038	25	0.0	0.0	4,546.2
2039	26	212.0	212.0	4,758.2
2040	27	0.0	0.0	4,758.2
2041	28	214.0	214.0	4,972.2
2042	29	0.0	0.0	4,972.2
2043	30	419.4	419.4	5,391.6
TOTAL			**5,391.6**	

The following table shows the annual estimates of deforestation within the Leakage Belt, obtained by means of modelling.

Table 18. Annual areas deforested in each zone within the leakage belt in the baseline case (baseline activity data per zone) (Table 13.c of VM0015)

	ID_z >	1	Total baseline deforestation in the leakage belt	
	Name >	Pasture		
Year	Project year *t*	ha	annual $ABSLLK_t$ ha	cummulative ABSLLK ha
2013	0	0.0	0.0	0.0
2014	1	9,824.5	9,824.5	9,824.5
2015	2	9,550.7	9,550.7	19,375.2
2016	3	10,816.8	10,816.8	30,192.0
2017	4	8,854.7	8,854.7	39,046.7
2018	5	10,414.4	10,414.4	49,461.1
2019	6	8,464.0	8,464.0	57,925.1
2020	7	10,012.1	10,012.1	67,937.2
2021	8	8,358.8	8,358.8	76,296.0
2022	9	11,309.6	11,309.6	87,605.6
2023	10	7,678.3	7,678.3	95,283.8
2024	11	8,632.8	8,632.8	103,916.6
2025	12	7,620.2	7,620.2	111,536.8
2026	13	8,142.8	8,142.8	119,679.6
2027	14	7,435.6	7,435.6	127,115.2
2028	15	7,759.2	7,759.2	134,874.4
2029	16	7,194.7	7,194.7	142,069.1
2030	17	9,005.5	9,005.5	151,074.6
2031	18	6,466.6	6,466.6	157,541.3
2032	19	6,958.6	6,958.6	164,499.9
2033	20	6,291.9	6,291.9	170,791.8
2034	21	6,668.8	6,668.8	177,460.6
2035	22	6,039.0	6,039.0	183,499.6
2036	23	6,427.9	6,427.9	189,927.5
2037	24	5,778.2	5,778.2	195,705.7
2038	25	7,492.6	7,492.6	203,198.3
2039	26	5,144.3	5,144.3	208,342.7
2040	27	5,857.8	5,857.8	214,200.5
2041	28	8,801.2	8,801.2	223,001.7
2042	29	1,792.8	1,792.8	224,794.4
2043	30	4,774.6	4,774.6	229,569.0
TOTAL			**229,569.0**	

3.1.6 STEP 6: ESTIMATION OF BASELINE CARBON STOCK CHANGES AND NON-CO_2 EMISSIONS

The goal of this step is to finalize the baseline assessment by calculating:

- Baseline carbon stock changes; and (optionally)

- Baseline non-CO_2 emissions from forest fires used to clear forests.

3.1.6.1 Estimation of baseline carbon stock changes

The use of carbon stock estimates in similar ecosystems derived from local studies, literature and IPCC defaults is permitted, provided the accuracy and conservativeness of the estimates are demonstrated.

According to “1.10 Conditions Prior to Project Initiation” of this VCS-PD, biomass data have been taken from 6 parcels of Cummings et al. (2002) work. Data presented in the next table have been calculated from this scientific publication, as well as superior and inferior limits of the 90% Confidence Intervals.

Table 19. Carbon stocks per hectare of initial forest classes icl existing in the project area and leakage belt: Estimated values (Table 15.a of VM0015)

Year	Project year t	Initial forest class *icl* Name: Submontane open ombrophilous forest (As) ID $_{icl}$ 1 Average carbon stock per hectare ± 90% CI											
		Cab $_{icl}$		Cbb $_{icl}$		Cwp $_{icl}$						Ctot $_{icl}$	
						short lived		*medium lived*		*long lived*			
		C *stock*	± 90% CI	C *stock*	± 90% CI	C *stock*	± 90% CI	C *stock*	± 90% CI	C *stock*	± 90% CI	C *stock*	± 90% CI
		t CO_2e ha^{-1}	t CO_2e ha^{-1}	t CO_2e ha^{-1}	t CO_2e ha^{-1}	t CO_2e ha^{-1}	t CO_2e ha^{-1}	t CO_2e ha^{-1}	t CO_2e ha^{-1}	t CO_2e ha^{-1}	t CO_2e ha^{-1}	t CO_2e ha^{-1}	t CO_2e ha^{-1}
2013	0												
2014	1		555		168		0		0		25		698
2015	2	575		174		0		0		30		719	
…	…		595		180		0		0		35		740
2043	30												

The 90% Confidence Intervals have been used to define if the most suitable choice would be the average or the inferior limit of intervals, to mitigate uncertainties in estimates, as shown in table below. In the present case, the averages of above and below-ground biomass have been taken for calculation; while the superior limit of the interval has been taken for the calculations related to the wood products carbon pool, for conservativeness purposes and mitigation of uncertainties.

Table 20. Carbon stocks per hectare of initial forest classes icl existing in the project area and leakage belt: Values to be used after discounts for uncertainties (Table 15.b of VM0015)

Year	Project year t	Initial forest class *icl* — Name: Submontane open ombrophilous forest (As); ID $_{icl}$ 1; Average carbon stock per hectare ± 90% CI										Ctot $_{icl}$	
		Cab $_{icl}$		Cbb $_{icl}$		Cwp $_{icl}$ *short lived*		Cwp $_{icl}$ *medium lived*		Cwp $_{icl}$ *long lived*			
		C stock	*C stock change*	C stock	*C stock change*	C stock	*C stock change*	C stock	*C stock change*	C stock	*C stock change*	C stock	*C stock change*
		t CO_2e ha^{-1}	t CO_2e ha^{-1}	t CO_2e ha^{-1}	t CO_2e ha^{-1}	t CO_2e ha^{-1}	t CO_2e ha^{-1}	t CO_2e ha^{-1}	t CO_2e ha^{-1}	t CO_2e ha^{-1}	t CO_2e ha^{-1}	t CO_2e ha^{-1}	t CO_2e ha^{-1}
2013	0												
2014	1												
2015	2	575	0	174	0	0	0	0	0	35	5	714	-5
...	...												
2043	30												

The same reasoning is applicable to post-deforestation classes, for which the superior limit of the interval has been taken in the case of above-ground biomass, while the superior limit has been chosen for below-ground biomass, for conservativeness purposes and mitigation of uncertainties.

Table 21. Long-term (20-years) average carbon stocks per hectare of post-deforestation LU/LC classes present in the reference region (Table 16 of VM0015)

Year	Project year t	Post deforestation class *fcl* — Name: Pasture; ID $_{fcl}$ 1; Average carbon stock per hectare ± 90% CI										Ctot $_{fcl}$	
		Cab $_{fcl}$		Cbb $_{fcl}$		Cwp $_{fcl}$ *short lived*		Cwp $_{fcl}$ *medium lived*		Cwp $_{fcl}$ *long lived*			
		average stock	± 90% CI	*average stock*	± 90% CI	*average stock*	± 90% CI	*average stock*	± 90% CI	*average stock*	± 90% CI	*average stock*	± 90% CI
		t CO_2e ha^{-1}	t CO_2e ha^{-1}	t CO_2e ha^{-1}	t CO_2e ha^{-1}	t CO_2e ha^{-1}	t CO_2e ha^{-1}	t CO_2e ha^{-1}	t CO_2e ha^{-1}	t CO_2e ha^{-1}	t CO_2e ha^{-1}	t CO_2e ha^{-1}	t CO_2e ha^{-1}
2013	0												
2014	1		17.6		11.6		0		0		0		29.2
2015	2	39.32		26.08		0		0		0		65.40	
...	...		61.1		40.5		0		0		0		101.6
2043	30												
Average		39.32		26.08		0		0		0		65.40	
Average to be used in calculations		61.1		40.5		0		0		0		101.6	

Table 22. Long-term (20-years) area weighted average carbon stock per zone (Table 17 of VM0015)

Zone		Post -deforestation LU/LC-class *fcl* — Name: Pasture; ID $_{fcl}$ 1			Area weighted long-term (20 years) average carbon stocks per zone *z*			
		Cab $_{fcl}$ *C stock*	Cbb $_{fcl}$ *C stock*	Cwp $_{fcl}$ *C stock*	Cab $_{z}$ *C stock*	Cbb $_{z}$ *C stock*	Cwp $_{z}$ *C stock*	Ctot $_{z}$ *C stock*
IDz	Name	t CO_2e ha^{-1}	t CO_2e ha^{-1}	t CO_2e ha^{-1}	t CO_2e ha^{-1}	t CO_2e ha^{-1}	t CO_2e ha^{-1}	t CO_2e ha^{-1}
1	RR	61.1	40.5	0	61.1	40.5	0	101.6

The carbon stock change factors shown below have been calculated based on VM0015 premises and using Method 2, as activity data are available for categories.

Table 23. Carbon stock change factors for land-use change categories (ct or ctz) (Method 2) (Table 20.c of VM0015)

Year after deforestation		$\Delta Cab_{ctz,t}$	$\Delta Cbb_{ctz,t}$	$\Delta Cwp_{ctz,t}$ long-lived
0	2013	-575	-17.37	0
1	2014	6.11	-13.32	0
2	2015	6.11	-13.32	0
3	2016	6.11	-13.32	0
4	2017	6.11	-13.32	0
5	2018	6.11	-13.32	0
6	2019	6.11	-13.32	0
7	2020	6.11	-13.32	0
8	2021	6.11	-13.32	0
9	2022	6.11	-13.32	0
10	2023	6.11	4.05	0
11	2024	0	0.00	0
12	2025	0	0.00	0
13	2026	0	0.00	0
14	2027	0	0.00	0
15	2028	0	0.00	0
16	2029	0	0.00	0
17	2030	0	0.00	0
18	2031	0	0.00	0
19	2032	0	0.00	0
20	2033	0	0.00	0
21	2034	0	0.00	0
22	2035	0	0.00	0
23	2036	0	0.00	0
24	2037	0	0.00	0
25	2038	0	0.00	0
26	2039	0	0.00	0
27	2040	0	0.00	0
28	2041	0	0.00	0
29	2042	0	0.00	0
30	2043	0	0.00	0

The following tables show the calculation of baseline carbon stock changes in above-ground biomass, below-ground biomass and wood products in the Project Area, using the carbon stock change factors presented in Table 23.

Table 24. Baseline carbon stock change in the above-ground biomass in the project area (Table 22.b.1 of VM0015)

Year	Project year t	Activity data per category x Carbon stock change factor for above-ground biomass in the project area		Total baseline carbon stock change in the project area	
		Forest / Pasture		annual	cumulative
		$ABSLPA_{ct,t}$	$\Delta Cab_{ct,t}$	$\Delta CabBSLPA_t$	$\Delta CabBSLPA$
		ha	tCO_2-e ha^{-1}	tCO_2-e	tCO_2-e
2013	0	0.0	0	0	0
2014	1	1,748.3	-575	-1,005,875	-1,005,875
2015	2	244.0	-65	-129,709	-1,135,584
2016	3	0.0	6	12,170	-1,123,415
2017	4	242.3	-57	-127,246	-1,250,661
2018	5	0.0	6	13,650	-1,237,011
2019	6	241.9	-51	-125,513	-1,362,524
2020	7	0.0	6	15,127	-1,347,397
2021	8	246.7	-47	-126,791	-1,474,188
2022	9	0.0	6	16,634	-1,457,554
2023	10	238.7	-41	-120,693	-1,578,248
2024	11	0.0	15	18,092	-1,560,156
2025	12	237.5	-107	-129,259	-1,689,414
2026	13	0.0	6	7,373	-1,682,041
2027	14	238.9	-108	-130,057	-1,812,099
2028	15	0.0	6	7,352	-1,804,747
2029	16	225.7	-103	-122,484	-1,927,230
2030	17	0.0	6	7,253	-1,919,977
2031	18	224.4	-105	-121,869	-2,041,846
2032	19	0.0	6	7,117	-2,034,729
2033	20	219.8	-104	-119,353	-2,154,082
2034	21	0.0	6	7,002	-2,147,080
2035	22	217.4	-105	-118,093	-2,265,173
2036	23	0.0	6	6,879	-2,258,294
2037	24	220.7	-108	-120,103	-2,378,397
2038	25	0.0	6	6,768	-2,371,628
2039	26	212.0	-105	-115,220	-2,486,848
2040	27	0.0	6	6,685	-2,480,163
2041	28	214.0	-107	-116,425	-2,596,589
2042	29	0.0	6	6,621	-2,589,967
2043	30	419.4	-183	-234,697	-2,824,664

Table 25. Baseline carbon stock change in the below-ground biomass in the project area (Table 22.b.2 of VM0015)

Year	Project year t	Activity data per category x Carbon stock change factor for below-ground biomass in the project area		Total baseline carbon stock change in the project area	
		Forest / Pasture		annual	cumulative
		$BBSLPA_{ct,t}$	$\Delta Cbb_{ct,t}$	$\Delta CbbBSLPA_t$	$\Delta CbbBSLPA$
		ha	tCO_2-e ha^{-1}	tCO_2-e	tCO_2-e
2013	0	0.0	0.00	0	0
2014	1	1,748.3	-17.37	-30,368	-30,368
2015	2	244.0	-13.82	-27,523	-57,891
2016	3	0.0	-13.32	-26,535	-84,426
2017	4	242.3	-13.76	-30,744	-115,170
2018	5	0.0	-13.32	-29,762	-144,932
2019	6	241.9	-13.71	-33,963	-178,895
2020	7	0.0	-13.32	-32,984	-211,879
2021	8	246.7	-13.69	-37,268	-249,147
2022	9	0.0	-13.32	-36,269	-285,416
2023	10	238.7	-13.65	-40,415	-325,830
2024	11	0.0	-32.51	-39,448	-365,278
2025	12	237.5	-16.81	-20,289	-385,567
2026	13	0.0	-13.32	-16,077	-401,644
2027	14	238.9	-16.80	-20,226	-421,870
2028	15	0.0	-13.32	-16,031	-437,901
2029	16	225.7	-16.80	-19,951	-457,851
2030	17	0.0	-13.32	-15,815	-473,666
2031	18	224.4	-16.92	-19,713	-493,380
2032	19	0.0	-13.32	-15,519	-508,898
2033	20	219.8	-16.87	-19,337	-528,235
2034	21	0.0	-13.32	-15,267	-543,503
2035	22	217.4	-16.91	-19,044	-562,547
2036	23	0.0	-13.32	-14,999	-577,546
2037	24	220.7	-17.00	-18,833	-596,379
2038	25	0.0	-13.32	-14,758	-611,137
2039	26	212.0	-16.85	-18,440	-629,577
2040	27	0.0	-13.32	-14,576	-644,153
2041	28	214.0	-16.88	-18,293	-662,446
2042	29	0.0	-13.32	-14,437	-676,883
2043	30	419.4	-16.92	-21,722	-698,605

Table 26. Baseline carbon stock change in the wood products in the project area (Table 22.b.6 of VM0015)

Year	Project year t	Activity data per category x Carbon stock change factor for wood products biomass in the project area		Total baseline carbon stock change in the project area	
		Forest / Pasture		annual	cumulative
		$WPSLPA_{ct,t}$	$\Delta Cwp_{ct,t}$	$\Delta CwpBSLPA_t$	$\Delta CwpBSLPA$
		ha	tCO_2-e ha^{-1}	tCO_2-e	tCO_2-e
2013	0	0.0	0.00	0	0
2014	1	1,748.3	0.00	0	0
2015	2	244.0	0.00	0	0
2016	3	0.0	0.00	0	0
2017	4	242.3	0.00	0	0
2018	5	0.0	0.00	0	0
2019	6	241.9	0.00	0	0
2020	7	0.0	0.00	0	0
2021	8	246.7	0.00	0	0
2022	9	0.0	0.00	0	0
2023	10	238.7	0.00	0	0
2024	11	0.0	0.00	0	0
2025	12	237.5	0.00	0	0
2026	13	0.0	0.00	0	0
2027	14	238.9	0.00	0	0
2028	15	0.0	0.00	0	0
2029	16	225.7	0.00	0	0
2030	17	0.0	0.00	0	0
2031	18	224.4	0.00	0	0
2032	19	0.0	0.00	0	0
2033	20	219.8	0.00	0	0
2034	21	0.0	0.00	0	0
2035	22	217.4	0.00	0	0
2036	23	0.0	0.00	0	0
2037	24	220.7	0.00	0	0
2038	25	0.0	0.00	0	0
2039	26	212.0	0.00	0	0
2040	27	0.0	0.00	0	0
2041	28	214.0	0.00	0	0
2042	29	0.0	0.00	0	0
2043	30	419.4	0.00	0	0

The following tables show the calculation of baseline carbon stock changes in above-ground biomass, below-ground biomass and wood products in the Leakage Belt, using the carbon stock change factors presented in Table 23.

Table 27. Baseline carbon stock change in the above-ground biomass in the leakage belt area (Table 22.c.1 of VM0015)

Year	Project year t	Activity data per category x Carbon stock change factor for above-ground biomass in the leakage belt		Total baseline carbon stock change in the leakage belt	
		Forest / Pasture		annual	cumulative
		$ABSLLK_{ct,t}$	$\Delta Cab_{ct,t}$	$\Delta CabBSLLK_t$	$\Delta CabBSLLK$
		ha	tCO_2-e ha^{-1}	tCO_2-e	tCO_2-e
2013	0	0	0	0	0
2014	1	9,825	-575	-5,652,658	-5,652,658
2015	2	9,551	-281	-5,435,089	-11,087,747
2016	3	10,817	-202	-6,105,208	-17,192,954
2017	4	8,855	-126	-4,910,223	-22,103,178
2018	5	10,414	-116	-5,753,531	-27,856,709
2019	6	8,464	-79	-4,567,720	-32,424,429
2020	7	10,012	-80	-5,406,723	-37,831,151
2021	8	8,359	-58	-4,394,308	-42,225,460
2022	9	11,310	-69	-6,041,054	-48,266,513
2023	10	7,678	-41	-3,882,638	-52,149,151
2024	11	8,633	-47	-4,384,941	-56,534,091
2025	12	7,620	-41	-3,809,598	-60,343,689
2026	13	8,143	-46	-4,122,080	-64,465,769
2027	14	7,436	-42	-3,731,547	-68,197,317
2028	15	7,759	-46	-3,926,368	-72,123,685
2029	16	7,195	-43	-3,617,796	-75,741,481
2030	17	9,006	-56	-4,667,448	-80,408,929
2031	18	6,467	-40	-3,212,818	-83,621,747
2032	19	6,959	-46	-3,507,419	-87,129,165
2033	20	6,292	-42	-3,150,421	-90,279,586
2034	21	6,669	-46	-3,375,714	-93,655,300
2035	22	6,039	-42	-3,025,377	-96,680,677
2036	23	6,428	-46	-3,258,811	-99,939,488
2037	24	5,778	-42	-2,895,451	-102,834,939
2038	25	7,493	-57	-3,891,957	-106,726,896
2039	26	5,144	-38	-2,542,500	-109,269,396
2040	27	5,858	-47	-2,965,544	-112,234,940
2041	28	8,801	-71	-4,678,249	-116,913,190
2042	29	1,793	-10	-631,623	-117,544,812
2043	30	4,775	-40	-2,378,807	-119,923,619

Table 28. Baseline carbon stock change in the below-ground biomass in the leakage belt area (Table 22.c.2 of VM0015)

Year	Project year t	Activity data per category x Carbon stock change factor for below-ground biomass in the leakage belt		Total baseline carbon stock change in the leakage belt	
		Forest / Pasture		annual	cumulative
		$BBSLLK_{ct,t}$	$\Delta Cbb_{ct,t}$	$\Delta CbbBSLLK_t$	$\Delta CbbBSLLK$
		ha	tCO_2-e ha^{-1}	tCO_2-e	tCO_2-e
2013	0	0	0.00	0	0
2014	1	9,825	-17.37	-170,657	-170,657
2015	2	9,551	-15.32	-296,753	-467,411
2016	3	10,817	-14.77	-445,951	-913,362
2017	4	8,855	-14.24	-555,937	-1,469,300
2018	5	10,414	-14.17	-700,966	-2,170,265
2019	6	8,464	-13.91	-805,795	-2,976,061
2020	7	10,012	-13.92	-945,418	-3,921,479
2021	8	8,359	-13.76	-1,050,049	-4,971,528
2022	9	11,310	-13.84	-1,212,637	-6,184,165
2023	10	7,678	-13.65	-1,300,191	-7,484,356
2024	11	8,633	-15.08	-1,419,038	-8,903,395
2025	12	7,620	-15.03	-1,385,576	-10,288,971
2026	13	8,143	-15.30	-1,368,941	-11,657,912
2027	14	7,436	-15.00	-1,321,043	-12,978,955
2028	15	7,759	-15.31	-1,307,763	-14,286,718
2029	16	7,195	-15.01	-1,262,592	-15,549,310
2030	17	9,006	-15.36	-1,277,142	-16,826,451
2031	18	6,467	-15.01	-1,219,634	-18,046,085
2032	19	6,959	-15.64	-1,202,978	-19,249,064
2033	20	6,292	-15.01	-1,133,447	-20,382,511
2034	21	6,669	-15.25	-1,121,528	-21,504,039
2035	22	6,039	-15.07	-1,084,430	-22,588,470
2036	23	6,428	-15.23	-1,070,127	-23,658,596
2037	24	5,778	-15.10	-1,036,001	-24,694,597
2038	25	7,493	-15.28	-1,043,705	-25,738,302
2039	26	5,144	-15.08	-999,364	-26,737,666
2040	27	5,858	-15.60	-984,449	-27,722,116
2041	28	8,801	-15.18	-993,652	-28,715,768
2042	29	1,793	-14.98	-903,006	-29,618,774
2043	30	4,775	-15.07	-885,999	-30,504,773

Table 29. Baseline carbon stock change in the wood products in the leakage belt area (Table 22.c.6 of VM0015)

Year	Project year t	Activity data per category x Carbon stock change factor for wood products biomass in the leakage belt area		Total baseline carbon stock change in the leakage belt area	
		Forest / Pasture		annual	cumulative
		$WPSLLK_{ct,t}$	$\Delta Cwp_{ct,t}$	$\Delta CwpBSLLK_t$	$\Delta CwpBSLLK$
		ha	tCO_2-e ha^{-1}	tCO_2-e	tCO_2-e
2013	0	0.0	0.00	0	0
2014	1	9,824.5	0.00	0	0
2015	2	9,550.7	0.00	0	0
2016	3	10,816.8	0.00	0	0
2017	4	8,854.7	0.00	0	0
2018	5	10,414.4	0.00	0	0
2019	6	8,464.0	0.00	0	0
2020	7	10,012.1	0.00	0	0
2021	8	8,358.8	0.00	0	0
2022	9	11,309.6	0.00	0	0
2023	10	7,678.3	0.00	0	0
2024	11	8,632.8	0.00	0	0
2025	12	7,620.2	0.00	0	0
2026	13	8,142.8	0.00	0	0
2027	14	7,435.6	0.00	0	0
2028	15	7,759.2	0.00	0	0
2029	16	7,194.7	0.00	0	0
2030	17	9,005.5	0.00	0	0
2031	18	6,466.6	0.00	0	0
2032	19	6,958.6	0.00	0	0
2033	20	6,291.9	0.00	0	0
2034	21	6,668.8	0.00	0	0
2035	22	6,039.0	0.00	0	0
2036	23	6,427.9	0.00	0	0
2037	24	5,778.2	0.00	0	0
2038	25	7,492.6	0.00	0	0
2039	26	5,144.3	0.00	0	0
2040	27	5,857.8	0.00	0	0
2041	28	8,801.2	0.00	0	0
2042	29	1,792.8	0.00	0	0
2043	30	4,774.6	0.00	0	0

3.1.6.2 Baseline non-CO_2 emissions from forest fires

Conversion of forest to non-forest involving fires is a source of emissions of non-CO_2 gases (CH_4 and N_2O). Sufficient data on such forest fires are available from the historical reference period and the project proponent considers that these emissions are an important component of the baseline. Thus, CH_4 emissions from biomass burning were estimated.

The effect of fire on carbon emissions is counted in the estimation of carbon stock changes; therefore CO_2 emissions from forest fires were ignored to avoid double counting.

To estimate non-CO_2 emissions from forest fires, the average percentage of the deforested area in which fire was used, the average proportion of mass burnt in each carbon pool (Pburnt,p), and the average combustion efficiency of each pool (CE_p) were estimated. These average percentage values were estimated for each forest class (*icl*) and are assumed to remain the same in the future.

Based on revised IPCC 1996 GL LULUCF, GHG emissions from biomass burning were estimated as follows.

$$EBBtot_{icl,t} = EBBN2O_{icl,t} + EBBCH4_{icl,t}$$

Where:

$EBBtot_{icl,t}$ Total GHG emission from biomass burning in forest class *icl* at year *t*; tCO_2-e ha^{-1}

$EBBN2O_{icl,t}$ N_2O emission from biomass burning in forest class *icl* at year *t*; tCO_2-e ha^{-1}

$EBBCH4_{icl,t}$ CH_4 emission from biomass burning in forest class *icl* at year *t*; tCO_2-e ha^{-1}

$$EBBN2O_{icl,t} = EBBCO2_{icl,t} * 12/44 * NCR*ER_{N2O}*44/28*GWP_{N2O}$$

$$EBBCH4_{icl,t} = EBBCO2_{icl,t} * 12/44 * ER_{CH4}*16/12*GWP_{CH4}$$

Where:

$EBBCO2_{icl,t}$ Per hectare CO_2 emission from biomass burning in slash and burn in forest class *icl* at year *t*; tCO_2-e ha^{-1}

$EBBN2O_{icl,t}$ Per hectare N_2O emission from biomass burning in slash and burn in forest class *icl* at year *t*; tCO_2-e ha^{-1}

$EBBCH4_{icl,t}$ Per hectare CH_4 emission from biomass burning in slash and burn in forest class *icl* at year *t*; tCO_2-e ha^{-1}

NCR	Nitrogen to Carbon Ratio (IPCC default value = 0.01); dimensionless
ER_{N2O}	Emission ratio for N_2O (IPCC default value = 0.007)
ER_{CH4}	Emission ratio for CH_4 (IPCC default value = 0.012)
GWP_{N2O}	Global Warming Potential for N_2O (IPCC default value = 310 for the first commitment period)
GWP_{CH4}	Global Warming Potential for CH_4 (IPCC default value = 21 for the first commitment period)

$$EBBCO2_{icl,t} = Fburnt_{icl} * \sum_{p=1}^{P} (C_{p,icl,t} * Pburnt_{p.icl} * CE_{p,icl})$$

Where:

$EBBCO2_{icl,t}$	Per hectare CO_2 emission from biomass burning in the forest class *icl* at year *t*; tCO_2-e ha^{-1}
$Fburnt_{icl}$	Proportion of forest area burned during the historical reference period in the forest class *icl*; %
$C_{p,icl,t}$	Average carbon stock per hectare in the carbon pool *p* burnt in the forest class *icl* at year *t*; tCO_2-e ha^{-1}
$Pburnt_{p,icl}$	Average proportion of mass burnt in the carbon pool *p* in the forest class *icl*; %
$CE_{p,icl}$	Average combustion efficiency of the carbon pool *p* in the forest class *icl*; dimensionless
p	Carbon pool that could burn (above-ground biomass, dead wood, litter)
icl	1, 2, 3, …*icl* (pre-deforestation) forest classes
t	1, 2, 3 … T, a year of the proposed project crediting period; dimensionless

The IPCC default combustion efficiency of 0.5 was used. The Nitrogen to Carbon Ratio (NCR) of 0.01 was used.

Table 30. Parameters used to calculate non-CO_2 emissions from forest fires (Table 23 of VM0015)

Initial Forest Class		Parameters								
		$Fburnt_{icl}$	Cab	$Pburnt_{ab,icl}$	$CEab,icl$	$ECO2\text{-}ab$	$EBBCO2\text{-}tot$	$EBBN2O_{icl}$	$EBBCH4_{icl}$	$EBBtot_{icl}$
IDcl	Name	N/A	$tCO_2e\ ha^{-1}$	N/A	N/A	$tCO_2e\ ha^{-1}$	$tCO_2e\ ha^{-1}$	$tCO_2e\ ha^{-1}$	$tCO_2e\ ha^{-1}$	$tCO_2e\ ha^{-1}$
1	Submontane open ombrophilous forest (As)	1.0	575	0.86	0.5	247	247	2.30	22.7	25.0

Table 31. Baseline non-CO_2 emissions from forest fires in the project area (Table 24 of VM0015)

Year	Project year t	Emissions of non-CO2 gasses from baseline forest fires		Total baseline non-CO2 emissions from forest fires in the project area	
		IDicl = 1		annual	cumulative
		$ABSLPA_{icl,t}$	$EBBBSLtot_{icl}$	$EBBBSLPA_t$	EBBBSLPA
		ha	tCO_2-e ha^{-1}	tCO_2-e	tCO_2-e
2013	0	0.0	24.97	0	0
2014	1	1,748.3	24.97	43,648	43,648
2015	2	244.0	24.97	6,092	49,740
2016	3	0.0	24.97	0	49,740
2017	4	242.3	24.97	6,050	55,789
2018	5	0.0	24.97	0	55,789
2019	6	241.9	24.97	6,039	61,828
2020	7	0.0	24.97	0	61,828
2021	8	246.7	24.97	6,158	67,986
2022	9	0.0	24.97	0	67,986
2023	10	238.7	24.97	5,959	73,945
2024	11	0.0	24.97	0	73,945
2025	12	237.5	24.97	5,931	79,876
2026	13	0.0	24.97	0	79,876
2027	14	238.9	24.97	5,964	85,839
2028	15	0.0	24.97	0	85,839
2029	16	225.7	24.97	5,634	91,473
2030	17	0.0	24.97	0	91,473
2031	18	224.4	24.97	5,603	97,076
2032	19	0.0	24.97	0	97,076
2033	20	219.8	24.97	5,488	102,564
2034	21	0.0	24.97	0	102,564
2035	22	217.4	24.97	5,428	107,992
2036	23	0.0	24.97	0	107,992
2037	24	220.7	24.97	5,510	113,502
2038	25	0.0	24.97	0	113,502
2039	26	212.0	24.97	5,293	118,796
2040	27	0.0	24.97	0	118,796
2041	28	214.0	24.97	5,342	124,138
2042	29	0.0	24.97	0	124,138
2043	30	419.4	24.97	10,471	134,609

3.2 Project Emissions

The goal of this step (STEP 7) is to provide an ex ante estimate of future carbon stock changes and non-CO_2 emissions from forest fires under the project scenario ("actual").

3.2.1 Ex ante estimation of actual carbon stock changes

These carbon stock changes are due to the following:

- Planned activities within the project area.
- Unplanned deforestation that cannot be avoided.

Carbon stock changes due to possible future catastrophic events cannot be predicted and are therefore excluded from the ex ante assessment.

Certain discrete areas of forest within the project area will be subject to project activities that will change the carbon stocks of these areas compared to the baseline. In this Project Activity, such activities are related to planned timber logging.

According to the Sustainable Forest Management Plan, the annual area of wood controlled logging is 1,831.74 hectares. Considering that the total management area is 24,295.89 hectares, it is assumed that logging activities will be carried out during 13 years, followed by 14 years of fallow. The table below shows the yearly estimates of carbon stock decrease due to planned logging activities in the Project Area.

The increase following planned logging activities in the Project Area has also been estimated, using secondary data by WEST et al. (2014)[21], which points to an annual increase of 3.03 tCO_2 per hectare per year due to post-logging regeneration of vegetation.

[21] West et al. 2014. Forest Ecology and Management 314 (2014) 59–63.

Table 32. Ex ante estimated actual carbon stock decrease due to planned logging activities in the project area (Table 25.b of VM0015)

Year	Project year t	Areas of planned logging activities x Carbon stock change (decrease) in the project area		Total carbon stock decrease due to planned logging activities	
		IDcl = 1		annual	cumulative
		$APLPA_{icl,t}$	$\Delta Ctot_{icl,t}$	$\Delta CPLdPA_t$	$\Delta CPLdPA$
		ha	tCO_2-e ha^{-1}	tCO_2-e	tCO_2-e
2013	0	0,0	47,24	0	0
2014	1	1.831,7	47,24	86.538	86.538
2015	2	1.831,7	47,24	86.538	173.075
2016	3	1.831,7	47,24	86.538	259.613
2017	4	1.831,7	47,24	86.538	346.150
2018	5	1.831,7	47,24	86.538	432.688
2019	6	1.831,7	47,24	86.538	519.225
2020	7	1.831,7	47,24	86.538	605.763
2021	8	1.831,7	47,24	86.538	692.300
2022	9	1.831,7	47,24	86.538	778.838
2023	10	1.831,7	47,24	86.538	865.375
2024	11	1.831,7	47,24	86.538	951.913
2025	12	1.831,7	47,24	86.538	1.038.450
2026	13	1.831,7	47,24	86.538	1.124.988
2027	14	0,0	47,24	0	1.124.988
2028	15	0,0	47,24	0	1.124.988
2029	16	0,0	47,24	0	1.124.988
2030	17	0,0	47,24	0	1.124.988
2031	18	0,0	47,24	0	1.124.988
2032	19	0,0	47,24	0	1.124.988
2033	20	0,0	47,24	0	1.124.988
2034	21	0,0	47,24	0	1.124.988
2035	22	0,0	47,24	0	1.124.988
2036	23	0,0	47,24	0	1.124.988
2037	24	0,0	47,24	0	1.124.988
2038	25	0,0	47,24	0	1.124.988
2039	26	0,0	47,24	0	1.124.988
2040	27	0,0	47,24	0	1.124.988
2041	28	1.831,7	47,24	86.538	1.211.525
2042	29	1.831,7	47,24	86.538	1.298.063
2043	30	1.831,7	47,24	86.538	1.384.600

Table 33. Ex ante estimated carbon stock increase following planned logging activities in the project area (Table 26.b of VM0015)

Year	Project year t	Areas of planned logging activities x Carbon stock change (increase up to maximum long-term average)		Total carbon stock increase due to planned logging activities	
		IDcl = 1		annual	cumulative
		$APLPA_{icl,t}$	$\Delta Ctot_{icl,t}$	$\Delta CPLiPA_t$	$\Delta CPLiPA$
		ha	tCO_2-e ha^{-1}	tCO_2-e	tCO_2-e
2013	0	0.0	0.00	0	0
2014	1	1,831.7	3.03	5,541	5,541
2015	2	1,831.7	6.05	11,082	16,623
2016	3	1,831.7	9.08	16,623	33,246
2017	4	1,831.7	12.10	22,164	55,410
2018	5	1,831.7	15.13	27,705	83,115
2019	6	1,831.7	18.15	33,246	116,361
2020	7	1,831.7	21.18	38,787	155,148
2021	8	1,831.7	24.20	44,328	199,476
2022	9	1,831.7	27.23	49,869	249,345
2023	10	1,831.7	30.25	55,410	304,755
2024	11	1,831.7	33.28	60,951	365,707
2025	12	1,831.7	36.30	66,492	432,199
2026	13	1,831.7	39.33	72,033	504,232
2027	14	1,831.7	42.35	77,574	581,806
2028	15	1,831.7	45.38	83,115	664,921
2029	16	1,831.7	48.40	88,656	753,577
2030	17	1,831.7	51.43	94,197	847,774
2031	18	1,831.7	54.45	99,738	947,512
2032	19	1,831.7	57.48	105,279	1,052,792
2033	20	1,831.7	60.50	110,820	1,163,612
2034	21	1,831.7	63.53	116,361	1,279,973
2035	22	1,831.7	66.55	121,902	1,401,875
2036	23	1,831.7	69.58	127,443	1,529,318
2037	24	1,831.7	72.60	132,984	1,662,302
2038	25	1,831.7	75.63	138,525	1,800,828
2039	26	1,831.7	78.65	144,066	1,944,894
2040	27	1,831.7	81.68	149,607	2,094,501
2041	28	1,831.7	81.68	149,607	2,244,108
2042	29	1,831.7	81.68	149,607	2,393,715
2043	30	1,831.7	81.68	149,607	2,543,323

Some unplanned deforestation may happen in the project area despite the AUD project activity. The level at which deforestation will actually be reduced in the project case depends on the effectiveness of the proposed activities, which cannot be measured ex ante.

To allow ex ante projections to be made, the project proponent shall make a conservative assumption about the effectiveness of the proposed project activities and estimate an Effectiveness Index (*EI*) between 0 (no effectiveness) and 1 (maximum effectiveness). The estimated value of *EI* is used to multiply the baseline projections by the factor (1 - *EI*) and the result shall be considered the ex ante estimated emissions from unplanned deforestation in the project case.

$$\Delta CUDdPA_t = \Delta CBSL_t * (1 - EI)$$

Where:

$\Delta CUDdPA_t$	Total ex ante actual carbon stock change due to unavoided unplanned deforestation at year *t* in the project area; tCO_2-e
$\Delta CBSL_t$	Total baseline carbon stock change at year t in the project area; tCO_2-e
EI	Ex ante estimated Effectiveness Index; %
t	1, 2, 3 … T, a year of the proposed project crediting period; dimensionless

Table 34. Ex ante estimated net carbon stock change in the project area under the project scenario (Table 27 of VM0015)

		Total carbon stock decrease due to planned logging activities		Total carbon stock increase due to planned logging activities		Total carbon stock decrease due to unavoided unplanned deforestation		Total carbon stock change in the project case	
		annual	cumulative	annual	cumulative	annual	cumulative	annual	cumulative
	Project	$\Delta CPLdPA_t$	$\Delta CPLdPA$	$\Delta CPLiPA_t$	$\Delta CPLiPA$	$\Delta CUDdPA_t$	$\Delta CUDdPA$	$\Delta CPSPA_t$	$\Delta CPSPA$
Year	year t	tCO_2-e	tCO_2-e	tCO_2-e	tCO_2-e	tCO_2-e	tCO_2-e	tCO_2-e	tCO_2-e
2013	0	0	0	0	0	0	0	0	0
2014	1	86,538	86,538	5,541	5,541	-103,624	-103,624	-184,621	-184,621
2015	2	86,538	173,075	11,082	16,623	-15,723	-119,348	-91,179	-275,800
2016	3	86,538	259,613	16,623	33,246	-1,437	-120,784	-71,351	-347,151
2017	4	86,538	346,150	22,164	55,410	-15,799	-136,583	-80,172	-427,323
2018	5	86,538	432,688	27,705	83,115	-1,611	-138,194	-60,444	-487,767
2019	6	86,538	519,225	33,246	116,361	-15,948	-154,142	-69,239	-557,006
2020	7	86,538	605,763	38,787	155,148	-1,786	-155,928	-49,536	-606,542
2021	8	86,538	692,300	44,328	199,476	-16,406	-172,334	-58,615	-665,157
2022	9	86,538	778,838	49,869	249,345	-1,963	-174,297	-38,632	-703,789
2023	10	86,538	865,375	55,410	304,755	-16,111	-190,408	-47,238	-751,028
2024	11	86,538	951,913	60,951	365,707	-2,136	-192,543	-27,722	-778,750
2025	12	86,538	1,038,450	66,492	432,199	-14,955	-207,498	-35,000	-813,750
2026	13	86,538	1,124,988	72,033	504,232	-870	-208,369	-15,375	-829,125
2027	14	0	1,124,988	77,574	581,806	-15,028	-223,397	62,546	-766,579
2028	15	0	1,124,988	83,115	664,921	-868	-224,265	82,247	-684,331
2029	16	0	1,124,988	88,656	753,577	-14,243	-238,508	74,413	-609,919
2030	17	0	1,124,988	94,197	847,774	-856	-239,364	93,341	-516,578
2031	18	0	1,124,988	99,738	947,512	-14,158	-253,523	85,580	-430,998
2032	19	0	1,124,988	105,279	1,052,792	-840	-254,363	104,439	-326,559
2033	20	0	1,124,988	110,820	1,163,612	-13,869	-268,232	96,951	-229,608
2034	21	0	1,124,988	116,361	1,279,973	-827	-269,058	115,535	-114,073
2035	22	0	1,124,988	121,902	1,401,875	-13,714	-282,772	108,188	-5,885
2036	23	0	1,124,988	127,443	1,529,318	-812	-283,584	126,631	120,746
2037	24	0	1,124,988	132,984	1,662,302	-13,894	-297,478	119,091	239,837
2038	25	0	1,124,988	138,525	1,800,828	-799	-298,277	137,726	377,563
2039	26	0	1,124,988	144,066	1,944,894	-13,366	-311,643	130,700	508,263
2040	27	0	1,124,988	149,607	2,094,501	-789	-312,432	148,818	657,082
2041	28	86,538	1,211,525	149,607	2,244,108	-13,472	-325,903	49,598	706,680
2042	29	86,538	1,298,063	149,607	2,393,715	-782	-326,685	62,288	768,968
2043	30	86,538	1,384,600	149,607	2,543,323	-25,642	-352,327	37,428	806,395

3.2.2 Ex ante estimation of actual non-CO_2 emissions from forest fires

Where forest fires have been included in the baseline scenario, non-CO_2 emissions from biomass burning must be included in the project scenario. This is done by multiplying the baseline emissions by the factor (1 – *EI*).

$$EBBPSPA_t = EBBBSPA_t * (1 - EI)$$

Where:

$EBBPSPA_t$	Total ex ante actual non-CO_2 emissions from forest fire due to unavoided unplanned deforestation at year *t* in the project area; tCO_2-e
$EBBBSPA_t$	Total non-CO_2 emissions from forest fire at year *t* in the project area; tCO_2-e
EI	Ex ante estimated Effectiveness Index; %
t	1, 2, 3 … T, a year of the proposed project crediting period; dimensionless

Table 35. Total ex ante estimated actual emissions of non-CO_2 gases due to forest fires in the project area (Table 28 of VM0015)

Year	Project year t	Total ex ante estimated actual non-CO2 emissions from forest fires in the Project area	
		annual	cumulative
		$EBBPSPA_t$	EBBPSPA
		tCO_2-e	tCO_2-e
2013	0	0	0
2014	1	4,365	4,365
2015	2	609	4,974
2016	3	0	4,974
2017	4	605	5,579
2018	5	0	5,579
2019	6	604	6,183
2020	7	0	6,183
2021	8	616	6,799
2022	9	0	6,799
2023	10	596	7,395
2024	11	0	7,395
2025	12	593	7,988
2026	13	0	7,988
2027	14	596	8,584
2028	15	0	8,584
2029	16	563	9,147
2030	17	0	9,147
2031	18	560	9,708
2032	19	0	9,708
2033	20	549	10,256
2034	21	0	10,256
2035	22	543	10,799
2036	23	0	10,799
2037	24	551	11,350
2038	25	0	11,350
2039	26	529	11,880
2040	27	0	11,880
2041	28	534	12,414
2042	29	0	12,414
2043	30	1,047	13,461

3.2.3 Total ex ante estimations for the project area

Table 36. Total ex ante estimated actual net carbon stock changes and emissions of non-CO_2 gases in the project area (Table 29 of VM0015)

Year	Project year t	Total ex ante carbon stock decrease due to planned activities		Total ex ante carbon stock increase due to planned activities		Total ex ante carbon stock decrease due to unavoided unplanned deforestation		Total ex ante net carbon stock change		Total ex ante estimated actual non-CO2 emissions from forest fires in the project area	
		annual $\Delta CPAdPA_t$ tCO_2-e	cumulative $\Delta CPAdPA$ tCO_2-e	annual $\Delta CPAiPA_t$ tCO_2-e	cumulative $\Delta CPAiPA$ tCO_2-e	annual $\Delta CUDdPA_t$ tCO_2-e	cumulative $\Delta CUDdPA$ tCO_2-e	annual $\Delta CPSPA_t$ tCO_2-e	cumulative $\Delta CPSPA$ tCO_2-e	annual $EBBPSPA_t$ tCO_2-e	cumulative EBBPSPA tCO_2-e
2013	0	0	0	0	0	0	0	0	0	0	0
2014	1	86,538	86,538	5,541	5,541	-103,624	-103,624	-184,621	-184,621	4,365	4,365
2015	2	86,538	173,075	11,082	16,623	-15,723	-119,348	-91,179	-275,800	609	4,974
2016	3	86,538	259,613	16,623	33,246	-1,437	-120,784	-71,351	-347,151	0	4,974
2017	4	86,538	346,150	22,164	55,410	-15,799	-136,583	-80,172	-427,323	605	5,579
2018	5	86,538	432,688	27,705	83,115	-1,611	-138,194	-60,444	-487,767	0	5,579
2019	6	86,538	519,225	33,246	116,361	-15,948	-154,142	-69,239	-557,006	604	6,183
2020	7	86,538	605,763	38,787	155,148	-1,786	-155,928	-49,536	-606,542	0	6,183
2021	8	86,538	692,300	44,328	199,476	-16,406	-172,334	-58,615	-665,157	616	6,799
2022	9	86,538	778,838	49,869	249,345	-1,963	-174,297	-38,632	-703,789	0	6,799
2023	10	86,538	865,375	55,410	304,755	-16,111	-190,408	-47,238	-751,028	596	7,395
2024	11	86,538	951,913	60,951	365,707	-2,136	-192,543	-27,722	-778,750	0	7,395
2025	12	86,538	1,038,450	66,492	432,199	-14,955	-207,498	-35,000	-813,750	593	7,988
2026	13	86,538	1,124,988	72,033	504,232	-870	-208,369	-15,375	-829,125	0	7,988
2027	14	0	1,124,988	77,574	581,806	-15,028	-223,397	62,546	-766,579	596	8,584
2028	15	0	1,124,988	83,115	664,921	-868	-224,265	82,247	-684,331	0	8,584
2029	16	0	1,124,988	88,656	753,577	-14,243	-238,508	74,413	-609,919	563	9,147
2030	17	0	1,124,988	94,197	847,774	-856	-239,364	93,341	-516,578	0	9,147
2031	18	0	1,124,988	99,738	947,512	-14,158	-253,523	85,580	-430,998	560	9,708
2032	19	0	1,124,988	105,279	1,052,792	-840	-254,363	104,439	-326,559	0	9,708
2033	20	0	1,124,988	110,820	1,163,612	-13,869	-268,232	96,951	-229,608	549	10,256
2034	21	0	1,124,988	116,361	1,279,973	-827	-269,058	115,535	-114,073	0	10,256
2035	22	0	1,124,988	121,902	1,401,875	-13,714	-282,772	108,188	-5,885	543	10,799
2036	23	0	1,124,988	127,443	1,529,318	-812	-283,584	126,631	120,746	0	10,799
2037	24	0	1,124,988	132,984	1,662,302	-13,894	-297,478	119,091	239,837	551	11,350
2038	25	0	1,124,988	138,525	1,800,828	-799	-298,277	137,726	377,563	0	11,350
2039	26	0	1,124,988	144,066	1,944,894	-13,366	-311,643	130,700	508,263	529	11,880
2040	27	0	1,124,988	149,607	2,094,501	-789	-312,432	148,818	657,082	0	11,880
2041	28	86,538	1,211,525	149,607	2,244,108	-13,472	-325,903	49,598	706,680	534	12,414
2042	29	86,538	1,298,063	149,607	2,393,715	-782	-326,685	62,288	768,968	0	12,414
2043	30	86,538	1,384,600	149,607	2,543,323	-25,642	-352,327	37,428	806,395	1,047	13,461

3.3 Leakage

The goal of this step (STEP 8) is to provide an ex ante estimate of the possible decrease in carbon stock and increase in GHG emissions (other than carbon stock change) due to leakage.

Two sources of leakage are considered in this methodology and must be addressed:

- Decrease in carbon stocks and increase in GHG emissions associated with leakage prevention measures;

- Decrease in carbon stocks and increase in GHG emissions associated with activity displacement leakage.

3.3.1 Ex ante estimation of the decrease in carbon stocks and increase in GHG emissions due to leakage prevention measures

If leakage prevention measures include tree planting, agricultural intensification, fertilization, fodder production and/or other measures to enhance cropland and grazing land areas, a reduction in carbon stocks and/or an increase in GHG emissions may occur compared to the baseline case. If such decrease in carbon stock or increase in GHG emission is significant, it must be accounted and monitoring will be required. If it is not significant, it must not be accounted and ex post monitoring will not be necessary.

The following activities in leakage management areas could occasion a decrease in carbon stocks or an increase in GHG emissions:

- Carbon stock changes due to activities implemented in leakage management areas;

- Methane (CH_4) and nitrous oxide (N_2O) emissions from livestock intensification (involving a change in the animal diet and/or animal numbers).

In the case of this project activity, this calculation component is not applicable. This Project Activity does not involve decrease in carbon stocks and increase in GHG emissions associated with leakage prevention activities. In this project, leakage prevention activities do not involve any carbon stock reduction due to deforestation or additional emissions caused by increased grazing activities. The project proponent will offer training on sustainable cattle raising, to stimulate that the increase in livestock (that would occur in the baseline) will be carried out without deforestation. It is intended that ranchers will be able to rationalize the land use by means of techniques that allow a bigger production without increasing the area, so decreasing deforestation pressures. The activities do not intend to change “animal diet and/or animal numbers” additionally to that occurring in the baseline: the training goals will lead to a spatial rearrangement of production in a sustainable manner. Thus, the final balance of these training activities will be lower deforestation for a given number of cattle heads. In this case, only the decrease in carbon stocks and increase in GHG emissions due to activity displacement leakage will be calculated and monitored.

3.3.2 Ex ante estimation of the decrease in carbon stocks and increase in GHG emissions due to activity displacement leakage

Activities that will cause deforestation within the project area in the baseline case could be displaced outside the project boundary due to the implementation of the AUD project activity. If carbon stocks in the leakage belt area will decrease more during project implementation than projected in the baseline case, this will be an indication that leakage due to displacement of baseline activities has occurred. Leakage due to activity displacement can thus be estimated by ex post monitoring of deforestation in the leakage belt and comparing ex post observed deforestation with ex ante projected baseline deforestation.

Ex ante activity displacement leakage can only be guessed based on the anticipated combined effectiveness of the proposed leakage prevention measures and project activities. This shall be done by multiplying the estimated baseline carbon stock changes for the project area by a “Displacement Leakage Factor” (DLF) representing the percent of deforestation expected to be displaced outside the project boundary.

If deforestation agents do not participate in leakage prevention activities and project activities, the Displacement Factor shall be 100%. Where leakage prevention activities are implemented the factor shall be equal to the proportion of the baseline agents estimated to be given the opportunity to participate in leakage prevention activities and project activities.

It is expected that 100% of potential deforestation agents in the Reference Region will be given the opportunity to participate in leakage prevention activities. Thus, the “Displacement Leakage Factor” (DLF) is conservatively considered as 0.05.

If emissions from forest fires have been included in the baseline, the ex ante emissions from forest fires due to activity displacement leakage will be calculated by multiplying baseline forest fire emissions in the project area by the same DLF used to estimate the decrease in carbon stocks.

Table 37. Ex ante estimated leakage due to activity displacement (Table 34 of VM0015)

Year	Project year t	Total ex ante estimated decrease in carbon stocks due to displaced deforestation		Total ex ante estimated increase in GHG emissions due to displaced forest fires	
		annual $\Delta CADLK_t$ tCO_2-e	cumulative $\Delta CADLK$ tCO_2-e	annual $EADLK_t$ tCO_2-e	cumulative $EADLK$ tCO_2-e
2013	0	0	0	0	0
2014	1	-51,812	-51,812	2,182	2,182
2015	2	-7,862	-59,674	305	2,487
2016	3	-718	-60,392	0	2,487
2017	4	-7,899	-68,292	302	2,789
2018	5	-806	-69,097	0	2,789
2019	6	-7,974	-77,071	302	3,091
2020	7	-893	-77,964	0	3,091
2021	8	-8,203	-86,167	308	3,399
2022	9	-982	-87,149	0	3,399
2023	10	-8,055	-95,204	298	3,697
2024	11	-1,068	-96,272	0	3,697
2025	12	-7,477	-103,749	297	3,994
2026	13	-435	-104,184	0	3,994
2027	14	-7,514	-111,698	298	4,292
2028	15	-434	-112,132	0	4,292
2029	16	-7,122	-119,254	282	4,574
2030	17	-428	-119,682	0	4,574
2031	18	-7,079	-126,761	280	4,854
2032	19	-420	-127,181	0	4,854
2033	20	-6,934	-134,116	274	5,128
2034	21	-413	-134,529	0	5,128
2035	22	-6,857	-141,386	271	5,400
2036	23	-406	-141,792	0	5,400
2037	24	-6,947	-148,739	276	5,675
2038	25	-399	-149,138	0	5,675
2039	26	-6,683	-155,821	265	5,940
2040	27	-395	-156,216	0	5,940
2041	28	-6,736	-162,952	267	6,207
2042	29	-391	-163,343	0	6,207
2043	30	-12,821	-176,163	524	6,730

3.3.3 Ex ante estimation of total leakage

Table 38. Ex ante estimated total leakage (Table 35 of VM0015)

Year	Project year t	Total ex ante increase in GHG emissions due to displaced forest fires: annual $EADLK_t$ tCO_2-e	Total ex ante increase in GHG emissions due to displaced forest fires: cumulative EADLK tCO_2-e	Total ex ante decrease in carbon stocks due to displaced deforestation: annual $\Delta CADLK_t$ tCO_2-e	Total ex ante decrease in carbon stocks due to displaced deforestation: cumulative $\Delta CADLK$ tCO_2-e	Total net carbon stock change due to leakage: annual ΔCLK_t tCO_2-e	Total net carbon stock change due to leakage: cumulative ΔCLK tCO_2-e	Total net increase in emissions due to leakage: annual ELK_t tCO_2-e	Total net increase in emissions due to leakage: cumulative ELK tCO_2-e
2013	0	0	0	0	0	0	0	0	0
2014	1	2,182	2,182	-51,812	-51,812	-51,812	-51,812	2,182	2,182
2015	2	305	2,487	-7,862	-59,674	-7,862	-59,674	305	2,487
2016	3	0	2,487	-718	-60,392	-718	-60,392	0	2,487
2017	4	302	2,789	-7,899	-68,292	-7,899	-68,292	302	2,789
2018	5	0	2,789	-806	-69,097	-806	-69,097	0	2,789
2019	6	302	3,091	-7,974	-77,071	-7,974	-77,071	302	3,091
2020	7	0	3,091	-893	-77,964	-893	-77,964	0	3,091
2021	8	308	3,399	-8,203	-86,167	-8,203	-86,167	308	3,399
2022	9	0	3,399	-982	-87,149	-982	-87,149	0	3,399
2023	10	298	3,697	-8,055	-95,204	-8,055	-95,204	298	3,697
2024	11	0	3,697	-1,068	-96,272	-1,068	-96,272	0	3,697
2025	12	297	3,994	-7,477	-103,749	-7,477	-103,749	297	3,994
2026	13	0	3,994	-435	-104,184	-435	-104,184	0	3,994
2027	14	298	4,292	-7,514	-111,698	-7,514	-111,698	298	4,292
2028	15	0	4,292	-434	-112,132	-434	-112,132	0	4,292
2029	16	282	4,574	-7,122	-119,254	-7,122	-119,254	282	4,574
2030	17	0	4,574	-428	-119,682	-428	-119,682	0	4,574
2031	18	280	4,854	-7,079	-126,761	-7,079	-126,761	280	4,854
2032	19	0	4,854	-420	-127,181	-420	-127,181	0	4,854
2033	20	274	5,128	-6,934	-134,116	-6,934	-134,116	274	5,128
2034	21	0	5,128	-413	-134,529	-413	-134,529	0	5,128
2035	22	271	5,400	-6,857	-141,386	-6,857	-141,386	271	5,400
2036	23	0	5,400	-406	-141,792	-406	-141,792	0	5,400
2037	24	276	5,675	-6,947	-148,739	-6,947	-148,739	276	5,675
2038	25	0	5,675	-399	-149,138	-399	-149,138	0	5,675
2039	26	265	5,940	-6,683	-155,821	-6,683	-155,821	265	5,940
2040	27	0	5,940	-395	-156,216	-395	-156,216	0	5,940
2041	28	267	6,207	-6,736	-162,952	-6,736	-162,952	267	6,207
2042	29	0	6,207	-391	-163,343	-391	-163,343	0	6,207
2043	30	524	6,730	-12,821	-176,163	-12,821	-176,163	524	6,730

3.4 Net GHG Emission Reductions and Removals

The determination of which GHG emissions by sources, decreases in carbon pools, and leakage emissions are significant for this Project Activity has been carried out using the "Tool for testing significance of GHG emissions in A/R CDM project activities (Version 01)". According to the tool, the GHG emissions by sources, decreases in carbon pools and leakage emissions are all considered significant, as their sums represent more than 5% of net emission reductions.

3.4.1 Calculation of ex-ante estimation of total net GHG emissions reductions

The net anthropogenic GHG emission reduction (STEP 9) of the proposed AUD project activity is calculated as follows:

$$REDD_t = (CBSLPA_t + EBBBSLPA_t) - (CPSPA_t + EBBPSPA_t) - (CLK_t + ELK_t)$$

Where:

$REDD_t$ Ex ante estimated net anthropogenic greenhouse gas emission reduction attributable to the AUD project activity at year t; tCO_2e

$CBSLPA_t$ Sum of baseline carbon stock changes in the project area at year t; tCO_2e

Note: The absolute values of $CBSLPA_t$ shall be used in equation above.

$EBBBSLPA_t$ Sum of baseline emissions from biomass burning in the project area at year *t*; tCO_2e

$CPSPA_t$ Sum of ex ante estimated actual carbon stock changes in the project area at year *t*; tCO_2e

Note: If $CPSPA_t$ represents a net increase in carbon stocks, a negative sign before the absolute value of $CPSPA_t$ shall be used. If $CPSPA_t$ represents a net decrease, the positive sign shall be used.

$EBBPSPA_t$ Sum of (ex ante estimated) actual emissions from biomass burning in the project area at year *t*; tCO_2e

CLK_t Sum of ex ante estimated leakage net carbon stock changes at year *t*; tCO_2e

Note: If the cumulative sum of CLK_t within a fixed baseline period is > 0, CLK_t shall be set to zero.

ELK_t Sum of ex ante estimated leakage emissions at year *t*; tCO_2e

t 1, 2, 3 … T, a year of the proposed project crediting period; dimensionless

3.4.2 Calculation of ex-ante Verified Carbon Units (VCUs)

The number of Verified Carbon Units (VCUs) to be generated through the proposed AUD project activity at year t is calculated as follows:

$VCU_t = REDD_t – VBC_t$

$VBC_t = (CBSLPA_t - CPSPA_t) * RF_t$

Where:

VCU_t	Number of Verified Carbon Units that can be traded at time t; t CO2-e
$REDD_t$	Ex ante estimated net anthropogenic greenhouse gas emission reduction attributable to the AUD project activity at year *t*; tCO_2-e ha^{-1}
VBC_t	Number of Buffer Credits deposited in the VCS Buffer at time *t*; t CO_2-e
$CBSLPA_t$	Sum of baseline carbon stock changes in the project area at year *t*; tCO_2e
$CPSPA_t$	Sum of ex ante estimated actual carbon stock changes in the project area at year *t*; tCO_2-e ha^{-1}
RF_t	Risk factor used to calculate VCS buffer credits; %

Note: RF_t is a risk factor to be determined using the latest version of the VCS-approved AFOLU Non-Permanence Risk Tool.

t	1, 2, 3 … T, a year of the proposed project crediting period; dimensionless

Table 39. Ex ante estimated net anthropogenic GHG emission reductions (ΔREDDt) and Verified Carbon Units (VCUt)

Years	Estimated baseline emissions (tCO_2e)	Estimated project emissions (tCO_2e)	Estimated leakage emissions (tCO_2e)	Estimated net GHG emission reductions (tCO_2e)
2013	0	0	0	0
2014	1,079,891	188,986	53,995	836,911
2015	163,324	91,788	8,166	63,370
2016	14,365	71,351	718	-57,704
2017	164,040	80,777	8,202	75,060
2018	16,112	60,444	806	-45,137
2019	165,515	69,843	8,276	87,396
2020	17,856	49,536	893	-32,573
2021	170,218	59,231	8,511	102,476
2022	19,635	38,632	982	-19,979
2023	167,067	47,834	8,353	110,880
2024	21,356	27,722	1,068	-7,434
2025	155,478	35,593	7,774	112,111
2026	8,704	15,375	435	-7,106
2027	156,247	-61,949	7,812	210,384
2028	8,679	-82,247	434	90,492
2029	148,068	-73,849	7,403	214,514
2030	8,562	-93,341	428	101,475
2031	147,186	-85,020	7,359	224,846
2032	8,401	-104,439	420	112,420
2033	144,178	-96,402	7,209	233,371
2034	8,265	-115,535	413	123,387
2035	142,565	-107,646	7,128	243,083
2036	8,120	-126,631	406	134,345
2037	144,446	-118,540	7,222	255,764
2038	7,989	-137,726	399	145,316
2039	138,954	-130,171	6,948	262,177
2040	7,891	-148,818	395	156,315
2041	140,060	-49,064	7,003	182,121
2042	7,816	-62,288	391	69,713
2043	266,891	-36,381	13,345	289,927
Total	3,657,879	-792,935	182,894	4,267,919

4 MONITORING

4.1 Data and Parameters Available at Validation

Data Unit / Parameter:	**CF**
Data unit:	tC/tdm
Description:	Default value of carbon fraction in biomass
Source of data:	Values from the literature (e.g. IPCC 2003. Good practice guidance for land use, land-use change and forestry. Kanagawa: IGES, 2003. Available at: <http://www.ipccnggip. iges.or.jp/public/gpglulucf/gpglulucf.html>)
Value applied:	0.5
Justification of choice of data or description of measurement methods and procedures applied:	The default value was used for conservativeness purposes.
Any comment:	If new and more accurate carbon fraction data become available, these can be used to estimate the net anthropogenic GHG emission reduction of the subsequent fixed baseline period.

Data Unit / Parameter:	**44/12**
Data unit:	dimensionless
Description:	Carbon mass to CO_2e mass conversion factor
Source of data:	From scientific literature: 2006 IPCC Guidelines for National Greenhouse Gas Inventories Volume 4 AFOLU
Value applied:	44/12
Justification of choice of data or description of measurement methods and procedures applied:	Conversion from C to CO_2 based on molecular weights
Any comment:	IPCC standard value

Data Unit / Parameter:	**R**
Data unit:	t root d.m.t^{-1} shoot d.m.
Description:	Root to shoot ratio appropriate to species or forest type / biome; note that as defined here, root to shoot ratio is applied as belowground biomass per unit area: aboveground biomass per unit area (not on a per stem basis)
Source of data:	Average of following references: 0.37 root-shoot ratio (R), according to “2006 IPCC Guidelines for National Greenhouse Gas Inventories”, V. 4, Ch. 4, AFOLU, pg. 4.49, Table 4-4; and 0.24 root-shoot ratio, according to VM0015, Appendix 3, Table 2. Root to shoot ratios
Value applied:	0.31
Justification of choice of data or description of measurement methods and procedures applied:	Local values are not known, and the IPCC and VM0015 factors are conservative values.
Any comment:	Peer-reviewed work performed in the region of the Project Area, with a similar vegetation typology. The statistical quality of model is in conformance with methodology requirements.

Data Unit / Parameter:	**BEF**
Data unit:	dimensionless
Description:	Biomass Expansion Factor
Source of data:	According to “Brown, S., A. J. R. Gillespie, and A. E. Lugo, 1989. Biomass estimation methods for tropical forests with applications to forest inventory data. Forest Science, 35:881-902”. (Table 4; pg. 890; minimum value deducted from lowest limit.: 1.743 - 0.083 = 1.66)
Value applied:	1.66
Justification of choice of data or description of measurement methods and procedures applied:	BEF was applied for conversion of merchantable volume to total aboveground tree biomass.
Any comment:	N/A

Data Unit / Parameter:	**Cab_{icl}**
Data unit:	tCO_2/ha
Description:	Average carbon stock per hectare in the aboveground biomass pool of initial forest class icl
Source of data:	Average of public literature data from the project region. Further details are provided in "1.10 Conditions Prior to Project Initiation" of this VCS-PD.
Value applied:	575
Justification of choice of data or description of measurement methods and procedures applied:	0.31 root-shoot ratio (R) was applied (average of following references: 0.37 root-shoot ratio (R), according to "2006 IPCC Guidelines for National Greenhouse Gas Inventories", V. 4, Ch. 4, AFOLU, pg. 4.49, Table 4-4; and 0.24 root-shoot ratio, according to VM0015, Appendix 3, Table 2. Root to shoot ratios) 1.66 Biomass Expansion Factor (BEF) was applied for conversion of merchantable volume to total aboveground tree biomass, according to "Brown, S., A. J. R. Gillespie, and A. E. Lugo, 1989. Biomass estimation methods for tropical forests with applications to forest inventory data. Forest Science, 35:881-902". (Table 4; pg. 890; minimum value deducted from lowest limit.: 1.743 - 0.083 = 1.66) 0.589 t/m^3 wood density was applied, according to Nogueira (2008).
Any comment:	Literature studies used for this assessment, as well as respective calculations, are available for consultation by the audit team.

Data Unit / Parameter:	**Cbb_{icl}**
Data unit:	tCO_2/ha
Description:	Average carbon stock per hectare in the belowground biomass pool of initial forest class icl
Source of data:	Average of public literature data from the project region. Further details are provided in "1.10 Conditions Prior to Project Initiation" of this VCS-PD.
Value applied:	174
Justification of choice of data or description of measurement methods and procedures applied:	0.31 root-shoot ratio (R) was applied (average of following references: 0.37 root-shoot ratio (R), according to "2006 IPCC Guidelines for National Greenhouse Gas Inventories", V. 4, Ch. 4, AFOLU, pg. 4.49, Table 4-4; and 0.24 root-shoot ratio, according to VM0015, Appendix 3, Table 2. Root to shoot ratios) 0.589 t/m^3 wood density was applied, according to Nogueira (2008).
Any comment:	Literature studies used for this assessment, as well as respective calculations, are available for consultation by the audit team.

Data Unit / Parameter:	**Cab_{fcl}**
Data unit:	tCO_2/ha
Description:	Average carbon stock per hectare in the aboveground biomass pool of post-deforestation class fcl
Source of data:	Weighted average (by area obtained in Terra Class database): 2006 IPCC Guidelines for National Greenhouse Gas Inventories, V. 4, Chapter 6: Grassland, pg. 6.27, Table 6.4 (for Pasture: 76.1% of area) 2006 IPCC Guidelines for National Greenhouse Gas Inventories, V. 4, Chapter 4: Forest Land, pg. 4.63, Table 4.12 (for Pasture with regeneration: 23.9% of area)
Value applied:	61.1
Justification of choice of data or description of measurement methods and procedures applied:	Conservative default value from IPCC, to estimate post-deforestation land use carbon stock.

Any comment:	Conservative average to be used in calculations, based on uncertainties in source values.

Data Unit / Parameter:	**Cbb_{fcl}**
Data unit:	tCO_2/ha
Description:	Average carbon stock per hectare in the belowground biomass pool of post-deforestation class fcl
Source of data:	Weighted average (by area obtained in Terra Class database): 2006 IPCC Guidelines for National Greenhouse Gas Inventories, V. 4, Chapter 6: Grassland, pg. 6.27, Table 6.4 (for Pasture: 76.1% of area) 2006 IPCC Guidelines for National Greenhouse Gas Inventories, V. 4, Chapter 4: Forest Land, pg. 4.63, Table 4.12 (for Pasture with regeneration: 23.9% of area)
Value applied:	40.5
Justification of choice of data or description of measurement methods and procedures applied:	Conservative default value from IPCC, to estimate post-deforestation land use carbon stock.
Any comment:	Conservative average to be used in calculations, based on uncertainties in source values.

Data Unit / Parameter:	**EI**
Data unit:	N/A
Description:	Ex ante estimated effectiveness index
Source of data:	Local assessment
Value applied:	0.9
Justification of choice of data or description of measurement methods and procedures applied:	The project design team conservatively considers that surveillance activities are able to attain 90% of effectiveness in avoiding unplanned deforestation inside the Project Area.
Any comment:	This value is an ex ante estimate. Accurate and actual values will be monitored and reported in verification periods.

Data Unit / Parameter:	**DLF**
Data unit:	N/A
Description:	Displacement Leakage Factor
Source of data:	Local assessment
Value applied:	0.05
Justification of choice of data or description of measurement methods and procedures applied:	If deforestation agents do not participate in leakage prevention activities and project activities, the Displacement Factor shall be 100%. Where leakage prevention activities are implemented the factor shall be equal to the proportion of the baseline agents estimated to be given the opportunity to participate in leakage prevention activities and project activities. The project design team estimates that 100% of potential deforestation agents in the Reference Region will be given the opportunity to participate in leakage prevention activities. Thus, the "Displacement Leakage Factor" (DLF) is conservatively considered as 0.05.
Any comment:	This value is an ex ante estimate. Accurate and actual values will be monitored and reported in verification periods.

Data Unit / Parameter:	**Deforestation**
Data unit:	ha
Description:	Maps of forest cover areas converted into non-forest areas
Source of data:	Measured through data from PRODES/INPE project
Value applied:	Yearly variable: deforestation values are presented for the Reference Region, Leakage Belt and Project Area (projections) in this VCS-PD
Justification of choice of data or description of measurement methods and procedures applied:	The project area is located within a region that is subject to a monitoring program that is approved or sanctioned by the national government (PRODES). The data generated by such program is used in this project. PRODES data are applicable for use in this project, according to

	the criteria listed below (Methodology VM0015): i) PRODES monitoring occurs in the entire project area and leakage belt. ii) PRODES monitoring occurs in the entire reference region and covers the beginning, middle and end of the fixed baseline period. iii) PRODES monitors conversion of forest land to non-forest land. iv) Monitoring occurred during the entire fixed baseline period.
Any comment:	N/A

4.2 Data and Parameters Monitored

Data Unit / Parameter:	**ACPAt**
Data unit:	ha
Description:	Annual area within the Project Area affected by catastrophic events at year t
Source of data:	- Remote sensing data and GIS, - Supervisor reports
Description of measurement methods and procedures to be applied:	The following sources will be monitored: - INMET (INMET. Instituto Nacional de Meteorologia. http://www.inmet.gov.br /portal/index.php?r=home/page&page= rede_estacoes_conv_graf) - Periodic reports from area supervisor - INPE (INPE. Instituto Nacional de Pesquisas Espaciais. http://www.inpe.br/queimadas/abasFogo.php)
Frequency of monitoring/recording:	At each time a catastrophic event occurs
Value applied:	The value will be calculated ex-post each time a catastrophic event occurs, when significant
Monitoring equipment:	Remote sensing and GIS
QA/QC procedures to be applied:	Best practices in remote sensing and GIS: 1) Land use and land cover mapping is assessed using images with spatial resolution superior to 30 meters. Image acquisition is performed during

	the period of low incidence of clouds and rainfall in the region, within July and September. 2) Images undergo geometric correction by means of geo-referencing, using topographic maps as reference or USG-NASA orthorectified images. 3) For analysis of areas with cloud cover, visual interpretation of radar image is performed. 4) Evaluation of classification accuracy is performed by analyzing the overall accuracy and kappa index obtained from a confusion matrix. The minimum accuracy of the classification mapping should be 80%.
Calculation method:	Remote sensing and GIS
Any comment:	N/A

Data Unit / Parameter:	**ABSLLKt**
Data unit:	ha
Description:	Annual area of deforestation within the leakage belt at year t
Source of data:	Remote sensing data and GIS
Description of measurement methods and procedures to be applied:	Deforestation in the leakage belt area will be considered activity displacement leakage. Activity data for the leakage belt area will be determined using the same methods applied to monitoring deforestation activity data in the project area.
Frequency of monitoring/recording:	Annually
Value applied:	Values projected annually
Monitoring equipment:	Remote sensing and GIS
QA/QC procedures to be applied:	Best practices in remote sensing and GIS: 1) Land use and land cover mapping is assessed using images with spatial resolution superior to 30 meters. Image acquisition is performed during the period of low incidence of clouds and rainfall in the region, within July and September. 2) Images undergo geometric correction by means of geo-referencing, using topographic maps as reference or USG-NASA orthorectified images. 3) For analysis of areas with cloud cover, visual

	interpretation of radar image is performed. 4) Evaluation of classification accuracy is performed by analyzing the overall accuracy and kappa index obtained from a confusion matrix. The minimum accuracy of the classification mapping should be 80%.
Calculation method:	Analysis of satellite images and maps
Any comment:	Where strong evidence can be collected that deforestation in the leakage belt is attributable to deforestation agents that are not linked to the project area, the detected deforestation will not be attributed to the project activity, thus not considered leakage.

Data Unit / Parameter:	**ABSLPAt**
Data unit:	ha
Description:	Annual area of deforestation in the project area at year t
Source of data:	Remote sensing data and GIS
Description of measurement methods and procedures to be applied:	Forest cover change due to deforestation is monitored through periodic assessment of classified satellite imagery covering the project area.
Frequency of monitoring/recording:	Annually
Value applied:	Annual average deforestation in the project area during the project crediting period
Monitoring equipment:	Remote sensing and GIS
QA/QC procedures to be applied:	Best practices in remote sensing and GIS: 1) Land use and land cover mapping is assessed using images with spatial resolution superior to 30 meters. Image acquisition is performed during the period of low incidence of clouds and rainfall in the region, within July and September. 2) Images undergo geometric correction by means of geo-referencing, using topographic maps as reference or USG-NASA orthorectified images. 3) For analysis of areas with cloud cover, visual interpretation of radar image is performed. 4) Evaluation of classification accuracy is performed by analyzing the overall accuracy and

	kappa index obtained from a confusion matrix. The minimum accuracy of the classification mapping should be 80%.
Calculation method:	Analysis of satellite images and maps
Any comment:	N/A

Data Unit / Parameter:	**ΔCADLKt**
Data unit:	tCO_2e
Description:	Total decrease in carbon stocks due to displaced deforestation at year t
Source of data:	Remote sensing data and GIS
Description of measurement methods and procedures to be applied:	Deforestation in the leakage belt area will be considered activity displacement leakage. Activity data for the leakage belt area will be determined using the same methods applied to monitoring deforestation activity data in the project area.
Frequency of monitoring/recording:	Annually
Value applied:	Annual average decrease in carbon stocks due to displaced deforestation during the project crediting period
Monitoring equipment:	Remote sensing and GIS
QA/QC procedures to be applied:	Best practices in remote sensing and GIS: 1) Land use and land cover mapping is assessed using images with spatial resolution superior to 30 meters. Image acquisition is performed during the period of low incidence of clouds and rainfall in the region, within July and September. 2) Images undergo geometric correction by means of geo-referencing, using topographic maps as reference or USG-NASA orthorectified images. 3) For analysis of areas with cloud cover, visual interpretation of radar image is performed. 4) Evaluation of classification accuracy is performed by analyzing the overall accuracy and kappa index obtained from a confusion matrix. The minimum accuracy of the classification mapping should be 80%.
Calculation method:	Emissions from deforestation are estimated by multiplying the detected area of forest loss by the average forest carbon stock per unit area.

Any comment:	N/A

Data Unit / Parameter:	**ΔCPAdPAt**
Data unit:	tCO_2e
Description:	Total decrease in carbon stock due to all planned activities at year t in the project area
Source of data:	Documents, remote sensing and GIS
Description of measurement methods and procedures to be applied:	The planned activities in the project area that result in carbon stock decrease will be subject to monitoring, when significant.
Frequency of monitoring/recording:	Annually
Value applied:	0
Monitoring equipment:	Remote sensing and GIS
QA/QC procedures to be applied:	Best practices in remote sensing and GIS: 1) Land use and land cover mapping is assessed using images with spatial resolution superior to 30 meters. Image acquisition is performed during the period of low incidence of clouds and rainfall in the region, within July and September. 2) Images undergo geometric correction by means of geo-referencing, using topographic maps as reference or USG-NASA orthorectified images. 3) For analysis of areas with cloud cover, visual interpretation of radar image is performed. 4) Evaluation of classification accuracy is performed by analyzing the overall accuracy and kappa index obtained from a confusion matrix. The minimum accuracy of the classification mapping should be 80%.
Calculation method:	Emissions from deforestation are estimated by multiplying the detected area of forest loss by the average forest carbon stock per unit area.
Any comment:	N/A

Data Unit / Parameter:	**ΔCPSLKt**
Data unit:	tCO_2e
Description:	Total annual carbon stock change in leakage management areas in the project case

Source of data:	- Activities report related to leakage prevention measures. - Field assessment. - Remote sensing and GIS.
Description of measurement methods and procedures to be applied:	The planned activities in leakage management areas that result in carbon stock decrease will be subject to monitoring, when significant.
Frequency of monitoring/recording:	Annually
Value applied:	0
Monitoring equipment:	Remote sensing and GIS
QA/QC procedures to be applied:	Best practices in remote sensing and GIS: 1) Land use and land cover mapping is assessed using images with spatial resolution superior to 30 meters. Image acquisition is performed during the period of low incidence of clouds and rainfall in the region, within July and September. 2) Images undergo geometric correction by means of geo-referencing, using topographic maps as reference or USG-NASA orthorectified images. 3) For analysis of areas with cloud cover, visual interpretation of radar image is performed. 4) Evaluation of classification accuracy is performed by analyzing the overall accuracy and kappa index obtained from a confusion matrix. The minimum accuracy of the classification mapping should be 80%.
Calculation method:	Emissions from deforestation are estimated by multiplying the detected area of forest loss by the average forest carbon stock per unit area.
Any comment:	N/A

Data Unit / Parameter:	**ΔCUDdPAt**
Data unit:	tCO_2e
Description:	Total actual carbon stock change due to unavoided unplanned deforestation at year t in the project area
Source of data:	Remote sensing and GIS
Description of measurement methods and procedures to be applied:	Forest cover change due to unplanned deforestation is monitored through periodic assessment of classified satellite imagery

	covering the project area.
Frequency of monitoring/recording:	Annually
Value applied:	Annual average decrease in carbon stocks due to unavoided unplanned deforestation during the project crediting period
Monitoring equipment:	Remote sensing and GIS
QA/QC procedures to be applied:	Best practices in remote sensing and GIS: 1) Land use and land cover mapping is assessed using images with spatial resolution superior to 30 meters. Image acquisition is performed during the period of low incidence of clouds and rainfall in the region, within July and September. 2) Images undergo geometric correction by means of geo-referencing, using topographic maps as reference or USG-NASA orthorectified images. 3) For analysis of areas with cloud cover, visual interpretation of radar image is performed. 4) Evaluation of classification accuracy is performed by analyzing the overall accuracy and kappa index obtained from a confusion matrix. The minimum accuracy of the classification mapping should be 80%.
Calculation method:	Emissions from deforestation are estimated by multiplying the detected area of forest loss by the average forest carbon stock per unit area.
Any comment:	N/A

Data Unit / Parameter:	**EBBPSPAt**
Data unit:	tCO_2e
Description:	Sum of (or total) actual non-CO_2 emissions from forest fire at year t in the project area
Source of data:	- Remote sensing data and GIS, - Supervisor reports.
Description of measurement methods and procedures to be applied:	If forest fires occur, these non-CO_2 emissions will be subject to monitoring and accounting, when significant.
Frequency of monitoring/recording:	Areas burnt will be monitored every 5 years or if verification occurs on a frequency of less than every 5 years, examination will occur prior to any verification event.

Value applied:	0
Monitoring equipment:	Remote sensing and GIS
QA/QC procedures to be applied:	Best practices in remote sensing and GIS: 1) Land use and land cover mapping is assessed using images with spatial resolution superior to 30 meters. Image acquisition is performed during the period of low incidence of clouds and rainfall in the region, within July and September. 2) Images undergo geometric correction by means of geo-referencing, using topographic maps as reference or USG-NASA orthorectified images. 3) For analysis of areas with cloud cover, visual interpretation of radar image is performed. 4) Evaluation of classification accuracy is performed by analyzing the overall accuracy and kappa index obtained from a confusion matrix. The minimum accuracy of the classification mapping should be 80%.
Calculation method:	Analysis of satellite images and maps to determine the incidence of deforestation and multiplying it by the respective emission factors.
Any comment:	If forest fires occur, these non-CO_2 emissions will be subject to monitoring and accounting, when significant.

Data Unit / Parameter:	**EADLKt**
Data unit:	tCO_2e
Description:	Total increase in GHG emissions due to displaced forest fires at year t
Source of data:	Remote sensing data and GIS
Description of measurement methods and procedures to be applied:	When significant, GHG emissions due displaced forest fires will be monitored.
Frequency of monitoring/recording:	Annually
Value applied:	0
Monitoring equipment:	Remote sensing and GIS
QA/QC procedures to be applied:	Best practices in remote sensing and GIS: 1) Land use and land cover mapping is assessed using images with spatial resolution superior to 30 meters. Image acquisition is performed during the period of low incidence of clouds and rainfall

	in the region, within July and September. 2) Images undergo geometric correction by means of geo-referencing, using topographic maps as reference or USG-NASA orthorectified images. 3) For analysis of areas with cloud cover, visual interpretation of radar image is performed. 4) Evaluation of classification accuracy is performed by analyzing the overall accuracy and kappa index obtained from a confusion matrix. The minimum accuracy of the classification mapping should be 80%.
Calculation method:	Analysis of satellite images and maps to determine the incidence of deforestation and multiplying it by the respective emission factors.
Any comment:	Where strong evidence can be collected that forest fires in the leakage belt is attributable to deforestation agents that are not linked to the project area, the detected deforestation will not be attributed to the project activity, thus not considered leakage.

Data Unit / Parameter:	**RFt**
Data unit:	%
Description:	Risk factor used to calculate VCS buffer credits
Source of data:	- VCS Non-Permanence Risk Report (v3.1), - Remote sensing data and GIS, - Supervisor report. - Literature data.
Description of measurement methods and procedures to be applied:	All sources of data from the VCS Non-Permanence Risk Report will be used to measure the various risk factors.
Frequency of monitoring/recording:	Annually
Value applied:	21
Monitoring equipment:	VCS-approved AFOLU Non-Permanence Risk Tool
QA/QC procedures to be applied:	Literature data from reputed sources will be used and critically checked. When possible, the average of two or more sources will be used.
Calculation method:	All the risk factors described in the VCS Non-Permanence Risk Report were assessed.

Any comment:	N/A

Data Unit / Parameter:	**Deforestation in the project area and leakage belt**
Data unit:	ha
Description:	Forest cover areas converted into non-forest areas inside the Project Area and Leakage Belt
Source of data:	Calculated through remote sensing images
Description of measurement methods and procedures to be applied:	The monitoring of the forest cover in the Project Area and Leakage Belt will be done through satellite image analysis. When data from the PRODES system are not available, the forest cover monitoring will be carried out by automatic classification and visual interpretation of images from other optical sensors or SAR data.
Frequency of monitoring/recording:	Annually
Value applied:	N/A
Monitoring equipment:	Remote sensing images digital processing program, geographic information systems
QA/QC procedures to be applied:	Best practices in remote sensing and GIS: 1) Land use and land cover mapping is assessed using images with spatial resolution superior to 30 meters. Image acquisition is performed during the period of low incidence of clouds and rainfall in the region, within July and September. 2) Images undergo geometric correction by means of geo-referencing, using topographic maps as reference or USG-NASA orthorectified images. 3) For analysis of areas with cloud cover, visual interpretation of radar image is performed. 4) Evaluation of classification accuracy is performed by analyzing the overall accuracy and kappa index obtained from a confusion matrix. The minimum accuracy of the classification mapping should be 80%.
Calculation method:	Analysis of satellite images and maps
Any comment:	N/A

Data Unit / Parameter:	**ΔCabBSLLKt**
Data unit:	tCO_2e
Description:	Total carbon stock changes in the leakage belt area
Source of data:	Calculated
Description of measurement methods and procedures to be applied:	• leakage prevention activities will be listed; • a map showing areas of intervention and type of intervention will be prepared; • areas where leakage prevention activities impact carbon stock will be identified; • non-forest classes existing within these areas in the baseline case will be identified; • carbon stocks will be measured on the identified classes or conservative literature estimates will be used; • carbon stock changes in the leakage management areas under the project scenario will be reported using table 30b of the VM0015; • net carbon stock changes that the leakage prevention measures cause during the fixed baseline period and, optionally, the project crediting period will be calculated; • results of the calculations will be reported in table 30.c of the VM0015.
Frequency of monitoring/recording:	To be determined depending on the activity
Value applied:	0
Monitoring equipment:	Remote sensing images digital processing program, geographic information systems
QA/QC procedures to be applied:	Best practices in remote sensing and GIS: 1) Land use and land cover mapping is assessed using images with spatial resolution superior to 30 meters. Image acquisition is performed during the period of low incidence of clouds and rainfall in the region, within July and September. 2) Images undergo geometric correction by means of geo-referencing, using topographic maps as reference or USG-NASA orthorectified images. 3) For analysis of areas with cloud cover, visual interpretation of radar image is performed. 4) Evaluation of classification accuracy is performed by analyzing the overall accuracy and

	kappa index obtained from a confusion matrix. The minimum accuracy of the classification mapping should be 80%.
Calculation method:	Analysis of satellite images and maps to determine deforestation in Leakage Belt and multiplying it by the carbon stocks previously set.
Any comment:	N/A

4.3 Monitoring Plan

This Monitoring Plan was developed according to Methodology VM0015 “Methodology for Avoided Unplanned Deforestation”, Version 1.1. The methodology encompasses three main monitoring tasks:

i) Monitoring of actual carbon stock changes and GHG emissions within the project area;

ii) Monitoring of leakage; and

iii) Ex post calculation of net anthropogenic GHG emission reduction.

This Monitoring Plan describes how these tasks will be implemented. For each task, the monitoring plan includes the following aspects:

a) Technical description of the monitoring tasks.

b) Data to be collected.

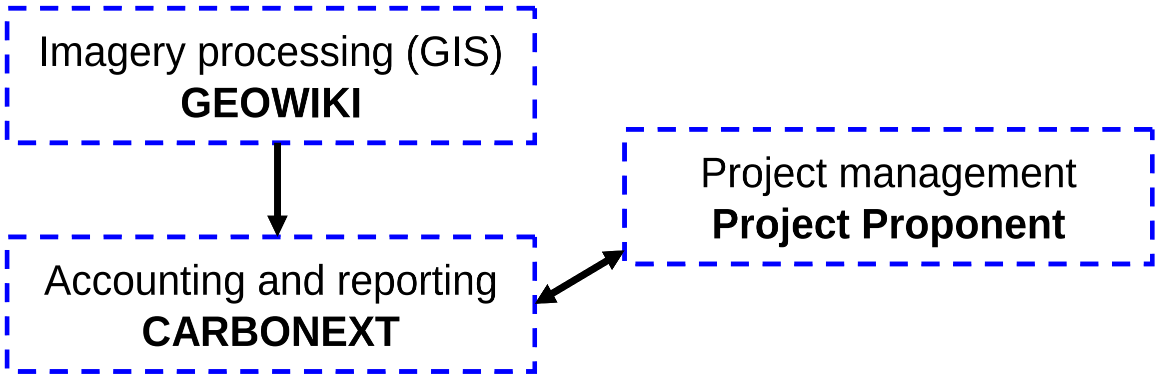
c) Overview of data collection procedures.

d) Quality control and quality assurance procedures.

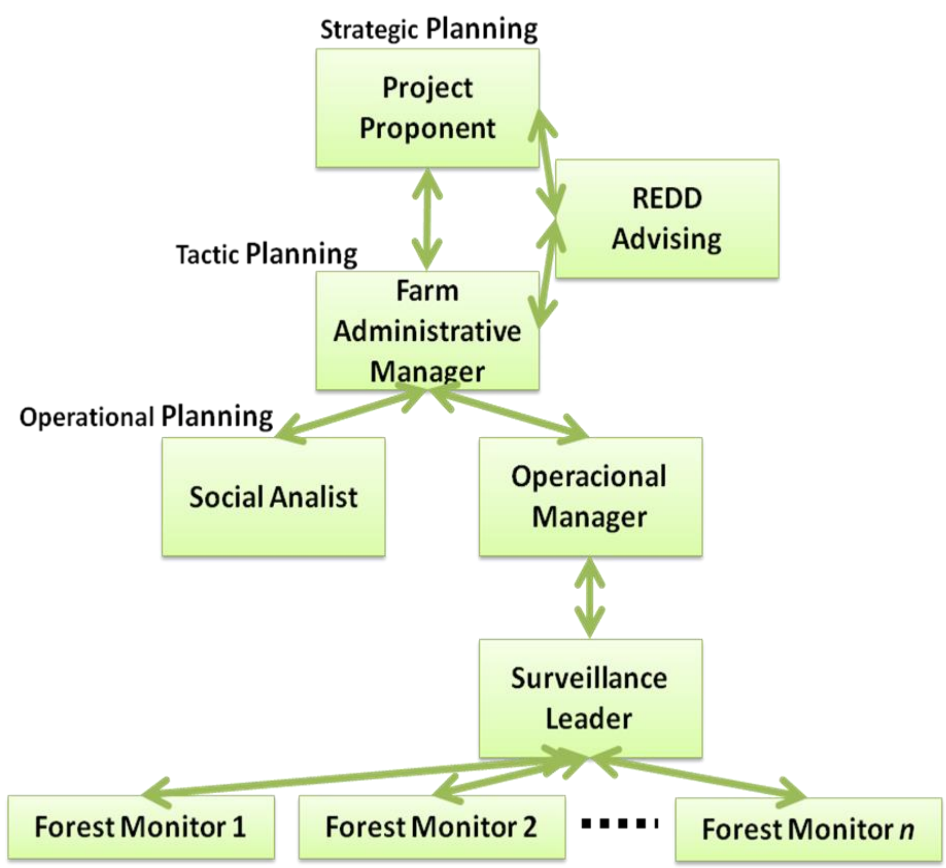
e) Data archiving.

f) Organization and responsibilities of the parties involved in all the above.

General overview of parties involved in monitoring activities



General overview of staff in the Project Area



4.3.1 Monitoring of actual carbon stock changes and GHG emissions within the project area

Monitoring of project implementation

a) Technical description of the monitoring tasks.

Project activities implemented within the project area will be monitored to be consistent with the management plans of the project area and the PD.

b) Data to be collected.

Monitoring of deforestation-avoidance activities will be performed by means of evaluations of the surveillance rounds, and using satellite imagery to continuously inspect the forest condition within the Project Area. All images, maps and records generated during project implementation should be conserved and made available to VCS verifiers at verification for inspection to demonstrate that the AUD project activity has actually been implemented.

Monitoring of social and biodiversity parameters of project implementation will be based on data required in Tables 40 and 41, which attest that foreseen activities are being effectively implemented. A system will be implemented to record data on costs and investments, based on invoices, receipts and contracts related to activity implementation, as well as signed attendance lists.

c) Overview of data collection procedures.

All invoices, receipts and contracts related to activities implemented in this REDD project shall be conserved in printed version. Whenever possible, documentation should be kept in electronic format.

d) Quality control and quality assurance procedures.

The project proponent will train personnel to collect and keep all documentation in a sure place. All electronic documentation should also be sent to CARBONEXT to further security and checking.

e) Data archiving.

All maps and records generated during project implementation will be conserved and made available to VCS verifiers at verification. Backup copies of files should be available in the project proponent facilities, as well as in CARBONEXT facilities.

All documents and records will be kept in a secure retrievable manner for at least two years after the end of the project crediting period.

f) Organization and responsibilities of the parties involved in all the above.

The project proponent is responsible to implement this monitoring item. CARBONEXT is co-responsible in archiving, and quality control and quality assurance procedures.

Monitoring of land-use and land-cover change within the project area

a) Technical description of the monitoring tasks.

Monitoring of land-use and land-cover change within the Project Area will be performed annually by analyzing satellite imagery of the Project Area.

Imagery analysis of land use will be based on secondary information from PRODES Digital (INPE, 2014), referring mainly to the classes "Forest Land" and "Non-Forest Land".

b) Data to be collected.

The categories of change that will be subject to MRV-A (monitoring, reporting, verification and accounting) are “Area of forest land converted to non-forest land”, “Area of forest land undergoing carbon stock decrease” and “Area of forest land undergoing carbon stock increase”. These categories are mandatory in AUD project activities having the same characteristics as this project (i.e. planned logging above the baseline and claiming carbon credits for carbon stock increase).

In this context, data to be collected consists of annual satellite imagery processed by PRODES, for the entire land coverage of Project Area.

The satellite images used will be four scenes of satellite Landsat 8 TM (orbits 001/65, 001/66, 233/65, and 233/66) to the total geographic scope of the Project Area and Reference Region.

c) Overview of data collection procedures.

The project area is located within a region that is subject to a monitoring program that is approved or sanctioned by the national government (PRODES). The data generated by such program is used in this project. PRODES data are applicable for use in this project, according to the criteria listed below (Methodology VM0015):

i) PRODES monitoring occurs in the entire project area and leakage belt.

ii) PRODES monitoring occurs in the entire reference region and covers the beginning, middle and end of the fixed baseline period.

iii) PRODES monitors conversion of forest land to non-forest land.

iv) Monitoring occurred during the entire fixed baseline period.

d) Quality control and quality assurance procedures.

The validation of land-use data used for modeling of land use will be performed by using the confusion matrix, in order to calculate the overall index of success by period and by class. Three specific classes will be used: forest, accumulated deforestation and other (hydrography, not forest, clouds, roads, residues, unclassified objects, and others).

The validation will be performed by using the land use mapping PRODES Digital (2014). The satellite images used will be four scenes of satellite Landsat 8 TM (orbits 001/65, 001/66, 233/65, and 233/66) to the total geographic scope of the Project Area and Reference Region.

With the help of the "Create Random Points" tool in ArcGIS 10.0, 100 random points will be generated for each class / year as samples for evaluation, using satellite images as reference, making it possible to generate a confusion matrix for calculation of the accuracy indexes, and the Kappa index (indicators for validation of mapping accuracy).

Land use classes must have higher values than 90% accuracy for the accuracy and Kappa index, as required in VM00015 1.1 methodology.

e) Data archiving.

All maps and records generated during project implementation will be conserved and made available to VCS verifiers at verification for inspection to demonstrate that the AUD project activity has actually been implemented.

All documents and records will be kept in a secure retrievable manner for at least two years after the end of the project crediting period.

f) Organization and responsibilities of the parties involved in all the above.

All satellite imagery assessments will be performed by GEOWIKI. CARBONEXT is responsible for reporting and data archiving, according to VM0015, and for providing assistance during verification audits. The Project Proponent is co-responsible for data archiving.

Monitoring of carbon stock changes and non-CO2 emissions from forest fires

a) Technical description of the monitoring tasks.

Monitoring of carbon stocks is mandatory in the following cases:

Within the project area:

a) Areas subject to significant carbon stock decrease in the project scenario according to the ex ante assessment. These will be areas subject to controlled deforestation and planned harvest activities, such as logging, fuel wood collection and charcoal production. In these areas, carbon stock changes must be estimated at least once after each harvest event.

b) Areas subject to unplanned and significant carbon stock decrease, e.g. due to uncontrolled forest fires and other catastrophic events. In these areas, carbon stock losses must be estimated as soon as possible after the catastrophic event. See section 1.1.4 below for more detailed guidance.

Within leakage management areas:

a) Areas subject to planned and significant carbon stock decrease in the project scenario according to the ex ante assessment. In these areas, carbon stocks must be estimated at least once after the planned event that caused the carbon stock decrease.

b) Data to be collected.

The results of monitoring activity data and carbon stocks must be reported using the same formats and tables used for the ex ante assessment, according to Methodology VM0015 (the applicability of each table must be evaluated ex post, in the Monitoring Report):

Table 15 Ex post carbon stock per hectare of initial forest classes icl existing in the project area and leakage belt

Table 16 Ex post carbon stock per hectare of final classes fcl existing in the project area and leakage belt

Table 25.a Ex post carbon stock decrease due to planned and unplanned deforestation in the project area.

Table 25.b Ex post carbon stock decrease due to planned logging activities.

Table 25.c Ex post carbon stock decrease due to planned fuel-wood and charcoal activities.

Table 25.d Total ex post carbon stock decrease due to planned activities in the project area.

Table 25.e Ex post carbon stock decrease due to forest fires.

Table 25.f Ex post carbon stock decrease due to catastrophic events.

Table 25.g Total ex post carbon stock decrease due to forest fires and catastrophic events.

Table 26.a Ex post carbon stock increase due to growth without harvest.

Table 26.b Ex post carbon stock increase following planned logging activities.

Table 26.c Ex post carbon stock increase following planned fuel-wood and charcoal activities.

Table 26.d Total ex post carbon stock increase due to planned activities in the project area.

Table 26.e Ex post carbon stock increase on areas affected by forest fires.

Table 26.f Ex post carbon stock increase on areas affected by catastrophic events.

Table 26.g Ex post carbon stock increase on areas recovering after forest fires and catastrophic events.

Table 27 Ex post total net carbon stock change in the project area.

Non-CO_2 emissions from forest fires are subject to monitoring and accounting, when significant. In this case, under the project scenario it will be necessary to monitor the variables of table 23 within the project area and to report the results in table 24, according to VM0015.

Decreases in carbon stocks and increases in GHG emissions (e.g. in case of forest fires) due to natural disturbances (such as hurricanes, earthquakes, volcanic eruptions, tsunamis, flooding, drought, fires, tornados or winter storms) or man-made events, including those over which the project proponent has no control (such as acts of terrorism or war), are subject to monitoring and must be accounted under the project scenario, when significant. Use tables 25.e, 25.f and 25.g to report carbon stock decreases and, optionally, tables 26.e, 26.f and 26.g to report carbon stock increases that may happen on the disturbed lands after the occurrence of an event. Use tables 23 and 24 to report emissions from forest fires.

If the area (or a sub-set of it) is affected by natural disturbances or man-made events generated VCUs in past verifications, the total net change in carbon stocks and GHG emissions in the area(s) that generated VCUs must be estimated, and an equivalent amount of VCUs must be cancelled from the VCS buffer.

Summarize the results of all ex post estimations in the project area using the same table format used for the ex ante assessment:

Table 29: Total ex post estimated actual net changes in carbon stocks and emissions of GHG gases in the project area.

c) Overview of data collection procedures.

The project area is located within a region that is subject to a monitoring program that is approved or sanctioned by the national government (PRODES). The data generated by such program is used in this project. PRODES data are applicable for use in this project, according to the criteria listed below (Methodology VM0015):

i) PRODES monitoring occurs in the entire project area and leakage belt.

ii) PRODES monitoring occurs in the entire reference region and covers the beginning, middle and end of the fixed baseline period.

iii) PRODES monitors conversion of forest land to non-forest land.

iv) Monitoring occurred during the entire fixed baseline period.

d) Quality control and quality assurance procedures.

The validation of land-use data used for modeling of land use will be performed by using the confusion matrix, in order to calculate the overall index of success by period and by class. Three specific classes will be used: forest, accumulated deforestation and other (hydrography, not forest, clouds, roads, residues, unclassified objects, and others).

The validation will be performed by using the land use mapping PRODES Digital (2014). The satellite images used will be four scenes of satellite Landsat 8 TM (orbits 001/65, 001/66, 233/65, and 233/66) to the total geographic scope of the Project Area and Reference Region.

With the help of the "Create Random Points" tool in ArcGIS 10.0, 100 random points will be generated for each class / year as samples for evaluation, using satellite images as reference, making it possible to generate a confusion matrix for calculation of the accuracy indexes, and the Kappa index (indicators for validation of mapping accuracy).

Land use classes must have higher values than 90% accuracy for the accuracy and Kappa index, as required in VM00015 1.1 methodology.

e) Data archiving.

All maps and records generated during project implementation will be conserved and made available to VCS verifiers at verification for inspection to demonstrate that the AUD project activity has actually been implemented.

All documents and records will be kept in a secure retrievable manner for at least two years after the end of the project crediting period.

f) Organization and responsibilities of the parties involved in all the above.

All satellite imagery assessments will be performed by GEOWIKI. CARBONEXT is responsible for reporting and data archiving, according to VM0015, and for providing assistance during verification audits. The Project Proponent is co-responsible for data archiving.

4.3.2 Monitoring of leakage

a) Technical description of the monitoring tasks.

The sources of leakage identified as significant in the ex ante assessment are subject to monitoring. Two sources of leakage are potentially subject to monitoring:

- Decrease in carbon stocks and increase in GHG emissions associated with leakage prevention activities;

- Decrease in carbon stocks and increase in GHG emissions in due to activity displacement leakage.

This Project Activity does not involve decrease in carbon stocks and increase in GHG emissions associated with leakage prevention activities. In this project, leakage prevention activities do not involve any carbon stock reduction due to deforestation or additional emissions caused by increased grazing activities. In this case, only the decrease in carbon stocks and increase in GHG emissions in due to activity displacement leakage will be monitored.

b) Data to be collected.

Deforestation above the baseline in the leakage belt area will be considered activity displacement leakage.

The result of the ex post estimations of carbon stock changes must be reported using the same table formats used in the ex ante assessment of baseline carbon stock changes in the leakage belt.

Table 22.c.1. Ex post above-ground net carbon stock changes in the leakage belt.

Table 22.c.2. Ex post below-ground net carbon stock changes in the leakage belt.

Table 22.c.6. Ex post net carbon stock changes in the wood products in the leakage belt.

Where strong evidence can be collected that deforestation in the leakage belt is attributable to deforestation agents that are not linked to the Project Area, the detected deforestation will not be attributed to the Project Activity and considered leakage. The operational entity verifying the monitoring data shall determine whether the documentation provided by the project proponent represents sufficient evidence to consider the detected deforestation as not attributable to the Project Activity and therefore not leakage.

To estimate the increased GHG emissions due to forest fires in the leakage belt area the assumption is made that forest clearing is done by burning the forest. The parameter values used to estimate emissions shall be the same used for estimating forest fires in the baseline (table 23), except for the initial carbon stocks (Cab, Cdw) which shall be those of the initial forest classes burned in the leakage belt area.

Report the result of the estimations using the same table formats used in the ex ante assessment of baseline GHG emissions from forest fires in the project area:

Table 23: Parameters used to calculate emissions from forest fires in the leakage belt area

Table 24: Ex post estimated non-CO_2 emissions from forest fires in the leakage belt area

The results of all ex post estimations of leakage are summarized using the same table format used for the ex ante assessment:

Table 35. Total ex post estimated leakage.

c) Overview of data collection procedures.

The project area is located within a region that is subject to a monitoring program that is approved or sanctioned by the national government (PRODES). The data generated by such program is used in this project. PRODES data are applicable for use in this project, according to the criteria listed below (Methodology VM0015):

i) PRODES monitoring occurs in the entire project area and leakage belt.

ii) PRODES monitoring occurs in the entire reference region and covers the beginning, middle and end of the fixed baseline period.

iii) PRODES monitors conversion of forest land to non-forest land.

iv) Monitoring occurred during the entire fixed baseline period.

d) Quality control and quality assurance procedures.

The validation of land-use data used for modeling of land use will be performed by using the confusion matrix, in order to calculate the overall index of success by period and by class. Three specific classes will be used: forest, accumulated deforestation and other (hydrography, not forest, clouds, roads, residues, unclassified objects, and others).

The validation will be performed by using the land use mapping PRODES Digital (2014). The satellite images used will be four scenes of satellite Landsat 8 TM (orbits 001/65, 001/66, 233/65, and 233/66) to the total geographic scope of the Project Area and Reference Region.

With the help of the "Create Random Points" tool in ArcGIS 10.0, 100 random points will be generated for each class / year as samples for evaluation, using satellite images as reference, making it possible to generate a confusion matrix for calculation of the accuracy indexes, and the Kappa index (indicators for validation of mapping accuracy).

Land use classes must have higher values than 90% accuracy for the accuracy and Kappa index, as required in VM00015 1.1 methodology.

e) Data archiving.

All maps and records generated during project implementation will be conserved and made available to VCS verifiers at verification for inspection to demonstrate that the AUD project activity has actually been implemented.

All documents and records will be kept in a secure retrievable manner for at least two years after the end of the project crediting period.

f) Organization and responsibilities of the parties involved in all the above.

All satellite imagery assessments will be performed by GEOWIKI. CARBONEXT is responsible for reporting and data archiving, according to VM0015, and for providing assistance during verification audits. The Project Proponent is co-responsible for data archiving.

4.3.3 Ex post calculation of net anthropogenic GHG emission reduction

a) Technical description of the monitoring tasks.

The calculation of ex post net anthropogenic GHG emission reductions is similar to the ex ante calculation with the only difference that ex post estimated carbon stock changes and GHG emissions must be used in the case of the project scenario and leakage.

b) Data to be collected.

Report the ex post estimated net anthropogenic GHG emissions and calculation of Verified Carbon Units (VCUt, and VBCt) using the same table format used for the ex ante assessment:

Table 36: Ex post estimated net anthropogenic GHG emission reductions and VCUs.

c) Overview of data collection procedures.

Data collection procedures are the same as described in previous steps. This step involves compilation of data from previous procedures to calculate ex post net anthropogenic GHG emission reduction.

d) Quality control and quality assurance procedures.

A map showing Cumulative Areas Credited within the project area shall be updated and presented to VCS verifiers at each verification event. The cumulative area cannot generate additional VCUs in future periods.

e) Data archiving.

All maps and records generated during project implementation will be conserved and made available to VCS verifiers at verification for inspection to demonstrate that the AUD project activity has actually been implemented.

All documents and records will be kept in a secure retrievable manner for at least two years after the end of the project crediting period.

f) Organization and responsibilities of the parties involved in all the above.

All satellite imagery assessments will be performed by GEOWIKI. CARBONEXT is responsible for reporting and data archiving, according to VM0015, and for providing assistance during verification audits. The Project Proponent is co-responsible for data archiving.

4.3.4 Initial plan for selecting community and biodiversity variables to be monitored

Communities

a) Technical description of the monitoring tasks.

The farm already supports a company for harvest of Brazil-nuts, which is called “Castanhal Fortaleza”. The farm has established a kind of partnership with this company, by giving it free access to the forest for harvesting nuts. The families and communities involved in “Castanhal Fortaleza” business will receive additional benefits due to implementation of this Project Activity.

Among the proposed activities, the project proponent forecasts the organization of trainings focusing on sustainable cattle ranching. Furthermore, fire brigade teams will be trained, a biomass inventory will be set up, and new income opportunities will be created in the Municipalities of Lábrea and Porto Velho (both in terms of wood products and in terms of the sustainable exploitation of non-wood products, e.g. Brazil nuts).

b) Data to be collected.

i) Complementary monitoring of labor conditions (monthly internal audits for health and security assessments, nutrition aspects, personal care and hygiene etc.);

ii) Monitoring the attendance of young in schools;

iii) Number of workers trained for sustainable cattle ranching techniques;

iv) Number of workers trained for fire brigades;

v) Number of attendees in training on forest management;

vi) Number of people reached in dissemination of forest conservation practices;

vii) Commercial activity data from “Castanhal Fortaleza” company.

Table 40. Social parameters to be monitored: activities, scope, indicators, units, monitoring frequencies, goals, corrective actions after critical analyses

Activities dependent on the completion of the Validation process

Activity	Scope	Indicator	Unit	Monitoring Frequency	Goal	Corrective Actions after Critical Analyses
Training of fire brigades	Project Area	Attendance	Attendees per Year	5 years	All employees and 15 neighbors	Enhance partnership with teaching institutions; Improve dissemination and communication means; Revise conditions of local and time of sessions
Training on forest management	Project Area	Attendance	Attendees per Year	3 years	All employees and 15 neighbors	Enhance partnership with teaching institutions; Improve dissemination and communication means; Revise conditions of local and time of sessions
Health internal audits	Project Area	Coverage	% of Employees per Month	monthly	100	Improve supervisor attendance in the field; Increase the number of supervisors in the field
Security internal audits	Project Area	Coverage	% of Employees per Month	monthly	100	Improve supervisor attendance in the field; Increase the number of supervisors in the field
Advice on nutritional aspects	Project Area	Attendance	% of Employees per Two Months	2 months	100	Improve dissemination and communication means; Consult employees about conditions of local and time of sessions
Advice on personal care and hygiene	Project Area	Attendance	% of Employees per Two Months	2 months	100	Improve dissemination and communication means; Consult employees about conditions of local and time of sessions
Health insurance for workers	Project Area	Coverage	% of Covered Employees	monthly	100	Provide urgent health insurance to uncovered employees
Monitoring the attendance in schools	Project Area	Attendance	% of School Attendance by Employees' Sons	2 months	90	Strengthen orientation of parents (employees); Improve relationship with schools to incentive students; Provide additional incentive to students

Activities dependent on carbon credits sales

Activity	Scope	Indicator	Unit	Monitoring Frequency	Goal	Corrective Actions after Critical Analyses
Training on sustainable cattle raising	Regional	Attendance	Attendees per Year	yearly	15	Enhance partnership with teaching institutions; Improve dissemination and communication means; Revise conditions of local and time of sessions
Training on forest management	Regional	Attendance	Attendees per Year	yearly	15	Enhance partnership with teaching institutions; Improve dissemination and communication means; Revise conditions of local and time of sessions

c) Overview of data collection procedures.

Data collection procedures will consist of monthly internal audits involving field visits in operation sites, as well as interviews with workers and their families.

d) Quality control and quality assurance procedures.

All communication with workers and families will be registered in minutes of meeting, which might be signed by all parties involved.

Attestation of health plans and attendance in school should also be collected every 6 months.

Reports of internal audits should be produced monthly. These reports should clearly inform the results of variables involved in monitoring, by means of photos, interviews, and documents.

e) Data archiving.

All records generated during project implementation will be conserved and made available to VCS verifiers at verification for inspection to demonstrate that the AUD project activity has actually been implemented.

All documents and records will be kept in a secure retrievable manner for at least two years after the end of the project crediting period.

f) Organization and responsibilities of the parties involved in all the above.

The Project Proponent is responsible for the social aspects and labor conditions inside the Project Area.

Biodiversity

a) Technical description of the monitoring tasks.

The monitoring tasks aim to assess the effectiveness of measures used to maintain High Conservation Values to community well-being present in the project zone.

b) Data to be collected.

A survey on the occurrence of High Conservation Values in the Project Area will be carried out after the first verification period. This assessment will be monitored and reported every 5 years.

The studies will involve fauna and flora aspects in the Project Area, as well as evaluations of the relationship between High Conservation Values in the Project Area and local communities.

The biodiversity monitoring results will be inserted in the Sustainable Forest Management Plan for publication and dissemination to the communities and other stakeholders.

Table 41. Biodiversity parameters to be monitored: activities, scope, indicators, units, monitoring frequencies, goals, corrective actions after critical analyses

Activities dependent on the completion of the Validation process

Activity	Scope	Indicator	Unit	Monitoring Frequency	Goal	Corrective Actions after Critical Analyses
Training of fire brigades	Project Area	Attendance	Attendees per Year	5 years	All employees and 15 neighbors	Enhance partnership with teaching institutions; Improve dissemination and communication means; Revise conditions of local and time of sessions
Dissemination of forest conservation practices	Project Area	Attendance	% of Employees per Two Months	2 months	100	Improve supervisor attendance in the field; Increase the number of supervisors in the field

Activities dependent on carbon credits sales

Activity	Scope	Indicator	Unit	Monitoring Frequency	Goal	Corrective Actions after Critical Analyses
Biomass, fauna and flora inventory	Project Area	Carbon Stock	tCO_2 per hectare	5 years	Maintenance of carbon stocks	Increase in surveillance mechanisms; Develop conservation practices; Consult specialists; Revise exploitation procedures; Revise contingency procedures; Consider enrichment practices to improve biodiversity
		Endangered fauna species	Number of Endangered Species		Maintenance of number of fauna endangered species	
		Total fauna species	Number of Species		Maintenance of total number of fauna species	
		Endangered plant species	Number of Endangered Species		Maintenance of number of plant endangered species	
		Total plant species	Number of Species		Maintenance of total number of plant species	
Survey on High Conservation Value areas	Project Area	Attributes to be defined by Survey	% of Protection of High Conservation Value Attributes	5 years	100	Increase in surveillance mechanisms; Development of conservation practices; Consultation of specialists
Dissemination of forest conservation practices	Regional	Attendance	Attendees per Year	yearly	15	Enhance partnership with teaching institutions; Improve dissemination and communication means; Revise conditions of local and time of sessions

c) Overview of data collection procedures.

Data collection will be carried out by means of local studies on fauna, flora and High Conservation Value aspects. These studies will be planned and performed by a specialized outsourced company. Data collection procedures will be described in depth in the first biodiversity monitoring report to be issued after the first verification period.

d) Quality control and quality assurance procedures.

The quality control and quality assurance procedures will be determined by a specialized outsourced company. Quality control and quality assurance procedures will be described in depth in the first biodiversity monitoring report to be issued after the first verification period.

e) Data archiving.

All records generated during project implementation will be conserved and made available to VCS verifiers at verification for inspection to demonstrate that the AUD project activity has actually been implemented.

All documents and records will be kept in a secure retrievable manner for at least two years after the end of the project crediting period.

f) Organization and responsibilities of the parties involved in all the above.

The Project Proponent is responsible for the biodiversity assessments in this Project Activity. Fauna and flora assessments will be performed by a specialized outsourced company (to be defined).

4.3.5 Revisiting the baseline projections for future fixed baseline period

According to VM0015, the baseline will be revisited every 10 years. Thus, the first revision of the baseline is forecast by 2023. For this purpose, the following tasks will be carried out:

- Updating information on agents, drivers and underlying causes of deforestation, which involves the following sub-tasks:
    - Collecting information that is relevant to understand deforestation agents, drivers and underlying causes;
    - Redoing step 3 of the ex ante methodology;

- Recalibrating the model for projection of future deforestation, using new "Factor Maps" for the subsequent fixed baseline period.

- Adjusting the land-use and land-cover change component of the baseline, which involves reassessing the following components of the baseline projections:
    - The annual areas of baseline deforestation.
    - The location of baseline deforestation.
    - Adjustment of the annual areas of baseline deforestation.
    - Adjustment of the location of the projected baseline deforestation.
- Adjusting, as needed, the carbon component of the baseline (this task will only be carried out if more accurate methods for carbon stocks estimates are available in the occasion of baseline revision).

5 SAFEGUARDS

5.1 No Net Harm

The project activities do not cause any potential negative offsite stakeholder impacts. The project does not result in net negative impacts on the wellbeing of other stakeholder groups. A communication channel will be established for stakeholders to express their concerns and to solve eventual conflicts and grievances that arise during project planning and implementation. The project will involve several inclusion actions for the neighbouring communities – by means of a partnership to be established with Lábrea and Porto Velho (Nova Califórnia and Extrema districts) Municipal Administrations, in order to implement technical education programmes. These actions might be communicated by means of conventional media (i.e. telephone, internet, newspapers etc.). People from the local communities will be given priority in these opportunities.

Technical qualification, training in forest management, community development in the form of participative workshops may increase the collective understanding of climate change and the importance of the forest. This understanding is essential for each individual in the process of a collective transformation of cultural relations and of the lifestyle of the local community.

Among the proposed activities, the project proponent forecasts the organization of trainings focusing on sustainable cattle ranching, which intend to train workers to apply the knowledge for a sustainable meat production chain. Furthermore, fire brigade teams will be trained, a biomass inventory will be set up, and new income opportunities will be created in the Municipalities of Lábrea and Porto Velho (both in terms of wood products and in terms of the sustainable exploitation of non-wood products, e.g. Brazil nuts).

The farm already supports a company for harvest of Brazil-nuts, which is called “Castanhal Fortaleza”. The farm has established a kind of partnership with this company, by giving it free access to the forest for harvesting nuts. The families and communities involved in “Castanhal Fortaleza” business will receive additional benefits due to implementation of this Project Activity, as further described in this VCS-PD.

These activities will attenuate several work safety risks, in addition to improve well-being of local workers:

i) Complementary monitoring of labor conditions (monthly internal audits for health and security assessments, nutrition aspects, personal care and hygiene etc.). All situations and occupations that might arise through the implementation of the project and pose a substantial risk to worker safety will be comprehensively assessed.

ii) Monitoring the attendance of young in schools.

All relevant laws and regulations covering worker’s rights will be periodically informed to workers, as part of community development sessions in the form of participative workshops. These workshops and training sessions will also cover subjects related to health and security, in a manner to reduce risks during the field activities.

5.2 Environmental Impact

The net positive biodiversity impacts, provided by this Project Activity, are summarized as follows:

- Avoidance of deforestation of 5,391.6 hectares of the Amazon Biome over 30-years;
- Biomass inventory will be performed, as well as fauna and flora assessment;
- A survey on the occurrence of High Conservation Values in the Project Area will be carried out after the first verification period;
- Forest conservation practices will be disseminated as a means for increase value of standing forests.

The Project Proponent intends to implement a seedling production nursery with capacity of producing 50.000 native-specie seedlings per year, for donation for neighbors wishing to plant.

High Conservation Values related to biodiversity will not be negatively affected. This Project Activity does not forecast the implementation of planting activities using potentially invasive or exotic species.

The Project team guarantees that no genetically modified organisms (GMOs) will be used to generate GHG emissions reductions or removals.

Biodiversity in the Project Area: description of importance

According to the literature available, it is concluded that Biodiversity inside the Project Area is highly important. In 2007, the Brazilian Ministry of Environment has launched the official document that establishes priorities for sustainable land use and conservation[22]. Is this official document, the regions of Nova California, RESEX Ituxi and several other lands in the municipality of Lábrea have been pointed as being of "extremely high importance".

In 2012, the National Forest (FLONA) of "Iquiri" (neighbor at North of Project Area), in the municipality of Boca do Acre (AM), has publicized results of its first inventory of mammals[23]. The inventory registered 33 species of mammals, including four under extinction: jaguar ("*onça-pintada*"), nutria ("*ariranha*"), ant-bear ("*tamanduá-bandeira*"), and armadillo ("*tatu-canastra*").

According to researchers, the number of species can be regarded as high in relation to sampling adopted. The registration of these species attests the high level of integrity and environmental quality of the region.

Figure 27. Ant-bear ("*tamanduá-bandeira*"; *Myrmecophaga tridactyla*) Photo: Ricardo Sampaio

[22] MMA, 2007. "ÁREAS PRIORITÁRIAS PARA CONSERVAÇÃO, USO SUSTENTÁVEL E REPARTIÇÃO DE BENEFÍCIOS DA BIODIVERSIDADE BRASILEIRA; ATUALIZAÇÃO: Portaria MMA nº 9, de 23 de janeiro de 2007". Available at: http://www.mma.gov.br/estruturas/chm/_arquivos/biodiversidade31.pdf (visited in 22/02/2016)
[23] Available at: http://www.icmbio.gov.br/portal/comunicacao/noticias/4-geral/3209-flona-do-iquiri-faz-primeiro-inventario-de-mamiferos.html (visited in 22/02/2016)

Figure 28. Nutria ("*ariranha*"; *Pteronura brasiliensis*) Photo: Luiz Henrique Medeiros Borges

Andrade (2013)[24] reports that chelonians of the Ituxi River are strongly vulnerable to antropic action and to natural predators: these factors are leading some chelonian species to extinction, mainly due to hunting for commercialization of these animals and their eggs. In this context, any project activity that protects water bodies (including the Iquiri River in the case of this Project) might have positive effects on the population of local chelonians.

The most comprehensive study on biodiversity in the project region was publicized by Irgang (2012)[25]. Among several Conservation Units assessed by the authors, the National Forest (FLONA) of "Iquiri" is the closest to the Project Area. Regarding proximity between both areas, it might be considered that results of biodiversity inventories should be fairly similar between the Project Area and FLONA of "Iquiri". As observed in maps below, some of the highest values for indexes of biodiversity are found nearby the Project Area.

[24] Preservar para viver : a experiência da preservação de quelônios no Rio Ituxi em Lábrea (AM) / Roberta Amaral de Andrade, organizadora. – Brasília : IEB, 2013. 75 p. : il. ; 30 cm.

[25] Irgang, G. 2012. "Estudo e mapeamento das Unidades de Paisagem Natural, correlacionadas aos índices de diversidade biológica, ocorrências biológicas e riqueza específica de fauna e flora, para a elaboração dos planos de manejo das unidades de conservação federal do interflúvio dos rios Purus-Madeira (área sob influência da BR-319)". Instituto Chico Mendes de Conservação da Biodiversidade – ICMBio, 239 pp.

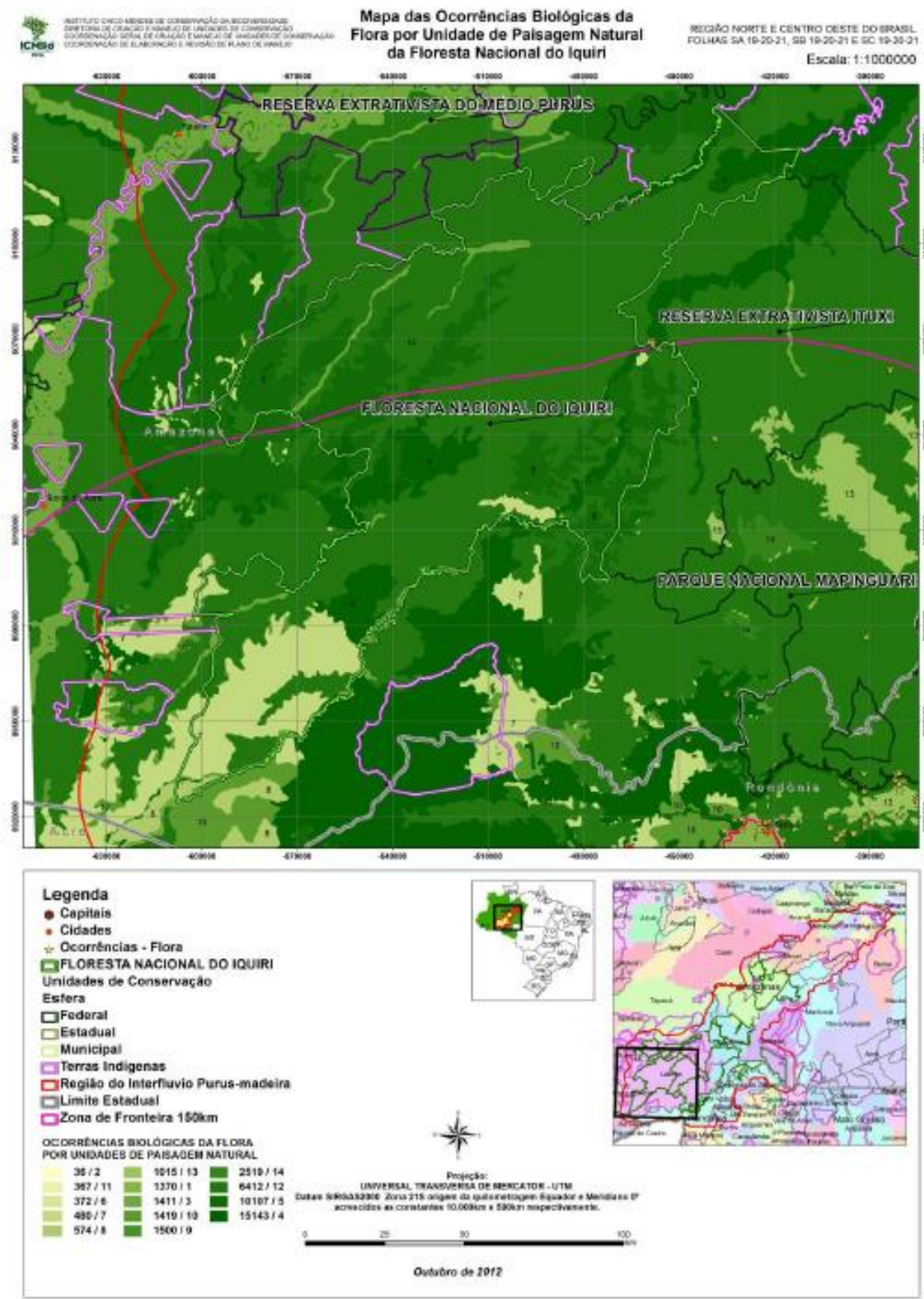


Figure 29. Map of biological occurrences in FLONA Iquiri (Flora). Source: Irgang (2012)

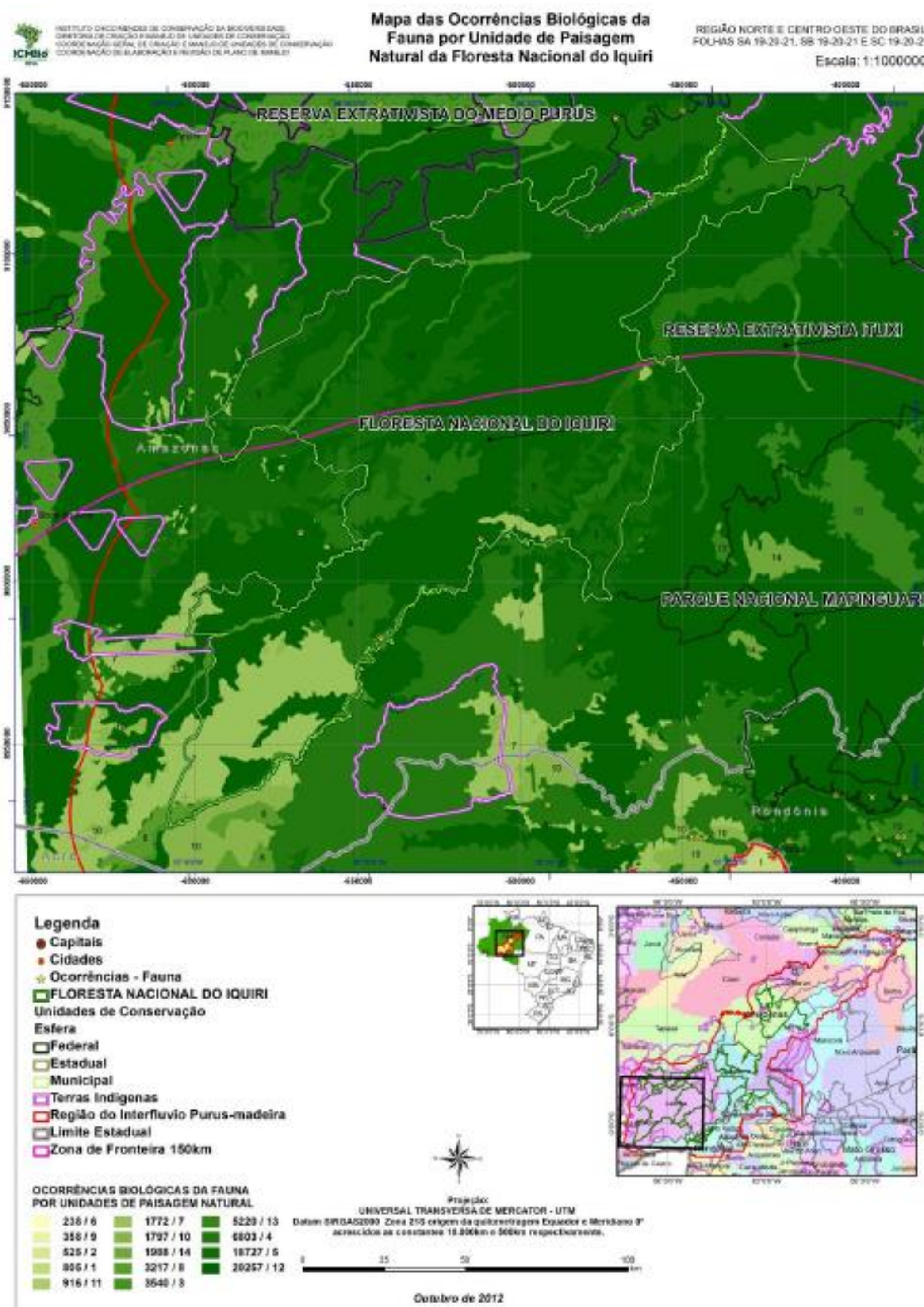


Figure 30. Map of biological occurrences in FLONA Iquiri (Fauna). Source: Irgang (2012)

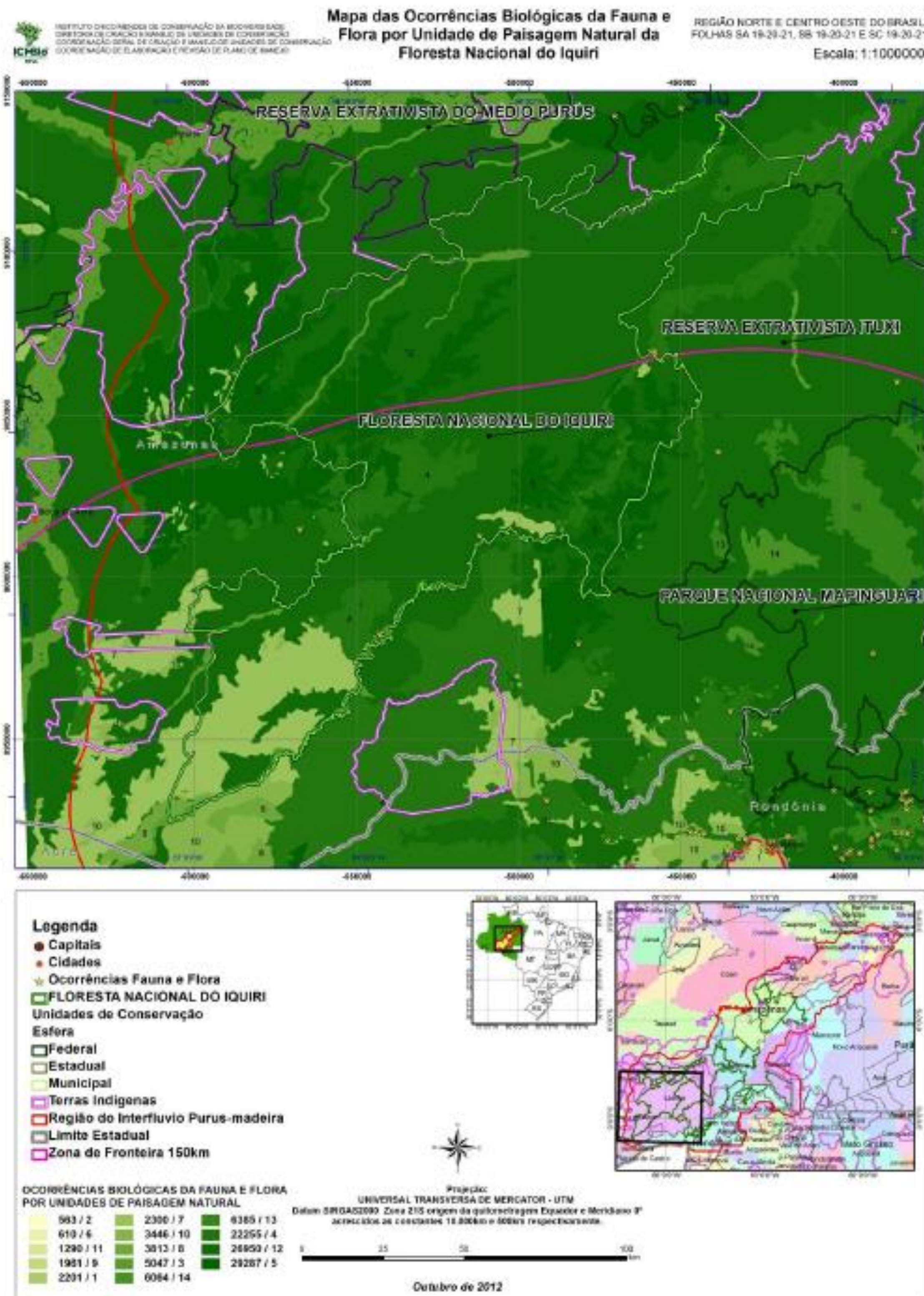


Figure 31. Map of biological occurrences in FLONA Iquiri (Fauna and Flora). Source: Irgang (2012)

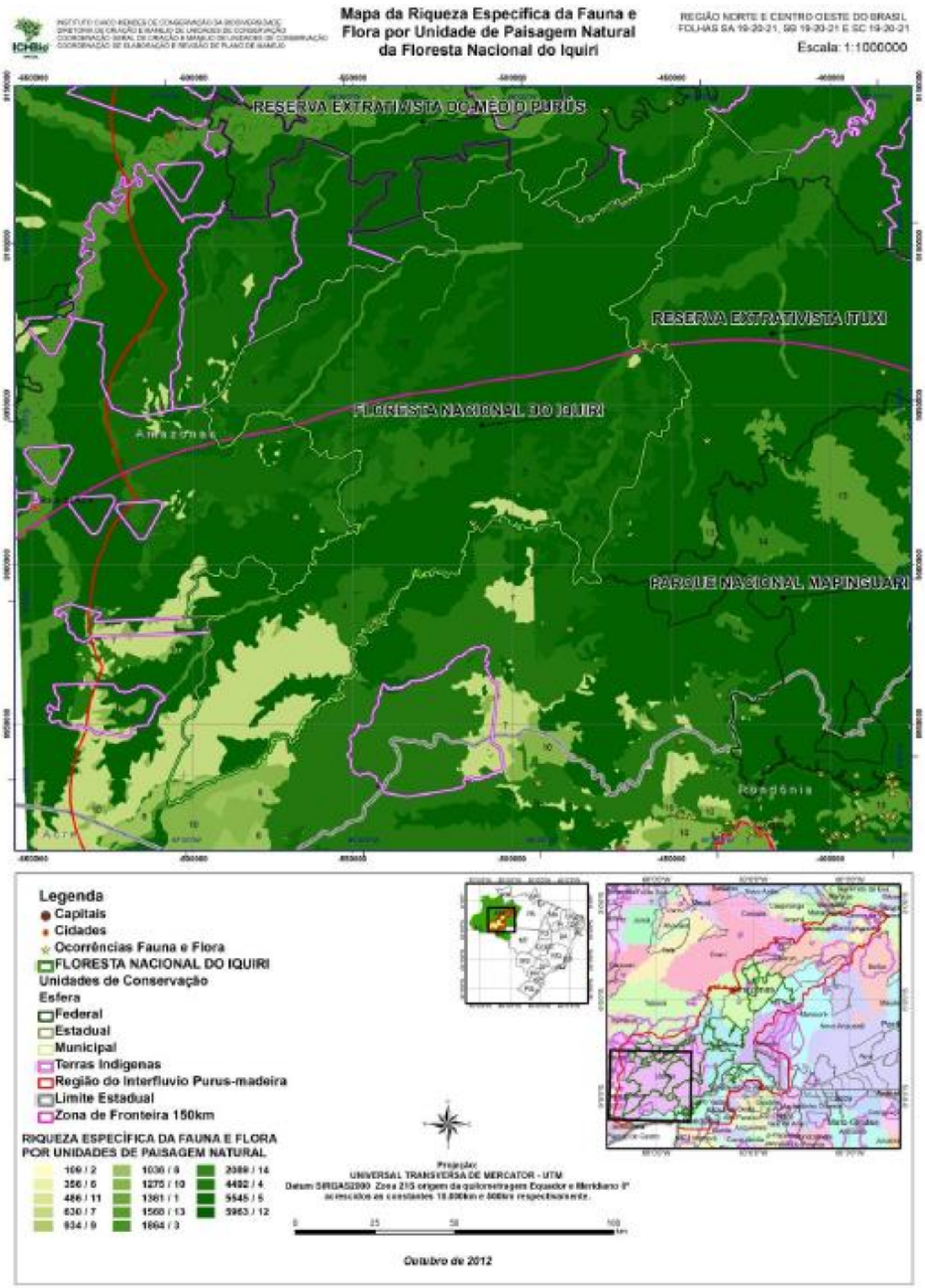


Figure 32. Map of specific richness in FLONA Iquiri (Fauna and Flora). Source: Irgang (2012)

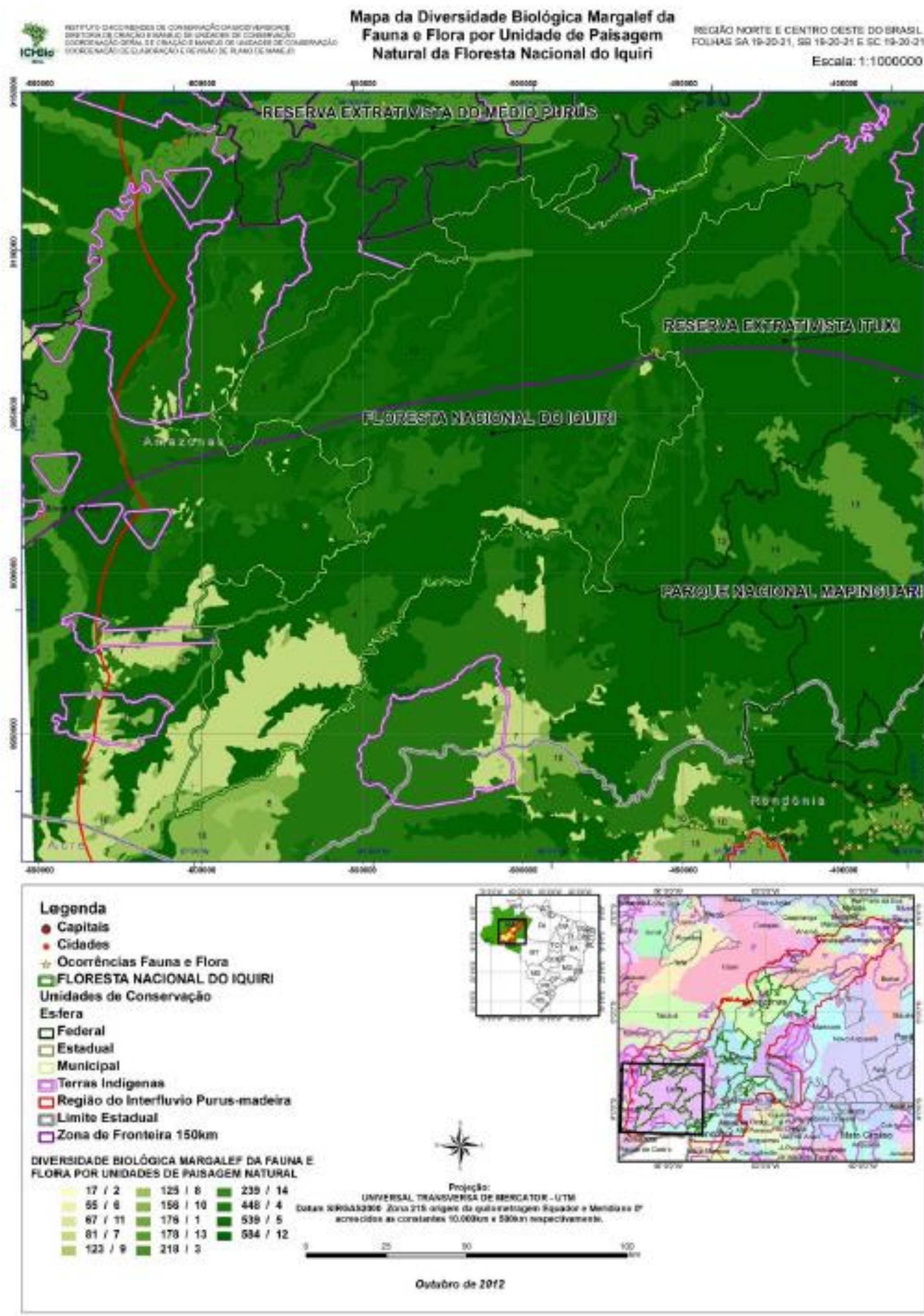


Figure 33. Map of “Margalef biodiversity” in FLONA Iquiri (Fauna and Flora). Source: Irgang (2012)

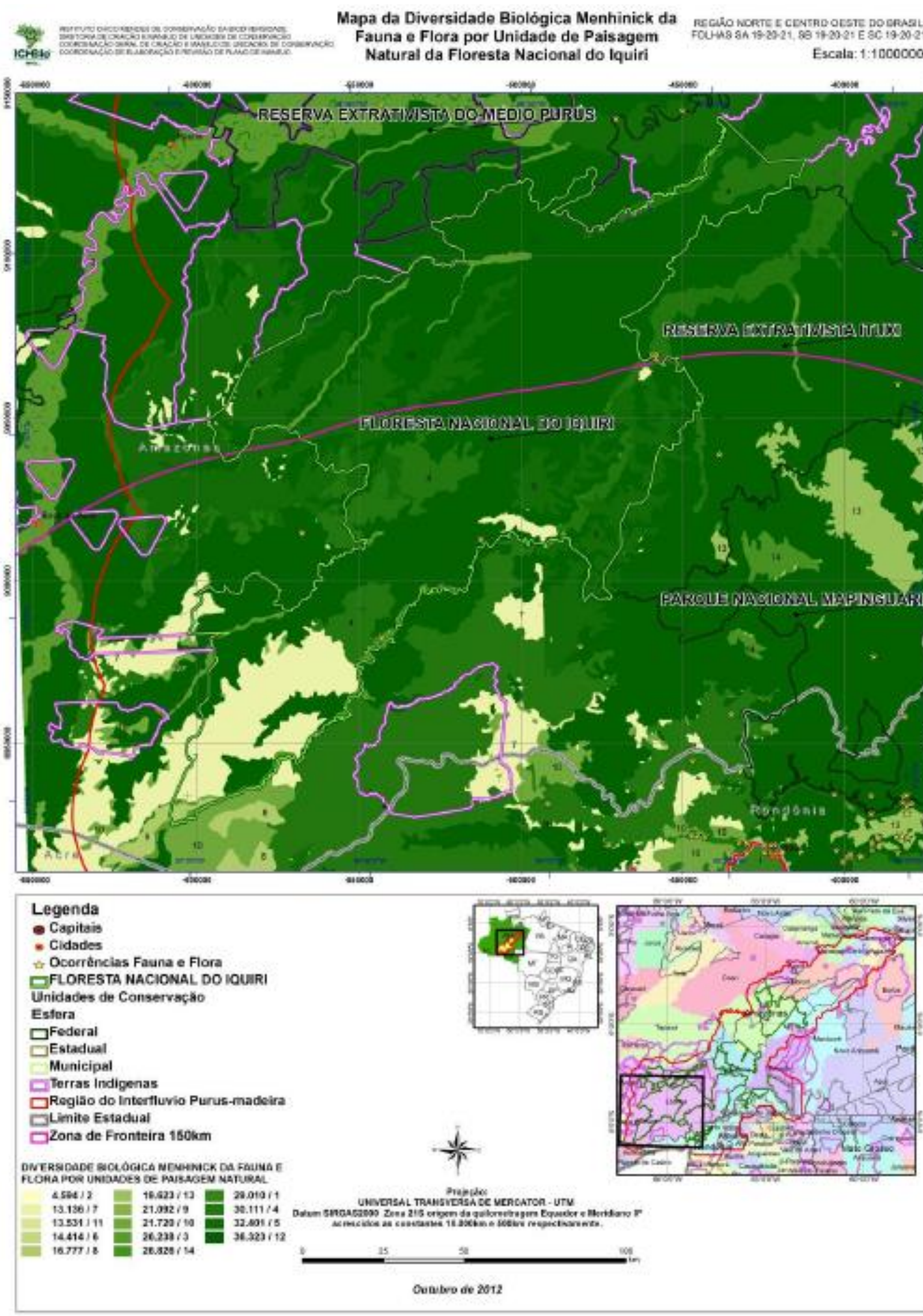


Figure 34. Map of "Menhinick biodiversity" in FLONA Iquiri (Fauna and Flora). Source: Irgang (2012)

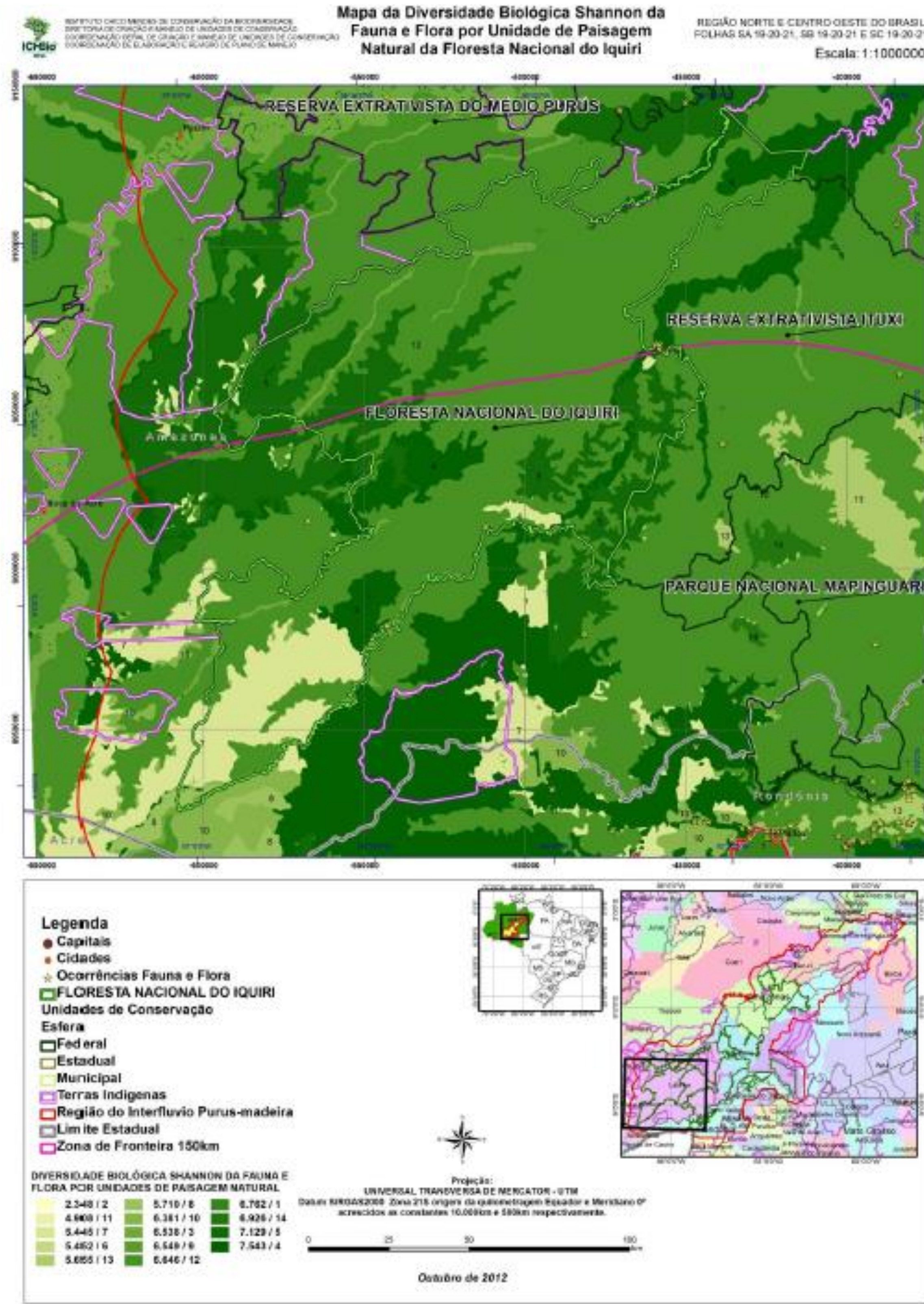


Figure 35. Map of "Shannon biodiversity" in FLONA Iquiri (Fauna and Flora). Source: Irgang (2012)

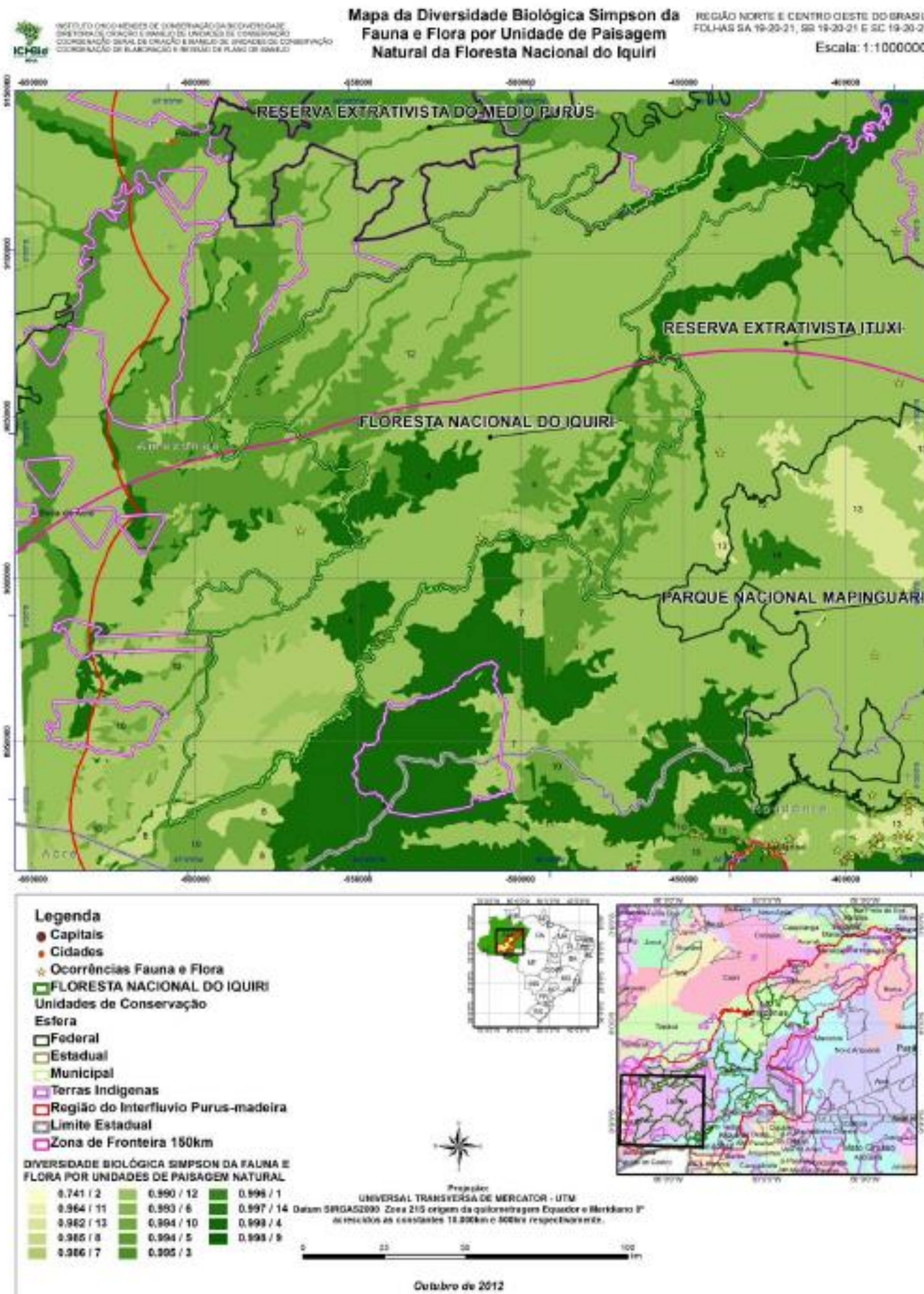


Figure 36. Map of “Simpson biodiversity” in FLONA Iquiri (Fauna and Flora). Source: Irgang (2012)

In the baseline scenario, the deforestation inside the Project Area is expected to reach 5,391.6 hectares for the next 30-years. The project activity foresees the avoidance of this deforestation, with consequent preservation of biodiversity and carbon stocks.

Monitoring of biodiversity

This project activity foresees the development and implementation of a monitoring plan to identify biodiversity variables inside the Project Area. This monitoring program can only be implemented after the first verification period, due to high costs involved in this operation. It is expected that this monitoring activity will be performed every 5 years. All biodiversity data obtained inside the Project Area will be shared with Conservation Units, competent public entities, and research / teaching institutes.

The biodiversity monitoring results will be compared with those obtained in neighboring Conservation Units, in order to establish the causal effects of this Project Activity. For validation of this PD, the Project Proponent and Project Developers have opted to use data available from Conservation Units of the region to assess biodiversity inside the Project Area. However, the establishment of local High Conservation Values will only be possible with a local assessment involving local data collection, which is foreseen to be carried out after the first verification period, using funds obtained from the commercialization of carbon credits.

Negative Offsite Biodiversity Impacts

The project is not likely to cause any potential negative offsite biodiversity impacts, as all activities are aimed at conserving biodiversity and carbon stocks.

The project activity has a procedure for identifying, classifying and managing all waste products resulting from project activities. The Project Area involves two main extractive activities: i) timber management; ii) Brazil-nut management. These activities generate the following types of waste:

- Residues of mechanized timber harvest: lubricants, fuels, filters, rubber hoses, used tires etc.

- Living areas for workers: paper, plastics, glass, metals, and organic residues.

All recyclable waste must be separated in identified brackets, in order to facilitate destination to recycling mills.

Hazardous wastes (e.g. lubricants, contaminated roses, filters etc.) will be stored in the field in particular structures with impermeable base, to avoid soil contamination, while waiting for final disposal. Machines must be equipped with containment kits (canvas, shovel and brackets). In case of leaks from tractors or implements, a containment canvas must be used to immediately protect the soil against contamination. In case of soil contamination, the contaminated portion must be collected with a shovel and stored in impermeable containers for final disposal.

The disposed waste must be registered in terms of volume or mass and name of the company responsible for transportation, processing and/or final disposal. These companies must present valid Licenses of Operation, and must be in compliance with local legislation on waste management.

5.3 Local Stakeholder Consultation

According to database surveys and the structure of activities foreseen in the project, the following list of stakeholders has been established:

- Lábrea City Hall

- Porto Velho City Hall (districts of Nova Califórnia and Extrema)

- Municipal Secretariat of Education of Lábrea

- Municipal Secretariat of Education of Porto Velho (districts of Nova Califórnia and Extrema)

- SEMA - AM (Amazonas State Secretariat of Environment)

- Extractive Reserve (RESEX) of “Ituxi”

- Extractive Reserve (RESEX) of “Médio Purus”

- National Forest (FLONA) of “Iquiri”

- National Park (PARNA) of “Mapinguari”

- Community leaders of Kaxarari Indigenous Land

- “Castanhal Fortaleza” company

- IFAM (Federal Institute of Science and Technology; Campus Lábrea)

The full project documentation has been made accessible to Communities and Other Stakeholders. The summary project documentation has been actively disseminated to Communities in Portuguese by mail and internet. A communication channel has been established with Communities and Other Stakeholders to better explain the project activities and to respond to stakeholders’ doubts and concerns related to the project.

The project proponent understands that stakeholders want and need to be involved in project design, implementation, monitoring and evaluation throughout the project lifetime. Therefore, a communication channel will be established for stakeholders to continually express their concerns and to solve eventual conflicts and grievances that arise during project planning, implementation and monitoring. It is expected that this communication channel will be a mechanism to ensure that the project proponent and all other entities involved in project design and implementation are not involved in or complicit in any form of discrimination or sexual harassment with respect to the project. All denouncements will be available to stakeholders and auditors. In case of conflicts, the project proponent and stakeholders will be free to propose and take any appropriate corrective action. This is the formalized grievance redress procedure that will be used throughout the project lifetime to address disputes with stakeholders, which may arise during project planning and implementation.

The process for receiving, hearing, responding to and attempting to resolve Grievances will be performed within a reasonable time period. It is expected that each grievance is responded in a delay of 7 days, proposing and/or taking corrective actions. This Feedback and Grievance Redress Procedure has three stages:

First: the Project Proponent shall attempt to amicably resolve all Grievances, and provide a written response to the Grievances in a manner that is culturally appropriate. (Action must be taken in 7 days)

Second: any Grievances that are not resolved by amicable negotiations shall be referred to mediation by a neutral third party. (Action must be taken in 30 days)

Third: any Grievances that are not resolved through mediation shall be referred either to a) arbitration, to the extent allowed by the laws of the relevant jurisdiction or b) competent courts in the relevant jurisdiction, without prejudice to a party's ability to submit the Grievance to a competent supranational adjudicatory body, if any. (The time to accomplish this stage is dependent on local jurisdiction delays.)

Process of stakeholder identification and analysis used to identify Communities and Other Stakeholders

Traditional communities

Aiming at locating the traditional communities and also the social movements and conflicts occurring in the project region, the "Project New Social Cartography of the Amazon", series "Social Movements, Collective Identity and Conflicts" [26,27] has been consulted. These studies

[26] Nova Cartografia Social da Amazônia: Comunidade extrativista da Resex de Ituxi lutando por uma vida melhor- Lábrea, Amazonas / coordenador, Alfredo Wagner Berno de Almeida ; autores, Mason Mathews, Thereza Menezes . – Lábrea, AM / Projeto Nova Cartografia Social da Amazônia / UEA Edições, 2009. 12 p. : il. ; 25 cm. (Movimentos Sociais Identidade Coletiva e Conflitos ; 33). ISBN 978-85-7883-075-5. 1. Comunidade Extrativista – Lábrea (AM) I. Almeida, Alfredo Wagner Berno de. II. Mathews, Mason, III. Meneses Thereza. IV. Série. Available at: http://novacartografiasocial.com/ (visited in 19/02/2016)

[27] Nova Cartografia Social da Amazônia : Povos indígenas do município de Lábrea, AM : lutando por nossas terras / coordenação do projeto Alfredo Wagner Berno de Almeida ; coordenação de pesquisa Ana Carla Bruno, Thereza Cristina Cardoso Menezes. – Manaus : UEA Edições, 2013. 12 p.: il. color.; 25 cm.– Movimentos sociais, identidade coletiva e conflitos; 43. ISBN 978-85-7883-242-1. 1. Conflitos sociais. 2. Organizações sociais. 3. Índios – Lábrea (AM). 4. Movimentos sociais. 5. Cartografia. I. Almeida, Alfredo Wagner Berno de. II. Bruno, Ana Carla. III.

regard the “Extractive Communities of the Resex Ituxi” and the “Indigenous peoples of the municipality of Lábrea”, as the main elements of the social scenario of the region. Based on this evaluation, it can be concluded that these social elements have potential for consideration as stakeholders.

“Quilombola” communities

The survey on “quilombola” (African) communities was performed for the State of Amazonas. According to SEPPIR (Secretariat of Policies for Promotion of Racial Equality; *Secretaria de Políticas de Promoção da Igualdade Racial*)[28] database, the State has six “quilombola” communities officially recognized. The studies have shown that none of these communities is located in a geographic position that could be directly affected by the project activities.

Indigenous lands

For mapping the indigenous lands that could be impacted by the project activities, the cartographic database from IBGE (indigenous maps)[29] has been consulted. As shown in the table below, considering the portions North and West from the Project Area, the indigenous village called “Vinhas” is the closest, located at 81 km in straight line from the closest point of the Project Area. Thus, it can be inferred that the project activities might have only discrete effects on these indigenous communities, considering that the Project Area is relatively distant from interactions with these communities.

Indigenous Village	Distance (km)
Vinhas	81
Alto Sapatine	84
Três Bocas	92
São Pedro	94
Kamicuã	108
Morada	109
Maeriene	117
Kanacuri	122

Straight-line distances between indigenous villages and the Project Area

However, the portion at the South is home to Indigenous Kaxarari, which has a regularized area of 145,889.98 hectares near the Project Area. According to the assessment made, it is

Menezes, Thereza Cristina Cardoso. IV. Série. Available at: http://novacartografiasocial.com/ (visited in 19/02/2016)

[28] Available at: http://monitoramento.seppir.gov.br/ (visited in 19/02/2016)

[29] Available at: http://indigenas.ibge.gov.br/mapas-indigenas-2.html (visited in 19/02/2016)

considered that this indigenous land may be affected by the project activity. This indigenous land has been facing deforestation pressures, as recently reported by the media[30].

Other stakeholders

The project activities will require direct interaction with some public entities, as well as partnerships with research and teaching institutions. Thus, the process of stakeholder identification comprised all entities that will be associated directly or indirectly to the activities foreseen in this project.

As a complement, a survey was carried out to map the Conservation Units and rural settlements located nearby the Project Area.

Location Map of Communities

The following maps indicate the social movements currently active, as well as the location of communities and Conservation Units in the project region. According to "Project New Social Cartography of the Amazon", series "Social Movements, Collective Identity and Conflicts", the most relevant social movements in the project region are "Extractive Communities of the Resex Ituxi" (number 33 in the Brazilian map below) and the "Indigenous peoples of the municipality of Lábrea" (number 43 in the Brazilian map below).

Concerning the indigenous lands, eight indigenous villages were mapped in the project region (IBGE data), as indicated in the Google Earth map below. As previously stated, the direct impact of this project activity on regional indigenous lands is considered to be very feeble, given that the closest indigenous village is located at a distance of 81 km from the Project Area.

A land-use survey has also been carried out to the project region, mapping conservation units, settlements, indigenous lands and private lands. The closest conservation units to the Project Area are the Extractive Reserve (RESEX) of "Ituxi", the Extractive Reserve (RESEX) of "Médio Purus", the National Forest (FLONA) of "Iquiri" and the National Park (PARNA) of "Mapinguari". The management staffs of these conservation units are being contacted to publicize this project, and to exchange data on local fauna, flora and forest biomass stock.

[30] Available at: http://www.rondoniaovivo.com/interior/distrito-de-vista-alegre-do-abuna/noticia/exclusivo-madeireiros-retornam-para-t-i-kaxarari-apos-operacao-toruk/129839 (visited in 19/07/2017)

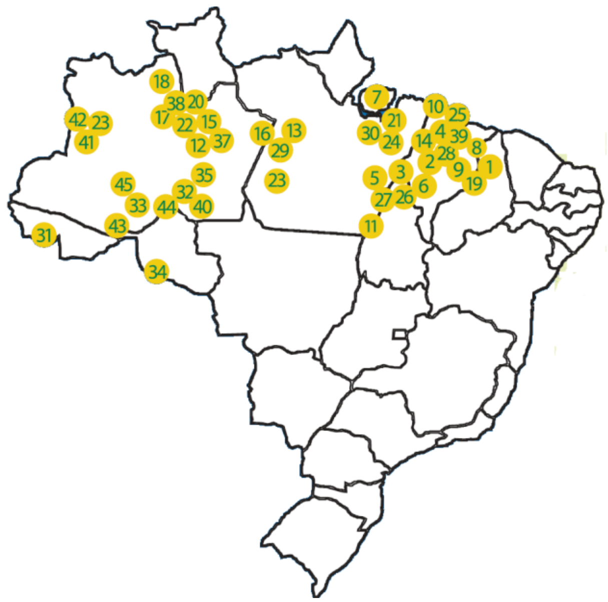


Figure 37. "New Social Cartography of the Amazon", "Social Movements, Collective Identity and Conflicts": 33 - "Extractive Communities of the Resex Ituxi"; 43 - "Indigenous peoples of the municipality of Lábrea"

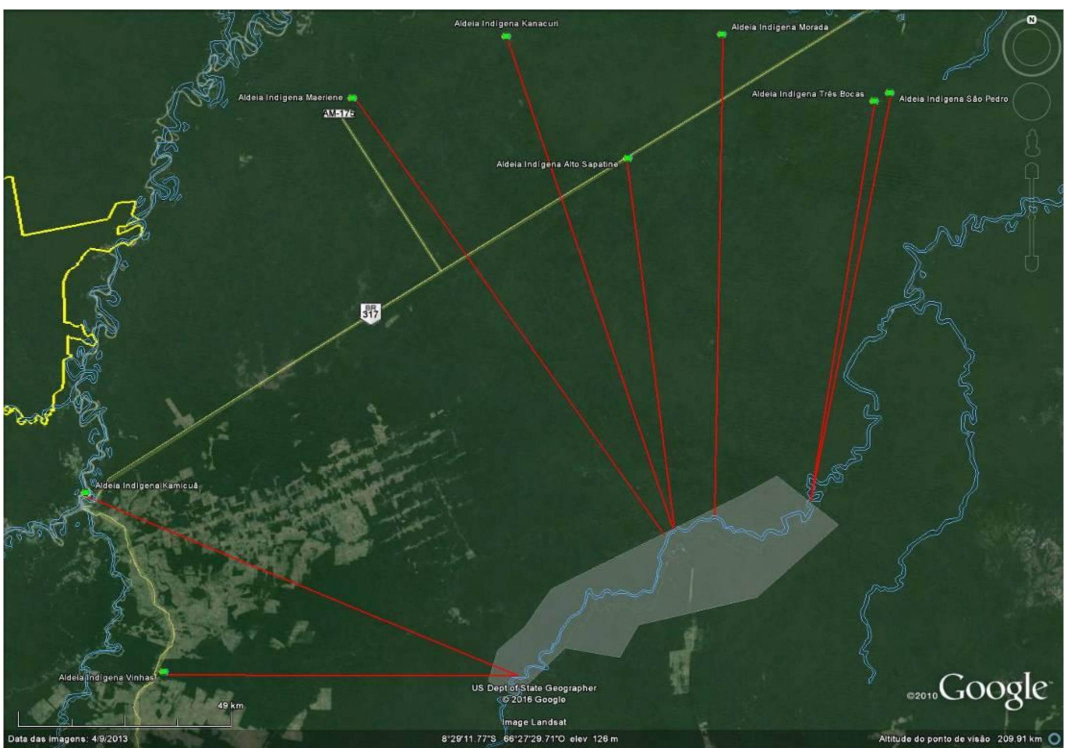


Figure 38. Location of indigenous villages in the project region

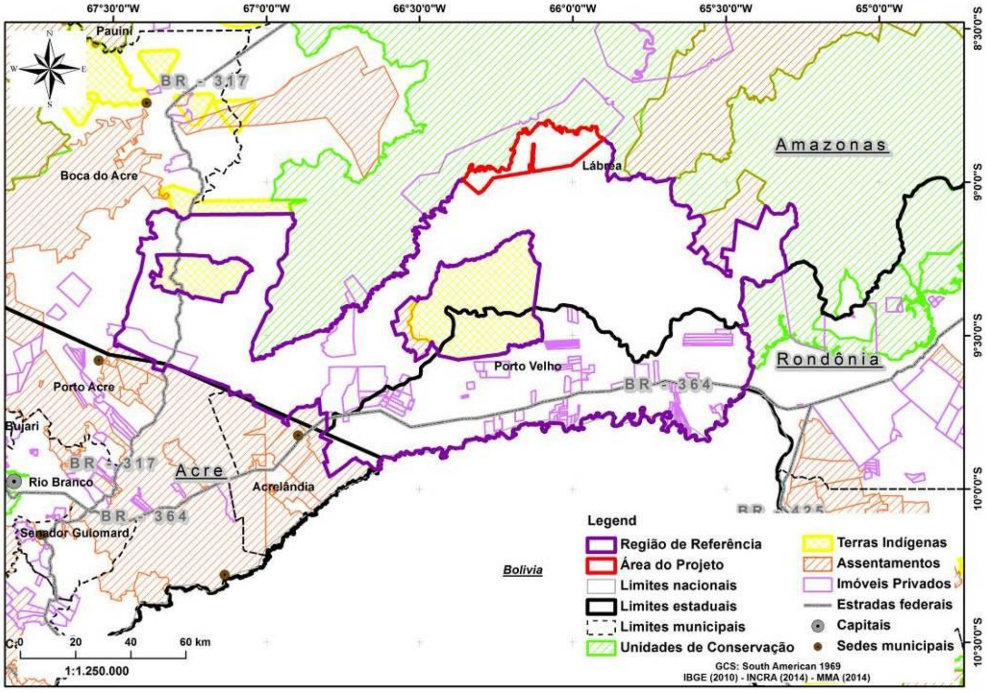


Figure 39. Land use map in the project region, indicating Conservation Units, settlements, indigenous lands (including Kaxarari land) and private lands

5.4 Public Comments

The "Nossa Senhora das Cachoeiras do Rio Ituxi" Farm has been submitted to the creation of a federal conservation unit (*Floresta Nacional*; National Forest) at the north of Iquiri River. The project proponent, landowner, started a judicial process to recover the rights of land use, having succeeded, according to documentation available for consultation. Nevertheless, the proponent has decided to keep this area out of the project scope, to avoid problems related to project non-permanence.

The ICMBio (Instituto Chico Mendes de Conservação da Biodiversidade) has manifested concerns about the location of the project activity, as the farm holds a portion of Iquiri National Forest (FLONA). The project proponent provided explanations on the project, as well as the full project for consultation. In the occasion, the project proponent elucidated that the Project Area has been located outside the FLONA area, and no negative impact is expected to occur in relation to the activities of this federal conservation unit.

APPENDIX 1: NON-PERMANENCE RISK REPORT FORTALEZA ITUXI REDD PROJECT

NON-PERMANENCE RISK REPORT FORTALEZA ITUXI REDD PROJECT

Document Prepared By Carbonext

Contact Information: Janaína Dallan - janaina@carbonext.com.br

Project Title	Fortaleza Ituxi REDD Project
Version	3.0
Date of Issue	06-June-2018
Project ID	n/a
Monitoring Period	n/a
Prepared By	CARBONEXT
Contact	Rua Iguatemi, 252 cj 62, Sao Paulo – SP, Brazil; 55 11 2339 6931, janaina@carbonext.com.br, www.carbonext.com.br

INTERNAL RISK

Project Management		
Risk Factor	Risk Factor and/or Mitigation Description	Risk Rating
a)	Not applicable: the project does not involve plantations.	0
b)	Not applicable: GHG credits have not been previously issued.	0
c)	Management team includes individuals with significant experience in all skills necessary to successfully undertake all project activities.	0
d)	Management team maintains a presence in the country and is located less than a day of travel from the project site, considering all parcels or polygons in the project area.	0
e)	Mitigation: Management team includes individuals with experience in AFOLU project design and implementation, carbon accounting and reporting under the VCS Program or other approved GHG programs. The Management team is composed among others by some experienced people in the field of Carbon Markets and forestry. CARBONEXT has prepared the Monitoring Plan and Guidelines for the Management Team to follow during the implementation of the project. This will serve as a framework to be followed by the Project Proponent's technical team throughout the project period. The technical aspects of the Project Activity will be supported by the following team: **Janaina Dallan MBA.-** Carbon markets specialist. Working in the coordination of projects related to sustainability strategy and projects to the Clean Development Mechanism. Part of the UNFCCC Registration and Issuance Team as an Expert. Has a Bachelor degree in Forestry Engineer and a Masters in Business of the environment. Carbon markets specialist based in São Paulo working specifically in the carbon credit development department being responsible of managing the Brazilian projects and participating as a reviewer of projects in other countries, was part of the international Carbon Assets Team of Ecofys. Working with Carbon Market issues since 2002 when she worked with the Center for Advanced Studies on Applied Economics at the University of São Paulo while participating in two projects directed by the Ministry of the Environment. Ms. Dallan later managed CDM projects and Carbon market activities at the company Golder Associates São Paulo and provided support to other Golder offices throughout Latin American countries and North America. She has also worked as a Carbon Markets consultant for an Energy company being responsible for the implementation of the CDM department including staff training, project advisor and staff coordination. **Luiz Fernando de Moura.** – Forestry Engineer, M.Sc. and Ph.D. in Wood technology by the Université Laval (Quebec, Canadá). He is responsible to coordinate the technical group at PLANT Environmental Intelligence, working with projects for the Carbon Markets including Forestry projects. Dr. de Moura had participation in the preparation of "Energia Verde Carbonization Project - Mitigation of Methane Emissions in the Charcoal Production of Grupo Queiroz Galvão,	-2

	Maranhão, Brazil", registered on March 21, 2011. Complete CVs are available to auditors. Based on team expertise, the Project Proponent and Project Developers have the unconditional, undisputed and unencumbered ability to claim that the project can generate climate, community and biodiversity benefits.	
f)	Mitigation: Adaptative management plan in place Management plan includes strategic bases in place equipped with mobile phone and motorcycle. The plan is aimed at restricting invasions and risks of fire. (File: "Proced_Fortaleza_Ituxi P-02 Controle Patrimonial da Fazenda e Controle e Combate a Incendio Final para validaáao do grupo 20_02_2012.doc")	-2
Total Project Management (PM) [as applicable, (a + b + c + d + e + f)] Total may be less than zero.		**-4**

Financial Viability		
Risk Factor	Risk Factor and/or Mitigation Description	Risk Rating
a)	This is not the case in the present project.	0
b)	This is not the case in the present project.	0
c)	This is not the case in the present project.	0
d)	Project cash flow breakeven point is less than 4 years from the current risk assessment. Financial spreadsheet available to auditors. Financial healthy evidence is available to auditors. The Project Proponent and any of the other entities involved in project design and implementation are not involved in or are not complicit in any form of corruption, such as bribery, embezzlement, fraud, favoritism, cronyism, nepotism, extortion, and collusion. Official documentation on Project Proponent and Project Developers' suitability is available to the auditors (e.g. Negative Certificates of Legal Disputes or Debts).	0

	PROJECT WITH FOREST MANAGEMENT WITH VCUs				PROJECT WITHOUT FOREST MANAGEMENT WITH VCUs			
	Annual net revenue (R$)	IRR (%)	NPV (R$)	Break Even	Annual net revenue (R$)	TIR (%)	NPV (R$)	Break Even
SCENARIO WITH R$ 2,00 PER VCU	-1,653,866	N/A	-9,344,710.78		-153,943	-62	-869,815	
SCENARIO WITH R$ 5,00 PER VCU	-1,513,981	N/A	-8,554,329.90		-14,059	-6	-79,434	
SCENARIO WITH R$ 10,00 PER VCU	-1,280,839	N/A	-7,237,028.44		219,083	89	1,237,868	*****
SCENARIO WITH R$ 15,00 PER VCU	-1,047,698	N/A	-5,919,726.97		452,224	183	2,555,169	
SCENARIO WITH R$ 20,00 PER VCU	-814,556	N/A	-4,602,425.50		685,366	277	3,872,471	
SCENARIO WITH R$ 25,00 PER VCU	-581,415	N/A	-3,285,124.03		918,507	372	5,189,772	
SCENARIO WITH R$ 35,00 PER VCU	-115,132	N/A	-650,521.10		1,384,790	560	7,824,375	
SCENARIO WITH R$ 40,00 PER VCU	118,010	4	666,780.37	*****	1,617,932	655	9,141,677	

The financial analysis indicates the following aspects about the financial security of this project activity: 1) the "break even" is linked to the VCU prices, and can be reached in the first year and 2) the project proponent can cease forest management activities at any time, keeping only the surveillance on the Project Area, in a manner that VCUs can be sold at lower prices, in case of a temporary breakdown in the forest management system.

e)	This is not the case in the present project.	0
f)	This is not the case in the present project.	0
g)	This is not the case in the present project.	0
h)	Project has secured 80% or more of funding needed to cover the total cash out before the project reaches breakeven. The proponent has independent wealth and alternative means to generate income from his property. This will provide a buffer if the carbon market performs poorly. Risk of technical failure Very low, as the project has limited technical requirements from this point. No advancements in technologies or maintenance of technical systems are required for the project's success.	0
i)	This is not the case in the present project.	0
Total Financial Viability (FV) [as applicable, ((a, b, c or d) + (e, f, g or h) + i)] Total may not be less than zero.		**0**

Opportunity Cost		
Risk Factor	Risk Factor and/or Mitigation Description	Risk Rating
a)	This is not the case in the present project.	0
b)	This is not the case in the present project.	0
c)	This is not the case in the present project.	0
d)	"NPV from the most profitable alternative land use activity is expected to be between 20% more than and up to 20% less than from project activities": The NPV calculated for the Project Area is R$ 14.31 / hectare at the break even	0

	VCU price. This NPV, based on a discount rate of 12%, is comparable to that observed for the BAU activity (i.e. pasture). For pasture activity, SCHNEIDER et al. (2000) reports negative NPV for a discount rate of 6 %, based on data presented in Table 7, page 44. Thus, for the discount rate adopted for comparisons in this analysis (12%), the NPV of pasture would be even more negative. In the context explained above, it is concluded that the NPV from the most profitable alternative land use activity is expected to be between 20% more than and up to 20% less than from project activities. Pasture NPV information source: SCHNEIDER et al. Amazônia Sustentável: limitantes e oportunidades para o desenvolvimento rural. Brasília: World Bank; Belém: Imazon, 2000. 58 pp.	
e)	This is not the case in the present project.	0
f)	This is not the case in the present project.	0
g)	This is not the case in the present project.	0
h)	This is not the case in the present project.	0
i)	This is not the case in the present project.	0
Total Opportunity Cost (OC) [as applicable, (a, b, c, d, e or f) + (g + h or i)] Total may not be less than 0.		**0**

Project Longevity		
a)	This is not the case in the present project.	0
b)	With legal agreement to continue the management practice. As demonstrated in the PD, the project proponent detains the second biggest Operation License approved in the State of Amazonas. This license allows the landowner to harvest wood logs at left and right sides of Ituxi River. This constitutes a legal agreement to continue the management practice. Additionally, the Legal Reserve (LR) (80% of the property) is registered in property deed in the Real Estate Registry Office: its location is publicly known. Brazilian Forest Code determines that, once allocated, LR may not be changed even in cases of real estate transfer, land dismembering or area rectification.	30 - (30/2) = 15
Total Project Longevity (PL) May not be less than zero		**15**

Internal Risk	
Total Internal Risk (PM + FV + OC + PL) Total may not be less than zero.	**11**

EXTERNAL RISKS

Land Tenure and Resource Access/Impacts		
Risk Factor	Risk Factor and/or Mitigation Description	Risk Rating
a)	Ownership and resource / use rights are held by the same entity(s). Ricardo Stoppe Junior is the only owner of the property and it holds all the legal rights, including rights for using property resources. Ownership documentation is available to auditors.	0
b)	This is not the case in the present project.	0
c)	This is not the case in the present project.	0
d)	There exist disputes over access/use rights (or overlapping rights)	5
e)	This is not applicable to the present project.	0
f)	Project area is protected by legally binding commitment (protected area) to continue management practices that protect carbon stocks over the length of the project crediting period. According to Real State documentation, the landowner has to conserve 80% of the forest. The forest management activities can be considered as a way to conservation and they must continue over the length of the project crediting period. Although there is a general non-compliance observed for this legislation aspect, the Brazilian Forest Code foresees the conservation of 80% of the land as Legal Reserve.	-2
g)	Documented evidence is provided that the project has implemented activities to resolve the disputes or clarify overlapping claims. In regard to disputes with Brazilian Government on the establishment of a Conservation Unit on the Northern portion of the farm, the project proponent has earned a favorable legal opinion towards his property rights.	-2
Total Land Tenure (LT) [as applicable, ((a or b) + c + d + e + f + g)] Total may not be less than zero.		**1**

Community Engagement		
Risk Factor	Risk Factor and/or Mitigation Description	Risk Rating
a)	This is not the case in the present project: there are no households living within the project area.	0
b)	Less than 20 percent of households living within 20 km of the project boundary outside the project area, and who are reliant on the project area, have been consulted. Given the lack of a more complex and detailed analysis on this topic, the project proponent attributed the maximum score for this item. The landowner has informed the farm workers about the project and about its	5

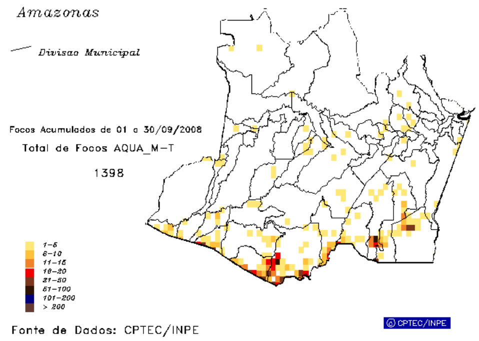
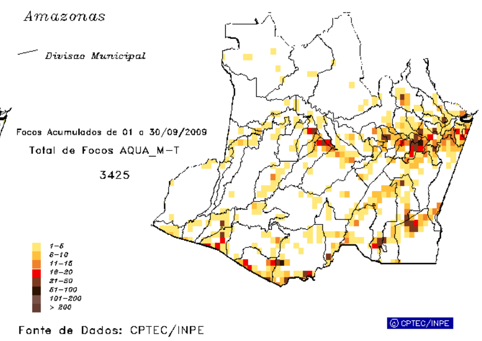
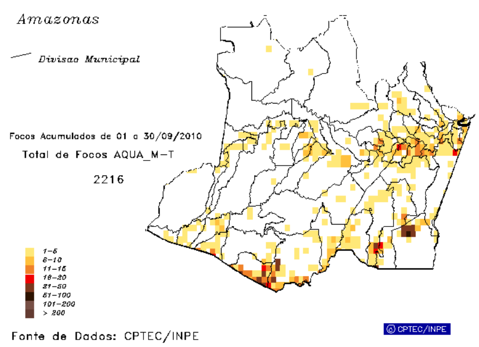
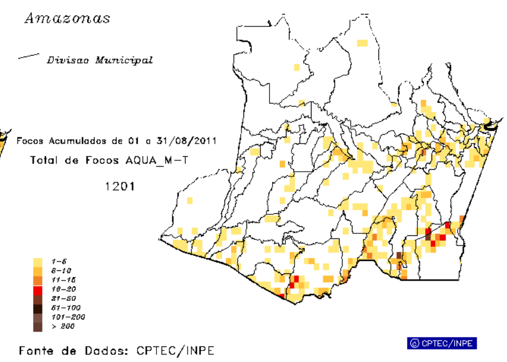
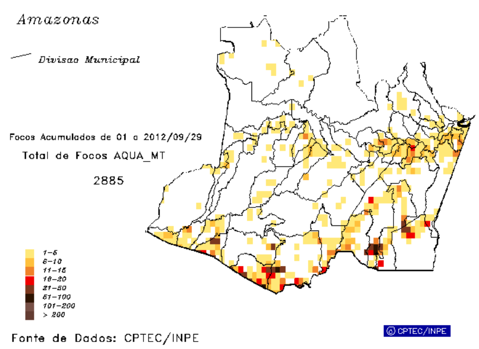
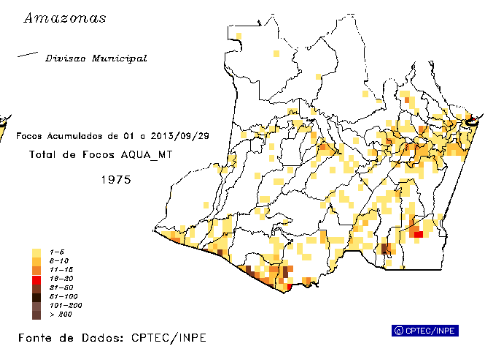
	relevant importance to keep the forest, jobs, natural resources etc.	
c)	The mitigation measures foreseen have not been implemented.	0
Total Community Engagement (CE) [where applicable, (a + b + c)] Total may be less than zero.		**5**

Political Risk		
Risk Factor	Risk Factor and/or Mitigation Description	Risk Rating
a)	This is not the case in the present project.	0
b)	This is not the case in the present project.	0
c)	Governance score of -0.32 to less than 0.19 (0.054)	2
d)	This is not the case in the present project.	0
e)	This is not the case in the present project.	0
f)	Mitigation: The country has an established Designated National Authority under the CDM and has at least one registered CDM Afforestation/Reforestation project See: *http://www.mct.gov.br/index.php/content/view/317381.html* Moreover, Brazil has been a leader in the establishment of the REDD framework at international level.	-2
Total Political (PC) [as applicable ((a, b, c, d or e) + f)] Total may not be less than zero.		**0**

External Risk	
Total External Risk (LT + CE + PC) Total may not be less than zero.	**6**

NATURAL RISKS

Fire (F)	
Significance	A survey on forest fires was performed in CPTEC/INPE database, for years 2008 to 2013. It was observed that most of fire points occur in September.

	 **2008**  **2009**  **2010**  **2011**  **2012**  **2013** Source: http://sigma.cptec.inpe.br/queimadas/anima_filmes.php (last visited in 20/05/2014) For September, fire points were observed nearby the Project Area in all years, excepting 2009 and 2013. In image classification, the zones neighboring the Project Area presented from 1 to 6 fire points in September maps. However, there were no evidences, in satellite images, that these fire points were located inside the Project Area.
Likelihood	The likelihood of fire in the project area is less than every 10 years. Loss in carbon stock: insignificant (less than 5% loss of carbon stocks) or transient (full recovery of lost carbon stocks expected within 10 years of any

	event)
Score (LS)	2
Mitigation	Mitigation: Adaptative management plan in place Management plan includes strategic bases in place equipped with mobile phone and motorcycle. The plan is aimed at restricting invasions and risks of fire. (File: "Proced_Fortaleza_Ituxi P-02 PLANO DE GESTAO ADAPTATIVO 31_10_2017") Fire brigades will be organized from local labor. Those in favour of the objectives put forward by the project (preservation of natural resources and the continuation of forest management) will be included in training courses and may become a source of income for the local community. The Project budget foresees investments in vehicles and monitoring agreements of park frontiers nearby farm limits. All neighbors will be invited to participate in these training sessions promoted by the Project; all costs will be covered by the project proponent. It is expected that these training sessions will involve from 15 to 20 neighbors.

Pest and Disease Outbreaks (PD)	
Significance	**No loss**
Likelihood	Risk is not applicable to the project area There is no record of Pest and Disease outbreaks in the area, since the area is a natural forest in its equilibrium, where it is hardly believed to have a pest or disease outbreak. Regarding the disease and pest outbreaks in tropical humid forests, it is sound to belief that due to the high species diversity and resilience, these ecosystems have a strong capability to adapt and react to any specific single pathogen, insect, or pest (in general terms) that could develop into broadly spread damage to the vegetation, with consequent carbon loss. There is not scientific evidence on this sort of outbreaks in highly diverse tropical humid forests vegetation in the Amazon, which could be different in single tropical species plantation.
Score (LS)	0
Mitigation	None

Extreme Weather (W)	
Significance	According to Lewis et al. (2011): "The 2005 and 2010 droughts both coincided with higher than normal tropical North Atlantic sea surface temperatures (SST), which have been linked to the 2005 Amazon drought and are suspected in the 2010 drought. The 2010 drought also coincided with a La Niña event, associated with cooler than normal sea surface temperatures in the equatorial Pacific. While La Niña events are generally associated with wetter than normal weather over the northern parts of the Amazon Basin, including some areas impacted by the 2010 drought, it has also been associated with drying over much of the southern half of

	the basin. It seems likely that the 2010 drought was influenced by both Pacific and Atlantic SSTs. Furthermore, both droughts are consistent with climate modelling that projects drying of the Amazon, although researchers concede that significant uncertainty still remains in these linkages”. Insignificant (less than 5% loss of carbon stocks) or transient (full recovery of lost carbon stocks expected within 10 years of any event)
Likelihood	Less than every 10 years.
Score (LS)	2
Mitigation	None

Geological Risk (G)	
Significance	**No loss**
Likelihood	Not applicable to the project area. The project area is located in a stable geological area with no faults. The risks of carbon losses related to geological phenomena are more prone to occur in steeply sloped landscapes, which is not the case in the project farm (predominantly flat landscape). In steeply sloped areas, biomass loss can occur through earthquake-induced landslides. Even in these cases, previous studies (ALLEN et al. 1999) show that much of an earthquake's immediate impact is low-intensity damage to forests. ALLEN et al. (1999) quantified the immediate impact of an earthquake (magnitude index MW 6.7 in 1994). Brazil has a mild seismic activity: earthquakes are predominantly of low intensity varying between 2 and 4 degrees Richter. The highest earthquake recorded in the country occurred in 1955 in the State of Mato Grosso (6.6 degrees Richter) (TOMINAGA et al. 2009). Thus, the average earthquakes in Brazil are not likely to produce significant losses of forest biomass. Moreover, according to REN et al. (2009), the occurrence an earthquake-induced landslide must comply with the combination of a series of factors, comprising soil mechanics, vegetation transpiration and root mechanical reinforcement, and hydrological processes. In this context, there are strong reasons to reject the possibility of any significant vegetation damage caused by earthquakes in the project region. Literature cited: ALLEN, ROBERT B., PETER J. BELLINGHAM, AND SUSAN K. WISER. 1999. IMMEDIATE DAMAGE BY AN EARTHQUAKE TO A TEMPERATE MONTANE FOREST. Ecology 80:708–714. [doi:http://dx.doi.org/10.1890/0012-9658(1999)080[0708:IDBAET]2.0.CO;2] REN, D.; WANG, J; FU, R.; KAROLY, D.J.; HONG, Y.; LESLIE, L.M.; FU, C.; HUANG, G. 2009. Mudslide-caused ecosystem degradation following Wenchuan earthquake 2008. GEOPHYSICAL RESEARCH LETTERS, v. 36, L05401, doi:10.1029/2008GL036702 TOMINAGA, L.K.; SANTORO, J.; AMARAL, R. DESASTRES NATURAIS: Conhecer para prevenir. Instituto Geológico, Governo do Estado de São Paulo,

	2009.
Score (LS)	0
Mitigation	None

Blow-Down Wind (ON)	
Significance	**No loss (0.004%)**
Likelihood	Less than every 10 years. 1. The occurrence of blow-down in response to strong wind gasps, are natural and randomic in mature forests in the Tropical Amazon. According to Nelson et al (1994) few quantification of large scale blow-down, derived from convectional storms, had been reported in the literature, at that time. More recently, Laurance (2003) associated the increase of blow-down occurrence in areas where the forest is fragmented and Gloor et al (2009) reaffirmed, highlighting that large scale (more than 30ha) blow-down are rare and unpredictable events in preserved, primary forest. 2. Nevertheless, the occurrence of blow-down is considered in the scientific literature. Malhi et al (2003) highlight that the forest patches under disturbance, from a blow-down event, are under recovery processes by a succession of local plant species, to which is conceivable to assume that the net biome production is zero, which means that the carbon released by the dead of the trees is absorbed by the growth of the new plants, composing the stand biomass. This process is modulated by the resilience of the system. 3. Thus, biomass loss is negligible, once such disturbance does not export any material from the area, as it would occur in timber harvest.
Score (LS)	0
Mitigation	None

Score for each natural risk applicable to the project (Determined by (LS × M)	
Fire (F)	2
Pest and Disease Outbreaks (PD)	0
Extreme Weather (W)	2
Geological Risk (G)	0
Other natural risk (ON)	0
Total Natural Risk (as applicable, F + PD + W + G + ON)	**4**

OVERALL NON-PERMANENCE RISK RATING AND BUFFER DETERMINATION

Overall Risk Rating

Risk Category	Rating
a) Internal Risk	11
b) External Risk	6
c) Natural Risk	4
Overall Risk Rating (a + b + c)	**21**

Calculation of Total VCUs

Year	Project year t	Ex ante net anthropogenic GHG emission reductions annual $\Delta REDD_t$ tCO_2-e	cumulative $\Delta REDD$ tCO_2-e	Ex ante VCUs tradable annual VCU_t tCO_2-e	cumulative VCU tCO_2-e	Ex ante buffer credits annual VBC_t tCO_2-e	cumulative VBC tCO_2-e
2013	0	0	0	0	0	0	0
2014	1	836,911	836,911	658,070	658,070	178,841	178,841
2015	2	63,370	900,281	49,499	707,569	13,871	192,712
2016	3	-57,704	842,577	-45,737	661,832	-11,967	180,745
2017	4	75,060	917,637	58,719	720,550	16,342	197,087
2018	5	-45,137	872,500	-35,827	684,723	-9,310	187,777
2019	6	87,396	959,896	68,446	753,169	18,950	206,727
2020	7	-32,573	927,324	-25,920	727,250	-6,653	200,074
2021	8	102,476	1,029,799	80,332	807,582	22,143	222,217
2022	9	-19,979	1,009,821	-15,989	791,593	-3,989	218,228
2023	10	110,880	1,120,700	86,967	878,560	23,913	242,141
2024	11	-7,434	1,113,266	-6,097	872,463	-1,337	240,804
2025	12	112,111	1,225,377	88,056	960,519	24,055	264,859
2026	13	-7,106	1,218,271	-5,705	954,813	-1,401	263,458
2027	14	210,384	1,428,655	165,690	1,120,503	44,694	308,152
2028	15	90,492	1,519,147	71,398	1,191,900	19,094	327,246
2029	16	214,514	1,733,661	168,976	1,360,877	45,538	372,784
2030	17	101,475	1,835,136	80,075	1,440,952	21,400	394,184
2031	18	224,846	2,059,982	177,142	1,618,094	47,704	441,888
2032	19	112,420	2,172,402	88,724	1,706,818	23,696	465,584
2033	20	233,371	2,405,773	183,887	1,890,704	49,485	515,069
2034	21	123,387	2,529,160	97,389	1,988,093	25,998	541,067
2035	22	243,083	2,772,242	191,564	2,179,657	51,518	592,585
2036	23	134,345	2,906,588	106,048	2,285,705	28,298	620,883
2037	24	255,764	3,162,351	201,578	2,487,283	54,186	675,069
2038	25	145,316	3,307,668	114,716	2,601,998	30,600	705,669
2039	26	262,177	3,569,844	206,661	2,808,660	55,516	761,185
2040	27	156,315	3,726,159	123,406	2,932,065	32,909	794,094
2041	28	182,121	3,908,279	143,414	3,075,480	38,706	832,800
2042	29	69,713	3,977,992	54,991	3,130,471	14,722	847,522
2043	30	289,927	4,267,919	228,219	3,358,690	61,708	909,230