



**Verified Carbon
Standard**

MONITORING REPORT: UNITOR REDD+ PROJECT



Document Prepared by Carbonext

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Contents

1.1	Summary Description of the Implementation Status of the Project'	3
1.2	Sectoral Scope and Project Type	4
1.3	Project Proponent	4
1.4	Other Entities Involved in the Project	5
1.5	Project Start Date	5
1.6	Project Crediting Period	5
1.7	Project Location	6
1.8	Title and Reference of Methodology	11
1.9	Participation under other GHG Programs	12
1.10	Other Forms of Credit	12
1.11	Sustainable Development Contributions	12
2.1	No Net Harm	15
2.2	Local Stakeholder Consultation	15
2.3	AFOLU-Specific Safeguards	24
3.1	Implementation Status of the Project Activity	25
3.2	Deviations	55
3.3	Grouped Projects	63
4.1	Data and Parameters Available at Validation	63
4.2	Data and Parameters Monitored	70
4.3	Monitoring Plan	90
5.1	Baseline Emissions	108
5.2	Project Emissions	150
5.3	Leakage	158
5.4	Net GHG Emission Reductions and Removals	167

1 PROJECT DETAILS

1.1 Summary Description of the Implementation Status of the Project'

The UNITOR REDD+ PROJECT is located in Lábrea, Amazonas State, Brazil, which is the municipality with the fourth highest aggregate deforestation rate in Brazil between 2008 – 2021, according to PRODES data¹. Municipal deforestation rates have risen year on year, with an increase of 41% from 2020 to 2021¹. A consortium of 12 neighboring rural properties comprises the Unitor REDD+ Project area, together covering 94.270,74 ha of forest area. The main Project activities that have been implemented during this second monitoring period are listed below with their respective dates, for more details on the implementation of each Project Activity see Section 3.1.

1. **Fire brigade training and formation:** a training was held on July 22, 2022;
2. **Advice on nutritional and health aspects:** lectures were carried out on July 22 and 27, 2022;
3. **Technical Training on Sustainable Cattle Raising:** training was held on July 23 and 27, 2022;
4. **Sustainable Forest management:** the Sustainable Forest Management were carried out at 5 locations during August 2021 and July 2022.
5. **Health and Security internal audits:** verification of workers' health and safety conditions and remedial actions for project farms in 2021 in 2022.
6. **Monitoring against deforestation:** frequent on-site monitoring, from August 2021 to July 2022, in addition to remote satellite monitoring, through the MonitoraCarbon system, implemented in April 2022, which detects changes in land-use, validates and sends alerts for monitoring agents to confirm and take appropriate actions.
7. **Job creation:** a total of 23 people were hired in this period to contribute to the activities carried out in the project, during the monitoring period.
8. **On-Site Improvements:** construction of a bridge at “Ramal da Mococa” road; construction and conclusion of Presidente Prudente, Três Barras and Santa Catarina monitoring bases; finalization of São José #2 monitoring base; start the construction of Jardim Alegre monitoring base; Installation of identification plates on finalised monitoring bases.
9. **Community visits:** visit to local communities in October 2021 and July 2022.

The activities developed so far play a fundamental role in minimizing deforestation and curbing invasions, bringing benefits for climate, community, and biodiversity. The net GHG emission reductions for this monitoring period are estimated to be 639,970 tCO₂e.

This is a grouped project. No new areas were included during this monitoring period. However, three areas were excluded from the project and will remain under continuous monitoring.

¹ http://terrabrasilis.dpi.inpe.br/app/dashboard/deforestation/biomes/legal_amazon/increments

1.2 Sectoral Scope and Project Type

Sectoral Scope: 14 – Agriculture, Forestry, Land Use

Project Type: REDD

Project Category: Avoided Unplanned Deforestation (AUD project activity)

This is a grouped project.

1.3 Project Proponent

Organization name	Ituxi Administração e Participação Ltda.
Contact person	Ricardo Stoppe Junior
Title	Project Proponent (Landowner)
Address	Av. Calama N. 5040 Sala 01, Porto Velho, Rondônia
Telephone	55 (92) 3634-7521
Email	aamericardo@ig.com.br

Organization name	Carbonext Tecnologia em Soluções Ambientais Ltda.
Role in the Project	Managing partner
Contact person	Janaína Dallan, Luiz Fernando de Moura
Title	Project developer
Address	Rua do Rocio, 220, cj 21 São Paulo – SP, Brazil www.carbonext.com.br
Telephone	55 (11) 2339-6931
Email	janaina@carbonext.com.br

Organization name	Green Forest Carbon Consultoria Empresarial Ltda.
Contact person	Élcio Aparecido Moço
Title	Project Proponent (Landowner)
Address	Av Professor Nilton Lins, 1591, sala 6B Manaus – AM, Brazil
Telephone	55 (92) 9121-8933
Email	admin@rionegroagro.com.br

1.4 Other Entities Involved in the Project

Not applicable: There were no other entities involved in the Project during this monitoring period.

1.5 Project Start Date

The Unitor Project's Start Date is defined as the date of implementation of the first Sustainable Forest Management (SFMP) activities on the ground. The first property to implement its SFMP was the Santa Maria on 26/04/2018. Various instances of the project became active on different dates, as described in the VCS PD².

SFMPs have the explicit intention of contributing to conservation and to atmospheric carbon sequestration, they are key to forest surveillance by providing personnel on the ground. Furthermore, critically, SFMPs are an explicit component of the Brazilian National REDD+ Strategy³. Therefore, the initiation of the respective SFMP activities is defined as the Project Start Dates.

1.6 Project Crediting Period

Start date: 26/04/2018

End date: 25/04/2048

30 years.

² Available at <https://registry.verra.org/app/projectDetail/VCS/2508> - latest version: 1.7, dated 04-May-2022

³ http://redd.mma.gov.br/images/publicacoes/enredd_documento_web.pdf

1.7 Project Location

The UNITOR REDD+ PROJECT consists of a 94,270.74 hectares total Project Area of protected native forests, located in a region with the fourth highest deforestation rate in the Amazon Biome⁴ at the time of writing: the municipality of Lábrea. Being one of the southernmost municipalities in the Brazilian state of Amazonas, Lábrea is geographically located close to the “Arc of Deforestation” and border with other highly deforested municipalities to the South (Rio Branco, State of Acre; and Porto Velho, State of Rondônia).

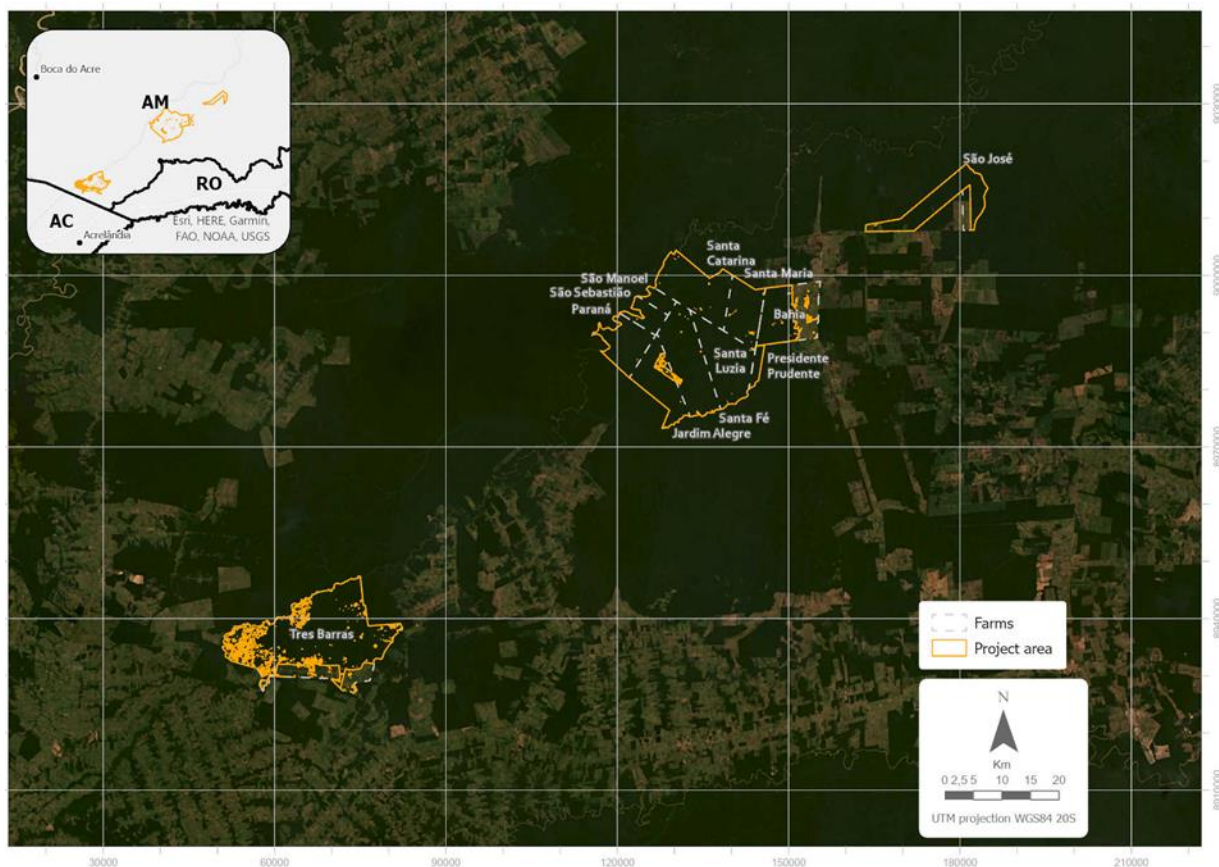


Figure 1. Location of each of the properties within the project area

During this monitoring period, three areas (Fazenda Recanto, Fazenda União and Fazenda Panorama) were excluded from the project, for having their registration cancelled. The project area changed from 99,035.20 ha to 94,270.474 ha, representing a decrease of 4.7% of the project area. The old and new information of the composition of the PA are presented in the

⁴ Source A Pública (accessed 22/03/21): <https://apublica.org/2020/08/governo-bolsonaro-reduz-multas-em-municipios-onde-desmatamento-cresce/>

tables below. More information of the change is presented at Section 3.1.2 *Project Description Deviations*.

Table 1: Old breakdown of properties in the Project Area

	Property Name	Ownership	Total property Area (ha)	REDD PA Area (all forest) (ha)	PA area composition (%)
i	Fazenda Santa Catarina	Ituxi Administração e Participação LTDA	10,031.37	10,009.53	10.1%
ii	Fazenda Santa Maria	Rio Grande Produção Florestal LTDA	6,046.67	6,016.63	6.1%
iii	Fazenda Bahia	Castanhal Agro Industria de Produtos Não Madeireiros LTDA	9,906.94	6,000.23	6.1%
iv	Fazenda Paraná	Odair Augustinho Dall' Agnol Junior	5,855.24	5,842.97	5.9%
v	Fazenda Santa Fé	Rio Grande Produção Florestal Ltda	11,310.39	11,237.47	11.3%
vi	Fazenda Presidente Prudente	Veridiana Taina dos Santos Moço de Oliveira	1,045.59	1,009.15	1.0%
vii	Fazenda Jardim Alegre	Rio Grande Produção Florestal Ltda	7,000.23	6,546.37	6.6%
viii	Fazenda Santa Luzia	Elcio Aparecido Moço	9,792.14	9,786.09	9.9%
ix	Fazenda São José	Marilda Aparecida Lot Stoppe	8,764.00	7,780.87	7.9%
x	Fazenda Recanto	Rio Negro Gestão e Comercio de Produtos Agroflorestais	2,025.01	2,024.38	2.0%
xi	Fazenda São Manoel	Henrique Manoel dos Santos Moço	1,472.33	1,468.86	1.5%
xii	Fazenda São Sebastião	Henrique Manoel dos Santos Moço	2,450.02	2,441.62	2.5%
xiii	Fazenda União	Rio Negro Gestão e Comercio de Produtos Agroflorestais	1,642.41	1,631.63	1.6%

	Property Name	Ownership	Total property Area (ha)	REDD PA Area (all forest) (ha)	PA area composition (%)
xiv	Fazenda Panorama	Rio Negro Gestão e Comercio de Produtos Agroflorestais	1,110.74	1,108.45	1.1%
xv	Fazenda Três Barras	Castanhal Agro Indústria de Produtos Não Madeireiros Ltda	33,504.60	26,130.96	26.4%
TOTAL			111,957.69	99,035.20	100.0%

Table 2: New breakdown of properties in the Project Area

	Property Name	Ownership	Total property Area (ha)	REDD PA Area (all forest) (ha)	PA area composition (%)
i	Fazenda Santa Catarina	Ituxi Administração e Participação LTDA	10,031.37	10,009.53	10.6%
ii	Fazenda Santa Maria	Rio Grande Produção Florestal LTDA	6,046.67	6,016.63	6.4%
iii	Fazenda Bahia	Castanhal Agro Industria de Produtos Não Madeireiros LTDA	9,906.94	6,000.23	6.4%
iv	Fazenda Paraná	Odair Augustinho Dall' Agnol Junior	5,855.24	5,842.97	6.2%
v	Fazenda Santa Fé	Rio Grande Produção Florestal Ltda	11,310.39	11,237.47	11.9%
vi	Fazenda Presidente Prudente	Veridiana Taina dos Santos Moço de Oliveira	1,045.59	1,009.15	1.0%
vii	Fazenda Jardim Alegre	Rio Grande Produção Florestal Ltda	7,000.23	6,546.37	6.9%
viii	Fazenda Santa Luzia	Elcio Aparecido Moço	9,792.14	9,786.09	10.4%
ix	Fazenda São José	Marilda Aparecida Lot Stoppe	8,764.00	7,780.87	8.3%
x	Fazenda São Manoel	Henrique Manoel dos Santos Moço	1,472.33	1,468.86	1.6%

	Property Name	Ownership	Total property Area (ha)	REDD PA Area (all forest) (ha)	PA area composition (%)
xi	Fazenda São Sebastião	Henrique Manoel dos Santos Moço	2,450.02	2,441.62	2.6%
xii	Fazenda Três Barras	Castanhal Agro Indústria de Produtos Não Madeireiros Ltda	33,504.60	26,130.96	27.7%
TOTAL			107,179.53	94,270.74	100.0%

The property boundaries were created using the land limit assigned by the owners and registered with INCRA⁵.

The main geodetic coordinates of the Project Area, separated into three main zones, are as follows, applying the Lat; Long coordinate system. The complete set of 1,671 coordinates, is available upon request.

The zones were created using data from the delimitation of the project area minus the areas that were deforested between 2009 and 2018 in the properties. The geographic coordinates of the main vertices of each zone were calculated and can be seen at tables below.

Project Zone 1:

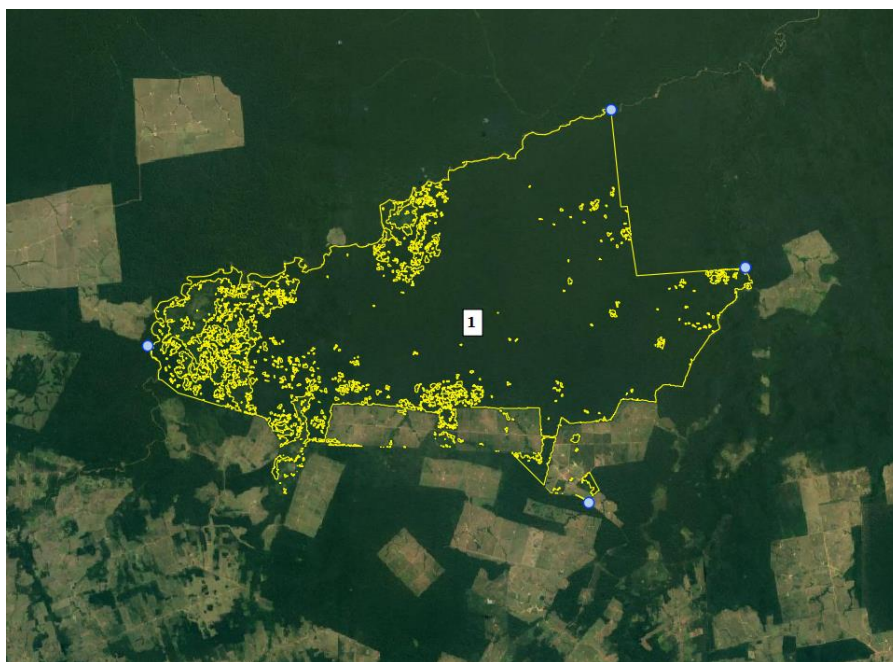
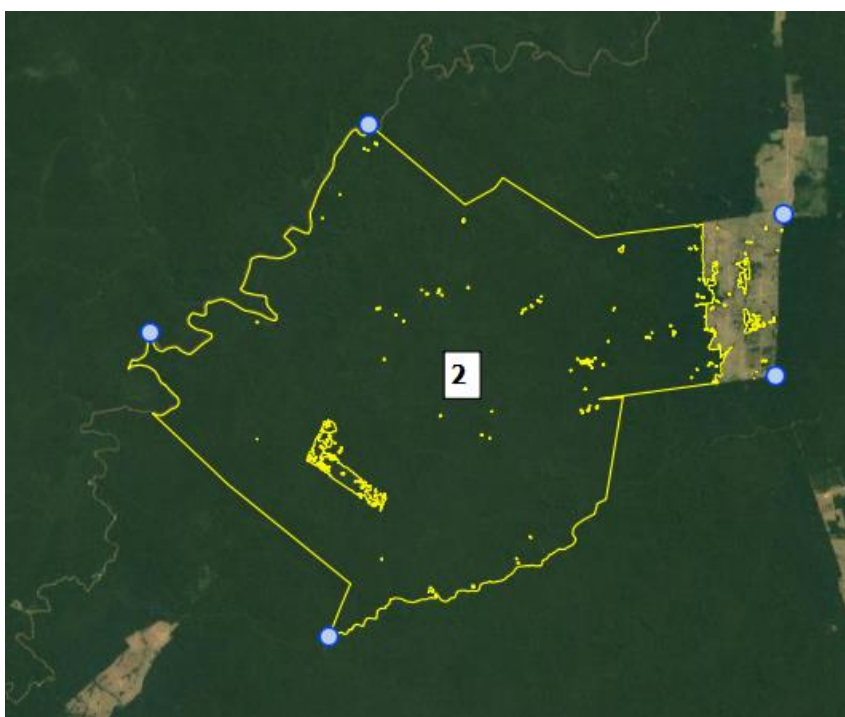


Figure 2. Area of the project Zone 1

⁵ Source: SIGEF: <https://sigef.incra.gov.br/consultar/parcelas/>

Table 3: Latitude and Longitude of Project Zone 1

Latitude	Longitude
-9,57635	-66,8059
-9,68594	-66,8814
-9,60964	-67,0903
-9,50126	-66,8689

Project Zone 2:

Figure 3. Area of the project Zone 2
Table 4: Latitude and Longitude of Project Zone 2

Latitude	Longitude
-9,1317	-66,138
-9,2724	-66,387
-9,1051	-66,484
-8,9915	-66,362

Project Zone 3:

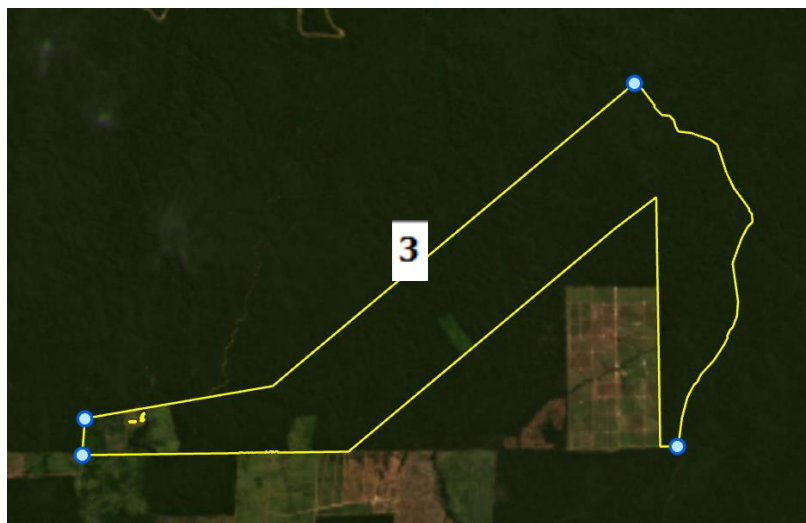


Figure 4. Area of the project Zone 3

Table 5: Latitude and Longitude of project Zone 3

Latitude	Longitude
-8,954156	-66,059467
-8,964679	-66,060309
-8,963548	-65,887723
-8,859158	-65,899423

1.8 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>.

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-cs.org/methodologies/VT0001>.

AFOLU “Non-Permanence Risk Tool” VCS Version 4, Procedural Document, 19 September 2019, v4.0. At: <http://www.v-c-s.org/program-documents>.

1.9 Participation under other GHG Programs

Not applicable: the project is not engaged in any other emissions trading program and the host country has no binding limits on GHG emissions as yet. The project has not been registered, nor is seeking registration under any other GHG programs.

1.10 Other Forms of 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 project has not sought nor received another form of GHG-related environmental credit, including renewable energy certificates.

The VCUs generated in this project will only be used in the context of the voluntary carbon market, so they will not be applied in the context of the Paris Agreement.

1.11 Sustainable Development Contributions

The project is aligned with Brazil's commitments to the UN SDGs. National indicators⁶ follow the same standards as the global SDGs. During this monitoring period, the project activities involved technical qualification in trainings on sustainable cattle raising and fire brigade, lectures on nutritional aspects and internal audits for health and security assessments. These activities contributed to meet the targets of the following SDGs:

- (1) No poverty;
- (3) Good health and well-being;
- (4) Quality education;
- (8) Decent work and economic growth;
- (13) Climate action; and
- (15) Life on land ecosystems.

The table below shows the project's contribution to the SDGs. Details of the actions are described in section 3.1 and further evidence was presented at audit.

⁶ <https://odsbrasil.gov.br/>

Table 6. Sustainable Development Contributions

Row number	SDG Target	SDG Indicator	Net Impact on SDG Indicator	Current Project Contributions	Contributions Over Project Lifetime
1)	1.1	1.1.1: Proportion of the population living below the international poverty line by sex, age, employment status and geographic location (urban/rural)	Implemented activities to decrease	A total of 23 people were employed between fixed and temporary positions, increasing their income source. 3 are women and 20 are men.	Employment of 33 people to carry out various activities, such as patrolling, forest management and general services
2)	3.d	Number of people who participated in lectures on guidance on nutritional and health aspects	Implemented activities to increase	The project proponents offered lectures on guidance on nutritional and health aspects for 48 persons. 39,6% of participants were women.	The project has increased the 48 participants total in advice on nutritional and health aspects
3)	4.5	4.5.1: Parity indices for all education indicators on the list that can be disaggregated	Implemented activities to increase	The project proponents offered training of fires brigades and technical training on sustainable cattle raising for 72 persons. 36,1% of participants were women.	The project has increased the 78 participants total in forest management and fires brigade training, technical training in sustainable cattle ranching. 33.3% of participants were women.
4)	8.3	8.3.1: Proportion of informal employment in total employment by sector and sex	Implemented activities to increase	A total of 23 people were employed between fixed and temporary positions. Where 3 are women and 20 are men.	Employment of 33 people to carry out various activities, such as patrolling, forest management and general services.

5)	8.8	Proportion of checklist applied (named "Vistoria de Saúde e Segurança") and percentage of equipment and team checked	Implemented activities to increase	24 checklists were applied, to plan corrective action for the next periods 2021 AISSO: 0.28 2022 AISSO: 0.17	Monitoring of labor conditions in order to decrease work safety risks, in addition to improving wellbeing of local workers: annually internal audits for health and safety assessments, nutrition aspects, personal care and hygiene etc. The goal is 90% corrective actions completed.
6)	13.0*	SDG 13.0: Tonnes of greenhouse gas emissions avoided or removed Brazil's NDC ⁷ : Reduction of 37% (in 2025) and 50% (in 2030) of CO2 emissions	Implemented activities to increase	Project Unitor has prevented the release of 629,738 tonnes of carbon into the atmosphere during this monitoring period	Prevented the release of 2,545,824 tonnes of carbon into the atmosphere
7)	13.3	13.3 Improve education, awareness-raising and human and institutional capacity on climate change mitigation, adaptation, impact reduction and early warning	Implemented activities to increase	Second training in firefighting and form a fire brigade team was carried out for 19 persons.	The first training in firefighting to form a fire brigade team was carried out in March 2019 for 6 persons. A total of 25 people were trained.
8)	15.1*	SDG 15.1.1 Forest areas as a proportion of total land area Brazil's NDC ⁸ : Zero illegal deforestation by 2030	Implemented activities to increase	By avoiding deforestation 1,278.4 ha of Amazon tropical rainforest within the PA, located in the Amazon biome in Lábrea municipality.	Contribute to forest conservation in Brazil and contribute to increasing or maintaining the percentage of the area covered by forests in relation to the total area of the country's territory. 5,395.55 ha of avoided deforestation until now.
9)	15.2	15.2.1 Progress towards sustainable forest management	Implemented activities to increase	SFM in 5 locations (Santa Maria, São Manoel, Santa Catarina and Três Barras (UPF 2 and UPF 5), totalizing 2,335 hectares.	The Project has carried out 9,460 ha of Sustainable Forest Management until now.

* The indicator also is measured in Brazil's NDC. However, as mentioned in Section 1.10, the VCU's generated in this project will only be used in the context of the voluntary carbon market, so they will not be applied in the context of the Paris Agreement.

⁷ <https://unfccc.int/sites/default/files/NDC/2022-06/Updated%20-%20First%20NDC%20-%20%20FINAL%20-%20PDF.pdf>

2 SAFEGUARDS

2.1 No Net Harm

The project activities did not cause any potential negative environmental or socio-economic impacts. The project did not result in net negative impacts on the wellbeing of stakeholder groups.

In order to mitigate any possible impacts, a communication channel was established for stakeholders to express their concerns and to solve potential conflicts and grievances that may arise during project planning and implementation, as best described in PD's section *2.2 Local Stakeholder Consultation*.

During the period of this monitoring report, no complaints or denunciations were made by the communities. However, once conflicts are identified, appropriate procedures will be adopted, as described in PD's item *2.5 AFOLU – Specific Safeguards*.

2.2 Local Stakeholder Consultation

The project proponent duly conducted assessment of the local stakeholders who are potentially impacted by the project. Also, a communication channel was established, and ongoing public consultations are carried out in order to allow stakeholders to raise concerns and give feedbacks on the project.

Communication channel

An on-going communication with the stakeholders is carried out during the project lifetime. The communication channel between the local community stakeholders and the project proponents is through meetings in person or via WhatsApp, directly with the local people hired by the project proponents. The community is also informed about the project's email (redd.unitor@carbonext.com.br) and Carbonext's phone number to contact in case of any report, question, or complaint about the project.

The local people involved with the project also have the contact details of the local workers hired by the UNITOR REDD+ Project, to contact in case of any report, question, or complaint. The folder below, that presents the telephone contact (WhatsApp) and e-mails of the Unitor project, was sent via WhatsApp to the people involved locally with the project. The Portuguese-to-English translation indicates:

“Contact UNITOR PROJECT

Hello, Dear, the UNITOR REDD+ project would like to inform you about the different ways to contact the team. UNITOR is a project of Nature Conservation!

Preserving the Value of the Living Forest.”



Figure 5 - Folder with the contact information of those responsible for the project sent to the people involved locally.

The communication channel with institutional stakeholders is via e-mail (using the contact [redd.unitor@carbonext.com.br](mailto:red.d.unitor@carbonext.com.br)). At each verification period of the Unitor REDD+ Project, both local community and institutional stakeholders are consulted through public consultations, described below. In addition, the communication channel is continuously open for any communication between stakeholders and the project proponents.

Public Community Consultation

The process of identifying and involving local stakeholders is as described in item 2.2 *Local Stakeholder Consultation* of the Project Description (PD). It was mapped individuals, neighbors, and communities living in the following areas as envisioned by methodology and described in the PD:

- i. the project area; and

ii. within a 20km radius of the project area;

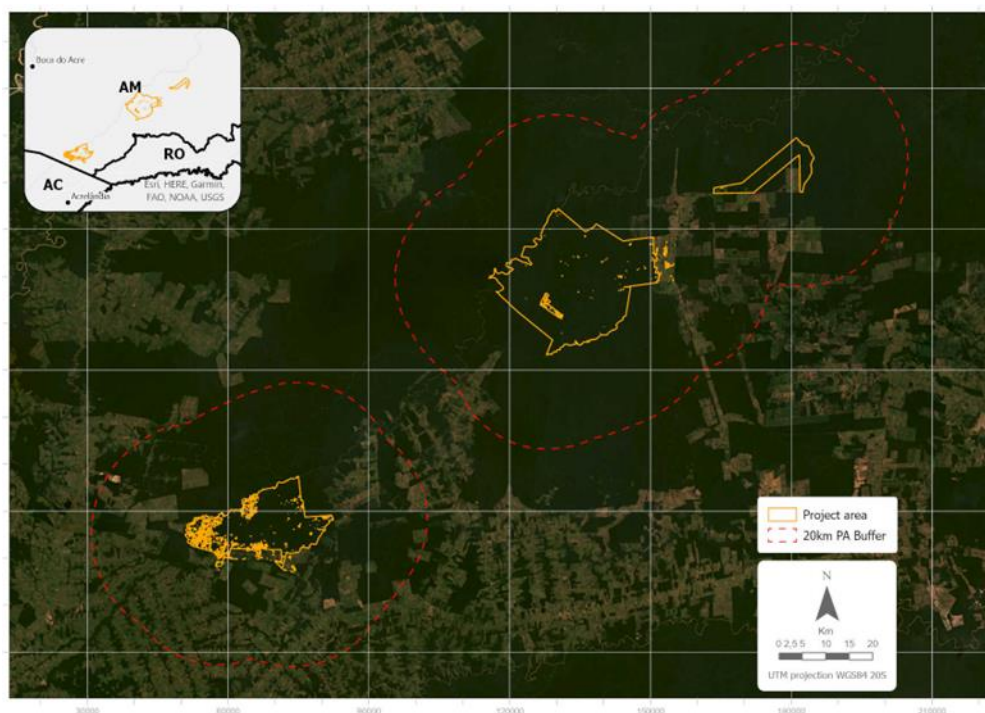


Figure 6 - Project Area and the 20km radius where the neighbors were mapped

The public consultation was carried out with the project area residents, workers, and neighbors of the Unitor REDD+ Project, with the objective of informing the local public about the project, including what a REDD+ project is, the activities that are developed, the results of the last monitoring period, among others. People were invited to the public consultation by personally delivering printed invitations to their homes; or invitations sent via WhatsApp informing date, time, place, and some issues to be addressed. The community public consultation was held on July 23rd and 27th in Santa Maria farm (with the community from “Ramal do Boi”) and in São Roque farm in the Frota's soccer field (a neighboring farm located at “Ramal da Mococa”), respectively. For the public consultation of the “Ramal do Boi”, 23 invitations were sent via WhatsApp and 5 personally. As for the consultation with the community from “Ramal da Mococa”, 2 invitations were via WhatsApp and 16 personally, as evidenced to the auditing body. Below are the models of invitations sent for Community Public Consultation, as well as other activities developed with the community during as described in “Table 7. Implementation schedule”.



Figure 7 - Invitation for community public consultation and other activities developed during July 22 and 23, at Santa Maria Farm - "Ramal do Boi".



Figure 8 - Invitation for community public consultation and other activities developed during July 27th, at the neighboring farm São Roque (Frota's soccer field) - "Ramal da Mococa"

To facilitate the displacement and the presence of the community members at the meeting, it was offered to some neighbors a ride to the event. The meetings took place in person at Santa Maria Farm and São Roque Farm, and the information was presented orally and with

the help of an informative banner. On both dates, the public consultation process started at 7am with breakfast, and at 8am with the opening of the meeting, which lasted until around the end of the afternoon. A total of 52 people attended the community public consultation over the two days, with 17 men and 8 women (25 total) on July 23; and 14 men and 13 women (27 total) on July 27.

Community public consultation meetings was attended by farm workers and also by the external community, with representatives from the region of São José, Extrema, Ramal do Boi, Vista Alegre, Presidente Prudente, Ramal Três Barras, Ramal da Mococa, among others, as per attendance list presented to the auditing body.

During the Public Community Consultations, they were informed about the communication channel between proponents and the community; how the auditing process works and the date of the next verification; and explained about the importance of keeping forests standing in order to avoid climate change. In addition, the e-mail address of the Unitor REDD+ Project was presented to the population, as well as the information that they can contact the project in case there are any complaints, doubts, or grievances about the project.

During this monitoring period, no e-mail was received from the community people related to the project. Also, there were no changes to risks, costs and benefits the project may bring to local stakeholder; nor changes in laws and regulations covering workers' right in the Brazil occurred in this period of monitoring.



Figure 9 - Community Public Consultation on Ramal do Boi, July 23, 2022.



Figure 10: Community Public Consultation on Ramal da Mococa, July 27, 2022.

At the end of the community public consultation processes, questionnaires were applied with the objective of collecting information from the communities, an attendance list, and a declaration of consent, as mentioned below and presented as evidence to the auditors:

- i) Attendance list and declaration: including the name of the participant in the public consultation, profession, information on whether they work on the farm or not, and where they live. The document also includes a declaration of receipt of visit from the project representative, and declaration of receipt of information such as the objective of the project and what the auditing processes are and how they work. Also stated is the authorization of use and image use of the participants for social media purposes.
- ii) Socio-economic diagnosis: as foreseen in MR1, it was started the process of socio-economic diagnostic with the local community. With the purpose of better understand the living and working conditions to start planning a future transition to a VCS & CCB project, questions as the main income source, monthly income, presence and quality of the education system, among others, where asked to the people involved. This study helps in the future development of community actions of socio-environmental benefit, including for the development of the benefits and actions associated with the planned CCB.

The result of the questionnaire is presented in section 3.1.1 below.

During the public consultation, no conflicts with the project or possible risks that could affect the community were raised by the public present, therefore, no risks to their rights and well-being were identified. Also, the project workers have an open and ongoing communication with the communities, and until now no conflicts, complaints or risks were reported.

Prior to the community consultation mentioned above, in October 2021, communities' members from Ramal da Mococa and workers from Santa Maria base were visited by members of the Carbonext team. At Ramal da Mococa, 33 people participated in the project

presentation. In the visit at Santa Maria, five people were consulted, with the presence of some family members. The activity carried out was recorded and the videos were made available at audit.



Figure 11: Project Presentation at Ramal da Mococa – Oct 2021



Figure 12: Project Presentation at the Santa Maria Base - Oct 2021

Another visit that took place in October 2021 was the visit to other nearby communities. The communities visited were the Boca do Querequetê, Eireli Sawmill and Nova California Cooperative. The visit had as goal a first interaction with them in order to identify possible new stakeholders for when the project transitions to a VCS & CCB project. It is important to state that these communities were not identified in the Project Description as a stakeholder, thus, are not presently included in the project activities. In the case of them being future involved in the project, a new visit and consultation will take place.

During the visits, community members were interviewed and the Unitor project was presented to them. The participation in the visits was:

- Boca do Querequetê: 14 people
- Nova California: 7 people
- Eireli Sawmill: 14 people



Figure 13: Rural activities at Community Boca do Querequetê



Figure 14: Community members of Nova Calífornia



Figure 15: Community members at Eireli Sawmill

Public Institutional Consultation

As described in the PD in item 2.2, for the institutional public consultation process the following stakeholders were contacted:

- Lábrea City Hall;
- Porto Velho City Hall (districts of Nova Calífornia 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);
- SEDAM (Secretary of State for Environmental Development);
- Extractive Reserve (RESEX) of “Ituxi”;
- National Forest (FLONA) of “Iquiri”;
- National Park (PARNA) of “Mapinguari”;
- Community leaders of Kaxarari Indigenous Land;
- IFAM (Federal Institute of Science and Technology; Campus Lábrea);
- IDAM - Institute for Sustainable Agricultural and Forest Development of the State of Amazonas.

The institutional public consultation process occurred by sending emails with a summary of the Unitor REDD+ Project to the cited stakeholders, in July 2022. The summary, which was made available to the auditors, included information such the proponents, project objectives, location, the results of the project implementation, the communication channel, the process of verification and the date of the next verification, among others. The responses from the institutions were documented in the same email account and were made available to the auditing body as evidence.

In the body of the email was also informed about the availability to get in touch for the purpose of clarifying any questions. To date, no feedback from the Public Institutional Consultation has been received from stakeholders. Therefore, no changes to the Project Design have been necessary.

2.3 AFOLU-Specific Safeguards

As mentioned in section ‘2.2 Local Stakeholder Consultation’ of the PD, after the community public consultation all participants signed an attendance list with the project consent declaration, where they give their free consent and acceptance with the project objectives and its development. The same happen during the community public consultation held during this monitoring period.

The procedures used to communicate and consult with local stakeholders during the monitoring period were done through community and institutional public consultations. In addition, all stakeholders have contact information for the proponents and Carbonext's technical team, and the communication channel is constantly open. During this monitoring

period, no complaints were received, there were no conflicts between the project proponent and the local stakeholders, or registration of occurrence reports. In addition, since the project takes place on private territory, there are no conflicts over land title with the surrounding communities.

In order to identify and mitigate risks to the local stakeholders that may arise due to the project implementation, the project proponents and workers have constructed and are maintaining a good relationship with the local stakeholders. In case of complaints or reports received through the communication channel, the complaint procedure should be followed as indicated below:

1. *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);*
2. *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);*
3. *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).*

During the public consultation, participants did not identify any conflicts or risks caused by the project to their interests and well-being, as per report "Activities Report – July 2022" presented to the auditing body. And at the time of the writing of this report, no complaints or suggestions have been made by neighbors or communities, thus, it is possible to conclude that there were no negative impacts on the property and land use rights of the local stakeholders during the period of this MR.

3 IMPLEMENTATION STATUS

3.1 Implementation Status of the Project Activity

The section below addresses the aspects specified by the VCS Monitoring Report template, section 3.1. The implementation schedule for the Unitor REDD+ project's second monitoring

report, for the period August 1, 2021, to July 31, 2022, along with current accomplishments, is as follows:

Table 7. Implementation schedule

Date	Event
October 2021 - May 2022	The construction of the Presidente Prudente monitoring base began in October 2021 with site clearance and earthmoving activities. It was completed, ready for use, at the end of May 2022, and is already operating at this time.
August 2021 - July 2022	Hiring 23 new employees to contribute to REDD Unitor project activities, with two additional employees previously hired.
July-2021	Completion of construction of second base at Fazenda São José #2.
August 2021 - October 2021	Completion of construction of the Três Barras and Santa Catarina monitoring bases, which already have the structure finalized for use and are in operation. The beginning of construction also began during this monitoring period.
November, 2021	Construction of a bridge over the Igarapé, at the Mococa branch line, to allow the displacement of vehicles.
December, 2021	Beginning of the construction of the Jardim Alegre monitoring base
June - July 2022	Installation of identification plates on all finished bases.
July 22, 2022	The second training in firefighting to form a fire brigade team was carried out in Ramal do Boi.
July 22 and 27, 2022	Lecture about Advice on nutritional aspects was conducted in Ramal do Boi.
July 23 and 27, 2022	Training on sustainable cattle raising for the community, in Ramal do Boi.
August 2021 - July 2022	Constant ground monitoring and remote monitoring.
August 2021 - July 2022	Development and implementation of the Forest Integrity Monitoring Plan (FIMP, or PMIF in Portuguese)
August 2021 - July 2022	Sustainable Forest Management activities
August 2021 - July 2022	1 motorbike was purchased for monitoring activities against deforestation

July 23 and 27,
2022

Community Public Consultation on Ramal do Boi (July 23) and on Ramal da Mococa (July 27) for 17 men and 8 women (25 total) and 14 men and 13 women (27 total), respectively.

All the evidence of the activities in the table above, duly organized, was made available to the verifying body for this monitoring period.

During this monitoring period, there were no changes in the project proponents and no new instance was added to the project.

The social activities carried out during this monitoring period followed the activities plan presented in the Project Description. The results of the activities for this period are presented in the table below, and in details during the next items of this section.

Table 8: Social Activities Indicators and Results – MR2

Activity	Scope	Indicator	Unit	Monitoring Frequency	Goal	Achieved During this MR
Training of Fire Brigade	Project Area	Attendance	Nº of attendees	Annual	100% employees	100% of the fixed workers (11 people) participated in the training. Therefore, this goal was achieved.
Health and Security internal audits	Project Area	Occurrences	Nº of non-conformities detected; Nº of corrective actions performed;	Semiannual	90% corrective actions completed	Of the five actions to be corrected identified, four showed 100% improvement. All actions are under control, as evidenced and explained in item 3.1.2
Advice on nutritional aspects	Project Area	Attendance	Nº of attendees	Annual	At least 30 participants (employees + neighbors)	48 participants

Gender equity	Project Area	Presence of men and women in trainings	% by gender	Annual	At least 30% of the presence of women in training and workshops carried out by the project	40% of women in the Sustainable Cattle Raising; 41% of women in the Advice on nutritional aspects; 32% of women in the fire brigade training.
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Activities dependent on carbon credit sales

Training on sustainable cattle raising	Regional	Attendance	Nº of attendees	2 years	At least 15 participants (employees + neighbors)	49 participants
Training on sustainable forest management	Regional	Attendance	Nº of attendees	Annual	At least 15 participants (employees + neighbors)	Due to the VCU credits from MR1 being released only in May this year, this activity will happen during the next monitoring period.
Creation of jobs positions	Project Area	Hired employees	Nº of workers	Annual	Have at least 30 workers total	25 project workers + the SFM workers (an average of 8 people per location, totaling about 40 workers).

Over the next subsections, the activities implemented will be presented in detail.

3.1.1 Community Social Activities

During this monitoring period, the following activities were performed with the project workers and communities' members, as presented in the item above.

The Map below presents the locations where the activities were performed, at Santa Maria Farm, with the community from Ramal do Boi, and at Ramal da Mococa, near the Três Barras Farm.

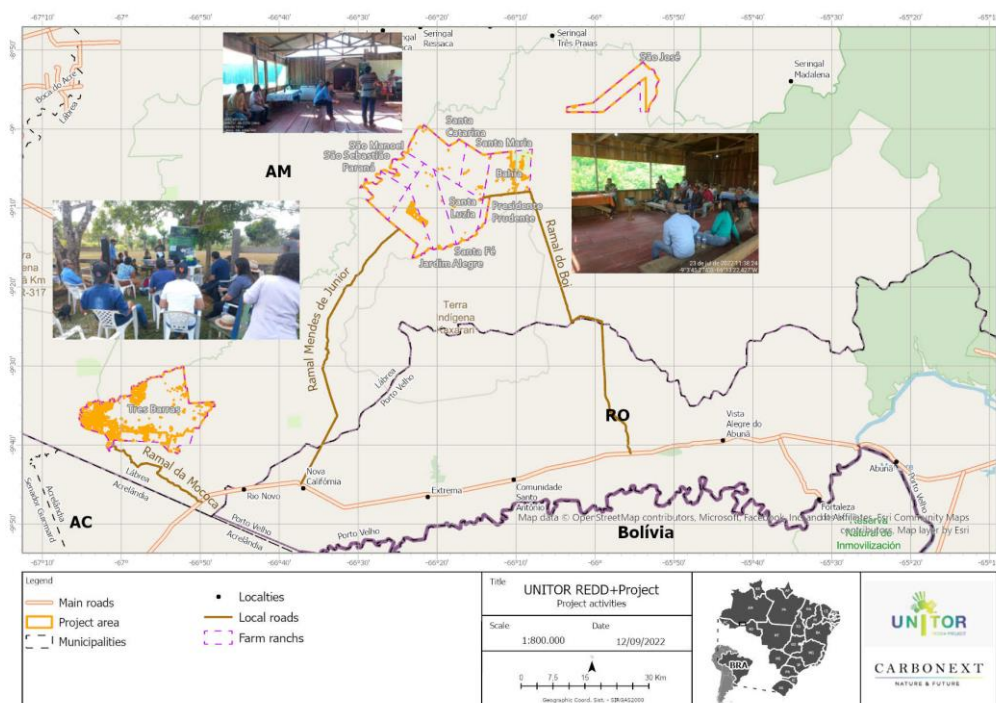


Figure 16 - Location of farms, "Ramal" (road) and Project Activity sites.

- **Sustainable Cattle Raising**

Activity held at Ramal do Boi, it has as main objective to disseminate practices in pasture and cattle management that provide more sustainable conditions for pasture areas. This activity is important since pasture is the main land use after deforestation, thus, the course presents ways of maintaining the production without opening new areas and increasing deforestation.

The training took place over two days (July 23 and 27, 2022), at Santa Maria and São Roque (neighboring farm) farms, with the participation of 15 men and 7 women (22 in total), and 14 men and 13 women (27 in total), respectively. The content approached was about as Rotational Cattle Management; Dairy Cattle; Beef Cattle; Orientation to bovine zoonosis; Applicable systems: intensive, semi-intensive and extensive management; Sanitary management; and Agroforestry-pastoral system.



Figure 17: Sustainable Cattle raising July 23 and 27, 2022

- **Fire Brigade Training**

A fire brigade training was held with the objective to prepare those directly involved in the project in fire prevention and the action of fighting outbreaks and fires. This training, held every year, aims to train new brigade members and renew the knowledge of those already involved in the brigade, so that in the event of fires, they can be activated to fight the fire quickly and effectively, decreasing the negative impacts in the forest and the GHG emissions.

The training was carried in July 22, with a public of 17 men and 6 women (23 in total). The content included the principles of fire; how to operate; how to use the extinguishers; which extinguishers are used in each situation; practical and theoretical classes, and firefighting practices.



Figure 18: Fire Brigade Training

- **Advice on Nutritional Aspects**

The training took place over two days, 22nd and 27th of July 2022, on the Santa Maria and São Roque (neighboring farm) farms, with the participation of 15 men and 6 women (21 in

total) and 14 men and 13 women (27 in total), respectively. The lecture was conducted by a professional nurse hired by the project. The content approached involved aspects of nutrition: What is the difference between healthy and inadequate food?; How to have a healthy diet?; What are the benefits of healthy eating?; What are the healthiest foods?; What is health?; and hygiene: Types of Hygiene: personal and Environmental; Well-being and Quality of Life.



Figure 19: Lectures advice on nutritional aspects July 27, 2022

- **Socioeconomic Diagnostic**

On the 22nd and 27th of June, as mentioned in section 2.1 '*Local Stakeholder Consultation*' project representatives visited neighbors and communities to explain the characteristics of the Unitor REDD+ project. On this occasion, 44 people responded to the socioeconomic questionnaires and usual use of resources applied to better understand the community's natural resource use and management activities within the Project Area. During the consult documents were collected:

- i. **Declaration of Consent with the Project:** those consulted declare that they received a visit from a project representative, that they are aware of the objectives and which properties belong to the project area. They also declare that they agree with the realization of the Unitor REDD+ Project and gave their free consent.
- ii. **Customary Resource Use Survey:** Questionnaire applied to neighbor and communities to fully understand community natural resource use and management activities within the Project Area.

All statements are duly stored and available during the audit.

Through the questionnaire, it was possible to analyze the following characteristics of wild harvesters:

- The main activities of the interviewees were livestock (68.18%) and family farming (31.82%).
- Most respondents (59.09% or 26 people) chose not to declare their income. Of those who declared 25% (11 people) receive up to 1 minimum wage, 11.36% (5 people) have income between 1 and 3 minimum wages and 4.55% (2 people) have income between 5 to 10 minimum wages (Figure 20. Monthly income of respondents).
- Of the 44 questionnaires answered, 13 (29.5%) declared having only elementary school I, while for high school and higher education there was an equal number of responses (7 people or 15.91% for each). In addition, 11 people did not answer this question (25%). Another 5 responded having finished Elementary School II (11.36%) and 1 person declared unlettered, totaling 44 respondents according to the number of questionnaires applied.
- As for the infrastructures present in the region, 23 people (52.27%) declared that there was no basic sanitation and the same number responded that they had energy in their homes. As for the presence of telephone and internet signal, 17 people (38.64%) said they have a signal from one of the two or both.
- Of the children declared as part of the families (54) only 18 (33.33%) of them attend school and 15 (27.78%) do not. 10 chips did not have this question answered.

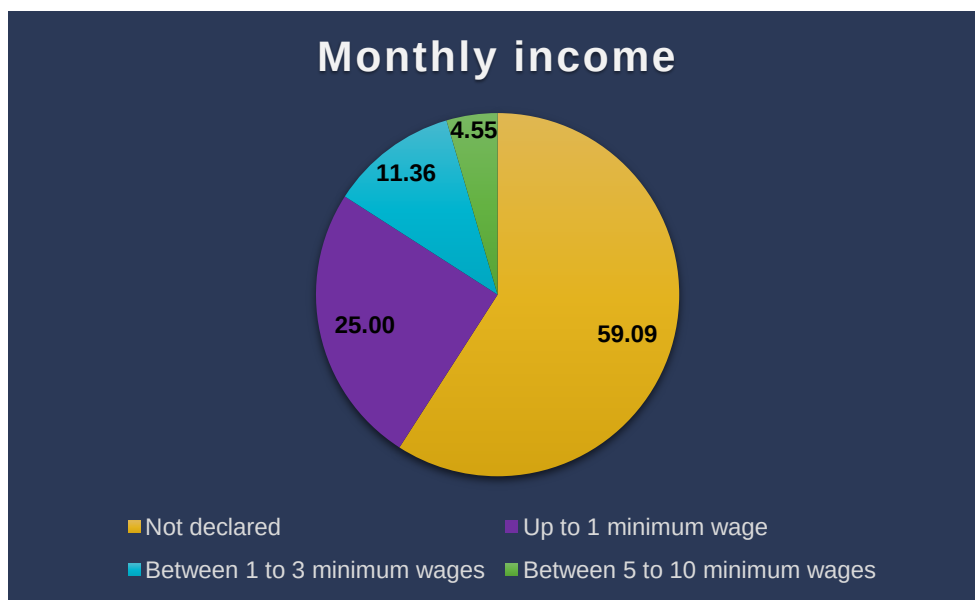


Figure 20. Monthly income of respondents

3.1.2 Health and Security Internal Audits

This evaluation aims to implement a routine verification of the Labor Safety and Occupational Health conditions in the service fronts of the UNITOR REDD+ project, in order to generate adequate conditions in the project's activity sites, guaranteeing more safety and health to the collaborators.

This procedure is intended for all employees who perform the inspections in the form of a Workplace Safety and Occupational Health Checklist. Thus, visits to verify the conditions of Labor Safety and Occupational Health were made to all farms during the current monitoring period. In 2021, the activities took place in December by workers hired by the project proponent. The visit occurred for each of the twelve farms in the Unitor REDD+ Project, as per coordinates in the table below. For 2022, the internal Health and Safety audits started at the end of July 2022, this time only for the farms with the occurrence of work fronts, which were: Santa Catarina, Jardim Alegre, Presidente Prudente, Santa Maria, Três Barras, and São José.

Table 9. Checklist performed for the farms according to their respective coordinates.

Farm	UTM Coordinates
Bahia	19L 806538 - 8989247
Jardim Alegre	19L 0784067 - 8980803
P. Prudente	19L 803822 - 8987926
Paraná	19L 784887 - 8988146
Santa Catarina	19L 789246 - 8993744
Santa Fé	19L 787436- 8991978
Santa Luzia	19L 801791- 8988467
Santa Maria	19L 804162 - 8990181
São José	#1: 19L 825224 - 9008732 #2: 20L 182156 - 9007954
São Manoel	19L 788593 - 8995489
São Sebastião	19L 787089 - 8991622
Três Barras	19L 732093 - 8932801

The site visits involved the verification of adequate conditions regarding PPE (Personal Protective Equipment), tools and materials, organization and cleanliness, housing, health conditions, machinery and equipment, and transportation. According to the Checklists documents evidenced to the auditing body, it is observed during this monitoring period that all farms visited had PPE in good conditions, as well as tools and materials for all activities developed in good conditions. All the places visited were in good conditions of use, clean and organized. There was no presence of spoiled food or lack of hygiene, as well as during this monitoring period there were no reports of accidents with venomous animals by the workers in any of the project farms. Regarding health conditions, in case of displacement of workers to the appropriate unit there is always transportation or a ride available. The water for human consumption at the sites where there is a semi-artesian well (item 3.1.3) is adequate for

consumption. In addition, for the sites which do not have a semi-artesian well, a drinking fountain or jerry can is provided to meet the needs of the local workers.

Among the twenty-four questions that characterize the official Checklist document presented to the auditing body, only five showed a need for remediation between the years 2021 and 2022. The actions were remediated as soon as possible in order to ensure the proper functioning of the activities of the UNITOR REDD+ project. The following table presents the points of attention for the farms and the corrective action adopted during this monitoring period.

Table 10 - Items from the internal health and safety questionnaire that required justification or corrective action.

Issues to be resolved	2021		2022		Corrective action
	Yes	No	Yes	No	
Are there first aid materials and supplies available?	0	100%	0	100%	The monitoring bases do not have the presence of first aid items, as these are brought by the management employees themselves who use the site. However, whenever requested the Unitor team provides medication support as well as health assistance by offering workers a ride to medical care.
Is the area free from endemic diseases (Malaria, dengue, COVID-19, others)	0	100%	100%	0	In 2021, there were many cases of malaria and Covid-19 in the project region. So far in 2022, no malaria cases have been identified and Covid-19 cases are infrequent.
Are the accesses and roads in good traffic conditions?	0	100%	100%	0	All roads that presented access problems in 2021 were fixed in 2022, as described in item 3.1.3.
Was PPE distributed?	93%	7%	100%	0	In 2021, only São José farm did not present all PPE at the time of the Checklist. The action was remedied immediately after identification.

Issues to be resolved	2021		2022		Corrective action
	Yes	No	Yes	No	
Are there any records of leaks in machinery and equipment?	0	100%	12,5%	87,5%	Only one machinery leak was registered for the year 2022, at Três Barras Farm and as a corrective action the occurrence was immediately communicated to the owner.

The AISSO (Intern Evaluation of Operational Health and Security, in English) of each assessment was calculated. The indicator is calculated by dividing the number of deviations (non-conformities) by the number of verified items. The result was 0.28 for 2021 and 0.17 for 2022. The goal is to reach values below 0.15. It is possible to see an improvement during this monitoring period. In August 2022, first aid kits were distributed for all the bases. Since the distribution date was after the end of this monitoring period, this action was not marked as solved. However, for the next monitoring period it is expected that the AISSO will reach the goal.

3.1.3 Infrastructure Improvements

Monitoring bases

By the end of this monitoring period, seven properties had bases constructed and in use, being present in the following farms: Presidente Prudente, Santa Catarina, Santa Luzia, Santa Maria, São José #1 and São José #2 and Três Barras. In the table below, it can be seen that the construction of the bases in Presidente Prudente, São José #2, Três Barras and Santa Catarina were completed during this monitoring period. The bases in Jardim Alegre and São Manoel are under construction. The properties Bahia, Parana, and Santa Fé farms do not have bases under construction, as they are monitored by neighboring bases, due to the proximity, as described below.

Table 11. Status of the monitoring bases in the current monitoring period.

Farm	Base presence	Implementation Date	Status	Next steps
Bahia	NO	Not applicable. The Base of Presidente Prudente is used.		
Jardim Alegre	YES	Under construction. Started in Dec-2021	Land cleared and leveled, semi-artesian well, internet, generator	Bathroom, air conditioning and structure completion

Farm		Base presence	Implementation Date	Status	Next steps
Paraná		NO	Not applicable. The Base of Jardim Alegre is used.		
P. Prudente		YES	May-2022	Structure, semi-artesian well, water tank, generator, internet, septic tank with sump	Installation of solar panels.
Santa Catarina		YES	Aug-2021	Housing, dining hall, kitchen, water tank, internet.	-
Santa Fé		NO	Not applicable. The Base of São Manoel is used.		
Santa Luzia		YES	Aug-2018	At the beginning of the deployment. Area cleared and terraced.	Building the house, well, internet, generator, or solar panel.
Santa Maria		YES	July-2015	Housing, kitchen, solar energy, internet.	Construction of a semi-artesian well
São José	#1	YES	Aug-2018	Lodging, kitchen, solar energy, internet artesian well.	-
	#2	YES	Jul-2021	Groundwork and foundation completed.	Structure, roof installation and functionalities (kitchen, solar energy, internet, artesian well)
São Manoel		YES	Under construction. Started in Jul-2019.	Roofing, internet, and electrical generator.	Finalizing the structure, construction of a semi-artesian well
São Sebastião		NO	Not applicable. The Bases of São Manoel is used.		
Três Barras		YES	Oct-2021	Structure, bathroom, well, generator, water tank.	Internet and Office

Note: The term "structure" refers to the structure of the house, roof, partitions, floor, kitchen, bathroom, and sometimes housing.

As for the specifics of the monitoring bases, it is noteworthy that the bases of Santa Catarina and São José #2 have lodgings in order to accommodate a large number of project workers for the different services, such as forest management workers. In addition, the Jardim Alegre base will also serve as a stopping point for the project's board of directors, and the Três Barras base still does not have stable internet, and efforts will be mobilized to improve the signal there.



Figure 21 - Surveillance base São José (left) and Três Barras (right).



Figure 22 - Surveillance base Presidente Prudente (left) and Santa Maria (right).

During this monitoring period, the finished bases (Presidente Prudente, Santa Catarina, Santa Luzia, Santa Maria, São José #1 and São José #2 and Três Barras) also received identification plate, as per photographic records presented below and to the audit body.



Figure 23 - Plates for bases of Santa Maria (left) and Presidente Prudente (right)

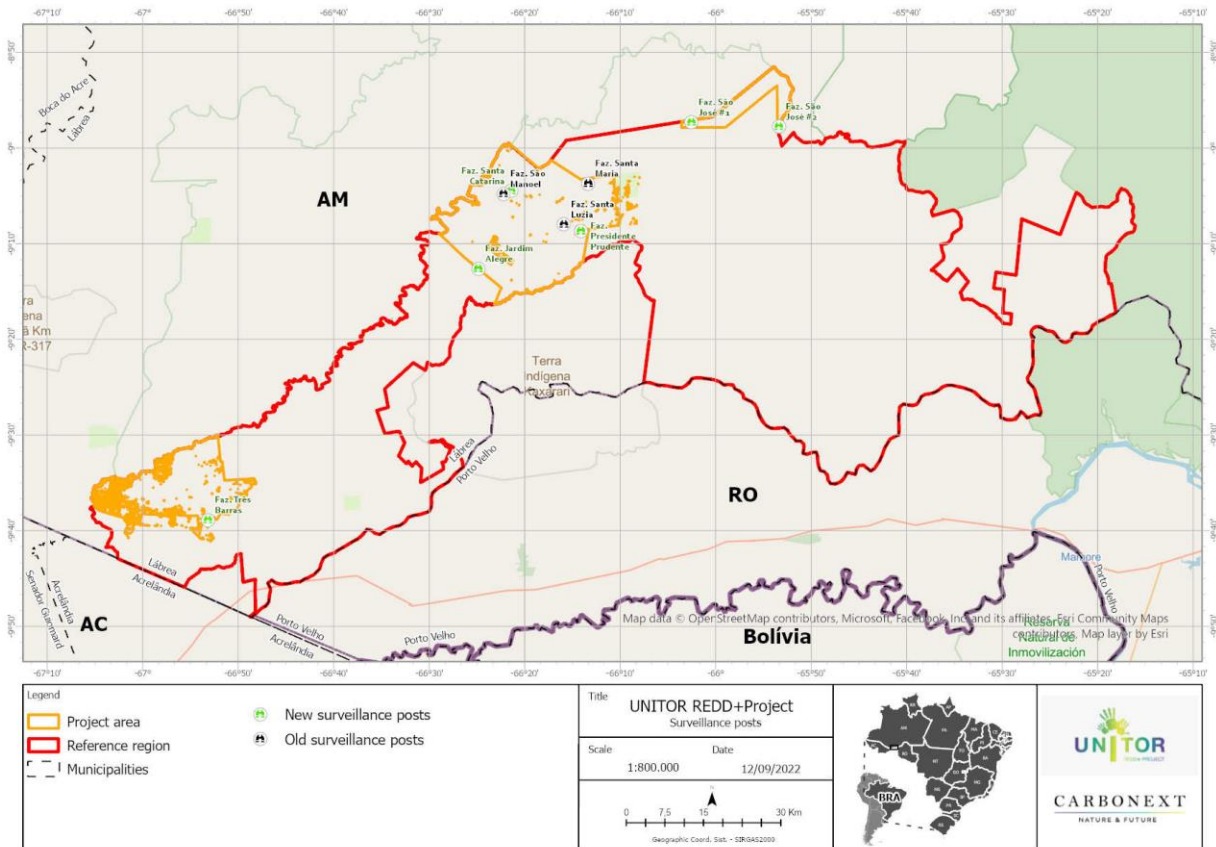


Figure 24: Location of the surveillance bases

Other improvements

In November 2021, a bridge was built over the Igarapé, at the “Ramal da Mococa”, approximately 5km from BR 364. In rainy seasons, the igarapé makes it impossible to cross due to flooding, which makes the road unsuitable. Thus, the bridge was built with the purpose of allowing the circulation of vehicles by the population, neighbors, and workers of the REDD+ Unitor Project.

The bridge is located on one of the two access roads to the project. The Unitor team periodically improves the roads, which included the construction and maintenance of bridges (figure below). These project’s community stakeholders live along these roads and had reported the need for road improvement. The need for improvements was also reported in the operational health and safety checklists, evidenced to the auditor. The improvement of the roads and the request made by the community was verified by the auditor during the field visit.



Figure 25 - Construction of the bridge, Mococa Branch Line.

The map below shows, in red, the location where the bridge was built.

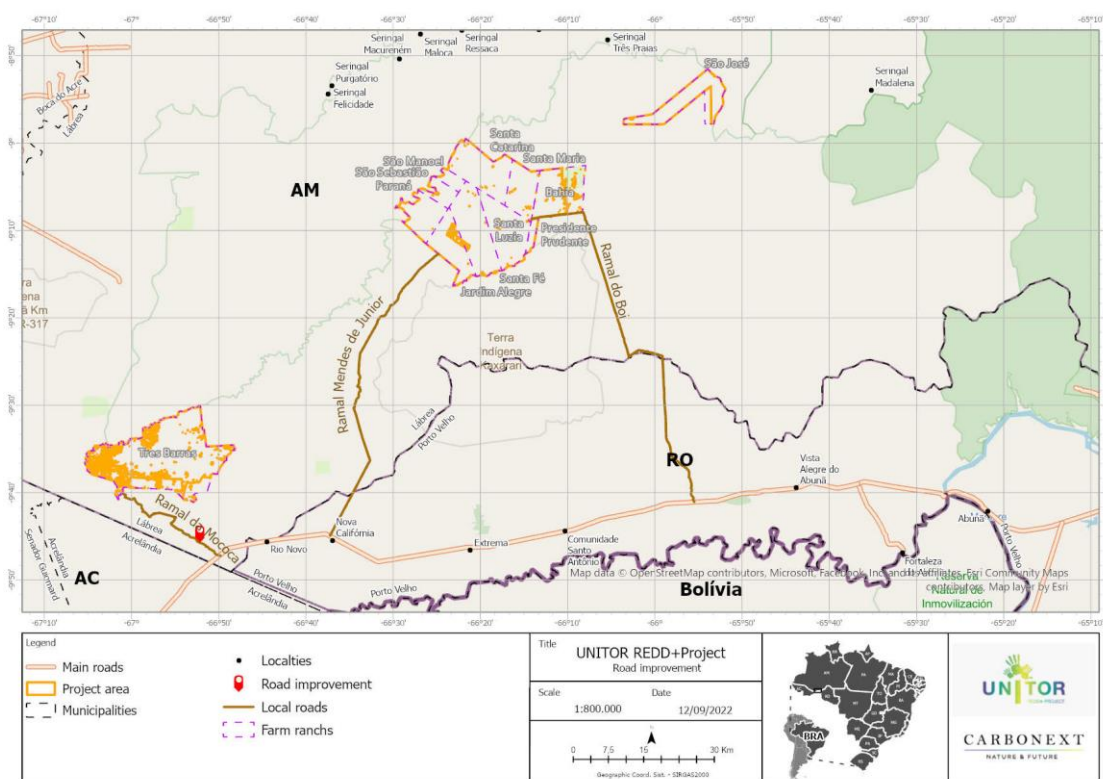


Figure 26 - Location of the Bridge constructed.

3.1.4 Related Monitoring against deforestation

Periodically, air, fluvial and terrestrial patrols are carried out in order to curb invasion, illegal deforestation and detect outbreaks of forest fires. In addition, the presence of workers in

management activities is the first factor to inhibit encroachment pressures within the Project Area.

During this monitoring period, 140 monitoring rounds were conducted for the Unitor REDD+ Project farms, as per the documents 'Occurrence Report' presented to the auditing body. Monitoring was conducted in all months during this monitoring period in all the twelve farms belonging to the Unitor REDD+ Project.

After all the monitoring activities an occurrence report is filled. During the months presented in the table below, in addition to the report, tracking points of the route were generated using Avenza Maps. Monitors were instructed on the use of the app. The monitoring by car has an average of 121km per route, totalizing 605 km, most of that during the dry season. Some monitoring activities occurred by river, with 46,6 km long. The map below shows all the paths taken by the monitoring team during the activities.

Table 12: Monitoring activities tracked during this monitoring period

	Date	Distance (km)
Car	September 2021	110
	October 2021	128
	December 2021	129
	May 2022	144
	June 2022	94
Boat	June 2022	46,6
TOTAL		651,6

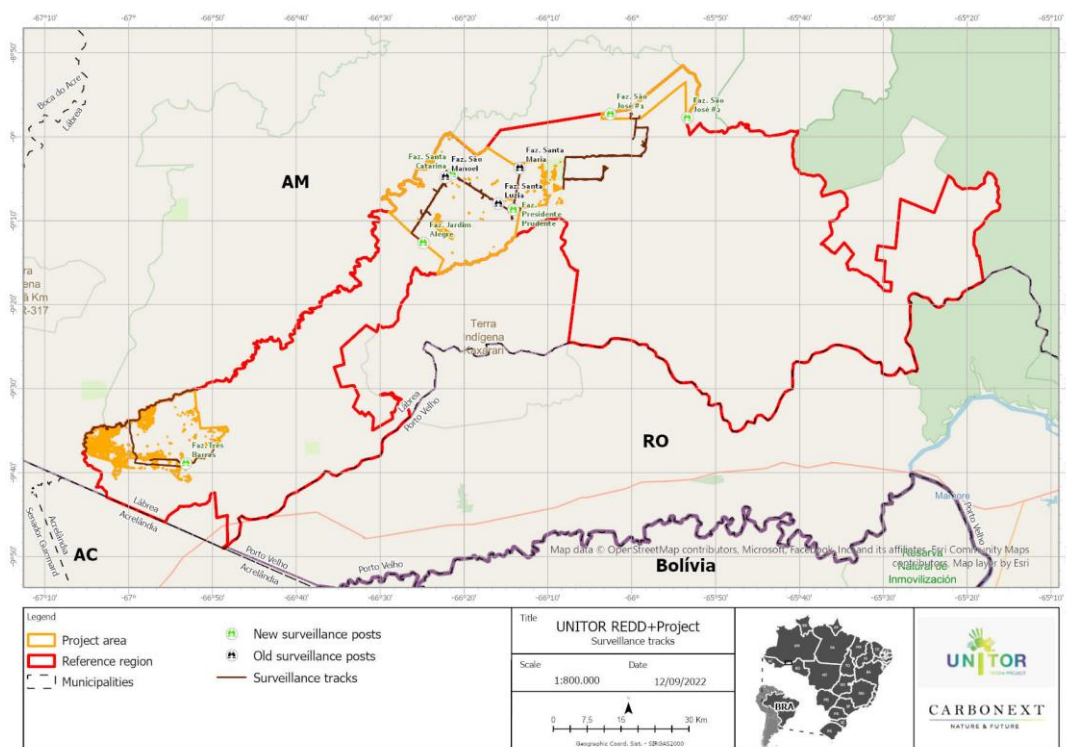


Figure 27: Monitoring activities tracked during this monitoring period

Air monitoring is only performed in cases of a verification that cannot be made by land, river or remotely. During this monitoring period, no air monitoring was made.

The model of the Occurrence Report follows the pattern presented by Forest Integrity Monitoring Plan developed by the Unitor team, and each document presents information about the name of the monitor, the place monitored, type of displacement, description of the local situation, photographic records, signature of the person responsible, among others.



Figure 28 - Workers using the Personal Protective Equipment in UNITOR REDD+ Project.

During this monitoring period, no serious occurrences such as fire outbreaks, illegal logging, trespassing or poaching were recorded. The majority had no occurrences, which, when recorded, were represented by holes in the road or branching obstructing the passage. In these cases, the Unitor Team carried out remediation. In addition, Occurrence Reports were made when alerts from the MonitoraCarbon system were identified, described below, in order to verify the situation onsite.

Implementation of the MonitoraCarbon

A remote monitoring system developed and monitored by Carbonext, named MonitoraCarbon, was implemented in April 2022. The system analyses satellite images from different sensors, as well as radar images, with a maximum frequency of 7 days. The system takes the image, evaluates the quality, processes it, detects any abnormality (probable deforestation), and sends notifications for validation, which is confirmed visually. What is validated as probable deforestation, the system will issue the alert, sending the warning by email, with date, image, dimension, etc, and a map for those responsible for the responsive action to take the necessary measures.

During this monitoring period, the system detected four abnormality events and sent the alerts. The details of the alerts, including the identified cause and resolution is presented below. No event detected had as cause invasion or illegal deforestation. The full reports for each of the verification of the events were presented at audit.

Detection #1

Date of Detection: 06/04/2022

Date of Inspection: 06/04/2022 (first verification) and 28/04/2022 (field verification)

Location: Santa Catarina Farm

Cause: Roads and terraces used for Sustainable Forest Management.

Resolution: No resolution action needed.

Maps and Photographs taken as evidence:

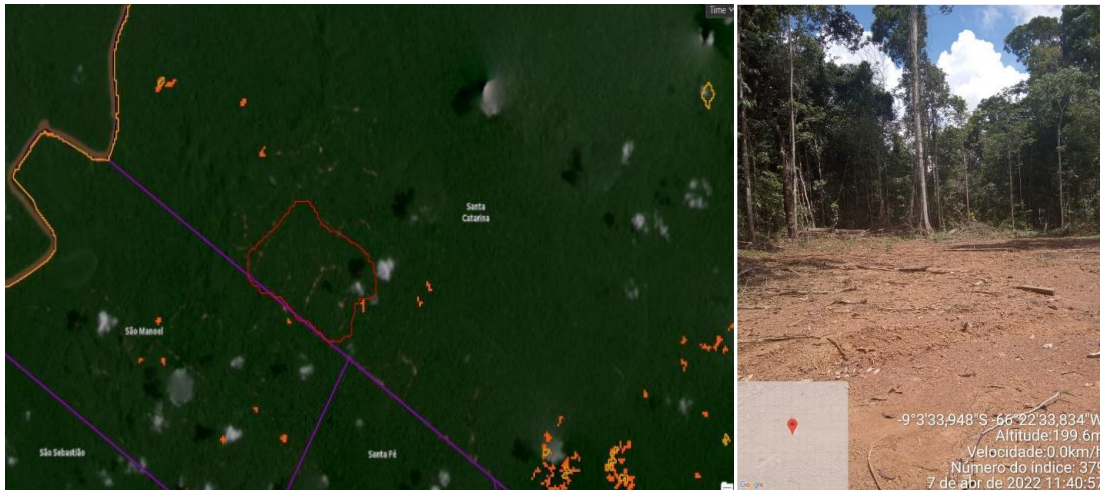


Figure 29: MonitoraCarbon #1 image detected (left) road image (right)

Detection #2

Date of Detection: 07/07/2022

Date of Inspection: 08/07/2022

Location: Bahia Farm

Cause: Maintenance of pasture area that borders with the project area, with cleaning of shrub vegetation from the pasture area, without any intervention in the native forest area.

Resolution: During the dry period, a visible identification of the boundaries of the pasture area with the Project Area will happen. This can be done by making a “dash” along the entire length of the pasture boundary marked with signs. After that, the farm team will be guided in this regard.

Maps and Photographs taken as evidence:



Figure 30: MonitoraCarbon image #2 detected (left) and Verification route (right)



Figure 31: Image of the detected area

Detection #3

Date of Detection: 22/07/2022

Date of Inspection: 22/07/2022

Location: São José and Panorama, União, Recanto (the three areas that left the Project)

Cause: It was detected a stronger deforestation pressure coming from outside the project area. No detections inside the project area were identified. The alert had as objective to be a preventive action.

Resolution: The team reported that they are aware of suppression activities taking place on neighboring properties and are in contact with the neighbors to ensure that property boundaries are respected.

Maps and Photographs taken as evidence:

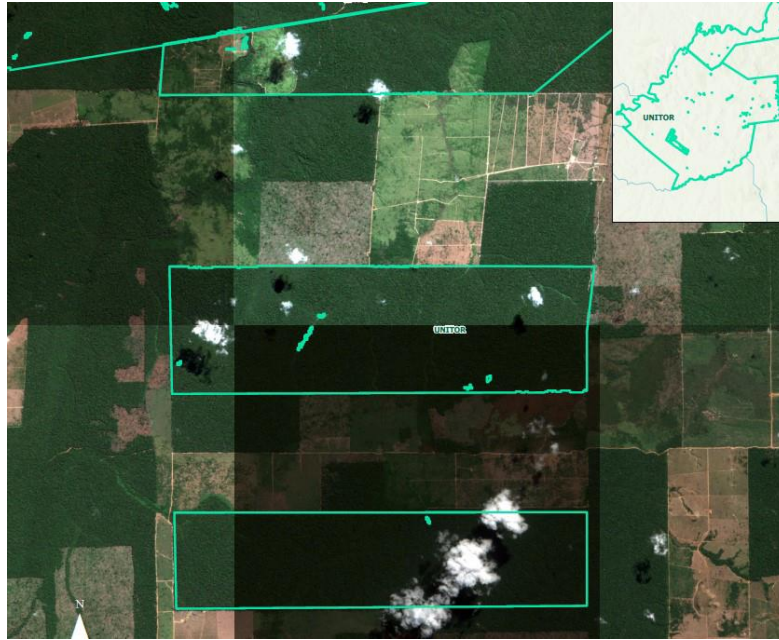


Figure 32: Deforestation pressure identified in the project boundaries

Even though the properties Fazenda, Recanto and União were excluded from the project, they are still monitored by the MonitoraCarbon and the field team.

Detection #4

Date of Detection: 28/07/2022

Date of Inspection: 28/07/2022

Location: Central Group of properties (Santa Catarina, São Manoel, São Sebastião, Paraná and Jardim Alegre) and Três Barras Farm

Cause: The points detected are the access road and boundary (Central Group), and the roads used for the Sustainable Forest Management at Três Barras.

Resolution: No resolution action needed.

Maps and Photographs taken as evidence:

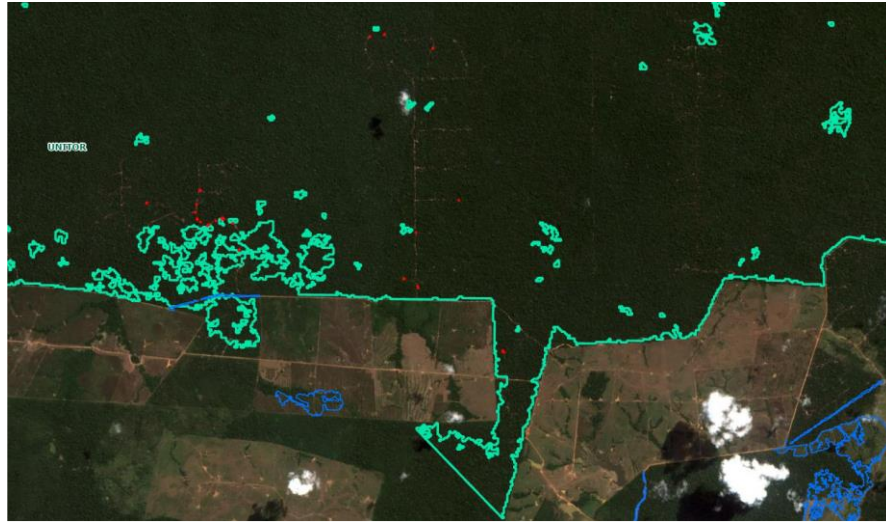


Figure 33: Points Detected in red – road used in the SFM

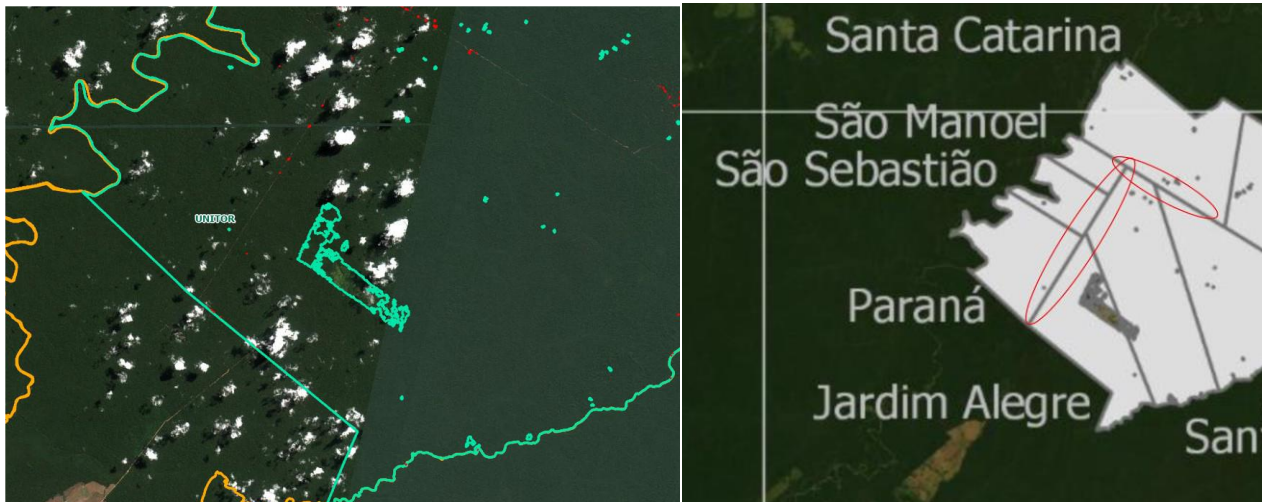


Figure 34: Points Detected in red (left image) and presence of roads (right image)

3.1.5 Development and implementation of the Forest Integrity Monitoring Plan

During this monitoring period, a Forest Integrity Monitoring Plan (FIMP) was developed, and the implementation began. The FIMP has as goal present the set of actions planned for the prevention, contingency and mitigation of risks and their impacts, identified in the Unitor REDD+ Project, so that the integrity of the areas and the forests cover continue without unwanted changes throughout the project.

The structure of this plan is designed to meet the three basic objectives: Prevent, Combat and Mitigate, in the same order of relevance. The image below brings details of each activity identified for the main objectives.



Figure 35: Forest Integrity Monitoring Plan Structure

The Plan is based on Prevention activities, where efforts will be more directed with the intention of blocking scenarios that result in the need for actions of the two other objectives, Combat and Mitigate. The last two objectives are contemplated in this plan with pre-established actions so that, in the event of any accident, there is a prompt response to the contingency and the monitoring of the recovery of the affected area. The Plan, made available to the audit team, describes in detail each of the steps listed in the figure below.

Table 13: Status of the Forest Integrity Monitoring Plan Activities

Activity	Status	Result During this Monitoring Period
Operational Process - Health and Safety	In implementation	Training on the OP with the employees in course.
Operational Process - Forest Integrity Monitoring	In implementation	Training on the OP with the employees in course.
Fire Brigade Training	Implemented	Fire Brigade Training was held at Ramal do Boi, with the total of 19 participants.
Good practices at Sustainable Forest Management Training	To be started	N/A
Sustainable Cattle Raising Training	Implemented	Sustainable Cattle Raising Trainings were held at Santa Maria (Ramal do Boi) and São Roque (neighboring farm), with the total of 31 participants.
Operational Process - Fire Brigade	To be started	N/A
Process for the Removal of Invaders	To be started	N/A
Communication Flow	Implemented	The project employees were trained on the communication flow.
Impacted Area Isolation Procedure	To be started	N/A
Monitoring of natural forest recovery	To be started	N/A
UNITOR REDD+ Project Aspects and Impacts Matrix	Implemented	Definition of the aspects, impacts, severity, and activities of control (preventive, contingency and mitigation actions).

All Project employees are being trained on the Forest Integrity Monitoring Plan. The activities implemented, or that are in implementation are summarized below:

- **Operational Process - Forest Integrity Monitoring**

It defines the main actions that will be used with the objective of preventing land invasions, theft of forest products, illegal hunting and fishing, in addition to identifying fire outbreaks at the beginning. This operational procedure is considered to be the “core” of the actions when it comes to forest maintenance of the Project Area. All other foreseen procedures or activities converge, assist or complement this procedure. It clearly contains the mode of operation of the main members of the monitoring action and the frequency the monitoring will take place. In addition, it shows how to record and document the activities.

- **Operational Process - Health and Safety**

This operational procedure was designed to describe the main actions and observations to be made during an assessment of the working conditions and occupational health of the employees working on the premises of the UNITOR project. As an example, we can mention all the activities involved in the Sustainable Forest Management Plans and monitoring activities, among others.

The procedure also contains a form for the report, which has the evaluation to the main points to be observed. It should be applied twice a year, whenever possible, on all active work fronts on the project properties. Furthermore, it describes the indicators that will be used to evaluate the activities and promote continuous improvement.

- **Sustainable Livestock Training**

The main objective of this training is to disseminate practices in the management of pastures and livestock that provide more sustainable conditions to pasture areas. It focuses on optimizing the use of open pasture areas, thus avoiding the expansion of pastures to forest areas.

- **Fire Brigade Training**

The Fire Brigade training has as main objective to prepare a qualified contingent to fight the outbreaks and installed fires. It is also a preventive action as anticipates occurrences. In addition, it prepares the entire workforce trained in fire prevention, fire identification and the communication of the occurrence to the project.

The target public of the trainings are the project employees and employees from outside the project area, residents of other properties outside the project. In this way, the capacity for firefighting actions is expanded and stimulated beyond the project area. The frequency of this training should be annual. Each year, in addition to new trained members, already trained employees must receive renewal training.

- **Communication Flow**

The communication flow defines the actions and communication that must be followed immediately after detection of any harmful event that involves any of the risks already detected in the FIMP. All employees are trained in this flow and must act accordingly. The flow is described in the image below.

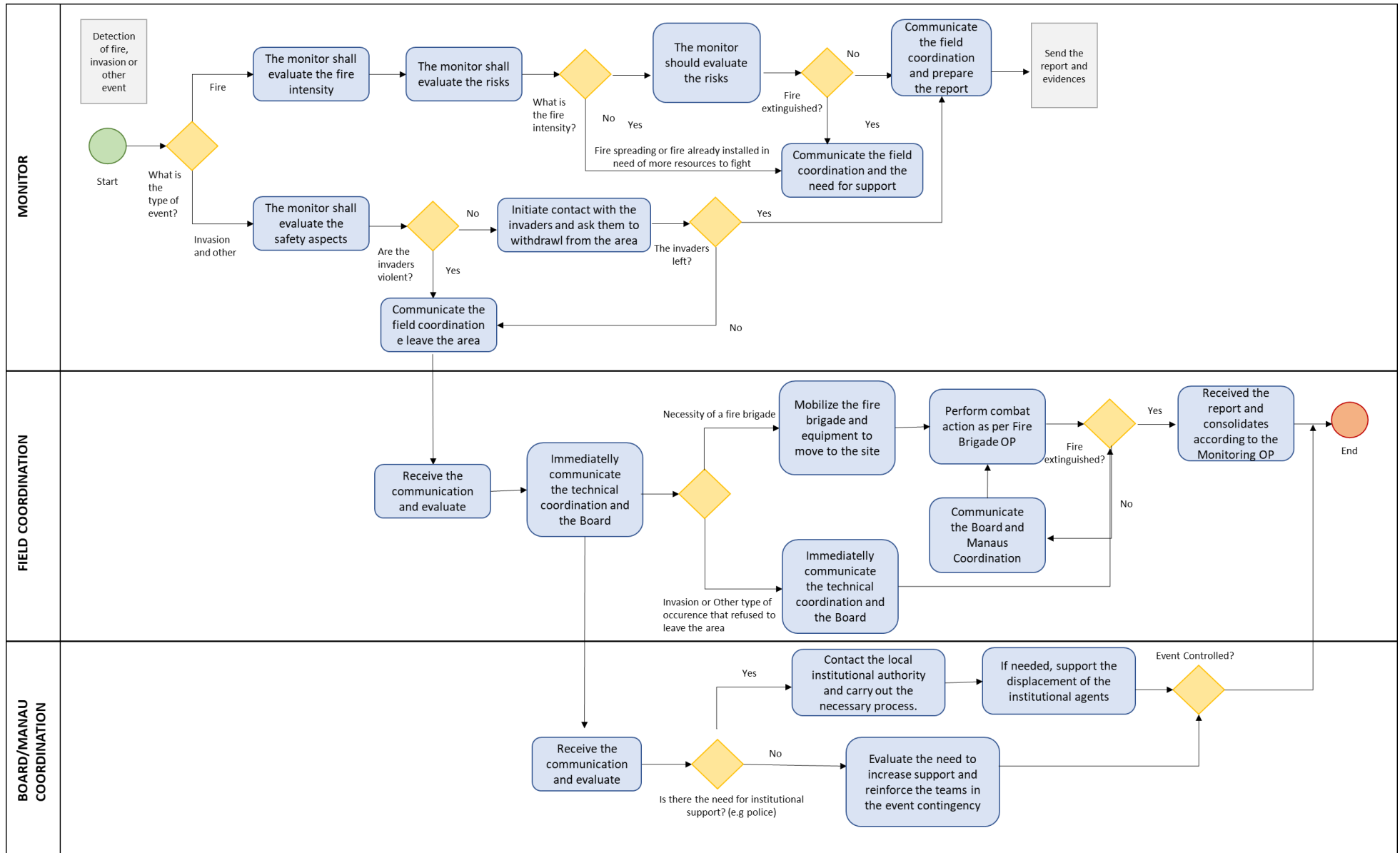


Figure 36: Communication Flow – Forest Integrity Monitoring Plan

3.1.6 Sustainable Forest Management

During this monitoring period, sustainable forest management was carried out at five locations, called Forest Management Unit. In total, it was explored 57,920.65 m³, in an area of 2,335.41 ha.

Table 14: Sustainable Forest Management Activities

Year/Location	Volume (m ³)		Area (ha)
	2021	2022	
São Manoel	2,499.87	1,787.08	173.13
Santa Catarina	14,892.59	10,109.85	1,000.38
Santa Maria	0.00	9,364.51	386.47
Três Barras (FMU2)	10,622.10	4,880.68	624.41
Três Barras (FMU5)	3,763.96	0.00	151.02
Total	31,778.52	25,870.40	2,335.41

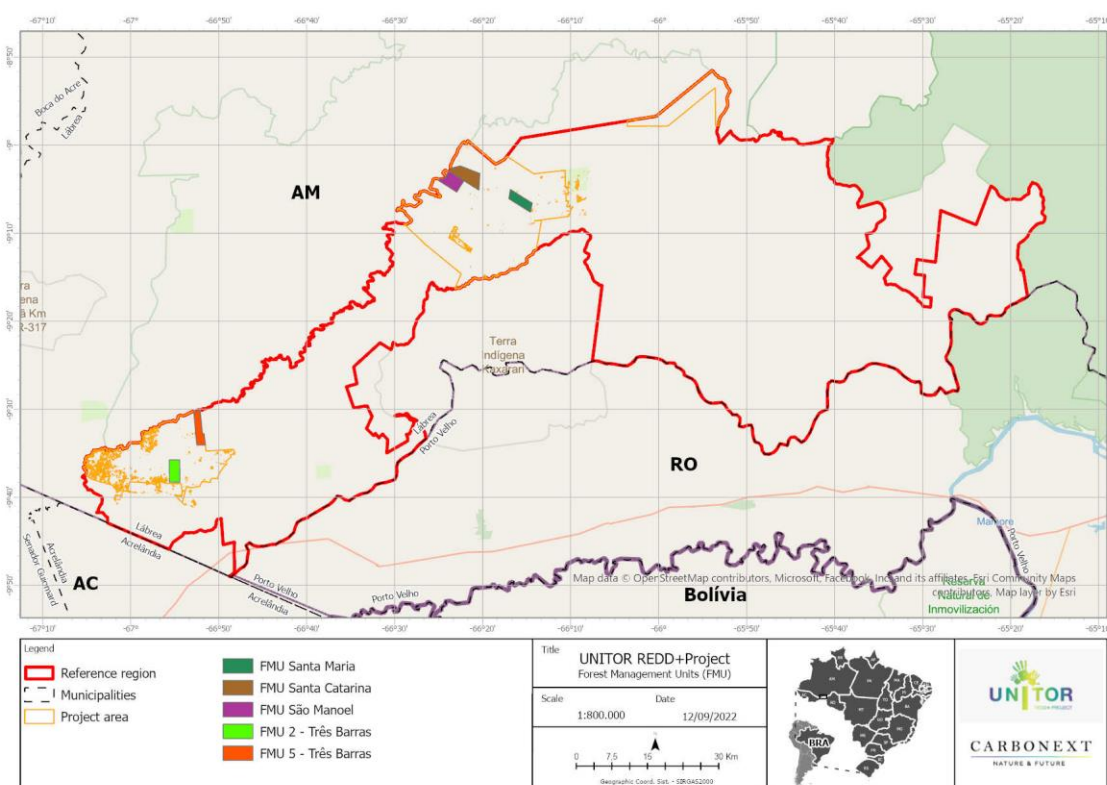


Figure 37: Location of the Sustainable Forest Management Activities

The Operational Licenses and evidence of the volume was presented during audit.

3.1.7 Monitoring and management of risk factors for leakage and non-permanence

The section 1.17 of the VCS-PD described the activities to be implemented in order to monitor leakage and non-permanence risk factor. During this monitoring period, the leakage management activities of the project are as follows:

- *Technical training on sustainable cattle raising:* With the objective of qualifying a labour force that finds little opportunity to work in the region and ends up taking part in illegal settlements and land occupation.
 - This action was held in July 2022, as described in the sections 3.1.1 above.
- *Training of fire brigades:* Training with the objective to prepare fire brigade members and employees on fire prevention, fire identification, firefighting and the communication of the occurrence to the project and, consequently, protect the project area and decrease possible areas affected by fire events.
 - This action was carried in July 2022, as described in the sections 3.1.1 above.
- *Surveillance activities designed to mitigate illegal logging and land occupation:* In order to increase the surveillance of the area, 3 bases were constructed and 1 motorbike were purchased during the monitoring period.
- *Combatting illegal land occupation and illegal logging:* The combatting of invasions was carried out, during this monitoring period, in several ways. Among them we can list:
 - The ongoing surveillance in the project area, by land and remote;
 - Implementation of the Forest Integrity Monitoring Plan;
 - The building of a good relationship with neighbouring farms and communities, who act as a communication channel about possible invasion events, and also as a means of spreading that the area belongs to a project that protects and preserves the forest.
- *Identification of deforestation events:* The MonitoraCarbon system was implemented, as mentioned in previous sections, in order to identify abnormalities in the project area, including fire events and deforestation. During this monitoring period, four alerts were identified, and the corrective action was performed normally the next day.

Regarding the monitoring of the Non-Permanence Risk Factors, they will be monitored through remote sensing, literature data, and internal Carbonext processes, in accordance with the Non-

Permanence risk tool, completed at each monitoring event⁸ approach being as follows for each risk category:

Internal risks: Carbonext internal control of project management methods and team, Financial Viability assessed through contact with project proprietors; opportunity cost assessed through financial modelling according to AFOLU Non-Permanence tool.

External risks assessed as per description in the VCS-Non-Permanence-Risk-Report-Template, broadly summarized below: Land-tenure and Resource Access/Impacts assessed according to contact with project owners and repeated stakeholder consultations; Community Engagement addressed via stakeholder consultation, which is repeated at each MR; and Political Risk is subject to a desk-based assessment according to AFOLU Non-Permanence Risk Tool.

Natural risks assessed via analysis of satellite images and maps, according to the VCS-Non-Permanence-Risk-Report-Template repeated at each MR. Leakage will be monitored annually through analysis of satellite images and maps. The remote sensing is carried out according to the following plan:

- 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%.

Identification of fire alerts: As one of the possible natural risks, fires events are identified by the MonitoraCarbon system. After the identification, an alert is sent and the field team is communicated in order to verify and, when needed, start the brigade action.

In relation to the Leakage Belt, it was identified during this monitoring period an overlap between the leakage belt of the REDD+ Unitor Project and the leakage belt of Fortaleza Ituxi REDD Project. As the finding happened during the audit period, the proponents agreed to sign a Leakage Belt Agreement, according to the guidelines of the section 1.1.3 of the VM0015 Methodology, step f. The project proponents agree to adjust the overlapping Leakage Belt areas during the next monitoring period, following the steps a) to d) of Section 1.1.3 of VM0015 Methodology. During this monitoring period, the leakage belt area monitored was the one defined in the project

⁸ NPRR Document provided at audit.

validation. For the following monitoring period, the area will be adjusted, and the monitoring will occur in the new leakage belt area. However, it is important to mention that neither project had leakages, thus, there was no double counting of emissions.

Furthermore, there have been no changes of project proponents or other entities in this monitoring period.

3.2 Deviations

3.2.1 Methodology Deviations

In past few years, the project Reference Region and Leakage Belt Area have been subjected to abnormal increase in deforestation rates, much higher than those initially foreseen in the validated Project Description. In this context, the current deforestation rate scenario is harmful to project feasibility, as Leakage estimates would be much higher than projected avoided deforestation inside the Project Area.

Increase in deforestation rate

The deforestation rate in the Reference Region increased much faster in recent years than the project team could forecast in statistical projection models. Total deforestation in the Reference Region for the historical period from 2009 to 2018 was 46,848.9, averaging of 5,632.5 ha per year, as shown in Table 15. It can be seen that the values of the average ex-post deforestation in the RR (Table 16), for only 5 years, is 5.6 times higher than the average observed during the historic reference period (10 years).

Table 15. Deforestation in the Reference Region for the historical period (2009 to 2017).

year	Historical Period (ha)	Average (ha)
2009	1,033	5,632.5
2010	1,069	
2011	2,494	
2012	4,912	
2013	2,046	
2014	4,084	
2015	4,227	
2016	9,973	
2017	17,010	
2018	9,478	
Total	46,847.9	

Table 16. Deforestation in the Reference Region ex-post (2018 to 2022)

Year	Ex-post Values (ha)	Average (ha)
------	---------------------	--------------

2018	14,909.0	31,597.5
2019	24,350.2	
2020	27,937.2	
2021	62,779.7	
2022*	28,011.6	
Total	157,987.7	

*Values measured until 31st July 2022

The Figure 38 shows that the progression in deforestation increase is much higher from 2018 towards than when compared to the historic reference period. Values from 2022 were measured until the end of this monitoring period, being 31st of July 2022, not accounting for the whole year.

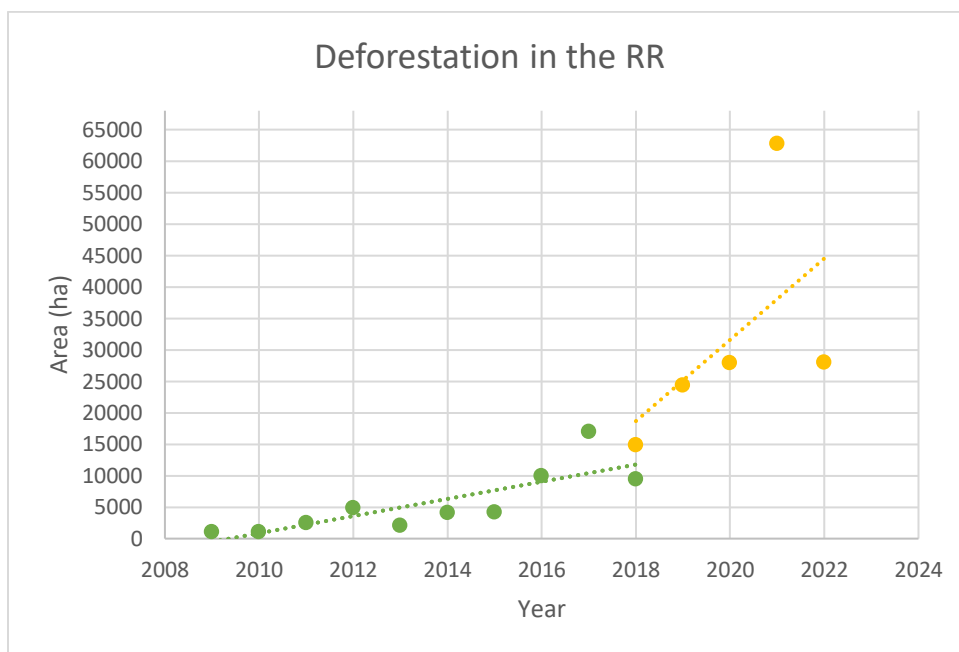


Figure 38. Historical deforestation in Reference Region from 2008 to 2018 and ex-post values.

The total ex-ante deforestation rate in Reference Region from 2018 to 2022 was estimated in 60,500.2 hectares, while the ex-post values from 2018 to 2022 were 152,526.2 hectares (i.e., a 185.4% increase). The same pattern can be observed in the Leakage belt. The total ex ante deforestation in the LB from 2018 to 2022 was estimated in 48,389.5 hectares, increasing to 121,637.4 hectares from 2018 to 2022 (i.e., a 166.5% increase), when measured ex post. This can be seen in the figures and table below. The increase in the RR and LK follows the same pattern, but with values in the leakage belt smaller than the ones in the RR.

Table 17. Deforestation ex-ante and ex-post in Reference Region and Leakage Belt from 2018 to 2022

Values observed during MR1						
year	RR (ha)			LB (ha)		
	Ex-ante	Ex-post	% Increase	Ex-ante	Ex-post	% Increase
2018	9,969.7	9,447.5	-5%	4,149.6	2,864.0	-31%
2019	15,387.3	24,350.2	58%	13,433.1	20,132.7	50%
2020	14,004.4	27,937.2	99%	12,253.8	23,450.9	91%
2021	8,141.2	42,563.8	423%	7,139.8	35,390.2	396%
Total	47,502.6	104,298.7	N/A	36,976.4	81,837.8	N/A
Values observed during MR2						
year	RR (ha)			LB (ha)		
	Ex-ante	Ex-post	% Increase	Ex-ante	Ex-post	% Increase
2021	5,875.5	20,215.9	244%	5,152.8	16,683.1	224%
2022	7,122.1	28,011.6	293%	6,260.3	23,116.4	269%
Total	12,997.6	48,227.5	N/A	11,413.1	39,799.5	N/A
Total from 2018 to 2022						
	RR (ha)			LB (ha)		
	Ex-ante	Ex-post	% Increase	Ex-ante	Ex-post	% Increase
Total	60,500.2	152,526.2	152,1%	48,389.5	121,637.4	151,4%

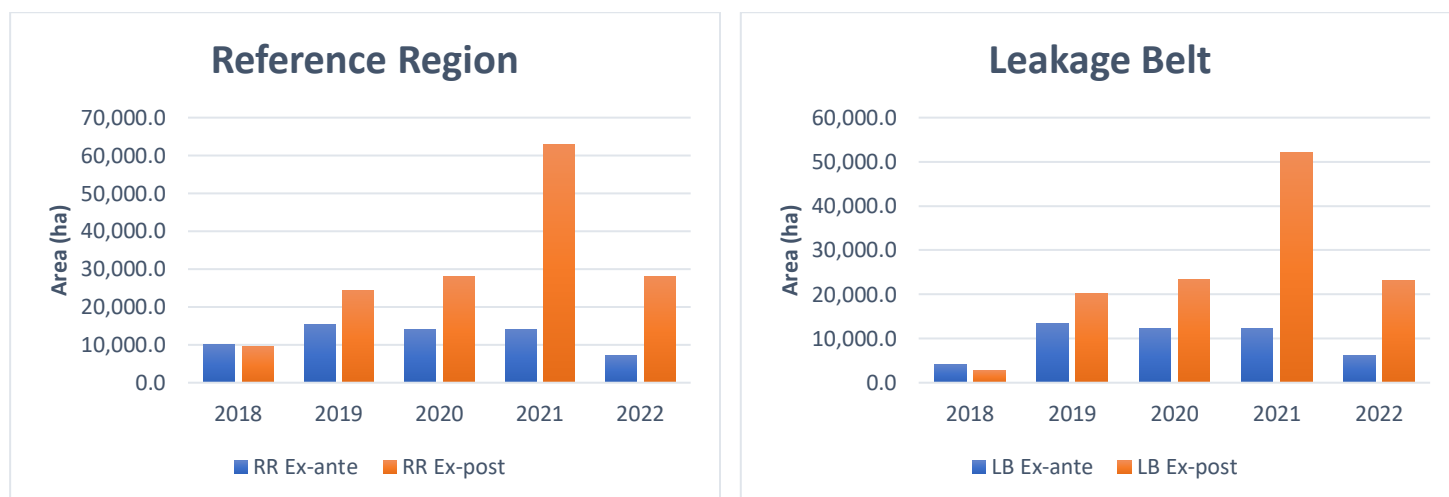


Figure 39. Deforestation ex-ante and ex-post in Reference Region and Leakage Belt

Thus, it is reasonable to affirm that ex-post deforestation rates have reached levels far beyond of those predictable by deforestation models until 2018.

As mentioned in Section 5.3 of this Monitoring Report, the increase of deforestation has as main causes the trends in Brazilian legislation, as the lack of action from the Federal Public Power, the granting of tacit (or automatic) environmental licensing in case of delay of the environmental agency, and the presence of legislation favoring landgrabbers. In addition, this increase reflects the implementation of infrastructure projects, such the acceleration of road paving projects and the construction of bridge over Madeira River. Detailed information on each of these factors are

presented in item 5.3. Thus, it is possible to state that the increase in deforestation in the leakage belt area is not caused by the presence of the Unitor project, but as a reflect of a trend present in the reference region, and Municipality of Lábrea, as can be seen in the figures below. The same pattern of deforestation ex-post is observed in the Reference Region, in the Leakage Belt and in the municipality of Lábrea⁹. The difference of the values ex-ante and ex-post of the Reference Region is also presented, showing the unexpected deforestation increase that the area is facing.

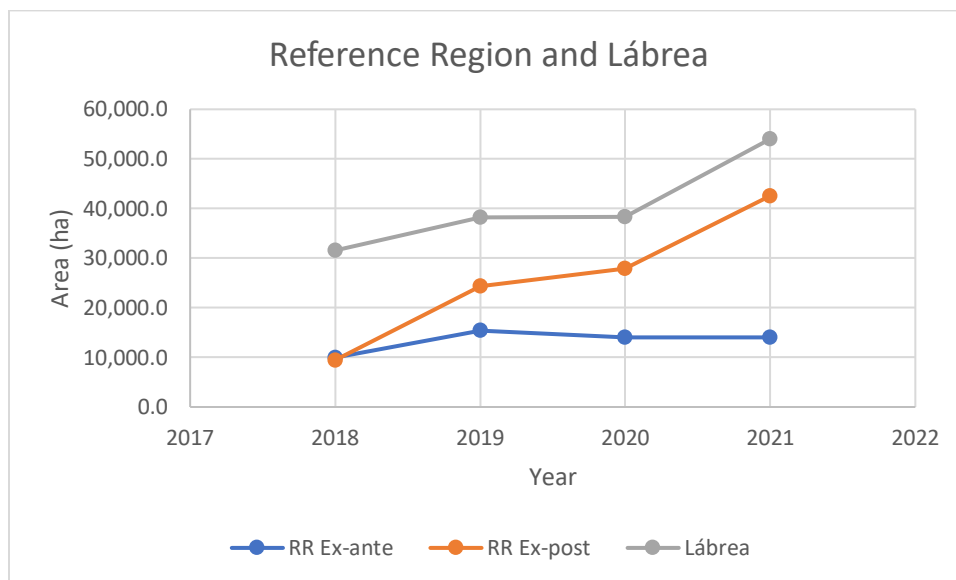


Figure 40: Deforestation trend in the RR and Lábrea

⁹ Data of Lábrea: <http://terrabrasilis.dpi.inpe.br/>

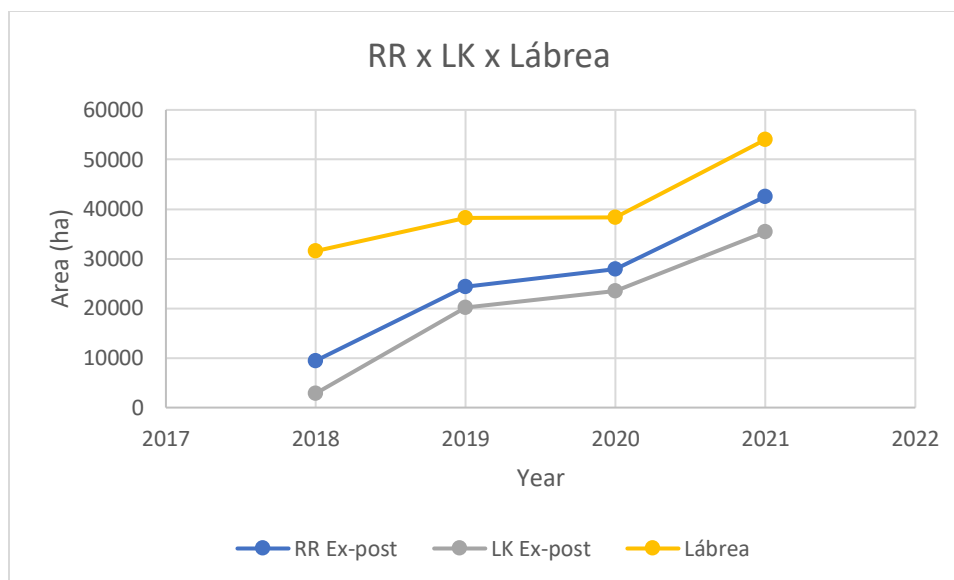


Figure 41: Deforestation trend in the RR, Leakage Belt and Lábrea

Problematics

The current scenario of Baseline and Leakage estimates lead to the following issues:

- Current underestimation of carbon credits in relationship to real deforestation occurring in the neighboring regions;
- Excessive leakage (far higher than leakage estimated ex-ante), which overwhelms emission reductions predicted for this Project.

Conclusion

Given that the Brazilian conjuncture (and that of the Municipality of Lábrea) of highly increasing deforestation cannot be solely attributed to leakage caused by this project activity, the total leakage measured in the Leakage Belt area during this monitoring periods has been adjusted by discounting the percentage difference of deforestation measured in the Reference Region during the verification period, according to the table below. Thus, according to the proved general conjuncture of high increase in deforestation rate in the country, municipal levels, and reference region, independently of this project activity, the project proponent understands that the deviation does not negatively impact the conservativeness of the quantification of GHG emission reductions. The deviation relates only to the criteria and procedures for monitoring or measurement, and do not relate to any other part of the methodology.

In this context, the actual values of deforestation in the Leakage Belt were corrected by discounting the effect observed in the Reference Region, as a correction for conjunctural unusual increase in deforestation in the RR and Municipality of Lábrea. This unusual increase in deforestation has also affected the Leakage Belt area and cannot be attributed to this Project Activity. The results of this correction are shown below and in Section 5.3 of this MR.

Table 18: Adjustment of the ex-post leakage values

Year	Project year t	Total LK -Ex ante		Total LK - Ex Post	Adjusted annual ex post deforestation in the leakage belt		Percentage difference observed in the RR (δ)	percentage difference in LB (δ)
		annual	cumulative	annual	annual	cumulative		
		ABSLLKt	ABSLLKt	ABSLLKt	ABSLLKt	ABSLLKt		
		ha	ha	ha	ha	ha		
2021	3	5,152.81	5,152.81	16,683.08	4,848.72	4,848.72	71%	69%
2022	4	6,260.30	11,413.10	23,116.43	5,877.45	10,726.16	75%	73%
Total		11,413.10	N/A	39,799.32	10,726.21	N/A	N/A	N/A

3.2.2 Project Description Deviations

For previous MR, no project description deviations were identified during the development.

However, during this monitoring period, the following project description deviations took place. None of the deviations impact the applicability of the methodology, additionality or the appropriateness of the baseline scenario, as per the justifications presented below:

1. The community and biodiversity parameters, presented at the Project Description at Section 5.3 (*Monitoring Plan*), subitem 5.3.4 (*Community and Biodiversity Variables to be Monitored*), were excluded from the correspondent item (4.3 Monitoring Plan) in this Monitoring Report, once the VCS Monitoring Template specify the description of the monitoring data and parameters set out in Section 4.2 (*Data and Parameters Monitored*). The social and biodiversity parameters will continue to be monitored, following the activities and indicators presented in Tables 65 and 66 of the PD, and the results will be presented in Section 3.1 of this MR and following MRs. Since this deviation is only a reallocation of information to Section 4.2 of this Monitoring Report, it does not imply in any change in additionality, appropriateness of the baseline scenario, or the applicability of the methodology. According to item 2 of Section 3.19.2 of the VCS Standard (v4.3), this deviation fits as a Project Description Deviation for the reason of keeping in accordance with the latest version of the VCS Monitoring Report Template.
2. Another project description deviation in the Section 4.3- Monitoring Plan was due to the improvement of the monitoring system. The implementation of the MonitoraCarbon was

- included as a part of the monitoring plan. Also, the implementation of the Forest Integrity Monitoring Plan brought changes to the organization and responsibilities of the parties involved. The improvement of the monitoring system (remote and ground) does not affect the additionality, baseline scenario, or the applicability of the methodology.
3. The Section 4.3 of this MR was also updated in order to include how the monitoring of the 3 excluded areas (cited below at item 5 of this section) will be carried out during the 30-years project longevity period. The monitoring will continue to take place using MonitoraCarbon, through the ground rounds, as well as satellite images. The inclusion of this specification and the ongoing monitoring of these areas during the project longevity do not impact the additionality, the baseline scenario nor the applicability of the methodology.
 4. In addition, for this period, the monitoring parameter “Biomass growth after logging” was included to monitor the average annual increment of above-ground forest biomass after logging. Although in this monitoring period it was used the same value used in the project description, from West et al. (2014), the parameter might vary in the case of the use of a more updated secondary source or even a value obtained in an on-site field survey. Thus, it was considered important to add the parameter in the section of this Monitoring Report. This PD deviation has been applied for the purpose of being able to update the parameter as new sources might be made available. This deviation does not affect the additionality, baseline scenario, or the applicability of the methodology.
 5. Three properties (three areas) had their registration cancelled, on December 2021, due to a process with the Federal agency INCRA (National Institute of Colonization and Agrarian Reform). Details of each property are listed below.

Table 19: Details of the three properties that had their registration cancelled

Property Name	Ownership	Total property Area (ha)	REDD PA Area (all forest) (ha)	PA area composition (%)
Fazenda União	Rio Negro Gestão e Comercio de Produtos Agroflorestais	1,642.41	1,631.63	1.6%
Fazenda Recanto	Rio Negro Gestão e Comercio de Produtos Agroflorestais	2,025.01	2,024.38	2.0%
Fazenda Panorama	Rio Negro Gestão e Comercio de Produtos Agroflorestais	1,110.74	1,108.45	1.1%

This resulted in the withdrawal of these properties from the project and the modification of the project area, with a discount of 4,764.46 ha from the total area, representing 4.7% of

the PA. The new project area is of 94,270.74 ha. The updated list of the project properties is presented in section 1.7 *Project Location*.

This deviation did not impact the additionality, since none of these properties had pre-project economic activities taking place and only one, Recanto Farm, had a SFMP foreseen for the next years. Thus, there were no significant changes in the results of the financial analysis. The new results of the additionality analysis were presented at audit to confirm the non-impact.

The baseline scenario is not affected by the withdrawal of the areas. The baseline emissions were updated in order to discount the effect that these areas had on the projections performed in the project description. The results are presented in section 5.1 of this Monitoring Report. The net GHG Emission Reduction and Removals during this monitoring period were calculated in accordance with the new baseline emissions.

There is no impact in the applicability of the methodology. In accordance with VCS Standard v4.3, regarding the requirements to be followed when an instance leaves a grouped project before the end of its 30-year longevity period, the Unitor project have continued to monitor the three properties areas and will continue to monitor for the remaining of the project duration, following the monitoring requirements of the applied VCS methodology. The monitoring has continued to be implemented as defined in the PD, with ground, remote and, when needed, air rounds. Evidence of the continued monitoring can be seen at Section 3.1.4 and during the audit visit. Section 4.3 describes how the monitoring of these areas will take place. In case of a loss event in these areas, the quantification and reporting of the event will be performed according to the applied methodology and the VCS Program document Registration and Issuance Process.

The monitoring procedures for the three excluded areas were added in the section 4.3.4 of this MR, including the steps that will be taken in the event of a loss. In addition, the parameters monitored for these areas were added in the section 4.2. of this MR.

6. It was identified during this monitoring period an overlap between the leakage belt of the REDD+ Unitor Project and the leakage belt of Fortaleza Ituxi REDD Project. As the finding happened during the audit period, the proponents agreed to sign a Leakage Belt Agreement, according to the guidelines of the section 1.1.3 Leakage belt of the VM0015 Methodology, step f. In addition, steps a) and c) were also performed in order to meet the requirements of VM0015 Methodology, while items b) and d) will be presented in the next monitoring report according to the justification presented in the document "Leakage Belt Overlap Report", made available to the audit team. For this monitoring period, the quantification of deforestation in the leakage belt area was performed for the LB area defined in the project validation. For the next monitoring period, the area will be adjusted, and the calculations will reflect the new leakage belt area, both for baseline and ex-post values. It is emphasized that neither project had leakages, thus, there was no double counting of emissions. The leakage belt agreement does not impact the additionality, the applicability of the methodology or the baseline scenario.

3.3 Grouped Projects

No new instance was included in the project during this monitoring period.

4 DATA AND PARAMETERS

4.1 Data and Parameters Available at Validation

Data / 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.
Purpose of Data	• Calculation of baseline emissions • Calculation of project emissions • Calculation of leakage
Comments	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 / Parameter	44/12
Data unit	Dimensionless
Description	Carbon mass to CO ₂ e 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	Conversion from C to CO ₂ based on molecular weights.

measurement methods and procedures applied	
Purpose of Data	• Calculation of baseline emissions • Calculation of project emissions • Calculation of leakage
Comments	IPCC standard value

Data / 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.
Purpose of Data	• Calculation of baseline emissions • Calculation of project emissions • Calculation of leakage
Comments	Peer-reviewed work performed in the region of the Project Area, with a similar vegetation typology. The statistical quality of model is in accordance with methodology requirements

Data / 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
Purpose of Data	• Determination of baseline scenario (AFOLU projects only) • Calculation of baseline emissions • Calculation of project emissions • Calculation of leakage
Comments	N/A.

Data / Parameter	Cab_{icl}
Data unit	tCO ₂ /ha
Description	Average carbon stock per hectare in the above-ground biomass carbon pool of initial forest class icl
Source of data	Forest biomass inventory carried out in Fortaleza Ituxi REDD Project in the municipality of Lábrea, nearby the Project area. Further details are provided in "1.13 Conditions Prior to Project Initiation" of this VCS-PD
Value applied	577
Justification of choice of data or description of measurement methods and procedures applied	As a forest biomass inventory has been carried out in a neighboring REDD project in the municipality of Lábrea, data have been used for this estimate. In this inventory, an average biomass of 189.6 t/ha has been obtained as result. 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, 35:881-908". (Table 4; pg. 890; minimum value deducted from lowest limit.: $1.743 - 0.083 = 1.66$). The result of this multiplication is 314.7 t/ha, whose conversion to CO₂ corresponds to 577 tCO₂/ha.
Purpose of Data	• Calculation of baseline emissions
Comments	Field measurements and literature studies used for this assessment, as well as respective calculations, are available for consultation by the audit team.

Data / Parameter	Cbb_{icl}
Data unit	tCO ₂ /ha
Description	Average carbon stock per hectare in the below-ground biomass carbon pool of initial forest class icl
Source of data	Forest biomass inventory carried out in Fortaleza Ituxi REDD Project in the municipality of Lábrea, nearby the Project area. Further details are provided in "1.13 Conditions Prior to Project Initiation" of this VCS-PD
Value applied	176
Justification of choice of data or description of measurement methods and procedures applied	As a forest biomass inventory has been carried out in a neighboring REDD project in the municipality of Lábrea, data have been used for this estimate. In this inventory, an average biomass of 189.6 t/ha has been obtained as result. This value has been multiplied by BEF (1.66, see table above), which resulted in 314.7 t/ha (aboveground biomass). This later value has been multiplied by the root-shoot ratio ®. 0.31 root-shot ratio (R) was applied (average of following references: 0.37 root-shoot ration (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). The multiplication of aboveground biomass (314,7 t/ha) by the R results in 96 t/ha of biomass, which converted to CO₂ corresponds to 176 tCO₂/ha.
Purpose of Data	Calculation of baseline emissions
Comments	Literature studies used for this assessment, as well as respective calculations, are available for consultation by the audit team.

Data / Parameter	Cab_{fcl}
Data unit	tCO ₂ /ha
Description	Average carbon stock per hectare in the above-ground biomass carbon pool of final post-deforestation class fcl.
Source of data	2006 IPCC Guidelines for National Greenhouse Gas Inventories, V. 4, Chapter 6: Grassland, pg. 6.27, Table 6.4 (for Pasture)
Value applied	Baseline: 16.8; Project emissions: 5.9
Justification of choice of data or description of	Conservative default value from IPCC, to estimate post-deforestation land use carbon stock.

measurement methods and procedures applied	
Purpose of Data	Calculation of baseline emissions
Comments	Conservative average to be used in calculations, based on uncertainties in source values. For both confidence Intervals (above and belowground biomass), the upper limit has been selected to be conservative. Thus, the highest possible value of pasture biomass is adopted for conservativeness purposes.

Data / Parameter	Cbb_{fcl}
Data unit	tCO ₂ /ha
Description	Average carbon stock per hectare in the below-ground biomass carbon pool of final post-deforestation class fcl.
Source of data	2006 IPCC Guidelines for National Greenhouse Gas Inventories, V. 4, Chapter 6: Grassland, pg. 6.27, Table 6.4 (for Pasture)
Value applied	26.9
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.
Purpose of Data	Calculation of baseline emissions
Comments	Conservative average to be used in calculations, based on uncertainties in source values. For both confidence Intervals (above and belowground biomass), the upper limit has been selected to be conservative. Thus, the highest possible value of pasture biomass is adopted for conservativeness purposes.

Data / Parameter	Deforestation
Data unit	ha
Description	Maps of forest cover areas converted into non-forest areas
Source of data	Measured through data from MapBiomass or PRODES/INPE (if available) or supervised classification.
Value applied	Yearly variable: deforestation values are presented for the Reference Region, Leakage Belt and Project Area (projections) in the VCS-PD
Justification of choice of data or description of	The project area is located within a region that is subject to a national LU/LC monitoring program such as MapBiomass and PRODES. The data generated by those programs are able to be

measurement methods and procedures applied	used in this project. Both sources are applicable for use in this project, according to the criteria listed below (Methodology VM0015): i) monitoring occurs in the entire project area and leakage belt. ii) monitoring occurs in the entire reference region and covers the beginning, middle and end of the fixed baseline period. iii) monitors conversion of forest land to non-forest land. iv) monitoring occurred during the entire fixed baseline period. v) data accuracies are acceptable according to the methodology criteria. An order of preference of data applies to the available sources data: 1) MapBiomass in first order of preference; 2) PRODES in second place; and 3) place self-classification of images.
Purpose of Data	Calculation of baseline emissions
Comments	N/A.

Data / 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. Projections of deforestation within the Leakage Belt have duly been made as part of the present project, according to projections of deforestation presented in Section 4.3 of the PD. The project proponent has conservatively allowed 5% leeway on this estimate, which is unlikely to be surpassed. If this allowance is surpassed, an assessment of how much is due to the project will be conducted during monitoring. Thus, the “Displacement Leakage Factor” (DLF) was conservatively defined as 0.05. It is worthy to notice that the project proponent is continuously divulging and recruiting new landowners to participate in this grouped REDD initiative, which can be also considered as a

	measure to fight leakage. Other leakage fighting activities are also listed in this VCS-PD, as fire brigade trainings, sustainable cattle rising etc.
Purpose of Data	Calculation of leakage
Comments	This value is an ex-ante estimate. Accurate and actual values will be monitored and reported in verification periods.

Data / Parameter	El
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. According to studies comparing the incidence of fires in the Reference Region and the Project Area (for 2019 and 2020), it is evidenced the initial fire occurrences in PA are 74% lower than in the RR. Moreover, none of these occurrences resulted in biomass loss, as demonstrated by satellite imagery. Evidence is available to auditors.
Purpose of Data	Calculation of project emissions
Comments	This value is an ex-ante estimate. Accurate and actual values will be monitored and reported in verification periods.

Data / Parameter	LDF
Data unit	Mg C m ⁻³
Description	Logging damage factor
Source of data	Pearson et al 2014 ¹⁵
Value applied	0.71
Justification of choice of data or description of measurement methods and procedures applied	The Person et al 2014 study was identified as the most authoritative study on this topic relating to sustainable forest management for Brazil.
Purpose of Data	Calculation of project emissions

Comments	N/A.
Data / Parameter	LIF
Data unit	Mg C m ⁻³
Description	Logging infrastructure factor
Source of data	Feldpausch et al (2005) via Pearson et al 2014 ⁹⁶
Value applied	0.27
Justification of choice of data or description of measurement methods and procedures applied	Feldpausch et al (2005) is identified within the Pearson et al 2014 study as the most authoritative study on this topic relating to sustainable forest management for Bolivia and Brazil.
Purpose of Data	Calculation of project emissions
Comments	N/A.

4.2 Data and Parameters Monitored

Data / Parameter	ACPA _t
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). https://www.gov.br/agricultura/pt-br/assuntos/inmet?r=home/page&page=%20rede_estacoes_conv_graf - Periodic reports from area supervisor - INPE (INPE. Instituto Nacional de Pesquisas Espaciais). https://queimadas.dgi.inpe.br/queimadas/portal - itens 1 and 5)
Frequency of monitoring/recording	Each time a catastrophic event occurs
Value monitored	0
Monitoring equipment	Remote sensing and GIS.

QA/QC procedures to be applied	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 90%.
Purpose of the data	• Calculation of project emissions
Calculation method	Remote sensing and GIS
Comments	The analysis was done considering the official data from INMET and INPE, which did not record any occurrence of catastrophic events in the project area during the period of this monitoring report. In this context, “Table 25.f Ex post carbon stock decrease due to catastrophic events” and “Table 26.f Ex post carbon stock increase on areas affected by catastrophic events” have been omitted.

Data / Parameter	ACEXCt
Data unit	ha
Description	Annual area within the excluded areas 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). https://www.gov.br/agricultura/pt-br/assuntos/inmet?r=home/page&page=%20rede_estacoes_conv_graf - Periodic reports from area supervisor - INPE (INPE. Instituto Nacional de Pesquisas Espaciais). https://queimadas.dgi.inpe.br/queimadas/portal - itens 1 and 5)

Frequency of monitoring/recording	Each time a catastrophic event occurs
Value monitored	0
Monitoring equipment	Remote sensing and GIS.
QA/QC procedures to be applied	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 90%.
Purpose of the data	• Calculation of excluded areas emissions
Calculation method	Remote sensing and GIS
Comments	The analysis was done considering the official data from INMET and INPE, which did not record any occurrence of catastrophic events in the excluded areas during the period of this monitoring report. In this context, “Table 25.f Ex post carbon stock decrease due to catastrophic events” and “Table 26.f Ex post carbon stock increase on areas affected by catastrophic events” have been omitted.

Data / Parameter	ABSLKt
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, which is due to displaced deforestation agents from the Project 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 monitored	2021: 0 2022: 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 90%.
Purpose of the data	• Calculation of leakage
Calculation method	Analysis of satellite images and maps
Comments	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. As shown in calculations of this MR, a strong increase in deforestation has been observed in the entire Reference Region ex-post. Thus, it has been considered that the conjunctural increase of deforestation in the Reference Region (including the Leakage Belt) could not be attributed to this project activity, as a general change in deforestation trends has been established in the project region after the project start date, far above the initial ex-ante deforestation estimations presented in the VCS-PD. In general context, deforestation rates in the Amazon can be expected to increase even more compared to those currently observed in the region. Among the main factors for increased

	deforestation after 2018, with an expectation of deforestation rates even higher than those observed historically so far, the following factors can be cited: i) Trends in Brazilian legislation: there are several indications of loosening of environmental legislation in recent years, mainly in the Bolsonaro government framework; ii) Increased demand for beef in the international market.
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Data / 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 monitored	2021: 135.40 2022: 187.61
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 90%.
Purpose of the data	• Calculation of project emissions • Calculation of baseline emissions

Calculation method	Analysis of satellite images and maps
Comments	N/A.
Data / Parameter	ABSLEXt
Data unit	ha
Description	Annual area of deforestation in the excluded areas 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 excluded areas.
Frequency of monitoring/recording	<i>Annually</i>
Value monitored	2021: 0 2022: 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 90%.

Purpose of the data	Calculation of emissions in the excluded area
Calculation method	Analysis of satellite images and maps
Comments	N/A.

Data / Parameter	APLPAicl,t								
Data unit	ha								
Description	Areas of planned logging activities in forest class icl at year t in the project area.								
Source of data	SFMP documents and receipts.								
Description of measurement methods and procedures to be applied	The planned logging area in the project area that result in carbon stock decrease will be subject to monitoring, when significant.								
Frequency of monitoring/recording	Annually								
Value monitored		<table><tr><th>Year</th><th>ha</th></tr><tr><td>2021</td><td>1,275.7</td></tr><tr><td>2022</td><td>1,059.7</td></tr></table>	Year	ha	2021	1,275.7	2022	1,059.7	
Year	ha								
2021	1,275.7								
2022	1,059.7								
Monitoring equipment	Project proponent records according to official SFMP documents and receipts								
QA/QC procedures to be applied	These procedures are subject to requirements and procedures defined by the State organ IPAAM (<i>Instituto de Proteção Ambiental do Estado do Amazonas</i>) ¹⁶ for SFMPs								
Purpose of the data	Calculation of project emissions								
Calculation method	For ex-post calculations, official SFMP documents and receipts are used to determine the total volume of wood extracted in forest management, and then the corresponding area of planned logging activities are calculated.								
Comments	N/A.								

Data / Parameter	$\Delta CADLK_t$
Data unit	tCO ₂ e
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 monitored	2021: 0 2022: 0
Monitoring equipment	Remote sensing and GIS
QA/QC procedures to be applied	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. Images undergo geometric correction by means of geo-referencing, using topographic maps as reference or USG-NASA orthorectified images. For analysis of areas with cloud cover, visual interpretation of radar image is performed. 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%.
Purpose of the data	Calculation of leakage
Calculation method	Emissions from deforestation are estimated by multiplying the detected area of forest loss by the average forest carbon stock per unit area.
Comments	N/A.

Data / Parameter	$\Delta CPAdPAt$
Data unit	tCO ₂ e

Description	Total decrease in carbon stocks 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 monitored	2021: 133,520 2022: 110,917
Monitoring equipment	Remote sensing and GIS
QA/QC procedures to be applied	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. Images undergo geometric correction by means of geo-referencing, using topographic maps as reference or USG-NASA orthorectified images. For analysis of areas with cloud cover, visual interpretation of radar image is performed. 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%.
Purpose of the data	Calculation of project emissions
Calculation method	Emissions from all planned activities are estimated by the sum of the emissions from planned deforestation + emissions from planned logging activities + emissions from planned fuel-wood and charcoal activities. For this project, the only source of emission is from planned deforestation, which is calculated by multiplying the detected areas of planned deforestation with the carbon stock change per unit area.
Comments	N/A.

Data / Parameter	ΔCPSLKt
Data unit	tCO ₂ e

Description	Total annual carbon stock change in leakage management areas in the project case
Source of data	Activity reports related to leakage prevention measures. Field assessments. 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 subject to monitoring, when significant.
Frequency of monitoring/recording	Annually
Value monitored	2021: 0 2022: 0
Monitoring equipment	Remote sensing and GIS
QA/QC procedures to be applied	Best practices in remote sensing and GIS: 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. Images undergo geometric correction by means of geo-referencing, using topographic maps as reference or USG-NASA orthorectified images. For analysis of areas with cloud cover, visual interpretation of radar image is performed. 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%.
Purpose of the data	Calculation of leakage
Calculation method	Emissions from planned activities in leakage management areas are estimated by multiplying the detected area of forest loss by the average forest carbon stock per unit area.
Comments	N/A.
Data / Parameter	ΔCUDdPA_t

Data unit	tCO2e
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 monitored	2021: 95,837 2022: 132,793
Monitoring equipment	Remote sensing and GIS
QA/QC procedures to be applied	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 90%.
Purpose of the data	• Calculation of project emissions
Calculation method	Emissions from unavoided unplanned deforestation are estimated by multiplying the detected area of forest loss by the average forest carbon stock per unit area.
Comments	N/A.

Data / Parameter	$\Delta CUDdEXt$
Data unit	tCO2e

Description	Total actual carbon stock change due to unavoided unplanned deforestation at year t in the excluded areas
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 excluded areas.
Frequency of monitoring/recording	<i>Annually</i>
Value monitored	2021: 0 2022: 0
Monitoring equipment	Remote sensing and GIS
QA/QC procedures to be applied	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 90%.
Purpose of the data	• Calculation of emissions in the excluded area
Calculation method	<i>Emissions from unavoided unplanned deforestation are estimated by multiplying the detected area of forest loss by the average forest carbon stock per unit area.</i>
Comments	N/A.

Data / Parameter	Biomass growth after logging
Data unit	tCO2/ha/year
Description	Average annual increments in aboveground biomass after logging
Source of data	- Values from the literature - Field Survey, when available
Description of measurement methods and procedures to be applied	Literature data from appropriated sources will be monitored in order to use the best and most recent source. In the event of the performance of a field assessment, local data will be used.
Frequency of monitoring/recording	Annually
Value monitored	3.03
Monitoring equipment	During this monitoring period, secondary data was used (West et al. 2014)
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 and direct field measurements.
Purpose of the data	Calculation of total carbon stock increase due to planned logging activities
Calculation method	The average between the values found by West et al. average annual increment of aboveground biomass (2.6 and 0.5) for the Amazon and multiplication by the conversion factors for tCO2 units.
Comments	N/A.

Data / Parameter	EBBPSPat
Data unit	tCO2e
Description	Sum of (or total) actual non-CO2 emissions from forest fire at year t in the project area
Source of data	Remote sensing and GIS. Supervisor reports.
Description of measurement methods	In forest fires occur, these non-CO2 emissions will be subject to monitoring and accounting, when significant

and procedures to be applied	
Frequency of monitoring/recording	Annually
Value monitored	2021: 4,373 2022: 6,059
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 90%.
Purpose of the data	• Calculation of project emissions
Calculation method	Analysis of satellite images and maps to determine the incidence of deforestation and multiplying it by the respective emission factors.
Comments	If forest fires occur, these non-CO2 emissions will be subject to monitoring and accounting, when significant.

Data / Parameter	EBBPSEXct
Data unit	tCO2e
Description	Sum of (or total) actual non-CO2 emissions from forest fire at year t in the excluded areas
Source of data	Remote sensing and GIS.

	Supervisor reports.
Description of measurement methods and procedures to be applied	In forest fires occur, these non-CO2 emissions will be subject to monitoring and accounting, when significant
Frequency of monitoring/recording	<i>Annually</i>
Value monitored	2021: 0 2022: 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 90%.
Purpose of the data	• Calculation of emissions in the excluded areas
Calculation method	<i>Analysis of satellite images and maps to determine the incidence of deforestation and multiplying it by the respective emission factors.</i>
Comments	If forest fires occur, these non-CO2 emissions will be subject to monitoring and accounting, when significant.
Data / Parameter	EADLKt
Data unit	tCO2e

Description	Total ex ante increase in GHG emissions due to displaced forest fires at year t
Source of data	Remote sensing 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 monitored	0
Monitoring equipment	Remote sensing and GIS
QA/QC procedures to be applied	The main data source is Mapbiomas Fire. The entire mapping of fire scars in Brazil is based on mosaics of images from Landsat satellites with a spatial resolution of 30 meters. The mapping period was from 1985 to 2020, with monthly and annual data on fire scars covering the entire Brazilian territory. Other fire data source such as BD QUEIMADAS (INPE) can be checked to evaluate emissions due to displaced forest fires.
Purpose of the data	Calculation of leakage
Calculation method	Analysis of satellite images and maps to determine the incidence of deforestation and multiplying it by the respective emission factors.
Comments	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 / Parameter	RFt
Data unit	%
Description	Risk factor used to calculate VCS buffer credits
Source of data	VCS Non-Permanence Risk Report (v3.1) (supplied at audit) 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 monitored	10
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.
Purpose of the data	Calculation of VCS buffer credits
Calculation method	All the risk factors described in the VCS Risk Report were assessed.
Comments	N/A

Data / 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 Mapbiomas or 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 monitored	Project Area: 2021: 135.40 2022: 187.61 Leakage Belt (not corrected): 2021: 16,683.08

	2022: 23,116.43
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 90%.
Purpose of the data	• Calculation of project emissions • Calculation of leakage
Calculation method	Analysis of satellite images and maps
Comments	N/A

Data / Parameter	Deforestation in the Excluded Areas
Data unit	ha
Description	Forest cover areas converted into non-forest areas inside the Excluded Areas
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 Excluded Areas will be done through satellite image analysis. When data from Mapbiomas or 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	<i>Annually</i>

Value monitored	2021: 0 2022: 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 90%.
Purpose of the data	Calculation of emissions in the excluded areas
Calculation method	<i>Analysis of satellite images and maps</i>
Comments	N/A

Data / Parameter	$\Delta CabBSLLKt$
Data unit	tCO ₂ e
Description	Total baseline carbon stock changes for the above-ground biomass pool in the Leakage Belt
Source of data	Calculated
Description of measurement methods	- leakage prevention activities will be listed; - a map showing areas of intervention and type of intervention will be created;

and procedures to be applied	- 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 monitored	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 90%.
Purpose of the data	• Calculation of leakage
Calculation method	Analysis of satellite images and maps to determine deforestation in Leakage Belt and multiplying it by the carbon stocks previously set.

Comments	N/A
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4.3 Monitoring Plan

4.3.1 General information and Organizational structure

Carbonext performs the monitoring of carbon stocks from deforestation rates and greenhouse gas emissions produced or avoided during the REDD project, which is executed by a specialized and experienced REDD team. This includes social experts, who have the necessary skills to involve the community and stakeholders, ensuring community participation, activity design and socio-economic indicator monitoring.

The main stakeholders in this Project are project workers and neighbours: the main communication channel between the interested parties and the project proponent is the employees hired by the project proponents, as well as the communication channels mentioned in Section 2.2 of this MR. They are the local people in charge to communicate problems, demands and conflicts to the landowner, and are responsible for the administrative and management side of the on-site activities.

Given the above, the organizational structure below is very simple, where the Project Proponents and the Managing Partner work together and exist a communication channel direct between the local workers and the technical developer team. The technical team is responsible for planning the activities and providing the guidance, while the site Manager is responsible for executing the project's actions and collecting the respective evidence.

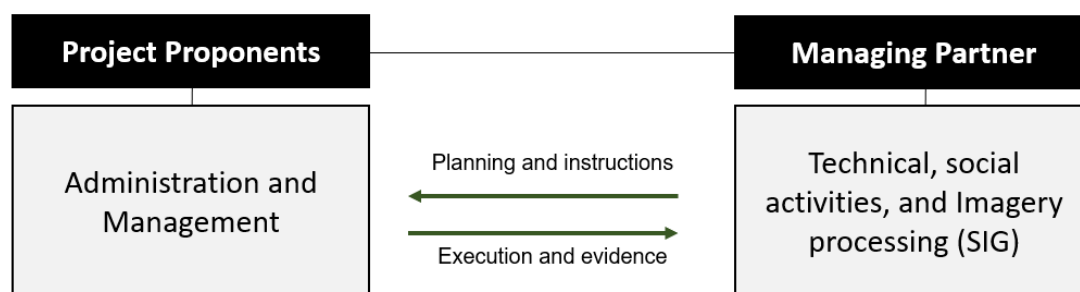


Figure 42. Organizational structure of REDD+ Unitor

As provided in the Forest Integrity Monitoring Plan, presented as evidence to the auditing body, the internal flow for communications of occurrences and actions of the Unitor REDD+ Project

happens mainly with the alignment of field monitors, following with the field coordination and project management (in this case, the project proponents).

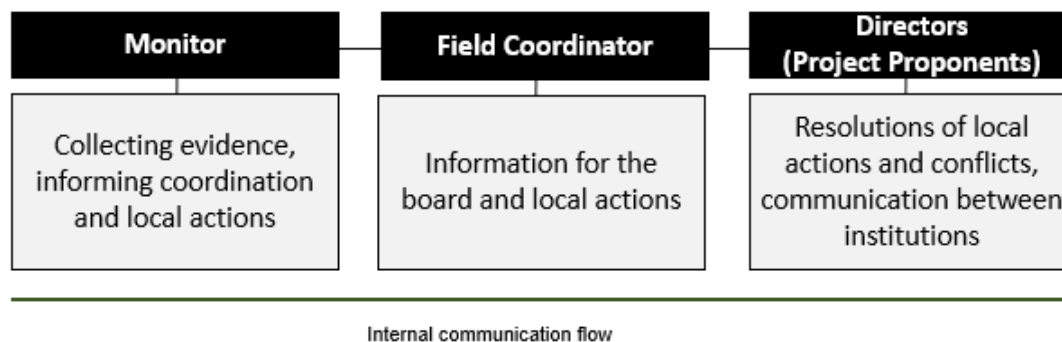


Figure 43. Internal organizational structure of REDD+ Unit, between project proponents and field teams

As presented in the item 3.1.7, in the communication flow, when the presence of fire is detected, the monitor must evaluate the fire's intensity and risks. Depending on the intensity, and only if there are safe conditions, one should try to control the fire; or communicate the field coordination to take the necessary measures. Reports with photos and collection of coordinates should be prepared as evidence. In case of high intensity fires, the monitor must communicate the field coordination and report the need for combat support. The field coordination receives the communication, evaluates it and immediately informs the technical coordination of Manaus and the management. If the fire requires a fire brigade, there is a mobilization of the fire brigade and equipment to go to the location. The firefighting action is carried out as foreseen in the Forest Integrity Monitoring Plan, and a report is made after its conclusion.

In case of invasion actions or damage from deforestation reported by the monitor, the measures taken are similar to those taken for fires. Once the presence of an invader is detected, if no security risks are identified, it must be communicated peacefully that the property is part of the Unitor REDD+ Project, being private property and with the objective of conservation. If threatening agents are identified, the monitors immediately inform the field coordination and leave the site. The coordination calls for collaborators and institutional support, and if this is not solved, the Manaus office is informed. The Directors evaluates the need for police support and contacts the local authorities to file an occurrence report and take the necessary actions. After the conflict is solved, an informative report is prepared about what happened for evidence records, as presented for the audit team.

For this monitoring period, no occurrence reports were registered. Conflicts with fires and invaders in the area were also not identified.

Managing Partner

Below, is a summary of Carbonext personnel's main responsibilities and tasks relating to monitoring activities to be carried out for the UNITOR REDD+ Project over the present monitoring period.

Name and Position	Responsibilities and competencies
Janaina Dallan Carbonext CEO	Degree in Forestry Engineering from Luiz de Queiroz College of Agriculture (ESALQ) and a Master's in environmental business. She has been working with the carbon market since 2001 on projects around the world and, as CEO of Carbonext, she is directly involved in coordinating the development and implementation of carbon credit projects. Throughout her career, she has managed UNFCCC CDM (Clean Development Mechanisms) projects through several international companies such as Golder Associates, Global Energy Partners, Orbeo / Soci��t�� Generale, One Carbon and Ecofys. She is currently a member of the United Nations Framework Convention on Climate Change (UNFCCC), in which she has been a member of the Registration and Issuance Team (RIT) since 2013, she is president of the Brazil Alliance for Nature-Based Solutions and is a member of the experts for the Taskforce for Scaling Voluntary Carbon Markets (TSVCM).
Luiz Fernando de Moura Technical Director	Forestry Engineer by Luiz de Queiroz College of Agriculture (ESALQ) the M.Sc. and Ph.D. in Wood technology from the Universit�� Laval (Quebec, Canada). He is responsible to coordinate the technical group at Carbonext, 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 Galv��o, Maranh��o, Brazil", registered on March 21, 2011. Dr. de Moura has also participation as project designer in Florestal Santa Maria REDD Project, Fortaleza Ituxi REDD project, UNITOR REDD project and Evergreen REDD project.
Alice Dias da Cruz Technical REDD+ Coordinator	Degree in Sanitary and Environmental Engineering from Federal University of Santa Catarina. Experience in developing REDD+ projects, having participated in the elaboration of Unitor REDD+, Evergreen REDD+ and Hiwi REDD+ projects. Previous experiences in sustainability consultancy and GHG inventory

Ághata Comparin Artusi REDD+ Analyst	Bachelor in Biological Sciences (URI) and Master student in Biodiversity Conservation and Sustainable Development (IPÊ/ESCAS) Experience in forestry, socio-environmental and ecological research development. Worked with Brazilian biodiversity monitoring, forest inventories and currently has a conservationist focus on REDD Projects and carbon stock.
Davi Faiani D'Lippi REDD+ Analyst	Degree in Forestry Engineering from Luiz de Queiroz College of Agriculture (ESALQ/USP), experience with different carbon projects (VCS, CCB, CDM standards), forest inventories, SALM, GIS and social activities with communities.
Luan Ferreira dos Santos REDD+ Analyst	Forestry Engineer by PUC-PR; MBA in Sustainable Projects and Environmental Innovations and Master student in Management of natural and planted forests from the Federal University of Paraná (UFPR). Experience in forest and biomass inventories, sustainability consulting and GHG inventory. He worked for three years in the government environment secretariat with a focus on climate change projects and public policies. It currently focuses on the development of REDD+ Projects and quantification of carbon stock.
Rui Almeida Social Project REDD+ Coordinator	Graduated in Education, attending post-graduation course in project management, attending master's course in Conflict Management. Experience in projects in the Amazon with traditional communities, quilombolas and indigenous peoples. Experience with the implementation of a financial fund in quilombola communities. Sustainable development, social dialogue, and land and conflict mediation. Training in Nonviolent Communication and advanced knowledge of social dialogue tools, digital technologies, communication methodologies and development of support material for communication projects.
Thiago Manoel Sozinho dos Santos Social Analyst for REDD+	Degree in Forestry Engineering from Amazonia Federal Rural University and a Master's in forestry economy in Paraná Federal University. He has ten years working on the follow themes: protected areas, environment, carbon market, community relations, research, geotechnologies, customer success, project management, BI and Data Science.
Rafael Martins GIS Coordinator	Bachelors in Biological Science; MBA in Database Administration; GIS Professional, Spatial Analyst and Spatial Data Processing ESRI certified; CTT+ certified

	Eighteen years of experience in developing GIS systems, processes and solutions for conservation projects, land use and land cover management, forest management and forest integrity monitoring.
Danilo Carneiro Valente GIS Analyst	Bachelor in Geography and Master student in Geography (University of Campinas – UNICAMP). Experience with Geographic Information Systems (GIS) and Remote Sensing. Land use and land cover mapping and geospatial analysis.

For this Monitoring Report, the monitoring activities carried out through GIS tools were performed by Carbonext. The mechanisms adopted in previous MRs continue as before but were executed by the internal team. Further, Carbonext implemented a deforestation alert system called MonitoraCarbon, which detects probable changes in land-use, validates and sends alerts for monitoring agents to confirm and take appropriate actions. The system has been available as of April 2022. The three excluded areas will also be monitored through the same process as described above during the project 30-years longevity period.

In addition, the local team hired by the proponents in this period carried out the ground monitoring, which consisted of motorcycle, car, on foot and river rounds (with outboard motorized “voadeira”). The three excluded areas will be monitored through the same process as described above, during the project longevity period, as it was already being performed.

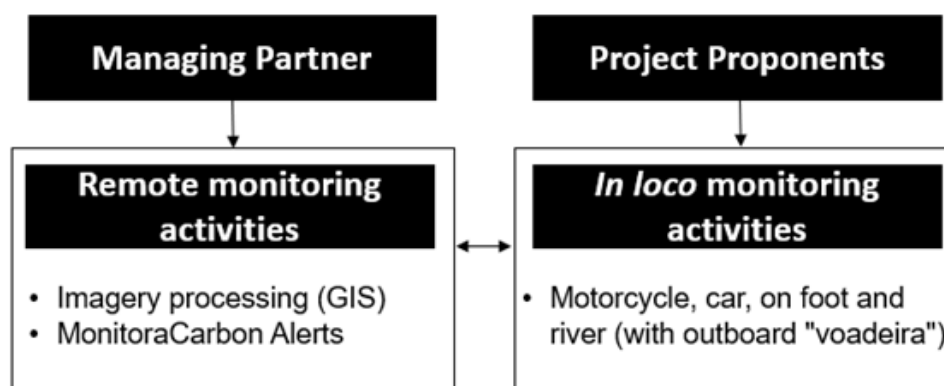


Figure 44 - General organizational structure of deforestation monitoring of REDD+ Unit

This Monitoring Plan for monitoring the data and parameters during this monitoring period encompasses three main monitoring tasks:

- 1) Monitoring of actual carbon stock changes and GHG emissions within the project area;
- 2) Monitoring of leakage; and
- 3) Ex post calculation of net anthropogenic GHG emission reduction.

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 procedures.
- d) Quality control and quality assurance procedures.
- e) Data archiving.
- f) Organization and responsibilities of the parties involved in all the above.

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

The following monitoring plan is applicable for the Project Area, Leakage Belt and the areas that were excluded from the project area during this monitoring period. These areas will be continuously monitored during the 30-years project longevity period.

4.3.2.1 Monitoring of project implementation

- a) Technical description of the monitoring tasks.

Project activities implemented within the project area during this monitoring period were 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 were 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 this monitoring period and project implementation are 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 were implemented according to data required in Table 65 and Table 66 in PD, 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 procedures.

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

d) Quality control and quality assurance procedures.

The project proponents have trained personnel to collect and keep all documentation stored in a safe place. All electronic documentation is also 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.

Non-Permanence Risk

The Risk factor used to calculate VCS buffer credits was updated in this monitoring period, as show in the non-permanence risk report.

Monitoring this parameter involved the following updates:

- Financial analyses performed as part of the Unitor REDD project permitted greater precision in the relationship between the project's NPV and the NPV of the most profitable land use.
- Contract between the project developer (Carbonext) and the project proprietors is defined as a legally binding commitment protecting the project area.
- Brazilian court decision returning the right of use to the proponent of part of the property (not include in the project area).

- Project activities generated net positive impacts on the social and economic well-and mitigated risk related to communities.
- Fire Brigade training and active firefighting in the MR period constitutes mitigation of fires risks.
- Monitoring of fire alerts through MonitoraCarbon.

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

a) Technical description of the monitoring tasks.

Monitoring of land-use and land-cover change within the Unitor REDD+ Project were carried out through analysis of satellite imagery covering the whole Reference Region, Project Area and Leakage Belt over the entire monitoring period. Satellite analysis of land-uses was based on primary information due to the unavailability of secondary data such as Prodes or Mapbiomas data. Therefore, we performed our own land use map. Imagery processing referred 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".

In this context, the deforestation that occurred within the period from 01/08/2021 to 31/07/2022 was mapped through automatic supervised optical multispectral image classification. The first step was to generate a mosaic of images of Sentinel 2, from European Space Agency, dated July 31, 2022 with the least amount of clouds possible for the period. The composition chosen was False Colour, combining the R8 G4 B3 bands to highlight the vegetation through band 8, near infrared. With the aid of high-resolution imagery (WMS imagery services such as ESRI basemaps and Planet), LU/LC samples were collected for forest, non-forest and water, throughout the entire RR, LB and PA. As well as the multispectral optical image, an NDVI (Normalized Difference Vegetation Index) image was created through the algebra of bands $(B8-B4)/(B8+B4)$, where band 4 is RED and band 8 is INFRARED to feed the classifier with one more variable and potentiate the separation of the forest class from any other non-forest class.

c) Overview of procedures.

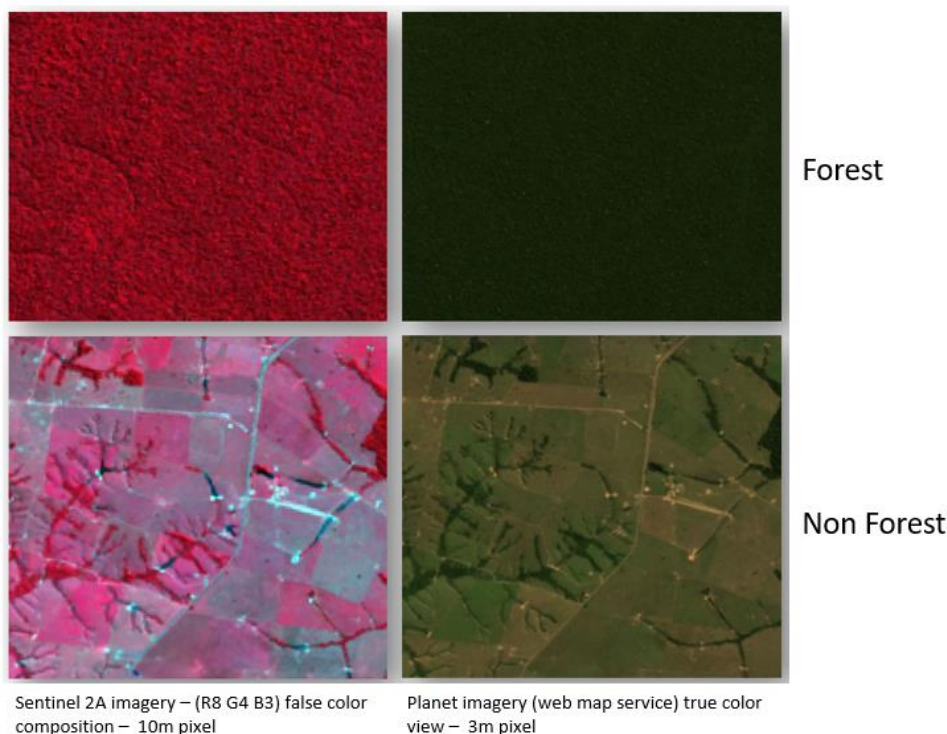
The classification of the Sentinel 2 optical image was done using the Random Forest algorithm [1] in the Google Earth Engine environment. Samples for training the Random Forest classifier were divided into two blocks, with 30% for training and evaluation of the

classifier; and 70% for use in the classification process. The classifier was run with 100 decision trees.

The initial result of the classification was treated in a GIS environment (ArcGIS), in order to reduce residuals and errors of the classifier. Pixel filters such as Majority (ArcGIS) was applied twice to reduce the so-called "salt and pepper effect" of the classification, identifying isolated pixels and recategorizing it according to the majority value of its eight neighbours. In addition, a visual inspection of the classification product overlaid on the image was performed with the objective of correcting main errors of the classifier via visual interpretation and vector scanning.

The visual interpretation and vector scanning was carried out through the following steps:

- i. **Target identification:** non-forest areas;
- ii. **Training:** deforestation areas observed in optical satellite images, of equal or better resolution are overlaid to identify patterns of hue, texture/roughness, shape, and location of the deforestation feature on the optical image;



- iii. **Photointerpretation:** identification and correction through scanning of possible classifier confusions on the optical image in a GIS environment. There are 2 types of automatically

classification confusion: omission and commission. Omissions means that deforested areas are no longer mapped automatically by the classifier and commission means that forested areas have been mapped as deforested by the classifier.

d) Quality control and quality assurance procedures.

The validation of land-use data used for modelling of land use is performed using a confusion matrix, in order to calculate the overall index of success by period and by class. Three specific classes will be used: forest, deforestation and hydrography.

The analysis of the accuracy of the Sentinel 2 image classification was performed by means of the confusion matrix, overall accuracy and Kappa index. The sampling was stratified, proportional by area, based on a total of 264 points randomly distributed across the RR, LB and PA by using the *Create Random Points* tool on ArcGIS. The reference data used in this step were the classified image itself and web service maps from ESRI and Planet, higher spatial resolution than the output image.

Table 20. Confusion Matrix and Kappa Accuracy Assessment - Sentinel imagery

		REFERENCE				
CLASSIFIED		Hydrography	Forest	Non forest	Total	User Accuracy
	Hydrography	7	0	2	9	77,77%
	Forest	0	147	1	148	99,32%
	Non-Forest	0	5	102	107	95,32%
	Total	7	152	105	264	Kappa
	Prod. Accuracy	100%	96,71%	97,14%		94,11%

The overall classification accuracy for all land use and land cover classes was 94.11% in the reference region, higher than the 90% suggested by the VM0015 methodology. The specific accuracy for the Forest and Non-forest classes were 99.32% and 95.32% respectively.

e) Data archiving.

All maps and records generated during project implementation will be kept on file and made available to VCS verifiers at verification for inspection as evidence of the AUD project activity's implementation.

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 either in-house by CARBONEXT, who also 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 achieving.

4.3.2.3 Monitoring of carbon stocks 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.

Within leakage management areas:

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-CO₂ 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 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 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.

This project area is located within a region that is subject to a national LU/LC monitoring program such as MapBiomass and PRODES. The data generated by those programs are able to be used in this project. Both sources are applicable for use in this project, according to the criteria listed below (Methodology VM0015).

- i) monitoring occurs in the entire project area and leakage belt.
- ii) monitoring occurs in the entire reference region and cover the beginning, middle and end of the fixed baseline period.
- iii) monitors conversion of forest land to non-forest land.
- iv) monitoring occurred during the entire fixed baseline period.
- v) data accuracies are acceptable according to the methodology criteria.

d) Quality control and quality assurance procedures.

The validation of land-use data used for modelling 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 VM0015 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 CARBONEXT, also 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 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, specifically:

- 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. As described in section 3.3.1 of the VCS-PD: leakage prevention activities do not involve any carbon stock reduction due to deforestation or additional emissions caused by increased grazing activities. For this reason, 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 baseline levels in the leakage belt will be considered activity displacement leakage. The result of the ex-post estimates of carbon stock changes were reported using the same table formats used in the ex-ante assessment of changes in baseline carbon stocks in the leakage belt (Tables 22.c.1; 22.c.2 and 22.c.6).

Where strong evidence can be collected that deforestation in the leakage belt is not linked to the Project Area, the deforestation detected is not be attributed to the Project Activity and considered

leakage. The operational entity verifying the monitoring data will determine whether the documentation provided by the project proponent represents sufficient evidence to consider the deforestation detected as not attributable to the Project activity and therefore not leakage.

To estimate the increase in GHG emissions due to forest fires in the leakage belt area, 100% of forest clearing is assumed to be done by burning the forest. The values of the parameters used to estimate emissions will be the same as those used to estimate forest fires in the baseline (table 23), except for the initial carbon stocks (C_{ab} , C_{dw}), which will be those of the initial forest classes burned in the area of the Leakage Belt.

We reported the results of the estimates using the same table formats used in the ex-ante assessment of baseline GHG emissions from forest fires in the project area (Tables 23 and 24).

The results of all ex-post estimates of leakage are summarized using the same table format used for the ex-ante assessment (Table 35)

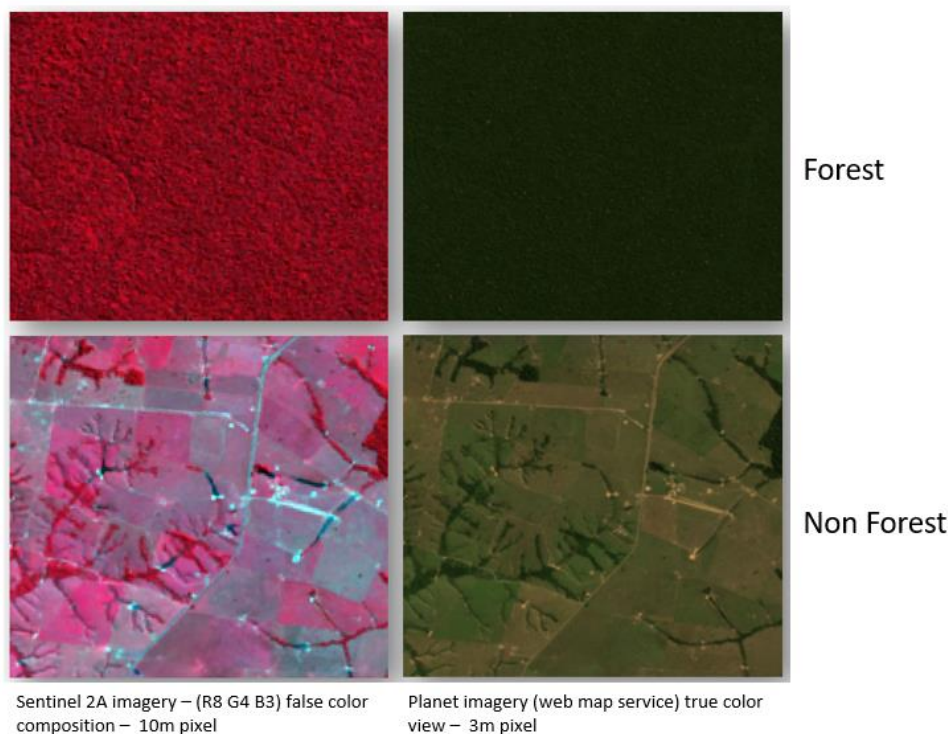
c) Overview of procedures.

The classification of the Sentinel 2 optical image was done using the Random Forest algorithm [1] in the Google Earth Engine environment. Samples for training the Random Forest classifier were divided into two blocks, with 30% for training and evaluation of the classifier; and 70% for use in the classification process. The classifier was run with 100 decision trees.

The initial result of the classification was treated in a GIS environment (ArcGIS), in order to reduce residuals and errors of the classifier. Pixel filters such as Majority (ArcGIS) was applied twice to reduce the so-called "salt and pepper effect" of the classification, identifying isolated pixels and recategorizing it according to the majority value of its eight neighbours. In addition, a visual inspection of the classification product overlaid on the image was performed with the objective of correcting main errors of the classifier via visual interpretation and vector scanning.

The visual interpretation and vector scanning was carried out through the following steps:

- iv. **Target identification:** non-forest areas;
- v. **Training:** deforestation areas observed in optical satellite images, of equal or better resolution are overlaid to identify patterns of hue, texture/roughness, shape, and location of the deforestation feature on the optical image;



- vi. **Photointerpretation:** identification and correction through scanning of possible classifier confusions on the optical image in a GIS environment. There are 2 types of automatically classification confusion: omission and commission. Omissions means that deforested areas are no longer mapped automatically by the classifier and commission means that forested areas have been mapped as deforested by the classifier.

d) Quality control and quality assurance procedures.

The validation of land-use data used for modelling of land use is performed using a confusion matrix, in order to calculate the overall index of success by period and by class. Three specific classes will be used: forest, deforestation, and hydrography.

The analysis of the accuracy of the Sentinel 2 image classification was performed by means of the confusion matrix, overall accuracy and Kappa index. The sampling was stratified, proportional by area, based on a total of 264 points randomly distributed across the RR, LB and PA by using the *Create Random Points* tool on ArcGIS. The reference data used in this step were the classified image itself and web service maps from ESRI and Planet, higher spatial resolution than the output image.

Table 21. Confusion Matrix and Kappa Accuracy Assessment - Sentinel imagery

		REFERENCE				
CLASSIFIED		Hydrography	Forest	Non forest	Total	User Accuracy
	Hydrography	7	0	2	9	77,77%
	Forest	0	147	1	148	99,32%
	Non-Forest	0	5	102	107	95,32%
	Total	7	152	105	264	Kappa
	Prod. Accuracy	100%	96,71%	97,14%		94,11%

The overall classification accuracy for all land use and land cover classes was 94.11% in the reference region, higher than the 90% suggested by the VM0015 methodology. The specific accuracy for the Forest and Non-forest classes were 99.32 and 95.32% respectively.

e) Data archiving.

All maps and records generated during project implementation will be retained and made available to VCS verifiers at verification for inspection to demonstrate that GHG emissions reductions. 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 Carbonext, also 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 Ex-post calculation of net anthropogenic GHG emission reduction

a) Technical description of the monitoring tasks.

The process of ex-post calculations of anthropogenic GHG net emission reductions was similar to the ex-ante calculations, with the only difference being that the ex-post estimate of carbon stock changes and GHGs should be used in the case of the project and the leakage scenario.

The excluded areas will also be monitored, according to the parameters listed in section 4.2, and any losses will be taken into consideration as described in the next paragraphs:

The loss will be assessed in order to identify if it qualifies as a loss event. According to the Program Definitions v4.2, loss event is described as “any event that results in a loss of more than five percent of previously verified emission reductions and removals due to losses in carbon stocks in pools included in the project boundary that is not planned for in the project description.”

If the loss in the excluded areas qualifies as a loss event, the steps indicated in the Registration and Issuance Process, v4.3, subitem 5.3, will be followed, including the writing and submission of the Loss Event Report (estimating on loss) and a loss event representation signed by the

project proponent. If it occurs, it will be done in accordance with the deadlines indicated in the same document.

Moreover, if occurs any event that does not qualify as a loss event, it will be considered as a project emission and the value will be deducted from the total GHG emission reductions and/or removals of the project.

The results are presented using Table 36 of the approved methodology VM0015 version 1.1, along with spatial data (deforestation maps made available).

b) Data to be collected.

Report of the ex-post estimated net anthropogenic GHG emissions and the calculation of verified GHG emissions Carbon Units (VCUt, and VBCT) were made using the same Table 36 of VM0015, same format used for ex-ante assessment.

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 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 VCU's in future periods.

e) Data archiving.

All maps, records, and reports generated during project implementation will be retained and archived in digital format and will be kept securely for at least two years after the end of the project credit period.

The original (raster) and processed (vector) digital data of satellite images, coordinates, technical maps, along with field photographs are stored, and the maps of annual deforested areas, satellite images, and reports are made available to the verification body at each verification event.

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

All satellite imagery assessments will be performed by Carbonext who is responsible for reporting and data archiving in accordance with VM0015 and for providing assistance during verification audits. The Project Proponent is co-responsible for data archiving.

5 QUANTIFICATION OF GHG EMISSION REDUCTIONS AND REMOVALS

5.1 Baseline Emissions

The results of the updated baseline emissions following the withdrawal of the Farms Recanto, Panorama and União are presented in this section. Some tables were included to present the changes of values that occurred due to the exclusion of the areas in comparison with the previous baseline values.

The new accumulated baseline deforestation projected to occur within the Project Area over the 30-year project lifetime was estimated at 22,476.0 hectares. The estimated average annual rate of deforestation is 725.03 hectares for the Project Area.

Table 22. New annual areas of baseline deforestation in the Project Area (Table 9.b of VM0015)

Year	Project year	Total - PA	
		annual ABSLPAt ha	cumulative ABSLPA ha
2018	0	1,041.18	1,041.2
2019	1	1,386.73	2,427.9
2020	2	1,700.25	4,128.2
2021	3	1,750.05	5,878.2
2022	4	1,494.16	7,372.4
2023	5	1,005.81	8,378.2
2024	6	838.90	9,217.1
2025	7	1,347.04	10,564.1
2026	8	848.95	11,413.1
2027	9	1,594.29	13,007.4
2028	10	734.96	13,742.3
2029	11	801.69	14,544.0
2030	12	801.69	15,345.7
2031	13	801.69	16,147.4
2032	14	801.69	16,949.1
2033	15	801.69	17,750.8
2034	16	345.73	18,096.5
2035	17	345.73	18,442.2
2036	18	345.73	18,788.0
2037	19	345.73	19,133.7
2038	20	345.73	19,479.4

2039	21	352.93	19,832.4
2040	22	352.93	20,185.3
2041	23	352.93	20,538.2
2042	24	352.93	20,891.1
2043	25	352.93	21,244.1
2044	26	302.71	21,546.8
2045	27	302.71	21,849.5
2046	28	302.71	22,152.2
2047	29	302.71	22,454.9
2048	30	21.08	22,476.0
TOTAL		22,476	

Table 23. Annual areas of baseline deforestation in the leakage belt (Table 9.c of VM0015)

Year	Project year	Total - LK	
		annual ABSLLKt ha	cumulative ABSLLK ha
2018	0	4,149.6	4,149.6
2019	1	13,433.1	17,582.7
2020	2	12,253.8	29,836.6
2021	3	12,292.6	42,129.2
2022	4	10,778.3	52,907.5
2023	5	10,561.9	63,469.5
2024	6	10,344.6	73,814.1
2025	7	10,377.8	84,191.9
2026	8	9,798.3	93,990.2
2027	9	9,601.4	103,591.5
2028	10	9,403.6	112,995.1
2029	11	2,668.9	115,664.0
2030	12	2,668.9	118,332.9
2031	13	2,668.9	121,001.8
2032	14	2,668.9	123,670.7
2033	15	2,668.9	126,339.6
2034	16	2,021.9	128,361.5
2035	17	2,021.9	130,383.3
2036	18	2,021.9	132,405.2
2037	19	2,021.9	134,427.0
2038	20	2,021.9	136,448.9
2039	21	2,060.3	138,509.2
2040	22	2,060.3	140,569.6
2041	23	2,060.3	142,629.9
2042	24	2,060.3	144,690.2
2043	25	2,060.3	146,750.6
2044	26	2,104.0	148,854.5
2045	27	2,104.0	150,958.5
2046	28	2,104.0	153,062.5

2047	29	2,104.0	155,166.5
2048	30	668.7	155,835.1
TOTAL		155,835.1	

According to MMA data, the Project Area displays 64% of its forests classified as open Ombrophylous forest (“As”), and 36% is submontane dense Ombrophylous forest (“Ds”), however only open (“As”) is taken into account for conservativeness reasons, as explained in VCS PD. The data processing procedure 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 24. New 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)

IDicl > 1				
	Name >	Submontane open ombrophylous forest (As)	Total baseline deforestation in the project area	
Year	Project year t	ha	annual ABSLPA $_t$ ha	cumulative ABSLPA ha
2018	0	1,041.2	1,041.2	1,041.2
2019	1	1,386.7	1,386.7	2,427.9
2020	2	1,700.3	1,700.3	4,128.2
2021	3	1,750.1	1,750.1	5,878.2
2022	4	1,494.2	1,494.2	7,372.4
2023	5	1,005.8	1,005.8	8,378.2
2024	6	838.9	838.9	9,217.1
2025	7	1,347.0	1,347.0	10,564.1
2026	8	849.0	849.0	11,413.1
2027	9	1,594.3	1,594.3	13,007.4
2028	10	735.0	735.0	13,742.3
2029	11	801.7	801.7	14,544.0
2030	12	801.7	801.7	15,345.7
2031	13	801.7	801.7	16,147.4
2032	14	801.7	801.7	16,949.1
2033	15	801.7	801.7	17,750.8
2034	16	345.7	345.7	18,096.5
2035	17	345.7	345.7	18,442.2
2036	18	345.7	345.7	18,788.0
2037	19	345.7	345.7	19,133.7
2038	20	345.7	345.7	19,479.4
2039	21	352.9	352.9	19,832.4

2040	22	352.9	352.9	20,185.3
2041	23	352.9	352.9	20,538.2
2042	24	352.9	352.9	20,891.1
2043	25	352.9	352.9	21,244.1
2044	26	302.7	302.7	21,546.8
2045	27	302.7	302.7	21,849.5
2046	28	302.7	302.7	22,152.2
2047	29	302.7	302.7	22,454.9
2048	30	21.1	21.1	22,476.0
TOTAL			22,476.0	

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

Table 25. 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)

ID _{icl} >		1	Total baseline deforestation in the leakage belt	
	Name >	Submontane open ombrophylous forest (As)		
Year	Project year <i>t</i>	ha	annual ABSLLK _t ha	cumulative ABSLLK ha
2018	0	4,149.6	4,149.6	4,149.6
2019	1	13,433.1	13,433.1	17,582.7
2020	2	12,253.8	12,253.8	29,836.6
2021	3	12,292.6	12,292.6	42,129.2
2022	4	10,778.3	10,778.3	52,907.5
2023	5	10,561.9	10,561.9	63,469.5
2024	6	10,344.6	10,344.6	73,814.1
2025	7	10,377.8	10,377.8	84,191.9
2026	8	9,798.3	9,798.3	93,990.2
2027	9	9,601.4	9,601.4	103,591.5
2028	10	9,403.6	9,403.6	112,995.1
2029	11	2,668.9	2,668.9	115,664.0
2030	12	2,668.9	2,668.9	118,332.9
2031	13	2,668.9	2,668.9	121,001.8
2032	14	2,668.9	2,668.9	123,670.7
2033	15	2,668.9	2,668.9	126,339.6
2034	16	2,021.9	2,021.9	128,361.5
2035	17	2,021.9	2,021.9	130,383.3
2036	18	2,021.9	2,021.9	132,405.2
2037	19	2,021.9	2,021.9	134,427.0
2038	20	2,021.9	2,021.9	136,448.9
2039	21	2,060.3	2,060.3	138,509.2
2040	22	2,060.3	2,060.3	140,569.6

2041	23	2,060.3	2,060.3	142,629.9
2042	24	2,060.3	2,060.3	144,690.2
2043	25	2,060.3	2,060.3	146,750.6
2044	26	2,104.0	2,104.0	148,854.5
2045	27	2,104.0	2,104.0	150,958.5
2046	28	2,104.0	2,104.0	153,062.5
2047	29	2,104.0	2,104.0	155,166.5
2048	30	668.7	668.7	155,835.1
TOTAL			155,835.1	

To project the LU/LC classes that will replace forests in the baseline case, Method 1 “Historical LU/LC-change” was chosen, because historical LU/LC-changes are assumed to be representative of 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 mentioned in “1.13 Conditions Prior to Project Initiation” of this VCS-PD, pasture accounts for virtually all the deforested land occupation in the project region. An analysis of land-use cover in Lábrea Municipality over the historical reference period years¹⁰, show that, of the agricultural land uses, pastureland accounts for over 99% of the area in every year analysed. Corresponding evidence was duly presented at audit, under category “16 – Land use land cover maps”. Thus, the post deforestation class is considered exclusively as “pasture”.

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

Table 26. New annual area deforested in each zone within the project area in the baseline case (baseline activity data zone) (Table 13.b of VM0015)

ID _z > 1				
Year	Name >	Pasture	Total baseline deforestation in the project area	
	Project year <i>t</i>	ha	annual ABSLPA _t ha	cumulative ABSLPA ha
2018	0	1,041.2	1,041.2	1,041.2
2019	1	1,386.7	1,386.7	2,427.9
2020	2	1,700.3	1,700.3	4,128.2
2021	3	1,750.1	1,750.1	5,878.2
2022	4	1,494.2	1,494.2	7,372.4
2023	5	1,005.8	1,005.8	8,378.2
2024	6	838.9	838.9	9,217.1
2025	7	1,347.0	1,347.0	10,564.1
2026	8	849.0	849.0	11,413.1
2027	9	1,594.3	1,594.3	13,007.4

¹⁰ Source, Mapbiomas, municipality Lábrea: <https://plataforma.brasil.mapbiomas.org>

2028	10	735.0	735.0	13,742.3
2029	11	801.7	801.7	14,544.0
2030	12	801.7	801.7	15,345.7
2031	13	801.7	801.7	16,147.4
2032	14	801.7	801.7	16,949.1
2033	15	801.7	801.7	17,750.8
2034	16	345.7	345.7	18,096.5
2035	17	345.7	345.7	18,442.2
2036	18	345.7	345.7	18,788.0
2037	19	345.7	345.7	19,133.7
2038	20	345.7	345.7	19,479.4
2039	21	352.9	352.9	19,832.4
2040	22	352.9	352.9	20,185.3
2041	23	352.9	352.9	20,538.2
2042	24	352.9	352.9	20,891.1
2043	25	352.9	352.9	21,244.1
2044	26	302.7	302.7	21,546.8
2045	27	302.7	302.7	21,849.5
2046	28	302.7	302.7	22,152.2
2047	29	302.7	302.7	22,454.9
2048	30	21.1	21.1	22,476.0
TOTAL			22,476.0	

The table below shows the comparison of the annual areas of baseline deforestation with the previous baseline and the new one, adjusted to consider the exclusion of the three areas, considering the total area projected to be deforested in the project area, as well as for each of the forest class and each zone (Tables 9.b, 11.b and 13.b of the VM0015 Methodology).

Table 27: Comparison of the baseline deforestation in the PA before and after the exclusion of the three areas

Year	Project year	Annual areas of baseline deforestation in the PA		Annual areas deforested per forest class icl in the baseline case in the PA		Annual area deforested in each zone within the PA in the baseline case	
		Total - PA		Submontane open ombrophylous forest (As)		Pasture	
		Previous annual ABSLPA _t ha *	Adjusted annual BSLPA ha	Previous annual ABSLPA _t ha **	Adjusted annual BSLPA ha	Previous annual ABSLPA _t ha ***	Adjusted annual BSLPA ha
2018	0	1041.2	1,041.2	1041.2	1,041.2	1041.2	1,041.2
2019	1	1386.7	1,386.7	1386.7	1,386.7	1386.7	1,386.7
2020	2	1700.3	1,700.3	1700.3	1,700.3	1700.3	1,700.3
2021	3	1750.1	1,750.1	1750.1	1,750.1	1750.1	1,750.1
2022	4	1736.9	1,494.2	1736.9	1,494.2	1736.9	1,494.2

2023	5	1005.8	1,005.8	1005.8	1,005.8	1005.8	1,005.8
2024	6	838.9	838.9	838.9	838.9	838.9	838.9
2025	7	1590.4	1,347.0	1590.4	1,347.0	1590.4	1,347.0
2026	8	849.0	849.0	849.0	849.0	849.0	849.0
2027	9	1594.3	1,594.3	1594.3	1,594.3	1594.3	1,594.3
2028	10	952.4	735.0	952.4	735.0	952.4	735.0
2029	11	881.2	801.7	881.2	801.7	881.2	801.7
2030	12	881.2	801.7	881.2	801.7	881.2	801.7
2031	13	881.2	801.7	881.2	801.7	881.2	801.7
2032	14	881.2	801.7	881.2	801.7	881.2	801.7
2033	15	881.2	801.7	881.2	801.7	881.2	801.7
2034	16	420.8	345.7	420.8	345.7	420.8	345.7
2035	17	420.8	345.7	420.8	345.7	420.8	345.7
2036	18	420.8	345.7	420.8	345.7	420.8	345.7
2037	19	420.8	345.7	420.8	345.7	420.8	345.7
2038	20	420.8	345.7	420.8	345.7	420.8	345.7
2039	21	406.0	352.9	406.0	352.9	406.0	352.9
2040	22	406.0	352.9	406.0	352.9	406.0	352.9
2041	23	406.0	352.9	406.0	352.9	406.0	352.9
2042	24	406.0	352.9	406.0	352.9	406.0	352.9
2043	25	406.0	352.9	406.0	352.9	406.0	352.9
2044	26	412.8	302.7	412.8	302.7	412.8	302.7
2045	27	412.8	302.7	412.8	302.7	412.8	302.7
2046	28	412.8	302.7	412.8	302.7	412.8	302.7
2047	29	412.8	302.7	412.8	302.7	412.8	302.7
2048	30	131.2	21.1	131.2	21.1	131.2	21.1
TOTAL		24,768.7	22,476.0	24,768.7	22,476.0	24,768.7	22,476.0

*Table 37 of PD

** Table 39 of PD

*** Table 41 of PD

The table below presents the values of annual baseline deforestation in the three excluded areas.

Table 28: Baseline deforestation in the three excluded areas

Year	Project year t	Total baseline deforestation in the excluded areas	
		annual	cumulative
		ABSLEXct	ABSLEXC
		ha	ha
2018*	0*	0.000	0.000
2019*	1*	0.000	0.000
2020	2	0.000	0.000
2021	3	0.000	0.000
2022	4	242.700	242.700
2023	5	0.000	242.700

2024	6	0.000	242.700
2025	7	243.400	486.100
2026	8	0.000	486.100
2027	9	0.000	486.100
2028	10	217.400	703.500
2029	11	79.540	783.040
2030	12	79.540	862.580
2031	13	79.540	942.120
2032	14	79.540	1,021.660
2033	15	79.540	1,101.200
2034	16	75.080	1,176.280
2035	17	75.080	1,251.360
2036	18	75.080	1,326.440
2037	19	75.080	1,401.520
2038	20	75.080	1,476.600
2039	21	53.100	1,529.700
2040	22	53.100	1,582.800
2041	23	53.100	1,635.900
2042	24	53.100	1,689.000
2043	25	53.100	1,742.100
2044	26	110.120	1,852.220
2045	27	110.120	1,962.340
2046	28	110.120	2,072.460
2047	29	110.120	2,182.580
2048	30	110.120	2,292.700
TOTAL		2,292.70	

* Obs: For the years 2018 and 2019 there was a deforestation projection of 113.4 and 193.3, respectively, but since the exclusion of the areas occurred during the second monitoring period, the values were not considered in the adjustment of the baseline.

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

Table 29. Annual areas deforested in each zone within the Leakage Belt area in the baseline case (baseline activity data per zone) (Table 13.c of VM0015)

Year	ID _z >	1	Total baseline deforestation in the leakage belt	
	Name >	Pasture		
	Project year t	ha	annual ABSLLK _t ha	cumulative ABSLLK ha
2018	0	4,149.6	4,149.6	4,149.6

2019	1	13,433.1	13,433.1	17,582.7
2020	2	12,253.8	12,253.8	29,836.6
2021	3	12,292.6	12,292.6	42,129.2
2022	4	10,778.3	10,778.3	52,907.5
2023	5	10,561.9	10,561.9	63,469.5
2024	6	10,344.6	10,344.6	73,814.1
2025	7	10,377.8	10,377.8	84,191.9
2026	8	9,798.3	9,798.3	93,990.2
2027	9	9,601.4	9,601.4	103,591.5
2028	10	9,403.6	9,403.6	112,995.1
2029	11	2,668.9	2,668.9	115,664.0
2030	12	2,668.9	2,668.9	118,332.9
2031	13	2,668.9	2,668.9	121,001.8
2032	14	2,668.9	2,668.9	123,670.7
2033	15	2,668.9	2,668.9	126,339.6
2034	16	2,021.9	2,021.9	128,361.5
2035	17	2,021.9	2,021.9	130,383.3
2036	18	2,021.9	2,021.9	132,405.2
2037	19	2,021.9	2,021.9	134,427.0
2038	20	2,021.9	2,021.9	136,448.9
2039	21	2,060.3	2,060.3	138,509.2
2040	22	2,060.3	2,060.3	140,569.6
2041	23	2,060.3	2,060.3	142,629.9
2042	24	2,060.3	2,060.3	144,690.2
2043	25	2,060.3	2,060.3	146,750.6
2044	26	2,104.0	2,104.0	148,854.5
2045	27	2,104.0	2,104.0	150,958.5
2046	28	2,104.0	2,104.0	153,062.5
2047	29	2,104.0	2,104.0	155,166.5
2048	30	668.7	668.7	155,835.1
TOTAL			155,835.1	

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

Table 30. Carbon stock change factor for land-use change categories (ct or ctz) (Method 2)
(Table 20.c of VM0015)

Year after deforestation		$\Delta C_{abctz,t}$	$\Delta C_{bbctz,t}$	$\Delta C_{wpctz,t}$ long-lived
1	2018	-575.35	-14.91	0
2	2019	1.68	-14.91	0
3	2020	1.68	-14.91	0
4	2021	1.68	-14.91	0
5	2022	1.68	-14.91	0
6	2023	1.68	-14.91	0
7	2024	1.68	-14.91	0

8	2025	1.68	-14.91	0
9	2026	1.68	-14.91	0
10	2027	1.68	-14.91	0
11	2028	0	0.00	0
12	2029	0	0.00	0
13	2030	0	0.00	0
14	2031	0	0.00	0
15	2032	0	0.00	0
16	2033	0	0.00	0
17	2034	0	0.00	0
18	2035	0	0.00	0
19	2036	0	0.00	0
20	2037	0	0.00	0
21	2038	0	0.00	0
22	2039	0	0.00	0
23	2040	0	0.00	0
24	2041	0	0.00	0
25	2042	0	0.00	0
26	2043	0	0.00	0
27	2044	0	0.00	0
28	2045	0	0.00	0
29	2046	0	0.00	0
30	2047	0	0.00	0
31	2048	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, with the exclusion of the three areas, using the carbon stock change factors presented in the Table immediately above.

Table 31. New 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}	ΔCab _{ct,t}	ΔCabBSLPA _t	ΔCabBSLPA
		ha	tCO ₂ -e ha ⁻¹	tCO ₂ -e	tCO ₂ -e
2018	0	1,041.2	-575	-599,048	-599,048
2019	1	1,386.7	-328	-796,107	-1,395,155
2020	2	1,700.3	-236	-974,157	-2,369,311
2021	3	1,750.1	-170	-999,945	-3,369,256
2022	4	1,494.2	-115	-850,201	-4,219,457
2023	5	1,005.8	-68	-566,709	-4,786,166
2024	6	838.9	-51	-468,983	-5,255,149
2025	7	1,347.0	-72	-759,930	-6,015,079

2026	8	849.0	-41	-471,083	-6,486,161
2027	9	1,594.3	-69	-898,487	-7,384,648
2028	10	735.0	-32	-403,136	-7,787,784
2029	11	801.7	-37	-442,627	-8,230,411
2030	12	801.7	-40	-444,140	-8,674,552
2031	13	801.7	-43	-445,307	-9,119,858
2032	14	801.7	-47	-446,473	-9,566,332
2033	15	801.7	-48	-446,817	-10,013,149
2034	16	345.7	-21	-184,543	-10,197,692
2035	17	345.7	-24	-186,230	-10,383,922
2036	18	345.7	-25	-187,078	-10,570,999
2037	19	345.7	-31	-189,181	-10,760,180
2038	20	345.7	-33	-189,836	-10,950,017
2039	21	352.9	-37	-194,745	-11,144,761
2040	22	352.9	-40	-195,501	-11,340,262
2041	23	352.9	-45	-196,257	-11,536,519
2042	24	352.9	-50	-197,013	-11,733,532
2043	25	352.9	-57	-197,769	-11,931,300
2044	26	302.7	-49	-168,863	-12,100,164
2045	27	302.7	-50	-168,936	-12,269,099
2046	28	302.7	-50	-169,008	-12,438,108
2047	29	302.7	-51	-169,081	-12,607,188
2048	30	21.1	-2	-7,117	-12,614,305

Table 32. New 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}	ΔCbb _{ct,t}	ΔCbbBSLPA _t	ΔCbbBSLPA
		ha	tCO ₂ -e ha ⁻¹	tCO ₂ -e	tCO ₂ -e
2018	0	1,041.2	-14.91	-15,524	-15,524
2019	1	1,386.7	-14.91	-36,200	-51,724
2020	2	1,700.3	-14.91	-61,550	-113,274
2021	3	1,750.1	-14.91	-87,643	-200,917
2022	4	1,494.2	-14.91	-109,921	-310,838
2023	5	1,005.8	-14.91	-124,917	-435,756
2024	6	838.9	-14.91	-137,425	-573,181
2025	7	1,347.0	-14.91	-157,509	-730,690
2026	8	849.0	-14.91	-170,167	-900,858
2027	9	1,594.3	-14.91	-193,938	-1,094,795
2028	10	735.0	-14.91	-189,372	-1,284,167
2029	11	801.7	-14.91	-180,649	-1,464,817
2030	12	801.7	-14.91	-167,252	-1,632,069
2031	13	801.7	-14.91	-153,112	-1,785,181

2032	14	801.7	-14.91	-142,787	-1,927,968
2033	15	801.7	-14.91	-139,744	-2,067,712
2034	16	345.7	-14.91	-132,391	-2,200,102
2035	17	345.7	-14.91	-117,461	-2,317,564
2036	18	345.7	-14.91	-109,959	-2,427,522
2037	19	345.7	-14.91	-91,343	-2,518,865
2038	20	345.7	-14.91	-85,539	-2,604,405
2039	21	352.9	-14.91	-78,848	-2,683,253
2040	22	352.9	-14.91	-72,157	-2,755,410
2041	23	352.9	-14.91	-65,467	-2,820,877
2042	24	352.9	-14.91	-58,776	-2,879,653
2043	25	352.9	-14.91	-52,085	-2,931,737
2044	26	302.7	-14.91	-51,443	-2,983,180
2045	27	302.7	-14.91	-50,802	-3,033,982
2046	28	302.7	-14.91	-50,160	-3,084,142
2047	29	302.7	-14.91	-49,519	-3,133,661
2048	30	21.1	-14.91	-44,678	-3,178,339

Table 33. New 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}	ΔCwp _{ct,t}	ΔCwpBSLPA _t	ΔCwpBSLPA
		ha	tCO ₂ -e ha ⁻¹	tCO ₂ -e	tCO ₂ -e
2018	0	1,041.2	0.00	0	0
2019	1	1,386.7	0.00	0	0
2020	2	1,700.3	0.00	0	0
2021	3	1,750.1	0.00	0	0
2022	4	1,494.2	0.00	0	0
2023	5	1,005.8	0.00	0	0
2024	6	838.9	0.00	0	0
2025	7	1,347.0	0.00	0	0
2026	8	849.0	0.00	0	0
2027	9	1,594.3	0.00	0	0
2028	10	735.0	0.00	0	0
2029	11	801.7	0.00	0	0
2030	12	801.7	0.00	0	0
2031	13	801.7	0.00	0	0
2032	14	801.7	0.00	0	0
2033	15	801.7	0.00	0	0
2034	16	345.7	0.00	0	0
2035	17	345.7	0.00	0	0
2036	18	345.7	0.00	0	0
2037	19	345.7	0.00	0	0

2038	20	345.7	0.00	0	0
2039	21	352.9	0.00	0	0
2040	22	352.9	0.00	0	0
2041	23	352.9	0.00	0	0
2042	24	352.9	0.00	0	0
2043	25	352.9	0.00	0	0
2044	26	302.7	0.00	0	0
2045	27	302.7	0.00	0	0
2046	28	302.7	0.00	0	0
2047	29	302.7	0.00	0	0
2048	30	21.1	0.00	0	0

The table below shows the comparison of the annual baseline carbon stock change for the previous baseline and the new one, adjusted to consider the exclusion of the three areas, considering the above-ground, below-ground and wood products (Tables 22.b.1, 22.b.2 and 22.b.6 of the VM0015 Methodology).

Table 34: Comparison of carbon stock change in the project area before and after the exclusion of the three areas

Year	Project year t	Total baseline carbon stock change in the above-ground biomass in the project area		Total baseline carbon stock change in the below-ground biomass in the project area		Total baseline carbon stock change in the wood products in the project area	
		Previous*	Adjusted	Previous**	Adjusted	Previous***	Adjusted
		$\Delta C_{abBSLPA_t}$	$\Delta C_{abBSLPA}$	$\Delta C_{bbBSLPA_t}$	$\Delta C_{bbBSLPA}$	$\Delta C_{wpBSLPA_t}$	$\Delta C_{wpBSLPA}$
		tCO ₂ -e	tCO ₂ -e	tCO ₂ -e	tCO ₂ -e	tCO ₂ -e	tCO ₂ -e
2018	0	-599,048	-599,048	-15,524	-15,524	0	0
2019	1	-796,107	-796,107	-36,200	-36,200	0	0
2020	2	-974,157	-974,157	-61,550	-61,550	0	0
2021	3	-999,945	-999,945	-87,643	-87,643	0	0
2022	4	-989,430	-850,201	-113,540	-109,921	0	0
2023	5	-565,892	-566,709	-128,536	-124,917	0	0
2024	6	-468,165	-468,983	-141,044	-137,425	0	0
2025	7	-899,154	-759,930	-164,757	-157,509	0	0
2026	8	-469,855	-471,083	-177,415	-170,167	0	0
2027	9	-897,259	-898,487	-201,186	-193,938	0	0
2028	10	-526,990	-403,136	-199,861	-189,372	0	0
2029	11	-486,797	-442,627	-192,324	-180,649	0	0
2030	12	-488,176	-444,140	-180,113	-167,252	0	0
2031	13	-489,618	-445,307	-167,159	-153,112	0	0
2032	14	-491,059	-446,473	-154,401	-142,787	0	0
2033	15	-491,269	-446,817	-152,544	-139,744	0	0
2034	16	-226,295	-184,543	-146,310	-132,391	0	0
2035	17	-228,265	-186,230	-128,871	-117,461	0	0
2036	18	-228,986	-187,078	-122,488	-109,959	0	0
2037	19	-230,963	-189,181	-104,991	-91,343	0	0

2038	20	-231,858	-189,836	-97,066	-85,539	0	0
2039	21	-224,128	-194,745	-89,981	-78,848	0	0
2040	22	-224,928	-195,501	-82,896	-72,157	0	0
2041	23	-225,729	-196,257	-75,811	-65,467	0	0
2042	24	-226,529	-197,013	-68,725	-58,776	0	0
2043	25	-227,330	-197,769	-61,640	-52,085	0	0
2044	26	-231,268	-168,863	-61,521	-51,443	0	0
2045	27	-231,282	-168,936	-61,402	-50,802	0	0
2046	28	-231,295	-169,008	-61,283	-50,160	0	0
2047	29	-231,309	-169,081	-61,164	-49,519	0	0
2048	30	-69,285	-7,117	-56,846	-44,678	0	0

*Table 49 of PD

** Table 50 of PD

*** Table 51 of PD

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 35 below.

Table 35. 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}	ΔCab _{ct,t}	ΔCabBSLLK _t	ΔCabBSLLK
		ha	tCO ₂ -e ha ⁻¹	tCO ₂ -e	tCO ₂ -e
2018	0	4,150	-575	-2,387,485	-2,387,485
2019	1	13,433	-439	-7,721,831	-10,109,316
2020	2	12,254	-235	-7,020,673	-17,129,989
2021	3	12,293	-167	-7,022,368	-24,152,357
2022	4	10,778	-116	-6,130,399	-30,282,756
2023	5	10,562	-94	-5,987,713	-36,270,469
2024	6	10,345	-79	-5,844,900	-42,115,370
2025	7	10,378	-69	-5,846,592	-47,961,962
2026	8	9,798	-58	-5,495,644	-53,457,606
2027	9	9,601	-52	-5,365,855	-58,823,461
2028	10	9,404	-48	-5,242,866	-64,066,328
2029	11	2,669	-14	-1,374,840	-65,441,168
2030	12	2,669	-16	-1,390,987	-66,832,155
2031	13	2,669	-18	-1,407,198	-68,239,353
2032	14	2,669	-20	-1,420,859	-69,660,212
2033	15	2,669	-23	-1,434,155	-71,094,367
2034	16	2,022	-20	-1,074,803	-72,169,170
2035	17	2,022	-24	-1,088,879	-73,258,048
2036	18	2,022	-29	-1,101,979	-74,360,027

2037	19	2,022	-36	-1,114,747	-75,474,774
2038	20	2,022	-48	-1,127,181	-76,601,955
2039	21	2,060	-50	-1,150,411	-77,752,366
2040	22	2,060	-52	-1,151,436	-78,903,802
2041	23	2,060	-53	-1,152,461	-80,056,263
2042	24	2,060	-55	-1,153,486	-81,209,749
2043	25	2,060	-57	-1,154,511	-82,364,261
2044	26	2,104	-58	-1,179,553	-83,543,814
2045	27	2,104	-57	-1,179,414	-84,723,228
2046	28	2,104	-57	-1,179,276	-85,902,504
2047	29	2,104	-57	-1,179,138	-87,081,641
2048	30	669	-18	-353,186	-87,434,827

Table 36. 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}	ΔCbb _{ct,t}	ΔCbbBBSLLK _t	ΔCbbBBSLLK
		ha	tCO ₂ -e ha ⁻¹	tCO ₂ -e	tCO ₂ -e
2018	0	4,150	-14.91	-61,870	-61,870
2019	1	13,433	-14.91	-262,156	-324,026
2020	2	12,254	-14.91	-444,859	-768,885
2021	3	12,293	-14.91	-628,140	-1,397,025
2022	4	10,778	-14.91	-788,844	-2,185,869
2023	5	10,562	-14.91	-946,320	-3,132,189
2024	6	10,345	-14.91	-1,100,557	-4,232,746
2025	7	10,378	-14.91	-1,255,289	-5,488,035
2026	8	9,798	-14.91	-1,401,379	-6,889,414
2027	9	9,601	-14.91	-1,544,534	-8,433,948
2028	10	9,404	-14.91	-1,622,870	-10,056,819
2029	11	2,669	-14.91	-1,462,377	-11,519,196
2030	12	2,669	-14.91	-1,319,467	-12,838,663
2031	13	2,669	-14.91	-1,175,979	-14,014,642
2032	14	2,669	-14.91	-1,055,068	-15,069,710
2033	15	2,669	-14.91	-937,385	-16,007,095
2034	16	2,022	-14.91	-813,294	-16,820,388
2035	17	2,022	-14.91	-688,707	-17,509,096
2036	18	2,022	-14.91	-572,762	-18,081,858
2037	19	2,022	-14.91	-459,753	-18,541,611
2038	20	2,022	-14.91	-349,693	-18,891,304
2039	21	2,060	-14.91	-340,619	-19,231,923
2040	22	2,060	-14.91	-331,546	-19,563,469
2041	23	2,060	-14.91	-322,472	-19,885,940

2042	24	2,060	-14.91	-313,398	-20,199,339
2043	25	2,060	-14.91	-304,325	-20,503,663
2044	26	2,104	-14.91	-305,549	-20,809,212
2045	27	2,104	-14.91	-306,773	-21,115,985
2046	28	2,104	-14.91	-307,998	-21,423,983
2047	29	2,104	-14.91	-309,222	-21,733,205
2048	30	669	-14.91	-289,046	-22,022,251

Table 37. 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	
				annual	cumulative
				$\Delta C_{wpBSLLK_t}$	$\Delta C_{wpBSLLK}$
		Forest / Pasture		tCO ₂ -e	tCO ₂ -e
		WPSLLK _{ct,t}	$\Delta C_{wpct,t}$		
		ha	tCO ₂ -e ha ⁻¹		
2018	0	4,149.6	0.00	0	0
2019	1	13,433.1	0.00	0	0
2020	2	12,253.8	0.00	0	0
2021	3	12,292.6	0.00	0	0
2022	4	10,778.3	0.00	0	0
2023	5	10,561.9	0.00	0	0
2024	6	10,344.6	0.00	0	0
2025	7	10,377.8	0.00	0	0
2026	8	9,798.3	0.00	0	0
2027	9	9,601.4	0.00	0	0
2028	10	9,403.6	0.00	0	0
2029	11	2,668.9	0.00	0	0
2030	12	2,668.9	0.00	0	0
2031	13	2,668.9	0.00	0	0
2032	14	2,668.9	0.00	0	0
2033	15	2,668.9	0.00	0	0
2034	16	2,021.9	0.00	0	0
2035	17	2,021.9	0.00	0	0
2036	18	2,021.9	0.00	0	0
2037	19	2,021.9	0.00	0	0
2038	20	2,021.9	0.00	0	0
2039	21	2,060.3	0.00	0	0
2040	22	2,060.3	0.00	0	0
2041	23	2,060.3	0.00	0	0
2042	24	2,060.3	0.00	0	0
2043	25	2,060.3	0.00	0	0
2044	26	2,104.0	0.00	0	0
2045	27	2,104.0	0.00	0	0
2046	28	2,104.0	0.00	0	0
2047	29	2,104.0	0.00	0	0

2048	30	668.7	0.00	0	0
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Conversion of forest to non-forest involving fires a source of emissions of non-CO₂ gases (CH₄ and N₂O). Sources report a steady increase in the number of fire alerts in Lábrea over the historical reference period. Furthermore, GIS analysis was conducted utilizing data on fire occurrence from the CPTEC/INPE database¹¹ and Mapbiomas¹².

To estimate non-CO₂ 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 (P_{burnt,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.

In accordance with the VM0015 methodology, GHG emissions from biomass burning were estimated based on revised IPCC 1996 GL LULUCF guidance, as follows.

$$EBB_{tot_{icl,t}} = EBBN_{20_{icl,t}} + EBBCH_{4_{icl,t}}$$

Where:

$EBB_{tot_{icl,t}}$ Total GHG emission from biomass burning in forest class icl ate year t; tCO_{2-e} ha⁻¹

$EBBN_{20_{icl,t}}$ Total GHG emission from biomass burning in forest class icl at year t; tCO_{2-e} ha⁻¹

$EBBCH_{4_{icl,t}}$ CH₄ emission from biomass burning in forest class icl at year t; tCO_{2-e} ha⁻¹

$$EBBN_{20_{icl,t}} = EBBCO_{2_{icl,t}} * 12/44 * NCR * ER_{N_{2}O} * 44/28 * GWP_{N_{2}O}$$

$$EBBCH_{4_{icl,t}} = EBBCO_{2_{icl,t}} * 12/44 * ER_{CH_4} * 16/12 * GWP_{CH_4}$$

Where:

$EBBCO_{2_{icl,t}}$ Per hectare CO₂ emission from biomass burning in slash and burn in forest class icl at year t, tCO_{2-e} ha⁻¹

$EBBN_{20_{icl,t}}$ Per hectare N₂O emission from biomass burning in slash and burn in forest class icl at year t; tCO_{2-e} ha⁻¹

$EBBCH_{4_{icl,t}}$ Per hectare CH₄ 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

¹¹ Source (last visited on 04/07/2021): <http://queimadas.dgi.inpe.br/queimadas/bdqueimadas#exportar-dados>

¹² Source . Projeto MapBiomas – Coleção 5.0 da Série Anual de Mapas de Uso e Cobertura da Terra do Brasil (last visited on 04/07/2021): https://mapbiomas.org/colecoes-mapbiomas-1?cama_set_language=pt-BR.

ER_{N2O} Emission ratio for N_2O (IPCC default value – 0.007)

GWP_{N2O} Global Warming Potential for N_2O (IPCC default value = 265, updated as required by the Standard v4.3, Section 3.14.4)

GWP_{CH4} Global Warming Potential for CH_4 (IPCC default value = 28, updated as required by the Standard v4.3, Section 3.14.4)

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

$C_{p,icl,t}$ Average carbon stock per hectare in the carbon pool p burnt in the forest class icl at year t ; $tCO_{2-e} \text{ ha}^{-1}$

$Pburnt_{p,icl}$ Proportion of forest area burned during the historical reference period 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 38. Parameters used to calculate non-CO2 emissions from forest fires (Table 23 of VM0015)

		Parameters								
Initial Forest Class		$Fburnt_{icl}$	C_{ab}	$Pburnt_{ab,icl}$	$CE_{ab,icl}$	$ECO2_{ab}$	$EBBCO2_{tot}$	$EBBN2O_{icl}$	$EBBCH4_{icl}$	$EBBtot_{icl}$
ID_{icl}	Name	N/A	$tCO_{2e} \text{ ha}^{-1}$	N/A	N/A	$tCO_{2e} \text{ ha}^{-1}$	$tCO_{2e} \text{ ha}^{-1}$	$tCO_{2e} \text{ ha}^{-1}$	$tCO_{2e} \text{ ha}^{-1}$	$tCO_{2e} \text{ ha}^{-1}$
1	Submontane open ombrophylous forest (As)	1.0	577	0.86	0.5	248	248	1.97	30.3	32.3

Table 39. New baseline non-CO2 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	
		<i>IDicl</i> = 1		annual	cumulative
		ABSLPA _{icl,t}	EBBBSL _{tot} _{icl}	EBBBSLPA _t	EBBBSLPA
		ha	tCO ₂ -e ha ⁻¹	tCO ₂ -e	tCO ₂ -e
2018	0	1,041.2	32,30	33.627	33.627
2019	1	1,386.7	32,30	44.788	78.415
2020	2	1,700.3	32,30	54.913	133.328
2021	3	1,750.1	32,30	56.522	189.850
2022	4	1,494.2	32,30	48.257	238.107
2023	5	1,005.8	32,30	32.485	270.592
2024	6	838.9	32,30	27.094	297.686
2025	7	1,347.0	32,30	43.506	341.192
2026	8	849.0	32,30	27.419	368.610
2027	9	1,594.3	32,30	51.491	420.101
2028	10	735.0	32,30	23.737	443.839
2029	11	801.7	32,30	25.892	469.731
2030	12	801.7	32,30	25.892	495.623
2031	13	801.7	32,30	25.892	521.515
2032	14	801.7	32,30	25.892	547.408
2033	15	801.7	32,30	25.892	573.300
2034	16	345.7	32,30	11.166	584.466
2035	17	345.7	32,30	11.166	595.632
2036	18	345.7	32,30	11.166	606.799
2037	19	345.7	32,30	11.166	617.965
2038	20	345.7	32,30	11.166	629.131
2039	21	352.9	32,30	11.399	640.530
2040	22	352.9	32,30	11.399	651.928
2041	23	352.9	32,30	11.399	663.327
2042	24	352.9	32,30	11.399	674.725
2043	25	352.9	32,30	11.399	686.124
2044	26	302.7	32,30	9.777	695.901
2045	27	302.7	32,30	9.777	705.677
2046	28	302.7	32,30	9.777	715.454
2047	29	302.7	32,30	9.777	725.231
2048	30	21.1	32,30	681	725.912

The table below shows the comparison of the annual baseline non-CO2 emissions from forest fires in the project area for the previous baseline and the new one, adjusted to consider the exclusion of the three areas (Tables 24 of the VM0015 Methodology).

Table 40: Comparison of emission from forest fires in the project area before and after the exclusion of the three areas

Year	Project year t	Total baseline non-CO2 emissions from forest fires in the project area	
		Previous*	Adjusted
		EBBBSLPA _t	EBBBSLPA
		tCO ₂ -e	tCO ₂ -e
2018	0	26,083	33,627
2019	1	34,739	44,788
2020	2	42,593	54,913
2021	3	43,841	56,522
2022	4	43,510	48,257
2023	5	25,197	32,485
2024	6	21,015	27,094
2025	7	39,842	43,506
2026	8	21,267	27,419
2027	9	39,939	51,491
2028	10	23,858	23,737
2029	11	22,076	25,892
2030	12	22,076	25,892
2031	13	22,076	25,892
2032	14	22,076	25,892
2033	15	22,076	25,892
2034	16	10,542	11,166
2035	17	10,542	11,166
2036	18	10,542	11,166
2037	19	10,542	11,166
2038	20	10,542	11,166
2039	21	10,172	11,399
2040	22	10,172	11,399
2041	23	10,172	11,399
2042	24	10,172	11,399
2043	25	10,172	11,399
2044	26	10,342	9,777
2045	27	10,342	9,777
2046	28	10,342	9,777
2047	29	10,342	9,777
2048	30	3,287	681

*Table 56 of PD. Values from the previous baseline were calculated using the GWP from IPCC Second Assessment Report (CH₄=21 and N₂O=310). The updated baseline used the GWP values from Fifth Report (AR5) (CH₄=28 and N₂O=265).

Table 47 and Table 48 present the comparison of ex ante estimated actual non-CO2 emissions from forest fires in the Project area and the emission of non-CO2 gases in the three excluded areas.

Ex-ante estimation of actual carbon stock changes

The ex-post carbon stock changes during the present monitoring period are due to the following:

Planned activities forest management within the project area.

Unplanned deforestation that cannot be avoided.

Carbon stock changes due to possible future catastrophic events cannot be predicted and were 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 sustainable logging is 3,747.78 hectares. Given that the total management area is of 41,138.98 hectares, it is assumed that logging activities will be carried out over 11 years, followed by 15 years of fallow period. 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), which indicates an annual increase of 3.03 tCO₂ per hectare per year due to post-logging regeneration of vegetation.

For the update of the ex-ante carbon stock decrease due to planned logging activities, the planned logging that was expected to take place in the excluded areas were discounted, being the value of 809.5 ha for each of the years of 2022 and 2023.

Table 41. New ex-ante estimated actual carbon stock decrease due to planned logging activities in the Project Area (Table 25.b of VM0015)

Year	Areas of planned logging activities x Carbon stock change (decrease) in the project area		Total carbon stock decrease due to planned logging activities	
	<i>IDcl</i> = 1		annual	cumulative
	<i>APLPA_{icl,t}</i>	<i>ΔC_{toticl,t}</i>	<i>ΔCPLdPA_t</i>	<i>ΔCPLdPA</i>
	ha	tCO ₂ -e ha ⁻¹	tCO ₂ -e	tCO ₂ -e
2018	488.7	103.20	50,433	50,433
2019	2,893.9	103.20	298,637	349,069
2020	4,430.8	103.20	457,241	806,310
2021	3,297.3	103.20	340,270	1,146,580
2022	3,966.0	103.20	409,274	1,555,853
2023	3,976.6	103.20	410,370	1,966,223
2024	3,976.6	103.20	410,370	2,376,592
2025	3,980.1	103.20	410,728	2,787,320
2026	3,980.1	103.20	410,728	3,198,047

2027	3,971.7	103.20	409,867	3,607,914
2028	3,971.7	103.20	409,867	4,017,781
2029	2,694.3	103.20	278,041	4,295,822
2030	0.0	103.20	0	4,295,822
2031	0.0	103.20	0	4,295,822
2032	0.0	103.20	0	4,295,822
2033	0.0	103.20	0	4,295,822
2034	0.0	103.20	0	4,295,822
2035	0.0	103.20	0	4,295,822
2036	0.0	103.20	0	4,295,822
2037	0.0	103.20	0	4,295,822
2038	0.0	103.20	0	4,295,822
2039	0.0	103.20	0	4,295,822
2040	0.0	103.20	0	4,295,822
2041	0.0	103.20	0	4,295,822
2042	0.0	103.20	0	4,295,822
2043	0.0	103.20	0	4,295,822
2044	0.0	103.20	0	4,295,822
2045	2,894.4	103.20	298,690	4,594,512
2046	4,920.0	103.20	507,727	5,102,239
2047	3,297.3	103.20	340,270	5,442,509
2048	3,966.0	103.20	409,274	5,851,782

Table 42. New 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} ha	$\Delta C_{toticl,t}$ tCO ₂ -e ha ⁻¹	$\Delta CPLIPA_t$ tCO ₂ -e	$\Delta CPLIPA$ tCO ₂ -e
2018	0	488.7	3.03	1,478	1,478
2019	1	2,893.9	3.03	10,232	11,711
2020	2	4,430.8	3.03	23,635	35,346
2021	3	3,297.3	3.03	33,610	68,956
2022	4	3,966.0	3.03	45,607	114,563
2023	5	3,976.6	3.03	57,636	172,199
2024	6	3,976.6	3.03	69,665	241,864
2025	7	3,980.1	3.03	81,705	323,569
2026	8	3,980.1	3.03	93,745	417,313
2027	9	3,971.7	3.03	105,759	523,073
2028	10	3,971.7	3.03	117,774	640,846
2029	11	2,694.3	3.03	125,924	766,770

2030	12	0.0	3.03	125,924	892,694
2031	13	0.0	3.03	125,924	1,018,617
2032	14	0.0	3.03	125,924	1,144,541
2033	15	0.0	3.03	125,924	1,270,465
2034	16	0.0	3.03	125,924	1,396,389
2035	17	0.0	3.03	125,924	1,522,312
2036	18	0.0	3.03	125,924	1,648,236
2037	19	0.0	3.03	125,924	1,774,160
2038	20	0.0	3.03	125,924	1,900,084
2039	21	0.0	3.03	125,924	2,026,007
2040	22	0.0	3.03	125,924	2,151,931
2041	23	0.0	3.03	125,924	2,277,855
2042	24	0.0	3.03	125,924	2,403,779
2043	25	0.0	3.03	125,924	2,529,703
2044	26	0.0	3.03	125,924	2,655,626
2045	27	2,894.4	2.99	133,201	2,788,827
2046	28	4,920.0	2.82	139,330	2,928,157
2047	29	3,297.3	2.58	135,901	3,064,059
2048	30	3,966.0	2.43	137,924	3,201,982

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. The project design team conservatively considers that surveillance activities are able to attain 90% of effectiveness in avoiding unplanned deforestation inside the Project Area. According to studies comparing the incidence of fires in the Reference Region and the Project Area (for 2019 and 2020), it is evidenced the initial fire occurrences in PA are 74% lower than in the RR. Moreover, only three of these occurrences resulted in biomass loss, as demonstrated by satellite imagery. Evidence is available to auditors.

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

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} GHG emission from biomass burning in forest class icl at year t; tCO_{2-e}ha⁻¹

$\Delta CBSL_t$ Total baseline carbon stock change at year t in the project area; tCO_{2-e}ha⁻¹

El	Ex ante estimated Effectiveness Index; %
t	1, 2, 3 ... t , a year of the proposed project crediting period; dimensionless

Table 43. New ex ante estimated net carbon stock change in the project area under the project scenario (Table 27 of VM0015)

Year	Project year t	Total carbon stock decrease due to planned logging activities		Total carbon stock increase due to planned logging activities		Total carbon stock decrease due to unavoi ded unplanned deforestation		Total carbon stock change in the project case	
		annual	cumulative	annual	cumulative	annual	cumulative	annual	cumulative
		ΔCPLdPA_t	ΔCPLdPA	ΔCPLiPA_t	ΔCPLiPA	ΔCUDdPA_t	ΔCUDdPA	ΔCPSPA_t	ΔCPSPA
		tCO ₂ -e	tCO ₂ -e	tCO ₂ -e	tCO ₂ -e	tCO ₂ -e	tCO ₂ -e	tCO ₂ -e	tCO ₂ -e
2018	0	50,433	50,433	1,478	1,478	-61,457	-61,457	-110,412	-110,412
2019	1	298,637	349,069	10,232	11,711	-83,231	-144,688	-371,635	-482,047
2020	2	457,241	806,310	23,635	35,346	-103,571	-248,259	-537,176	-1,019,223
2021	3	340,270	1,146,580	33,610	68,956	-108,759	-357,017	-415,419	-1,434,641
2022	4	409,274	1,555,853	45,607	114,563	-96,012	-453,030	-459,679	-1,894,320
2023	5	410,370	1,966,223	57,636	172,199	-69,163	-522,192	-421,896	-2,316,216
2024	6	410,370	2,376,592	69,665	241,864	-60,641	-582,833	-401,345	-2,717,561
2025	7	410,728	2,787,320	81,705	323,569	-91,744	-674,577	-420,767	-3,138,328
2026	8	410,728	3,198,047	93,745	417,313	-64,125	-738,702	-381,108	-3,519,436
2027	9	409,867	3,607,914	105,759	523,073	-109,242	-847,944	-413,350	-3,932,786
2028	10	409,867	4,017,781	117,774	640,846	-59,251	-907,195	-351,344	-4,284,130
2029	11	278,041	4,295,822	125,924	766,770	-62,328	-969,523	-214,445	-4,498,575
2030	12	0	4,295,822	125,924	892,694	-61,139	-1,030,662	64,785	-4,433,791
2031	13	0	4,295,822	125,924	1,018,617	-59,842	-1,090,504	66,082	-4,367,709
2032	14	0	4,295,822	125,924	1,144,541	-58,926	-1,149,430	66,998	-4,300,711
2033	15	0	4,295,822	125,924	1,270,465	-58,656	-1,208,086	67,268	-4,233,443
2034	16	0	4,295,822	125,924	1,396,389	-31,693	-1,239,779	94,230	-4,139,213
2035	17	0	4,295,822	125,924	1,522,312	-30,369	-1,270,149	95,555	-4,043,658
2036	18	0	4,295,822	125,924	1,648,236	-29,704	-1,299,852	96,220	-3,947,438
2037	19	0	4,295,822	125,924	1,774,160	-28,052	-1,327,905	97,871	-3,849,567
2038	20	0	4,295,822	125,924	1,900,084	-27,538	-1,355,442	98,386	-3,751,181
2039	21	0	4,295,822	125,924	2,026,007	-27,359	-1,382,801	98,564	-3,652,616
2040	22	0	4,295,822	125,924	2,151,931	-26,766	-1,409,567	99,158	-3,553,458
2041	23	0	4,295,822	125,924	2,277,855	-26,172	-1,435,740	99,751	-3,453,707
2042	24	0	4,295,822	125,924	2,403,779	-25,579	-1,461,318	100,345	-3,353,362
2043	25	0	4,295,822	125,924	2,529,703	-24,985	-1,486,304	100,938	-3,252,423
2044	26	0	4,295,822	125,924	2,655,626	-22,031	-1,508,334	103,893	-3,148,530

Year	Project year t	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
		ΔCPLdPA_t	ΔCPLdPA	ΔCPLiPA_t	ΔCPLiPA	ΔCUDdPA_t	ΔCUDdPA	ΔCPSPA_t	ΔCPSPA
		tCO ₂ -e	tCO ₂ -e	tCO ₂ -e	tCO ₂ -e	tCO ₂ -e	tCO ₂ -e	tCO ₂ -e	tCO ₂ -e
2045	27	298,690	4,594,512	133,201	2,788,827	-21,974	-1,530,308	-187,463	-3,335,993
2046	28	507,727	5,102,239	139,330	2,928,157	-21,917	-1,552,225	-390,314	-3,726,307
2047	29	340,270	5,442,509	135,901	3,064,059	-21,860	-1,574,085	-226,228	-3,952,535
2048	30	409,274	5,851,782	137,924	3,201,982	-5,179	-1,579,264	-276,529	-4,229,064

The table below shows the comparison of the results of carbon stock due to planned and unplanned activities for the previous baseline values and the new one, with the exclusion of the three areas (Table 27 of VM0015 Methodology).

Table 44: Comparison of carbon stock change due to planned and unplanned activities in the project area before and after the exclusion of the three areas

Year	Project year t	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	
		Previous*	Adjusted	Previous*	Adjusted	Previous*	Adjusted	Previous*	Adjusted
		ΔCPLdPA_t	ΔCPLdPA_t	ΔCPLiPA_t	ΔCPLiPA_t	ΔCUDdPA_t	ΔCUDdPA_t	ΔCPSPA_t	ΔCPSPA_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
2018	0	50,433	50,433	1,478	1,478	-61,457	-61,457	-110,412	-110,412
2019	1	298,637	298,637	10,232	10,232	-83,231	-83,231	-371,635	-371,635
2020	2	457,241	457,241	23,635	23,635	-103,571	-103,571	-537,176	-537,176
2021	3	340,270	340,270	33,610	33,610	-108,759	-108,759	-415,419	-415,419
2022	4	492,814	409,274	48,056	45,607	-110,297	-96,012	-555,055	-459,679
2023	5	493,910	410,370	62,534	57,636	-69,443	-69,163	-500,819	-421,896
2024	6	410,370	410,370	74,563	69,665	-60,921	-60,641	-396,728	-401,345
2025	7	410,728	410,728	86,603	81,705	-106,391	-91,744	-430,516	-420,767
2026	8	410,728	410,728	98,642	93,745	-64,727	-64,125	-376,812	-381,108

2027	9	409,867	409,867	110,657	105,759	-109,844	-109,242	-409,055	-413,350
2028	10	409,867	409,867	122,671	117,774	-72,685	-59,251	-359,881	-351,344
2029	11	278,041	278,041	130,821	125,924	-67,912	-62,328	-215,132	-214,445
2030	12	0	0	130,821	125,924	-66,829	-61,139	63,993	64,785
2031	13	0	0	130,821	125,924	-65,678	-59,842	65,144	66,082
2032	14	0	0	130,821	125,924	-64,546	-58,926	66,275	66,998
2033	15	0	0	130,821	125,924	-64,381	-58,656	66,440	67,268
2034	16	0	0	130,821	125,924	-37,260	-31,693	93,561	94,230
2035	17	0	0	130,821	125,924	-35,714	-30,369	95,108	95,555
2036	18	0	0	130,821	125,924	-35,147	-29,704	95,674	96,220
2037	19	0	0	130,821	125,924	-33,595	-28,052	97,226	97,871
2038	20	0	0	130,821	125,924	-32,892	-27,538	97,929	98,386
2039	21	0	0	130,821	125,924	-31,411	-27,359	99,411	98,564
2040	22	0	0	130,821	125,924	-30,782	-26,766	100,039	99,158
2041	23	0	0	130,821	125,924	-30,154	-26,172	100,667	99,751
2042	24	0	0	130,821	125,924	-29,525	-25,579	101,296	100,345
2043	25	0	0	130,821	125,924	-28,897	-24,985	101,924	100,938
2044	26	0	0	130,821	125,924	-29,279	-22,031	101,542	103,893
2045	27	353,972	298,690	139,719	133,201	-29,268	-21,974	-243,521	-187,463
2046	28	453,549	507,727	144,260	139,330	-29,258	-21,917	-338,547	-390,314
2047	29	339,165	340,270	140,799	135,901	-29,247	-21,860	-227,614	-226,228
2048	30	492,814	409,274	145,270	137,924	-12,613	-5,179	-360,157	-276,529

*Table 59 of PD

The table below presents the carbon stock change in the three excluded areas.

Table 45: Carbon stock change in the three excluded areas

Year	Project year t	Total carbon stock decrease due to planned logging activities in the three excluded areas		Total carbon stock increase due to planned logging activities in the three excluded areas		Total carbon stock decrease due to unavoided unplanned deforestation in the three excluded areas	Total carbon stock change in the three excluded areas		
		annual	cumulative	annual	cumulative	annual	cumulative	Previous*	Adjusted
		$\Delta\text{CPLdEXC}_t$	$\Delta\text{CPLdEXC}$	$\Delta\text{CPLiEXC}_t$	$\Delta\text{CPLiEXC}$	$\Delta\text{CUDdEXC}_t$	$\Delta\text{CUDdEXC}$	ΔCPSEXC_t	ΔCPSEXC
		tCO ₂ -e	tCO ₂ -e	tCO ₂ -e	tCO ₂ -e	tCO ₂ -e	tCO ₂ -e	tCO ₂ -e	tCO ₂ -e
2018	0	0	0	0	0	0	0	0	0
2019	1	0	0	0	0	0	0	0	0
2020	2	0	0	0	0	0	0	0	0
2021	3	0	0	0	0	0	0	0	0
2022	4	83,540	83,540	2,449	2,449	-14,285	-14,285	-95,376	-95,376
2023	5	83,540	167,081	4,898	7,346	-280	-14,565	-78,923	-174,299
2024	6	0	167,081	4,898	12,244	-280	-14,845	4,618	-169,682
2025	7	0	167,081	4,898	17,142	-14,647	-29,492	-9,749	-179,431
2026	8	0	167,081	4,898	22,039	-602	-30,094	4,296	-175,136
2027	9	0	167,081	4,898	26,937	-602	-30,696	4,296	-170,840
2028	10	0	167,081	4,898	31,835	-13,434	-44,130	-8,537	-179,377
2029	11	0	167,081	4,898	36,732	-5,584	-49,715	-687	-180,063
2030	12	0	167,081	4,898	41,630	-5,690	-55,405	-792	-180,856
2031	13	0	167,081	4,898	46,528	-5,836	-61,240	-938	-181,794
2032	14	0	167,081	4,898	51,425	-5,620	-66,860	-722	-182,516
2033	15	0	167,081	4,898	56,323	-5,725	-72,586	-828	-183,343

2034	16	0	167,081	4,898	61,221	-5,567	-78,153	-669	-184,013
2035	17	0	167,081	4,898	66,118	-5,344	-83,497	-447	-184,460
2036	18	0	167,081	4,898	71,016	-5,444	-88,941	-546	-185,006
2037	19	0	167,081	4,898	75,914	-5,543	-94,484	-645	-185,651
2038	20	0	167,081	4,898	80,811	-5,355	-99,839	-457	-186,108
2039	21	0	167,081	4,898	85,709	-4,052	-103,890	846	-185,262
2040	22	0	167,081	4,898	90,607	-4,017	-107,907	881	-184,381
2041	23	0	167,081	4,898	95,504	-3,982	-111,889	916	-183,465
2042	24	0	167,081	4,898	100,402	-3,947	-115,835	951	-182,514
2043	25	0	167,081	4,898	105,300	-3,912	-119,747	986	-181,528
2044	26	0	167,081	4,898	110,197	-7,248	-126,995	-2,351	-183,879
2045	27	55,282	222,363	6,518	116,715	-7,295	-134,290	-56,059	-239,938
2046	28	-54,178	168,185	4,930	121,645	-7,341	-141,631	51,767	-188,171
2047	29	-1,104	167,081	4,898	126,543	-7,387	-149,018	-1,385	-189,556
2048	30	83,540	250,621	7,346	133,890	-7,434	-156,452	-83,628	-273,184

Ex-ante estimation of actual non-CO2 emissions from forest fires

Where forest fires have been included in the baseline scenario, non-CO₂ 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-CO₂ emissions from forest fires due to unavoided unplanned deforestation at year t in the project area; tCO_{2-e}

EBBBSPA_t Total non-CO₂ emissions from forest fires 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 46. New total ex ante estimated actual emissions of non-CO₂ gases due to forest fires in the project area (Table 28 of VM0015)

Year	Project year t	Total ex ante estimated actual non-CO ₂ emissions from forest fires in the Project area	
		annual	cumulative
		EBBPSPA _t	EBBPSPA
		tCO _{2-e}	tCO _{2-e}
2018	0	3,363	3,363
2019	1	4,479	7,841
2020	2	5,491	13,333
2021	3	5,652	18,985
2022	4	4,826	23,811
2023	5	3,248	27,059
2024	6	2,709	29,769
2025	7	4,351	34,119
2026	8	2,742	36,861
2027	9	5,149	42,010
2028	10	2,374	44,384
2029	11	2,589	46,973
2030	12	2,589	49,562
2031	13	2,589	52,152
2032	14	2,589	54,741
2033	15	2,589	57,330
2034	16	1,117	58,447
2035	17	1,117	59,563
2036	18	1,117	60,680
2037	19	1,117	61,796

2038	20	1,117	62,913
2039	21	1,140	64,053
2040	22	1,140	65,193
2041	23	1,140	66,333
2042	24	1,140	67,473
2043	25	1,140	68,612
2044	26	978	69,590
2045	27	978	70,568
2046	28	978	71,545
2047	29	978	72,523
2048	30	68	72,591

The table below shows the comparison of the results of emission of non-CO2 gases for the previous baseline values and the new one, with the exclusion of the three areas (Table 28 of VM0015 Methodology).

Table 47: Comparison of emission of non-CO2 gases in the project area before and after the exclusion of the three areas

Year	Project year t	Total ex ante estimated actual non-CO2 emissions from forest fires in the Project area	
		Previous*	Adjusted
		EBBPSPA _t	EBBPSPA
		tCO ₂ -e	tCO ₂ -e
2018	0	2,608	3,363
2019	1	3,474	4,479
2020	2	4,259	5,491
2021	3	4,384	5,652
2022	4	4,351	4,826
2023	5	2,520	3,248
2024	6	2,102	2,709
2025	7	3,984	4,351
2026	8	2,127	2,742
2027	9	3,994	5,149
2028	10	2,386	2,374
2029	11	2,208	2,589
2030	12	2,208	2,589
2031	13	2,208	2,589
2032	14	2,208	2,589
2033	15	2,208	2,589
2034	16	1,054	1,117
2035	17	1,054	1,117
2036	18	1,054	1,117
2037	19	1,054	1,117
2038	20	1,054	1,117
2039	21	1,017	1,140
2040	22	1,017	1,140
2041	23	1,017	1,140
2042	24	1,017	1,140
2043	25	1,017	1,140
2044	26	1,034	978
2045	27	1,034	978
2046	28	1,034	978
2047	29	1,034	978
2048	30	329	68

*Table 60 of PD

The table below presents the emission of non-CO2 gases in the three excluded areas.

Table 48: Emission of non-CO2 gases in the three excluded areas

Year	Project year t	Total ex ante estimated actual non-CO2 emissions from forest fires in the excluded areas	
		annual	cumulative
		EBBPSEXC _t	EBBPSEXC
		tCO ₂ -e	tCO ₂ -e
2018	0	0.000	0.000
2019	1	0.000	0.000
2020	2	0.000	0.000
2021	3	0.000	0.000
2022	4	783.853	783.853
2023	5	0.000	783.853
2024	6	0.000	783.853
2025	7	786.114	1,569.967
2026	8	0.000	1,569.967
2027	9	0.000	1,569.967
2028	10	702.141	2,272.108
2029	11	256.892	2,529.000
2030	12	256.892	2,785.892
2031	13	256.892	3,042.784
2032	14	256.892	3,299.676
2033	15	256.892	3,556.568
2034	16	242.487	3,799.056
2035	17	242.487	4,041.543
2036	18	242.487	4,284.031
2037	19	242.487	4,526.518
2038	20	242.487	4,769.005
2039	21	171.498	4,940.504
2040	22	171.498	5,112.002
2041	23	171.498	5,283.500
2042	24	171.498	5,454.998
2043	25	171.498	5,626.496
2044	26	355.657	5,982.153
2045	27	355.657	6,337.810
2046	28	355.657	6,693.467
2047	29	355.657	7,049.123
2048	30	355.657	7,404.780
TOTAL		7,404.78	

Total ex ante estimations for the project area

Table 49. New total ex ante estimated actual net carbon stock changes and emissions of non-CO2 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	cumulative	annual	cumulative	annual	cumulative	annual	cumulative	annual	cumulative
		ΔCPAdPA_t	ΔCPAdPA	ΔCPAiPA_t	ΔCPAiPA	ΔCUDdPA_t	ΔCUDdPA	ΔCPSPA_t	ΔCPSPA	EBBPSPA_t	EBBPSPA
		tCO ₂ -e	tCO ₂ -e	tCO ₂ -e	tCO ₂ -e	tCO ₂ -e	tCO ₂ -e	tCO ₂ -e	tCO ₂ -e	tCO ₂ -e	tCO ₂ -e
2018	0	50,433	50,433	1,478	1,478	-61,457	-61,457	-110,412	-110,412	3,363	3,363
2019	1	298,637	349,069	10,232	11,711	-83,231	-144,688	-371,635	-482,047	4,479	7,841
2020	2	457,241	806,310	23,635	35,346	-103,571	-248,259	-537,176	-1,019,223	5,491	13,333
2021	3	340,270	1,146,580	33,610	68,956	-108,759	-357,017	-415,419	-1,434,641	5,652	18,985
2022	4	409,274	1,555,853	45,607	114,563	-96,012	-453,030	-459,679	-1,894,320	4,826	23,811
2023	5	410,370	1,966,223	57,636	172,199	-69,163	-522,192	-421,896	-2,316,216	3,248	27,059
2024	6	410,370	2,376,592	69,665	241,864	-60,641	-582,833	-401,345	-2,717,561	2,709	29,769
2025	7	410,728	2,787,320	81,705	323,569	-91,744	-674,577	-420,767	-3,138,328	4,351	34,119
2026	8	410,728	3,198,047	93,745	417,313	-64,125	-738,702	-381,108	-3,519,436	2,742	36,861
2027	9	409,867	3,607,914	105,759	523,073	-109,242	-847,944	-413,350	-3,932,786	5,149	42,010
2028	10	409,867	4,017,781	117,774	640,846	-59,251	-907,195	-351,344	-4,284,130	2,374	44,384
2029	11	278,041	4,295,822	125,924	766,770	-62,328	-969,523	-214,445	-4,498,575	2,589	46,973
2030	12	0	4,295,822	125,924	892,694	-61,139	-1,030,662	64,785	-4,433,791	2,589	49,562
2031	13	0	4,295,822	125,924	1,018,617	-59,842	-1,090,504	66,082	-4,367,709	2,589	52,152
2032	14	0	4,295,822	125,924	1,144,541	-58,926	-1,149,430	66,998	-4,300,711	2,589	54,741
2033	15	0	4,295,822	125,924	1,270,465	-58,656	-1,208,086	67,268	-4,233,443	2,589	57,330
2034	16	0	4,295,822	125,924	1,396,389	-31,693	-1,239,779	94,230	-4,139,213	1,117	58,447
2035	17	0	4,295,822	125,924	1,522,312	-30,369	-1,270,149	95,555	-4,043,658	1,117	59,563
2036	18	0	4,295,822	125,924	1,648,236	-29,704	-1,299,852	96,220	-3,947,438	1,117	60,680
2037	19	0	4,295,822	125,924	1,774,160	-28,052	-1,327,905	97,871	-3,849,567	1,117	61,796
2038	20	0	4,295,822	125,924	1,900,084	-27,538	-1,355,442	98,386	-3,751,181	1,117	62,913
2039	21	0	4,295,822	125,924	2,026,007	-27,359	-1,382,801	98,564	-3,652,616	1,140	64,053
2040	22	0	4,295,822	125,924	2,151,931	-26,766	-1,409,567	99,158	-3,553,458	1,140	65,193

2041	23	0	4,295,822	125,924	2,277,855	-26,172	-1,435,740	99,751	-3,453,707	1,140	66,333
2042	24	0	4,295,822	125,924	2,403,779	-25,579	-1,461,318	100,345	-3,353,362	1,140	67,473
2043	25	0	4,295,822	125,924	2,529,703	-24,985	-1,486,304	100,938	-3,252,423	1,140	68,612
2044	26	0	4,295,822	125,924	2,655,626	-22,031	-1,508,334	103,893	-3,148,530	978	69,590
2045	27	298,690	4,594,512	133,201	2,788,827	-21,974	-1,530,308	-187,463	-3,335,993	978	70,568
2046	28	507,727	5,102,239	139,330	2,928,157	-21,917	-1,552,225	-390,314	-3,726,307	978	71,545
2047	29	340,270	5,442,509	135,901	3,064,059	-21,860	-1,574,085	-226,228	-3,952,535	978	72,523
2048	30	409,274	5,851,782	137,924	3,201,982	-5,179	-1,579,264	-276,529	-4,229,064	68	72,591

The table below shows the comparison of the results of actual net carbon stock changes and emissions of non-CO2 gases in the project area for the previous baseline values and the new one, with the exclusion of the three areas (Table 29 of VM0015 Methodology).

Table 50: Comparison of net carbon stock changes and emissions of non-CO2 gases in the project area in the project area before and after the exclusion of the three areas

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	
		Previous*	Adjusted	Previous*	Adjusted	Previous*	Adjusted	Previous*	Adjusted	Previous*	Adjusted
		ΔCPLdPA_t	ΔCPLdPA	ΔCPLiPA_t	ΔCPLiPA	ΔCUDdPA_t	ΔCUDdPA	ΔCPSPA_t	ΔCPSPA	EBBPSPA_t	EBBPSPA
		tCO ₂ -e	tCO ₂ -e	tCO ₂ -e	tCO ₂ -e	tCO ₂ -e	tCO ₂ -e	tCO ₂ -e	tCO ₂ -e	tCO ₂ -e	tCO ₂ -e
2018	0	50,433	50,433	1,478	1,478	-61,457	-61,457	-110,412	-110,412	2,608	3,363
2019	1	298,637	298,637	10,232	10,232	-83,231	-83,231	-371,635	-371,635	3,474	4,479
2020	2	457,241	457,241	23,635	23,635	-103,571	-103,571	-537,176	-537,176	4,259	5,491
2021	3	340,270	340,270	33,610	33,610	-108,759	-108,759	-415,419	-415,419	4,384	5,652
2022	4	492,814	409,274	48,056	45,607	-110,297	-96,012	-555,055	-459,679	4,351	4,826
2023	5	493,910	410,370	62,534	57,636	-69,443	-69,163	-500,819	-421,896	2,520	3,248
2024	6	410,370	410,370	74,563	69,665	-60,921	-60,641	-396,728	-401,345	2,102	2,709
2025	7	410,728	410,728	86,603	81,705	-106,391	-91,744	-430,516	-420,767	3,984	4,351
2026	8	410,728	410,728	98,642	93,745	-64,727	-64,125	-376,812	-381,108	2,127	2,742
2027	9	409,867	409,867	110,657	105,759	-109,844	-109,242	-409,055	-413,350	3,994	5,149
2028	10	409,867	409,867	122,671	117,774	-72,685	-59,251	-359,881	-351,344	2,386	2,374
2029	11	278,041	278,041	130,821	125,924	-67,912	-62,328	-215,132	-214,445	2,208	2,589
2030	12	0	0	130,821	125,924	-66,829	-61,139	63,993	64,785	2,208	2,589
2031	13	0	0	130,821	125,924	-65,678	-59,842	65,144	66,082	2,208	2,589
2032	14	0	0	130,821	125,924	-64,546	-58,926	66,275	66,998	2,208	2,589
2033	15	0	0	130,821	125,924	-64,381	-58,656	66,440	67,268	2,208	2,589
2034	16	0	0	130,821	125,924	-37,260	-31,693	93,561	94,230	1,054	1,117
2035	17	0	0	130,821	125,924	-35,714	-30,369	95,108	95,555	1,054	1,117
2036	18	0	0	130,821	125,924	-35,147	-29,704	95,674	96,220	1,054	1,117
2037	19	0	0	130,821	125,924	-33,595	-28,052	97,226	97,871	1,054	1,117
2038	20	0	0	130,821	125,924	-32,892	-27,538	97,929	98,386	1,054	1,117
2039	21	0	0	130,821	125,924	-31,411	-27,359	99,411	98,564	1,017	1,140
2040	22	0	0	130,821	125,924	-30,782	-26,766	100,039	99,158	1,017	1,140

2041	23	0	0	130,821	125,924	-30,154	-26,172	100,667	99,751	1,017	1,140
2042	24	0	0	130,821	125,924	-29,525	-25,579	101,296	100,345	1,017	1,140
2043	25	0	0	130,821	125,924	-28,897	-24,985	101,924	100,938	1,017	1,140
2044	26	0	0	130,821	125,924	-17,250	-22,031	113,572	103,893	524	978
2045	27	353,972	298,690	139,719	133,201	-16,969	-21,974	-231,223	-187,463	524	978
2046	28	453,549	507,727	144,260	139,330	-16,689	-21,917	-325,978	-390,314	524	978
2047	29	339,165	340,270	140,799	135,901	-16,409	-21,860	-214,776	-226,228	524	978
2048	30	492,814	409,274	145,270	137,924	-7,712	-5,179	-355,256	-276,529	166	68
Total		6,102,404	5,851,782	3,335,872	3,201,982	-1,735,716	-1,579,264	-4,502,248	-4,229,064	62,049	72,591

*Table 61 of PD

Leakage

Activities that will cause 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 51. 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	cumulative	annual	cumulative
		$\Delta CADLK_t$	$\Delta CADLK$	$EADLK_t$	$EADLK$
		tCO ₂ -e	tCO ₂ -e	tCO ₂ -e	tCO ₂ -e
2018	0	-30,729	-30,729	1,681	1,681
2019	1	-41,615	-72,344	2,239	3,921
2020	2	-51,785	-124,129	2,746	6,666
2021	3	-54,379	-178,509	2,826	9,492
2022	4	-48,006	-226,515	2,413	11,905
2023	5	-34,581	-261,096	1,624	13,530
2024	6	-30,320	-291,416	1,355	14,884
2025	7	-45,872	-337,288	2,175	17,060
2026	8	-32,062	-369,351	1,371	18,431
2027	9	-54,621	-423,972	2,575	21,005
2028	10	-29,625	-453,598	1,187	22,192
2029	11	-31,164	-484,761	1,295	23,487
2030	12	-30,570	-515,331	1,295	24,781
2031	13	-29,921	-545,252	1,295	26,076
2032	14	-29,463	-574,715	1,295	27,370

2033	15	-29,328	-604,043	1,295	28,665
2034	16	-15,847	-619,890	558	29,223
2035	17	-15,185	-635,074	558	29,782
2036	18	-14,852	-649,926	558	30,340
2037	19	-14,026	-663,952	558	30,898
2038	20	-13,769	-677,721	558	31,457
2039	21	-13,680	-691,401	570	32,026
2040	22	-13,383	-704,784	570	32,596
2041	23	-13,086	-717,870	570	33,166
2042	24	-12,789	-730,659	570	33,736
2043	25	-12,493	-743,152	570	34,306
2044	26	-11,015	-754,167	489	34,795
2045	27	-10,987	-765,154	489	35,284
2046	28	-10,958	-776,112	489	35,773
2047	29	-10,930	-787,042	489	36,262
2048	30	-2,590	-789,632	34	36,296

Table 52. 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		Total ex ante decrease in carbon stocks due to displaced deforestation		Total net carbon stock change due to leakage		Total net increase in emissions due to leakage	
		annual	cumulative	annual	cumulative	annual	cumulative	annual	cumulative
		EADLK _t	EADLK	ΔCADLK _t	ΔCADLK	ΔCLK _t	ΔCLK	ELK _t	ELK
		tCO ₂ -e	tCO ₂ -e	tCO ₂ -e	tCO ₂ -e	tCO ₂ -e	tCO ₂ -e	tCO ₂ -e	tCO ₂ -e
2018	0	1.681	1.681	-30,729	-30,729	-30,729	-30,729	1.681	1.681
2019	1	2.239	3.921	-41,615	-72,344	-41,615	-72,344	2.239	3.921
2020	2	2.746	6.666	-51,785	-124,129	-51,785	-124,129	2.746	6.666
2021	3	2.826	9.492	-54,379	-178,509	-54,379	-178,509	2.826	9.492
2022	4	2.413	11.905	-48,006	-226,515	-48,006	-226,515	2.413	11.905
2023	5	1.624	13.530	-34,581	-261,096	-34,581	-261,096	1.624	13.530
2024	6	1.355	14.884	-30,320	-291,416	-30,320	-291,416	1.355	14.884
2025	7	2.175	17.060	-45,872	-337,288	-45,872	-337,288	2.175	17.060
2026	8	1.371	18.431	-32,062	-369,351	-32,062	-369,351	1.371	18.431
2027	9	2.575	21.005	-54,621	-423,972	-54,621	-423,972	2.575	21.005
2028	10	1.187	22.192	-29,625	-453,598	-29,625	-453,598	1.187	22.192
2029	11	1.295	23.487	-31,164	-484,761	-31,164	-484,761	1.295	23.487
2030	12	1.295	24.781	-30,570	-515,331	-30,570	-515,331	1.295	24.781
2031	13	1.295	26.076	-29,921	-545,252	-29,921	-545,252	1.295	26.076
2032	14	1.295	27.370	-29,463	-574,715	-29,463	-574,715	1.295	27.370
2033	15	1.295	28.665	-29,328	-604,043	-29,328	-604,043	1.295	28.665
2034	16	558	29.223	-15,847	-619,890	-15,847	-619,890	558	29.223
2035	17	558	29.782	-15,185	-635,074	-15,185	-635,074	558	29.782
2036	18	558	30.340	-14,852	-649,926	-14,852	-649,926	558	30.340

2037	19	558	30.898	-14,026	-663,952	-14,026	-663,952	558	30.898
2038	20	558	31.457	-13,769	-677,721	-13,769	-677,721	558	31.457
2039	21	570	32.026	-13,680	-691,401	-13,680	-691,401	570	32.026
2040	22	570	32.596	-13,383	-704,784	-13,383	-704,784	570	32.596
2041	23	570	33.166	-13,086	-717,870	-13,086	-717,870	570	33.166
2042	24	570	33.736	-12,789	-730,659	-12,789	-730,659	570	33.736
2043	25	570	34.306	-12,493	-743,152	-12,493	-743,152	570	34.306
2044	26	489	34.795	-11,015	-754,167	-11,015	-754,167	489	34.795
2045	27	489	35.284	-10,987	-765,154	-10,987	-765,154	489	35.284
2046	28	489	35.773	-10,958	-776,112	-10,958	-776,112	489	35.773
2047	29	489	36.262	-10,930	-787,042	-10,930	-787,042	489	36.262
2048	30	34	36.296	-2,590	-789,632	-2,590	-789,632	34	36.296

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.

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

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

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

Where:

$\Delta REDD_t$ Ex ante estimated net anthropogenic greenhouse gas emission reduction attributable to the AUD project activity at year t; tCO₂e

$\Delta CBSLPA_t$ Sum of baseline carbon stock changes in the project area at year t; tCO₂e

Note: The absolute values of $\Delta CBSLPA_t$ shall be used in the equation above

$EBBBSLPA_t$ Sum of baseline emissions from biomass burning in the project area at year t; tCO₂e

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

Note: If $\Delta CPSPA_t$ represents a net increase in carbon stocks, a negative sign before the absolute value of $\Delta CPSPA_t$ shall be used. If $\Delta CPSPA_t$ 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; tCO₂e

ΔCLK_t Sum of ex ante estimated leakage net carbon stock changes at year t; tCO₂e

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

ΔELK_t Sum of ex ante estimated leakage emissions at year t ; tCO₂e
 t 1, 2, 3 ... t , a year of the proposed project crediting period; dimensionless

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

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

$$\text{VCU}_t = \text{REDD}_t - \text{VBC}_t$$

$$\text{VBC}_t = (\text{CBSLPA}_t - \text{CPSPA}_t) * \text{RF}_t$$

Where:

VCU_t Number of Verified Carbon Units that can be traded at time t ; tCO₂-e
 REDD_t Ex-ante estimated net anthropogenic greenhouse gas emissions reductions attributable to the AUD project activity at year t ; tCO₂-eha-1
 VBC_t Number of Buffer Credits deposited in the VCS Buffer at time t ; tCO₂-e
 CBSLPA_t Sum of baseline carbon stock changes in the project area at year t ; tCO₂e
 CPSPA_t Sum of ex ante estimated actual carbon stock changes in the project area at year t ; tCO₂eha-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 below represents the current values for the baseline:

Table 53. Ex-ante estimated net anthropogenic GHG emissions reductions (ΔREDD_t) and Voluntary Carbon Units (VCU_t) adjusted with the withdrawn of the three areas (Table 36 of VM0015)

Year	Estimated baseline emissions or removals (tCO ₂ e)	Estimated project emissions or removals (tCO ₂ e)	Estimated leakage emissions (tCO ₂ e)	Estimated net GHG emission reductions or removals (tCO ₂ e)
2018	648,199	113,774	32,410	502,014
2019	877,095	376,114	43,855	457,126
2020	1,090,620	542,667	54,531	493,422
2021	1,144,110	421,071	57,205	665,834

2022	1,008,379	464,505	50,419	493,455
2023	724,112	425,145	36,206	262,761
2024	633,502	404,054	31,675	197,772
2025	960,945	425,117	48,047	487,781
2026	668,668	383,850	33,433	251,385
2027	1,143,916	418,499	57,196	668,221
2028	616,245	353,718	30,812	231,715
2029	649,168	217,034	32,458	399,676
2030	637,285	-62,195	31,864	667,616
2031	624,311	-63,493	31,216	656,588
2032	615,153	-64,408	30,758	648,804
2033	612,453	-64,678	30,623	646,509
2034	328,100	-93,114	16,405	404,809
2035	314,857	-94,438	15,743	393,553
2036	308,202	-95,104	15,410	387,896
2037	291,690	-96,755	14,584	373,860
2038	286,542	-97,270	14,327	369,484
2039	284,992	-97,425	14,250	368,167
2040	279,057	-98,018	13,953	363,122
2041	273,122	-98,612	13,656	358,077
2042	267,187	-99,205	13,359	353,033
2043	261,252	-99,799	13,063	347,988
2044	230,083	-102,915	11,504	321,494
2045	229,514	188,440	11,476	29,598
2046	228,945	391,291	11,447	-173,793
2047	228,376	227,206	11,419	-10,249
2048	52,476	276,597	2,624	-226,745
TOTAL	16,518,556	4,301,655	825,928	11,390,973

The values for the baseline before exclusion of the 3 areas are shown in table below, as presented in the Project Description are as follow.

Table 54. Ex-ante estimated net anthropogenic GHG emissions reductions (ΔREDDt) and Voluntary Carbon Units (VCU $\dagger$) (Table 36 of VM0015)

Year	Estimated baseline emissions or removals (tCO ₂ e)	Estimated project emissions or removals (tCO ₂ e)	Estimated leakage emissions (tCO ₂ e)	Estimated net GHG emission reductions or removals (tCO ₂ e)
2018	640,654	113,020	32,033	495,602
2019	867,046	375,109	43,352	448,585
2020	1,078,300	541,435	53,915	482,950
2021	1,131,429	419,803	56,571	655,055
2022	1,146,480	559,406	57,324	529,750
2023	719,624	503,339	35,981	180,304
2024	630,224	398,829	31,511	199,884
2025	1,103,753	434,500	55,188	614,065
2026	668,537	378,939	33,427	256,171
2027	1,138,384	413,049	56,919	668,416

2028	750,709	362,267	37,535	350,907
2029	701,197	217,339	35,060	448,798
2030	690,365	-61,785	34,518	717,632
2031	678,852	-62,936	33,943	707,846
2032	667,536	-64,068	33,377	698,227
2033	665,889	-64,233	33,294	696,827
2034	383,147	-92,507	19,157	456,496
2035	367,678	-94,054	18,384	443,348
2036	362,016	-94,620	18,101	438,535
2037	346,496	-96,172	17,325	425,343
2038	339,466	-96,875	16,973	419,368
2039	324,280	-98,393	16,214	406,460
2040	317,996	-99,022	15,900	401,118
2041	311,711	-99,650	15,586	395,776
2042	305,426	-100,279	15,271	390,434
2043	299,142	-100,907	14,957	385,092
2044	303,131	-100,508	15,157	388,483
2045	303,026	244,556	15,151	43,319
2046	302,920	339,581	15,146	-51,807
2047	302,815	228,648	15,141	59,026
2048	129,418	360,485	6,471	-237,538
TOTAL	17,977,649	4,564,296	898,882	12,514,470

5.2 Project Emissions

The text and tables presented below bring the data used for the quantification of the project emissions during this monitoring period, as well as the planned activities that occurred in the project area.

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. 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 55. Ex post carbon stock per hectare of initial forest classes icl existing in the project area and leakage belt (Table 15a of VM0015)

Year	Project year t	Initial forest class <i>icl</i> Name: Submontane open ombrophilous forest (As) ID <i>icl</i> 1 Average carbon stock per hectare ± 90% CI													
		Cab <i>icl</i>		Cbb <i>icl</i>		Cwp <i>icl</i>								Ctot <i>icl</i>	
						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 ₂ e ha ⁻¹	t CO ₂ e ha ⁻¹	t CO ₂ e ha ⁻¹	t CO ₂ e ha ⁻¹	t CO ₂ e ha ⁻¹	t CO ₂ e ha ⁻¹	t CO ₂ e ha ⁻¹	t CO ₂ e ha ⁻¹	t CO ₂ e ha ⁻¹	t CO ₂ e ha ⁻¹	t CO ₂ e ha ⁻¹	t CO ₂ e ha ⁻¹	t CO ₂ e ha ⁻¹	
2018	0	577	559	176	170	0	0	0	0	30	25	723	704		
2019	1														
2020	2														
2021	3														
			596		182		0		0		35		742		

The 90% Confidence Intervals were 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 the table below. In the present case, the averages of above and below-ground biomass have been utilized 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 56. Ex post carbon stock per hectare of initial forest classes icl existing in the project area and leakage belt (the selection of carbon pools is subject to the latest VCS requirements) (Table 15b of VM0015)

Year	Project year t	Initial forest class <i>icl</i> 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	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 ₂ e ha ⁻¹	t CO ₂ e ha ⁻¹	t CO ₂ e ha ⁻¹	t CO ₂ e ha ⁻¹	t CO ₂ e ha ⁻¹	t CO ₂ e ha ⁻¹	t CO ₂ e ha ⁻¹	t CO ₂ e ha ⁻¹	t CO ₂ e ha ⁻¹	t CO ₂ e ha ⁻¹	t CO ₂ e ha ⁻¹	t CO ₂ e ha ⁻¹	t CO ₂ e ha ⁻¹	
2018	0														
2019	1	577	0	176	0	0	0	0	0	35	5	718	-5		
2020	2														
2021	3														

In the case of baseline deforestation, the same reasoning is applicable to post-deforestation classes, for which the upper limit of the interval was taken in the case of above-ground biomass, while the average was utilized for below-ground biomass, for conservativeness purposes and mitigation of uncertainties. However, in the case of project emissions, the lower confidence intervals were utilized for above- and below-ground biomass, for conservativeness purposes.

Table 57. Ex post carbon stock per hectare of final classes fcl existing in the project area and leakage belt (Table 16 of VM0015)

Year	Project year t	Post deforestation class <i>fcl</i>											
		Name: Pasture											
		ID <i>fcl</i> 1											
		Average carbon stock per hectare ± 90% CI											
		<i>Cab fcl</i>		<i>Cbb fcl</i>		<i>short lived</i>		<i>Cwp fcl</i> <i>medium lived</i>		<i>long lived</i>		<i>Ctot fcl</i>	
		<i>average stock</i>	± 90% CI	<i>average stock</i>	± 90% CI	<i>average stock</i>	± 90% CI	<i>average stock</i>	± 90% CI	<i>average stock</i>	± 90% CI	<i>average stock</i>	± 90% CI
		t CO ₂ e ha ⁻¹	t CO ₂ e ha ⁻¹	t CO ₂ e ha ⁻¹	t CO ₂ e ha ⁻¹	t CO ₂ e ha ⁻¹	t CO ₂ e ha ⁻¹	t CO ₂ e ha ⁻¹	t CO ₂ e ha ⁻¹	t CO ₂ e ha ⁻¹	t CO ₂ e ha ⁻¹	t CO ₂ e ha ⁻¹	t CO ₂ e ha ⁻¹
2018	0												
2019	1	11,37	5,9	18,15	9,4	0	0	0	0	0	0	29,52	15,3
2020	2												
2021	3		16,8		26,9		0		0		0		43,7
Average		11,37		18,15		0		0		0		29,52	
Average to be used in calculations		16,8		26,9		0		0		0		43,7	

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

The table below shows results of the planned logging activities in the Project Area.

Table 58: Planned logging activities in the Project Area

Year/Location	Volume Explored (m ³)		Area Explored (ha)
	2021	2022	
São Manoel	2,499.87	1,787.08	173.13
Santa Catarina	14,892.59	10,109.85	1,000.38
Santa Maria	0.00	9,364.51	386.47
Três Barras (FMU2)	10,622.10	4,880.68	624.41
Três Barras (FMU5)	3,763.96	0.00	151.02
Total	31,778.520	25,870.403	2,335.41

The table below brings the carbon stock decrease due to the planned logging activities.

Table 59. Ex post carbon stock decrease due to planned logging activities the Project Area (Table 25.b of VM0015)

Year	Areas of planned logging activities x Carbon stock change (decrease) in the project area		Total carbon stock decrease due to planned logging activities	
	<i>IDCl</i> = 1		annual	cumulative
	$APLPA_{lcl,t}$	$\Delta C_{totlcl,t}$	$\Delta CPLdPA_t$	$\Delta CPLdPA$
	ha	tCO ₂ -e ha ⁻¹	tCO ₂ -e	tCO ₂ -e
2021	1,275.7	104.67	133,520	133,520
2022	1,059.7	104.67	110,917	244,436

The increase following planned logging activities in the Project Area has also been estimated, using secondary data by West et al. (2014), which indicates an annual increase of 3.03 tCO₂ per hectare per year due to post-logging regeneration of vegetation. For this monitoring period, the coefficient was adjusted in accordance with the length of the period in each year.

Table 60: Ex post 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}	$\Delta C_{tot_{icl,t}}$	$\Delta CPLiPA_t$	$\Delta CPLiPA$
		ha	tCO ₂ -e ha ⁻¹	tCO ₂ -e	tCO ₂ -e
2021	3	1,275.7	3.03	27,494	27,494
2022	4	1,059.7	3.03	30,700	58,194

Regarding unplanned deforestation, according to land use classification for this monitoring period, there was 323.0 ha of unplanned deforestation within the Project Area, as demonstrated in the table and figure below. The deforestation that took place were caused mainly by the roads opened to give access to the Sustainable Forest Management areas. These roads will continue to be used for ground monitoring when the SFM of those areas are finished.

Table 61. Ex post carbon stock decrease due unplanned deforestation in the Project Area (Table 25.a of VM0015)

Year	Areas of unplanned activities x Carbon stock change (decrease) in the project area		Total carbon stock decrease due to unplanned activities	
	IDcl = 1		annual	cumulative
	AUDPA _{icl,t}	$\Delta C_{tot_{icl,t}}$	$\Delta CUDdPA_t$	$\Delta CUDdPA$
	ha	tCO ₂ -e ha ⁻¹	tCO ₂ -e	tCO ₂ -e
2021	135.4	707.80	95,837	95,837
2022	187.6	707.80	132,793	228,630

There was no deforestation on the three excluded areas during this monitoring period. Evidence of such was provided to the audit team. The table below presents the carbon stock decrease in the excluded areas.

Table 62. Ex post carbon stock decrease due unplanned deforestation in the excluded areas (Table 25.a of VM0015)

Year	Areas of unplanned activities x Carbon stock change (decrease) in the excluded areas		Total carbon stock decrease due to unplanned activities in the excluded areas	
	IDcl = 1		annual	cumulative
	AUDEXC _{icl,t}	$\Delta C_{tot_{icl,t}}$	$\Delta CUDdEXC_t$	$\Delta CUDdEXC$
	ha	tCO ₂ -e ha ⁻¹	tCO ₂ -e	tCO ₂ -e
2021	0	707.80	0	0

2022	0	707.80	0	0
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The imagery classification was performed utilizing July 2022 Sentinel 2 images (table below), for which a 94% accuracy result (Kappa Index) was calculated for the whole reference region, leakage belt and project area. All data, products and accuracy assessment were made available as evidence at audit.

Table 63. Data used for historical LU/LC change analysis (Table 5 of VM0015).

Vector (Satellite or Airplane)	Sensor	Resolution		Coverage	Acquisition date	Scene or Point identifier	
		Spatial	Spectral	km	(YYYY)	Path / Latitude	Row / Longitude
Satellite	Sentinel 2	10 X 10 m	4.90 - 8.42 µm	110 x 110	2022	19	LGK
Satellite	Sentinel 2	10 X 10 m	4.90 - 8.42 µm	110 x 110	2022	19	LGL
Satellite	Sentinel 2	10 X 10 m	4.90 - 8.42 µm	110 x 110	2022	19	LHK
Satellite	Sentinel 2	10 X 10 m	4.90 - 8.42 µm	110 x 110	2022	19	LHL

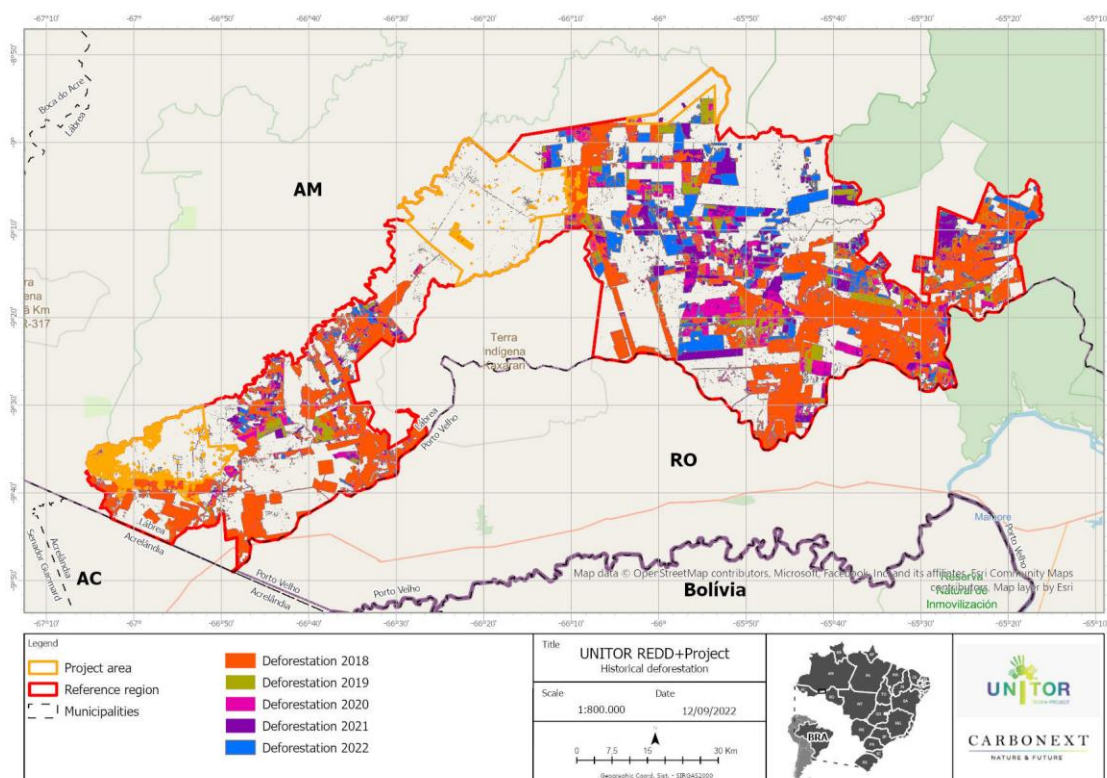


Figure 45: Deforestation Map

Consolidated results on land use changes and land cover changes within the project area is presented in the table below.

Table 64: LU/LC change in the project area

PROJECT AREA	Start Date	MR 1	MR 2*
Forest	99,035.20	98,007.70	92,920.23
Non forest	0	1,027.50	323.01
* PA size adjusted to 94,270.74			

The ex-post total net carbon stock change within the Project Area is expressed in the table below.

Table 65. Ex post total net carbon stock change in the Project Area (Table 27 of VM0015)

Year	Project year t	Total carbon stock decrease due to planned logging activities		Total carbon stock increase due to planned logging activities		Total carbon stock decrease due to unavioded unplanned deforestation		Total carbon stock change in the project case	
		annual	cumulative	annual	cumulative	annual	cumulative	annual	cumulative
		ΔCPLdPA_t	ΔCPLdPA	ΔCPLiPA_t	ΔCPLiPA	ΔCUDdPA_t	ΔCUDdPA	ΔCPSPA_t	ΔCPSPA
		tCO ₂ -e	tCO ₂ -e	tCO ₂ -e	tCO ₂ -e	tCO ₂ -e	tCO ₂ -e	tCO ₂ -e	tCO ₂ -e

2021	3	133,520	133,520	27,494	27,494	95,837	95,837	201,862	201,862
2022	4	110,917	244,436	30,700	58,194	132,793	228,630	213,010	414,872

The ex-post total net carbon stock change within the excluded areas is expressed in the table below.

Table 66. Ex post total net carbon stock change in the excluded areas (Table 27 of VM0015)

Year	Project year t	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
		$\Delta\text{CPLdEXC}_t$	$\Delta\text{CPLdEXC}$	$\Delta\text{CPLiEXC}_t$	$\Delta\text{CPLiEXC}$	$\Delta\text{CUDdEXC}_t$	$\Delta\text{CUDdEXC}$	ΔCPSEXC_t	ΔCPSEXC
		tCO ₂ -e	tCO ₂ -e	tCO ₂ -e	tCO ₂ -e	tCO ₂ -e	tCO ₂ -e	tCO ₂ -e	tCO ₂ -e
2021	3	0	0	0	0	0	0	0	0
2022	4	0	0	0	0	0	0	0	0

The ex-post non-CO2 emissions from forest fires in the Project Area are shown in the table below.

Table 67. Total ex-post estimated actual emissions of non-CO2 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
2021	3	4,373	4,373
2022	4	6,059	10,432

The ex-post non-CO2 emissions from forest fires in the excluded areas are shown in the table below.

Table 68. Total ex-post estimated actual emissions of non-CO2 gases due to forest fires in the excluded areas (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
		EBBPSEX _t	EBBPSEX
		tCO ₂ -e	tCO ₂ -e
2021	3	0	0

2022	4	0	0
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For this monitoring period, the values of the GWP for CH₄ and N₂O were updated according to the IPCC Fifth Assessment Report (AR5)¹³. The results of the parameters are presented in the table below.

Table 69. Parameters used to calculate non-CO₂ emissions from forest fires – ex-post (Table 23 of VM0015)

Initial Forest Class		Parameters				<i>ECO_{2-ab}</i>	<i>EBBCO_{2-tot}</i>	<i>EBBN_{2O}_{icl}</i>	<i>EBBCH₄_{icl}</i>	<i>EBBtot_{icl}</i>
		<i>Fburnt_{icl}</i>	<i>Cab</i>	<i>Pburnt_{ab,icl}</i>	<i>CEab,icl</i>					
<i>IDcl</i>	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 ombrophylous forest (As)	1.0	577	0.86	0.5	248	248	1.97	30.3	32.3

The ex-post actual net changes in carbon stocks and emissions in the Project Area are shown in table below.

¹³ IPCC Fifth Assessment Report. <https://www.ipcc.ch/report/ar5/wg1/>

Table 70: Total ex post estimated actual net changes in carbon stocks and emissions of GHG gases in the project area (Table 29 of VM0015)

Year	Total ex ante carbon stock decrease due to planned activities		Total ex-post carbon stock increase due to planned activities		Total ex-post carbon stock decrease due to unavoided unplanned deforestation		Total ex-post net carbon stock change		Total ex-poste estimated actual non-CO2 emissions from forest fires in the project area	
	annual	cumulative	annual	cumulative	annual	cumulative	annual	cumulative	annual	cumulative
	ΔCPA_{dPA_t}	ΔCPA_{dPA}	ΔCPA_{iPA_t}	ΔCPA_{iPA}	ΔCUD_{dPA_t}	ΔCUD_{dPA}	$\Delta CPSPA_t$	$\Delta CPSPA$	$EBBPSPA_t$	$EBBPSPA$
	tCO ₂ -e	tCO ₂ -e	tCO ₂ -e	tCO ₂ -e	tCO ₂ -e	tCO ₂ -e	tCO ₂ -e	tCO ₂ -e	tCO ₂ -e	tCO ₂ -e
2021	133,520	133,520	27,494	27,494	95,837	95,837	201,862	201,862	4,373	4,373
2022	110,917	244,436	30,700	58,194	132,793	228,630	213,010	414,872	6,059	10,432

The ex-post actual net changes in carbon stocks and emissions in the excluded areas are shown in table below.

Table 71: Total ex post estimated actual net changes in carbon stocks and emissions of GHG gases in excluded areas (Table 29 of VM0015)

Year	Total ex-post carbon stock decrease due to unavoided unplanned deforestation		Total ex-post net carbon stock change		Total ex-poste estimated actual non-CO2 emissions from forest fires in the project area	
	annual	cumulative	annual	cumulative	annual	cumulative
	ΔCUD_{dEXC_t}	ΔCUD_{dEXC}	$\Delta CPSEXC_t$	$\Delta CPSEXC$	$EBBPSEXC_t$	$EBBPSPA$
	tCO ₂ -e	tCO ₂ -e	tCO ₂ -e	tCO ₂ -e	tCO ₂ -e	tCO ₂ -e
2021	0	0	0	0	0	0
2022	0	0	0	0	0	0

5.3 Leakage

This section presents the results of all ex-post estimates of leakage, summarized below along with the ex-ante leakage projection. The values presented below were measured in the leakage belt area defined in the project validation, both for the baseline values as for the ex-post values. Section 3.2.2 presents the steps for the leakage belt overlap adjustment that will be addressed during the next monitoring period; however, the leakage belt area did not suffer any modification during the current monitoring period.

Table 72. Annual ex-ante estimated and ex post measured of deforestation in the Leakage Belt (Table 9.c of VM0015)

Year	Project year	Ex-ante Total - LK		Ex-post Total - LK	
		annual ABSLLK _t ha	cumulative ABSLLK ha	annual ABSLLK _t ha	cumulative ABSLLK ha
2021	3	5,152.8	5,152.8	16,683.1	16,683.1
2022	4	6,260.3	11,413.1	23,116.4	39,799.5
TOTAL		11,413.1		39,799.5	

The table above shows that in gross terms the ex-post measured leakage is higher than the ex-ante estimated leakage. However, not all increase in deforestation can be attributed to the project activity, given that the entire region underwent a highly significant boom of deforestation over the monitoring period. As already shown in Section 3.2.1, the total ex-ante deforestation rate in Reference Region from 2018 to 2022 was estimated in 60,500.2 hectares, while the total deforestation ex-post values from 2018 to 2022 was of 152,526.2 hectares (i.e., a 185.4% increase). The same pattern can be observed in the Leakage belt. The total ex ante deforestation rate in the LB from 2018 to 2022 was estimated in 48,389.5 hectares, increasing to 121,637.4 hectares from 2018 to 2022 (i.e., a 166.5% increase), measured ex post. This can be seen in the figures below.

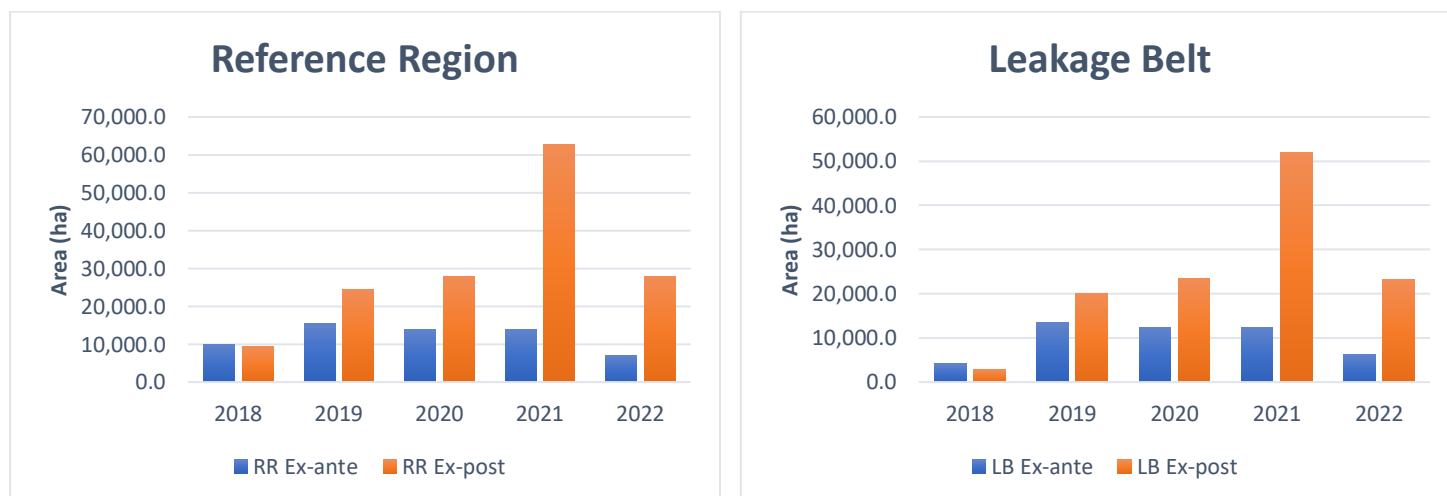


Figure 46. Deforestation ex-ante and ex-post in Reference Region and Leakage Belt

The same pattern of deforestation ex-post that is observed in the Reference Region and in the Leakage Belt is also seen in the municipality of Lábrea¹⁴. The difference of the values ex-ante

¹⁴ Data of Lábrea: <http://terrabilis.dpi.inpe.br/>

and ex-post of the Reference Region is also presented, showing the unexpected deforestation increase that the area is facing.

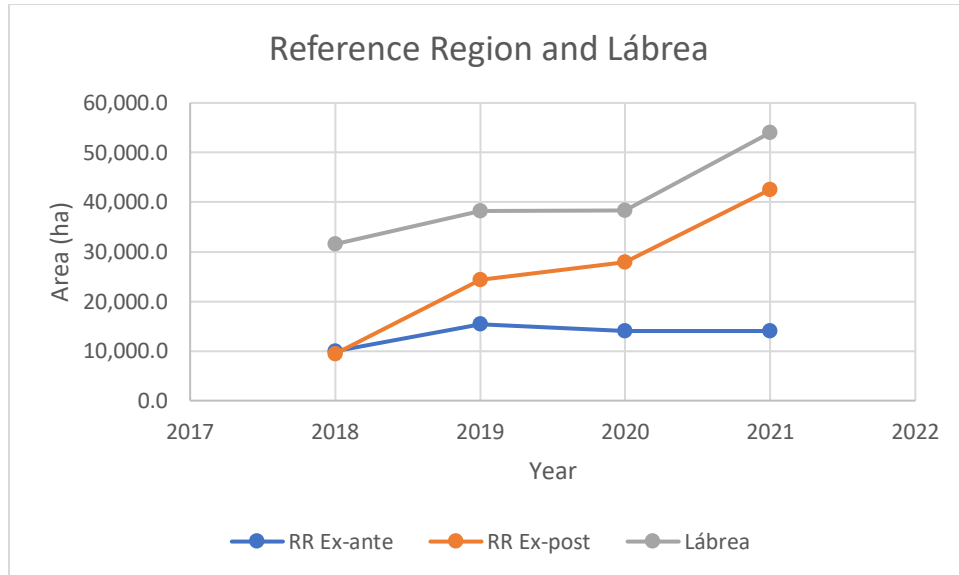


Figure 47: Deforestation trend in the RR and Lábrea

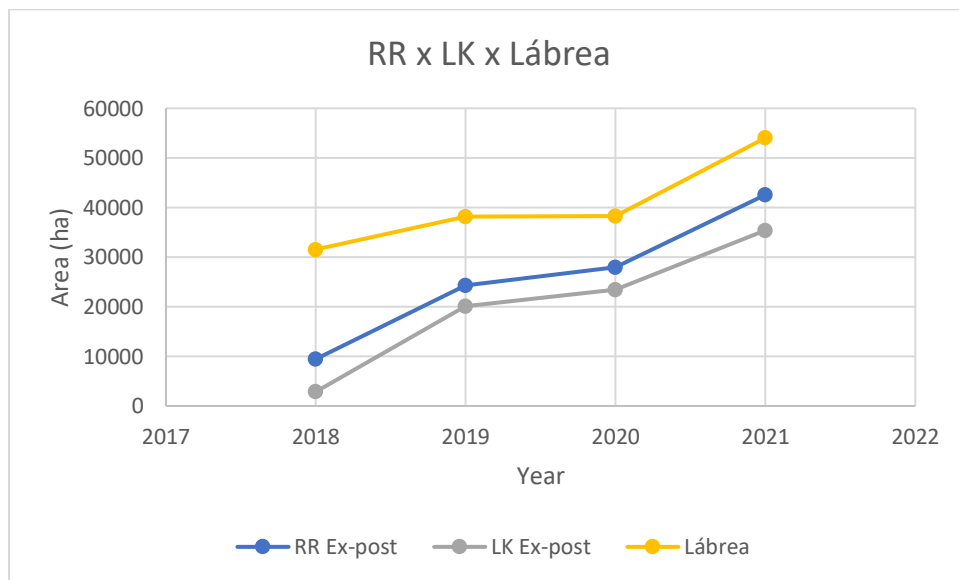


Figure 48: Deforestation trend in the RR, Leakage Belt and Lábrea

In order to identify if the increase in the ex-post values measured was caused by this regional increase or by the project activity, it was calculated the percentage difference in the Reference Region in the ex-ante and ex-post values, and this difference was, then, removed from

the values ex-post of the leakage belt. If the ex-post leakage adjusted values were higher than the ex-ante leakage values, then the leakage can be attributed to the project, if they were smaller, then they are a reflect of the boom in deforestation that is happening in the RR and Lábrea. The quantified difference between *ex-ante* and *ex-post* values of deforestation in the Reference Region (δ), are shown in the table below. The adjusted ex-post leakage values are in Table 74.

Table 73. Ex-ante estimated, ex-post measured deforestation for the period in the Reference Region, and percentage difference.

Year	Project year	Ex-ante		Ex-post		RR percentage difference (δ)
		annual ABSLRR _t ha	cumulative ABSLRR ha	annual ABSLRR _t ha	cumulative ABSLRR ha	
2021	3	5,875.5	5,875.5	20,215.8	20,215.8	71%
2022	4	7,122.1	12,997.6	28,011.5	48,227.3	75%
TOTAL		12,997.6	N/A	48,227.3	N/A	N/A

This increase in deforestation can be seen not only in Lábrea, where the project is located, but is a trend present in the whole country.

The '2021 MapBiomias Report'¹⁵, which analyzes deforestation alerts detected in Brazil in the year 2021 and that were validated and refined on high resolution satellite images by MapBiomias Alert, reported an increase of 20% during 2021, when compared to 2020. From all biomes, Amazonia alone represented 59% of the deforestation. Lábrea had the third higher area deforested, with an increase of 37.4% compared to 2020, being included in the List of Priority Municipalities for Actions for the Prevention, Monitoring and Control of Deforestation in the Amazon.

The main factors for this boom in deforestation are as follows:

Trends in Brazilian legislation: there are several indications of slackening of environmental legislation in recent years, mainly in the Bolsonaro government framework, with emphasis on the following subfactors:

Lack of Action from the Federal Public Power: The MapBiomias Report crossed the information on embargo and assessments by IBAMA¹⁶ between January 2018 and May 2022. It was observed that only 5.2% of the area of verified, refined and reported deforestation in Brazil had embargoes issued by IBAMA. Considering the IBAMA infraction notices, only 6.5% of the deforested area in Brazil during the period from 2019 to 2021 received fines. Regarding the ICMBio¹⁷, the Report

¹⁵ https://s3.amazonaws.com/alerta.mapbiomas.org/rad2021/RAD2021_Completo_FINAL_Rev1.pdf

¹⁶ IBAMA: linked to the Ministry of the Environment (MMA), the agency exercises the power of police, monitoring and environmental control. IBAMA is the highest body for environmental inspection and deforestation control, focusing on areas under the Union's domain, on priority areas of the federal government to control deforestation and, in a supplementary way, it acts when there is omission of inspection by state agencies.

¹⁷ ICMBio: linked to the MMA, the agency manages the federal Conservation Units and exercises the power of inspection and environmental police within these UCs.

pointed out ICMBio embargoes for infraction to flora to 1,199 deforestation alerts, which represents 1.7% of the total area of alerts. The embargoes and assessments by IBAMA and ICMBio together reached 2.4% of the alerts detected between 2019 and 2021, which represent 10.5% of the entire deforested area in the period. Additionally, the following graph shows how the deforestation trends increased during Bolsonaro's government (2019-2021) while the infractions and assessments by IBAMA lowered¹⁸.

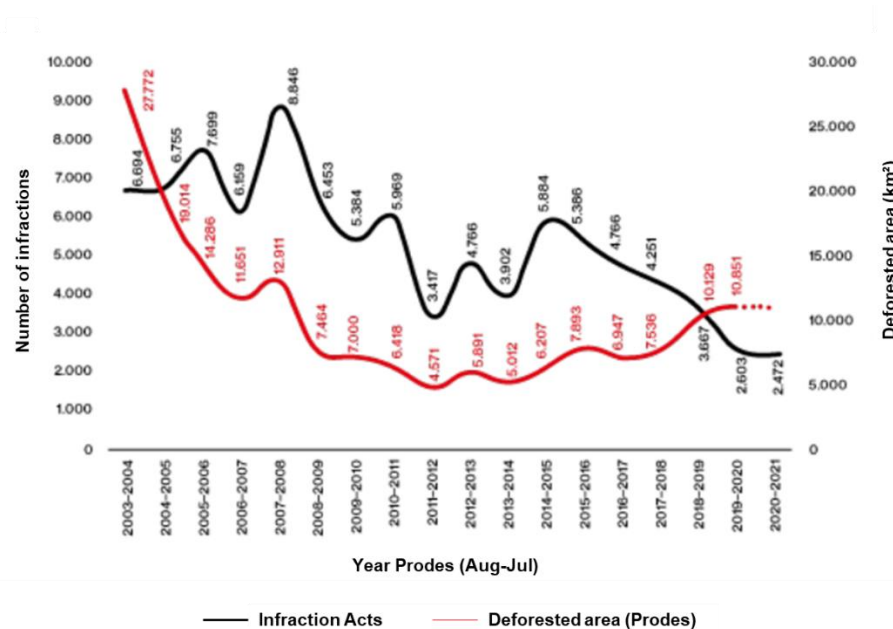


Figure 49: Deforestation in the Amazon and Infractions acts by the Ibama¹⁹.

Granting of tacit (or automatic) environmental licensing, in case of delay of the environmental agency: The controversial automatic release of environmental permits and permits by completion of term, that is, after a period stipulated for the government agency to respond (120 days), was voted for on 29/04/2020, by a virtual plenary. Provisional Measure 915 originally referred to the so-called "Economic Freedom Law" edited by the government, but ended up bringing, within the texts, changes that directly affect the rite of environmental licensing throughout the country. The change could lead to the automatic authorization of forest suppression in the Amazon and Atlantic Forest enforced by delay, and without analysis of the environmental agency. This means that, once the 120-day period is expired, the request would be automatically granted with a "tacit license"²⁰. Fortunately, environmentalists have revised the Provisional Measure 915, to prevent deforestation licensing from being subject to expiration of term²¹.

¹⁸ https://www.oc.eco.br/wp-content/uploads/2021/11/1000Dias_D_PORTUGUES.pdf

¹⁹ 1000Dias_D_PORTUGUES.pdf (oc.eco.br)

²⁰ <https://www.correiobraziliense.com.br/app/noticia/brasil/2020/04/29/interna-brasil,849652/camara-pode-aprovar-hoje-licenciamento-ambiental-automatico.shtml>

²¹ <https://epbr.com.br/ambientalistas-alteram-mp-915-para-prevent-licensing-environmental-by-course-of-time/>

Legislation favoring landgrabbers. An analysis conducted by IPAM (Environmental Research Institute of the Amazon) showed that 35% of deforestation in the Amazon between August 2018 and July 2019 was recorded in non-designated areas without information. Regarding land regularization, environmental NGOs warn about two ongoing projects. While Bill 510/21 was being presented in the Senate, the vote on Bill 2633/20²² was being considered in the House of Representatives. Both derive from the original text of Provisional Measure 910, known as "*MP da Grilagem*" (Landgrabbers' Provisional Measure), which proposes to change the law to favor large occupants of recently invaded public lands. Bill 510/21 once again changes the deadline for public land invasions to be legalized (from 2011 to 2014) and allows large areas (up to 2500 hectares) to be processed without the need for inspection. Indeed, given that land-grabs of undesignated public lands are responsible for more than 1/3 of the deforestation in the country, it is to be expected that amnesty for landgrabbers and illegal deforesters would be an incentive to intensify this practice in the coming years. Bill 2633/20 has a loophole that would allow legalization, via bidding, of public areas invaded after the deadline for occupation provided for by law (i.e., 2014). Of the 49.8 million hectares of forests under state and federal responsibility, but not yet allocated to any category of use, 11.6 million hectares, or 23%, were irregularly declared as rural properties for private use, under the National System of Rural Environmental Registration (CAR). If the entire area registered to date as private property were legalized, 2.2 to 5.5 million hectares could be deforested in the coming years, according to the deforestation limits defined by the Forest Code and taking into account that deforestation is often beyond permitted limits. In recent years, grabbing of uncategorized public forests has increased: in 2019, this was the land category displaying the most forest felled in the Amazon, according to data from the deforestation alert system of INPE (National Institute of Space Research), Deter. The trend continued in 2020. The following are some of the conditions defined by Provisional Measure 910, for appropriation of public lands by individuals: i) the area must be registered in the Rural Environmental Registry (CAR, "*Cadastro Ambiental Rural*"): as it is known, any information can be inputted into the "CAR" system up until the present moment without any veracity checking, and ii) the claimant must be carrying out agricultural activities in the area (i.e., should preferably have deforested the area)²³. The Provisional Measure defines that, for areas meeting the requirements above and having up to 15 fiscal modules (i.e., up to 1,650 hectares), the title is to be granted without the need for inspection. Before the Provisional Measure, the exemption from inspection was granted to areas with up to four fiscal modules (i.e., with a maximum of 440 hectares). The exemption from inspection may allow large illegally deforested areas to be taken over by individuals. This is because the Provisional Measure prohibits the regularization only of areas that have been subject to fines or environmental embargoes, and not all environmental violations are known and fined by the government²⁴. Given that Boa Fe farm is surrounded by public lands and that cases of land-grabbing have been proven in the Reference Region, an abnormal increase in deforestation in that region is expected in the coming years. This is primarily

²² <https://ipam.org.br/35-do-desmatamento-na-amazonia-e-grilagem-indica-analise-do-ipam/>

²³ <https://ipam.org.br/cientistas-mapeiam-grilagem-em-florestas-publicas-na-amazonia/#:~:text=O%20impacto%20da%20grilagem%20se,main%20g%C3%A1s%20effect%20estufa>

²⁴ <https://amazonia.org.br/como-a-mp-da-grilagem-pode-mudar-o-mapa-de-regioes-da-amazonia/>

because Brazilian legislation increasingly gives every indication that it is highly welcoming to acts of land-grabbing, by granting amnesty to landgrabbers and agents of illegal deforestation.

Infrastructure projects

Acceleration of road paving projects. One of the main drivers of deforestation in the Amazon Forest is access to road, specially paved roads which facilitates all the deforestation process. An acceleration of road paving projects was seen during Bolsonaro's government even though the Ministry of Environment imposed conditions to those cases²⁵. During this monitoring period, the government started paving an important road (BR-317) nearby the project area²⁶, accelerating the deforestation process in the region.

Construction of bridge over Madeira River. After 7 years of construction, the bridge over Madeira River was completed, connecting the State of Acre and Rondônia throughout road BR-364 and linking Brazil's last road frontier²⁷. Its goal was to bring development for the region (where the project area is situated) by connecting cargo transportation from Brazil to Pacific harbors. Additionally, the infrastructure project ended up ferry taxes, speeding up transportation time and lowering products costs²⁸. Because of boosting local economy, which is mainly based on agribusiness, the deforestation takes place once the clearance of new areas is needed²⁹.

Thus, considering the increase in deforestation in Brazil and, especially in the project region as a whole, the leakage value were adjusted, taking into account the increase registered by the values ex-ante and ex-post of the reference region. The adjusted value for ex-post deforestation in the Leakage Belt was obtained by multiplying *Total LK - Ex Post* by δ (The ex-ante – ex-post relationship in the RR shown above).

Table 74: Annual ex-post adjusted areas of deforestation in the Leakage Belt (Table 9.c of VM0015)

Year	Project year t	Total LK -Ex ante		Total LK - Ex Post	Adjusted annual ex post deforestation in the leakage belt		Percentage difference observed in the RR (δ)	percentage difference in LB (δ)
		annual	cumulative	annual	annual	cumulative		
		ABSLLKt	ABSLLKt	ABSLLKt	ABSLLKt	ABSLLKt		
		ha	ha	ha	ha	ha		

²⁵ <https://projetocolabora.com.br/ods15/brasil-lidera-de-novo-ranking-global-de-destruicao-de-florestas/>

²⁶ <https://oeco.org.br/reportagens/projeto-de-pavimentacao-da-br-319-ignora-regras-e-preve-entrega-em-2022/>

²⁷ <https://www.cimentoitambe.com.br/massa-cinzenta/ponte-sobre-o-rio-madeira-une-a-ultima-fronteira-do-brasil/>

²⁸ <https://g1.globo.com/ro/rondonia/noticia/2021/05/06/ponte-do-abuna-sobre-o-rio-madeira-e-inaugurada-na-sexta-feira-7-e-cria-expectativa-para-o-desenvolvimento-da-regiao.ghtml>

²⁹ http://repositorio.ipea.gov.br/bitstream/11058/10771/1/NT_35_Dinte_APonte_do_Abuna.pdf

2021	3	5,152.81	5,152.81	16,683.08	4,848.72	4,848.72	71%	69%
2022	4	6,260.30	11,413.10	23,116.43	5,877.45	10,726.17	75%	73%
Total		11,413.10	N/A	39,799.32	10,726.21	N/A	N/A	N/A

As shown in Table 74 above, the resulting adjusted annual ex-post deforestation in the leakage belt is below the estimated Total Leakage *Ex-ante*. Therefore, the leakage due to project activities was considered to be 0 for each year as shown below. This in turn resulted in 0 values for ex-post above and below-ground net carbon stock changes in the leakage belt, as well as in wood products, as shown in the following tables.

Table 75. Annual ex-post adjusted proportional areas of deforestation in the leakage belt (Table 9.c of VM0015)

Year	Project year	Total - LK	
		annual ABSLLK _t ha	cumulative ABSLLK ha
2021	3	0.0	0.0
2022	4	0.0	0.0
TOTAL		0.0	

Table 76. Ex post above-ground net carbon stock changes in the leakage belt (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}	ΔCab _{ct,t}	ΔCabBSLLK _t	ΔCabBSLLK
		ha	tCO ₂ -e ha ⁻¹	tCO ₂ -e	tCO ₂ -e
2021	3	0	0	0	0
2022	4	0	0	0	0

Table 77. Ex post below-ground net carbon stock changes in the leakage belt (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}	ΔCbb _{ct,t}	ΔCbbBSLLK _t	ΔCbbBSLLK
		ha	tCO ₂ -e ha ⁻¹	tCO ₂ -e	tCO ₂ -e
2021	3	0	0	0	0
2022	4	0	0	0	0

Table 78. Ex-post net carbon stock changes in wood products in the leakage belt (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}	$\Delta C_{wpct,t}$	$\Delta C_{wpBSLLK_t}$	$\Delta C_{wpBSLLK}$
		ha	tCO ₂ -e ha ⁻¹	tCO ₂ -e	tCO ₂ -e
2021	3	0.0	0.00	0	0
2022	4	0.0	0.00	0	0

Table 79. Parameters used to calculate emissions from forest fires in the leakage belt area (Table 23 in VM0015)

Initial Forest Class		Parameters				ECO2-ab	EBBCO2-tot	EBBN2O _{icl}	EBBCH4 _{icl}	EBBtot _{icl}
		$F_{burnt,icl}$	C_{ab}	$P_{burnt,ab,icl}$	$CE_{ab,icl}$					
IDcl	Name	N/A	tCO ₂ e ha ⁻¹	N/A	N/A	tCO ₂ e ha ⁻¹	tCO ₂ e ha ⁻¹	tCO ₂ e ha ⁻¹	tCO ₂ e ha ⁻¹	tCO ₂ e ha ⁻¹
1	Submontane open ombrophylous forest (As)	1.0	577	0.86	0.5	248	248	1.97	30.3	32.3

Table 80. Ex post estimated non-CO2 emissions from forest fires in the leakage belt

Year	Project year t	Total ex ante estimated increase in GHG emissions due to displaced forest fires	
		annual	cumulative
		EADLK _t	EADLK
		tCO ₂ -e	tCO ₂ -e
2021	3	0	0
2022	4	0	0

Table 81. Ex post estimated leakage due to activity displacement (Table 34 of VM0015)

Year	Project year t	Total ex post measured decrease in carbon stocks due to displaced deforestation		Total ex ante estimated increase in GHG emissions due to displaced forest fires	
		annual	cumulative	annual	cumulative
		ΔCADLK_t	ΔCADLK	EADLK_t	EADLK
		tCO ₂ -e	tCO ₂ -e	tCO ₂ -e	tCO ₂ -e
2021	3	0	0	0	0
2022	4	0	0	0	0

Consolidated results on land use changes and land cover changes within the leakage belt is presented in the table below.

Table 82: LU/LC change in the leakage belt

PROJECT AREA	Start Date	MR 1	MR 2
Forest	385.814,59	303.976,79	264.176,49
Non forest	0	81.837,80	39.800,30

Table 83. Total ex post estimated leakage (Table 35 of VM0015)

Year	Project year t	Total ex ante increase in GHG emissions due to displaced forest fires		Total ex ante decrease in carbon stocks due to displaced deforestation		Total net carbon stock change due to leakage		Total net increase in emissions due to leakage	
		annual	cumulative	annual	cumulative	annual	cumulative	annual	cumulative
		EADLK_t	EADLK	ΔCADLK_t	ΔCADLK	ΔCLK_t	ΔCLK	ELK_t	ELK
		tCO ₂ -e	tCO ₂ -e	tCO ₂ -e	tCO ₂ -e	tCO ₂ -e	tCO ₂ -e	tCO ₂ -e	tCO ₂ -e
2021	3	0	0	0	0	0	0	0	0
2022	4	0	0	0	0	0	0	0	0

5.4 Net GHG Emission Reductions and Removals

The table below expresses the quantification of the net change in carbon stocks. As determined in the AFOLU non-permanence risk report, this project activity has 10% non-permanence risk rating.

Table 84. Ex-post estimated net anthropogenic GHG emission reductions and VCUs (Table 36 of VM0015)

Year	Baseline emissions or removals (tCO ₂ e)	Project emissions or removals (tCO ₂ e)	Leakage emissions (tCO ₂ e)	Net GHG emission reductions or removals (tCO ₂ e)	Buffer pool allocation	VCUs eligible for issuance
2021	479,586	206,235	0	273,351	25,403	247,947
2022	585,688	219,069	0	366,619	34,465	332,154
Total	1,065,274	425,305	0	639,970	59,868	580,102

Below is the step-by-step for the ex-post net change in the carbon stocks, as well as the calculation of the buffer pool allocation.

Calculation of ex-post total net GHG emissions reductions

The net anthropogenic GHG emission reduction (STEP 9 of the VM0015 Methodology) of the proposed AUD project activity is calculated as follows:

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

$\Delta REDD_t$ Ex post net anthropogenic greenhouse gas emission reduction attributable to the AUD project activity at year t; tCO₂e

$\Delta CBSLPA_t$ Sum of baseline carbon stock changes in the project area at year t; tCO₂e

Note: The absolute values of $\Delta CBSLPA_t$ shall be used in the equation above

$EBBBSLPA_t$ Sum of baseline emissions from biomass burning in the project area at year t; tCO₂e

$\Delta CPSPA_t$ Sum of ex post actual carbon stock changes in the project area at year t;

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

$EBBPSPA_t$ Sum of ex post actual emissions from biomass burning in the project area at year t; tCO₂e

ΔCLK_t Sum of ex post calculated leakage net carbon stock changes at year t; tCO₂e

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

ΔELK_t	Sum of ex post estimated leakage emissions at year t; tCO ₂ e
t	1, 2, 3 ... t, a year of the proposed project crediting period; dimensionless

Calculation of Buffer Credits

As described below, the buffer is calculated based on the carbon stock change

$$VBC_t = (CBSLPA_t - CPSPA_t) * RF_t$$

Where:

VBC_t	Number of Buffer Credits deposited in the VCS Buffer at time t; tCO ₂ -e
$CBSLPA_t$	Sum of baseline carbon stock changes in the project area at year t; tCO ₂ e
$CPSPA_t$	Sum of ex post actual carbon stock changes in the project area at year t; tCO ₂ e
	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
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APPENDIX 1: SDG EVIDENCE

As indicated in the "VCS Monitoring Report Template", evidence of project contributions to the SDGs is provided in this appendix.

SDG Targets

1.1.1: Proportion of the population living below the international poverty line by sex, age, employment status and geographic location (urban/rural)

8.3.1: Proportion of informal employment in total employment by sector and sex

Table 85. Project permanent positions

Permanent employees	Contract Value
Ademir Pereira	R\$ 2,000.00
Dhones Pereira	R\$ 2,000.00
Frank Chantay	R\$ 1,670.00
Gilvan Quadros	R\$ 1,670.00
Lucas Braga	R\$ 2,670.00
*Queila da Silva	R\$ 2,000.00
Ariochiton Bruno	R\$ 1,670.00
Edilson Lopes	R\$ 4,000.00
Fabio Gomes	R\$ 5,000.00
*Sergio	R\$ 3,170.00
Teudes	R\$ 1,670.00
Edilson	R\$ 1,670.00
Luiz Rayne	R\$ 2,600.00
Average wage	R\$ 2,445.38

Table 86. Temporary project positions

Nº Job posts	Temporary employees
1	Alisson Costa
2	Antonio Maia
3	Antonio O
4	Francisca Maia
5	Francislandio Gomes
6	Gilvanea Quadros
7	Henrique Manoel
8	José Alves
9	Paulo Cezar
10	Raimundo
11	Soraya dos Santos
12	Thiago Dia

* Employees previously hired (MR1)

3.d Number of people who participated in lectures on guidance on nutritional and health aspects



Figure 50. Advice on nutritional aspects in Ramal do Boi (Santa Maria Farm) and Ramal da Mococa



UNITOR
UNIDADE NUTRICIONAL

TREINAMENTO NUTRIÇÃO E SAÚDE
PROJETO REDD+ UNITO



Green Forest
LABOR

REUNIÃO: Nutrição e Saúde

RESPONSÁVEIS TÉCNICOS: Chaudia Patrícia de Oliveira

DATA: 21/01/2019 CARGA HORÁRIA: 2h30

DECLARO QUE RECEBI A VISITA DE UM REPRESENTANTE DO PROJETO UNITOR E ESTOU CIENTE DOS OBJETIVOS DO PROJETO, BEM COMO DAS FAZENDAS E DOS PROPRIETÁRIOS ENCLAVADOS.

DECLARO QUE RECEBI EXPLICAÇÕES SOBRE O QUE SÃO E COMO FUNCIONAM OS PROCESSOS DE AUDITORIA.

CONFORME AS INFORMAÇÕES REPASSADAS PELO REPRESENTANTE, DECLARO QUE ESTOU DE ACORDO COM OS OBJETIVOS E RESULTADOS ESPERADOS NESSE PROJETO, E NÃO ME OPONHO A SUA REALIZAÇÃO.

DECLARO QUE ESTOU DE ACORDO COM O USO DE IMAGEM PARA USO EM MATERIAL DO PROJETO E MÍDIAS SOCIAIS.

[illegible][illegible]

Figure 51. Attendance list lecture nutritional aspects and health 27/07 in Ramal da Mococa

*The attendance list on 07/22 was made available to the auditors

4.5.1: Parity indices for all education indicators on the list that can be disaggregated



Figure 52. Training in Sustainable Cattle Raising



Figure 53. Fire Brigade Training first training in 2019 and second in 2022

UNITOR TREINAMENTO DE BRIGADA DE INCENDIO **Green Forest**

NUTRIÇÃO E SAÚDE
PROJETO REDD+ UNITOR

REUNIÃO: NUTRIÇÃO E SAÚDE TREINAMENTO DE BRIGADA DE INCENDIO
RESPONSÁVEIS TÉCNICOS: ED. CARLOS LIMA SILVA
DATA: 22/07/2022 CARGA HORÁRIA: 7 HORAS

DECLARO QUE RECEBI A VISITA DE UM REPRESENTANTE DO PROJETO UNITOR E ESTOU CIENTE DOS OBJETIVOS DO PROJETO, BEM COMO DAS FAZENDAS E DOS PROPRIETÁRIOS ENVOLVIDOS.
DECLARO QUE RECEBI EXPLICAÇÕES SOBRE O QUE SÃO E COMO FUNCIONAM OS PROCESSOS DE AUDITORIA, CONFORME AS INFORMAÇÕES REPASSADAS PELO REPRESENTANTE, DECLARO QUE ESTOU DE ACORDO COM OS OBJETIVOS E RESULTADOS ESPERADOS NESSE PROJETO, E NÃO ME OPONHO A SUA REALIZAÇÃO.
DECLARO QUE ESTOU DE ACORDO COM O USO DE IMAGEM PARA USO EM MATERIAL DO PROJETO E MÍDIAS SOCIAIS.

LISTA DE PRESENÇA E DE CONSENTIMENTO
AFILIAÇÃO: (F) FUNCIONÁRIO, (V) VIZINHO, (M) MORADOR

NOME	PROFISSÃO	TRABALHA NA FAZENDA? (SIM OU NÃO)	ONDE MORAR?	COORDENADA
ADEMIR PEREIRA DA SILVA	SERVIÇOS GERAIS	SIM	FAZ. SANTA MARIA	-9 3' 45,275"S - 66 3' 22,428"W
GILVAN QUADROS DO NASCIMENTO	MONITOR	SIM	ITUKI	-9 3' 45,275"S - 66 3' 22,428"W
TEJDES OLIVEIRA SANTOS	MONITOR	SIM	FAZ. SANTA MARIA	-9 3' 45,275"S - 66 3' 22,428"W
VERGILIANA T. DOS S. MOÇO DE OLIVEIRA	GERENTE ADMINISTRATIVO	SIM	EXTREMA	-9 3' 45,275"S - 66 3' 22,428"W
MARCOS PEREIRA MATEUS		NÃO	PORTO VELHO	-9 3' 45,275"S - 66 3' 22,428"W
CLAUDIA CRISTINA DE OLIVEIRA PINHEIRO	ENFEREIRA	NÃO	PORTO VELHO	-9 3' 45,275"S - 66 3' 22,428"W
QUEILA DA SILVA ALVES	AUX. ADMINISTRATIVO	NÃO	EXTREMA	-9 3' 45,275"S - 66 3' 22,428"W
VERONICA MAIA DOS SANTOS	DO LAR	SIM	FAZ. SANTA MARIA	-9 3' 45,275"S - 66 3' 22,428"W
MARIA FRANCISCA LACERDA MAIA	COZINHEIRA	NÃO	ITUKI	-9 3' 45,275"S - 66 3' 22,428"W
JOEL DO CARMO MONTEIRO	AUXILIAR DE CAMPO	NÃO	CAUPONEA	-9 3' 45,275"S - 66 3' 22,428"W
LUCAS BRAGA DOS SANTOS	AUXILIAR DE CAMPO	NÃO	TRES BARRAS	-9 3' 45,275"S - 66 3' 22,428"W
SERGIO BARBOSA GOMES	MONITOR	NÃO	TRES BARRAS	-9 3' 45,275"S - 66 3' 22,428"W
EDILTON S. DA SILVA	AUXILIAR DE CAMPO	NÃO		-9 3' 45,275"S - 66 3' 22,428"W
FABIO GOMES DE SOUZA	SEGURANÇA	NÃO	PRESIDENTE PRUDENTE	-9 3' 45,275"S - 66 3' 22,428"W
ALDENIZ ALVES	DO LAR	NÃO	PRESIDENTE PRUDENTE	-9 3' 45,275"S - 66 3' 22,428"W
EDILTON S.	SEGURANÇA	NÃO	TRES BARRAS	-9 3' 45,275"S - 66 3' 22,428"W
FRANK CHANTAY ORTIZ	AUXILIAR DE CAMPO	NÃO	EXTREMA	-9 3' 45,275"S - 66 3' 22,428"W

Figure 54. Fire brigade training presence list 22/07

* The attendance list of the other activities was made available to the auditors

8.8 Proportion of checklist applied (named "Vistoria de Saúde e Segurança") and percentage of equipment and team checked

CHECK - LIST Segurança do Trabalho e Saúde Ocupacional		Folha: 1/2		Revisão: 00	
		PROJETO UNITOR COORDENADA: 19L 784887,139 - 8988146,719 ATIVIDADE: TERRESTRE (CARRO) INSPETOR: TEUDES, GILVAN, ANTONIO , RAYNE RESPONSÁVEL PELA ATIVIDADE:		PROPRIEDADE: FAZENDA PARANA DATA: 06/12/2021 EFETIVO: 4 PESSOAS	
ASSUNTOS					
EPI's					
1. Os EPIs foram distribuídos? ☒ S ☐ N ☐ NA ☐ OBS.					
2. Estão em boas condições? (higiene, sem danos) ☒ S ☐ N ☐ NA ☐ OBS.					
FERRAMENTAS E MATERIAIS					
3. Existe ferramentas e materiais para todas as atividades desenvolvidas? ☒ S ☐ N ☐ NA ☐ OBS.					
4. As ferramentas e materiais estão em boas condições de uso? ☒ S ☐ N ☐ NA ☐ OBS.					
ORGANIZAÇÃO E LIMPEZA DA ATIVIDADE					
5. A equipe mantém o local organizado durante e após a realização da atividade? ☒ S ☐ N ☐ NA ☐ OBS.					
6. O local mantém-se limpo durante e após as atividades? ☒ S ☐ N ☐ NA ☐ OBS.					
ALOJAMENTO					

CHECK - LIST Segurança do Trabalho e Saúde Ocupacional		Folha: 1/2		Revisão: 00	
		PROJETO UNITOR LOCAL: 19L 732093,101 - 8932801,046 ATIVIDADE: TERRESTRE (CARRO) INSPETOR: SERGIO BARBOSA RESPONSÁVEL PELA ATIVIDADE:		PROPRIEDADE: FAZENDA TRÊS BARRAS DATA: 10/12/2021 EFETIVO: 1 PESSOAS	
ASSUNTOS					
EPI's					
1. Os EPIs foram distribuídos? ☒ S ☐ N ☐ NA ☐ OBS.					
2. Estão em boas condições? (higiene, sem danos) ☒ S ☐ N ☐ NA ☐ OBS.					
FERRAMENTAS E MATERIAIS					
3. Existe ferramentas e materiais para todas as atividades desenvolvidas? ☒ S ☐ N ☐ NA ☐ OBS.					
4. As ferramentas e materiais estão em boas condições de uso? ☒ S ☐ N ☐ NA ☐ OBS.					
ORGANIZAÇÃO E LIMPEZA DA ATIVIDADE					
5. A equipe mantém o local organizado durante e após a realização da atividade? ☒ S ☐ N ☐ NA ☐ OBS.					
6. O local mantém-se limpo durante e após as atividades? ☒ S ☐ N ☐ NA ☐ OBS.					
ALOJAMENTO					

CHECK - LIST Segurança do Trabalho e Saúde Ocupacional		Folha: 1/2		Revisão: 00	
		PROJETO UNITOR LOCAL: 19L 789246,301 - 8993744,633 ATIVIDADE: TERRESTRE (CARRO) INSPETOR: TEUDES, GILVAN, ANTONIO , RAYNE RESPONSÁVEL PELA ATIVIDADE:		PROPRIEDADE: FAZENDA SANTA CATARINA DATA: 05/12/2021 EFETIVO: 4 PESSOAS	
ASSUNTOS					
EPI's					
1. Os EPIs foram distribuídos? ☒ S ☐ N ☐ NA ☐ OBS.					
2. Estão em boas condições? (higiene, sem danos) ☒ S ☐ N ☐ NA ☐ OBS.					
FERRAMENTAS E MATERIAIS					
3. Existe ferramentas e materiais para todas as atividades desenvolvidas? ☒ S ☐ N ☐ NA ☐ OBS.					
4. As ferramentas e materiais estão em boas condições de uso? ☒ S ☐ N ☐ NA ☐ OBS.					
ORGANIZAÇÃO E LIMPEZA DA ATIVIDADE					
5. A equipe mantém o local organizado durante e após a realização da atividade? ☒ S ☐ N ☐ NA ☐ OBS.					
6. O local mantém-se limpo durante e após as atividades? ☒ S ☐ N ☐ NA ☐ OBS.					
ALOJAMENTO					

Figure 55. Checklist applied (named "Vistoria de Saúde e Segurança")

* The complete checklist of all farms has been made available for auditing