THE ARR HORIZONTE CARBON PROJECT MONITORING REPORT

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Prepared by	WayCarbon Soluções Ambientais e Projetos de Carbono LTDA

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1 PROJECT DETAILS

1.1 Summary Description of the Implementation Status of the Project

The ARR Horizonte Carbon Project is located at the Cerrado Biome, in the state of Mato Grosso do Sul, Brazil. It is an AFOLU project and therefore is classified within scope 14. More specifically, the project falls under the ARR category.

The ARR Horizonte Carbon Project's purpose is to remove and reduce GHG emissions through an increase in forestry area in the state of Mato Grosso do Sul, at the Cerrado biome, initially near the cities of Três Lagoas, Brasilândia, Santa Rita do Pardo, Selviria, Bataguassu, Água Clara and Aparecida do Taboado. The carbon credits, from this monitoring period and from the first monitoring period, are a result of the change of land use in previous pasture areas, through the plantation of Eucalyptus species in an area of 13,193.24 hectares that were inventoried and thus monitored. With an inclusion of 27 new instances, the project area for Eucalyptus reforestation has grown up to 28,665.25 hectares as a result of the recovery of pasture and degraded areas with exposed soil. The plantation of 999,10 ha of native vegetation that will be implemented from next monitoring event (3rd verification) will also be aggregated to the project area. The expected GHG benefit subject to Long-Term average was updated with the inclusion of the new instances and it is estimated at 5,113,780.04 tCO2 equivalent.

This activity is of great importance for the region under the light of deforestation events and rates for cattle ranching activities, which constitutes the baseline of the project. The state of Mato Grosso do Sul has the highest deforestation rates under the Cerrado biome, which has been the second most impacted biome by deforestation in the country, with 33.5% of the deforested areas[1].

In addition, the credit's revenue will allow for an additional restoration of native vegetation on Legal Reserves (RL – Reservas legais, in Portuguese) and Permanent Protection Areas (APP – área de preservação permanente, in Portuguese). Under the social sphere, the project also brings benefits for the region, with the implementation of additional social activities (programs named Inclusive Recycling and the Nursery for Native and Ornamental Seedlings), beyond those already implemented by Suzano where it operates, which will be implemented due to the credit's revenue. In addition to the socioeconomic benefits, both projects linked to the social scope will bring environmental awareness to the target population about climate change and mitigation actions.

[1] MapBiomas, 2021. Relatório anual do desmatamento no Brasil - 2020. Available at: <https://s3.amazonaws.com/alerta.mapbiomas.org/rad2020/RAD2020_MapBiomasAlerta_FINAL.pdf>. Last access on 25 November 2021.

The activities foreseen by the Project are characterized by their continuous implementation, with a large part that has started in this monitoring period. Among the main activities implemented during 22/02/2022 to 03/04/2023, we highlight the reforestation of 14,315.54 hectares with Eucalyptus species and an emission removal of 271,803tCO2 through planting and inventorying of 13,193.24 hectares. Also, in the social scope activities the Project implemented Inclusive Recycling Project with the Conscious Wall.

1.2 Audit History

Audit type	Period	Program	Validation/verification body name	Number of years
Validation/ verification	02-november-2017 – 21-february-2022	VCS	Earthood Services Private Limited	Six years
Verification	22-february-2022 – 03-april-2023	VCS	EPIC	One year

1.3 Sectoral Scope and Project Type

Sectoral scope	14 – Afforestation, Forestation and Other Land Use (AFOLU)
AFOLU project category[2]	ARR – Afforestation, Reforestation and Revegetation
Project activity type	Increase carbon sequestration by establishing, increasing, or restoring vegetative cover (forest or non-forest) through the planting.

1.4 Project Proponent

Organization name	Suzano S.A
Contact person	Julio Cesar Natalense
Title	Carbon Initiatives Executive Manager

[2] *See Appendix 1 of the* VCS Standard

Address	Brigadeiro Faria Lima Avenue, 1355. CEP 01452-919. São Paulo, SP, Brazil
Telephone	+55 11 99642-1051
Email	jcnatalense@suzano.com.br

1.5 Other Entities Involved in the Project

Organization name	WayCarbon Soluções Ambientais e Projetos de Carbono LTDA
Role in the Project	Development of the monitoring report and management of all audit procedures
Contact person	Felipe Bittencourt
Title	CEO
Address	Rua Bernardo Guimarães, n° 166, 6th floor, Belo Horizonte/MG-Brazil
Telephone	+55 31 3656-0501
Email	fbittencourt@waycarbon.com

Organization name	2Tree Consultoria e Meio Ambiente LTDA
Role in the Project	Development of the monitoring report and management of all audit procedures
Contact person	Thiago Rizzo
Title	Technical and Operational Director
Address	Rua Jequitibá, nº 25, bairro Jardins de Eunápolis, Eunápolis, Bahia
Telephone	+55 73 3262-0823
Email	thiagorizzo@2tree.com.br

Organization name	Agroicone
Role in the Project	Technical assistance in implementing ecological restoration
Contact person	Leila Harfuch
Title	Manager and Associate
Address	Avenida Angélica, 2447, 17o andar, conjunto 173, Consolação, São Paulo, SP
Telephone	+55 11 3025-0500
Email	agroicone@agroicone.com.br

1.6 Project Start Date

Project start date	02-november-2017
Justification	According to the VCS Standard Version 4.3 section 3.7, the project start date for AFOLU projects is the date on which activities, that lead to the generation of GHG emission reductions or removals, are implemented. Therefore, the project start date is defined as 02 November 2017, the date when activities for preparing land for seedling were implemented at the first PUS (Plantation units), at Santa Inês (T5AM) and Monte Alto (T2A9) Farms, according to internal documentation.

1.7 Project Crediting Period

Crediting period	☐ Seven years, twice renewable ☐ Ten years, fixed ☒ *Other*: Project Crediting Period is 35 years, renewable; meeting the requirements of VCS Standard v4.7, section 3.9.3, given that

	the period is greater than the minimum of 20 years and less than the maximum of 100 years.
Start and end date of first or fixed crediting period	02-November-2017 to 01-November-2052

1.8 Project Location

The ARR Horizonte Carbon Project is situated in Três Lagoas (10,217 km²), Brasilândia (5,807 km²), Santa Rita do Pardo (6,142 km²), Selvíria (3,259 km²), Bataguassu (2,418 Km²), Água Clara (7,809 km²) and Aparecida do Taboado (2,750 km²), cities of Mato Grosso do Sul state. Together, these cities representing 10.75% of the State area.

The designated areas and land occupation at the farms where the projects will be implemented are composed of two scopes: areas that will be planted with eucalyptus and areas that will be planted with native species after the project start date (November 2017). The ARR project activities will take place in previous degraded pasture areas and, regarding the areas to be restored, they will occur in 3 different land use situations, namely pasture (PST), exposed soil (SLE) and thin dirty pasture (PSR). In the maps below, eucalyptus areas is highlighted in outlined yellow (in degraded pasture) and the native plantation area is highlighted in light pink.

Native species that will be accounted for VCUs emission is outside of Permanent Preservation Areas and Legal Reserves (APP and RL), representing an amount of 999.10 hectares foreseen by the project. It is important to mention that the **restauration of native areas outside of APP and RL started in December 2023** but were not included in this monitoring report as they are outside the monitoring period which runs until April 3, 2023. Beyond these areas, the Project intends to recover APP and RL areas that will not be accounted in the emission reductions calculations.

As defined per law n. 12,651/2012, the Permanent Preservation area can be covered or not by native vegetation, and has the purpose to preserve hydrological resources, landscape, geological stability, and biodiversity, protecting the soil and assuring the wellbeing of communities. The same regulation outlines that every rural property must maintain an area with vegetation coverage, as a legal reservation. It is an area located inside the rural property or possessed by the same owner, with the purpose to grant the sustainable and economical use of natural resources, helping on conservation, ecological process rehabilitation, as well as promoting the biodiversity's conservation, wildlife protection and native flora.

Given this context, in this current monitoring period, new instances were included in the project area, adding about 14,315.54 hectares of reforested Eucalyptus to the previously considered area. **Thus, the new project area consists of 28,665.25 hectares of Eucalyptus reforestation, of which only 13,193.24**

hectares were inventoried and accounted for VCUs emission. It is important to highlight that only areas that are more than 2 years old are inventoried. For this reason, there is this separate report between areas that were planted and areas that were planted and inventoried. **Also, regarding the 999.10 of native areas outside of APP and RL, the project remains its intention of restoring but so far were not considered in this monitoring period as mentioned above.**

A KML file is attached separately to better indicate the coordinates of the project, and images of each area can be seen below. In the following maps the project area is highlighted in yellow when the project activity is the planting of eucalyptus and, mustard, white or pink when the activity is the native restoration planting. A few areas that were Eucalyptus plantation - identified in slashed pink, red and light grey on the maps below - before the beginning of the Project are not being considered under this Project.



Figure 1 - Location and stratification of Ana Rosa. Native vegetation plantation area highlighted in white (PSR), light pink (PST) and mustard (SLE)

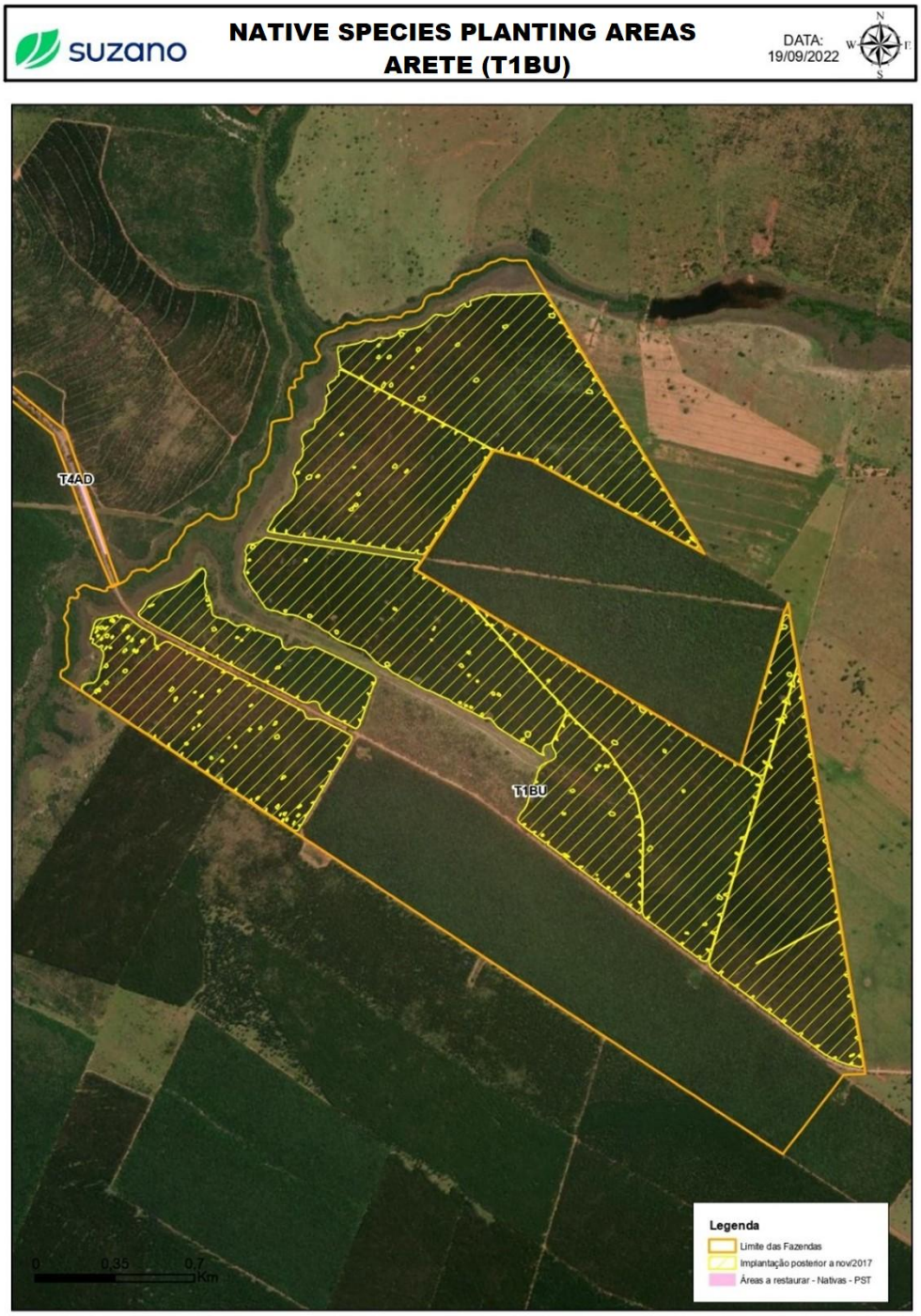


Figure 2 – Location and stratification of Arete. Eucalyptus plantation area highlighted in yellow.

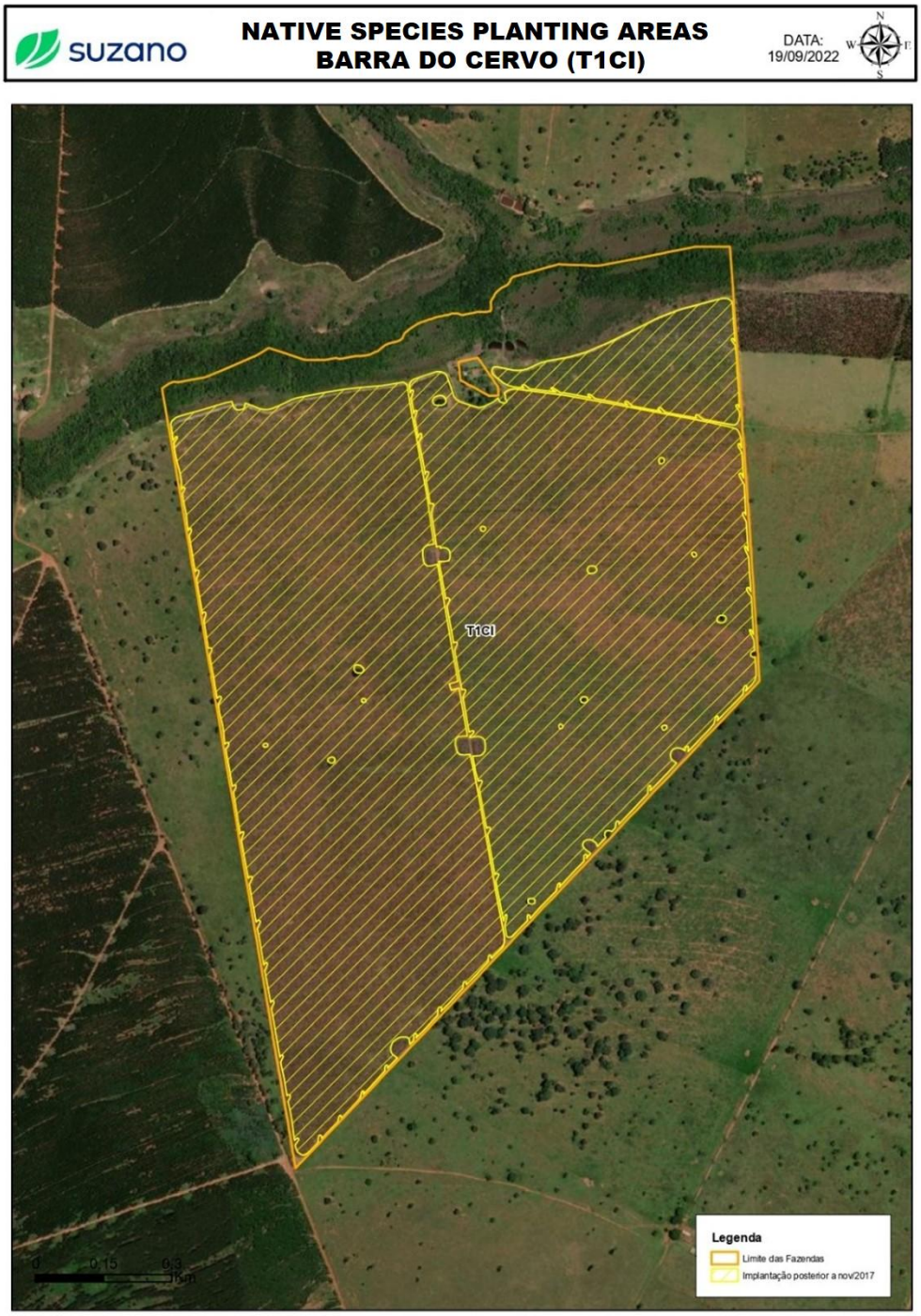


Figure 3 - Location and stratification of Barra do Cervo. Eucalyptus plantation area highlighted in yellow.



Figure 4 - Location and stratification of Barra do Moeda. Eucalyptus plantation area highlighted in yellow and native restoration planting area in white (PSR), light pink (PST) and mustard (SLE) .



Figure 5 - Location and stratification of Boa Esperança III. Eucalyptus plantation area highlighted in yellow and native restoration in light pink.



Figure 6 - Location and stratification of Bom Jesus. Eucalyptus plantation area highlighted in yellow and native restoration planting area in light pink (PST) and white (PSR).

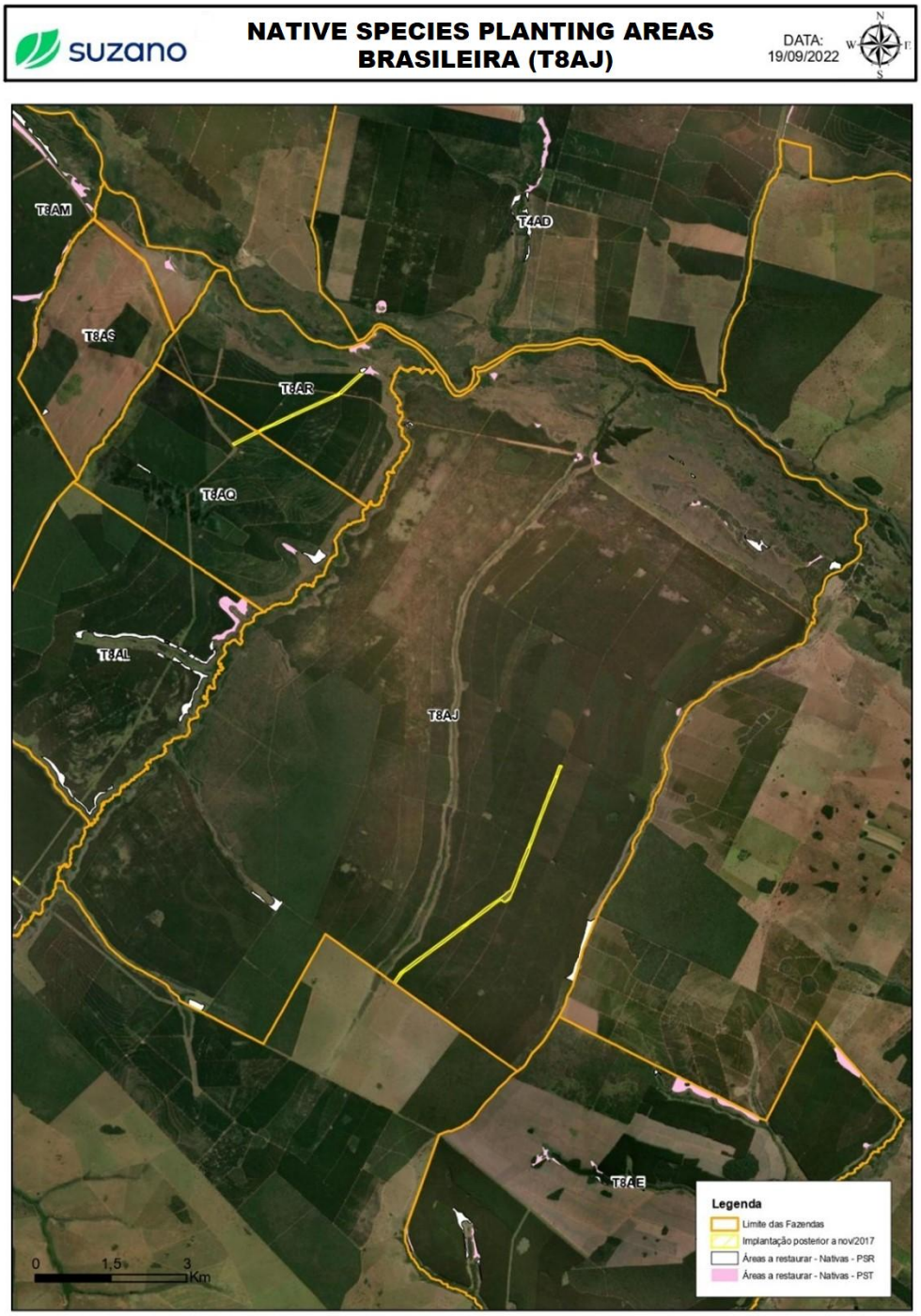


Figure 7 - Location and stratification of Brasileira. Eucalyptus plantation area highlighted in yellow and native restoration planting area in light pink (PST) and white (PSR).



Figure 8 - Location and stratification of Casa Branca. Native restoration in light pink (PST) and mustard (SLE).



Figure 9 - Location and stratification of Cristo Redentor. Eucalyptus plantation in yellow and Native restoration plantation area highlighted in light pink (PST) and white (PSR).



Figure 10 - Location and stratification of Curuaca. Eucalyptus plantation in yellow and Native restoration plantation area highlighted in light pink (PST) and white (PSR).



Figure 11 - Location and stratification of Duas Marias. Eucalyptus plantation area highlighted in yellow and native restoration planting area in light pink (PST) and white (PSR).



Figure 12 - Location and stratification of Estradão. Native restoration plantation area highlighted in light pink (PST) and white (PSR).



Figure 13 - Location and stratification of Figueira. Eucalyptus plantation area highlighted in yellow.



Figure 14 - Location and stratification of Flor da Serra. Native restoration planting area highlighted in white (PSR).



Figure 15 - Location and stratification of Guara-Suia. Native restoration planting area highlighted in light pink (PST) and white (PSR).



Figure 16 - Location and stratification of Jandaia. Eucalyptus plantation area highlighted in yellow



Figure 17 - Location and stratification of Joamar. Eucalyptus plantation area highlighted in yellow.

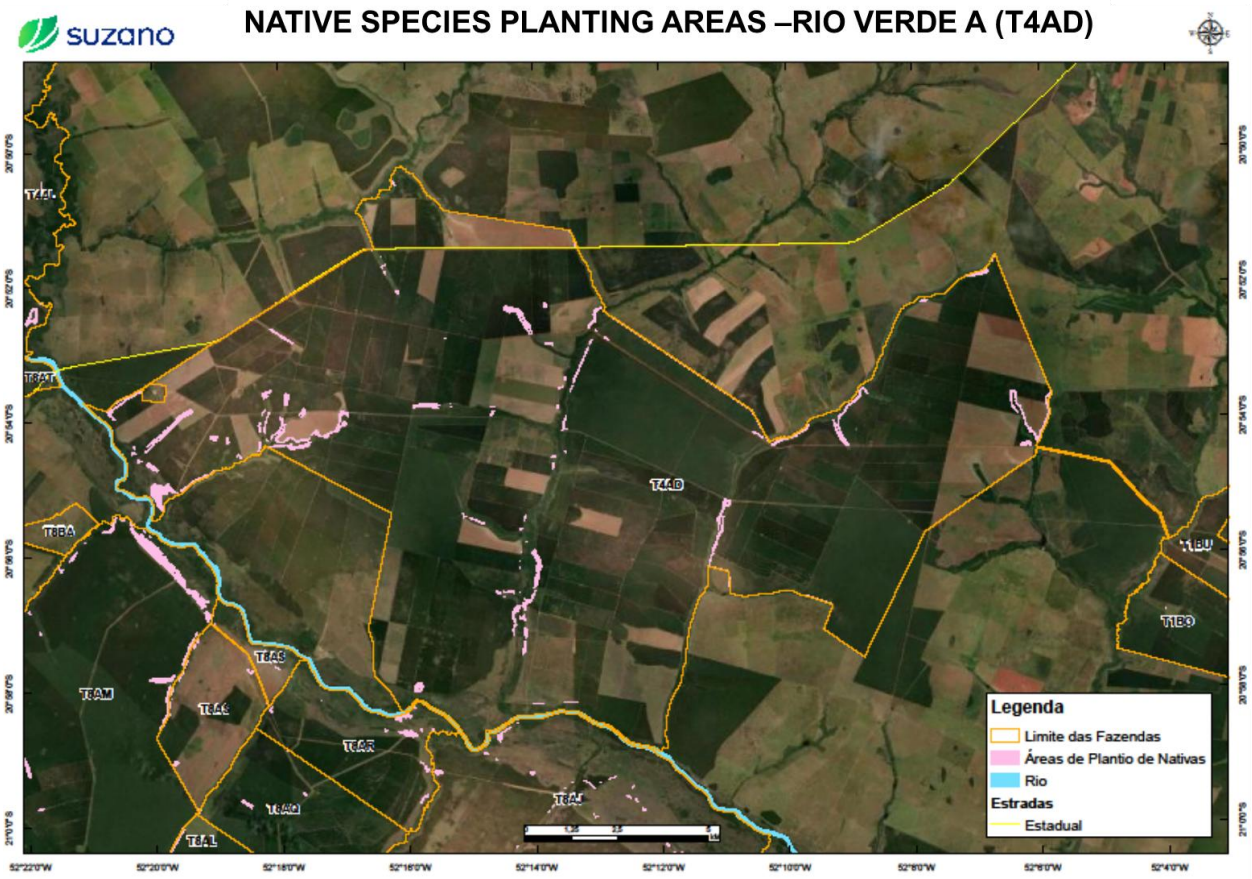


Figure 18 - Location and stratification of Rio Verde A. Native restoration planting area highlighted in light pink (PST).

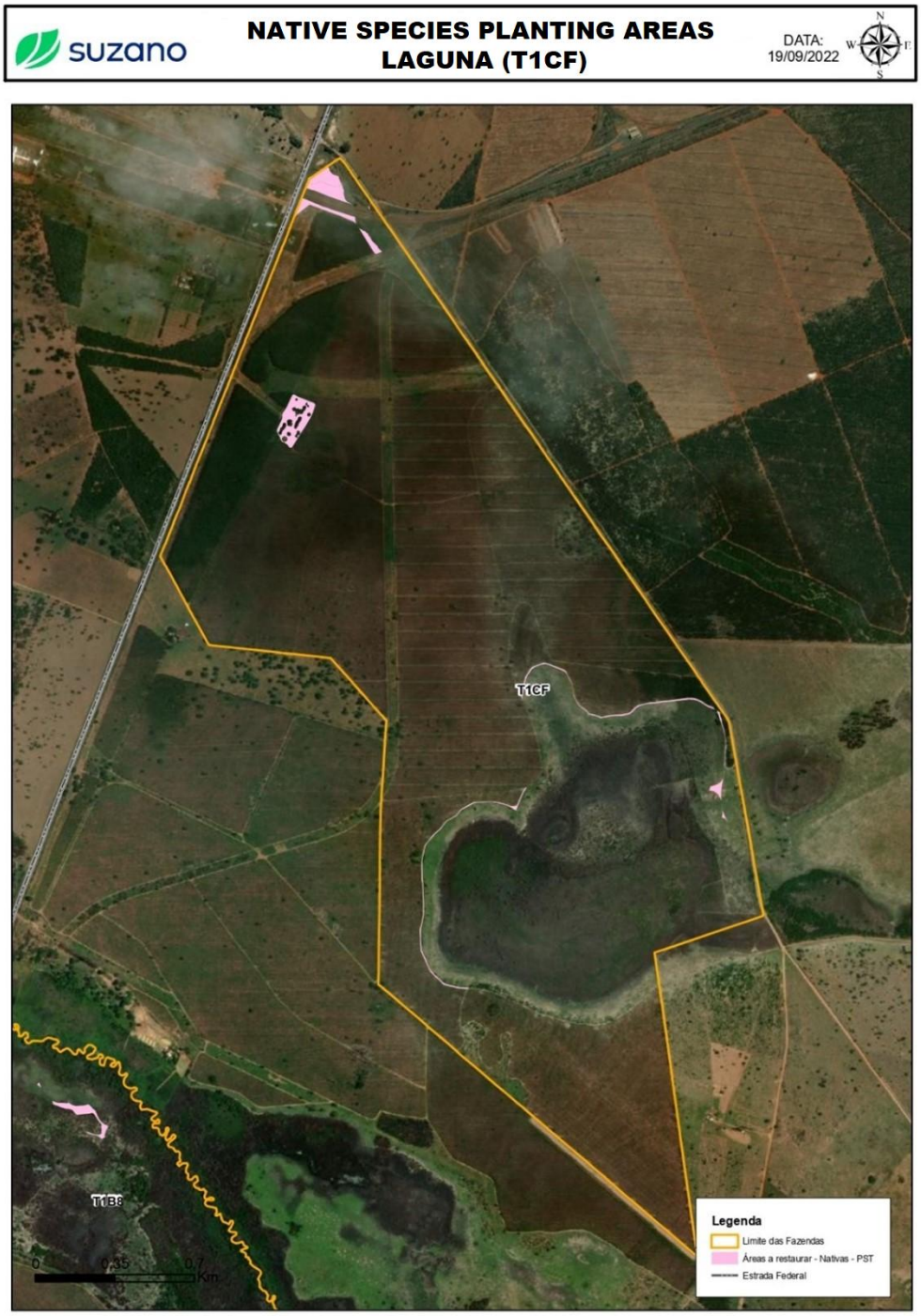


Figure 19 - Location and stratification of Laguna. Native restoration planting area highlighted in light pink (PST).



Figure 20 - Location and stratification of Matão. Native restoration area highlighted in light pink (PST) and white (PSR)

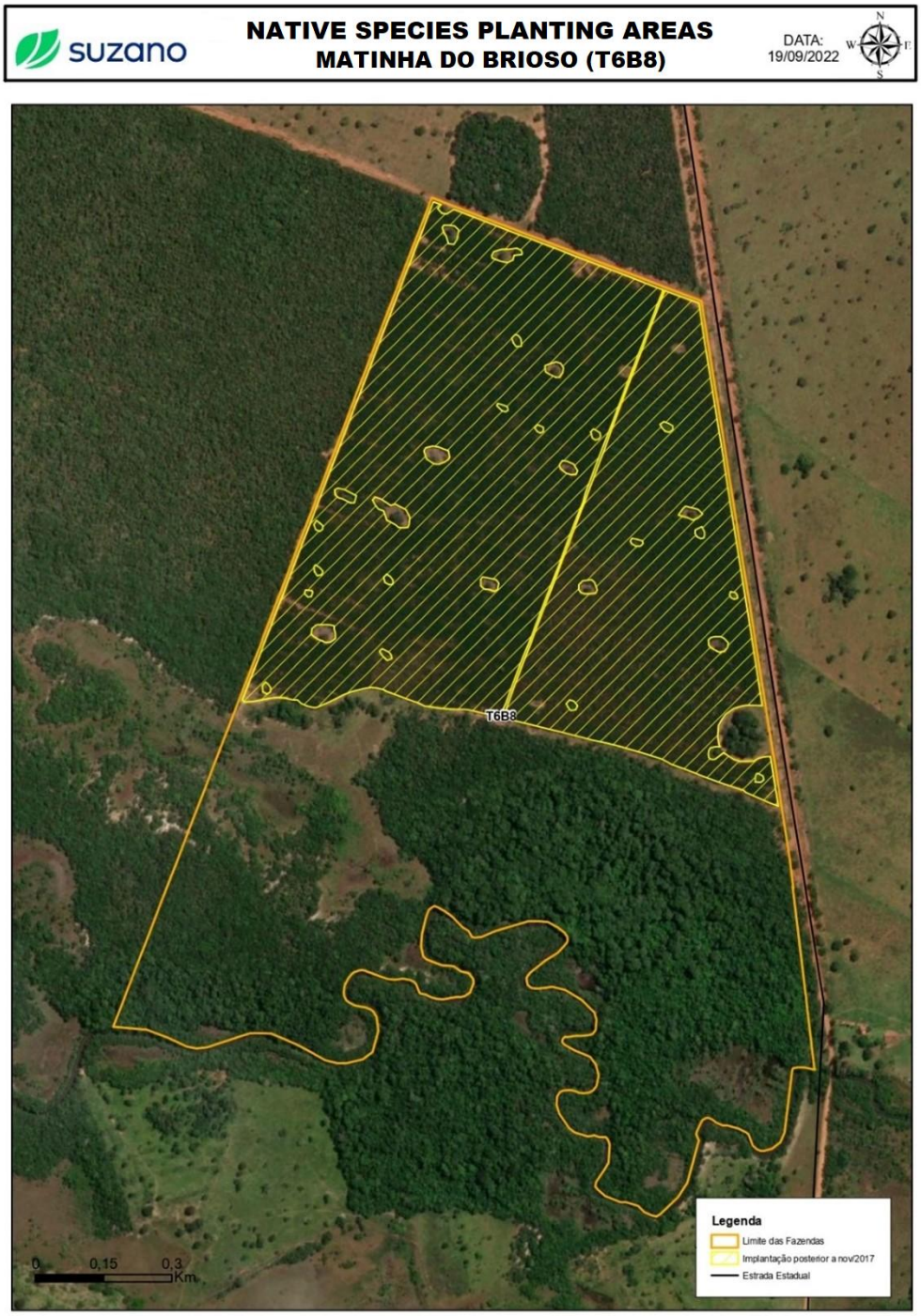


Figure 21 - Location and stratification of Matinha do Briosio. Eucalyptus plantation area highlighted in yellow.



Figure 22 - Location and stratification of Monte Alto. Eucalyptus plantation area highlighted in yellow.

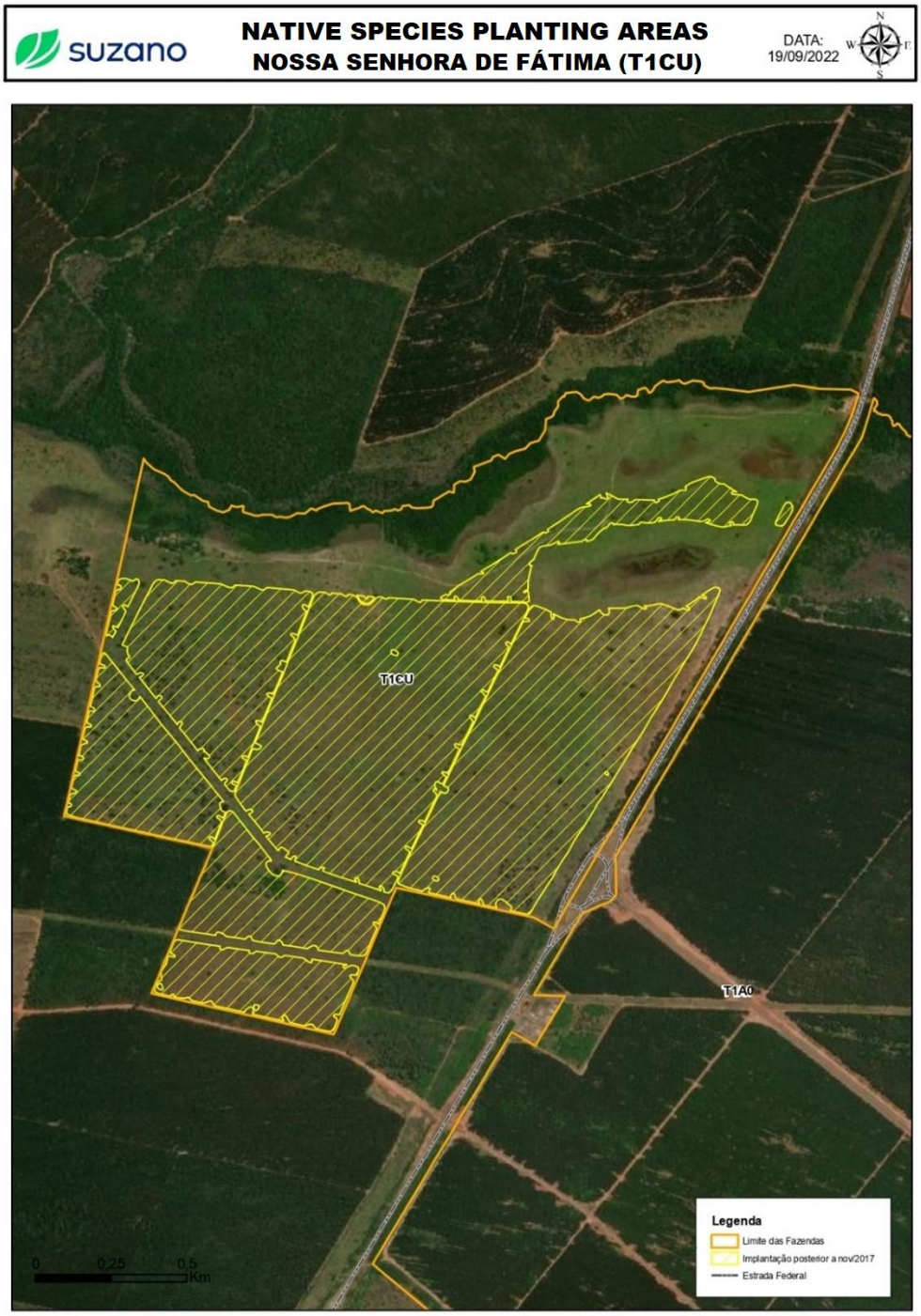


Figure 23 - Location and stratification of Nossa Senhora de Fátima. Eucalyptus plantation area highlighted in yellow.

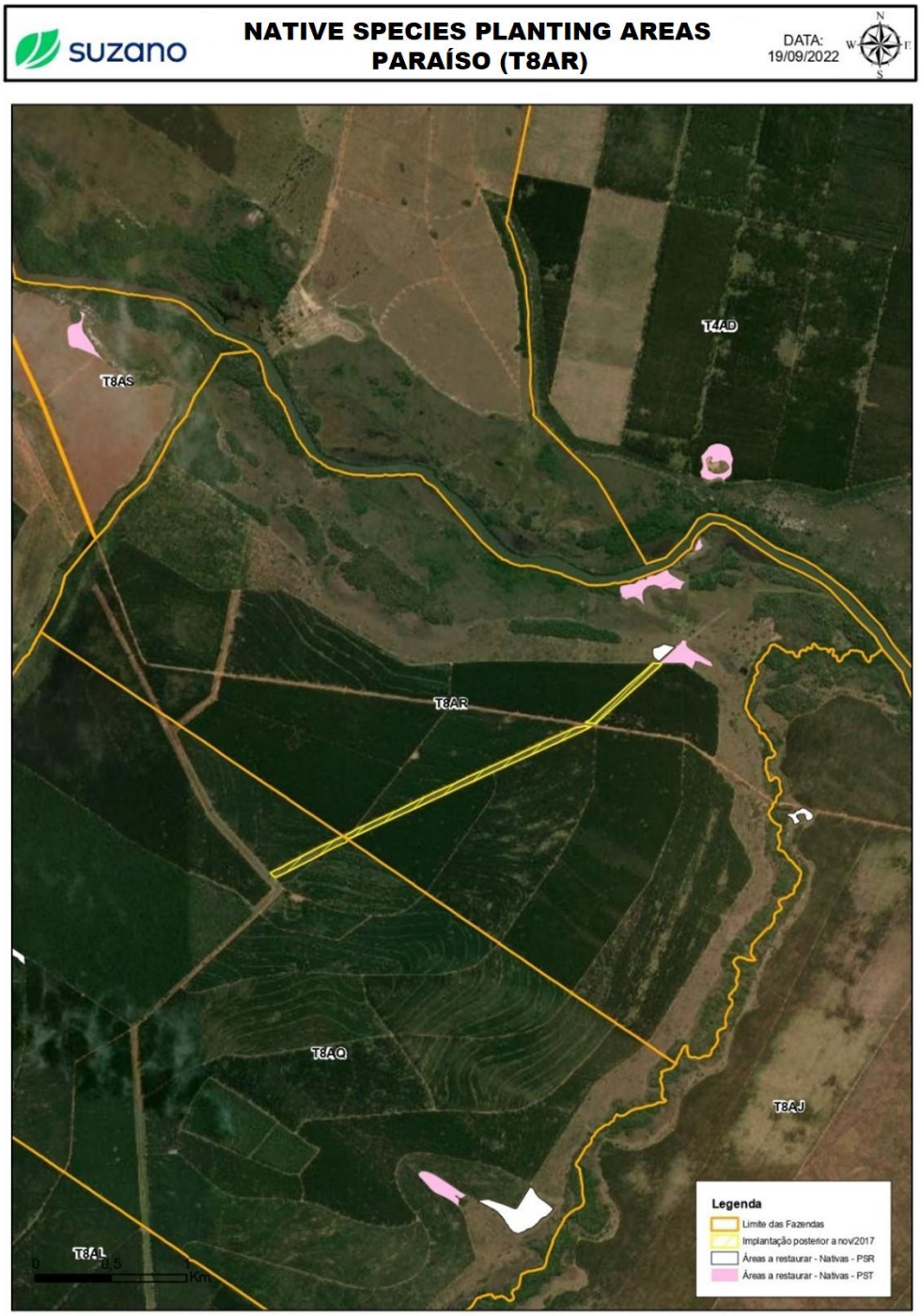


Figure 24 - Location and stratification of Paraíso. Eucalyptus plantation area highlighted in yellow and native restoration area highlighted in light pink (PST) and white (PSR).

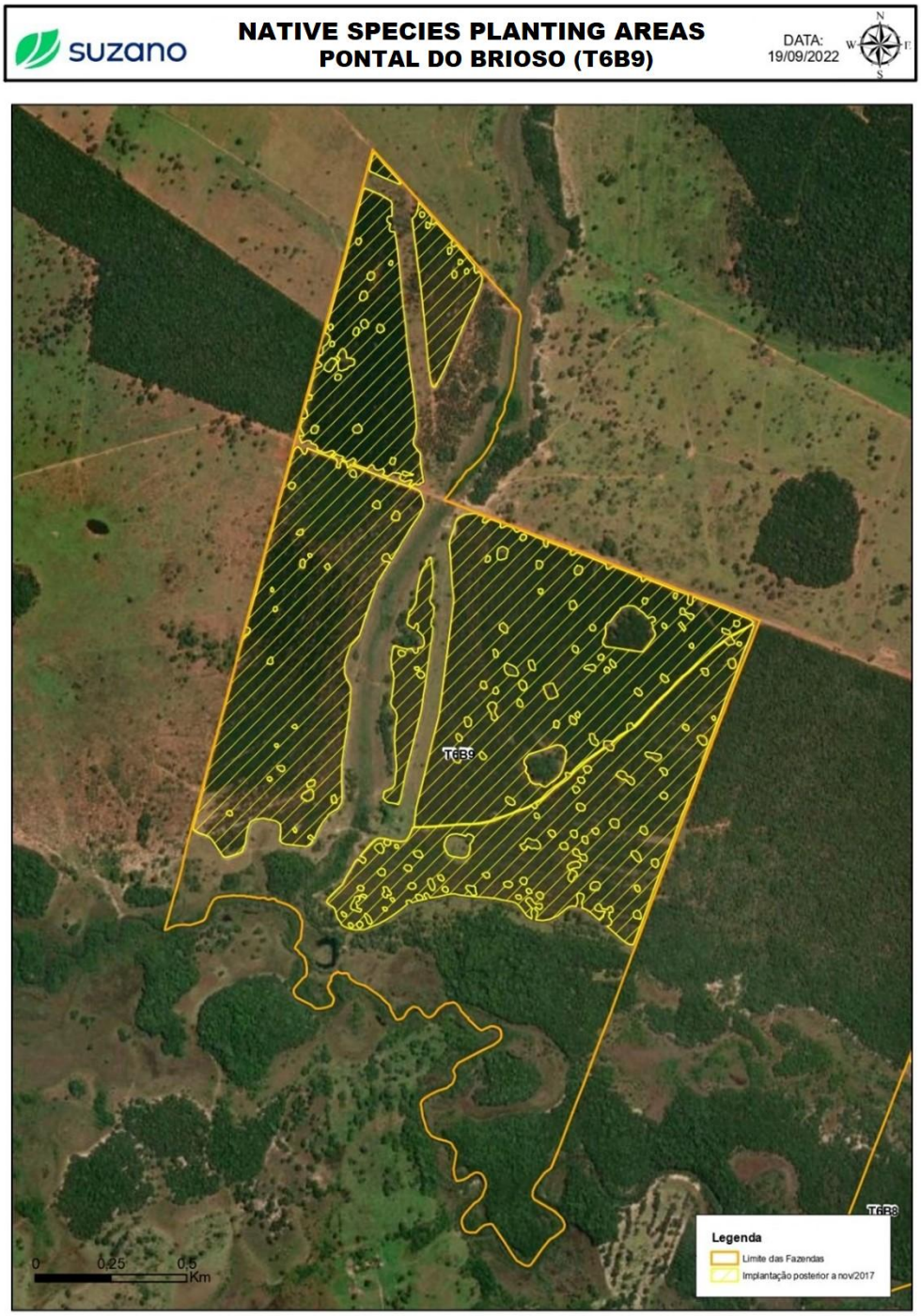


Figure 25 - Location and stratification of Pontal do Briosio. Eucalyptus plantation area highlighted in yellow.



Figure 26 - Location and stratification of Santa Inês Gleba C. Eucalyptus plantation area highlighted in yellow.



Figure 27 - Location and stratification of Santa Inês. Eucalyptus plantation area highlighted in yellow.

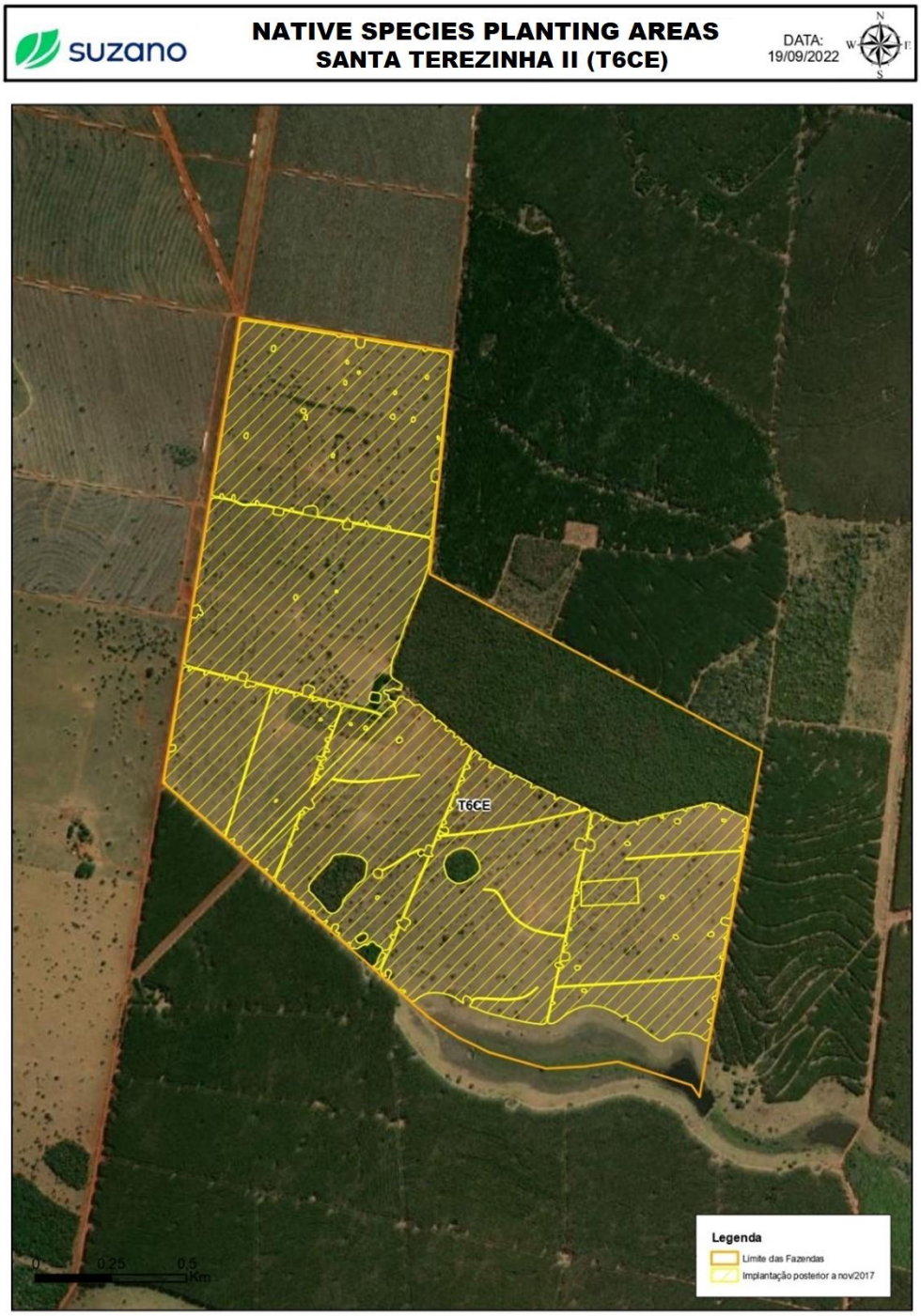


Figure 28 - Location and stratification of Santa Terezinha II. Eucalyptus plantation area highlighted in yellow.



Figure 29 - Location and stratification of Santo Antônio IV. Eucalyptus plantation area highlighted in yellow.

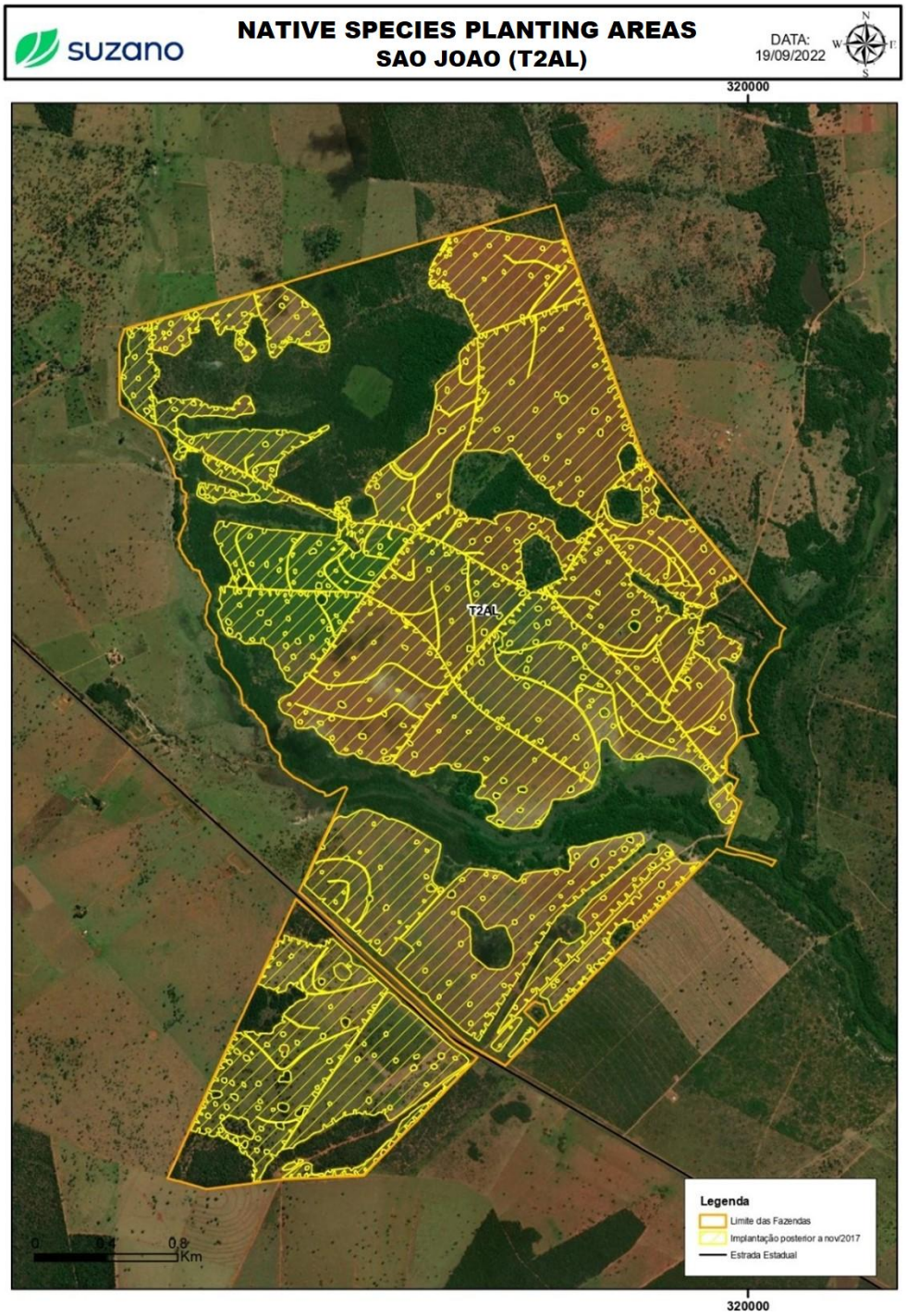


Figure 30 - Location and stratification of São João IV. Eucalyptus plantation area highlighted in yellow.



Figure 31 - Location and stratification of São José. Eucalyptus plantation area highlighted in yellow and native restoration area highlighted in light pink (PST) and white (PSR).

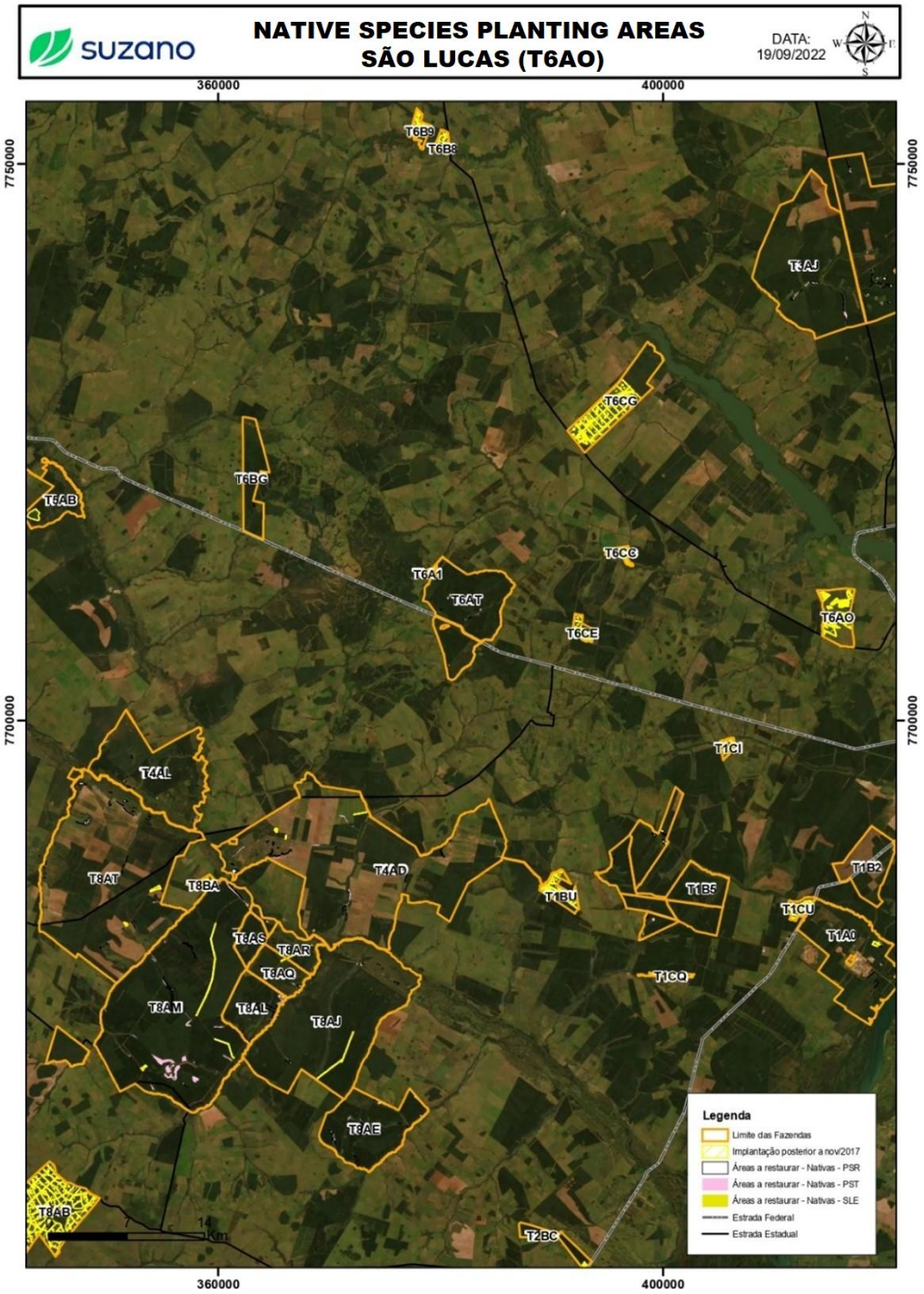


Figure 32 - Location and stratification of São Lucas. Eucalyptus plantation area highlighted in yellow.

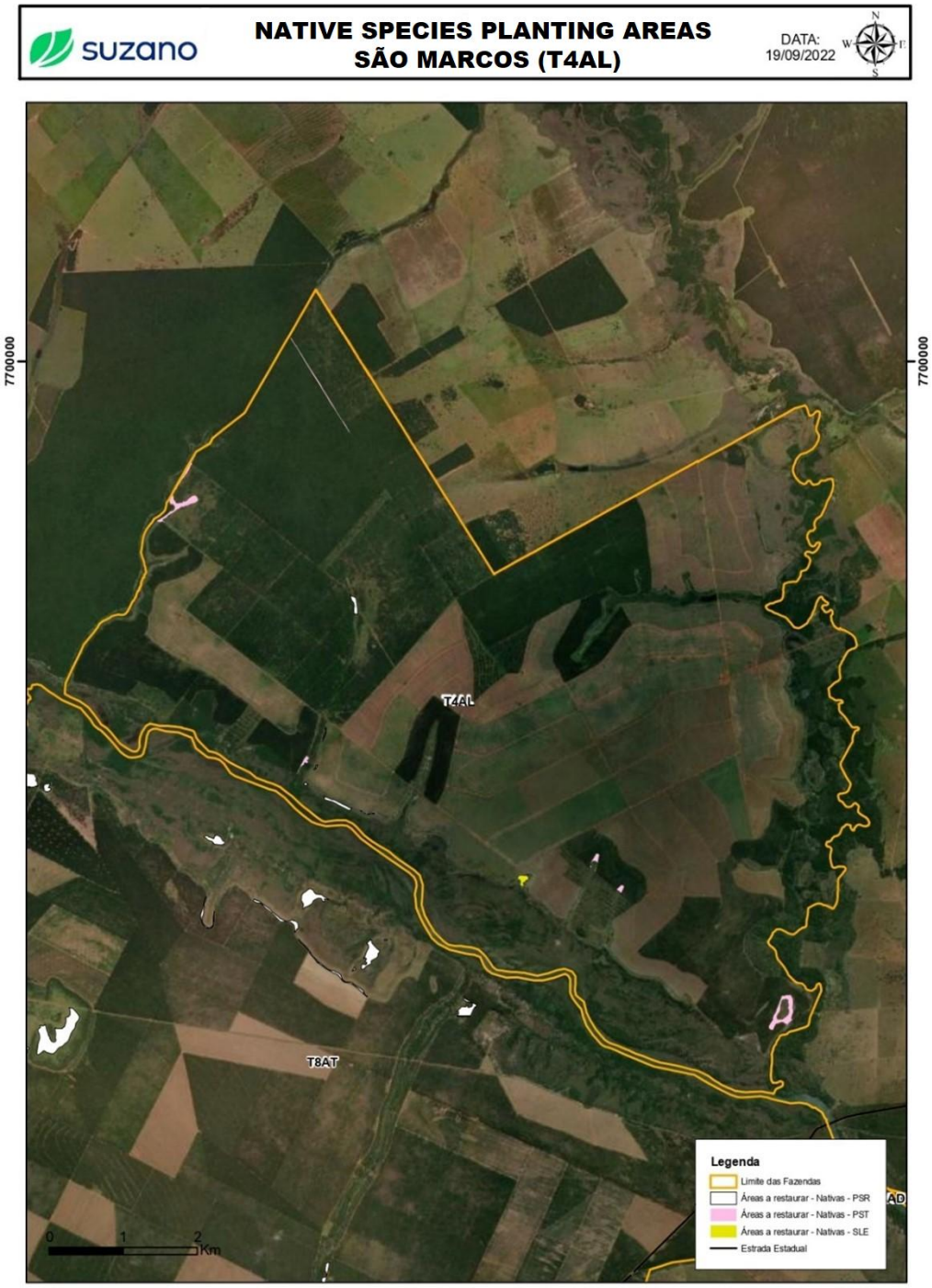


Figure 33 - Location and stratification of São Marcos. Native restoration planting area highlighted in light pink (PST), white (PSR) and mustard (SLE).



Figure 34 - Location and stratification of São Miguel III. Eucalyptus plantation area highlighted in yellow and Native restoration planting area highlighted in light pink (PST).

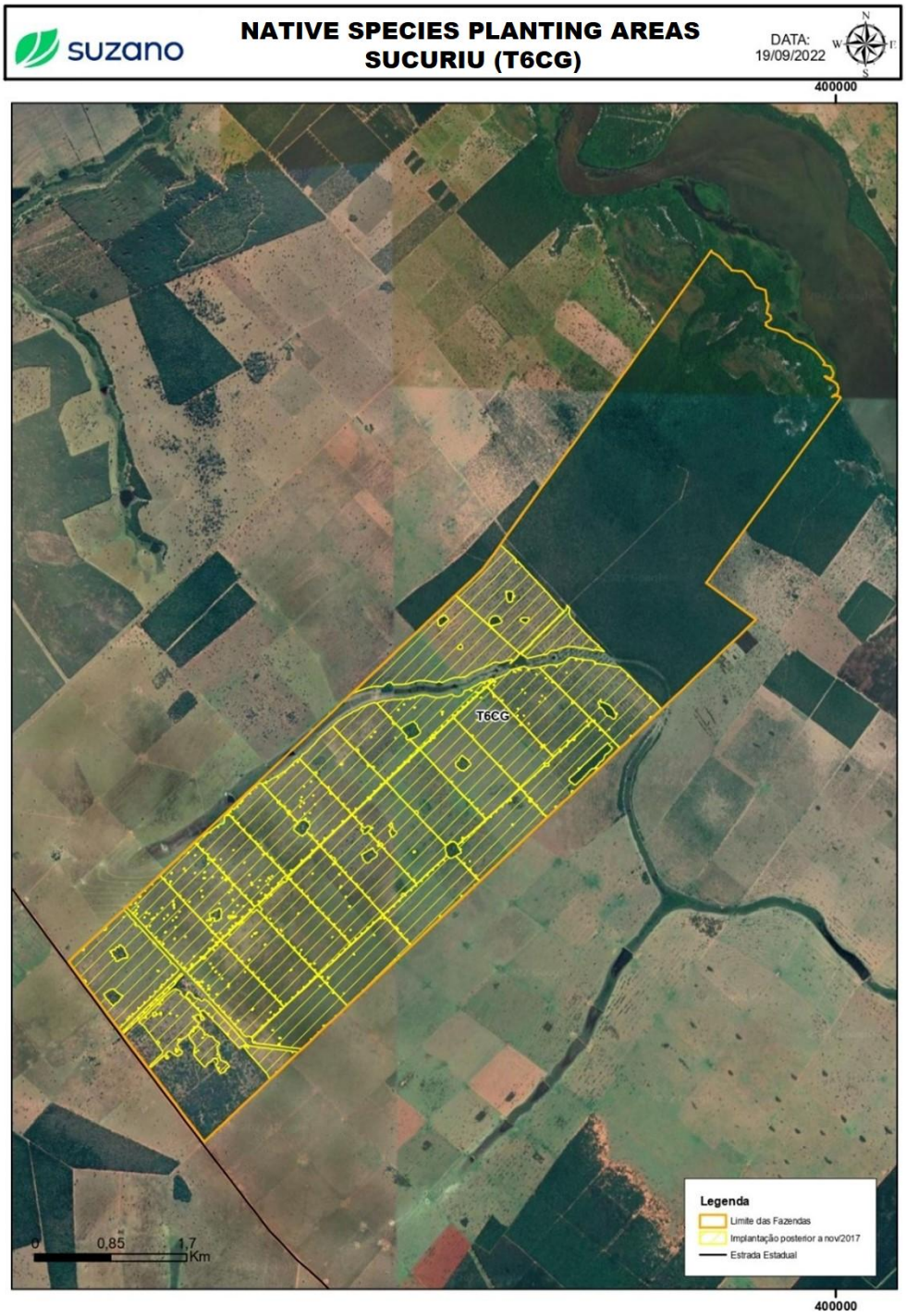


Figure 35 - Location and stratification of Sucuriu. Eucalyptus plantation area highlighted in yellow.

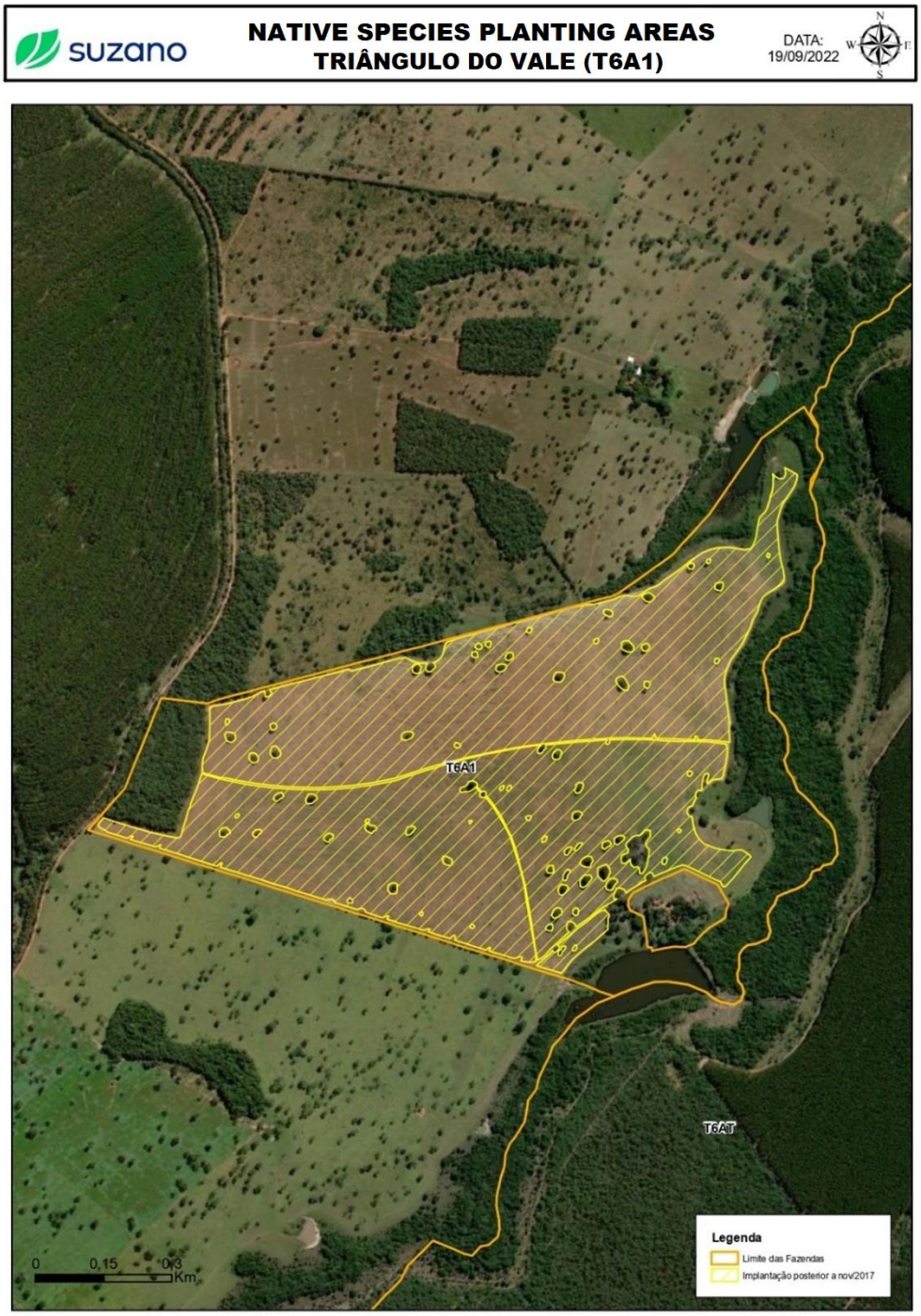


Figure 36 - Location and stratification of Triângulo do Vale. Eucalyptus plantation area highlighted in yellow.



Figure 37 - Location and stratification of Vale Gerivá. Eucalyptus plantation area highlighted in yellow and Native restoration planting area highlighted in light pink (PST) and white (PSR).

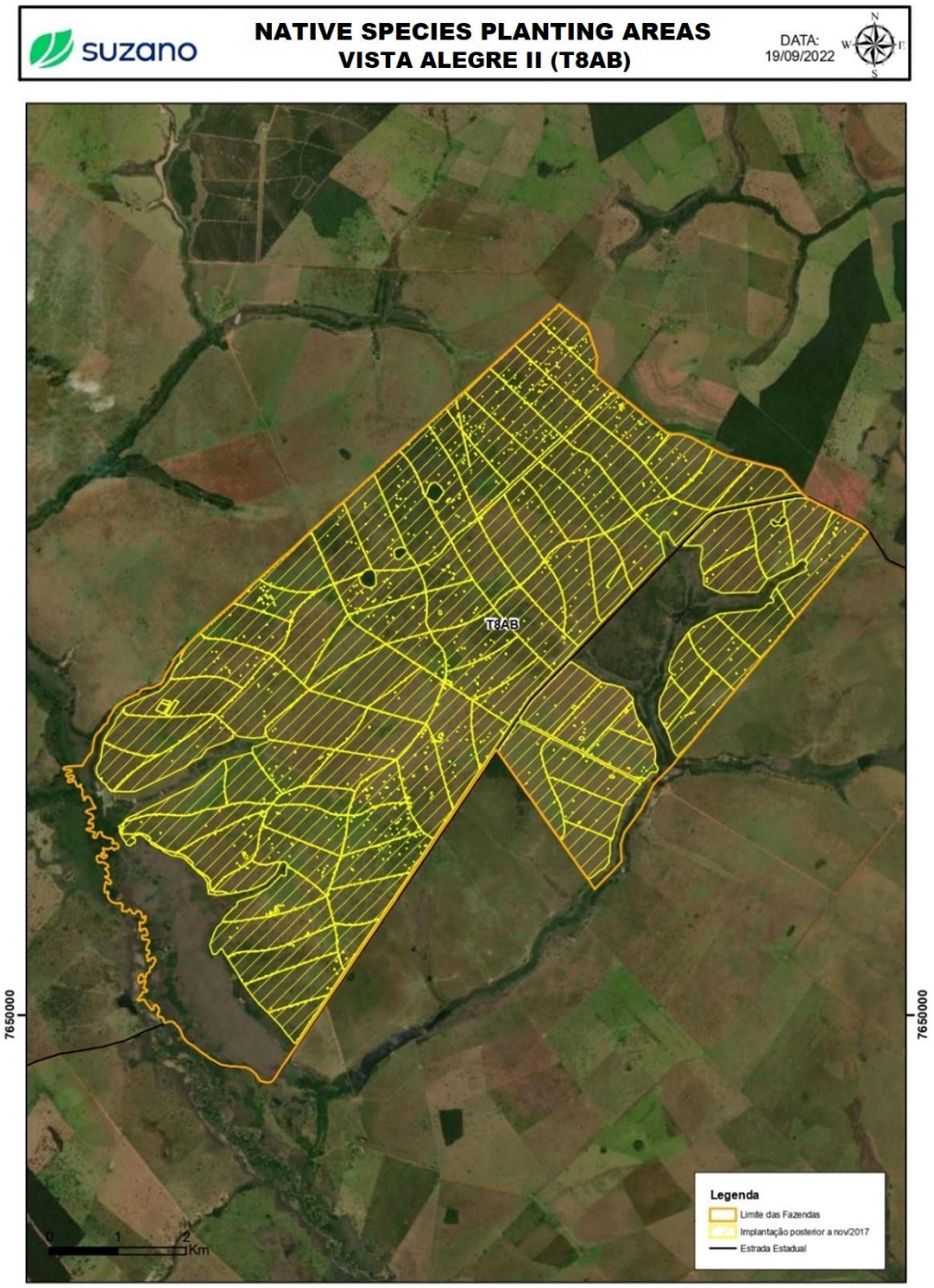


Figure 38 - Location and stratification of Vista Alegre II. Eucalyptus plantation area highlighted in yellow.

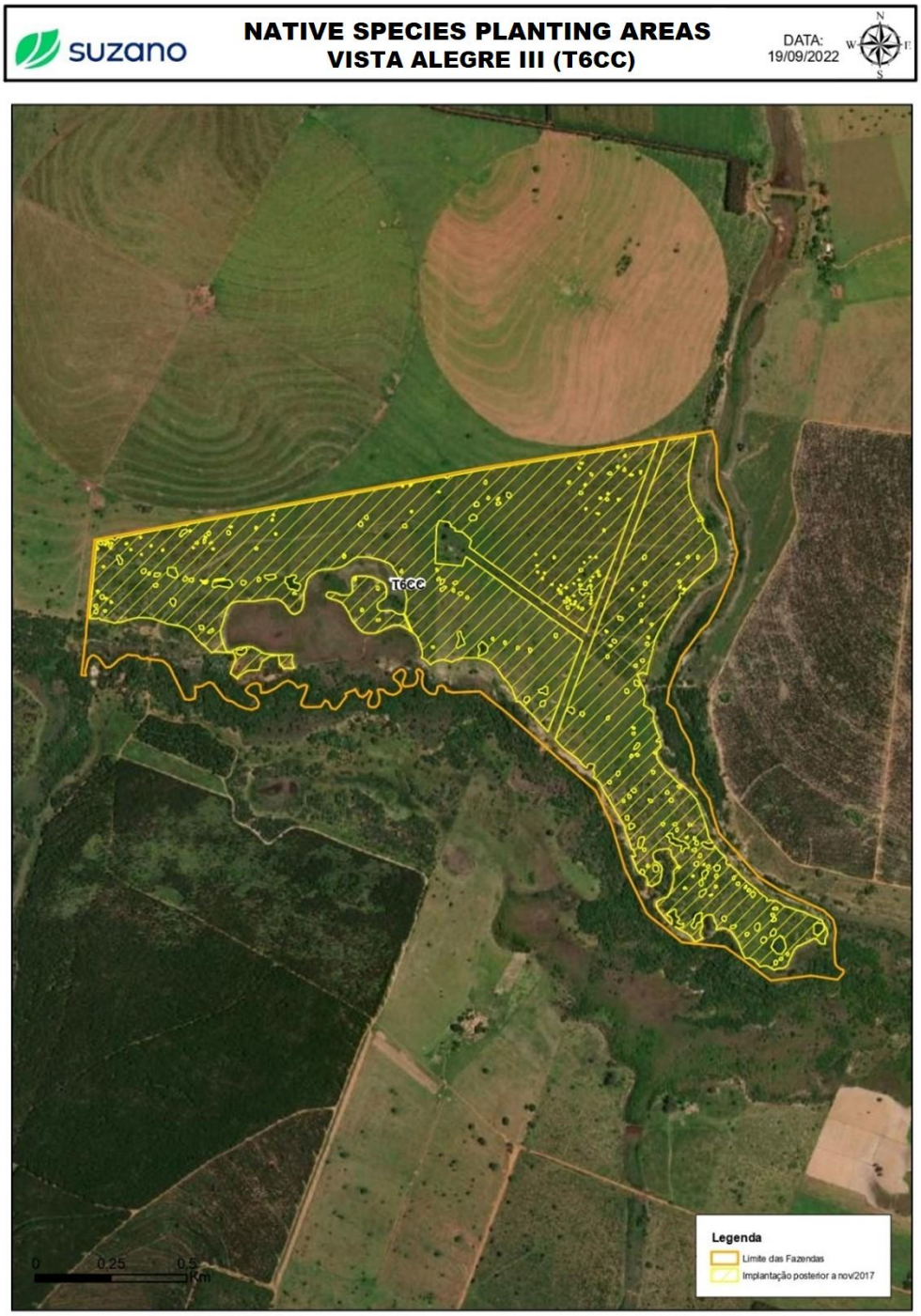


Figure 39 - Location and stratification of Vista Alegre III. Eucalyptus plantation area highlighted in yellow.

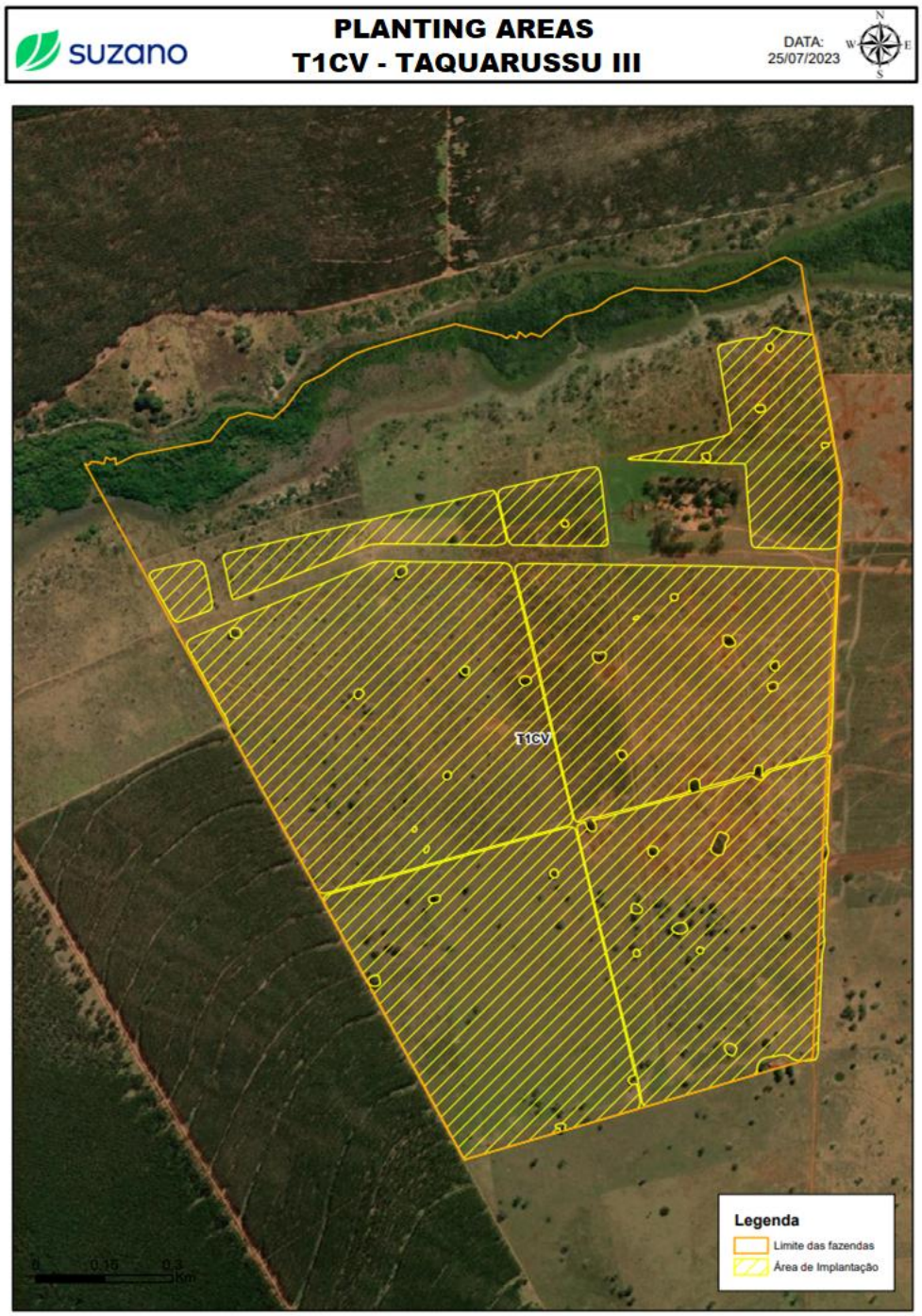


Figure 40 - Location and stratification of Taquarussu III. Eucalyptus plantation area highlighted in yellow.

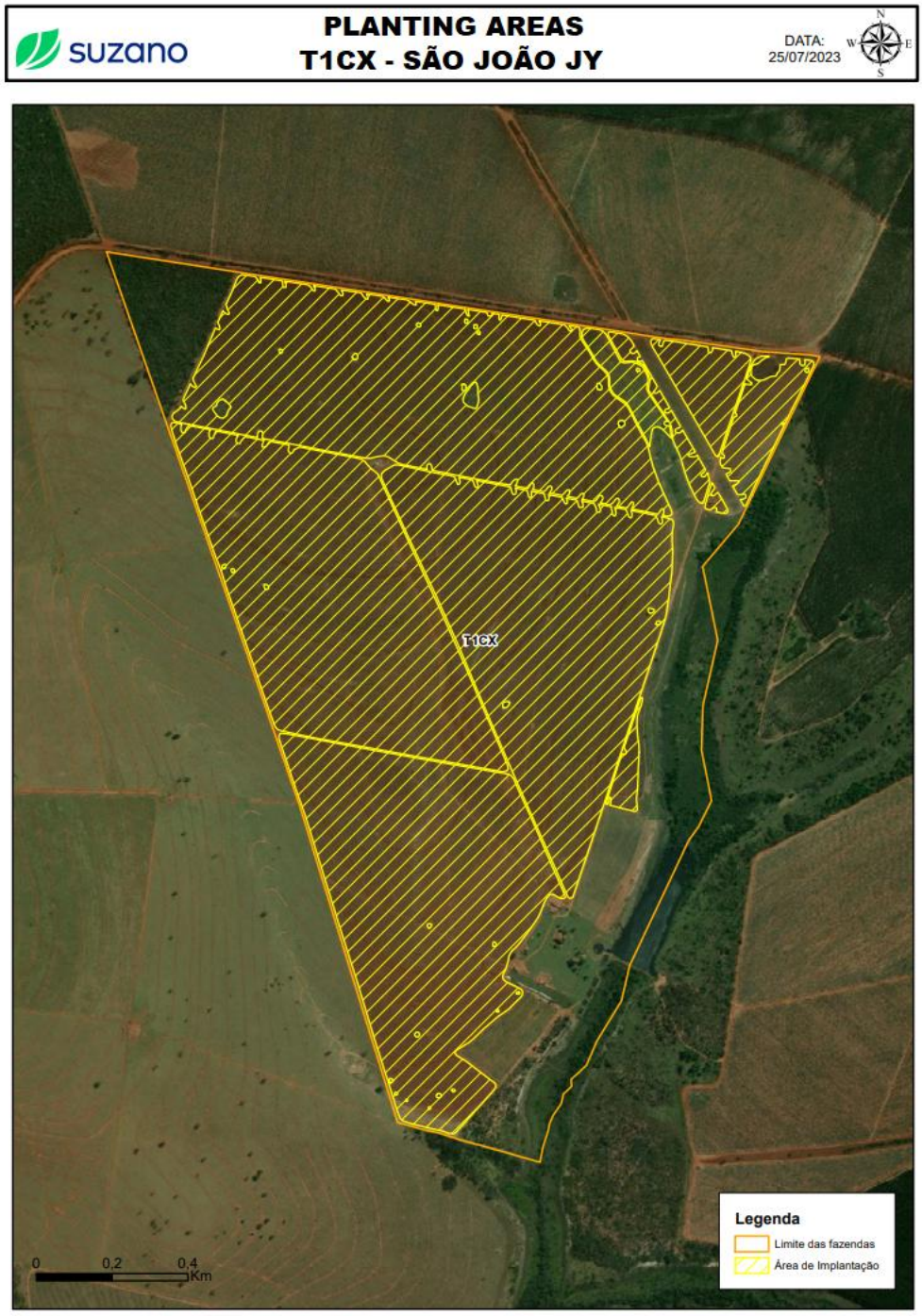


Figure 41 - Location and stratification of São João JY. Eucalyptus plantation area highlighted in yellow.

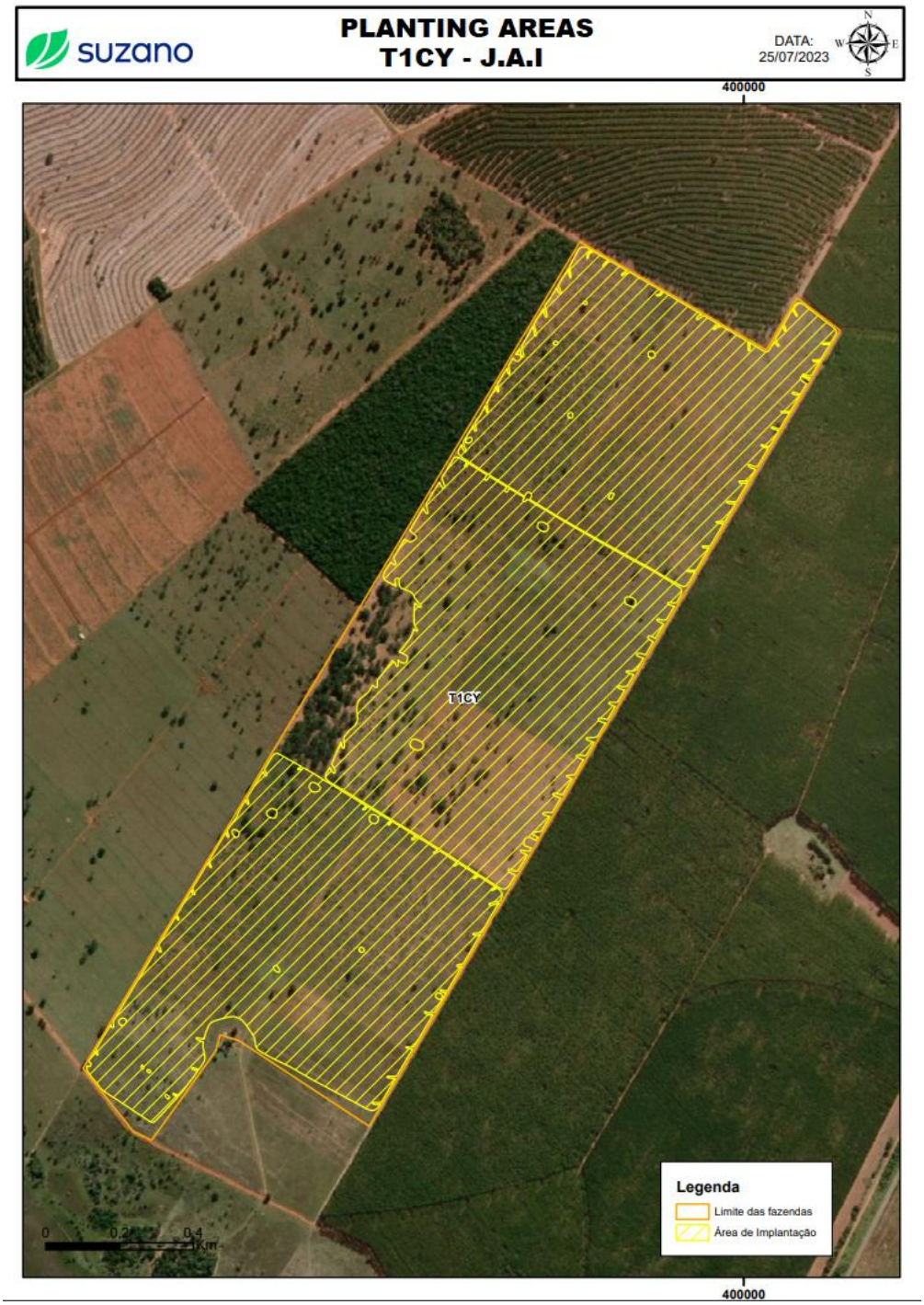


Figure 42 - Location and stratification of J.A.I. Eucalyptus plantation area highlighted in yellow.



Figure 43 - Location and stratification of Palmito II. Eucalyptus plantation area highlighted in yellow.



Figure 44 - Location and stratification of Pouso Alto I. Eucalyptus plantation area highlighted in yellow.

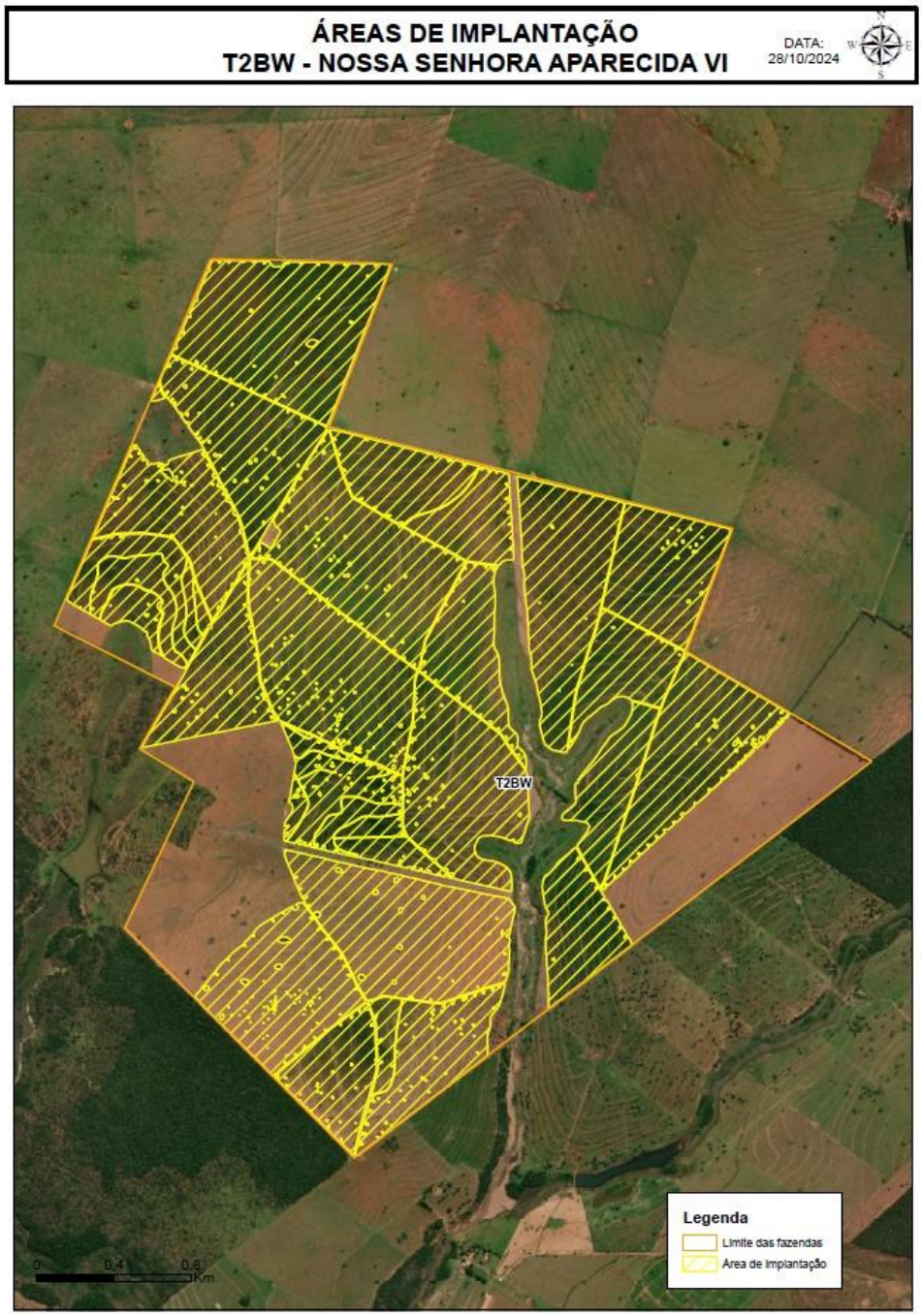


Figure 45 - Location and stratification of Nossa Senhora Aparecida VI. Eucalyptus plantation area highlighted in yellow.

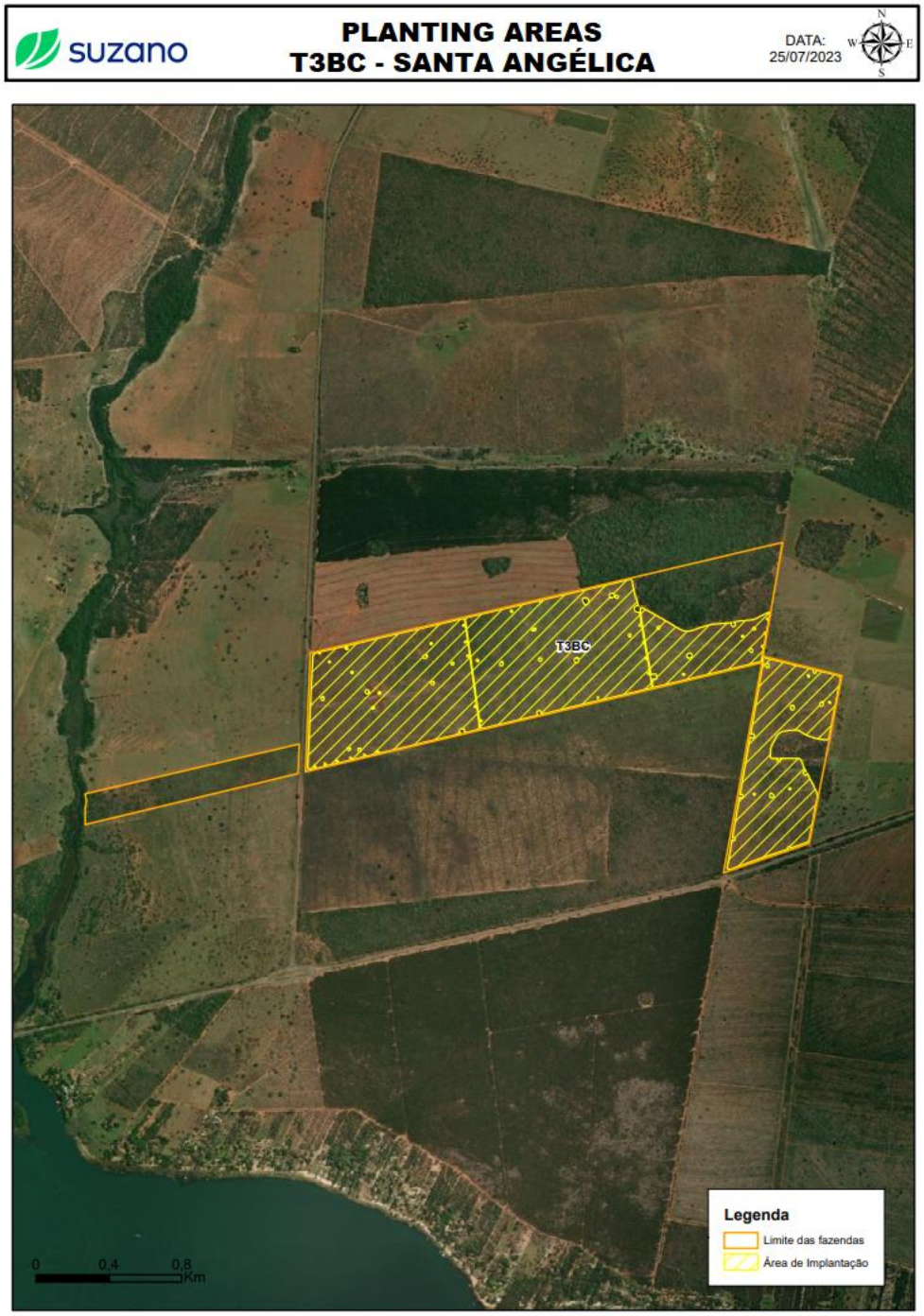


Figure 46 - Location and stratification of Santa Angélica. Eucalyptus plantation area highlighted in yellow.

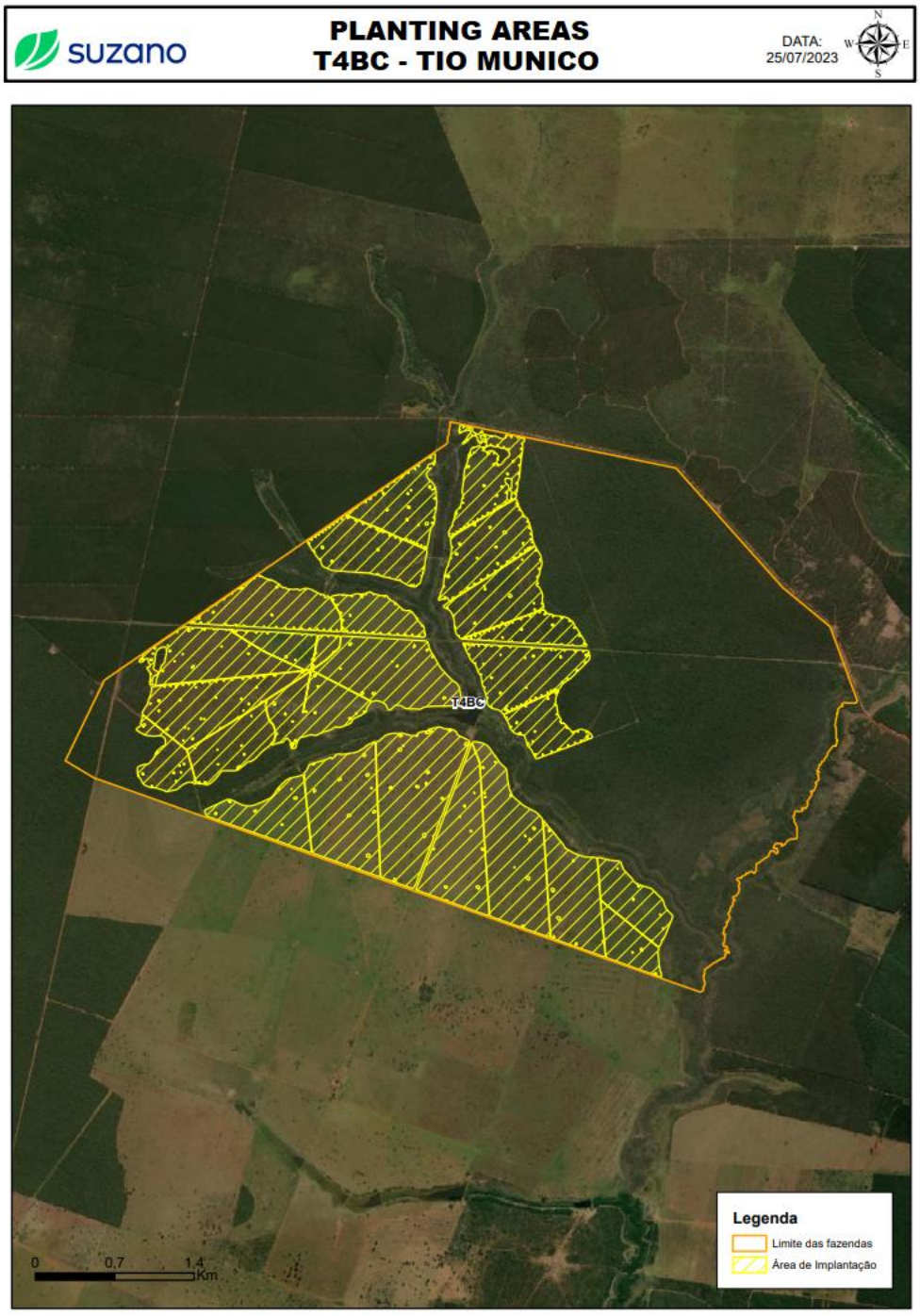


Figure 47 - Location and stratification of Tio Municо. Eucalyptus plantation area highlighted in yellow.

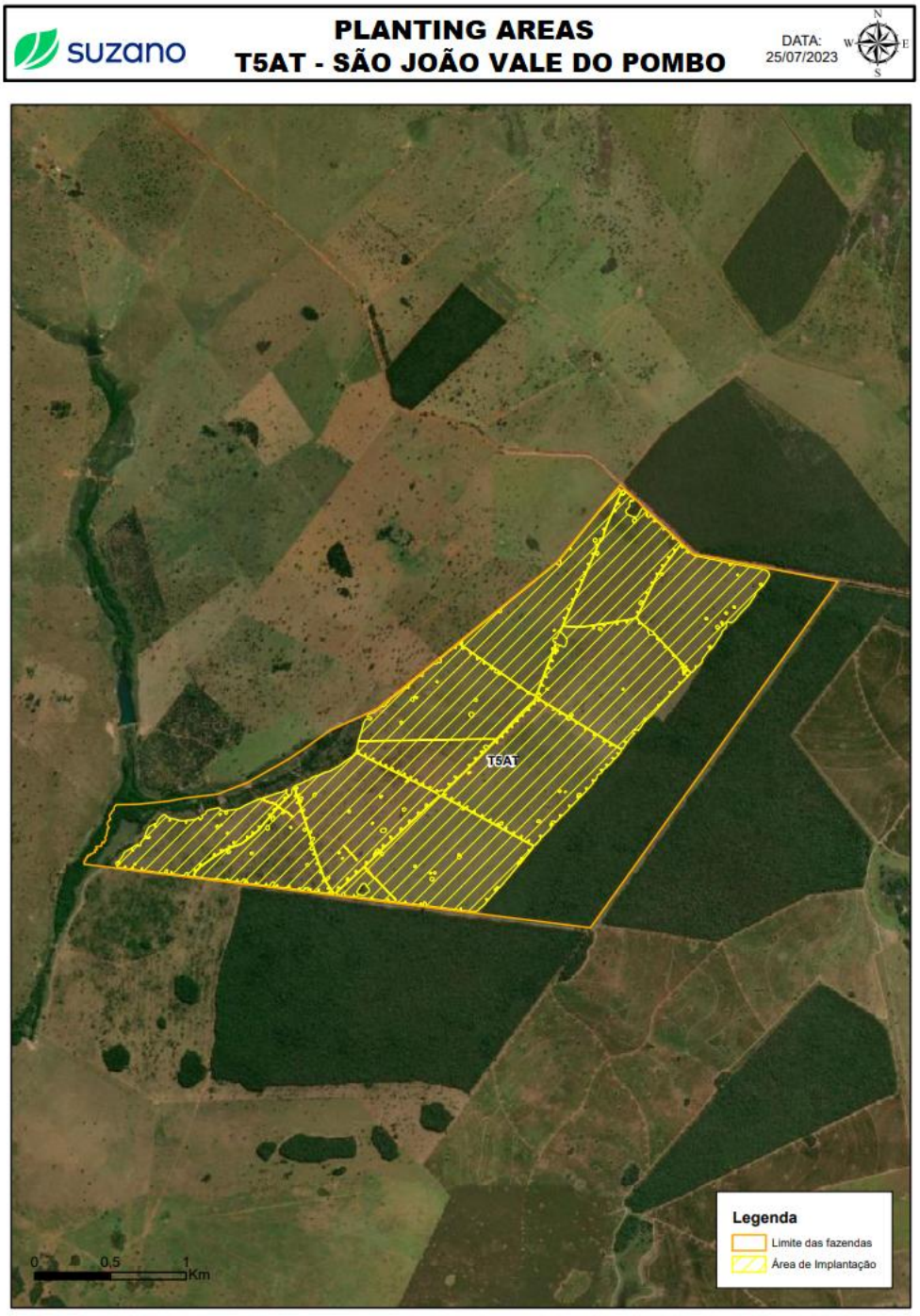


Figure 48 - Location and stratification of São João Vale do Pombo. Eucalyptus plantation area highlighted in yellow.

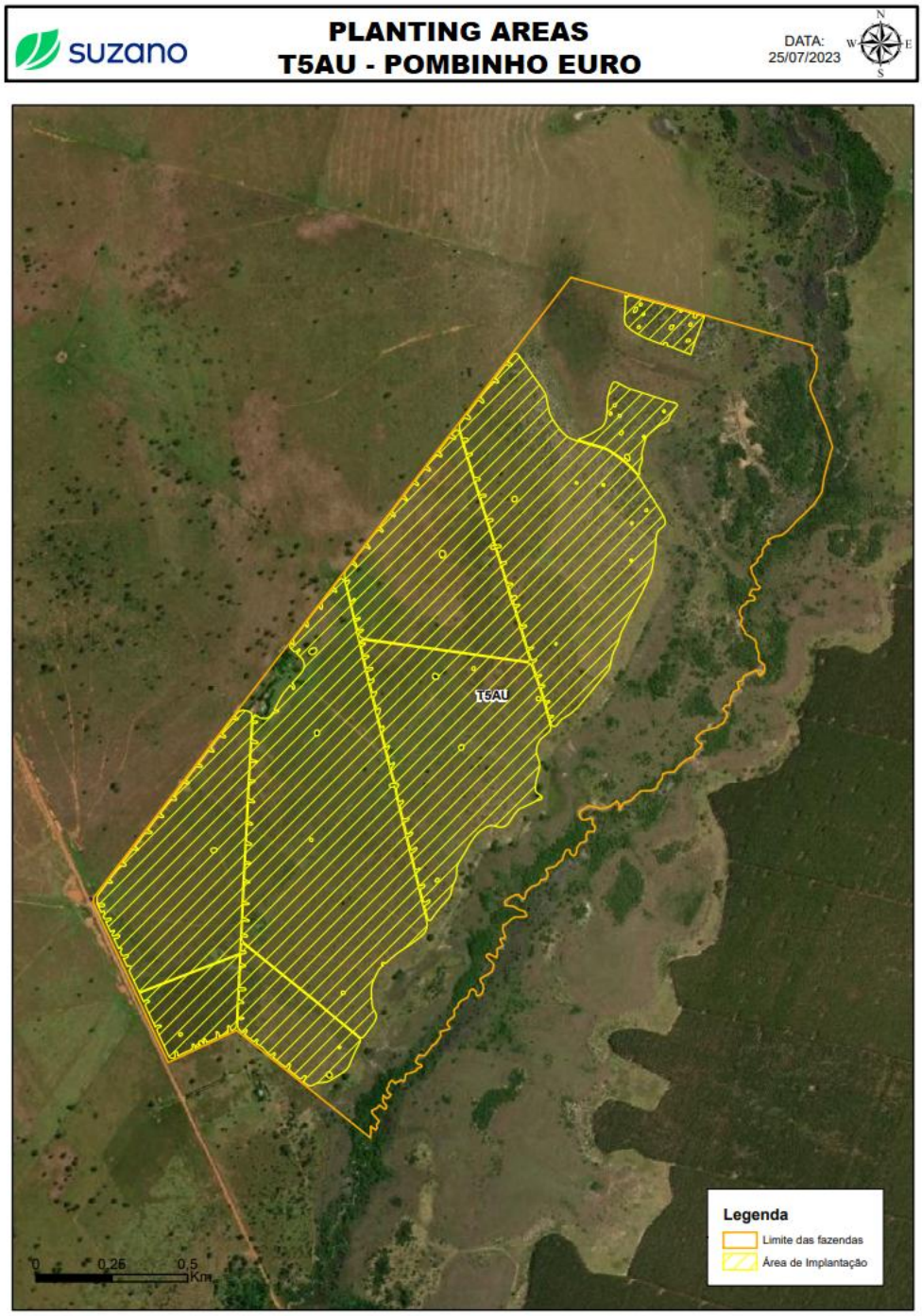


Figure 49 - Location and stratification of Pombinho Euro. Eucalyptus plantation area highlighted in yellow.



Figure 50 - Location and stratification of Marca B2. Eucalyptus plantation area highlighted in yellow.

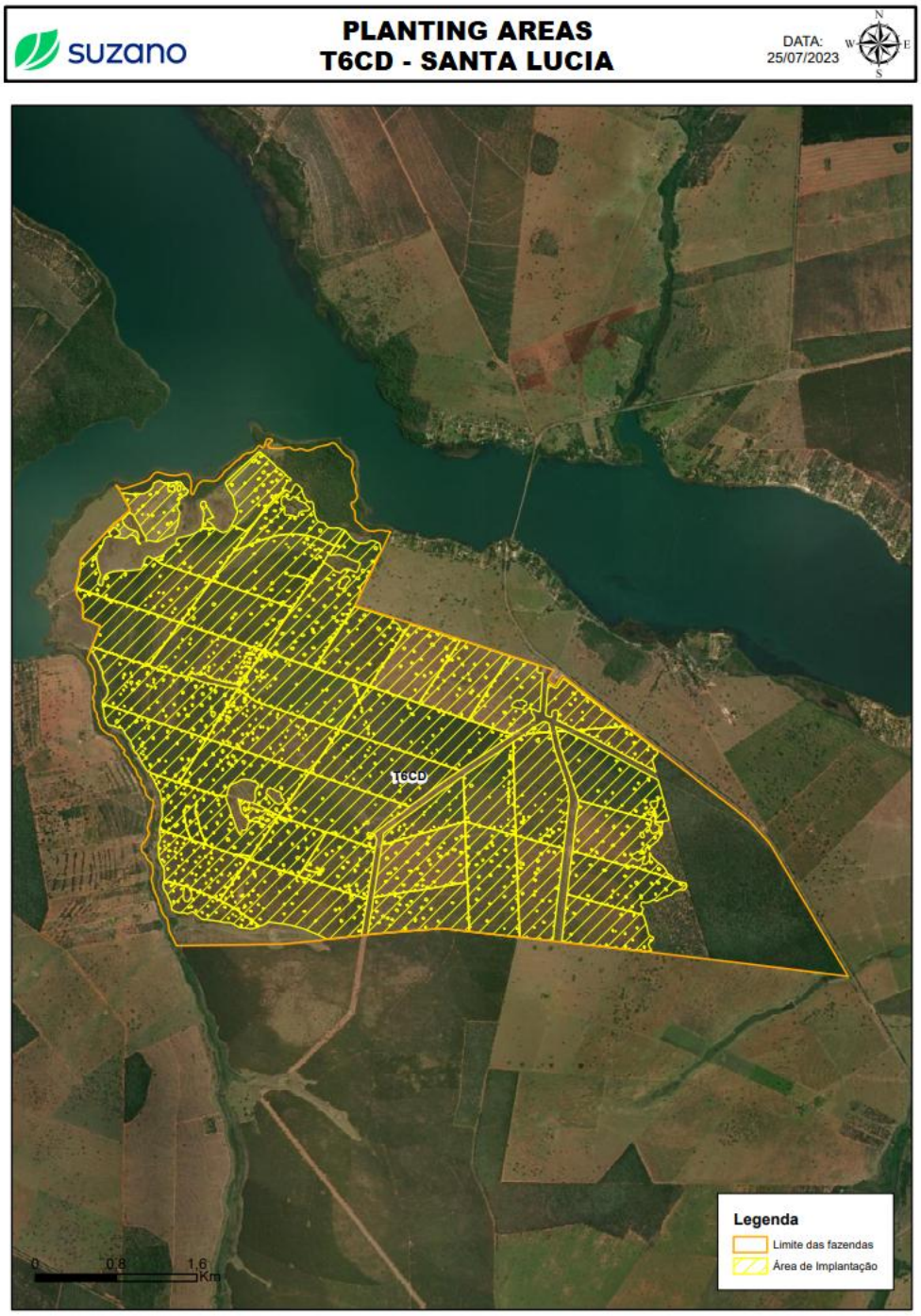


Figure 51 - Location and stratification of Santa Lucia. Eucalyptus plantation area highlighted in yellow.

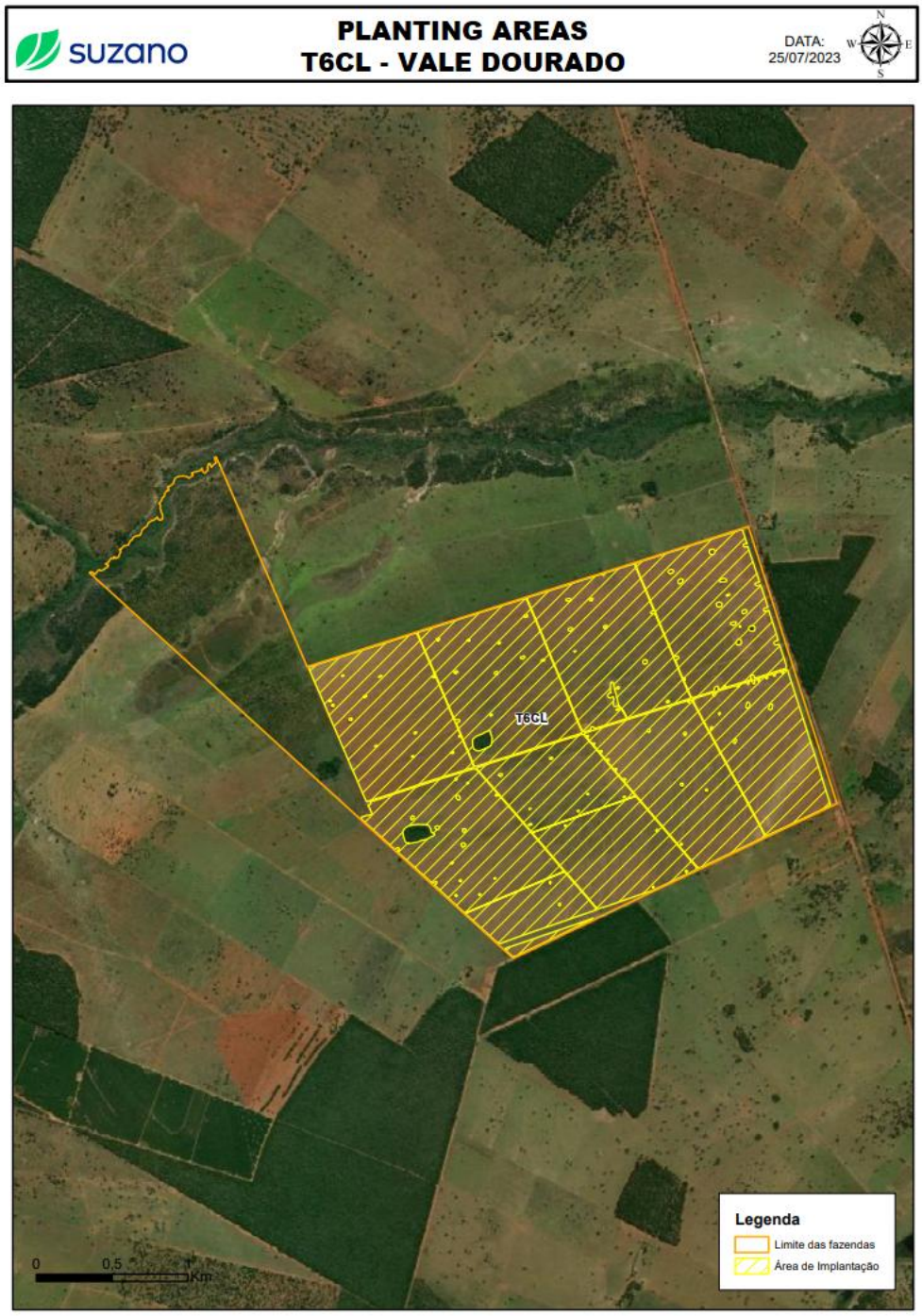


Figure 52 - Location and stratification of Vale Dourado. Eucalyptus plantation area highlighted in yellow.



Figure 53 - Location and stratification of Recanto dos Carvalhos. Eucalyptus plantation area highlighted in yellow.

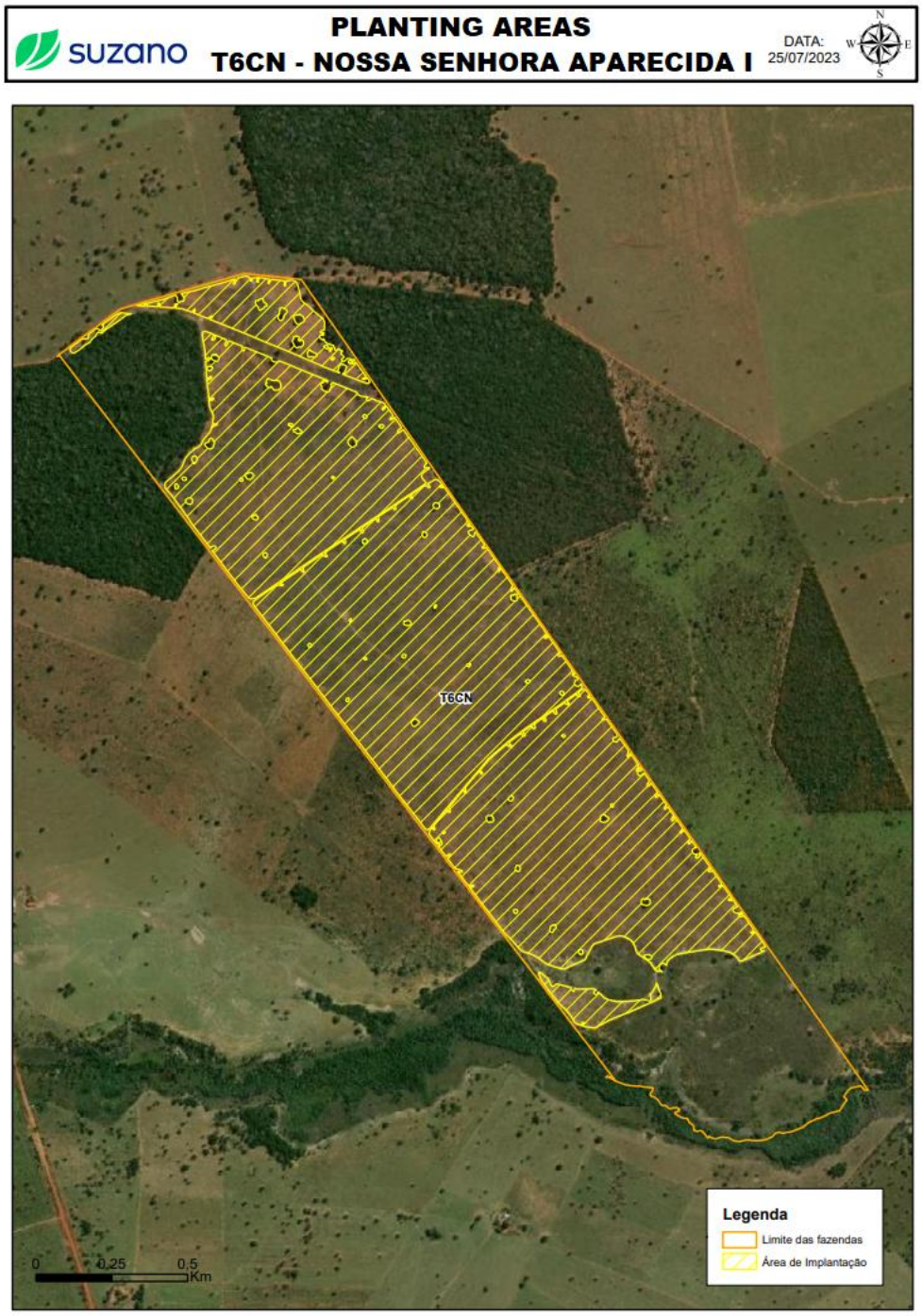


Figure 54 - Location and stratification of Nossa Senhora Aparecida I. Eucalyptus plantation area highlighted in yellow.

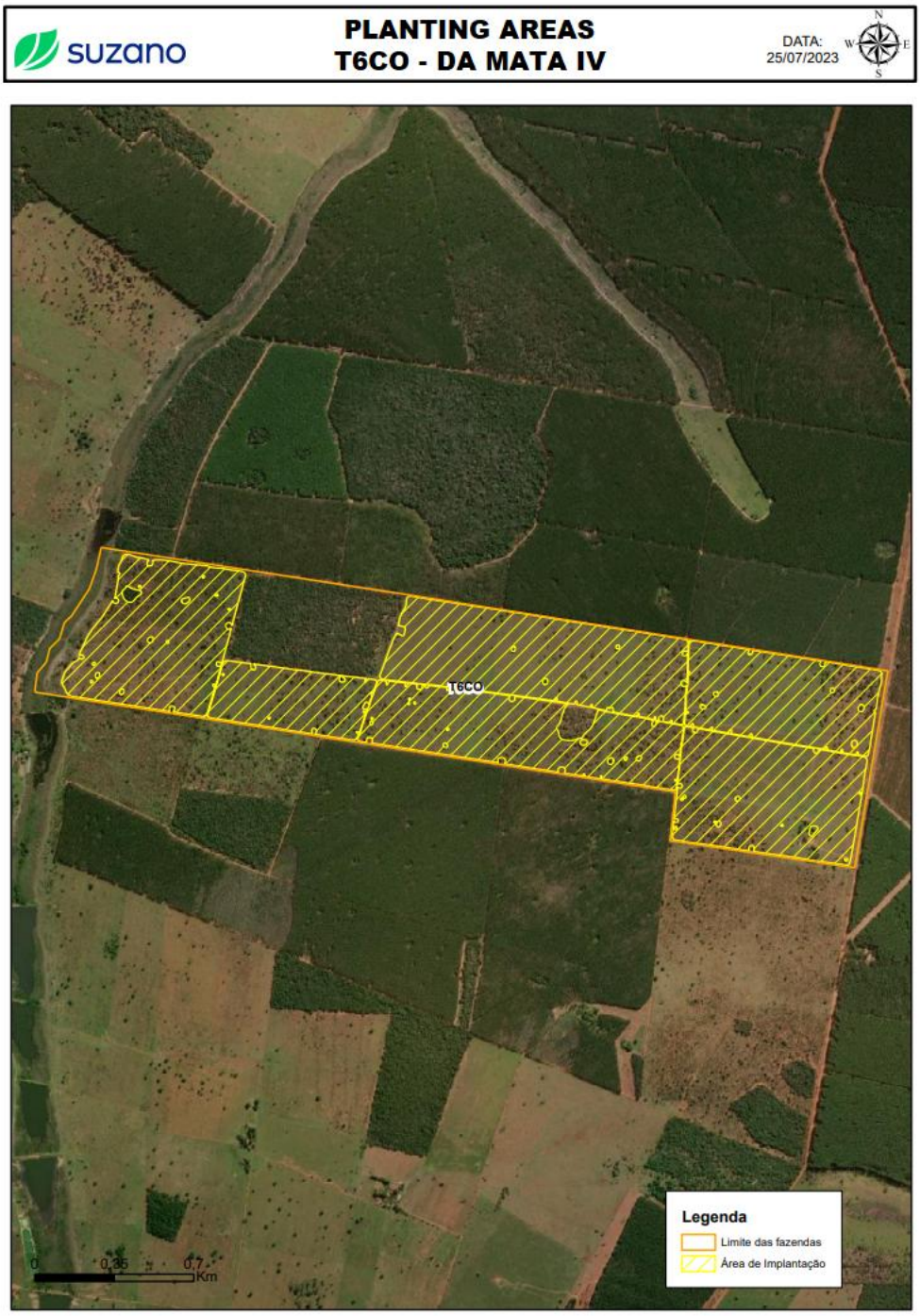


Figure 55 - Location and stratification of Da Mata IV. Eucalyptus plantation area highlighted in yellow.

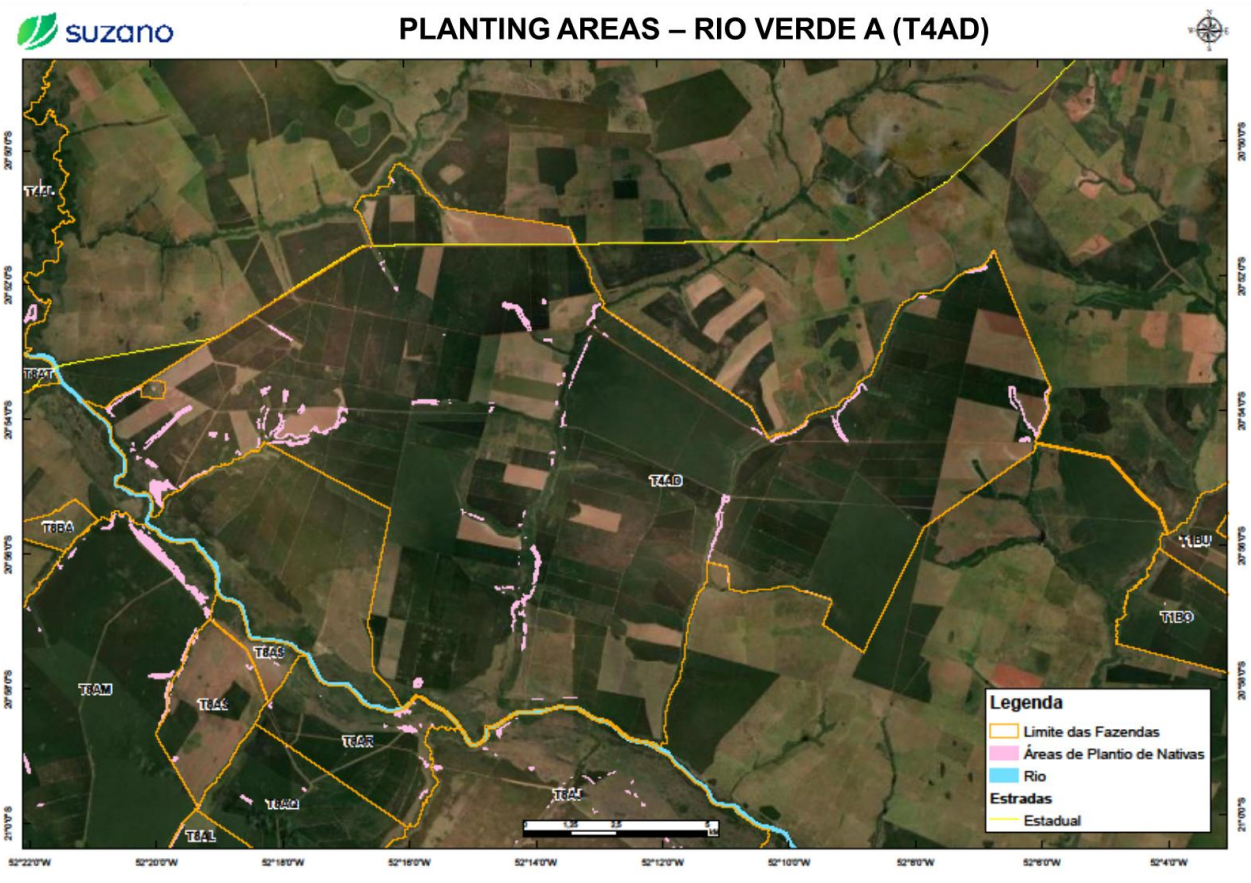


Figure 56 - Location and stratification of Rio Verde A. Eucalyptus plantation area highlighted in yellow.



Figure 57 - Location and stratification of Rio Verde B. Eucalyptus plantation area highlighted in yellow.



Figure 58- Location and stratification of Esperança. Eucalyptus plantation area highlighted in yellow.

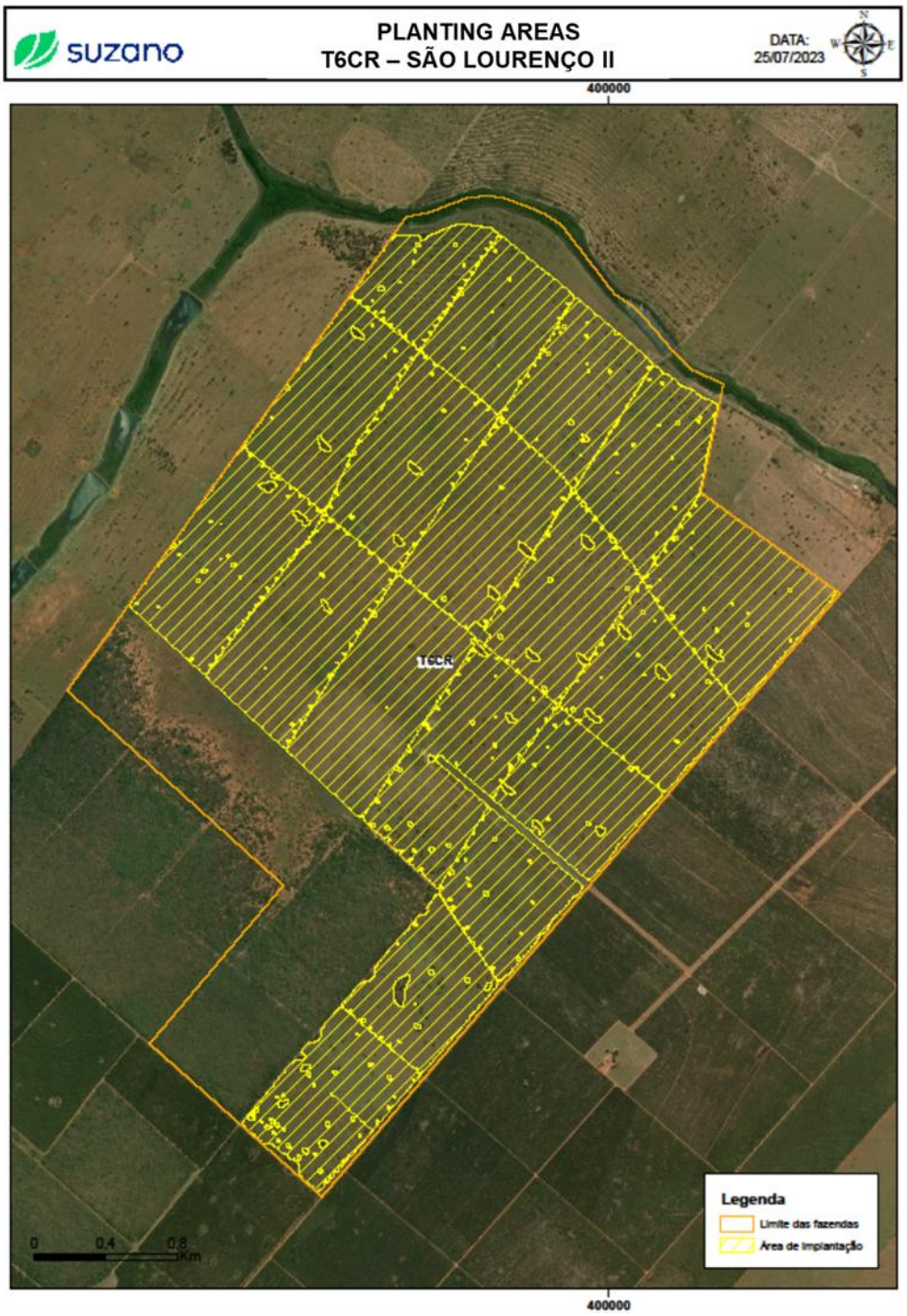


Figure 59 – Location and stratification of São Lourenço II. Eucalyptus plantation area highlighted in yellow.



Figure 60 - - Location and stratification of Mariana. Eucalyptus plantation area highlighted in yellow.



Figure 61 - Location and stratification of São Lourenço III . Eucalyptus plantation area highlighted in yellow.

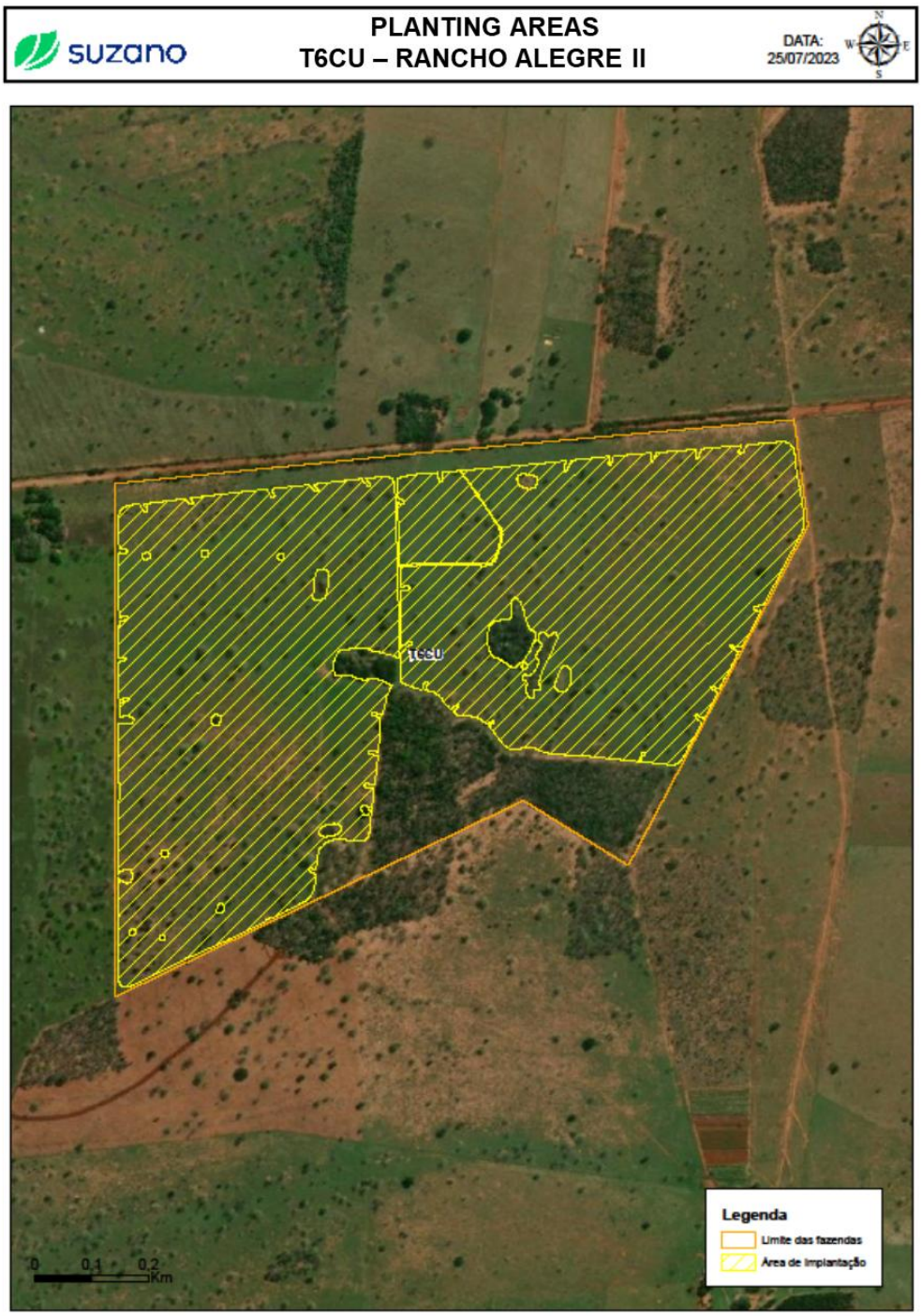


Figure 62 - Location and stratification of Rancho Alegre II. Eucalyptus plantation area highlighted in yellow.



Figure 63 - Location and stratification of Lua Cheia. Eucalyptus plantation area highlighted in yellow.

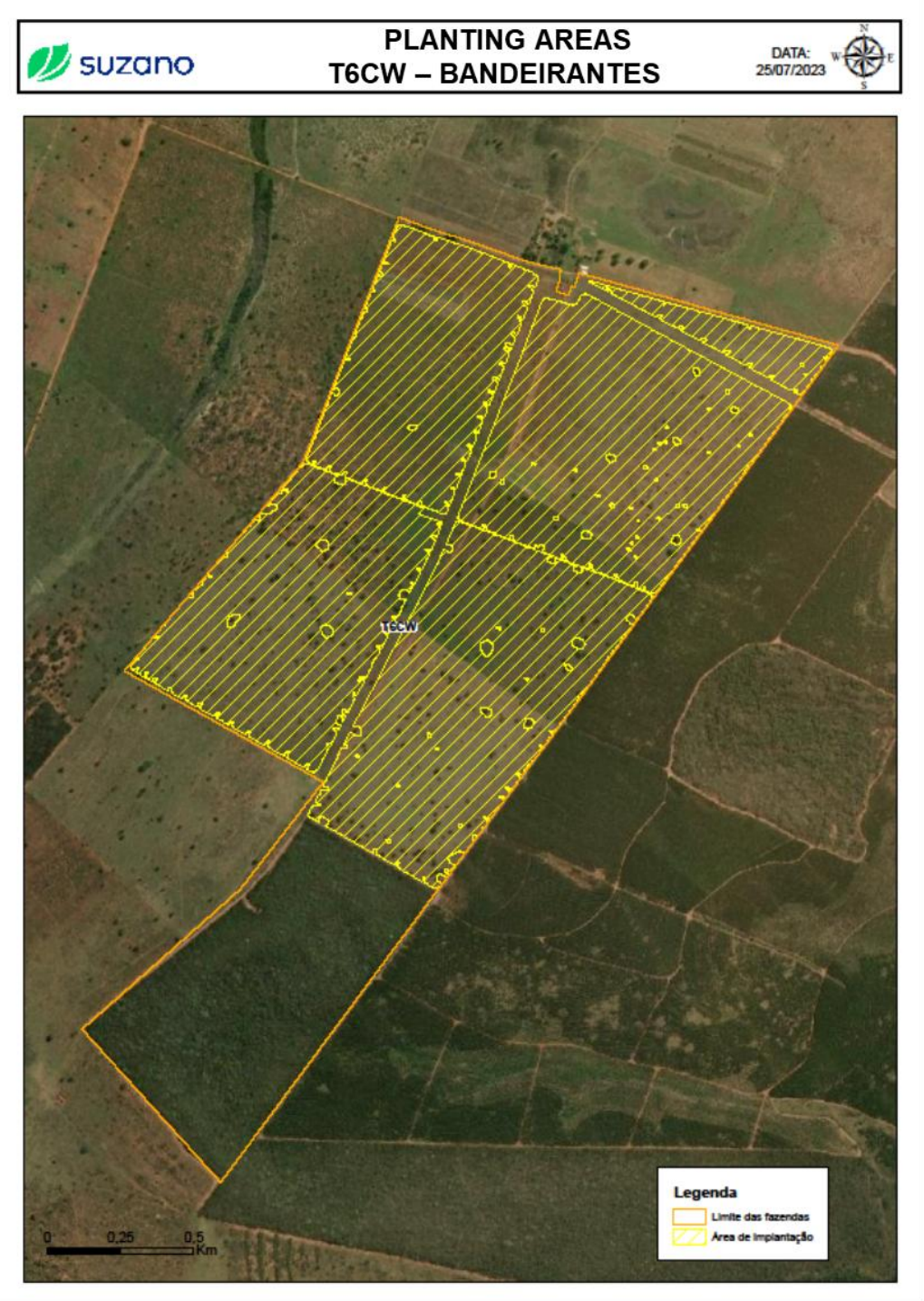


Figure 64 - Location and stratification of Bandeirantes. Eucalyptus plantation area highlighted in yellow.

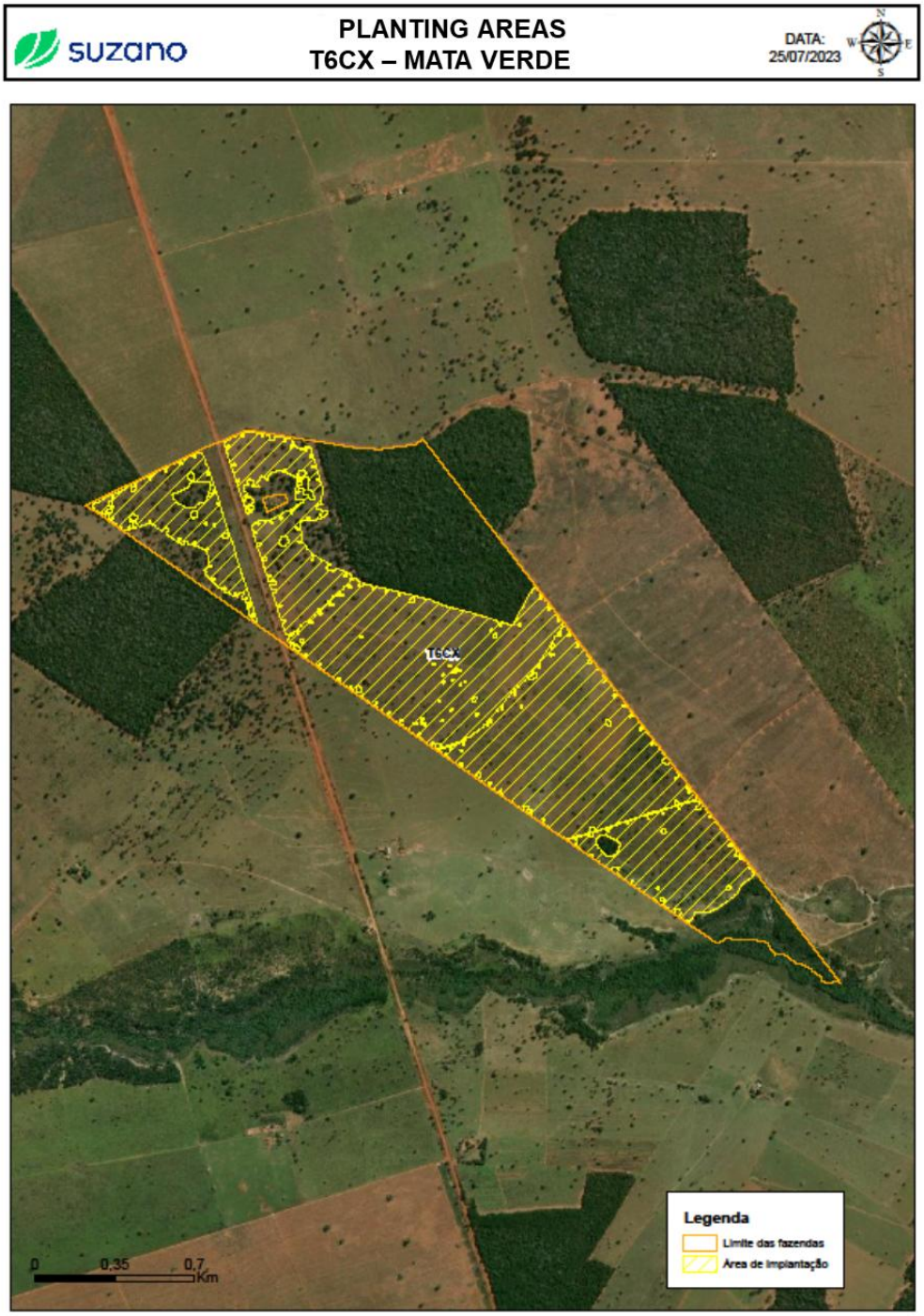


Figure 65 - Location and stratification of Mata Verde. Eucalyptus plantation area highlighted in yellow.

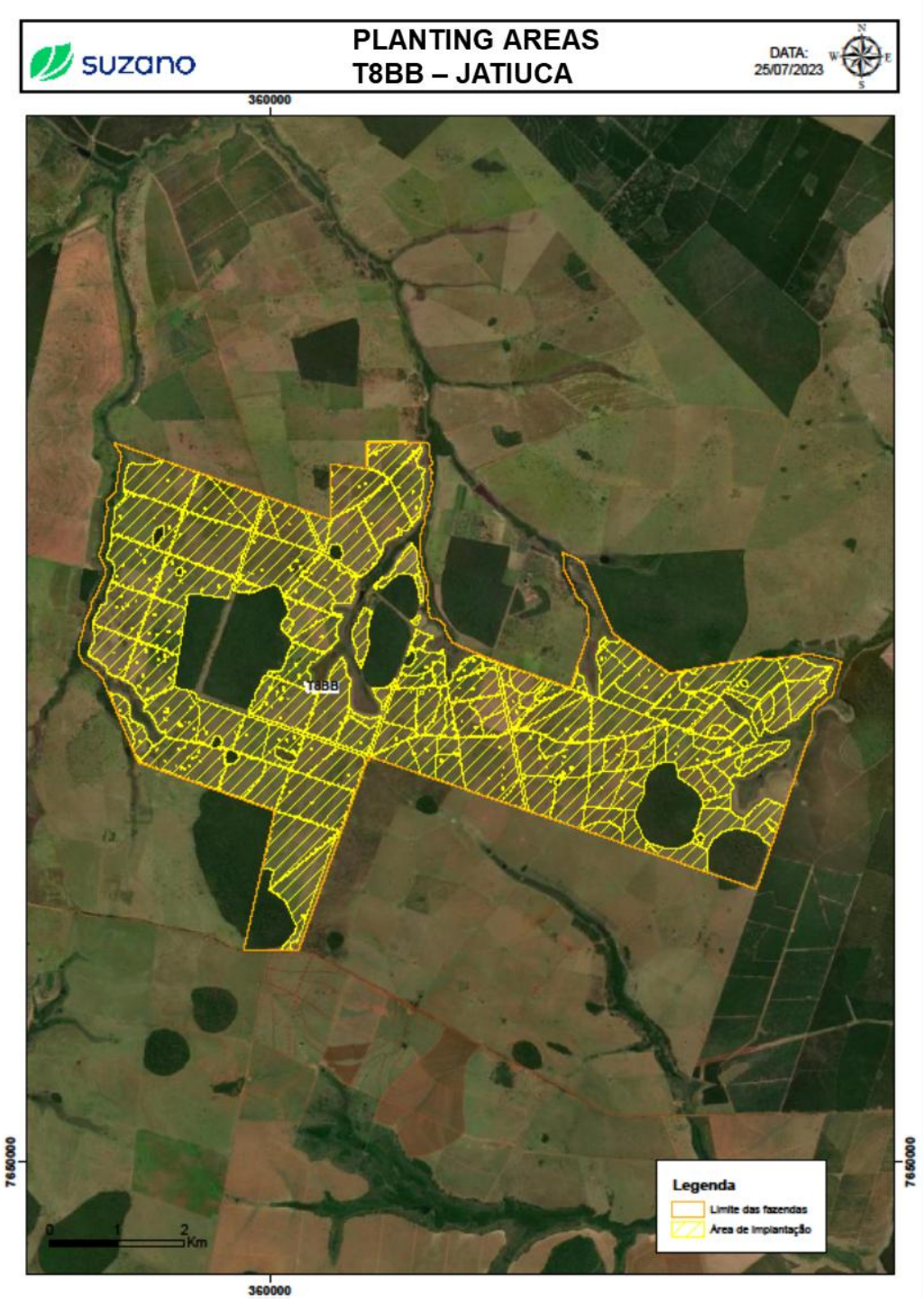


Figure 66 - Location and stratification of Jutiuca. Eucalyptus plantation area highlighted in yellow.

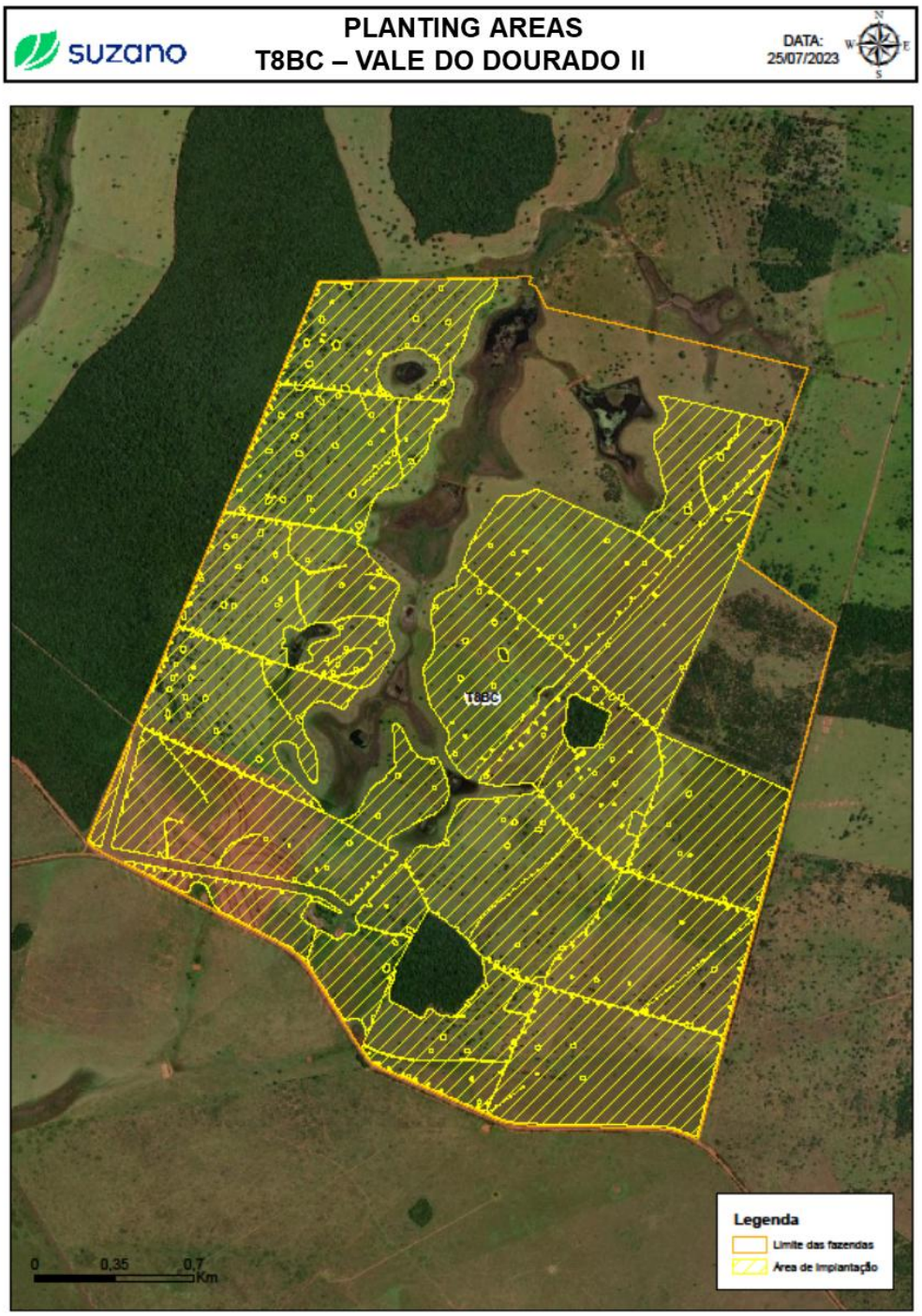


Figure 67 - Location and stratification of Vale do Dourado II . Eucalyptus plantation area highlighted in yellow.



Figure 68 – Location and stratification of Pecuária FRD. Eucalyptus plantation area highlighted in yellow.

1.9 Title and Reference of Methodology

Type (methodology, tool or module).	Reference ID, if applicable	Title	Version
Methodology	AR-ACM003	AR-ACM003 *Afforestation and Reforestation of Lands Except Wetlands*	2.0
Tool		VCS AFOLU Non-Permanence Risk Toll (T-BAR)	4.2
Tool	AR-TOOL02	"Combined tool to identify the baseline scenario and demonstrate additionality in A/R CDM project activities"	1.0
Tool	AR-TOOL14	"Estimation of carbon stocks and change in carbon stocks of trees and shrubs in A/R CDM project activities	4.2
Tool	AR-TOOL12	"Estimation of carbon stocks and change in carbon stocks in dead wood and litter in A/R CDM project activities"	3.1
Tool	AR-TOOL08	"Estimation of non-CO2 greenhouse gas (GHG) emissions resulting from burning of biomass attributable to an A/R CDM project activity"	4.0
Tool	AR-TOOL15	"Estimation of the increase in GHG emissions attributable to displacement of pre-project agricultural activities in A/R CDM project activity"	2.0
Tool	AR-TOOL16	"Tool for estimation of change in soil organic carbon stocks due to the implementation of A/R CDM project activities"	1.1

1.10 Double Counting and Participation under Other GHG Programs

1.10.1 No Double Issuance

Is the project receiving or seeking credit for reductions and removals from a project activity under another GHG program?

☐ Yes ☒ No

If yes, provide required evidence of no double issuance as outlined by the VCS Standard.

1.10.2 Registration in Other GHG Programs

Was the project registered or seeking registration under any other GHG programs?

☐ Yes ☒ No

If yes, provide the registration number and all relevant details including the date of project inactivity in the other GHG program.[3]

1.11 Double Claiming, Other Forms of Credit, and Scope 3 Emissions

1.11.1 No Double Claiming with Emissions Trading Programs or Binding Emission Limits

Are project reductions and removals or project activities also included in an emissions trading program or binding emission limit? See the *VCS Program Definitions* for definitions of emissions trading program and binding emission limit.

☐ Yes ☒ No

If yes, provide all required evidence of no double claiming as outlined by the VCS Standard.

1.11.2 No Double Claiming with Other Forms of Environmental Credit

Has the project activity sought, received, or is planning to receive credit from another GHG-related environmental credit system? See the *VCS Program Definitions* for definition of GHG-related environmental credit system.

☐ Yes ☒ No

If yes, provide all required evidence of no double claiming as outlined by the VCS Standard.

[3] The requirement to provide the date of project inactivity only applies to projects which request registration or crediting period renewal under the VCS Program on or after 1 January 2025.

1.11.3 Supply Chain (Scope 3) Emissions

Do the project activities affect the emissions footprint of any product(s) (goods or services) that are part of a supply chain?

☐ Yes ☒ No

1.12 Sustainable Development Contributions

The Project is responsible for more than just carbon fixation through reforestation. It is in line with the Brazilian NDC, which has a specific topic for the forestry and land use change sectors[4]. The activities developed during the monitoring period contributed to the following SDGs:

In this monitoring period, the Project contributed to the purpose (12) Responsible Consumption and Production, more specific with the 12.5 (By 2030, substantially reduce waste generation through prevention, reduction, recycling and reuse) with the inauguration of Conscious Wall, raising awareness among the population to reduce the environmental impact caused by the incorrect disposal of recyclable materials; purpose (10) Reduce Inequalities, more specific with the 10.2 (By 2030, empower and promote the social, economic, and political inclusion of all individuals, regardless of age, sex, disability, race, ethnicity, origin, religion, or economic or other status) by maintaining gender balance in Corpazul's workforce, with an equitable distribution of men and women; purpose (13) Climate Action, ensuring, together with the first monitoring period, the reforestation of 28,665.25 hectares of a forest coverage preventing the emission of 1,982,616.00 tCO2 (1,710,813.00tCO2 from the first monitoring and 271,803tCO2 from this current monitoring), reducing the vulnerability of ecosystems and communities to climate change, which is intrinsically related to purpose (15) Life on land more specific with 15.1 (By 2020, ensure the conservation, restoration and sustainable use of terrestrial and inland freshwater ecosystems and their services, in particular forests, wetlands, mountains and arid lands, in accordance with the obligations arising from international agreements), with an amount of 28,665.25 ha planted area over project lifetime that has contributed to the recovery of degraded areas, biodiversity conservation and improved ecosystem resilience, with intension to provide ecological restoration with native species on 999 hectares in the state of Mato Grosso do Sul.

[4] MMA. REDD+ e a NDC do Brasil, 2019. Available at: < http://redd.mma.gov.br/pt/redd-e-a-indc-brasileira>. Last Access: 20th October. 2021.

Table 1 - Sustainable Development Contributions

Row number	SDG Target	SDG Indicator	Net Impact on SDG Indicator	Current Project Contributions	Contributions Over Project Lifetime

1)	12.5	Number of initiatives related to Inclusive Recycling	Implemented activities to increase	The inauguration of the Conscious Wall using it as a volunteer waste drop-off point.	Inauguration of Conscious Wall: Inaugurated in June 2023, the Conscious Wall has made significant strides in selective waste collection. Data presented for VVB from 2024 indicates that between January and May, approximately 3,543 kg of materials (including paper, plastic, iron, metal, and glass) were collected. This effort resulted in the generation of 3.54 carbon credits, valued at R$389.40 through the Eu Reciclo reverse logistics program, in which the cooperative participates. With the average value of the collected materials at R$0.90 per kg, this translates to an income of R$3,188.70. In June, there was an additional 916 kg of recyclable material was collected, bringing the total to 4,459 kg of material collected and recycled between January and June 2024.The income generated from the ARR project will continue to be reinvested in enhancing current activities, upgrade equipment and infrastructure, provide personal protective equipment (PPE), and offer training for new members. These improvements aim to boost the productivity of recycled material and income generation.

2)	13.0	Tonnes of greenhouse gas emissions avoided or removed	Implemented activities to increase	271,803 tCO2 removed from the atmosphere from the reforestation with Eucalyptus	1,982,616.00 tCO2 removed from the atmosphere
3)	10.2	Number of people involved in the Inclusive Recycling initiative (i.e.: number of people below poverty line who participated and were benefited from the project)	Implemented activities to increase	48 direct beneficiaries of the initiative, among them 25 are women, 45 are in a vulnerable situation (below the poverty line) and, in terms of racial identification, 19 are self-identify as "pardo" (IBGE classification - Brazilian Institute of Geography and Statistics) and 6 as black.	The inclusive Recycling initiative has been working on the inclusion across economic status, particularly among individuals living below the poverty line. Among the 48 direct beneficiaries of the project, 25 are women, 45 are in a vulnerable situation (below the poverty line) and, in terms of racial identification, 19 are self-identify as "pardo" (IBGE classification - Brazilian Institute of Geography and Statistics) and 6 as black.
4)	15.1	Number of hectares of forest reforestation	Implemented activities to increase	By planting 14,315.54 ha of Eucalyptus	28,665.25 ha of planted areas with eucalyptus

1.13 Commercially Sensitive Information

Section	Information	Justification
5	Project budget statements	The project budget statements used to demonstrate that Suzano has the financial means to secure the project until it reaches breakeven are internal company documents.

2	Land ownership documents	Land ownership documents, such as leases and land acquisition contracts for the development of project activities, are confidential to the company and cannot be made public.

2 SAFEGUARDS AND STAKEHOLDER ENGAGEMENT

2.1 Stakeholder Engagement and Consultation

2.1.1 Stakeholder Identification

Stakeholder Identification	Local Stakeholders were identified by Suzano, through its social inventory, which observes directly onsite and conduces interviews with local people and is conducted every 4 years, and are composed of any interested person, group of people or entity which may be subject to the impact of its activities. The information of these stakeholders is updated by the Social Development Area, and vary according to the party in question, as outlined in the Relationship Management Manual. The Manual establishes that, for a proper understanding of the reality and social context in which the company operates, all settlements located within a radius of up to 3km from the limits of the operational unit must be identified and characterized using objective parameters of concrete conditions of existence. As shown in the map below (Figure 69), the stakeholder identified were Piaba Settlement, Paulistinha Settlement, Almanara Settlement, Aparecida do Taboado municipality, Ponte Velha Community, Montana Settlement, Brasilândia municipality and Arara Azul Cooperative (CORPAZUL) represented by Bairro Vila Maria in the map, which is the district where the organization is situated. As the main beneficiaries of the Inclusive Recycling Project, the Arara Azul Cooperative (CORPAZUL) plays an essential role in the carbon project, promoting the circular economy,

	sustainability, social inclusion and income generation in the region where it operates. CORPAZUL is the institution responsible for the destination and segregation of recyclable materials from selective collection, located in the district of Vila Maria. The partnership includes environmental education initiatives, trainings and creation of new alliances to ensure the proper disposal of waste, strengthening cooperativism and expanding positive impacts for the community.
Legal or customary tenure/access rights	The project areas are owned or leased by Suzano S.A. and its controlled companies. Therefore, Suzano is the project owner and proponent. As part of the assessment procedure for selecting new properties, the property deeds for each property are assessed by Suzano to guarantee they comply with all legal requirements, and documents are available in the project files. The project is implemented on private properties and do not impact local stakeholder's property rights, Suzano has a procedure for solving conflicts on land use claims and rights, which is based on prioritizing an amicable resolution between the parties.
Stakeholder diversity and changes over time	With the inclusion of the new instances in this monitoring period, stakeholder identification was updated, and 8 communities were identified within a 3km radius of the ranch boundaries (including communities from the first instances and new instances). No variations or changes in stakeholder diversity have been identified since the last monitoring.
Expected changes in well-being	Improve community income, and to develop, give strength and foster the organized production of cooperatives at the project region, improvement of public health by helping the government to deal with solid waste, reducing the amount of waste disposed on the landfills, improving knowledge. Also, with social activities, as described in section 3.1, project activity expects to humanize and integrate waste pickers and raise awareness among the population to

	reduce the environmental impact caused by the incorrect disposal of recyclable materials. By plantation of native species outside APPs and RLs areas, projected expect to increase biodiversity and rehabilitation of degraded areas. No impacts on resources identified as important to stakeholders have been identified.
Location of stakeholders	Municipality of Três Lagoas e Brasilândia, at Mato Grosso do Sul, Brazil. The social actors identified by the carbon initiative are located outside the Project Area, as shown on the map below. It is expected that these stakeholders will be indirectly and positively impacted by the project, especially regarding the climate, social and environmental benefits of the initiatives implemented and developed by the project's actions. Additionally, they are continuously communicated with and integrated by Suzano SA's Social Development team on the progress of activities locally. In addition, as detailed in item 2.1.4, the stakeholders are supported by an active communication channel so that they can forward complaints, impacts, doubts and compliments about the carbon project to the company. It is worth noting that the project areas belong to Suzano SA. (whose property documents were shared with VVB) and those leased by the company have legal agreements signed with their respective owners (documents also provided to VVB for analysis).

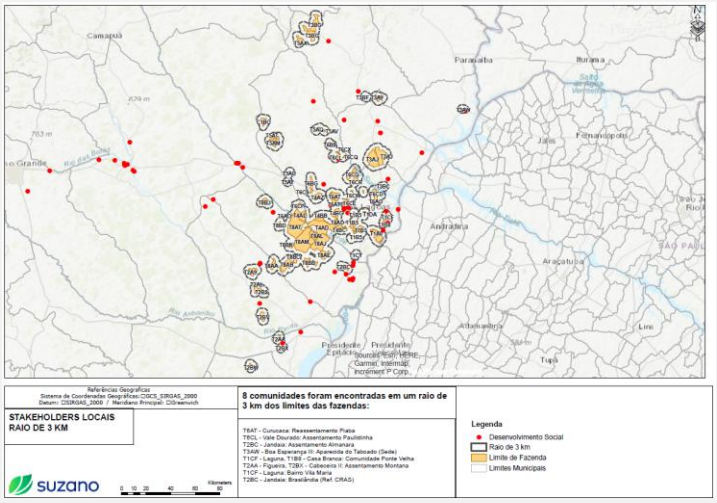


Figure 69 Location of stakeholders near the project area

Location of resources	Location of territories and resources which stakeholders own or to which they have customary access also at municipality of Três Lagoas e Brasilândia, at Mato Grosso do Sul, Brazil (Figure 69). As explained in the previous section, the communities identified are not dependent on resources from the Project Area. It should be noted that the properties included in the carbon initiative belong to Suzano SA. and those leased by the company have legal agreements signed with the respective owners. In addition, stakeholders are expected to benefit positively from the Project's activities, especially in relation to climate, socioeconomics and biodiversity.

2.1.2 Stakeholder Consultation and Ongoing Communication

Ongoing consultation	The local stakeholder consultation targeted two main publics: local authorities and local communities. The communication was contacted via e-mail, where a draft of the PD was sent, as well as a copy of the flyer developed to help understanding key concepts of the ARR Horizonte Carbon Project. Suzano also informed a specific e-mail for responding to any questions and clarifications requested

	and to maintain ongoing communication with this public. No relevant comments that could impact project design were received before the Project validation. The local community consultation was led by a trained team on how to present the Project and solve most frequently asked questions, which counted with a set of resources to better explain to the community how ARR carbon projects works, and the activities to be carried out. In addition, the communication channels for receiving incidents (ombudsman, e-mail, on-site, satisfaction surveys, etc.).
Date(s) of stakeholder consultation	26-July-2022 to 28-July-2022 and 13/05/2024 to 01/07/2024
Communication of monitored results	The results were communicated through visits to the communities near the project area. During the visits, a flyer (Figure 70) was distributed, informing about the existence of the project, its objectives, and impacts, and providing an e-mail address to contact the Suzano team in case of questions. In addition, a meeting was held with members of the Paulistinha Association, located in the community of Três Lagoas, where the results of the monitoring period were presented through a power point presentation. The attendance list, the consent form, and the document used in the presentation are available to the verification team. All evidence of communication of monitored results through ongoing stakeholder consultation will be shared with the VVB, with a presentation of all sites and communities involved.
Consultation records	During the consultation with local communities, the telephone number of those interested in receiving the video were written down and all questions raised were answered on time. To guarantee the ongoing communication and clarification of any questions, Suzano informed a specific email (creditosdecarbono@suzano.com.br). Suzano also has a continued operational procedure named operational dialogue, where neighbor properties and social entities are frequently visited, following an annual plan developed by

	Suzano Social Development team to contact such stakeholders in a period of 60 to 30 days before operational procedures, to inform about the operation to be conducted, its start and end date, Suzano's contacts, any possible impacts (positive and negative) of the operations on local community, and any preventing or mitigative action to be adopted. All meetings are recorded through a presence list, GPS, images, and the filling of a form. All evidence of consultation records through ongoing stakeholder consultation will be shared with the VVB, with a presentation of all sites and communities involved.
Stakeholder input	There were no requests from stakeholders for benefit sharing. Despite this, stakeholders benefit indirectly since the project contains climate, environmental and also social benefits, such as the Conscious Wall, previously mentioned in section 1.12. Therefore, during the monitoring cycle, no relevant comments were received that could have an impact on the design of the project.



Figure 70 The ARR Horizonte Carbon Project flyer used on onsite local stakeholder consultation.

2.1.3 Free, Prior, and Informed Consent

Consent	As explained in section 2.3.4, all the areas included in the project are owned by Suzano or are under a lease agreement. Therefore, all the lease documents for the areas will be made available to the VVB team to prove the common agreement between the parties. Local communities are not reliant on the project area. Nonetheless, local community was consulted, as outlined under section 2.1.2 above. The communities identified are continuously communicated with and integrated by Suzano Social Development team on the progress of activities locally. In addition, as detailed in section 2.1.4, the stakeholders are supported by a communication channel so that they can send complaints, impacts, doubts and compliments about the carbon project to the company. In this sense, social actors are expected to be indirectly and positively impacted by the project, especially with regard to the climate, social and environmental benefits arising from the project's actions.
Outcome of FPIC	Not applicable, because, as explained in section 2.3.4, all the areas included in the project are owned by Suzano or are under a lease agreement.

2.1.4 Grievance Redress Procedure

Suzano has a social impact management model that seeks to eliminate, reduce or compensate for negative impacts through management practices, socio-environmental investments and ongoing control and mitigation actions. The procedure for identifying and evaluating social aspects and impacts developed by Suzano classifies and prioritizes the significant aspects and impacts in the anthropic environment, in addition to defining the need for controls, guidelines and/or monitoring according to their significance. According to this procedure, all the relevant social impacts associated with Suzano's various operational processes and activities are mapped and classified in terms of relevance. For every

significant adverse impact identified, measures are defined to avoid, minimize, monitor and repair the damage.

Every year, the Local Shared Value Committees of each Unit assess the need to revise the social impact matrix, taking into account the results of the monitoring and critical evaluation of stakeholder relations processes.

All pertinent demands must be assessed and validated with operational areas, and inserted at the SISPART (Sistema de Partes Interessadas, in Portuguese). The implementation of the actions is a responsibility of forestry operations at the region. The Social Development area must send its socioenvironmental recommendations to operational areas. The Social Development area is also responsible for assessing the effectiveness of the activities implemented with the community and representative entities.

As an essential part of its relationship management process and in keeping with the principle that "it's only good for us if it's good for the world", Suzano monitors the adverse social impacts - potential and real - resulting from its activities on the communities surrounding its operations, as well as studying and implementing the most appropriate mitigation measures for each case. The relevance of the impacts is defined by applying the Social Impact Matrix, which weighs up factors such as severity, frequency, probability, and scope of the impacts identified.

In cases where the forestry operations surpass a period of thirty days, the Social Development area must assess the effectiveness of the operations implemented, and all non-compliances must also be registered at SISPART. It is important to highlight that all workers involved in the project have received information about their rights. This is a standard procedure for the project proponent, conducted by the Human Resources team (HR) every time a worker is hired by the company, where a power point presentation with all rights and benefits is shared and communication lines are indicated for solving any questions.

In addition, Suzano has specific guidelines for all stakeholder incidents (complaints, doubts, compliments, suggestions, opinions, and others) and a template for an out-of-court agreement when necessary to reach a consensus between the parties. The communication channels for receiving incidents (ombudsman, e-mail, on-site, satisfaction surveys, etc.), the procedures for dealing with and evaluating incidents, as well as the actions that must be taken for each incident received, and monitoring, where the adherence of the actions taken is evaluated. The documents were made available to the VVB team.

Below are the main occurrences recorded in the region covered by the Project, as well as the respective treatments adopted for each case. The other impacts, as well as those discussed in the table below,

follow Suzano's systemic flow of impacts, which includes the steps: 1. Receipt of the situation; 2. Assessment; 3. Communication; 4. Action and 5. Closure. Additional information, including specific details about all occurrences and their respective outcomes was shared with the VVB.

Grievances received	Resolution and outcome
Smell from the industrial plant	1. Service provided by the technical team, with information sent to the plant coordinator for analysis via Relacione+ and direct contact with the factory coordinator. 2. Service via RPO (Smell Perception Network), 0800 channel: At the time of service, the preliminary form of the Smell Perception Network is filled out and sent to the plant coordinator for analysis and monitoring of the perception of smells characteristic of the plant. 3. RPOi – Internal Smell Perception Network: composed of all plant employees, trained to identify smells. 4. Upon receiving the communication, the plant coordinator immediately activates the environmental inspection route of the Operational Team. After the routes are finalized, the factory coordinator must fill out the necessary forms and forward them to the Industrial Environment Team and the person responsible for the Relacione+ system of the Social Development Team by email. 5. Upon receiving the plant coordinator's failure analysis report, the Industrial Environment Team must check the notes made, search for meteorological data from the same period from the three meteorological stations belonging to the unit and check the atmospheric modeling in the “Aria View” system. 6. After this assessment, the Industrial Environment Team considers the communication as valid, possible or not valid and the plant coordination department responds to the communicators.
Damage to property (public and private)	1. Contact the responsible operational area to assess the ocurrence (carried out by the Social Development Team);

	2. Conduct an on-site visit by the operations team to verify the origin of the grievance; 3. If the damage is confirmed, hire the labor and materials necessary to perform maintenance, repairs or fix the damage. Note: If there is a work front already in operation on site, the response time is reduced, allowing the demand to be met more quickly and minimizing inconveniences to the community or neighborhood.
Fence Agreement	1. Contact the responsible operational area to assess the possibility of an agreement with the neighbor (carried out by the Social Development Team); 2. Conduct an on-site visit by the operations team to check the condition of the fence; 3. Purchase the necessary materials and arrange for documented delivery to the applicant, if the agreement is signed. Note: This classification is not considered an impact. The fence agreement is requested by the neighbor when the contracted fence footage has deteriorated due to time and weather conditions, in order to prevent future problems for them. This is an agreement in which Suzano supplies the material, and the labor is the applicant's responsibility.

2.1.5 Public Comments

The public comment period on Verra's website for the first verification cycle took place between 08/08/2022 and 07/09/2022. The comments received during this period were promptly answered in a document made available to the certifier and VVB. Below is a summary of the questions answered, and the actions taken:

- Completion of the baseline emissions calculations disclosed in section 4 of the Joint PD and MR document;

- Due diligence for the inclusion of new areas throughout the project's life cycle by the developer, ensuring compliance with all the legal requirements of Brazilian legislation;
- Disclosure of information on Local Stakeholder Consultation and Safeguards in sections 2.2 and 2.5 of the Joint PD and MR document;
- Clarification of the contributions of social activities to the reduction and removal of GHGs and ratification of the dependence on carbon credits for the implementation of these initiatives;
- Strict compliance with all the requirements set out in the additionality tool (AR-AMTOOL02);
- Confirmation that the ARR Horizonte Carbon Project does not have multiple activities.

Additionally, according to the table below, it is stated that no comments were received outside the public comment period for the second verification cycle of the ARR Horizonte Carbon Project.

Summary of comments received	Actions taken
No comments were received outside the public comment period.	No action required.

2.2 Risks to Stakeholders and the Environment

2.2.1 Management Experience

Suzano's management team includes people with significant experience in the skills necessary to successfully undertake the project activities, as Julio Cezar for Carbon Initiatives and Rodrigo Zagonel for Forest Operations and Henrique Ferraço Scolforo for Forestry Inventory and Carbon Estimation. Another person who is worth mentioning is José Luiz Stape, who published more than 110 articles in specialized venues, and 3 books, aside other contributions to the literature. Clara Sant'Anna also composes the Suzano's team, with more than 10 years of experience on environmental activities focused on native vegetation.

Nevertheless, Suzano has a well stablished structure, with different management areas specialized on the business, to ensure every step of the process is dully covered, as Biodiversity Monitoring Team, GIS Team, Monitoring Team of Alerts and Fires and Social Development Team. N and no member of the management team has ever made a mistake associated with not submitting a loss report within two years of detecting a loss event, as no loss event has ever occurred in any project developed by the team members.

Still about the management team, the entire team involved in the project is based in Brazil, the country where the project is located, and part of the management team is present less than a day away from the

instances that are part of the project. This team consists of Danielle Vasconcelos, Clara Sant'Anna, Henrique Scolforo, Renan Carvalho, Breno Gois, Rodrigo Zagonel, and Adriano de Arruda, all of whom are focal points located close to the project area and are responsible for various activities such as geoprocessing, forestry operations, inventories, restoration activities, communication with stakeholders, and other activities.

The CV information of the entire project management team is shared with the VVB, some of whose members are shown below:

Suzano's Team for Carbon Initiatives (Project Proponent)

Julio Natalense - Julio Natalense is the global responsible for carbon initiatives at Suzano S.A. These activities include maintaining a pipeline of potential projects and a project management strategy, developing selected projects to implementation, validation, monitoring and verification, relationship with target customers and partners, and interaction within the company, in special aligned with the long-term sustainability goals (biodiversity, reduction of poverty, emission reductions, among others). He´s been working at Suzano since 2020.

Julio is a professional with a well-developed 37 year career in the industry. He started his career as a chemist at the Dow Chemical Company, working at the R&D centers in São Paulo, Brazil, and Freeport, (TX) USA. Later in 2013, he moved to Rio de Janeiro as a Technical and Sustainability Leader for Dow Sports and Olympic Solutions, as part of the company activites as Global Olympic Partner of the International Olympic Committee. After the games, Julio became the Corporate Sustainability Leader for Dow in Latin America, as member of the global sustainability team. His activies included overseeing the sustainability strategy for the entire company in the region, including basic and specialty chemicals, plastics, agrochemicals, feedstocks, and energy.

He holds a BSc in Chemistry – Mackenzie University, Brazil, 1989-1992, MSc in Nuclear Technology, expertise in Technology Roadmaps, University of São Paulo 2009-2013, and an MBA, Heriot Watt University, Edinburgh, Scotland, 1999-2000. He is a certified Sigma Black Belt, Six Sigma Green Belt, Houston (TX), 2001.

Language proficiency: English (Toefl iBT, 105/120 - 2018).

More information: https://www.linkedin.com/in/julionatalense

Ana Luiza dos Santos - Ana Luiza is a geographer graduated from the Federal University of Alfenas (UNIFAL/MG) with master's degree in Geography from the Federal University of São João del Rei (UFSJ) and Specialist in Geotechnology with experience in automatic and semi-automatic mapping processes using satellite images and changes detection in land use. During the master's degree she carried out a period of research at the Limerick Institute of Technology in Ireland, having worked with geotechnologies for land use mapping and its relation to environmental changes, especially in water. At Suzano, she has experience with forestry planning and works with the Carbon Initiatives team in the development, certification, and monitoring of AFOLU projects for the carbon market, especially in the ARR scope. In addition, she works directly with startups to generate and apply geotechnologies in carbon projects.

Taisi Bech Sorrini - Taísi is an Agricultural Engineer graduated from the Escola Superior de Agricultura Luiz de Queiroz – University of São Paulo (ESALQ/USP), master's in forestry sciences from the same institution and Specialist in Environmental Conservation and Sustainable Development from ESCAS/IPÊ (Professional Master's Degree). She has experience in planning, managing, implementing and evaluating technical projects for the conservation and recovery of forest ecosystems, with a focus on ecological restoration. At Suzano SA., she works with the Carbon Initiatives team in the development, certification and monitoring of AFOLU projects for the credit market, especially the ARR scope. She was a member of the design and registration team for the Corridors for Life ARR Grouped Project (voted the best carbon project in the world by Environmental Finance in 2022)

WayCarbon's Team (developer)

Felipe Bittencourt – CEO of WayCarbon: graduated in Civil Engineering from the Federal University of Minas Gerais (2005) and in History from the Claretiano University Center (2016); holds a Master's Degree in Climate Change from the same institution (2007), a postgraduate degree in environmental law from Estácio (2018), and a PhD in Climate Change from the University of Oxford (2009) and in Climate Change from the Federal University of Minas Gerais (2011). He built his career around the Climate Change agenda, with diverse experiences. He started as a civil engineer at OEC for one year (2005). In 2006, he joined WayCarbon as Business Director, and was responsible for the Commercial, Marketing and New Business areas for 15 years. He then took over as CEO of WayCarbon, leading the team in their goal of driving low- impact savings. During his time at WayCarbon, he was a Climate Change consultant (2013 – 2014) at the United Nations Development Programme, a local consultant for Brazil at the World Bank Group (2012 – 2016), where he worked on the Energy Efficiency in Cities project.

Paulo Machado - Director of Finance and People: With a degree in Business Administration from Fundação Armando Álvares Penteado (FAAP), Paulo has over 30 years' experience in finance. He has worked in several companies and held various positions throughout his career, most recently as a member of the Project Finance team at Banco Santander Brasil, CFO at Fiserv Brasil, independent financial consultant, CFO and partner at Consenso Participações, as well as Director of Structured Finance at BBVA Rep Office in Brazil and Director of Financial Control at BBV Banco - Wholesale Banking. He has also worked at JPMorgan, Santander Investment and Arthur Andersen. He is currently CFO of WayCarbon Soluções Ambientais e Projetos de Carbono S.A.

Breno Rates – Director of Carbon Projects: Breno holds a degree in Biological Sciences from the Federal University of Minas Gerais (2001 – 2005); a master's degree in Biochemistry and Immunology from the Federal University of Minas Gerais (2005 – 2006), and a PhD in Biochemistry from the Federal University of Minas Gerais. He began his career as a managing partner of MundusCarbo (2006 – 2010). Then, he started working for WayCarbon, initially as a managing partner (2011 – 2022), assuming the position of Director of Carbon Projects, in 2022, which he holds until the present date. During his professional career, he has accumulated a lot of experience in carbon projects and greenhouse gas accounting. As a WayCarbon professional, he worked both with design, development and application of digital products, as well as with the development of carbon credit projects.

Henrique Pereira - Director of WayCarbon: Henrique holds a bachelor's degree in international relations from the Pontifical Catholic University of Minas Gerais, a master's degree in environmental technologies from the School of Engineering of the Federal University of Minas Gerais and a master's degree in Environment and Development from the London School of Economics and Policital Science. Henrique also holds executive certificates in Leadership from the Dom Cabral Foundation (FDC) and in Climate Change and Energy Policy from the Harvard Kennedy School of Government. With 17 years of professional experience, he has relevant professional experience in projects related to climate change, developed for governments and private companies in Latin America and Africa. Henrique has extensive experience in AFOLU as a project manager and technical consultant. In particular, he has developed afforestation and reforestation (A/R) offset projects in Brazil for VALE S.A (Vale Florestar) and Arcelor Mittal (Arcelor PPF) and REDD+ projects in Africa, including the first blue carbon (Floresta de Mangue) to issue carbon credits (Community avoided deforestation project in Guinea-Bissau). In addition, Henrique has experience in Forest Policy, Financing and Conservation Monitoring, Verification and Reporting (MRV) systems in FAO and Critical Ecosystem Partnership Fund (CEPF) works. Between 2008 and 2013, Henrique worked for the World Bank as a climate change specialist in the African region and in the management of climate change. Henrique's ability to work in complex contexts and projects, together with his communication and interpersonal skills, gives him a strong competence to lead and work in diverse teams and manage projects that require engagement with various stakeholders.

Camilla Paulino – Carbon Project Consultant: Camila holds a degree in Forest Engineering from the Federal University of Goiás (2019), a specialist in Forest Management from the Federal University of Paraná (2021). Since 2021, she has been working on the elaboration, implementation and monitoring of AFOLU carbon projects. In this sense, in order to improve project management techniques and tools, I received an MBA in Project Management from the University of São Paulo, where I conducted research on the importance of Stakeholder Management in REDD+ Projects. During the MBA in Forest Management, she carried out hers Final Paper with the theme: REDD+ is the hottest color, where she analyzed Brazilian REDD+ projects and the country's potential against this agenda. She has 3 years of experience with REDD+ projects and nature-based solutions (NbS) and in-depth knowledge in the main standards and methodologies of AFOLU carbon projects. At WayCarbon works with AFOLU Carbon Project Development (ARR and REDD+) and nature-based solutions for climate change mitigation.

Ciro Vaz - Ciro Vaz is a consultant focused on NBS Projects, with more than 10 years of professional experience in international groups (FAO - United Nations), non-governmental administrations (IBIO - Bioatlantic Institute), Water Resources Management Agencies (AGB Peixe Vivo), Technology-Based Companies for Climate Change (WayCarbon), International and National Environmental Consulting Companies (Ecosecurities and COBRAPE), and Public Agencies (INEA/RJ). Bachelor in Geography and master's in environmental engineering from UFMG, and PhD in Geography from UFRJ, he developed during his academic and professional life management of environmental and sustainability activities that resulted in a solid experience with the areas of forest carbon, blue carbon, climate change, modeling of environmental systems, territorial planning, water resources and management of similar projects. Currently, Ciro Vaz is part of WayCarbon's team of consultants and works on the development of forest carbon projects.

Rafaela Guimarães – Data Specialist: Rafaela is a Biologist from the Federal University of São João del-Rei (2012), has a Professional master's degree in environmental technologies and Innovations from the Federal University of Lavras (2014), a Ph.D. in Applied Ecology from the Federal University of Lavras (2019) and an MBA in Data Science & Analytics from the University of São Paulo (2024). She has been working for more than 10 years on projects related to Nature-Based Climate Solutions (NbS), focusing on the areas of Conservation, Sustainability, Ecological Restoration, Landscape Ecology, Spatial Data Science, and Consulting. She had experience as an environmental analyst with the environmental agency and as a consultant providing services to companies and rural producers. She has a solid experience in the organisation, creation, processing and validation of geospatial data, taking into account technical specifications; design and development of methodologies for project execution, respecting the standards of the organisations involved; application of agile methods; preparation of technical and research reports. Supervising and coordinating environmental projects. At WayCarbon, she has been working on REDD+ and ARR projects for 2.5 years, with in-depth knowledge of the main AFOLU carbon project standards and methodologies, developing technical feasibility studies, PDs (project description), MRs (monitoring reports), participating in audits as well as developing intelligence and solutions for climate change risk and adaptation projects.

Mirelle Souza - Carbon Project Analyst: Mirelle is a Undergrad Chemistry Student at Federal University of Minas Gerais. She has previous experience with projects, having participated in the Rede Candonga, where she worked on a multidisciplinary project with a community affected by the collapse of the Mariana barrage, participating in scientific/environmental divulgation, toxicological environmental analysis, as well as other activities. She also has solid experience in research and development, having taken part in the Minas Gerais Advanced Chromatography Network, where she developed a project to analyze endocrine disruptors in different environments, the main one being water, using two-dimensional gas chromatography. During this research, she also worked on the development of new environmental sampling devices for carrying out these analyses.

2.2.2 Risk assessment

Studies show that even eucalyptus plantations can bring benefits to local fauna and biodiversity[5]. In this sense, to monitor the benefits brought by this project activity, Suzano also monitors and records the appearances of local fauna. At the time of this monitoring period, fauna monitoring was carried out by Casa da Floresta, where endangered species were found in all the groups monitored (Avifauna and Mastofauna). The reports were made available to the VVB team.

Nevertheless, the potential risks identified, and the local community is frequently consulted on the matters, as informed under section 2.1.2. So far, in this monitoring period, no negative impacts have been indicated by the local Community members. It is also worth mentioning that the project will also bring socio-economic benefits for the region.

[5] de Araujo Gabriel, V., Vasconcelos, A. A., de Lima, E. F., Cassola, H., Barretto, K. D., & de Brito, M. C. (2013). The importance of eucalyptus plantations in biodiversity conservation. Pesquisa florestal brasileira, 33(74), 203-213.

	Risk identified	Mitigation or preventative measure(s) taken
Natural and human-induced risks to stakeholders' wellbeing	No risk identified	Considered the project activity (Eucalyptus planting and native vegetation planting), which are based on planting a new forest on a degraded land, there are no potential negative environmental and socio-economic impacts to highlight and mitigate by the project.
Risks to stakeholder participation	No risk identified	As described in sections 2.1.1 and 2.1.2, Suzano has well-established procedures for identifying and continuously consulting with stakeholders to ensure their participation in the project.
Working conditions	No risk identified	Through its Code of Conduct and Ethics, Suzano establishes various principles in order to avoid and mitigate any risk associated with working conditions. Among these principles, Suzano is committed to providing safe equipment and facilities, and always seeks to improve its processes and practices to foster a culture of safety for its employees, any visitors, and other stakeholders. In addition, Suzano complies with labor legislation in the country in which it operates, including in relation to remuneration, benefits, overtime, periodic vacations, and rest, guaranteeing employees fair and safe treatment and working conditions. In this sense, although

		the risks related to working conditions were not flagged in the development of this carbon project, the developer still has a Safety Inspection Program that aims to identify opportunities for improvement that can directly contribute to the elimination/minimization of threatening conditions for the safety and occupational health of workers, advocating compliance with internal procedures, legislation and certification requirements.
Safety of women and girls	No risk identified	As mentioned above, since the only activity of the project is the planting of eucalyptus and native trees, there are no risks to women, girls or other marginalized groups. Nevertheless, Suzano's Code of Ethics and Conduct provides for the awareness and prevention of human rights violations in its activities. The actions of its employees and Suzano's internal policies are developed and defined in accordance with international conventions such as the International Bill of Human Rights, which includes the Universal Declaration of Human Rights, the International Covenant on Civil and Political Rights and the International Covenant on Economic, Social and Cultural Rights, as well as the United Nations (UN) Guiding Principles on Business and Human Rights.
Safety of minority and marginalized	No risk identified	The project's activities are restricted only to the scope of

groups, including children		climate, so there is no associated risk for minorities and marginalized people. Despite this, Suzano, understanding the sensitivity of the topic, carries out various training sessions with all its employees focusing on its Code of Ethics and Conduct, which was developed based on the International Bill of Human Rights, which includes the Universal Declaration of Human Rights, the International Covenant on Civil and Political Rights and the International Covenant on Economic, Social and Cultural Rights, as well as the United Nations (UN) Guiding Principles on Business and Human Rights.
Pollutants (air, noise, discharges to water, generation of waste, and release of hazardous materials and chemical pesticides and fertilizers)	Alterations at the water resources and misuse or overuse of fertilizers; Misuse or overuse of fertilizers in the plantations.	This does not represent a risk for areas with pluviometry above 400mm/year , which is the case for the project city. Nevertheless, at the time of this monitoring period, Suzano monitored the water availability and quality, to ensure no net harm over these resources. For instances that have a water abstraction point, the Certificate of Declaration of Use of Water Resources (DURH) issued by the Institute of Environment of Mato Grosso do Sul (IMASUL) was requested, monitoring the abstraction regime, with the maximum instantaneous abstraction flow, within the requested period. All declarations

		had their declared flow and/or volume automatically assessed and identified as insignificant, so no instance was the subject of a Grant. In addition, Suzano is committed to updating the information with IMASUL in the event of changes or cancellations, thus avoiding the data remaining inaccurate and jeopardizing the water balance. The documents related were made available to VVB team. Suzano has well defined processes and procedures by a specific department of Soil, Nutrition and Forest Management. Thus, it is possible to closely control forest fertilization activities and nutritional monitoring. In the planting areas of the ARR Horizonte Carbon Project, NPK and corrective fertilization were used (as seen in the spreadsheet shared with the VVB team). In specific management situations, if necessary, the Suzano team controls weeds with pesticides, as a measure to help with soil preparation and forest growth. In this sense, it should be noted that, given the initial state of the soil (degraded pasture) and the pace of intensive forestry, in order to achieve forest sustainability,

		nutrient replacement, via mineral fertilization or another alternative source, is essential. However, it is important to note that all soil preparation and maintenance in Suzano's areas is carried out under the premise of minimum cultivation, which is a technique of using as little agricultural machinery as possible when preparing the soil, with the aim of reducing disturbance and compaction6. In the documents "FLORESTAL MS – Aplicação Defensivo", "Florestal corporativo- Manual de treinamento – Silvicultura – Adubação manual" and "Florestal corporativo- Manual de treinamento – Silvicultura – Adubação mecanizada" Suzano establishes guidelines for the preparation and application of fertilizers and pesticides in order to prevent poisoning accidents. Furthermore, in the document "FLORESTAL MS – Devolução de Embalagens" there are guidelines for the control of agrochemicals and fertilizer packaging, with the purpose of reducing related environmental impacts.

2.3 Respect for Human Rights and Equity

2.3.1 Labor and Work

[6] https://canaldohorticultor.com.br/saiba-como-implementar-o-sistema-de-cultivo-minimo/

	Risks identified[7]	Mitigation or preventative measure(s) taken
Discrimination	No risk identified	Through its Code of Ethics and Conduct, Suzano values a diverse and inclusive work environment and prohibits any form of prejudice and/or discrimination, whether based on race, ethnicity, gender, religion, sexual orientation, social class, age, marital status, disability, moral or sexual harassment, among others. To guarantee the effectiveness of the Code of Ethics and Conduct, Suzano promotes wide dissemination of the document, as well as providing an anonymous or non-anonymous ombudsman channel to receive possible complaints, reports or even suggestions for improvements.
Sexual harassment	No risk identified	Through its Code of Ethics and Conduct, Suzano strongly condemns any type of harassment, including sexual harassment, and provides for the application of punishments when necessary.
Gender equity in labor and work	No risk identified	Also, through its Code of Ethics and Conduct, Suzano guarantees that during processes such as recruitment, selection, promotion, and evaluation of its employees, they are assessed exclusively based on their competencies and their ability to meet the expectations of the position.

[7] The identified risks and commensurate mitigation or preventative measure(s) for forced labor, child labor, and human trafficking, must be inclusive of staff and contracted workers employed by third parties.

Forced labor	No risk identified	Suzano prohibits and condemns any form of forced labor, child labor, exhausting working hours, degrading working conditions or restriction of freedom of movement to improve work.
Child labor	No risk identified	Suzano does not allow the employment of people below the age defined by national and international legislation in any activity carried out by the company or its suppliers.
Human trafficking	No risk identified	One of Suzano's values is respect for equality and diversity, and through its Code of Conduct it has made several commitments to the defense of freedom and human rights, pledging to respect, raise awareness of and prevent the violation of human rights in our activities, and to act in accordance with national and international treaties and conventions aimed at protecting people. Furthermore, Suzano SA. values compliance with current labor laws in Brazil throughout the entire process of hiring employees, service providers and suppliers by the company; as well as continuous monitoring of working conditions and labor relations, through internal and external audits. In addition, the company has an active Ombudsman channel for complaints and claims from employees, service providers and suppliers.

		More detailed information can be found at the company's Sustainability Center (https://centraldesustentabilidade.suzano.com.br/en/indicators/?ind=authority-delegation-63f0f99af1f62.)

2.3.2 Human Rights

Risks identified	Mitigation or preventative measure(s) taken
No risks identified	No risks related to human rights violations were identified, reinforcing the company's commitment to maintaining its operations aligned with the best practices and international guidelines. Suzano is committed to respecting human rights and has a series of risk prevention processes related to this issue, recognizing in its Code of Ethics and Conduct the obligation to respect, raise awareness and prevent the violation of human rights in its activities, ensuring that it acts in accordance with national and international conventions. To this end, it applies a risk and opportunity management system aimed at reducing negative impacts and maximizing the positive impacts of the company and its value chain. In this sense, Suzano is constantly improving its due diligence process, mapping and monitoring human rights risks in its operations. Through dialogue and structured processes, Suzano interacts with its stakeholders and seeks to build networks of relationships that make it possible to understand and incorporate socio-environmental information and demands into the company's decision-making process.

2.3.3 Indigenous People and Cultural Heritage

Risks identified	Mitigation(s) or preventative measure taken
No risk identified	No risks to indigenous or traditional communities were identified during the monitoring period, as described in item 2.1.1 and according to the map shared with VVB that analyzed the presence of social actors, with emphasis on indigenous populations, within a radius of 3 kilometers in relation to the location of the carbon initiative, since no such communities were identified in the vicinity of the Horizonte project area. Despite this, Suzano anticipates the possible occurrence of conflicts and conducts its dialogues and engagements respecting the rights provided for in Brazilian legislation and in Convention No. 169 of the World Labor Organization (ILO), respecting the right to usufruct and the use of natural wealth and the goods that exist in them. In conducting these dialogues, it is guided by the Policy for Relations with Indigenous Peoples and Traditional Communities, available on the Suzano website.[8]

2.3.4 Property Rights

Risks identified	Mitigation or preventative measure(s) taken
No risk identified	The project was initially carried out in 40 areas owned or leased by Suzano S.A. and its subsidiaries. During the second verification period 27 new areas were added to the project. All the new areas meet the previously defined eligibility criteria and have the same ownership

[8] https://www.suzano.com.br/sustentabilidade/pessoas/direitos-humanos

	character as the others, owned or leased by Suzano and its subsidiaries. Suzano is therefore the project owner and one of the project proponents. As part of the evaluation procedure for selecting new properties, the title deeds for each property are evaluated by Suzano to ensure that they comply with all legal requirements, and the documents are available in the project archives. Each farm participating in the initial phase of this project is listed below, with the ID of the corresponding CAR document, in compliance with the Brazilian Forest Code.

2.3.5 Benefit Sharing

Summary of the benefit sharing plan	Since all the areas belong to Suzano, or have a lease agreement, there are no impacts on property rights and consequently Suzano becomes the owner and sole beneficiary. All the records of the areas, as well as the lease agreements, will be made available to the validation team as they contain commercially sensitive information. The ARR Horizonte Project aims to generate social benefits from the activities planned in the PDD section 3.5, targeting the local communities to improve their income, ensure work availability and to teach more sustainable practices, ensuring food availability for the entire year.
Benefit sharing during the monitoring period	In this monitoring period, Inclusive Recycling Project has been implemented in June 2022 with the aim of humanizing and integrating waste pickers and raise awareness among the population to reduce the environmental impact caused by the incorrect disposal of recyclable materials. Also, as part of the Nursey for Native and Ornamental Seedling Project, Suzano began contacting an organization, with the aim of setting up a nursery for native seedlings from the Cerrado biome and changing ornamental plants in the rural community, hoping to serve around 40 families.

2.4 Ecosystem Health

	Risk identified	Mitigation or preventative measure(s) taken during the monitoring period
Impacts on biodiversity and ecosystems	No risk identified	To assess the impact of its productive and forestry practices, Suzano SA. has a Biodiversity Monitoring Plan that includes 9 instances of the Horizonte project (Abasto, Barra do Moeda, Brasileira, Campo Limpo, Duas Marias, Formosa, Matão, Rio Verde A and Vista Alegra), 5 of which have identified High Conservation Value Attributes (HCVs). It is worth noting that only Barra do Moeda; Brasileira; Duas Marias; Matão; Rio Verde A and Vista Alegre belong to the aforementioned carbon project. During the assessment periods, the Abasto, Barra do Moeda, Matão, Rio Verde A and Duas Marias farms were characterized as areas of high conservation value. By 2022, different species of fauna and flora were observed, including around 18 species with a certain population vulnerability. The HCVs, by instance, are: Abasto - Attribute 1; Barra do Moeda - Attributes 1 and 2; Matão - Attribute 1; Rio Verde A - Attribute 2; and Duas Marias - Attribute 2). Attribute 1 refers to Concentrations of biological diversity, and Attribute 2 to Ecosystems and mosaics that are significant at a global, regional or national level.

		It is worth mentioning that the frequency of fauna monitoring is annual for the Barra do Moeda farm and every three years for the other sites; at two different times of the year (dry season and rainy season). The frequency of flora monitoring is every two years (at two different times of the year - dry season and rainy season) for the Barra do Moeda farm and every four years for the other sites (only at the end of the rainy season). During the monitoring periods, it was possible to verify that there were no significant changes in the groups of threatened or endemic species and that the HCV areas remain intact over the years, and when specific changes are identified, they are highlighted for monitoring by the operational areas.
Soil degradation and soil erosion	No risk identified	As we can see from the maps presented in section 3.3, the areas chosen for implementation were former pasture areas with degraded soil. Studies show that in scenarios such as the project, eucalyptus plantations have a positive effect on soil health because the deposition of leaves, roots and bark increases the amount of humus in the soil. In this sense, planting eucalyptus not only poses no risk of soil degradation, but also brings benefits such as increasing the amount of nutrients and moisture in previously degraded soils.

Water consumption and stress	Alterations at the water resources	This does not represent a risk for areas with pluviometry above 400mm/year[9] , which is the case for the project city. Nevertheless, at the time of this monitoring period, Suzano monitored the water availability and quality, to ensure no net harm over these resources. For instances that have a water abstraction point, the Certificate of Declaration of Use of Water Resources (DURH) issued by the Institute of Environment of Mato Grosso do Sul (IMASUL) was requested, monitoring the abstraction regime, with the maximum instantaneous abstraction flow, within the requested period. All declarations had their declared flow and/or volume automatically assessed and identified as insignificant, so no instance was the subject of a Grant. In addition, Suzano is committed to updating the information with IMASUL in the event of changes or cancellations, thus avoiding the data remaining inaccurate and jeopardizing the water balance. The documents related was made available to VVB team
Usage of fertilizers	misuse or overuse of fertilizers	Suzano has well defined processes and procedures by a specific department of Soil, Nutrition and Forest Management. Thus, it is possible to closely control forest

[9] VITAL, Marcos H. F. Environmental Impacto of Eucalyptus forests. BNDES Maganize, Rio de Janeiro, v. 14, n. 28, pages 235-276, Dec 2007. Available at: <https://edisciplinas.usp.br/pluginfile.php/3427263/mod_resource/content/1/florestal.pdf>. Last access: 20th April 2022

		fertilization activities and nutritional monitoring. In the planting areas of the ARR Horizonte Carbon Project, NPK and corrective fertilization were used (as seen in the spreadsheet shared with the VVB team). In specific management situations, if necessary, the Suzano team controls weeds with pesticides, as a measure to help with soil preparation and forest growth. In this sense, it should be noted that, given the initial state of the soil (degraded pasture) and the pace of intensive forestry, in order to achieve forest sustainability, nutrient replacement, via mineral fertilization or another alternative source, is essential. However, it is important to note that all soil preparation and maintenance in Suzano's areas is carried out under the premise of minimum cultivation, which is a technique of using as little agricultural machinery as possible when preparing the soil, with the aim of reducing disturbance and compaction[10]. In the documents "FLORESTAL MS – Aplicação Defensivo", "Florestal corporativo- Manual de treinamento – Silvicultura – Adubação manual" and "Florestal corporativo- Manual de treinamento – Silvicultura – Adubação mecanizada" Suzano establishes guidelines for the preparation and application of fertilizers and pesticides in order to

[10] https://canaldohorticultor.com.br/saiba-como-implementar-o-sistema-de-cultivo-minimo/

		prevent poisoning accidents. Furthermore, in the document "FLORESTAL MS – Devolução de Embalagens" there are guidelines for the control of agrochemicals and fertilizer packaging, with the purpose of reducing related environmental impacts.

2.4.1 Rare, Threatened, and Endangered species

Species or habitat	As mentioned above, nine areas were monitored, five of which were High Conservation Value Areas. Throughout the monitoring period, some species of fauna and flora were identified as having some degree of threat, according to the IUCN list. The monitoring was carried out inside the eucalyptus plantations, at the edge of the plantation and in the interior, and it was found that 38% of the fauna records were made inside the eucalyptus plantations. Regarding mammals, it was possible to see that diversity and abundance have remained constant over the years. Several species of mammals were identified in both the areas of native vegetation and the eucalyptus plantations. Regarding birdlife, it was possible to identify several species, some of which are endemic to the Cerrado. Most of the birds recorded inside the eucalyptus plantations are species of low or medium sensitivity to disturbance. The trend is similar in the fragments of native vegetation, with the difference of recording some species of high sensitivity to disturbance. With significant results in terms of the number of species recorded, the project's activities do not interfere with the distribution of local fauna, and the presence of fragments of native vegetation in the project areas helps to maintain the fauna's biodiversity.
Areas needed for habitat connectivity	The activities carried out in the Horizonte project have no impact on habitat connectivity areas. When monitoring the five High Conservation Value Areas, it is clear that they have

	remained intact over the years and are of great importance for maintaining and sheltering endemic species of the Atlantic Forest and Cerrado. Any occurrences of eucalyptus and pine in these areas are treated as a priority and eradicated through the Ecological Restoration Program.

Below is a table of possible risks to habitat and areas of connectivity for endangered species and project activities.

	Risks identified	Mitigation or preventative measure(s) taken
Habitats for rare, threatened, and endangered species	No risk identified	With the monitoring results presented in the table above and the other results in the monitoring report, it can be seen that the project's activities have no impact on the presence of endangered species, since there are several records of these species in the fragments of native vegetation and inside the eucalyptus plantations.
Areas for habitat connectivity	Accentuation of the edge effect in some fragments of native vegetation	In some areas, a marked edge effect was observed. To mitigate this risk, Suzano, in partnership with the Federal University of Mato Grosso do Sul, is developing an action plan to assess the dynamics of the edge and propose management measures.

2.4.2 Introduction of species

Species introduced	Classification	Justification for use	Adverse effects and mitigation
Eucalyptus urophylla	Non-native; monoculture.	The use of these species is due to their high adaptability to the biome found in the project's constituent areas. The ease of adaptation reduces the maintenance required to grow the trees and increases the rate	The ease with which eucalyptus adapts can lead to the presence of these individuals spreading beyond the planted area, invading areas destined for cultivation and maintenance of native vegetation. To mitigate
Eucalyptus spp	Non-native; monoculture.		
Eucalyptus grandis	Non-native; monoculture.		

		of adult individuals in the plantations. In addition, as previously mentioned, the areas planted with this species have proved capable of contributing to the maintenance of biodiversity, since various species have been found inside and bordering the eucalyptus plots.	this risk, Suzano periodically monitors native fragments and once the occurrence of a non-native species has been identified, the fragment is restored, as mentioned above.

The following table shows the results found during the monitoring of flora and fauna that has been carried out in recent years in the areas participating in the project. To identify the invasive potential of these species, the "Portal do Instituto Hórus", a collaborative database network of invasive exotic species, was used. It is worth mentioning that all the species described below were identified, at some point, in field evaluation campaigns in native areas.

Existing invasive species	Mitigation measures to prevent the spread or continued existence of invasive species
Actinocladum verticillatum: A native species to the Cerrado, not endemic to Brazil. It can be invasive when present in large groups, competing with planted trees for light and space due to its ability to spread by rhizomes. *Artocarpus heterophyllus*: An exotic species used by wildlife as a source of food, with a high capacity for occupying forest areas due to its tolerance to different climatic conditions. Allopathic, when in high density, inhibits the germination of native species. *Azadirachta indica*: An exotic species that, when dominant, can suppress the germination of native individuals due to its phytotoxic ability. This effect is more susceptible in historically degraded areas in tropical regions. *Casuarina equisetifolia*: An exotic species with an aggressive root system that can quickly colonize degraded areas in tropical regions. It forms a dense layer of litter that can alter the microclimate, making it difficult for native individuals to establish themselves.	Despite their presence in the Project Area, reforestation has not been compromised by the direct action of these invasive exotic species. This is because Suzano applies a robust internal procedure ("Manual_controle_exóticas-MS") for identifying, monitoring and controlling species with this characteristic. This process is carried out systematically, involving specialized technical teams that guarantee the effectiveness of the actions. Field observations and the corrective measures implemented are duly recorded in appropriate reports, ensuring control and quality in maintaining the ecological balance in the Project Area. In addition, these actions are aligned with good sustainability practices aimed at minimizing socio-environmental impacts.

Cortaderia selloana: A native species, not endemic to Brazil. It has high seed production, facilitating its dispersal and ability to colonize, especially in degraded areas. It thus competes with native trees. *Leucaena leucocephala*: A fast-growing exotic species with a high capacity for forming dense monospecific populations. It establishes itself in disturbed areas and competes directly with native species. *Mangifera indica*: An exotic species that is appreciated for its fruits, which serve as food for wildlife. It has a significant development capacity, giving the species a large size and making it impossible for native individuals to establish themselves under its canopy. *Psidium guajava*: An exotic species that is appreciated for its fruits, which serve as food for wildlife. Due to its ease of dispersion, it invades degraded areas and forms dense clumps; competing with native species for light and resources. *Ricinus communis*: Exotic species with a high capacity for dispersal and colonization of historically altered areas. It can establish itself quickly, forming clumps, and compete with native tree species. *Syzygium cumini*: An exotic species that is appreciated for its fruits, which serve as food for wildlife. It has significant growth capacity, giving the species a large size and making it impossible for native individuals to establish under its canopy. It has an allelopathic effect that affects the establishment of other species.	

	Risks identified	Mitigation or preventative measure(s) taken
Invasive species	Invasive exotic species represent a significant threat to native and planted forests, as their presence can cause a	To address this challenge, Suzano implements a periodic monitoring plan in its HCV areas. If any abnormality is identified, a specific action

	considerable loss of biodiversity. This is due to direct competition for essential resources such as water, light and nutrients, as well as the introduction of new predators and diseases. These species can also induce taxonomic homogenization, reducing the resilience of ecosystems. As a result, there is a change in vegetation that can compromise crucial ecosystem services such as pollination, climate regulation and soil protection, negatively affecting the health and sustainability of forests.	plan is drawn up for each situation. In native reforestation areas, the presence of these species is monitored during the flora monitoring cycles, with the results presented in the corresponding reports, whenever necessary. In addition, to mitigate the presence of invasive alien species, the field team assesses and delimits the dynamics of distribution and expansion of groups of individuals, adopting appropriate control measures for each case, strictly following the guidelines of internal procedures.

2.4.3 Ecosystem conversion

The images below show the analysis carried out for the 27 new areas in different periods, from 2006 to 2008, 2008 to 2015, 2015 to 2020, and after 2020. These cartographic products will be shared with the VVB for more accurate analysis and verification. The analysis identifies the existence of native vegetation conversion events within the periods mentioned, and there has been no conversion in the last 10 years with. In line with this, Suzano has adopted a No Deforestation Policy, in which it “reinforces its commitment to establishing its plantations in areas previously anthropized by other uses, whose conversion has not occurred under its direct or indirect responsibility”. Annual reports are provided to ensure transparency of the commitment and updates to the agenda. Based on the analysis carried out, it is concluded that the project's activities do not lead to the conversion of native vegetation.

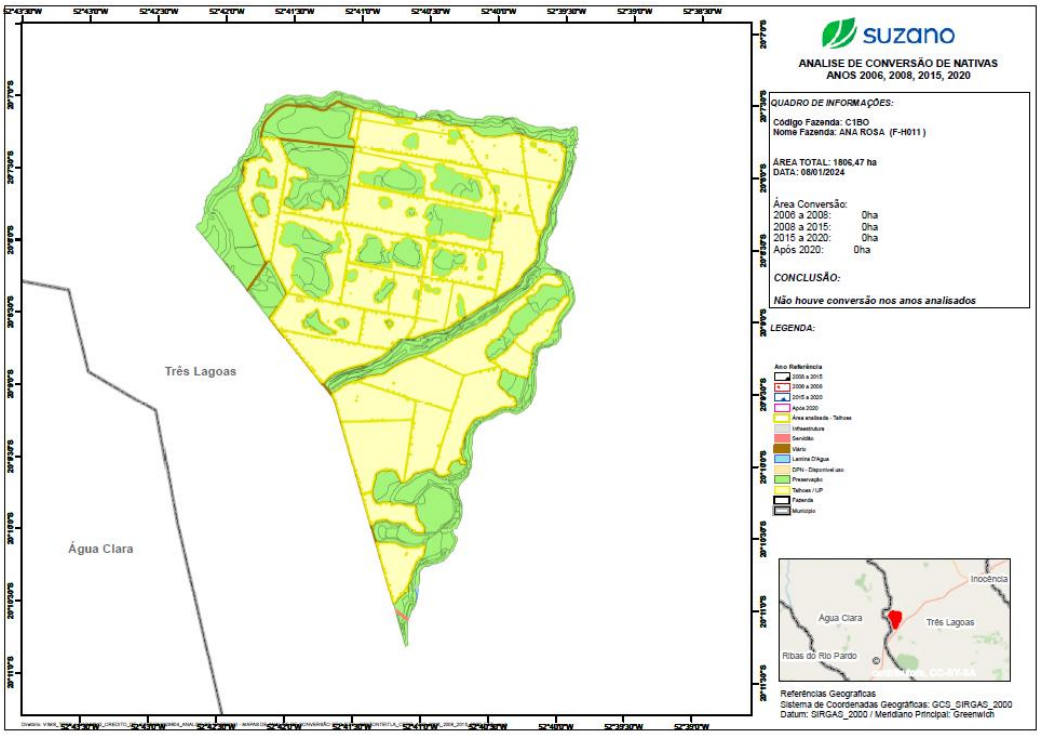


Figure 71 Analysis of native vegetation conversion - ANA ROSA (C1BO)

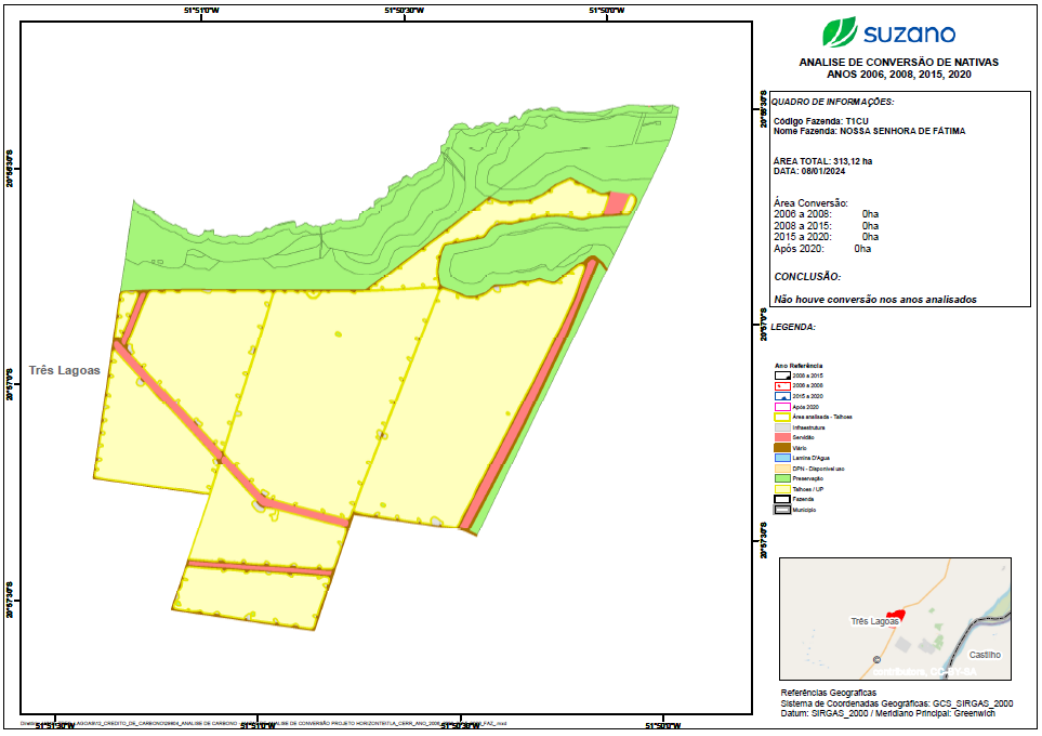


Figure 72 Analysis of native vegetation conversion – NOSSA SENHORA DE FÁTIMA (T1CU)

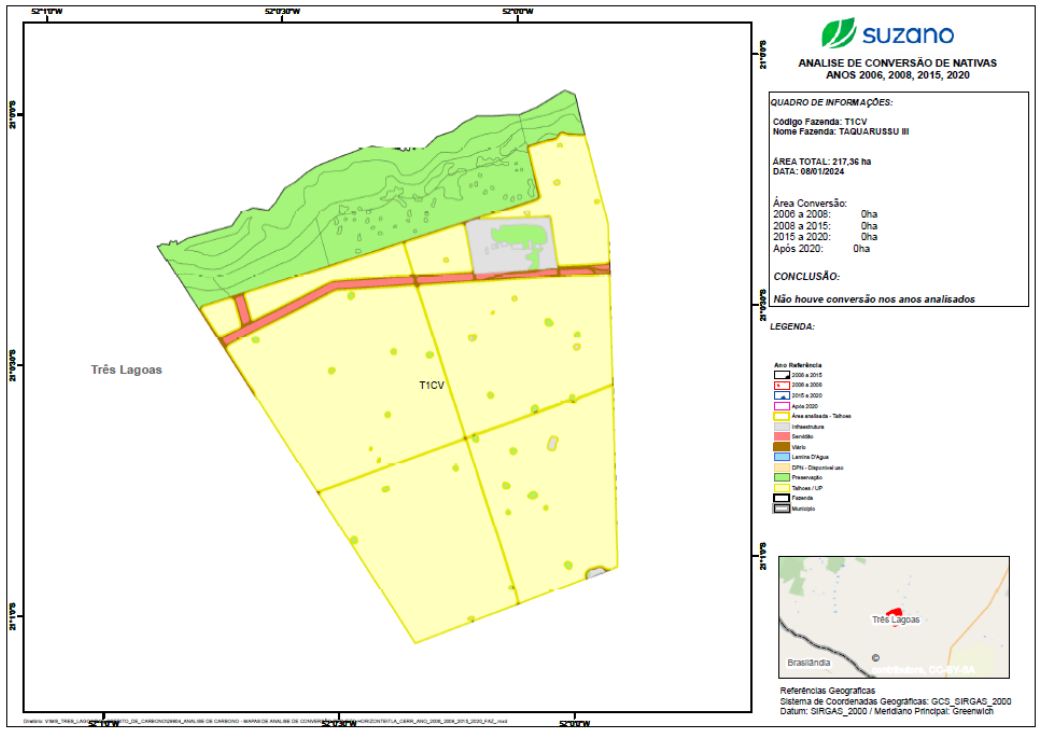


Figure 73 Analysis of native vegetation conversion - TAQUARUSSU (T1CV)

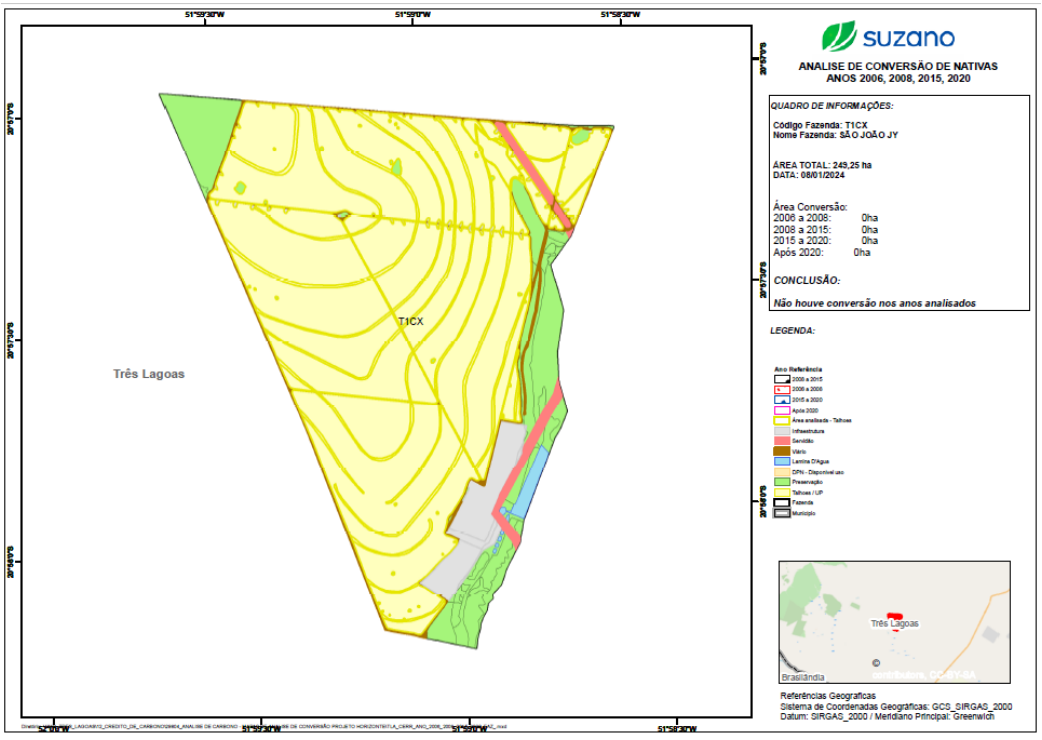


Figure 74 Analysis of native vegetation conversion - SÃO JOÃO JY (T1CX)

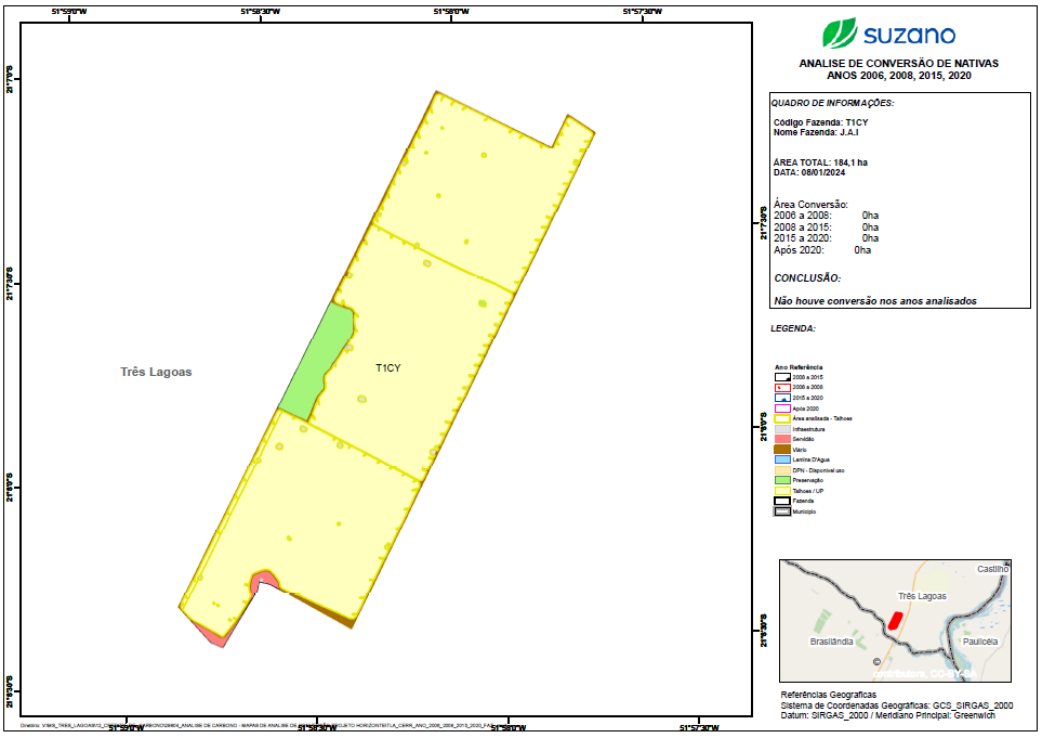


Figure 75 Analysis of native vegetation conversion - J.A.I (T1CY)

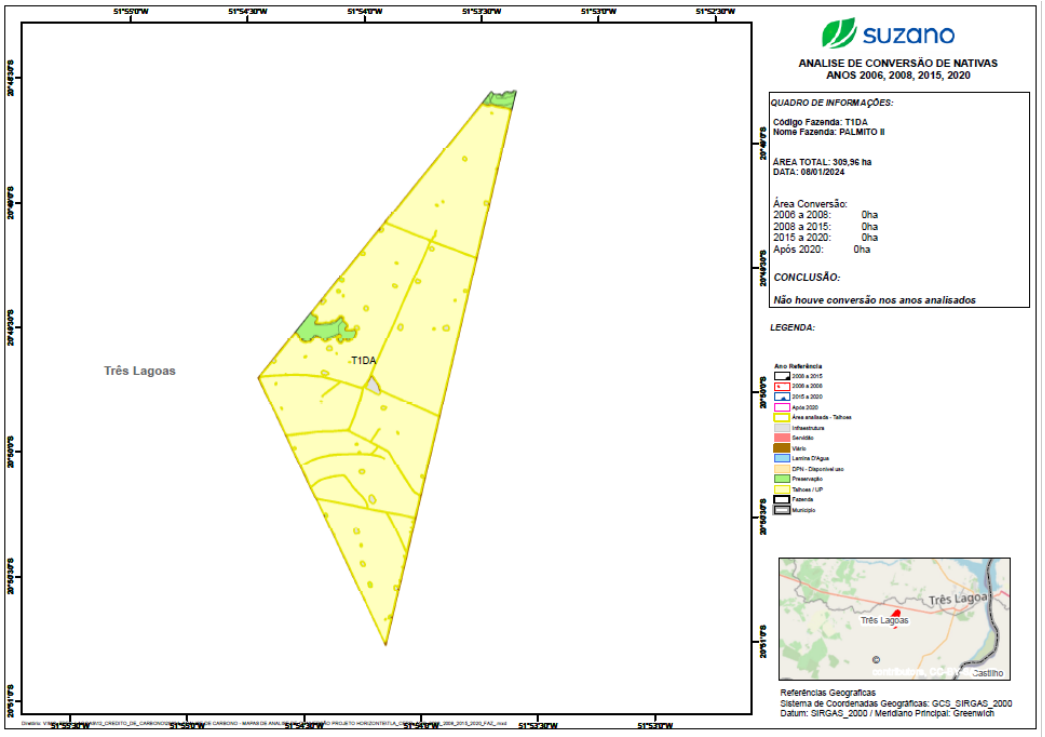


Figure 76 Analysis of native vegetation conversion - PALMITO III (T1DA)

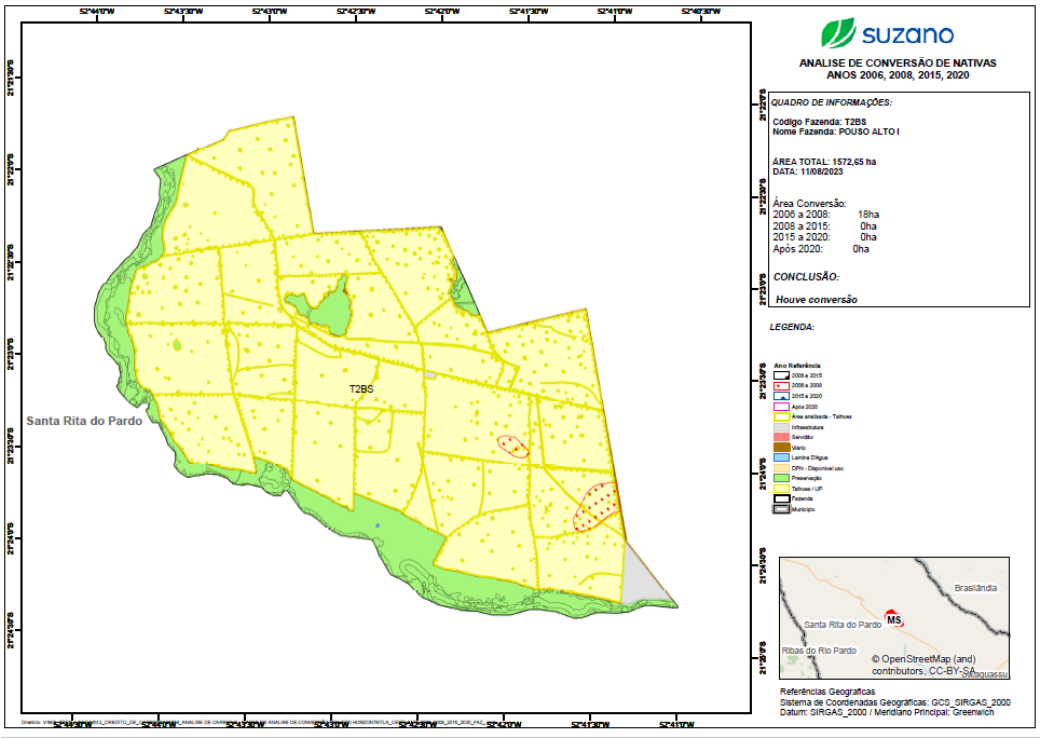


Figure 77 Analysis of native vegetation conversion - POUSO ALTO I (T2BS)

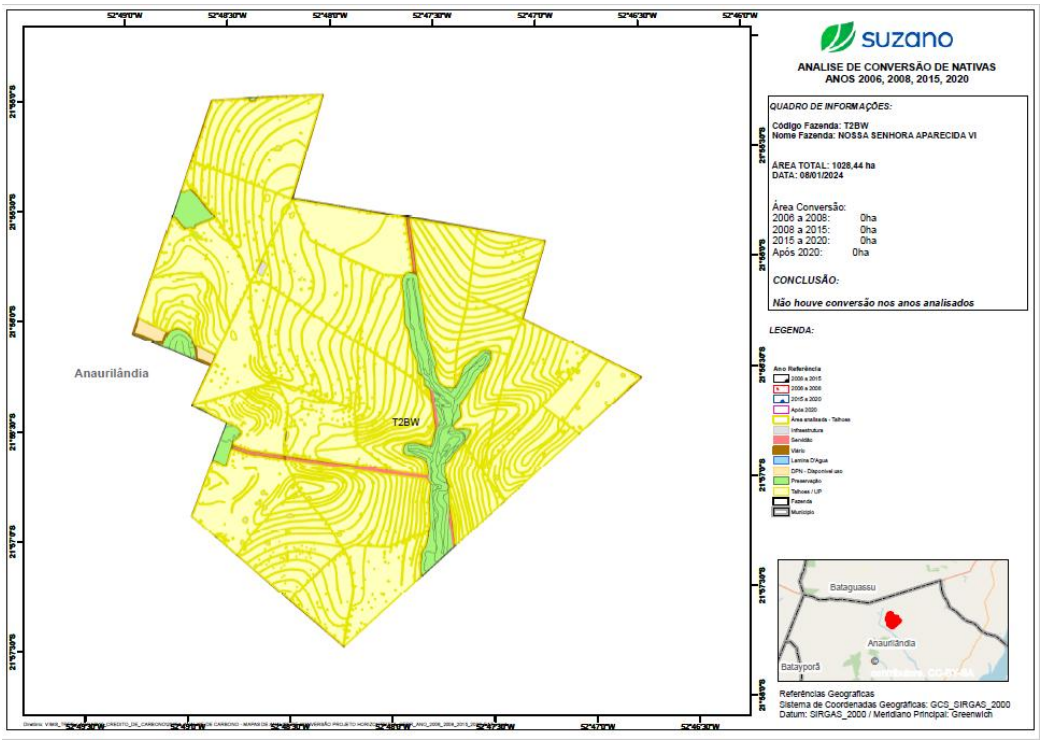


Figure 78 Analysis of native vegetation conversion - NOSSA SENHORA APARECIDA VI (T2BW)

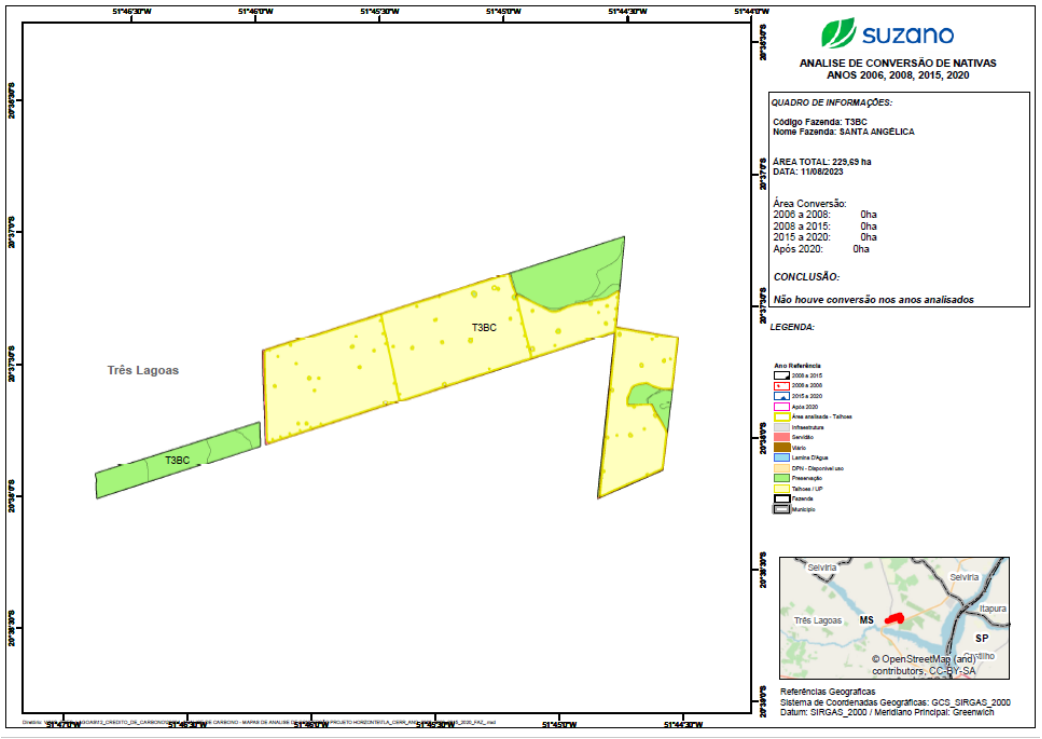


Figure 79 Analysis of native vegetation conversion - SANTA ANGÉLICA (T3BC)

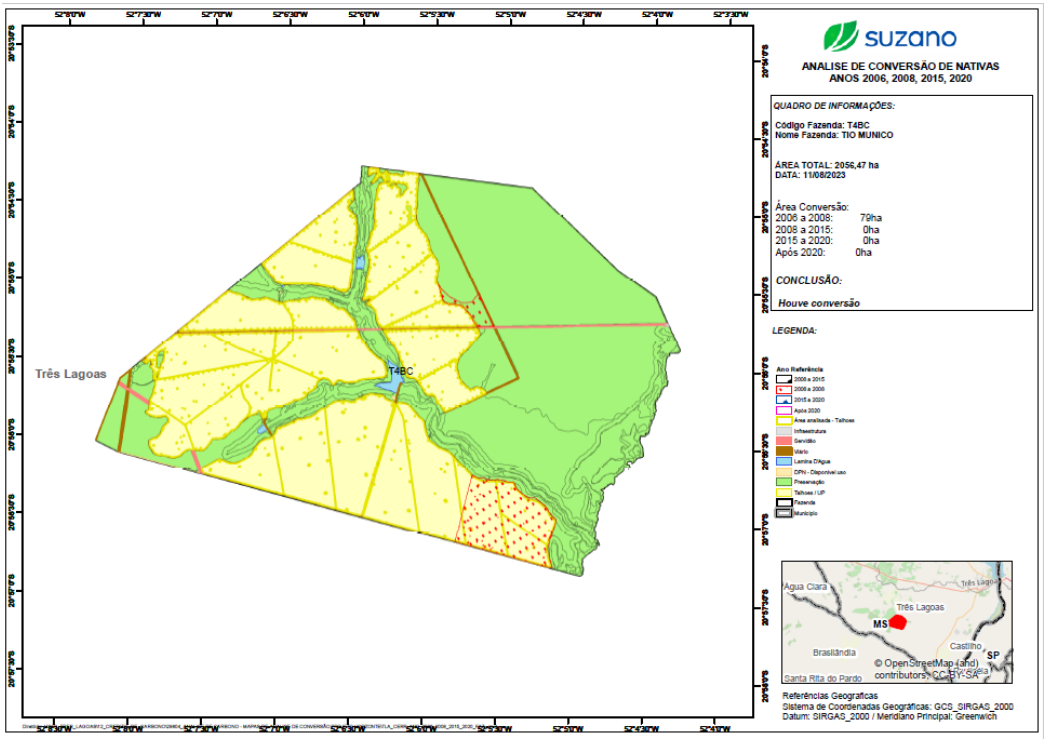


Figure 80 Analysis of native vegetation conversion - TIO MUNICO (T4BC)

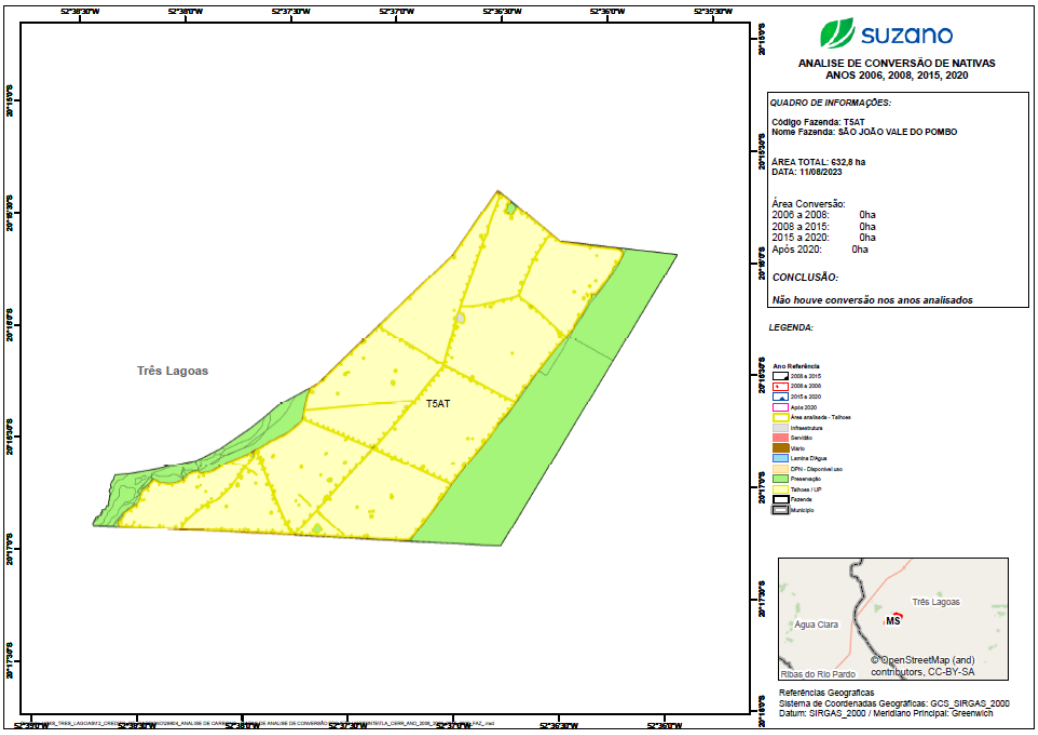


Figure 81 Analysis of native vegetation conversion - SÃO JOÃO DO VALE DO POMBO (T5AT)

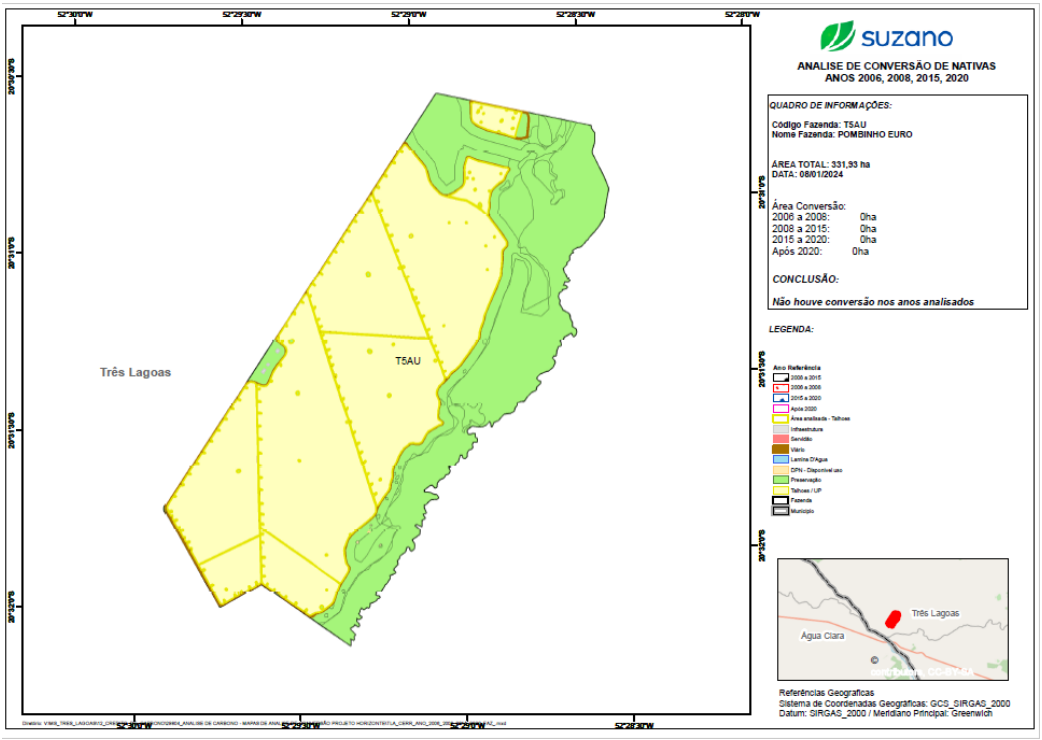


Figure 82 Analysis of native vegetation conversion - POMBINHO EURO (T5AU)

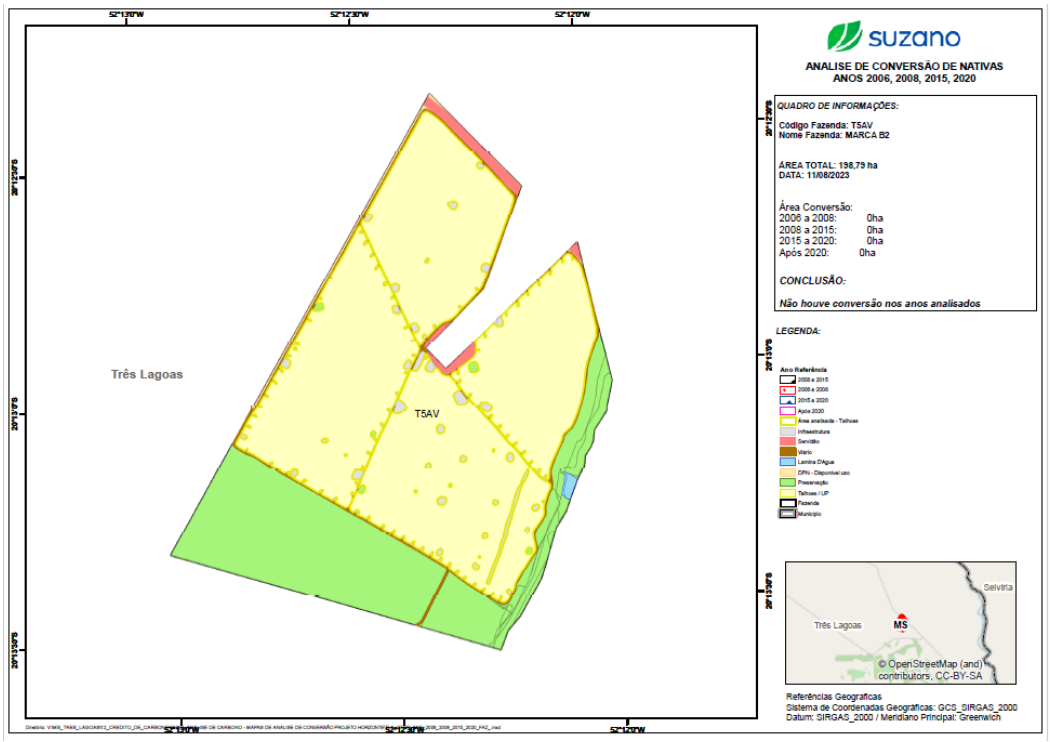


Figure 83 Analysis of native vegetation conversion - MARCA B2 (T5AV)

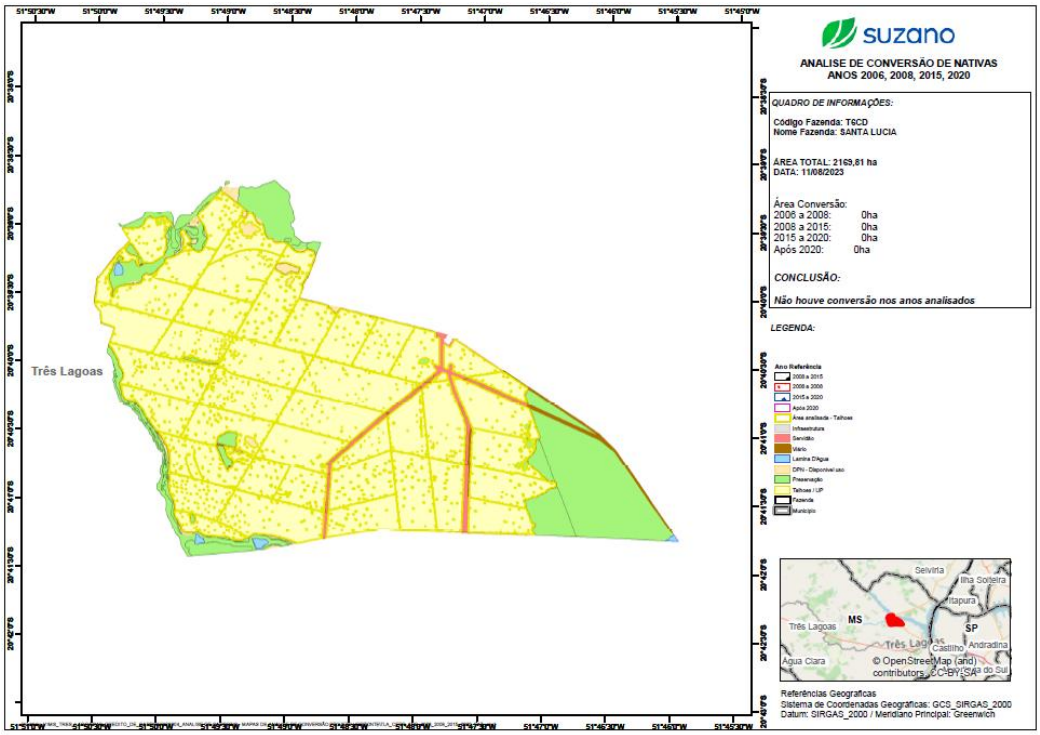


Figure 84 Analysis of native vegetation conversion - SANTA LUCIA (T6CD)

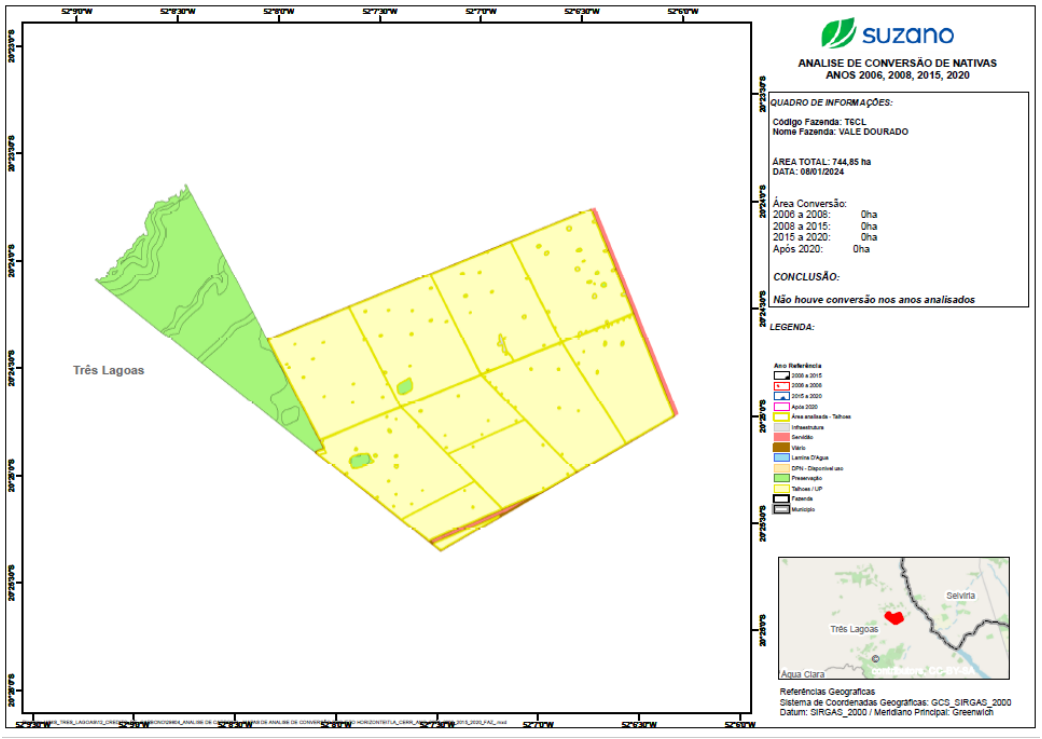


Figure 85 Analysis of native vegetation conversion - VALE DOURADO (T6CL)

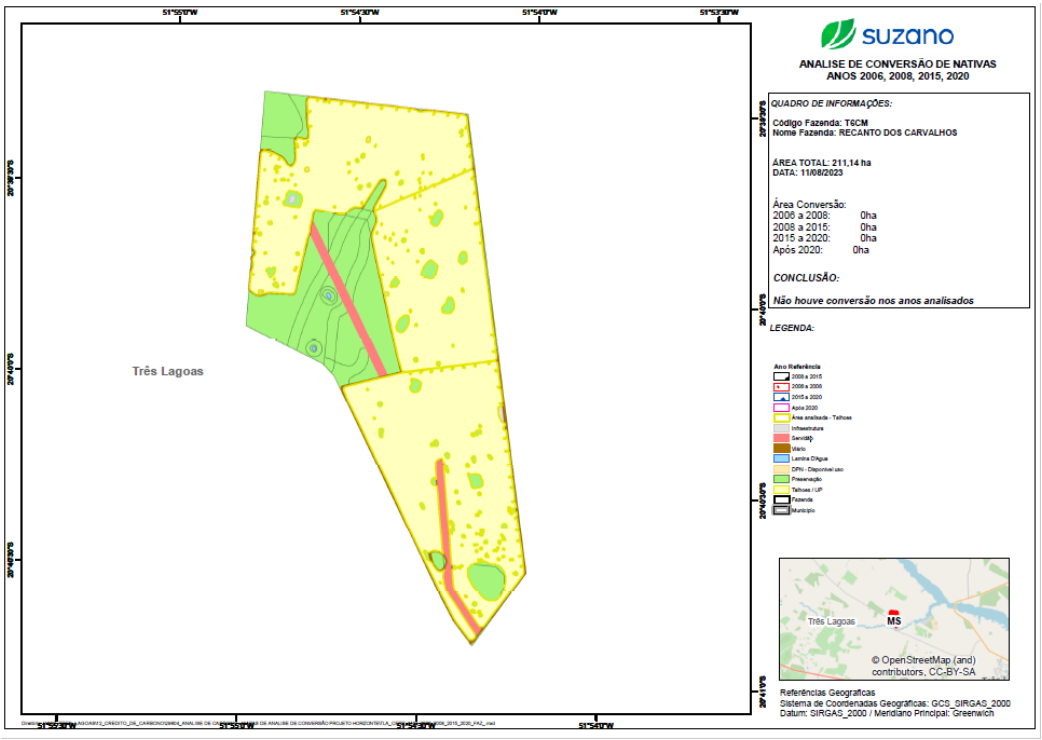


Figure 86 Analysis of native vegetation conversion - RECANTO DOS CARVALHOS (T6CM)

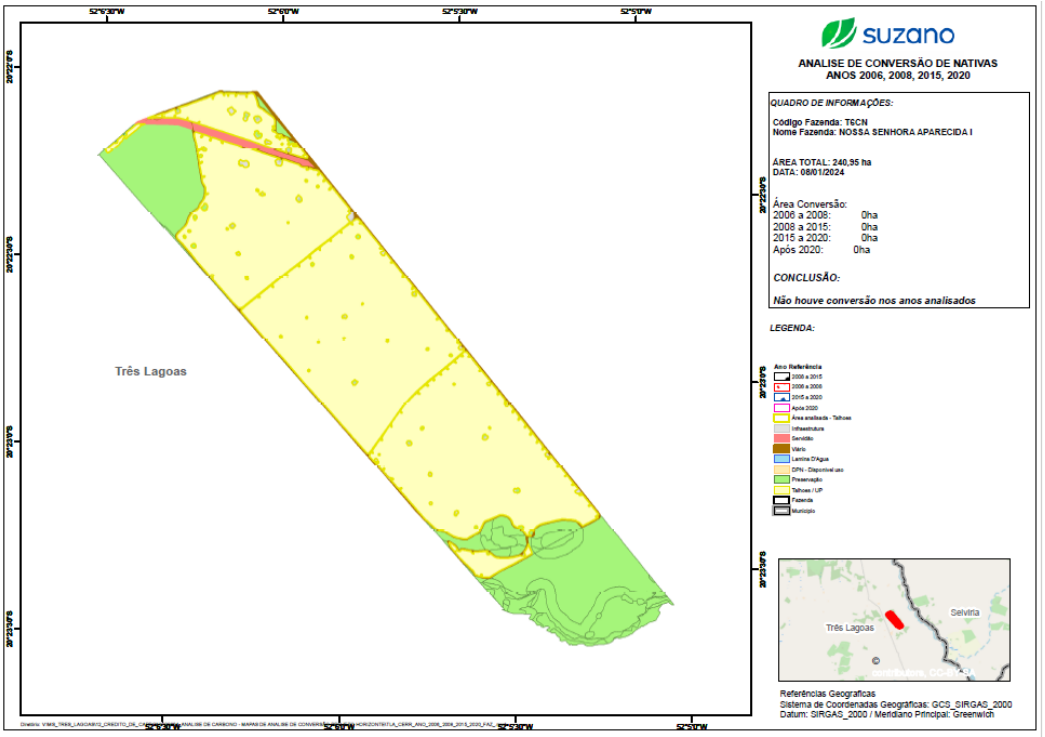


Figure 87 Analysis of native vegetation conversion - NOSSA SENHORA APARECIDA I (T6CN)

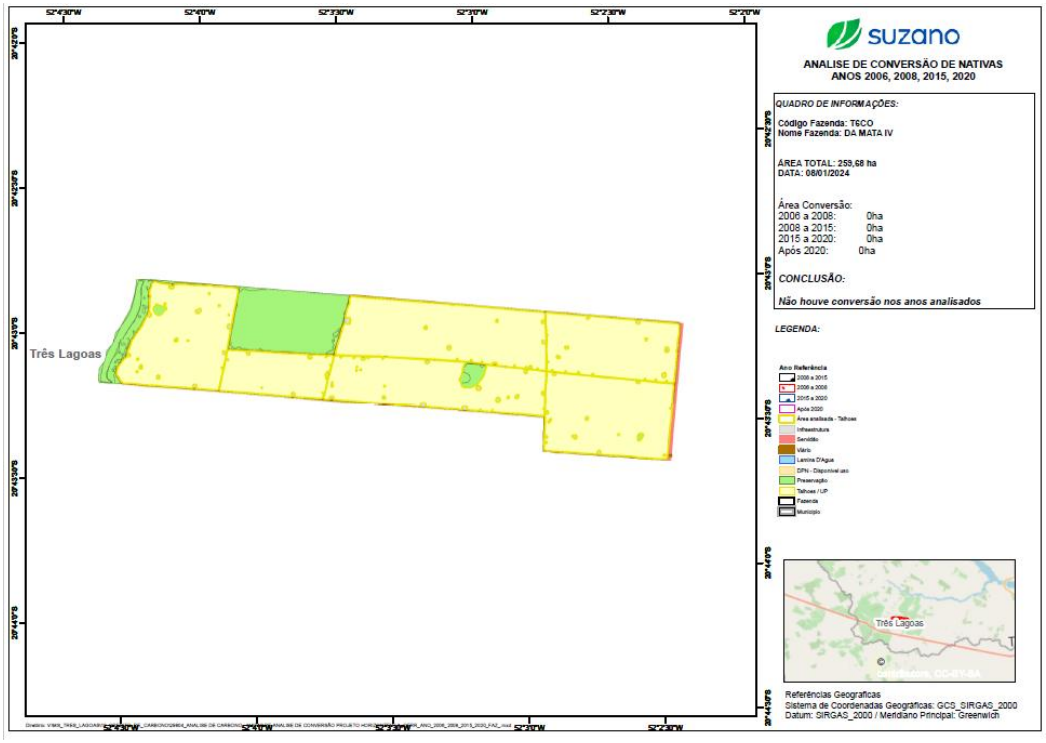


Figure 88 Analysis of native vegetation conversion - DA MATA IV (T6CO)

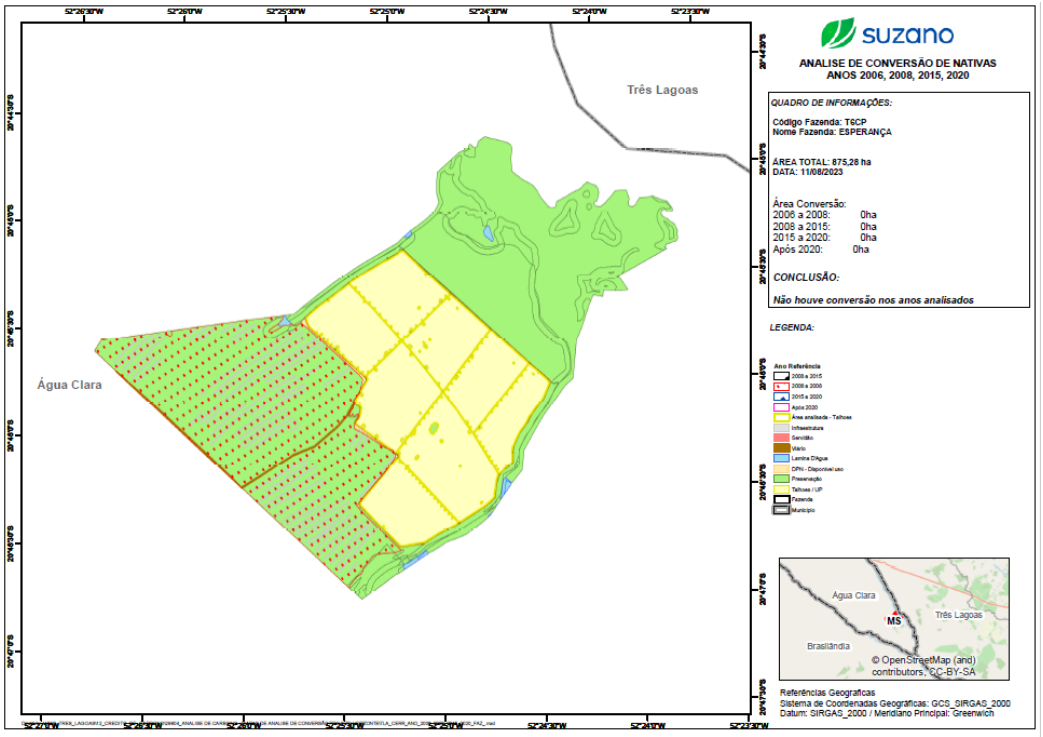


Figure 89 Analysis of native vegetation conversion - ESPERANÇA (T6CP)

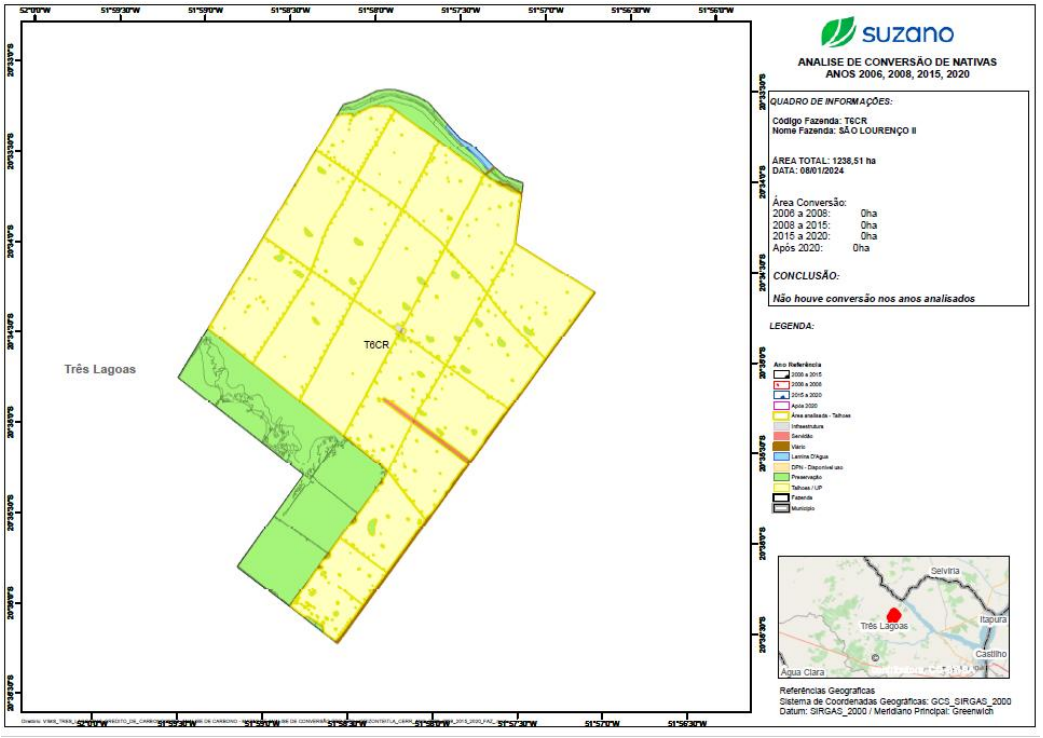


Figure 90 Analysis of native vegetation conversion - SÃO LOURENÇO II (T6CR)

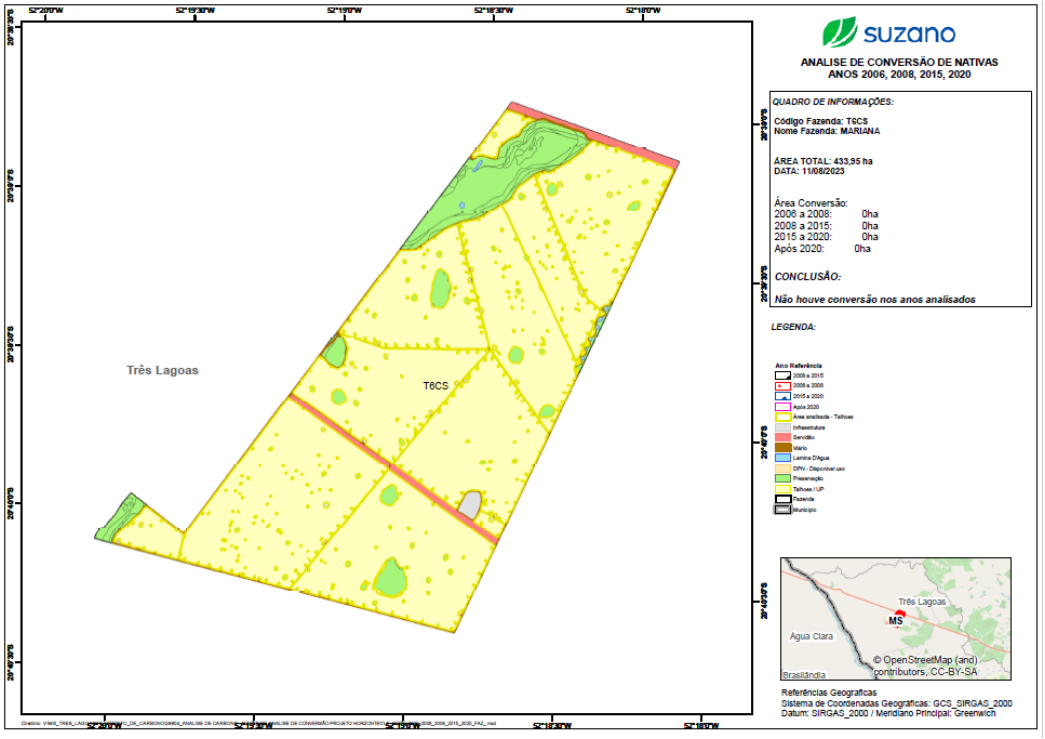


Figure 91 Analysis of native vegetation conversion - MARIANA (T6CS)

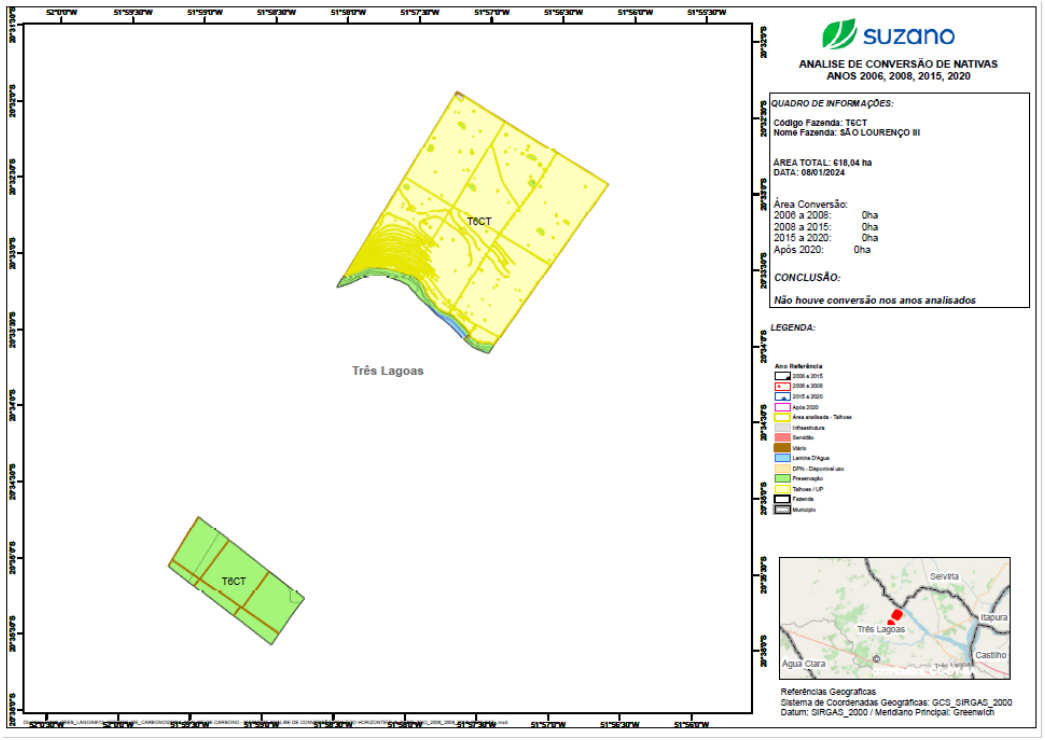


Figure 92 Analysis of native vegetation conversion - SÃO LOURENÇO III (T6CT)

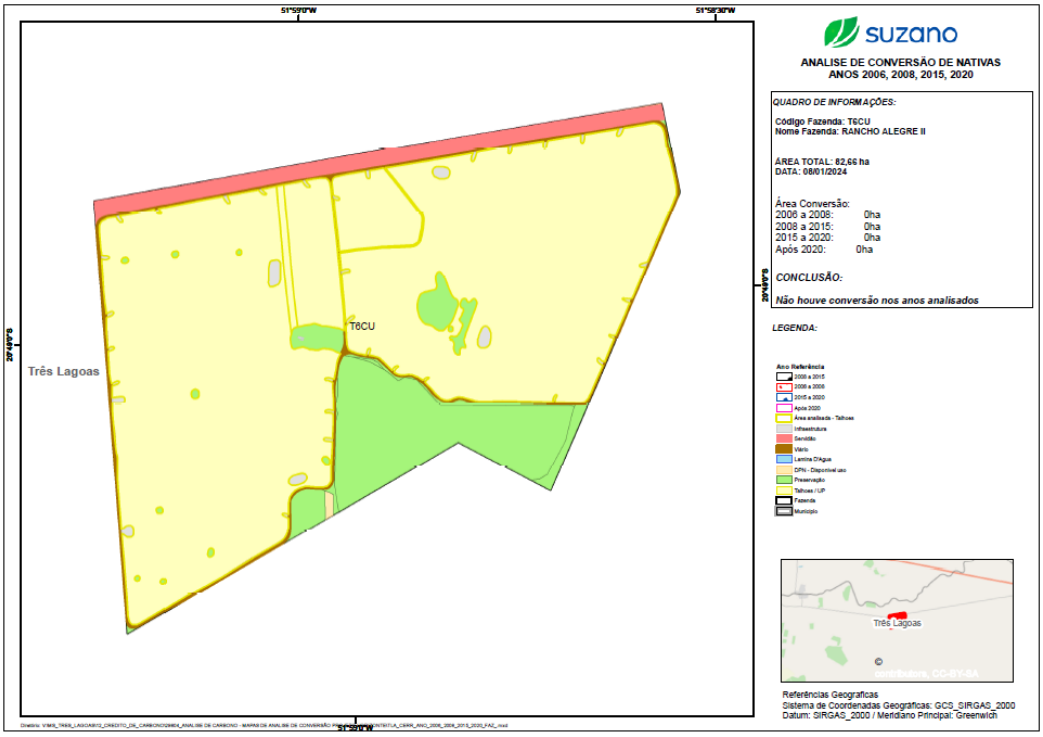


Figure 93 Analysis of native vegetation conversion - RANCHO ALEGRE II (T6CU)

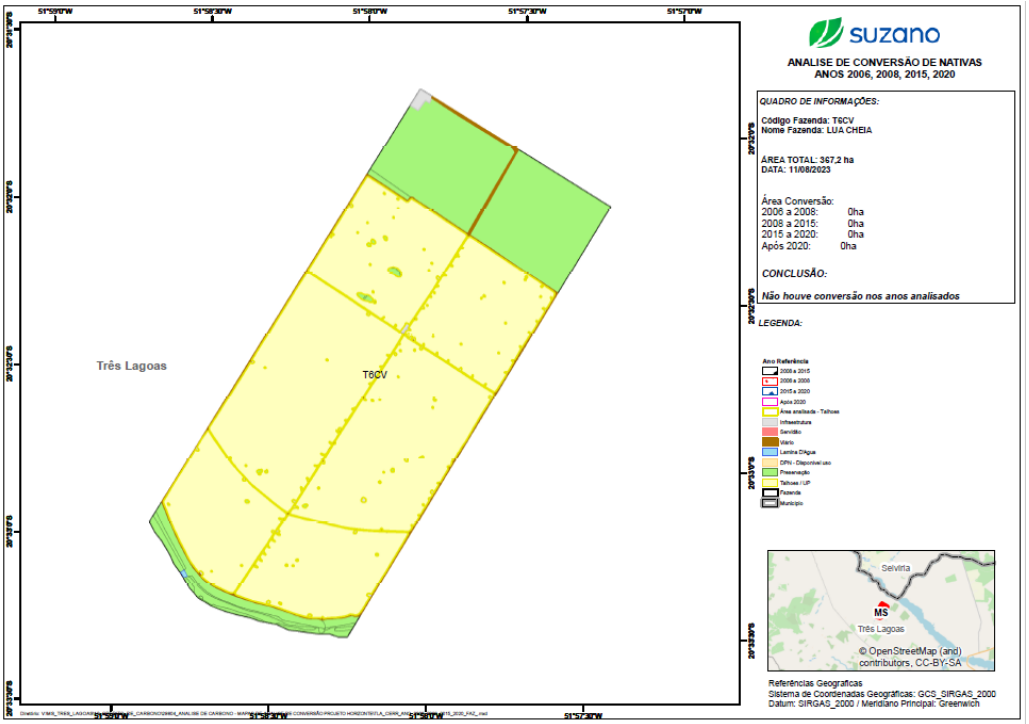


Figure 94 Analysis of native vegetation conversion - LUA CHEIA (T6CV)

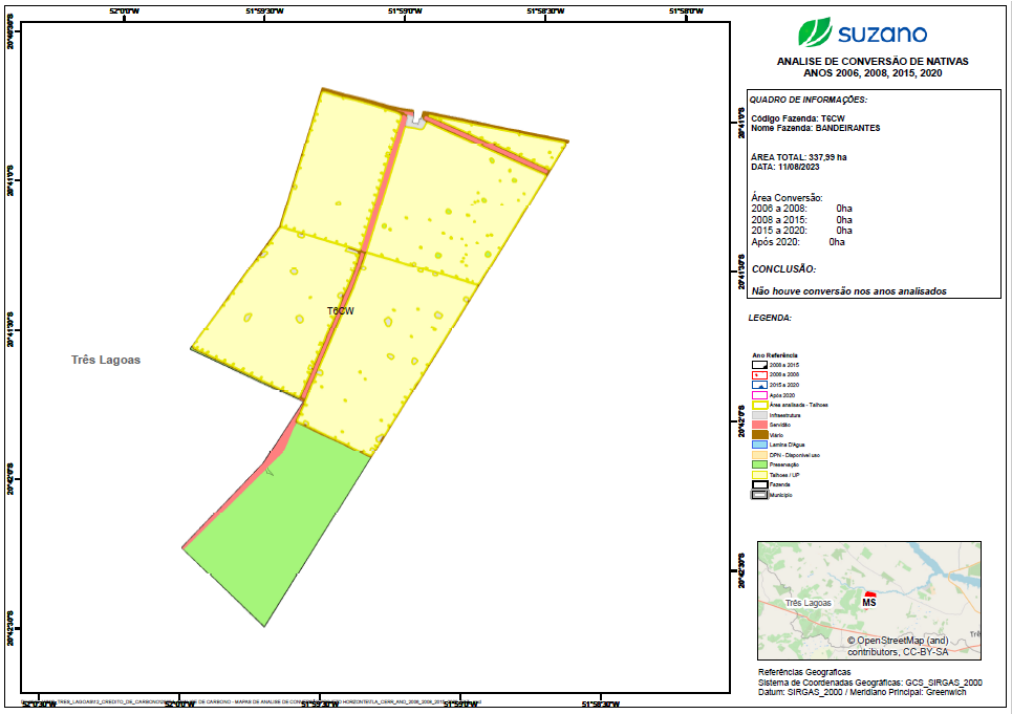


Figure 95 Analysis of native vegetation conversion - BANDEIRANTES (T6CW)

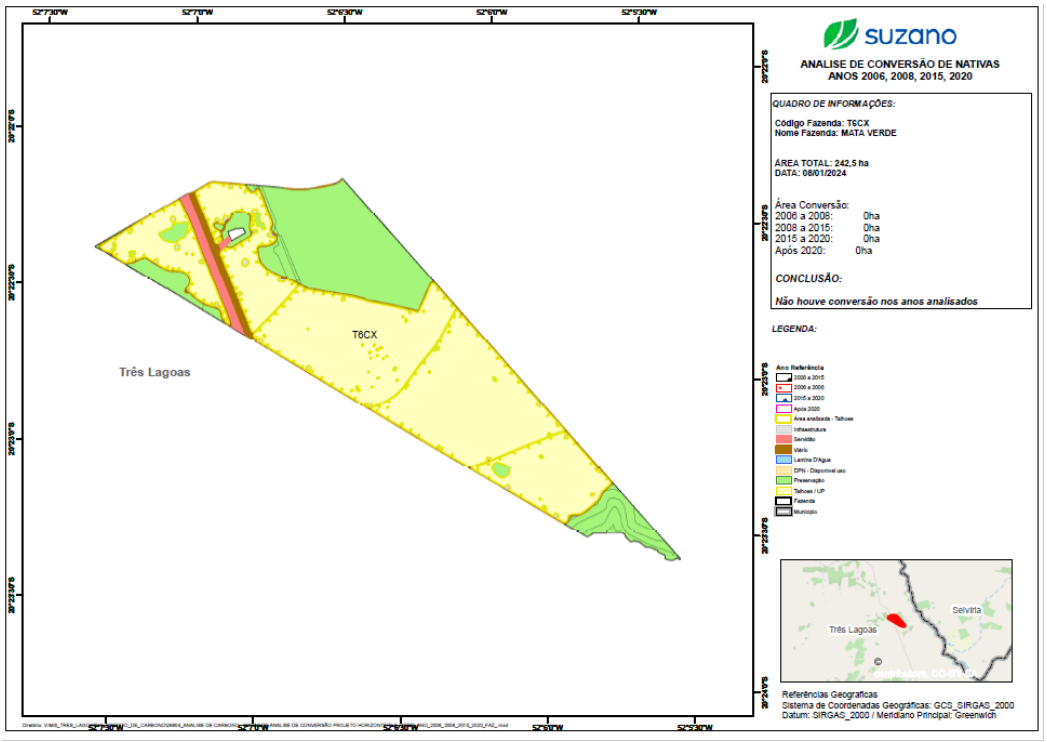


Figure 96 Analysis of native vegetation conversion - MATA VERDE (T6CX)

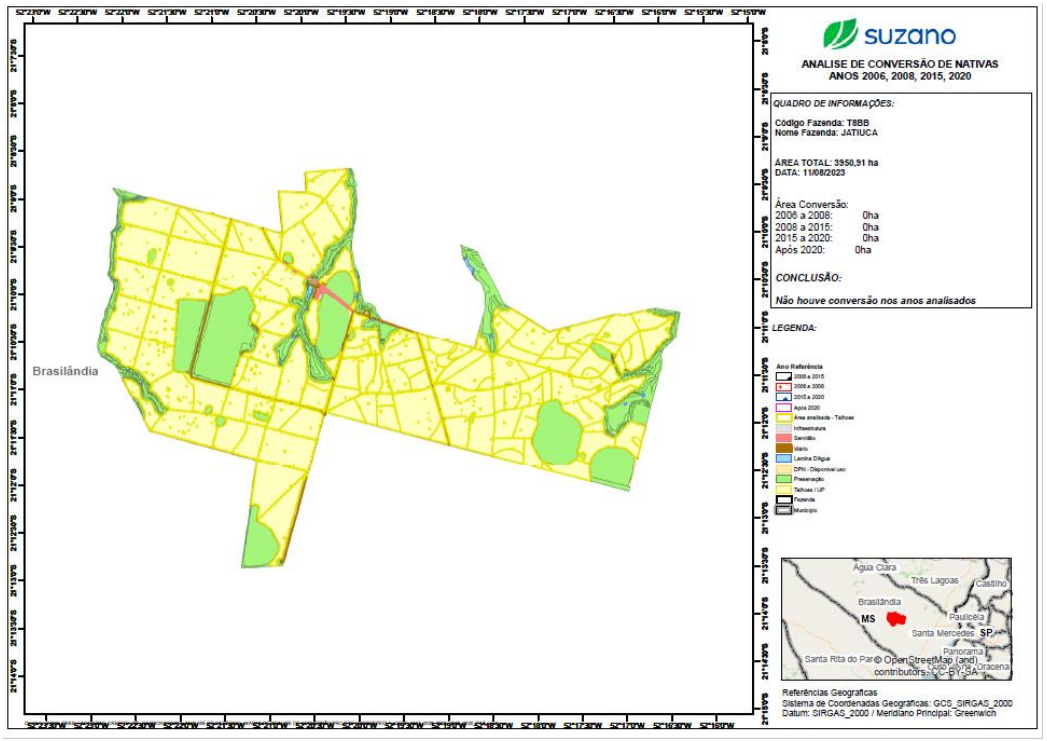


Figure 97 Analysis of native vegetation conversion - JATIUCA (T8BB)

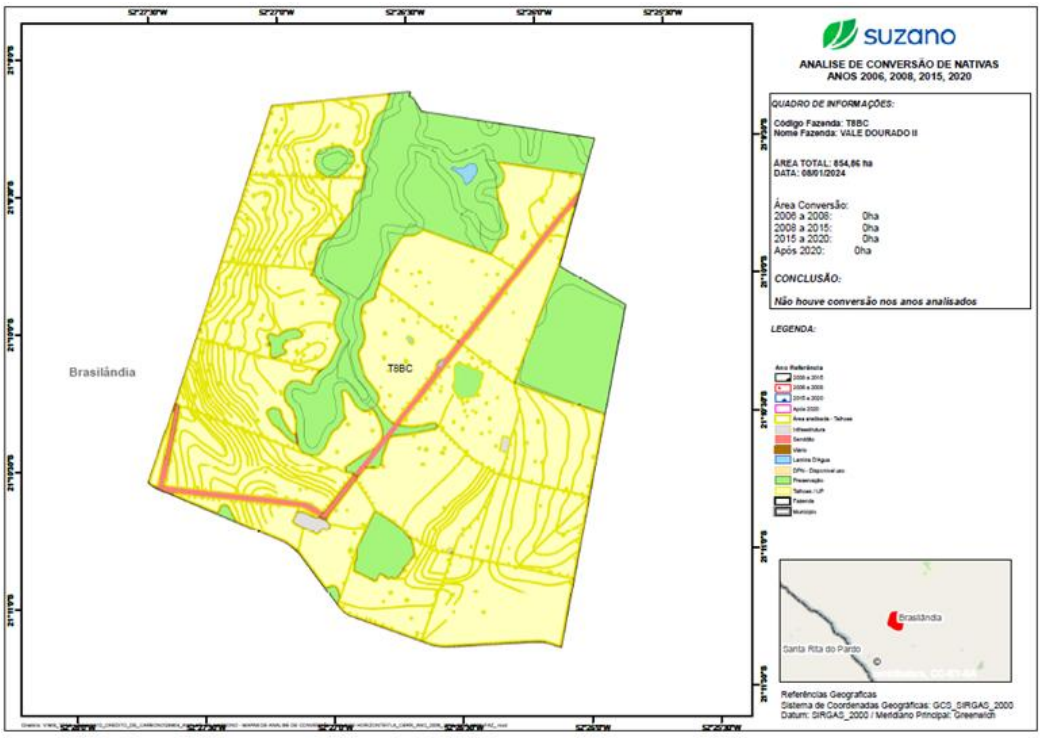


Figure 98 Analysis of native vegetation conversion – VALE DOURADO

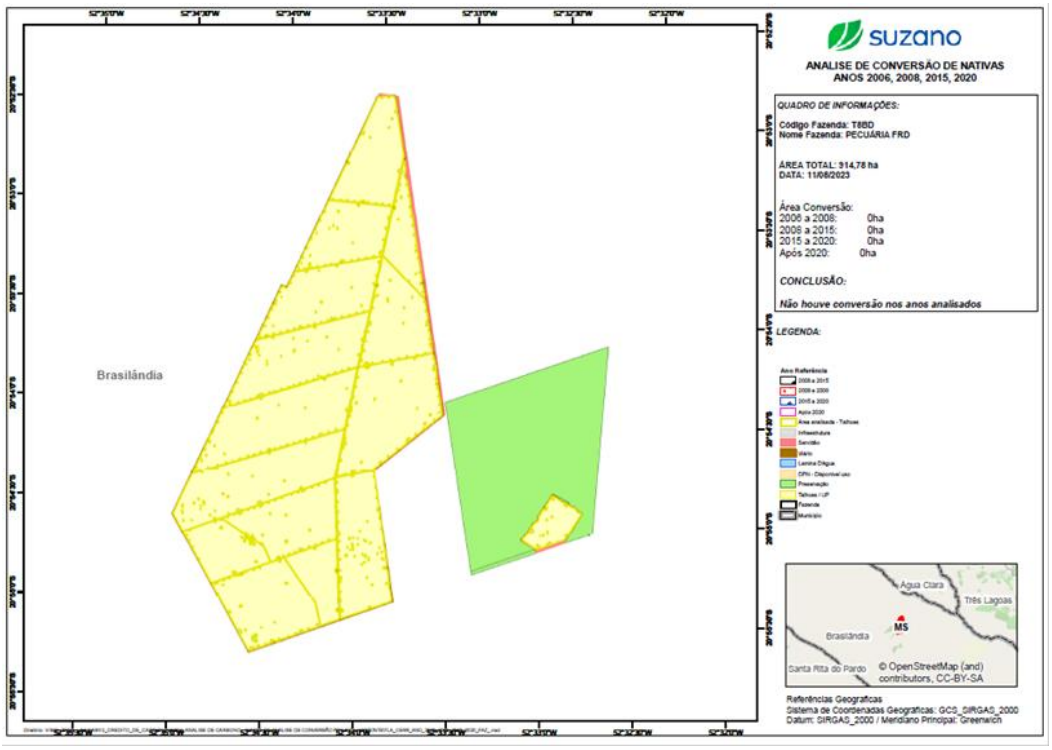


Figure 99 Analysis of native vegetation conversion – VALE DOURADO

Table 2 Table identifying possible risks

	Risks identified	Mitigation or preventative measure(s) taken
Ecosystem conversion	No risk identified	No risks of conversion of native vegetation were identified, because as previously mentioned (section 2.4.2) Suzano monitors the areas periodically and has a No Deforestation policy. With these tools, Suzano prevents possible episodes of deforestation.

3 IMPLEMENTATION STATUS

3.1 Implementation Status of the Project Activity

The Project activities implemented during the second monitoring period (22/02/2022 to 03/04/2023) are demonstrated below:

Plantation of native vegetation outside APPs and RL areas:

Control of erosive process and rehabilitation of degraded areas

There is no impact of water erosion on the soil predicted in the Project Area, according to the slope map shared with VVB, which shows that all locations are flat. Even so, the Project developer takes precautions and protects itself with an internal Suzano SA procedure for the operation, maintenance and monitoring of strategies to combat and mitigate erosion processes in water bodies; when identified in the reforestation areas of the carbon initiative.

For this activity, Suzano has systematized the process of identifying erosions so that the necessary measures can be taken more quickly and assertively.

Thus, with help of 2TREE (fixed-term contract staff) and Technicians of Environmental Team (MAF), there is a regular data source feed regarding the history of the area, monitoring of occurrences and monthly

reports, in addition to the availability of cartographic information and spreadsheets. This data is processed with a critical analysis of the bases and cross-checked with information from the actual and Monthly RF PAS (Annual Forestry Plan real Physical). The outcome of the process is monthly recommendations for MVIA (road network operations team), with a degree of criticality as an aid to decision-making. When there is erosion within the Production Units (PUs), the outcomes are sent to the forestry team.

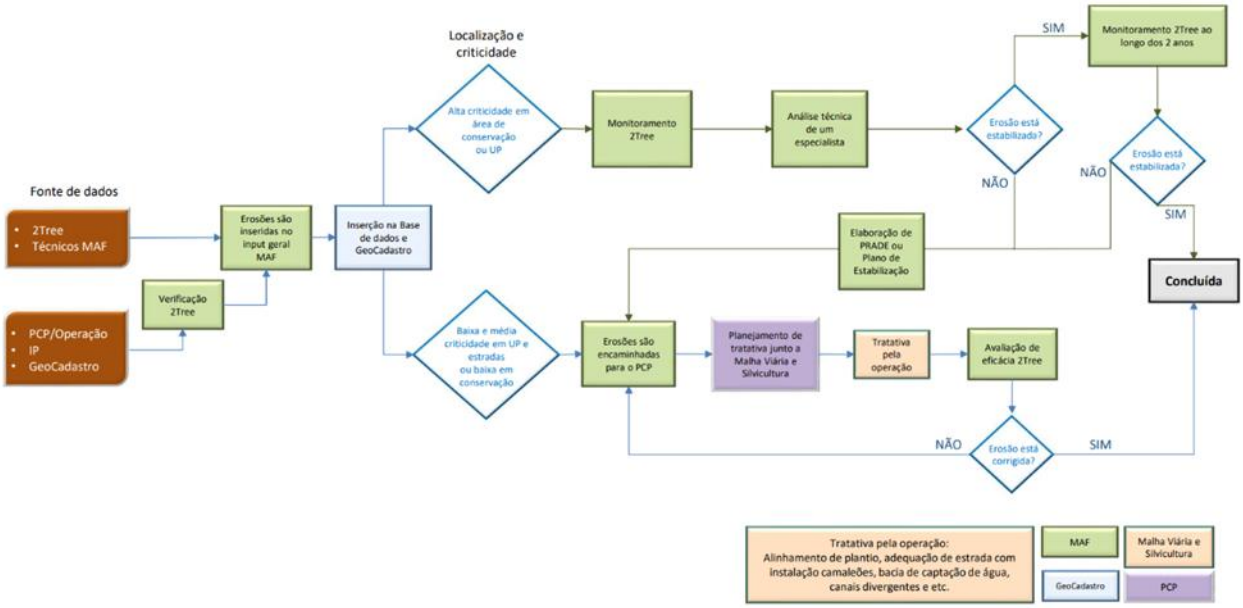


Figure 99 Flow and management of Suzano's negotiations regarding Erosion Systematization.

Suzano has systematized classification of erosion criteria, with 5 degrees:

- Erosion Grade 1: less than 10 cm deep and of low criticality. It is dealt with in routine road maintenance.
- Erosion Grade 2: less than 30 cm deep and of low/medium criticality.
- Erosion Grade 3: less than or equal to 1m deep and have medium/high criticality.
- Erosion Grade 4: more than 1 m and less than 2 m deep and highly critical.
- Erosion Grade 5: classified as a gully and is greater than 2 m deep and highly critical.

In addition, conservation technologies were implemented to control water erosion in degraded areas with suggested actions such as: adjustment of the roadbed, graveling of the road, among others.

In addition, for more critical erosions, the team responsible has been looking for Vant flights to support more accurate recommendations. No flights have yet been made to the farms, as there have been no critical erosions. Even so, the VVB team has been given maps with examples of Vant flights carried out on other Suzano farms.

Conduction and natural regeneration

This step is divided into 3 main activities:

a) Control of invasive exotic grass:

Suzano has prepared a document that refers to the Management of Ecological Restoration, made available with the VVB team, where the activities that will be conducted are established. In this sense, the control of exotic and invasive species refers to the restoration methodology where exotic tree species are controlled in areas classified as natural, aiming to reduce the dispersion of propagules and the dominance of the environment by these species and to reduce the incidence of new invaded areas. The document recommends that the control of exotic/invasive species should be adapted to the conditions of each area (such as degree of invasion, location of individuals, state of vegetation, etc) and of each species and should not be employed in areas where natural regeneration is intense, so as not to de-characterize or harm the existing native vegetation.

b) Eradication of exotic tree species:

As mentioned above, Suzano has prepared a document setting out the activities for controlling exotic and invasive species.

c) Plantation of native species:

Suzano has prepared a Management of Ecological Restoration document, with the objective of establishing general guidelines, procedures, and responsibilities regarding the Management of Suzano's Ecological Restoration Program.

To start the activity, a plan was drawn up for the implementation of experimental units, with a list of species for planting, a vegetation classification report and fauna monitoring and phytosociological analysis.

It was shared with the VVB team the timetable for the implementation of native planting activities, which is scheduled for July 2023, and the discussions to start the activities. The timetable shows that a partnership has been established with Agroicone, a company hired to provide technical assistance for

the native component restoration activities. The technical proposal was shared with the VVB team, as was all the related evidence.

In addition, Biophilium conducted training for Suzano's teams between 2021 and 2023 on the topics of "Conservation and restoration of native vegetation", "How to distinguish between conserved and degraded open physiognimies", "Mapping, classification and characterization of the vegetation of the natural areas of Suzano S.A.'s farms in the state of Mato Grosso do Sul" and "Vegetation classes of the farms in Ribas do Rio Pardo and Água Clara, MS".

Reforestation of degraded areas through the plantation of Eucalyptus:

Prior to planting the forests, Suzano SA. produces eucalyptus seedlings in its own nurseries to support the implementation of the forests in the project area in a qualified manner. To ensure best practices and to guarantee the quality in clonal seedling production process, Suzano applies the procedures of guideline MA.01.03.0003 for the state of Mato Grosso do Sul, which in summary contemplate the following stages:

- Obtaining the substrate; preparing the biodegradable tubes and trays: preparing the material in the recommended formulation and preparing suitable containers to receive the seedlings. This phase is directed and monitored by technicians from the company's Management, Soil and Nutrition team in order to guarantee the proper staking (“transplanting”) of the sprouts and the perfect formation of the eucalyptus seedlings.

- Seedling production: selection, collection and preparation of the sprouts produced in the mini clonal garden from the tops of seedlings previously planted in the nurseries and staking of the sprouts in trays prepared with formulated substrate. At this stage, the healthiest leaves are kept to support the aerial part and obtain the roots of the seedlings. At the same time, sprouts can be obtained from trees felled in the field; the preparation and replanting stages are carried out within the same guidelines as the nursery.

- Rooting and formation of the seedlings: in the Vegetation House, where irrigation, humidity, temperature and light are controlled, there is stimulation of the growth of the seedling roots, maintenance of the stock (e.g. removal of old leaves and dominated sprouts) and monitoring of the seedlings suitable for proper development. The rooting period depends directly on the climate of the region. Fertigation is applied throughout growth.

- Rustification: period of physiological preparation of the seedlings for planting in the field. During this phase, the seedlings must be nutritionally adapted to withstand the stress caused by the pre-planting stages (such as transportation). Some practices in this phase include water management and fertilization.

- Seedling dispatch and transport: after the end of the rustification stage, the seedlings go through a selection and standardization process before being sent to the field. All healthy seedlings that meet the dimensional standards are sent for planting.

It is worth mentioning that Suzano SA's operational teams are constantly trained and are always attentive to the operational process of producing eucalyptus seedlings in the nurseries. Any problems are immediately reported so that the corrective measures can be taken.

In the sequence, the forest implementation process is composed of a set of silvicultural activities, precisely designed to obtain a safe environment and technical conditions for the development of a planted forest. The eucalyptus plantations follow a specific protocol, whose ID is P0.12.02.001, developed by Suzano and made available to the VVB team. It is important to highlight that implementation funds were hired to assist the project proponent in planting activities, which must follow the requirements set by the project proponent.

The procedure starts with the silviculture team, where supervisors and technicians receive the micro-planning map of the area, with information about the location, conditions, and the activities to be performed. During the execution of the silvicultural implantation activities, the teams must follow the micro planning information, which defines the execution area for planting Eucalyptus and delimits the areas that will be conserved and remain in permanent preservation.

The forest implantation process is developed in sequential steps, as follows:

- Cleaning of the area: Suzano has guidance documents for each methodology applied in clearing the area: mechanized soil preparation, manual mowing, mechanized mowing, and semi-mechanized mowing.

  The activity was implemented in a way that may facilitate the execution of subsequent silvicultural activities. Eventually, chemical cleaning can be applied, depending on the characteristics of the area. The recommended dosage is defined by experts and varies according to the degree of infestation of invasive species. All dosage by chemical cleaning were made available to the VVB team.

  It is important to highlight that the project area's location has a high number of occurrence of weeds, which compete with the trees for water, light and nutrients, and is also vulnerable to plagues that can damage the leaves and lead to the death of great extensions of adult forests. Under this context, weeds and pests' control is essential for the maintenance of the planted trees. However, the edaphoclimatic context also promotes a higher and quicker degradation of defensives when compared to temperate climate regions.

In order to mitigate and address all environmental risks that may occur, the Project activities follows all the Brazilian laws regarding the application of such products, applying only registered products allowed by the agriculture, environmental and sanitary authorities; meets all the procedures and criteria listed by the chemical policies from the applied certifications (FSC and CERFLOR); has specific internal procedures to the appliance of such products, seeking safety; supports research institutes and companies that develop more sustainable products from the environmental perspective; apply such defensives only with a previous basement on monitored data, where it is evaluated the environmental impact; the chemical defensives are applied only as a last resource; drones and other equipment for spraying products are only used at the project areas, and mainly for the application of fertilizers and biological products. Fungicides are rarely applied.

- Ant control: documents were prepared by Suzano to establish technical and operational procedures, as well as guidelines for carrying out ant control activities.

The document code MA.27.01.0031 was used for this activity. It establishes information and instructions necessary for handling and using resources for the control of leaf-cutting ants. In this sense, the document provides clear instructions on safety standards for direct exposure workers who handle pesticides in any of the stages of storage, transportation, preparation, application, disposal and decontamination of equipment and clothing and indirect exposure workers, who perform their activities in areas neighboring the handling sites.

Thus, the document provides that the control of leafcutter ants can be carried out preventively in silvicultural activity (pre-cutting control and destruction control) or correctively, both with the purpose of minimizing or eliminating the possibility of damage caused by leafcutter ants. Also, it is treated how to calculate the dosage to be applied, as well as the recommendation of dose per square meter and forms of application, avoiding overdose.

Two other important documents prepared by Suzano are those for the operationalization of leaf-cutter ant control, with codes PO.01.03.0054 and PO.01.03.0048. The purpose of these documents is to establish the technical and operational procedures necessary to carry out the activities, with the expected result being areas of eucalyptus forest with control of the damage caused by leaf-cutting ants. The documents establish the frequency that the activity should be carried out:

- Pre-planting;

- Forest Maintenance;

- Pre-cutting.

In the pre-planting operation, as recommended, ant control was carried out 5 days in advance of planting, to guarantee control efficiency.

The forests implemented and monitored in this monitoring period, are old enough to carry out the ant control activity up to the "forest maintenance" phase, which was carried out, as recommended, by Suzano's operational team and/or by service providers.

- Soil preparation: The soil preparation for the implementation of the plantations of this monitoring period was based on the procedures and recommendations of the document code PG.01.03.0002 and PO.01.03.0050.

The document (PG.01.03.0002) aims to improve the physical conditions and the full development of the root system of forest individuals, the other document (PO.01.03.0050), presents the specialized activity of soil preparation with Savannah equipment (consisting of a tracked tractor, together with a subsoiler and V-SHEAR blade). Thus, the document has a description of the process, with environmental care in the maintenance of the machines, avoiding the leakage of oils and fuels and recommendations in the phase of thundering the soil, to carry out the activity in the direction perpendicular to the slope, reducing the risk of erosion. Despite the absence of impact of water erosion on the soil in the Project Area, according to the slope map shared with VVB, which shows that all locations are flat. Even so, as a preventive measure, the Project is protected by an internal procedure of Suzano SA. for the operation, maintenance and monitoring of strategies to combat and mitigate erosion processes in water bodies.

In addition, it is recommended that soil characterization be carried out (soil type and texture, textural gradient, presence and depth of impediment layer, slope of the terrain, presence and intensity of cohesion, presence of surface compaction and cutting cycle), so that soil preparation is done correctly for each type of soil in the Production Unit (UP). Therefore, a soil survey with its specific characteristics was carried out for each UP of this monitored period and the form of soil preparation for each one was defined.

- Fertilization: For this activity, the documents prepared by Suzano were used, with code MA.27.01.0028 and MA.27.01.0022, which instruct employees to safely perform manual and mechanized fertilization activities, consecutively.

Suzano's Forest Technology team, via SGS (Suzano Global Services), defined the fertilization recommendations for each UP during the monitored period, using the results of the soil survey collected before planting, thus defining the type of fertilizer and dosage.

- Planting and Irrigation: For these activities, Suzano has prepared a specific document, code MA.01.0025, with the objective of providing the necessary information and instructions for the planting and irrigation stages. Also, for Suzano's Três Lagoas Unit, the document code P0.12.02.001 is used to guide the activities. In this sense, the documents contain all the rules and safety information for the respective activities.

  The planting and irrigation instructions are contained in the documents cited and made available to the VVB team. Thus, the entire planting and irrigation process carried out during this monitoring period was guided by these documents.

  Thus, the total area of28,665.25 ha was planted during the last (02/11/2017 to 21/02/2022) and current (22/02/2022 to 03/04/2023) monitoring period.

Forest maintenance and management process

It is up to the Planning team to annually prepare the schedule of plantation units (PUs) to be monitored, proceed with the installation of plots and data collection, ensure data consistency and prepare the preliminary report of the monitoring results. This information will be used to make decisions regarding management recommendations/changes to the PUs.

Suzano keeps track of the activities carried out within the UPs in the form of a spreadsheet (sheet BD_SAP_atividades). All the related documents were handed over to the VVB team.

Social activities

Social activities are divided into two main projects:

Inclusive Recycling Project

Inclusive Recycling is a social project in partnership with Recycling Cooperatives to promote the inclusion of individual collectors with the purpose of generating income, promoting development, strengthening and fostering the productive organization of cooperatives. In Três Lagoas municipality, CORPAZUL is one of the stakeholders supported by the Project, that improves public health by complying with basic sanitation and solid waste policies, reducing the disposal of materials in municipal landfills by inclusion of individual collectors in the recycling production chain, who are benefited from the increase of their income.

In June 2023, the Conscious Wall was implemented, an initiative realized by Salesian Mission of Mato Grosso, the Jesus Adolescent Youth Center and CORPAZUL with the aim of humanizing and integrating waste pickers, using the walls as voluntary waste drop-off points (PEVs), to raise awareness among the population to reduce the environmental impact caused by the incorrect disposal of recyclable materials. The wall used was provided by the Salesian Mission of Mato Grosso, located in the city center of Três Lagoas-MT.



Figure 100 Inauguration of the Conscious Wall

Nursey for Native and Ornamental Seedling Project

As part of the Nursey for Native and Ornamental Seedling Project, Suzano began contacting an organization called Jesus Adolescent Youth Center, with the aim of setting up a nursery for native seedlings from the Cerrado biome and changing ornamental plants in the rural community, hoping to serve around 40 families. However, on August 25, 2022, the organization declined the partnership, citing difficulties in adapting the documentation.

For this reason, Suzano is looking for a partnership to develop this project. All of Jesus Adolescent Youth Center 's documentation describing the project and the email declining the project was shared with the VVB team.

3.2 Deviations

3.2.1 Methodology Deviations

No methodology deviation was applied

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3.2.2 Project Description Deviations

Removal of Ariranha Farm (T5AB)

In the Project Description document, the farm known as Ariranha Farm (T5AB) was initially considered eligible for Eucalyptus plantation activity. However, upon further analysis, it was found that the area is currently occupied by natural vegetation, which does not meet the eligibility criteria of the ARR Horizonte Project. As a result, this specific area was excluded from the project. It is important to note that this area was just listed in previous monitoring period andit was not monitored and no VCUs were generated in it. So this deviation didn't cause impact in the project.

GIS analysis of post-planting

Some previously listed instances had their areas updated due to the post-planting process. The limits of the UPs are drawn based on the microplanning of the property's operational activities established before planting. For this reason, the UPs undergo for review by the GIS team after planting to bring their limits closer to what is practiced in the field. A reduction in the useful area of the UP can only be performed when there is in fact exposed soil identified in the analysed images. The entire procedure followed by the GIS team is described in procedure PG.02.01.0004.

Despite the update of the areas of some instances, there is no compromise in the project report since all the areas monitored for calculating the VCUs, and which had to be inventoried, have already undergone the post-planting process and therefore have the most up-to-date values.

Remove of two parameters in the validation

Also, in the Project Description document, it was considered two parameters in the validation (A, as Project Area, and Ai_bsl, as Area of stratum I at baseline scenario) but were no longer presented in section

4.1 because they are not fixed and are constantly updated. This update was made to comply with the VCS Standard and furthermore does not harm the project as these are indicators that are being monitored and presented in section 4.2, and thus, constantly updated as new monitoring periods are carried out.

Inclusion of new entities involved in the Project

WayCarbon is a consulting firm specializing in solutions for the transition to a low-carbon economy, with expertise in greenhouse gas emissions management, climate strategies, and corporate sustainability. In the context of this project, WayCarbon was contracted to provide consulting services for the preparation of the Monitoring Report (MR). Its responsibilities include technical support preparing the documentation for the verification process conducted by a third party accredited by Verra.

2Tree is a company specialized in field monitoring and forest data analysis, providing technical support to ensure that implemented areas remain in compliance with the project planning and expected standards. For this monitoring period, 2Tree was contracted to monitor post-implementation areas, ensuring continuous tracking of planted areas' development. Its activities include identifying potential deviations, generating alerts when necessary, and recommending management actions, when applicable, to ensure compliance with established standards. Additionally, the company assesses the areas to verify that they are evolving as planned and provides periodic monitoring reports.

Agroícone is a company specialized in technical assistance for ecological restoration, with expertise in applying innovative and sustainable methodologies for the recovery of degraded ecosystems. Within the scope of this monitoring period, Agroícone was contracted to provide technical support at the onset of ecological restoration activities in Cerrado biome areas, using the direct seeding method. Its activities include diagnosing site conditions, jointly developing appropriate restoration methodologies, determining the required quantity and diversity of seeds, and facilitating the procurement and delivery of native seeds through partner networks. Additionally, the company is responsible for knowledge transfer regarding the "muvuca" seed method.

Agroícone will also provide assistance in planning, soil preparation, and seed implementation in areas designated for native vegetation restoration, ensuring that the process follows best technical practices. The company monitors vegetation regeneration, trains the local technical team in field operations, and ensures that restored areas develop as expected. Monitoring includes periodic assessments of key indicators such as plant density, species richness, and vegetation cover, as well as defining management actions to mitigate factors that could hinder restoration success.

It is important to emphasize that these new entities involved in the Project did not impact on the project, as they had an important role in supporting the activities of the project, as mentioned in the above paragraph and also in section 1.5 of the MR.

3.3 Grouped Projects

27 new instances were included in the ARR Horizonte Carbon Project. All of them meets the eligibility criteria and requirements set by the VCS Program for the AFOLU sectorial scope:

- The project activity in these instances falls under the Afforestation, Reforestation and Revegetation category.

- Where the plantation of trees will be implemented, was identified as degraded pasture or exposed sandy soil before the start of the project activity and was not cleared of native ecosystems for the development of the project activity. Hence, there has not been a change in land use in the project activity area within the last 10 years prior to the project start date.

Images below show the new instances areas 10 years before the project start date in degraded pasture or exposed sandy soil. This information is in line with the explanation below (Eligibility Criteria for New PAIs) of this document. The VVB will have access and navigation through Marvin's platform, being able to interact with the maps and perform the necessary historical analyses of land use and occupation in the Project instances; with a focus on pasture degradation, soil exposure and deforestation. It is important to note that all interactive maps present in the system are based on public data sources approved by the technical community, with emphasis on MapBiomas.

In addition, Suzano assumed a No Deforestation Policy, where it “reinforces its commitment to establish its plantations in areas previously anthropized by other uses, whose conversion has not occurred under its direct or indirect responsibility”. Annual reports are provided to guarantee transparency to the commitment and updates on the agenda. Therefore, the project activity does not drain native ecosystems.



Figure 101 – Map of Taquarussu III pre-implementation (2022) and 10 years before implementation (2012)

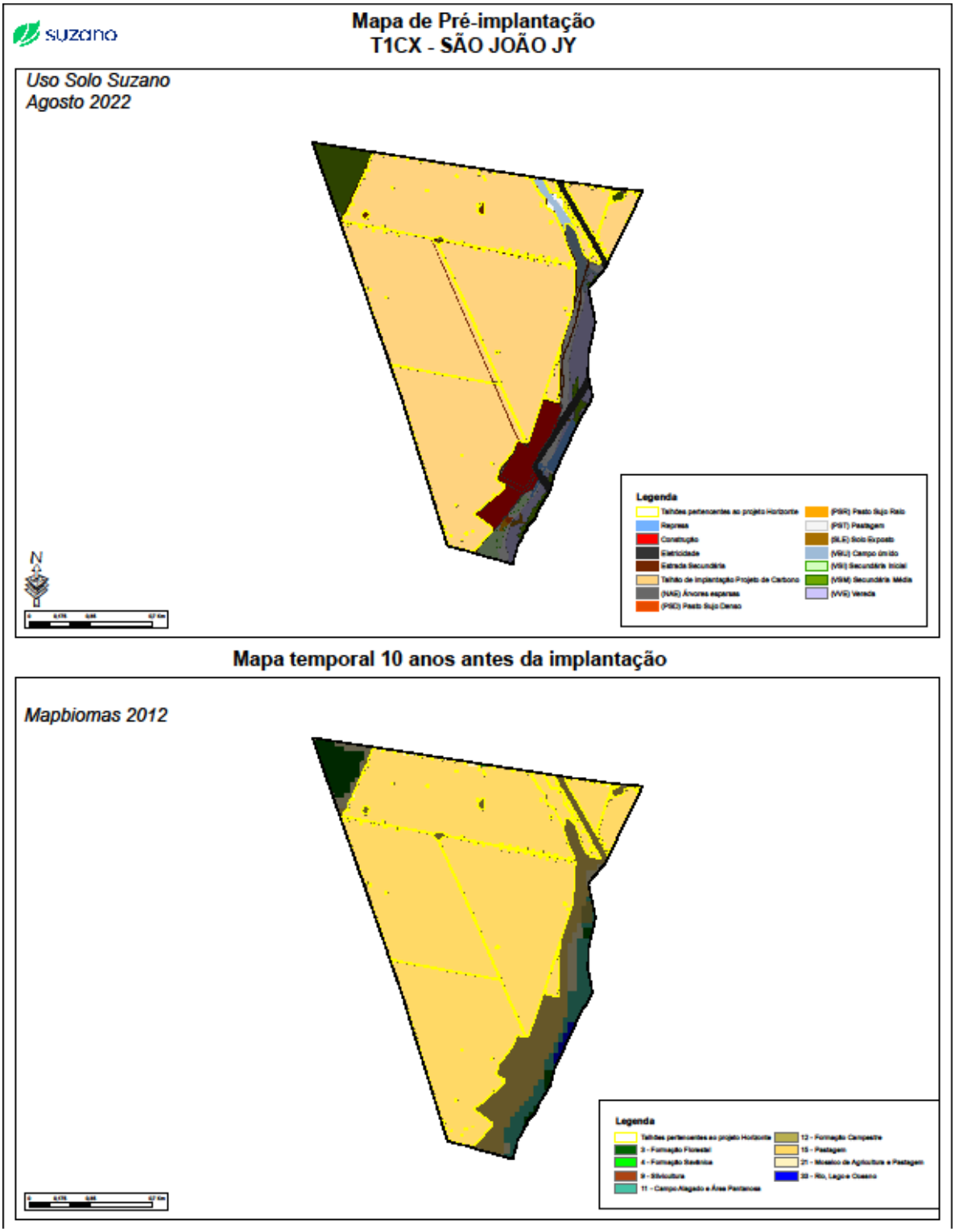


Figure 102 - Map of pre-implementation (2022) and 10 years before implementation (2012) of SÃO JOÃO JY

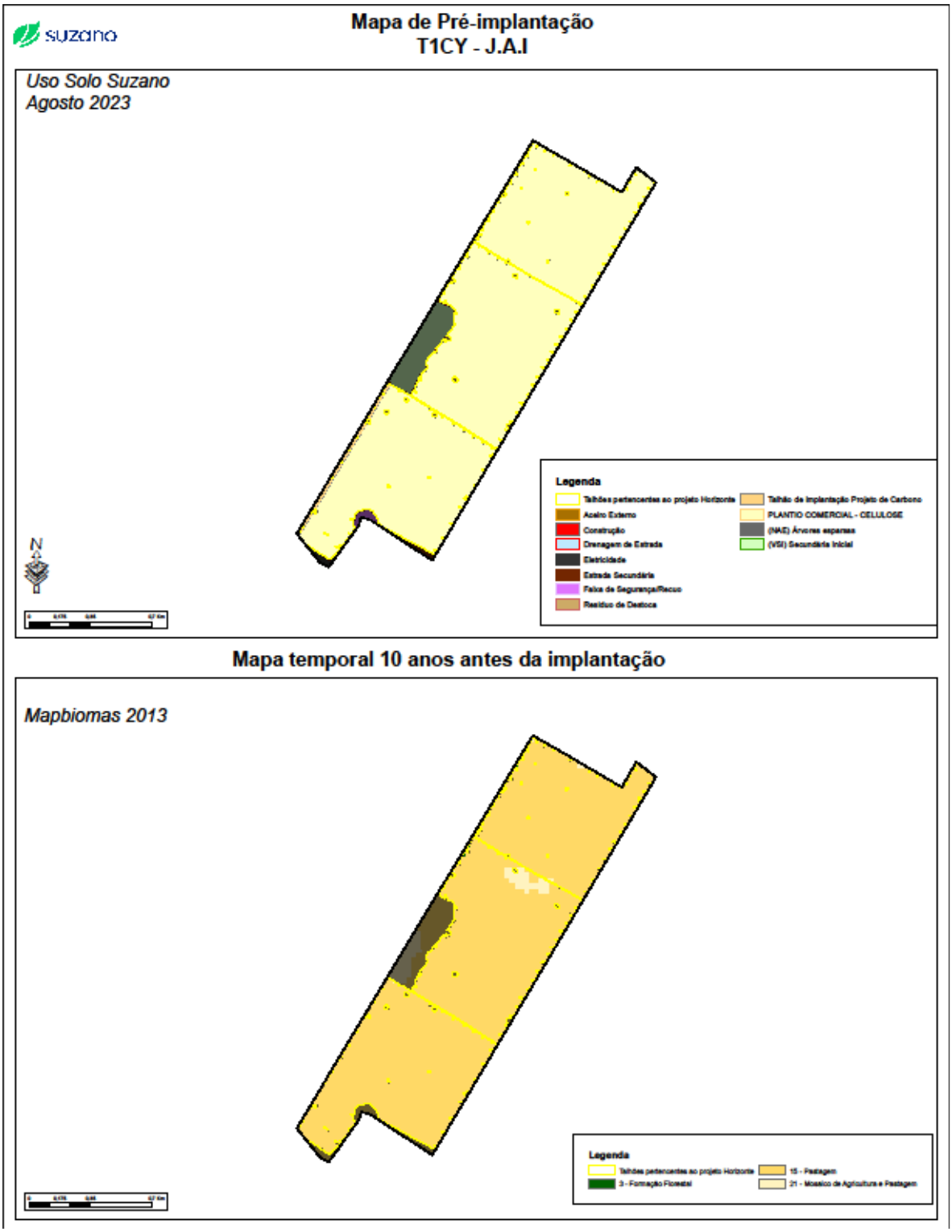


Figure 103 - Map of J.A.I. Pre-Implementation (2023) and 10 years before implementation (2013)

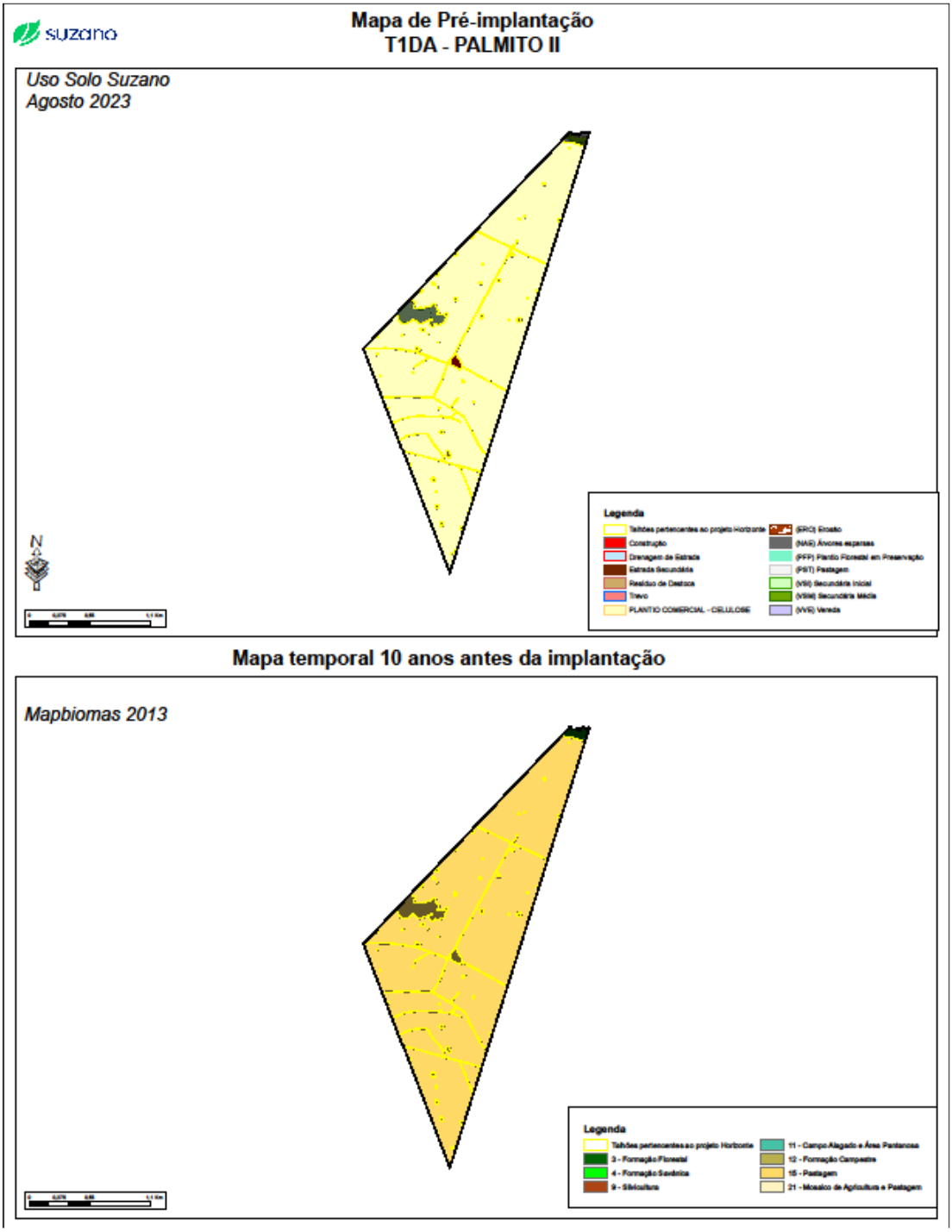


Figure 104 - Map of PALMITO II pre-implementation (2023) and 10 years before implementation (2013)

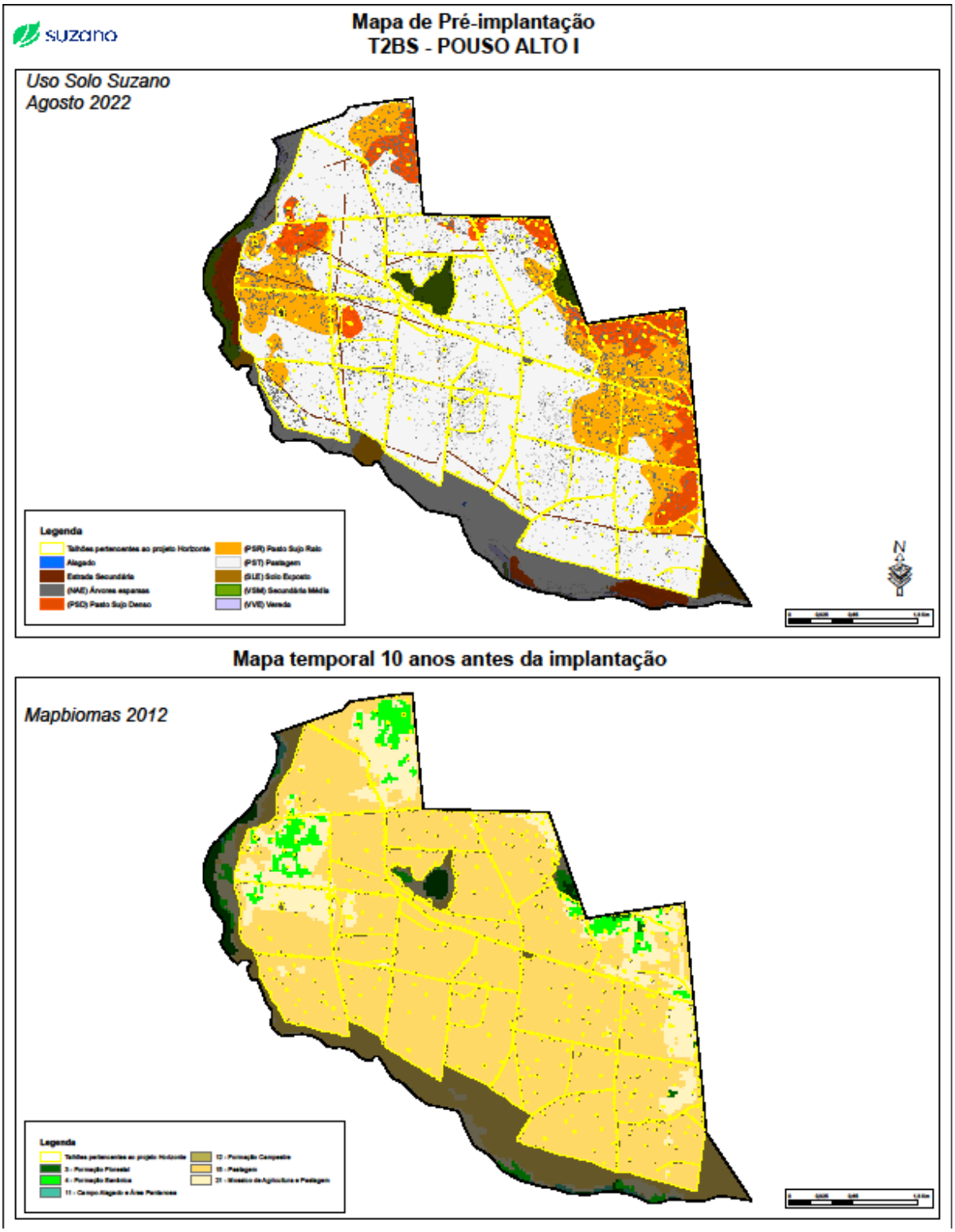


Figure 105 - Map of POUSO ALTO I pre-implementation (2022) and 10 years before implementation (2012)

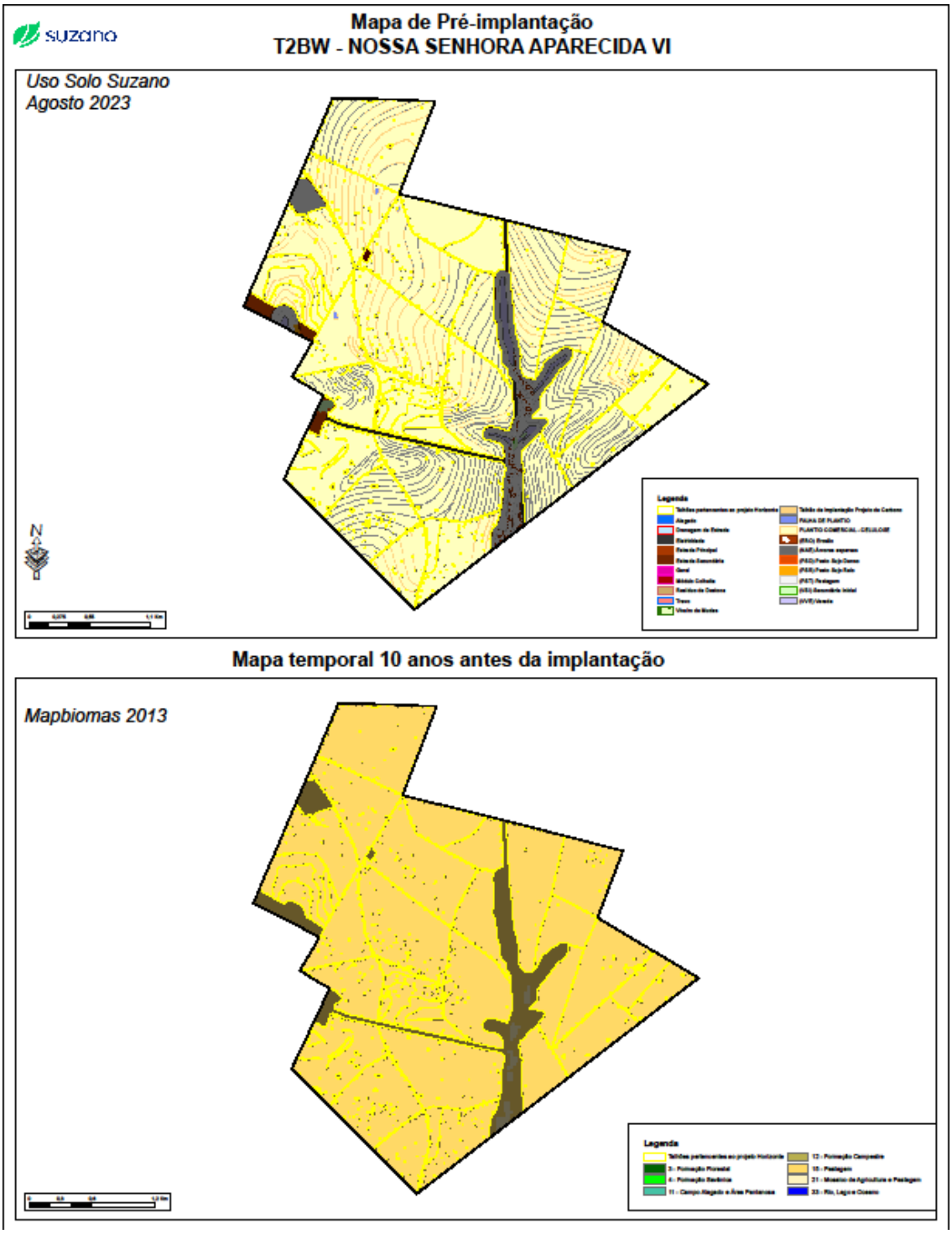


Figure 106 - Map of Pre-Implementation (2023) and 10 years before implementation (2013) of NOSSA SENHORA APARECIDA VI



Figure 107 - Map of SANTA ANGÉLICA pre-implementation (2022) and 10 years before implementation (2012)

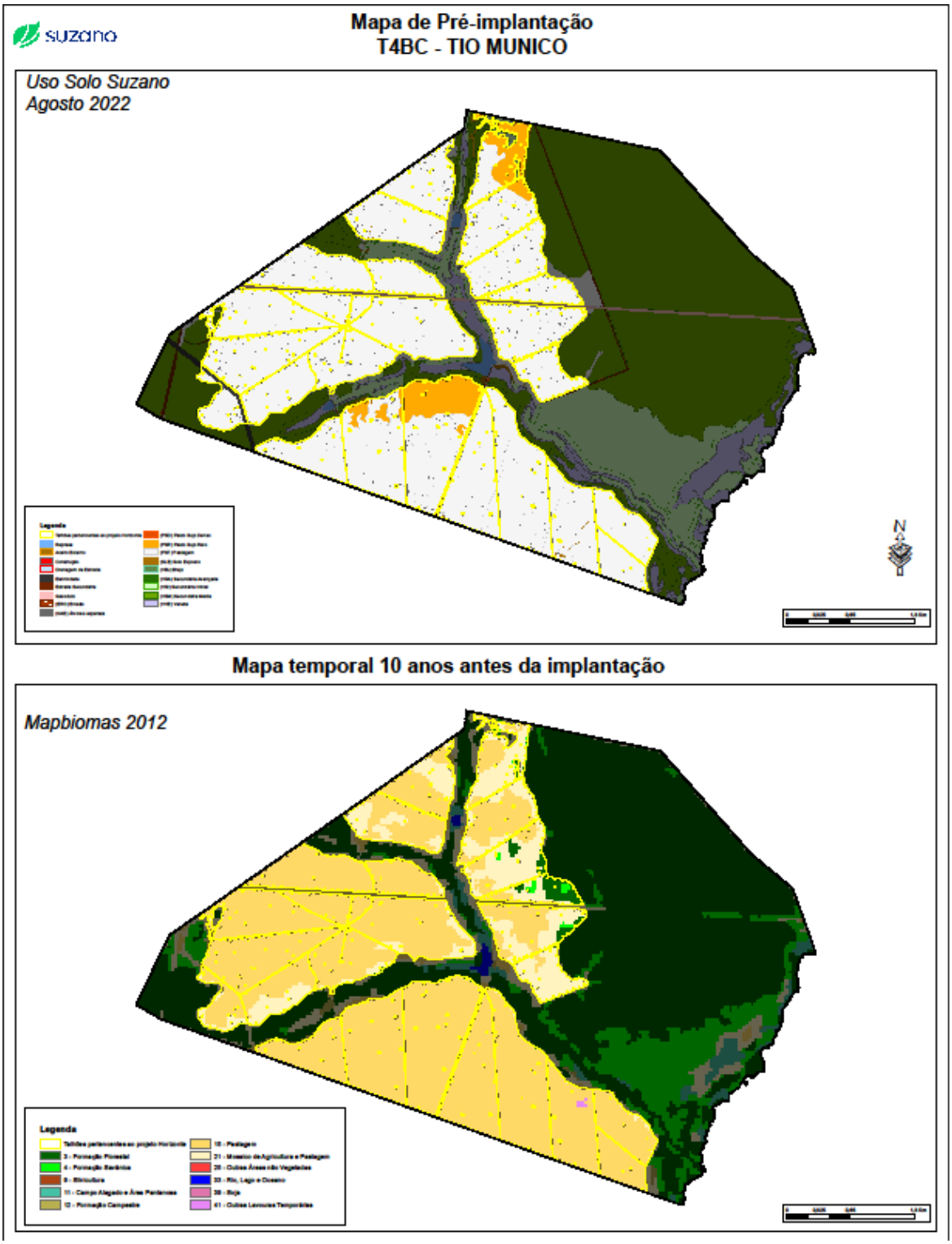


Figure 108 - Map of TIO MUNICO pre-implementation (2022) and 10 years before implementation (2012)

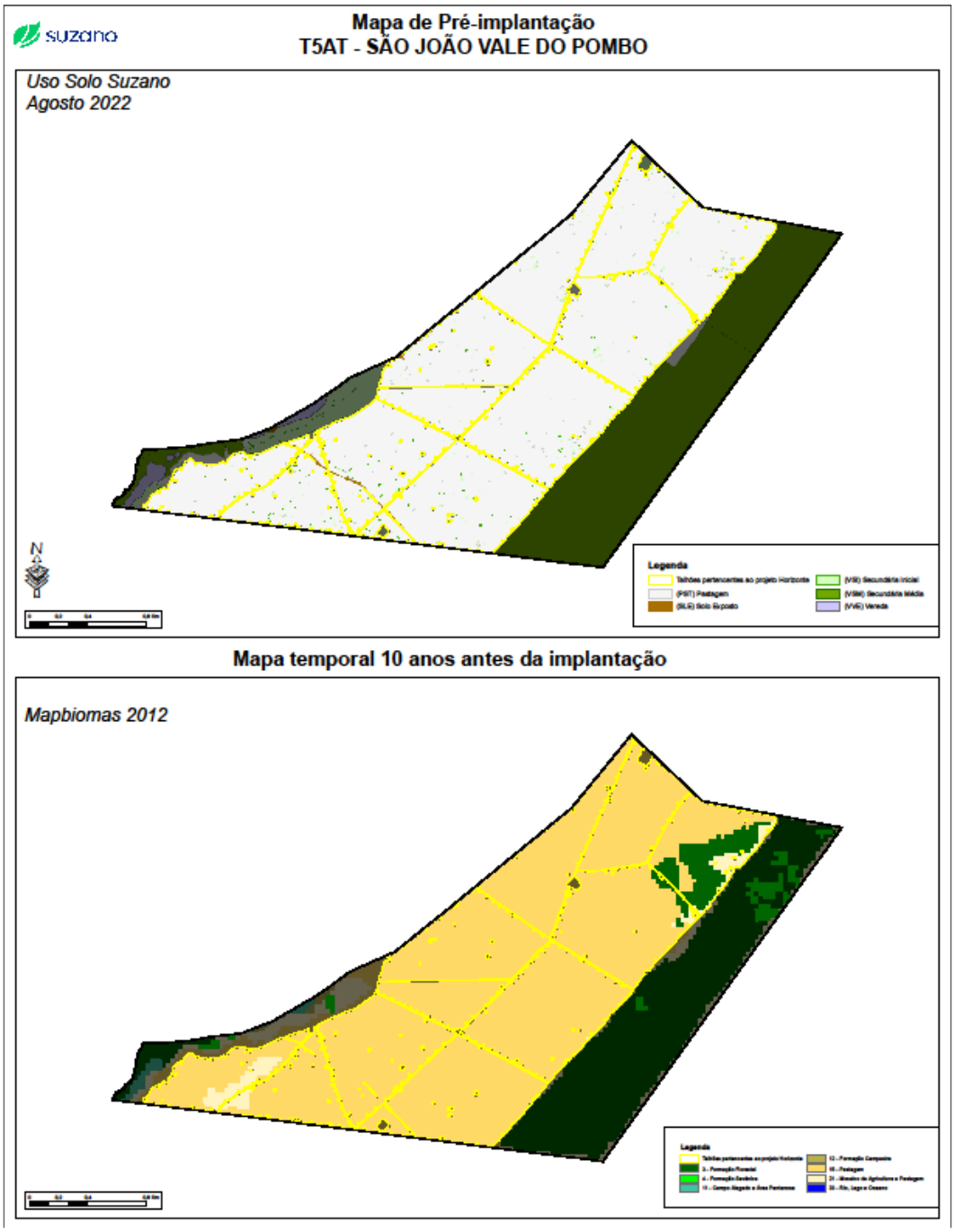


Figure 109 – Map of pre-implementation (2022) and 10 years before implementation (2012) of SÃO JOÃO VALE DO POMBO

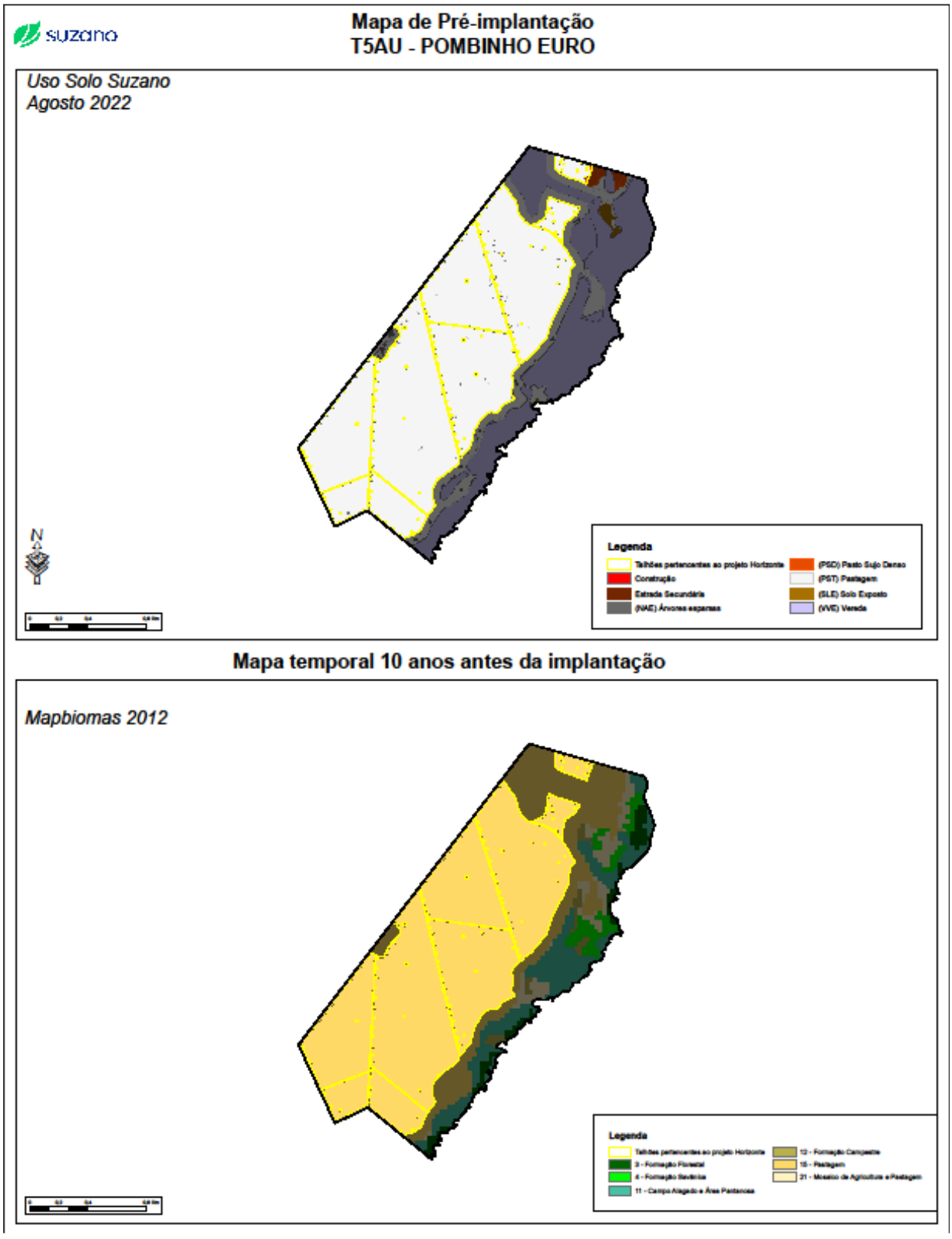


Figure 110 - Map of Pre-Implementation (2022) and 10 years before implementation (2012) of POMBINHO EURO

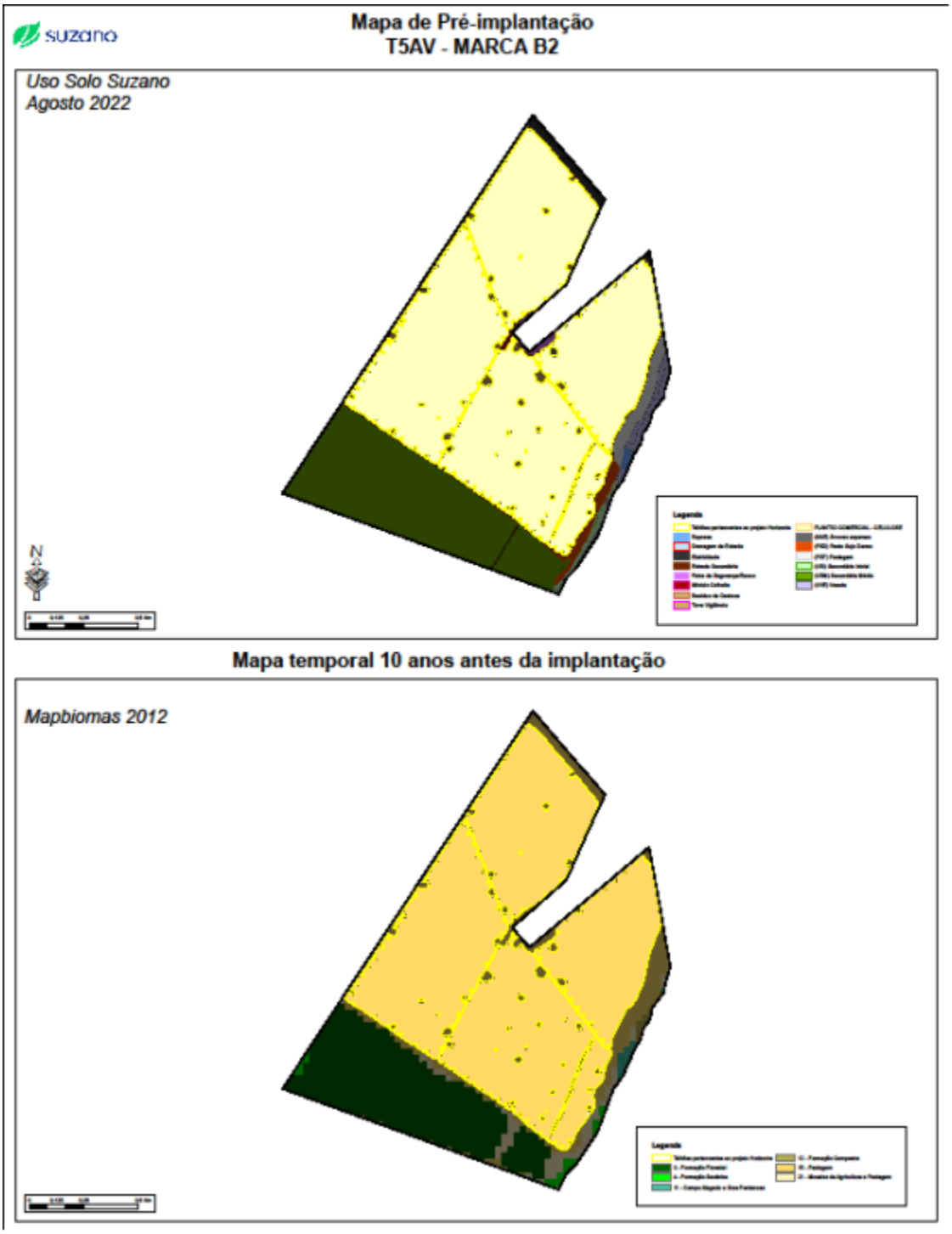


Figure 111 Map of Pre-Implementation (2022) and 10 years before implementation (2012) of MARCA B2

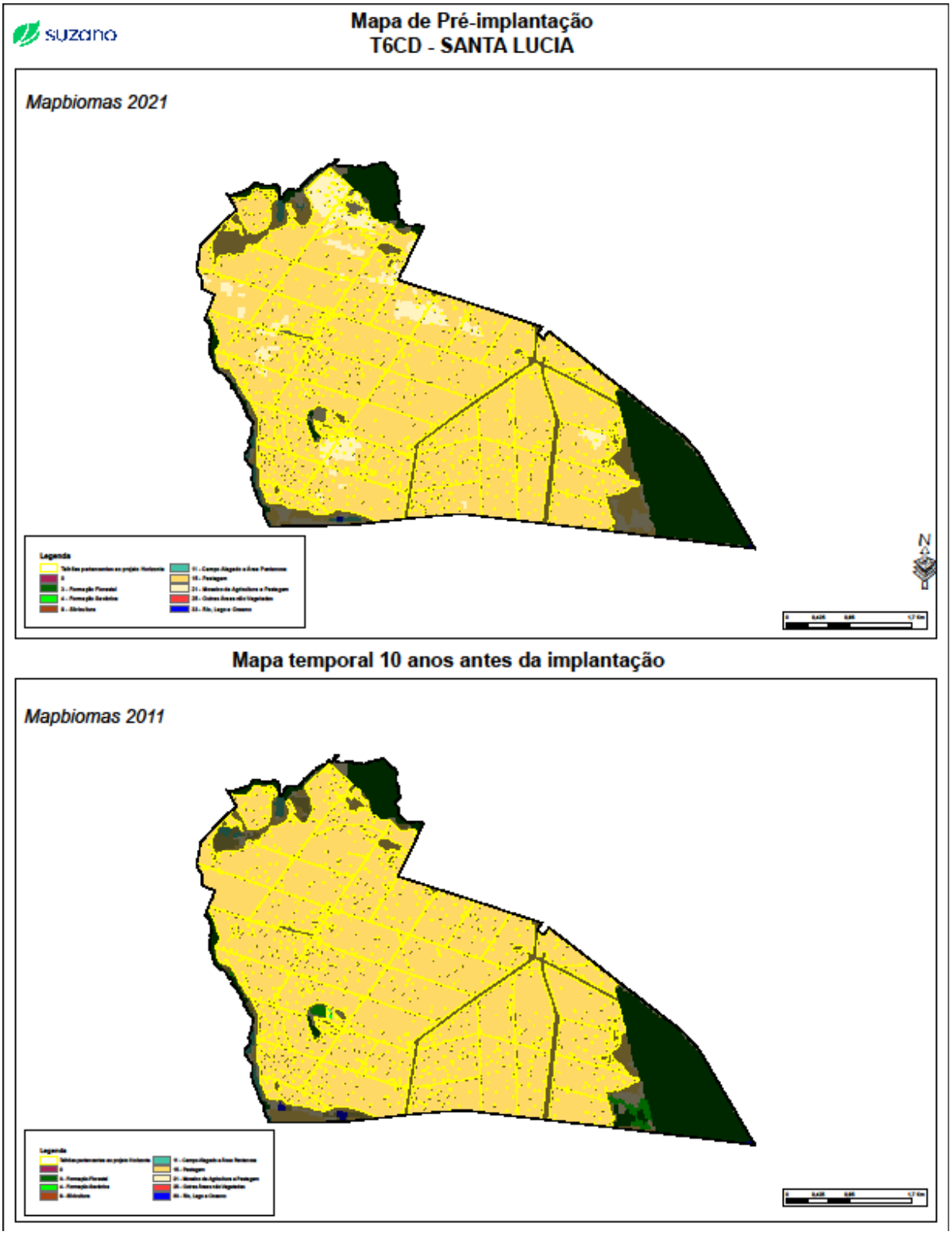


Figure 112 Map of SANTA LUCIA pre-implementation (2021) and 10 years before implementation (2011)

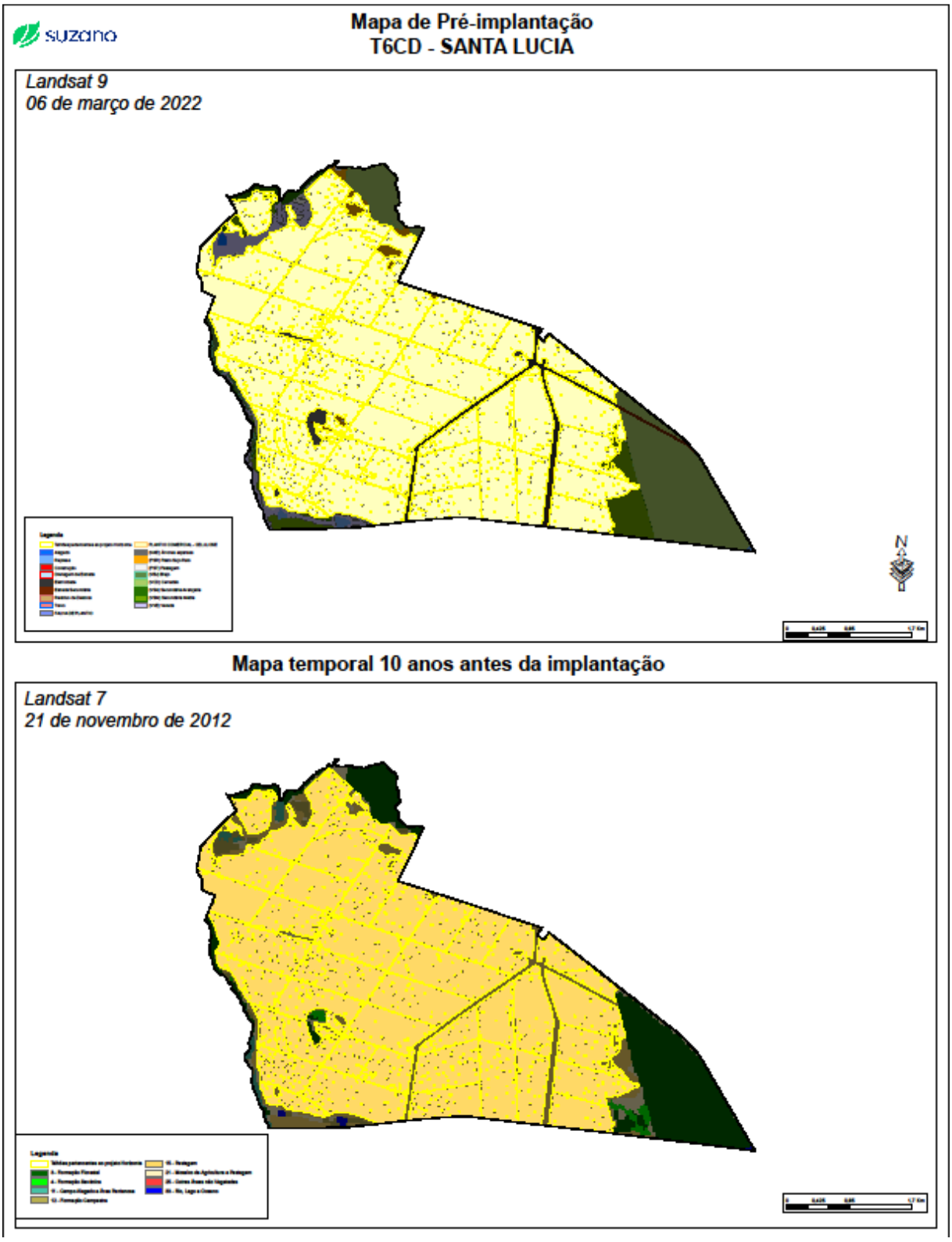


Figure 113 Map of SANTA LUCIA pre-implementation (2022) and 10 years before implementation (2012)



Figure 114 Map of VALE DOURADO pre-implementation (2022) and 10 years before implementation (2012)

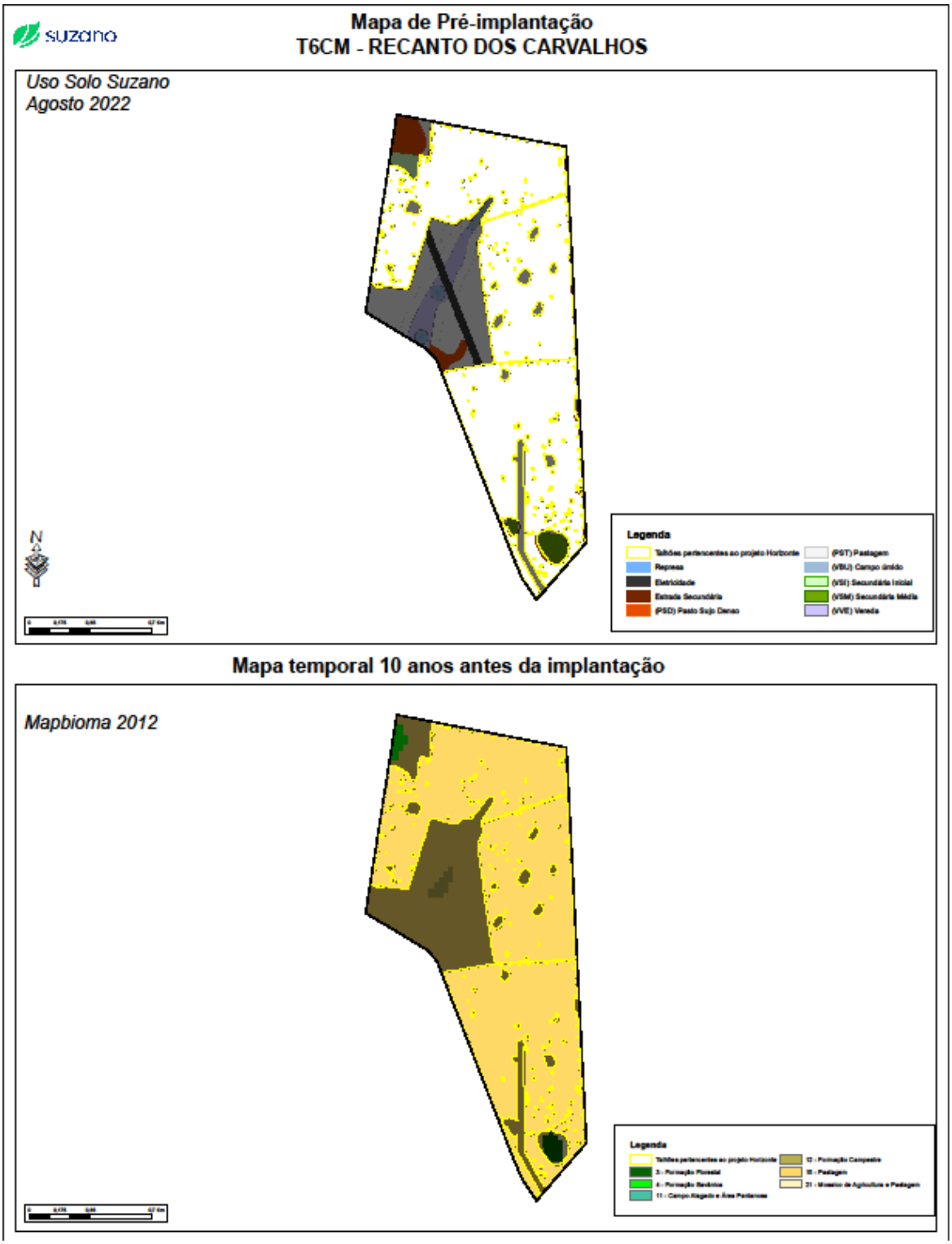


Figure 115 Map of RECANTO DOS CARVALHOS pre-implementation (2022) and 10 years before implementation (2012)

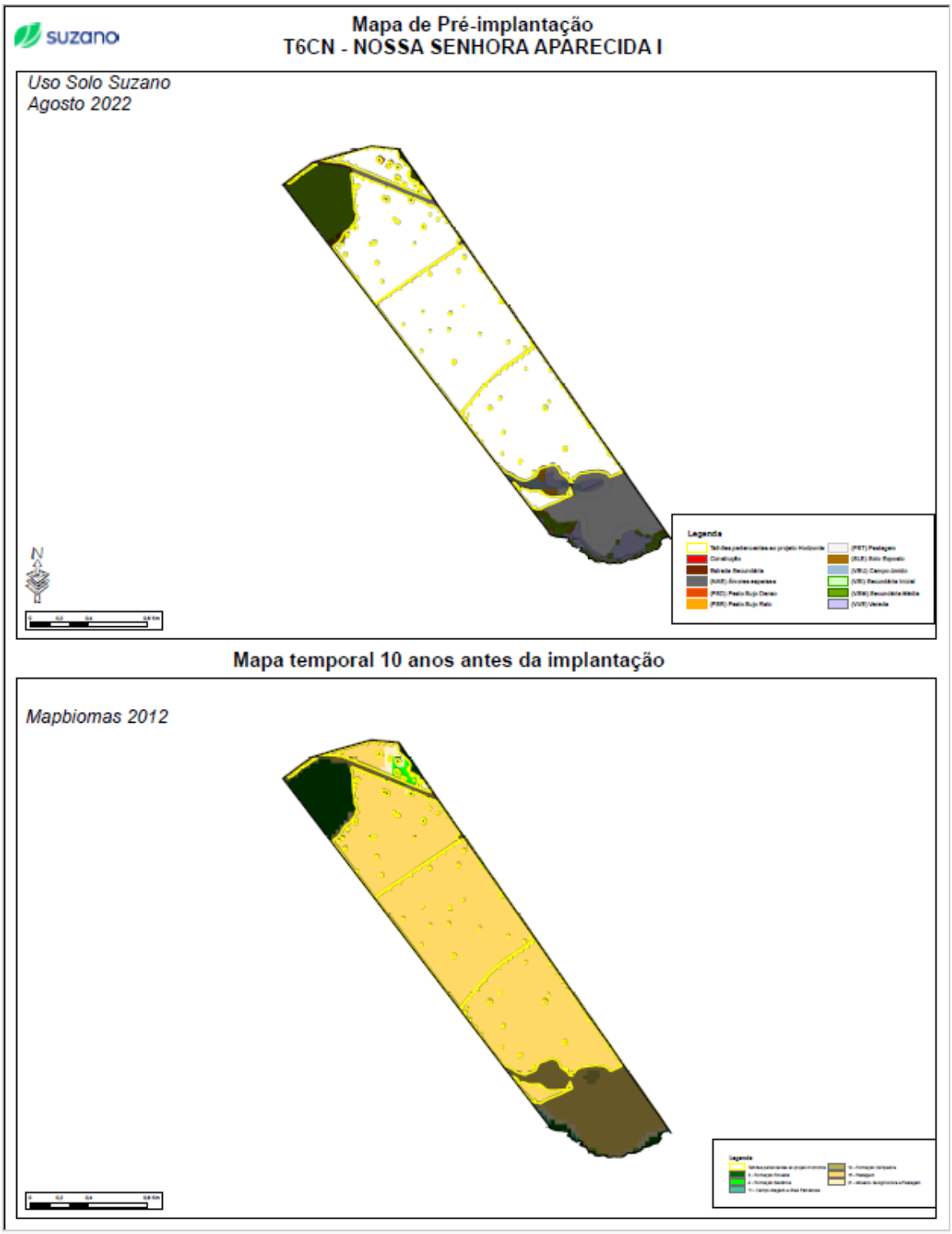


Figure 116 Map of NOSSA SENHORA APARECIDA I pre-implementation (2022) and 10 years before implementation (2012)

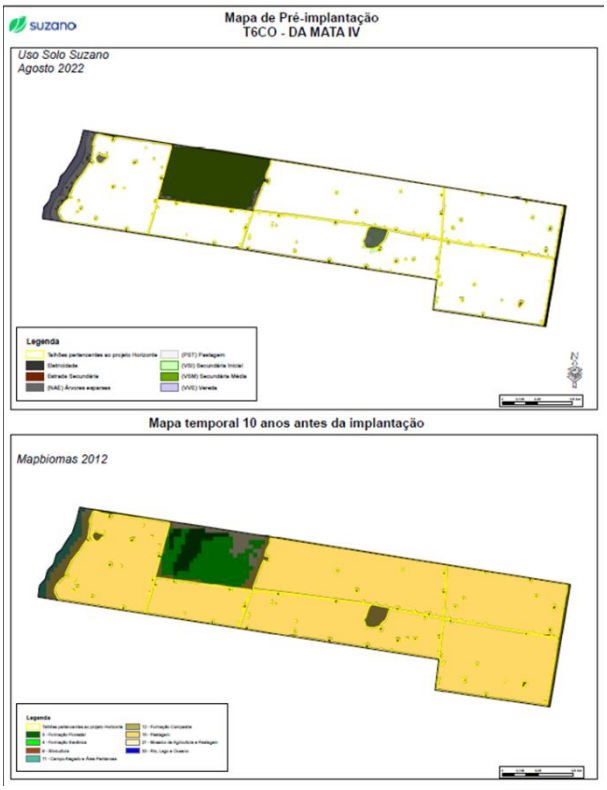


Figure 118 Map of DA MATA IV pre-implementation (2022) and 10 years before implementation



Figure 119 Map of ESPERANÇA pre-implementation (2022) and 10 years before implementation (2012)

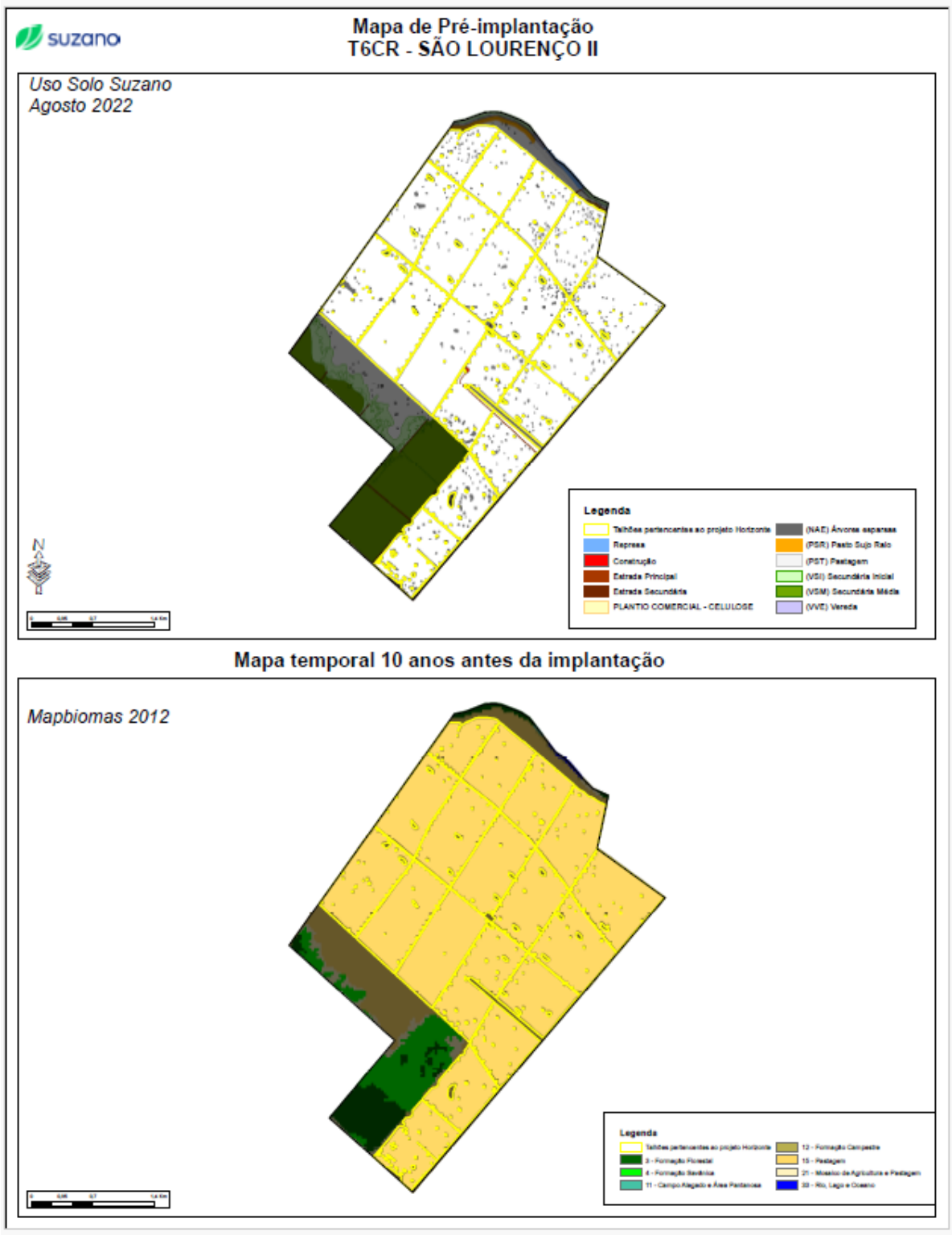


Figure 117 Map of SÃO LOURENÇO II pre-implementation (2022) and 10 years before implementation (2012)



Figure 118 Map of MARIANA pre-implementation (2022) and 10 years before implementation (2012)

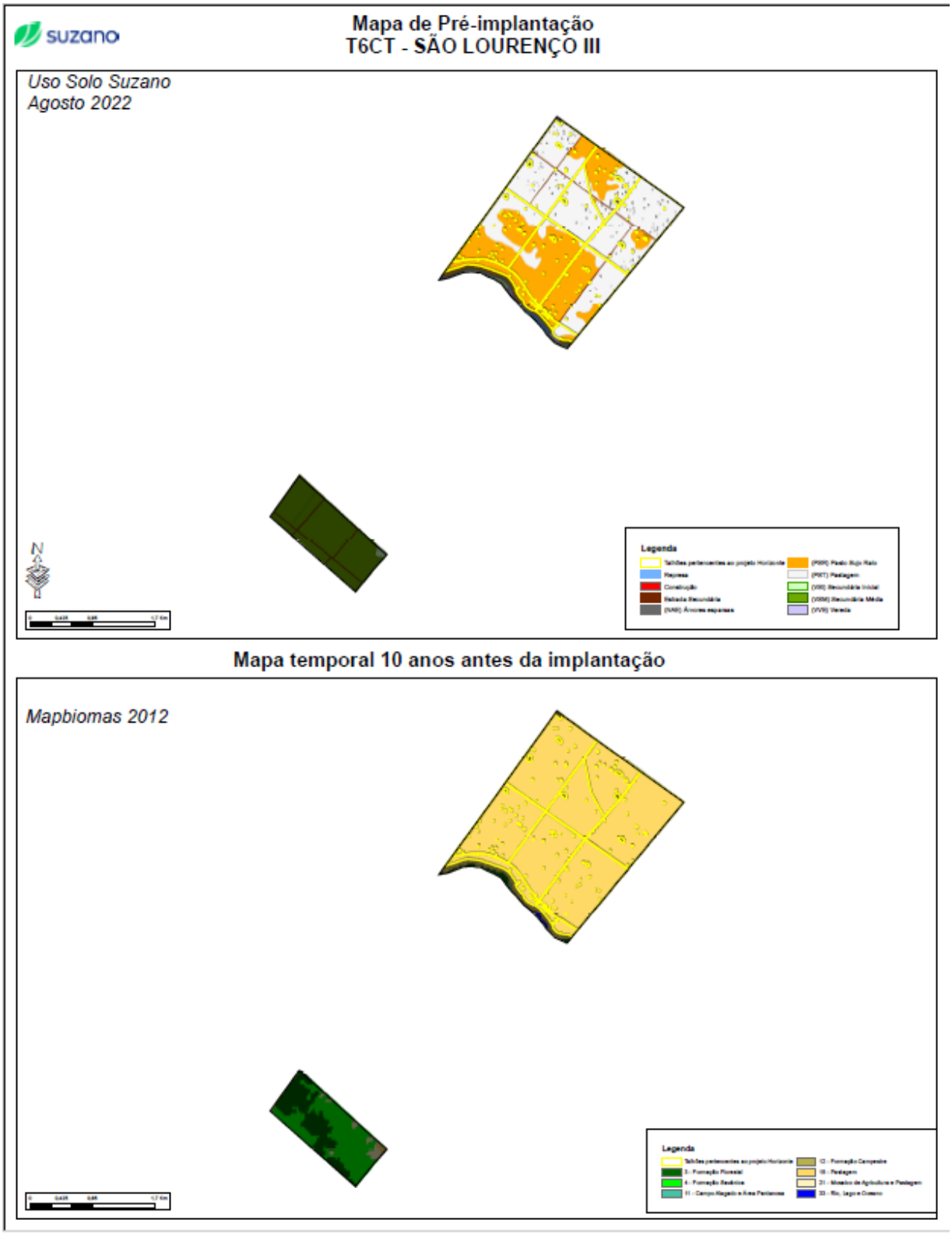


Figure 119 Map of SÃO LOURENÇO III pre-implementation (2022) and 10 years before implementation (2012)

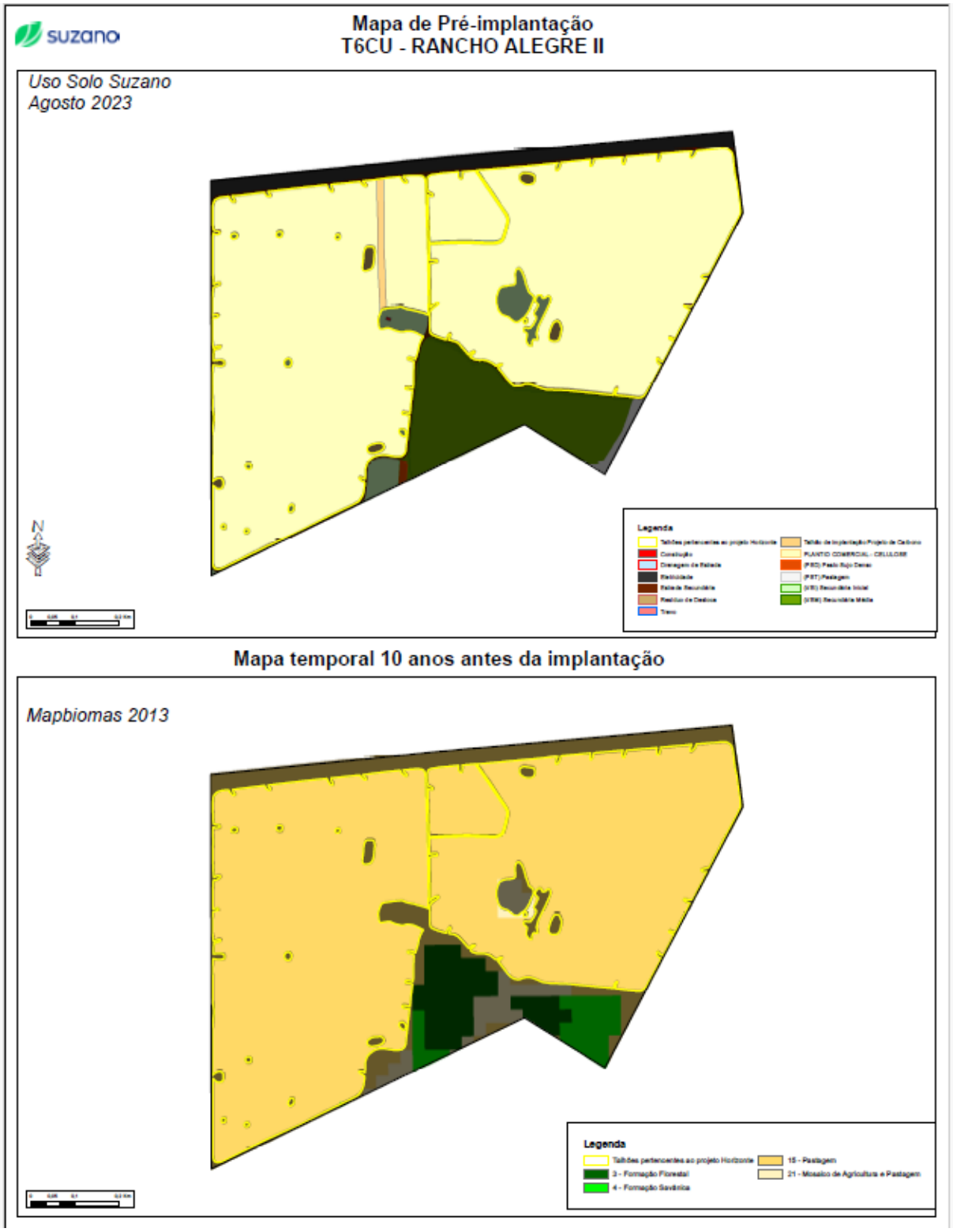


Figure 120 Map of RANCHO ALEGRE II pre-implementation (2023) and 10 years before implementation (2013)

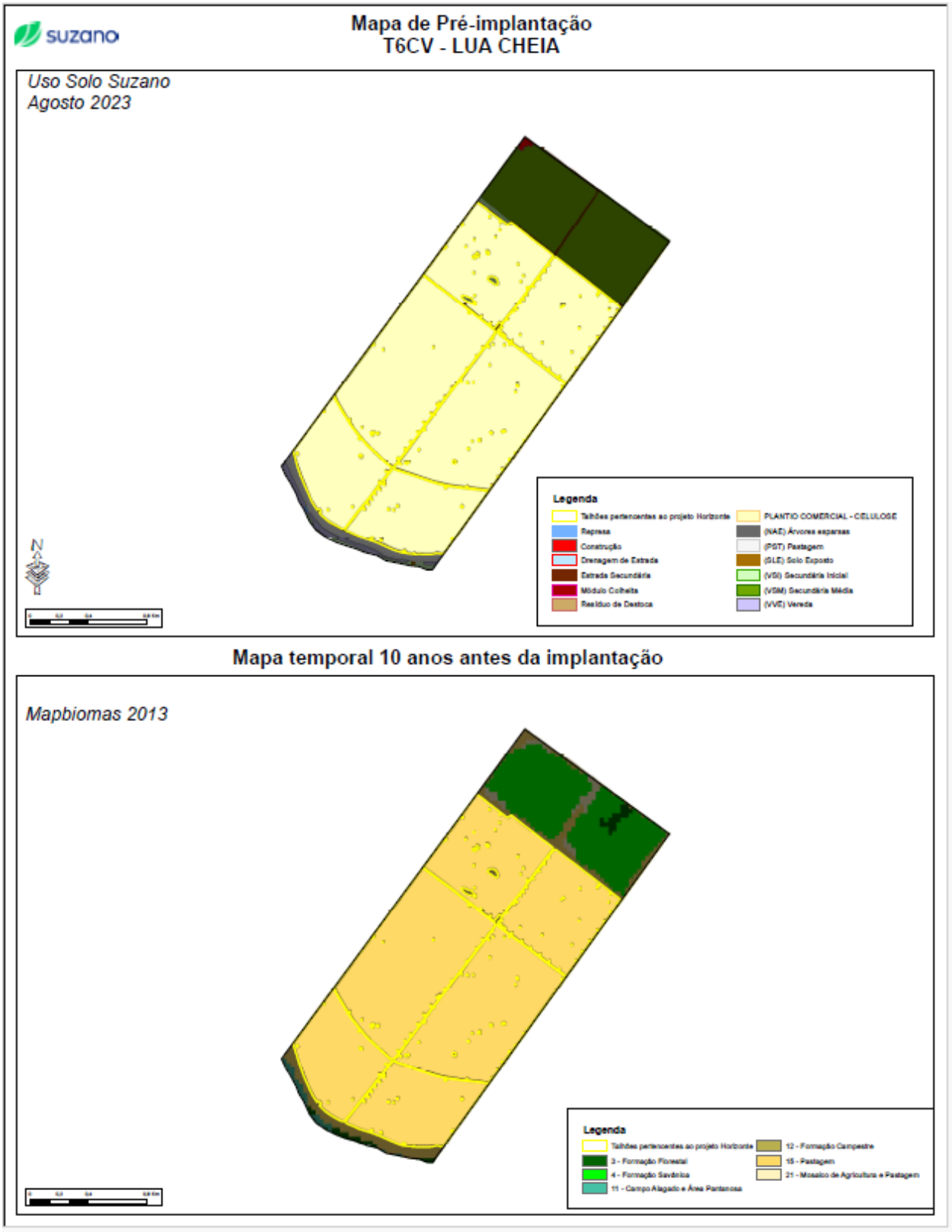


Figure 121 Map of LUA CHEIA pre-implementation (2023) and 10 years before implementation (2013)



Figure 122 Map of BANDEIRANTES pre-implementation (2022) and 10 years before implementation (2012)

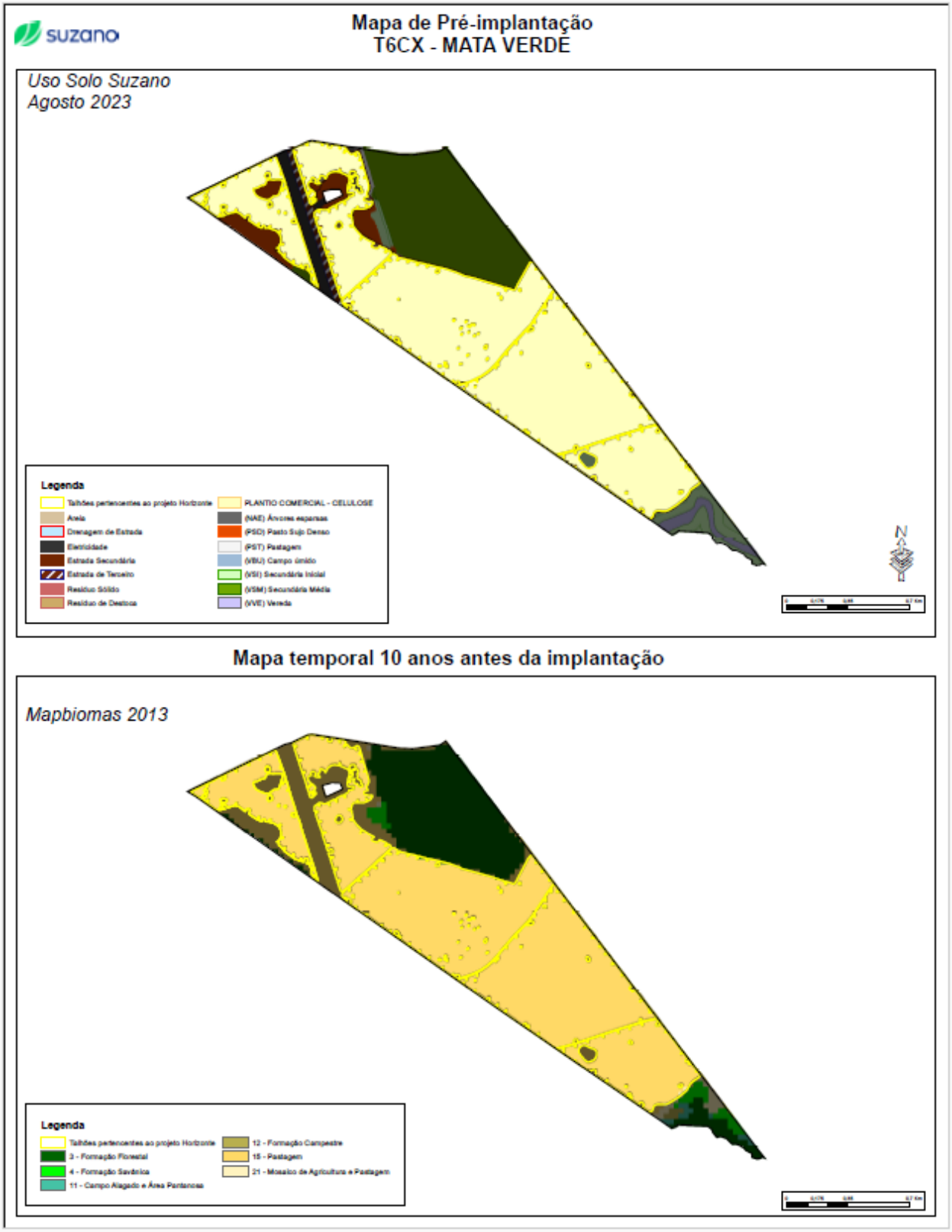


Figure 123 Map of MATA VERDE pre-implementation (2023) and 10 years before implementation (2013)

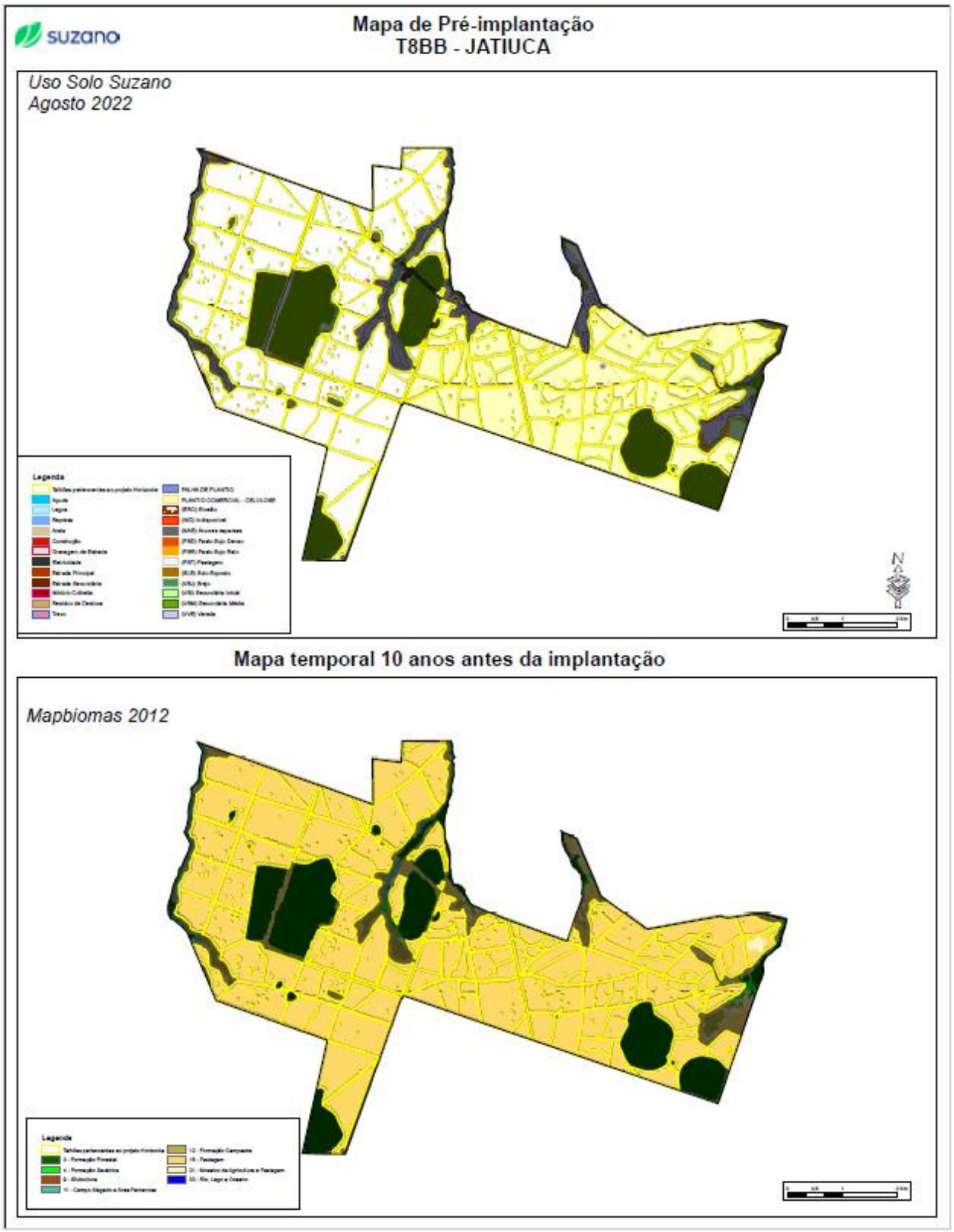


Figure 124 Map of JATIUCA pre-implementation (2022) and 10 years before implementation (2012)

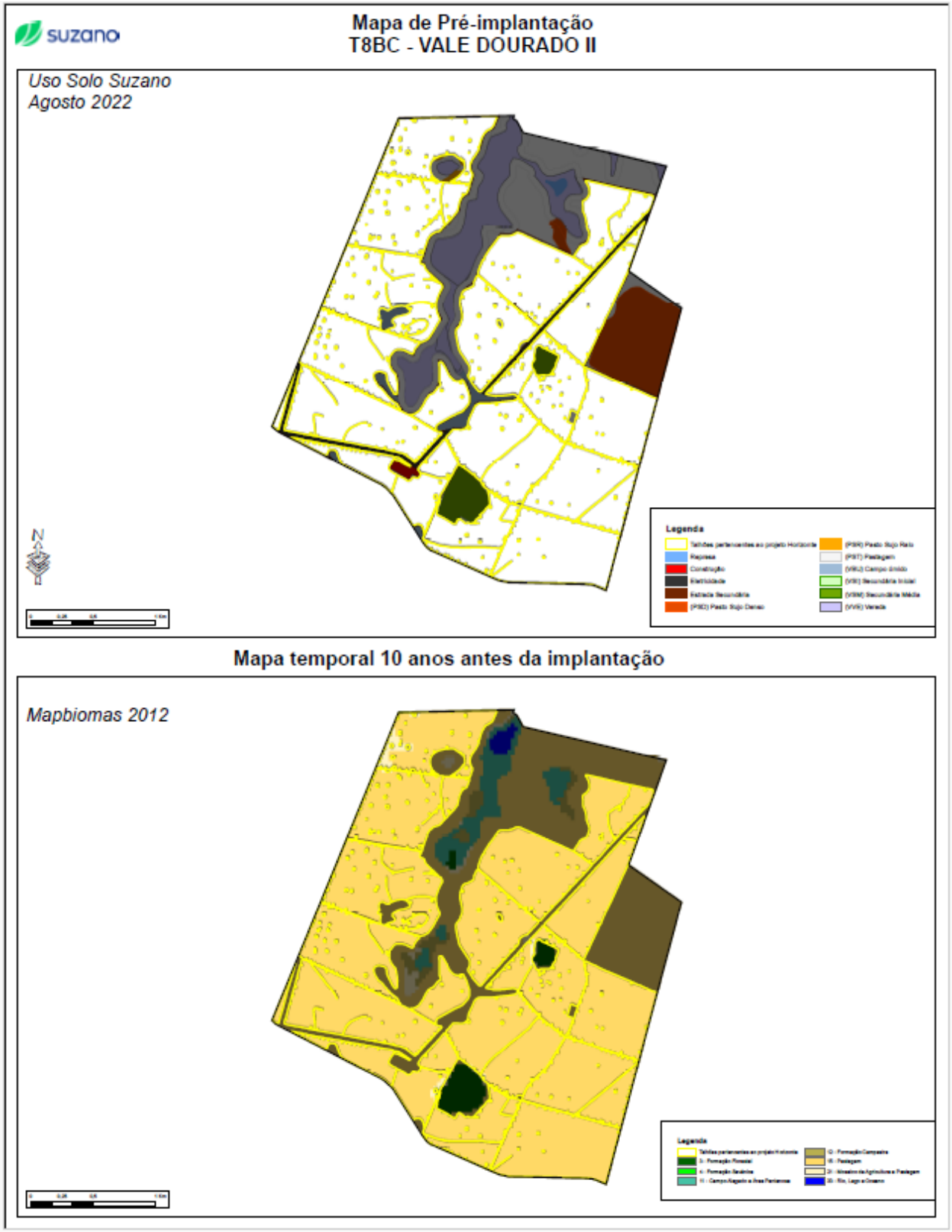


Figure 125 Map of VALE DOURADO II pre-implementation (2022) and 10 years before implementation (2012)

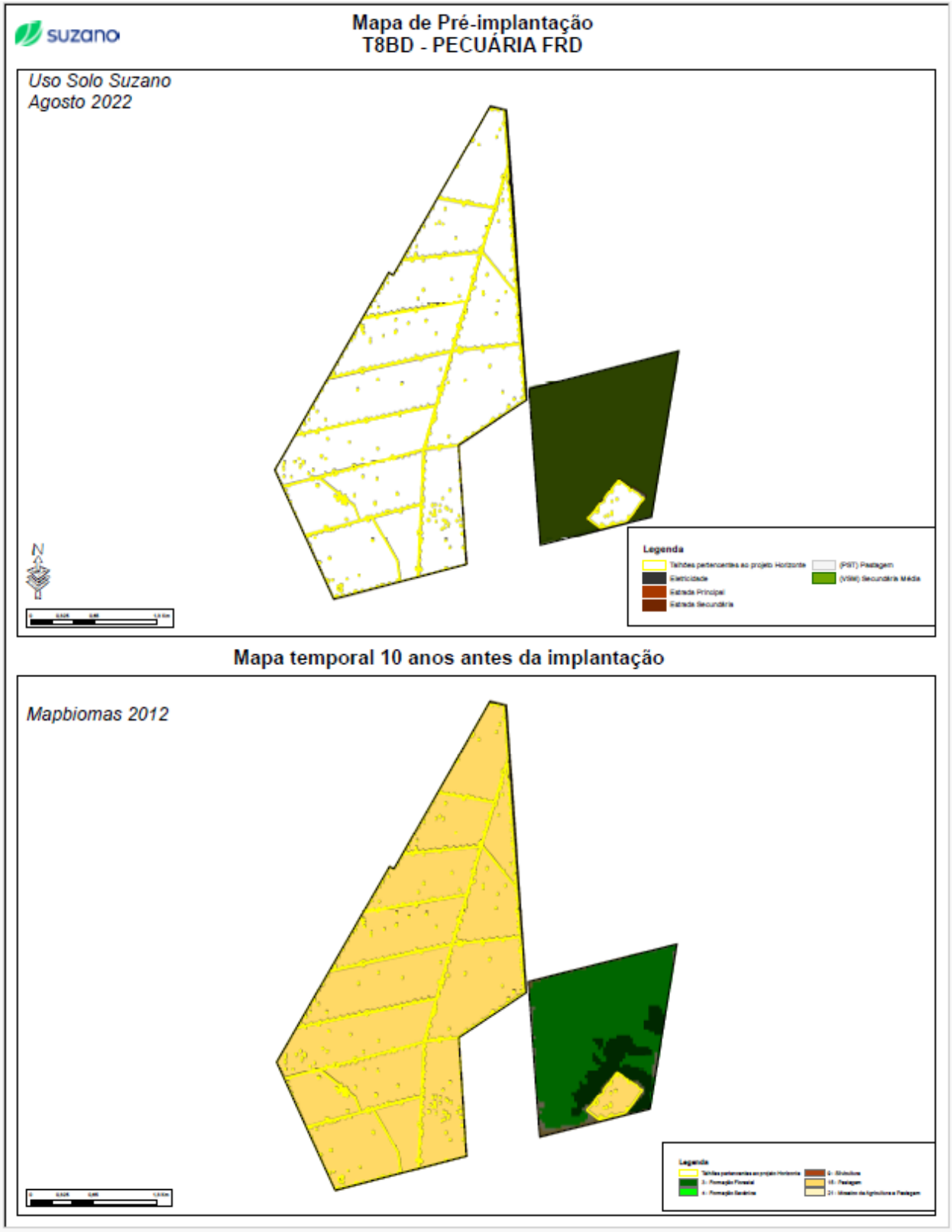


Figure 126 Map of PECUÁRIA FRD pre-implementation (2022) and 10 years before implementation (2012)

With the inclusion of new instances in the project area, there has not been nor will occur the degradation of any hydrological functions. In addition to restrictive laws, where a Permanent Preservation Area (APP) is created in the presence of water, there are no water courses within the project areas where commercial plantation will be implemented. Thus, the region and biome where the project area is located are not categorized as wetland areas and no draining activities will be conducted. The image below shows the water courses at the project region and APPs, where no project activity will be implemented. Moreover, it is important to highlight how Suzano is concerned about water resources where it operates. There is a dedicated process to assess and analyse hydrological conditions, where monthly and annual reports are structured to control the ecosystems where operations occur. This procedure is based on qualitative and quantitative data measured on site to identify water quality, flow rate and rainfall.

Eligibility Criteria for New PAIs

Grouped projects shall include one or more sets of eligibility criteria for the inclusion of new project activity instances. At least one set of eligibility criteria for the inclusion of new project activity instances shall be provided for each combination of project activity and geographic area specified in the project description. A set of eligibility criteria shall ensure that new project activity instances:

1) Meet the applicability conditions set out in the methodology applied to the project:
   all instances under the ARR Horizonte Carbon Project must meet the applicability conditions set out in the AR-ACM0003 methodology. Regarding the initial instances, the applicability conditions are met as demonstrated:
   I. **The lands subject to the project activity does not fall in wetland category.** The lands new instances included in this monitoring event are not categorized as wetland areas and no draining activities will be conducted (see figures above).
   II. **Soil disturbance attributable to the project activity does not cover more than 10 per cent of area in each of the following types of land, when these lands are included within the project boundary: (i) Land containing organic soils; (ii) Land which, in the baseline, is subjected to land-use and management practices and receives inputs listed in appendices 1 and 2 of the methodology.** None of the news instances included in this project are located at lands containing organic soils (see figures above). In addition, is important to highlight that Suzano thrives to implement best practices available at the

market, in line with FSC and other quality standards. Only the subsoiling procedure can cause disturbance to the soil, where a stem is used. Furthermore, it is based on the principle for minimum cultivation, where soil disturbance is as minimal as possible, maintaining all plant residues as coverage. Subsoiling activities are also monitored and controlled.

2) **Use the technologies or measures specified in the project description:** The technologies and measures available are detailed in sections 3.1 and 4.3 and, and follows the same steps and tools used in the project description and the first verification of the initial instances. To standardize the measurement procedures, Suzano established a comprehensive manual for field activities, named Field Activities Manual. It indicates tools to be used, shows how activities must be done, and which must be followed by all personal conducing field measurement activities in all properties owned or leased by Suzano.
3) **Apply the technologies or measures in the same manner as specified in the project description**: The applied technologies and measures are detailed in sections 3.1 and 4.3, and follows the same steps and tools described in the project description and the first verification of the initial instances.
4) **Are subject to the baseline scenario determined in the project description for the specified project activity and geographic area:** as described in section 3.3, all new instances follow the same baseline determined in the project description. In this sense, the ARR Horizonte Carbon Project new instances assumes as the initial baseline scenario large areas of grassland with sparse trees in landscape (see Figures above).
5) **Have characteristics with respect to additionality that are consistent with the initial instances for the specified project activity and geographic area**. The new project activity instances have financial, technical and/or other parameters (such as the size/scale of the instances) consistent with the initial instances, following the same additionality approach of initial instances that are detailed in the Project description. In this way, the additionality analysis was based on the three plausible scenarios already identified:
    I. Continuation of extensive cattle farming;
    II. Afforestation of the land within the limits of the Project carried out without registration as an AFOLU VCS project activity; and
    III. Land use within the project boundary for soy farming

For the areas with eucalyptus planting, the following set of eligibility criteria is met for new instances as determined in the validated Project Description:

- New areas are certified or seeking certification under a recognized and high-level market sustainability program, for example the FSC. Most of the farms were certified by the FSC in 2022 (FSC report delivered to the VVB team), 2023 (awaiting finalization of the FSC report, but all the documents proving that they passed the audit in 2023 have been delivered to the VVB team) or awaiting certification for 2024. The Santa Lucia farm (T6CD) is planted under the responsibility of the Lacan fund, which is why it is obliged to obtain FSC certification. In the contract with Lacan (made available to the VVB team), item 6.1, letter "m", it is agreed that it is the partner's responsibility to adopt the necessary measures to obtain FSC certification.

- Planted only eucalyptus species from the positive list provided by Suzano;

- The pre-existing land use of the grouped project instance area is degraded pasture.

  The images below, taken by the Marvin Horizon Platform, show the new sites 10 years before the start of the project, proving that they were all degraded pasture areas. Marvin (https://www.marvinblue.earth) is a climate tech company developing technologies to enable companies adopt digital practices for land use management and carbon project auditing. Marvin Horizon platform fuses peer-reviewed data sources, advanced remote sensing techniques and primary data collection pipelines to streamline feasibility and eligibility assessments for carbon project development.

  The following data sources were used to assemble evidence for this monitoring report.

  1. Satellite Imagery: Marvin provides a harmonized collection of satellite imagery, using quarterly-based cloud-free image mosaics from the following satellite constellations:

  1999 - 2013: NASA Landsat 7 (30m resolution)

  2013 - 2018: NASA Landsat 8 (30m resolution)

  2019 - Present: ESA Sentinel 2 (10m resolution)

  The platform automatically prioritizes imagery with highest resolution available during the assessment period. The images undergo atmospheric correction (Surface Reflectance, bottom of atmosphere) and cloud cover filtering according to best practices on Google Earth Engine.

  2. Land Cover and Land Use maps: As supplementary evidence, the platform integrates MapBiomas Collection 8 maps, which includes annual land cover and land use

maps and data for Brazil for the period from 1985 to 2022. This collection is the result of 8 years of work by the MapBiomas project and is in constant development.

3. Pastureland Degradation maps: The Atlas of Pastures, open to the public, was developed by the Image Processing and Geoprocessing Laboratory of the Federal University of Goiás (Lapig/UFG), to facilitate the access to results and products generated within the MapBiomas initiative, regarding Brazilian pastures. It provides access to six databases: (1) mapping of lands used for pastures in Brazil; (2) mapping of quality of those pastures; (3) mapping of pastures carbon stocks in the Cerrado biome; (4) information on the Brazilian cattle herd analyzed from municipalities survey of livestock (IBGE); (5) time series of land use and land cover classification through visual inspection of Landsat satellites data; (6) ground truth data of pastures condition obtained through field campaigns carried out by Lapig's teams.

Project operational data: The platform aggregates primary data collected by the project developer to manage and ease manual workflows and facilitate audit processes.

To see more details, the VVB team will be able to access Marvin's platform, which allows them to interact with the maps.

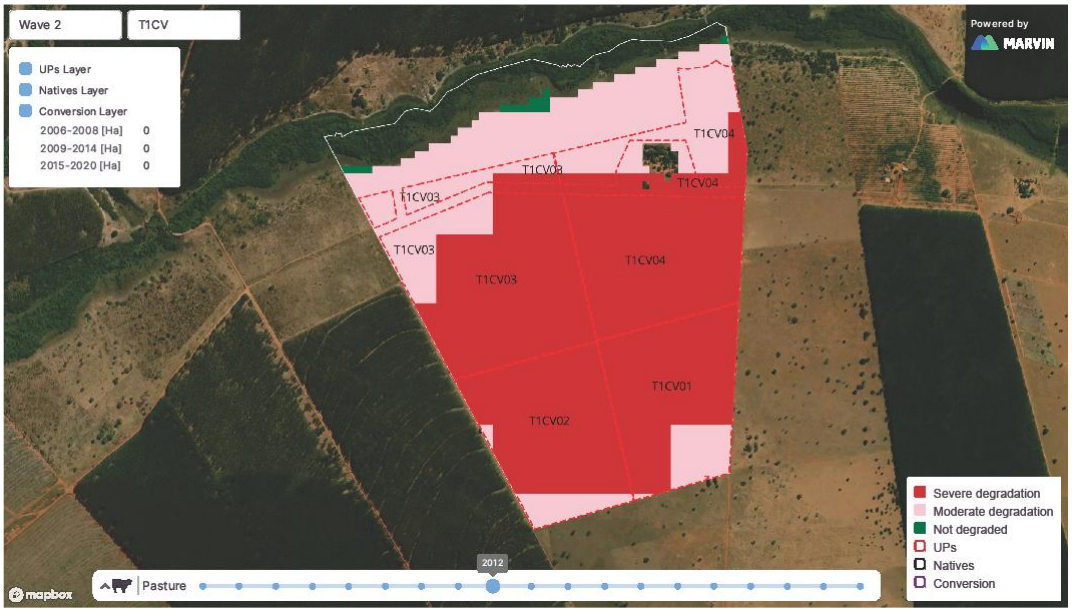


Figure 127 Degraded pasture area 10 years before the start of the verification period - TAQUARUSSU III

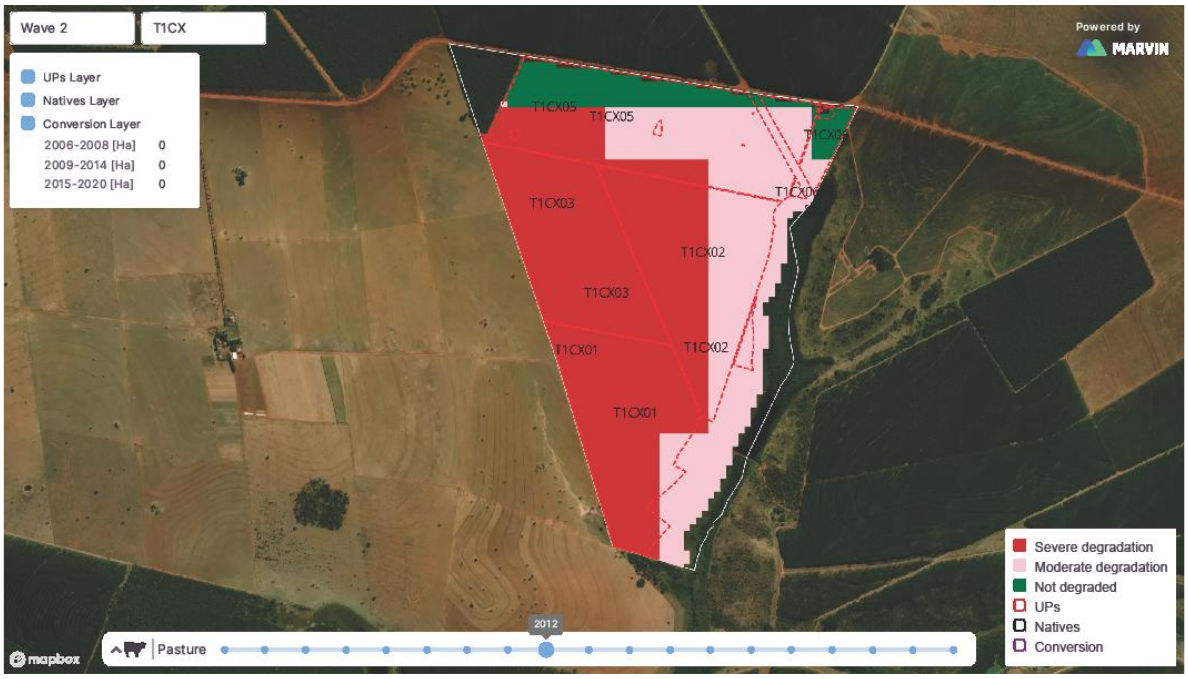


Figure 128 Degraded pasture area 10 years before the start of the verification period - SÃO JOÃO JY

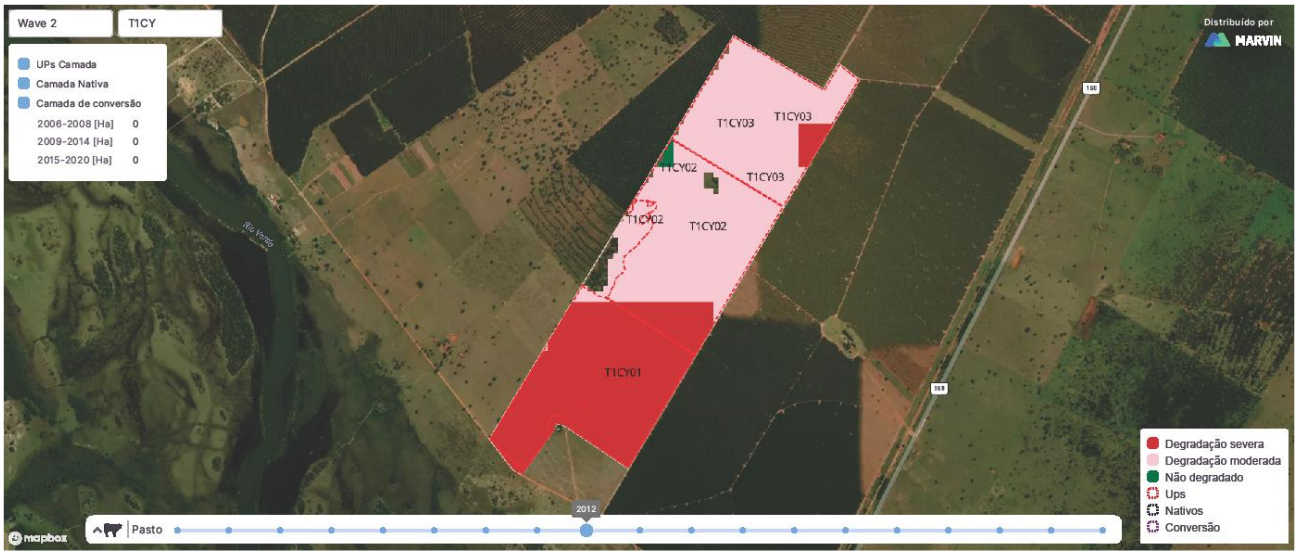


Figure 129 Degraded pasture area 10 years before the start of the verification period - J.A.I

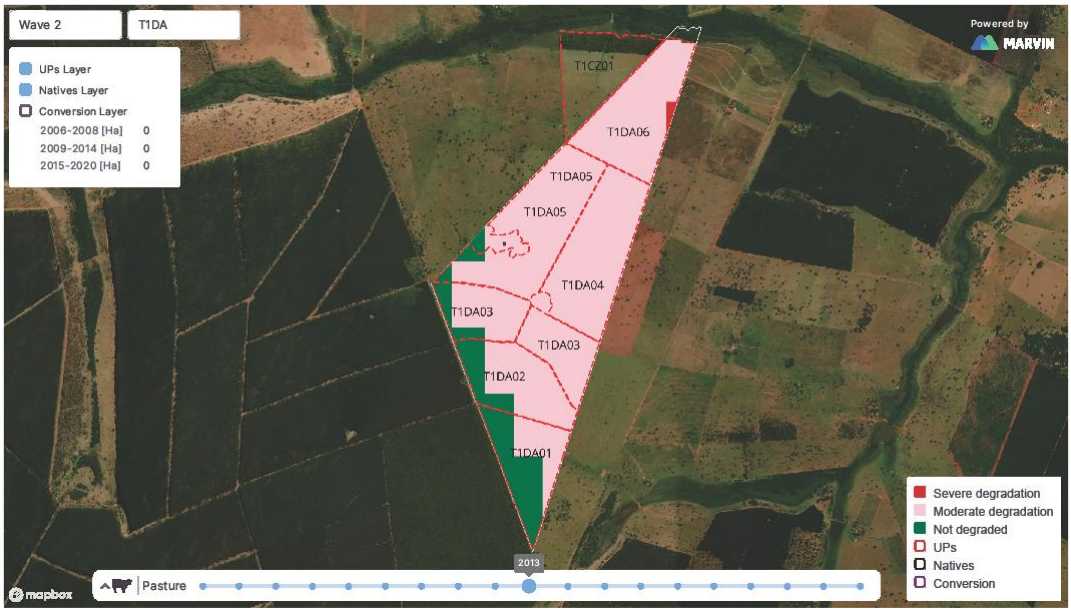


Figure 130 Degraded pasture area 10 years before the start of the verification period - PALMITO II

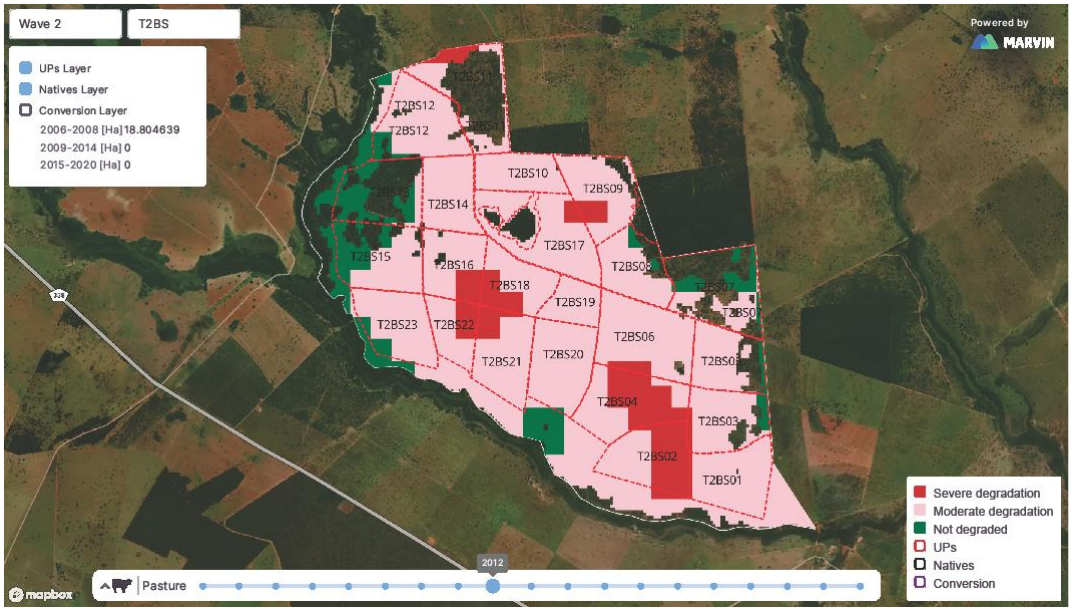


Figure 131 Degraded pasture area 10 years before the start of the verification period - POUSO ALTO I



Figure 132 Degraded pasture area 10 years before the start of the verification period - NOSSA SENHORA APARECIDA VI

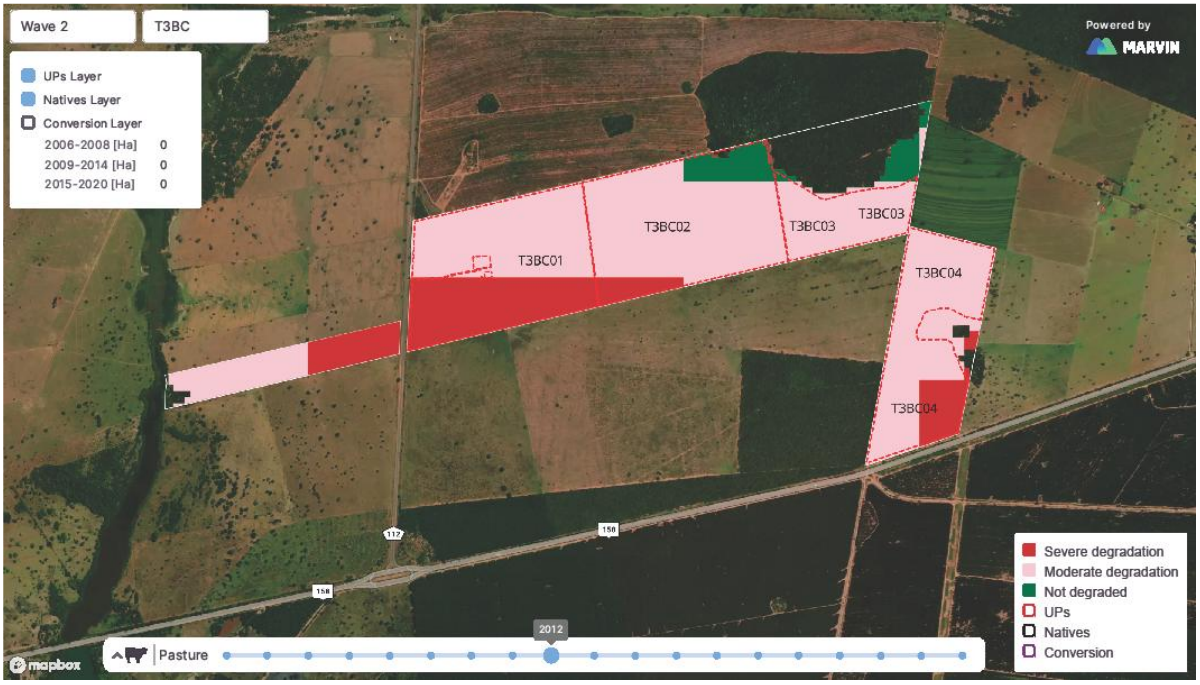


Figure 136 Degraded pasture area 10 years before the start of the verification period - SANTA ANGÉLICA

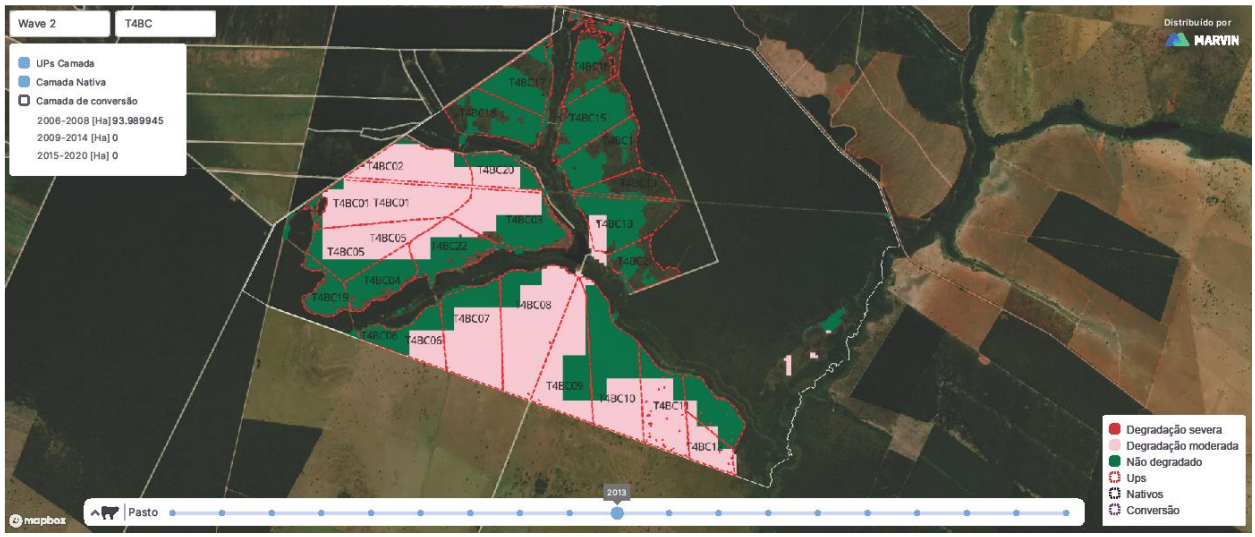


Figure 137 Degraded pasture area 10 years before the start of the verification period - TIO MUNICO

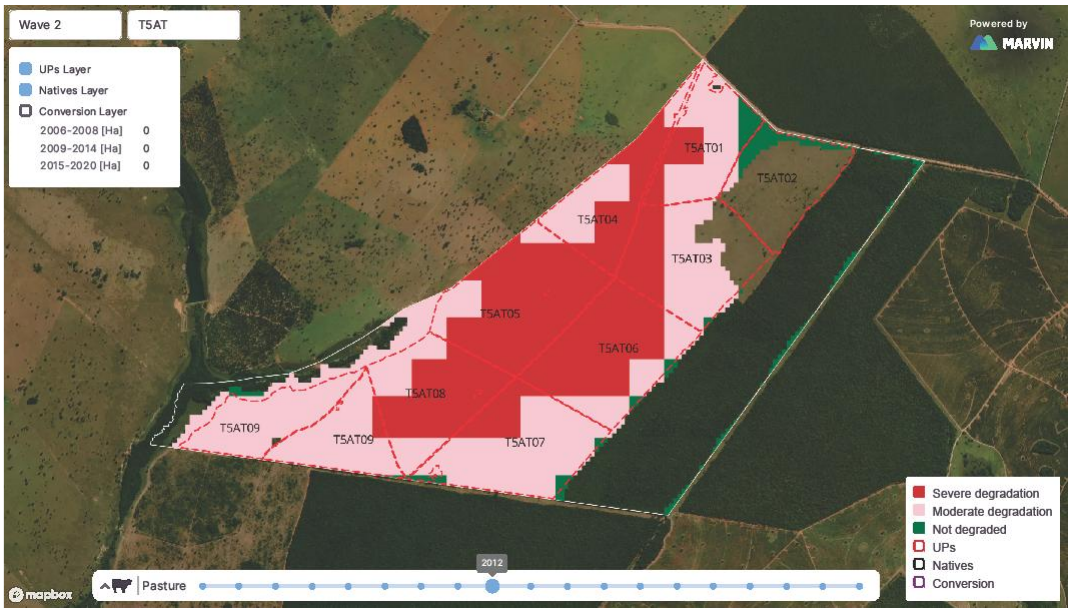


Figure 138 Degraded pasture area 10 years before the start of the verification period – SÃO JOAO VALE DO POMBO

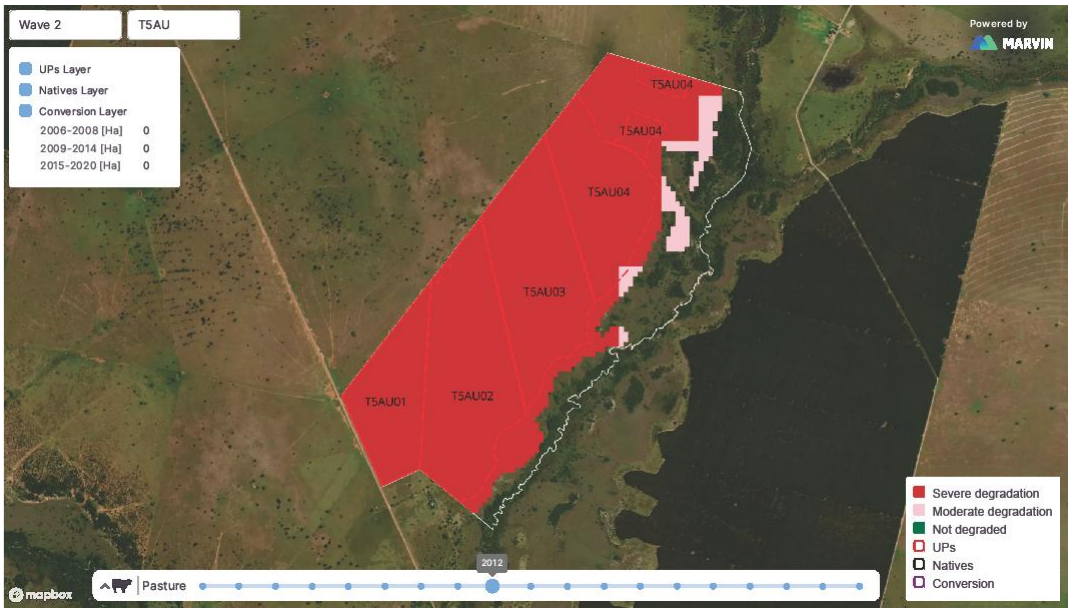


Figure 139 Degraded pasture area 10 years before the start of the verification period – POMBINHO EURO



Figure 140 Degraded pasture area 10 years before the start of the verification period – MARCA B2

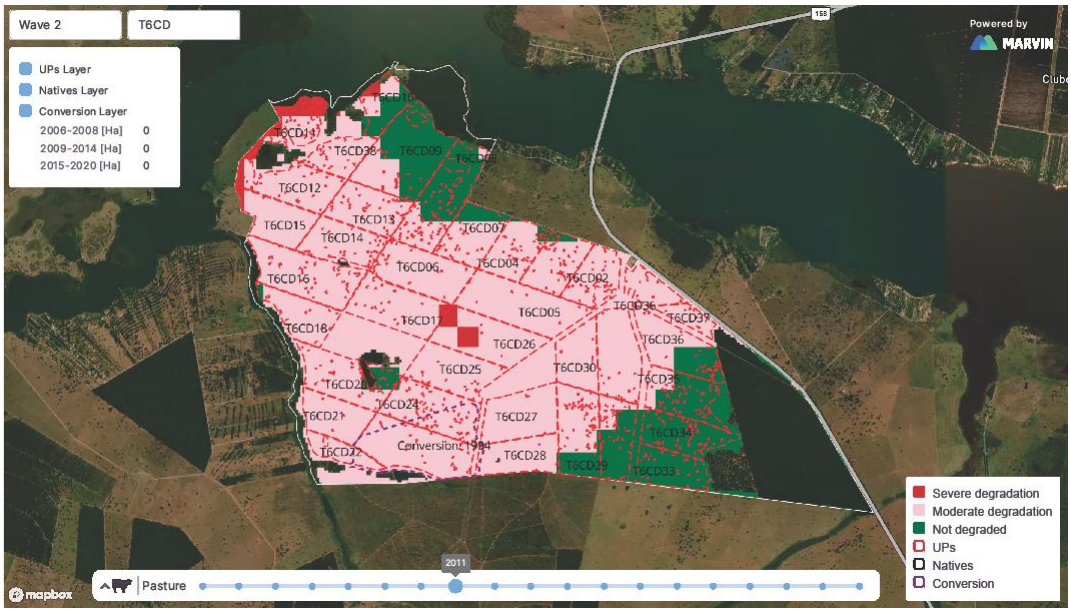


Figure 141 Degraded pasture area 10 years before the start of the verification period – SANTA LUCIA

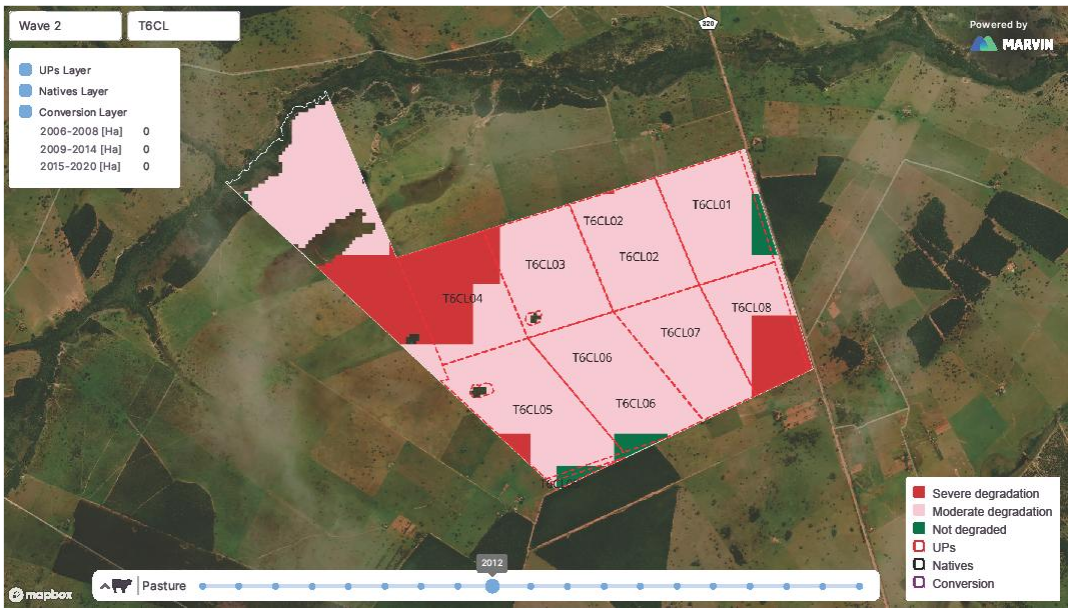


Figure 142 Degraded pasture area 10 years before the start of the verification period - VALE DOURADO



Figure 143 Degraded pasture area 10 years before the start of the verification period - RECANTO DOS CARVALHOS

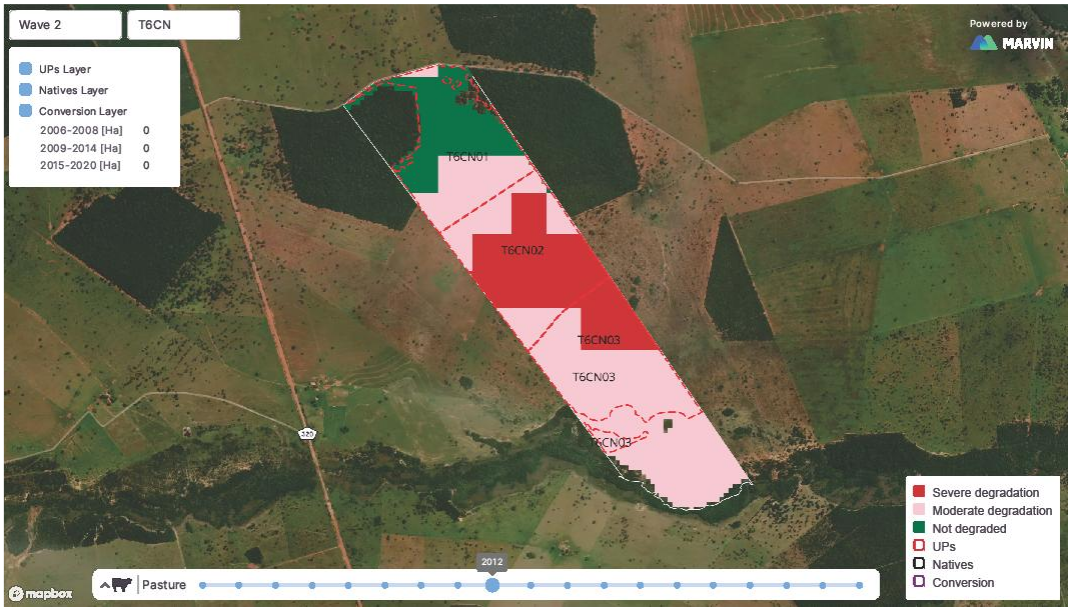


Figure 144 Degraded pasture area 10 years before the start of the verification period - NOSSA SENHORA APARECIDA I



Figure 145 Degraded pasture area 10 years before the start of the verification period - DA MATA IV

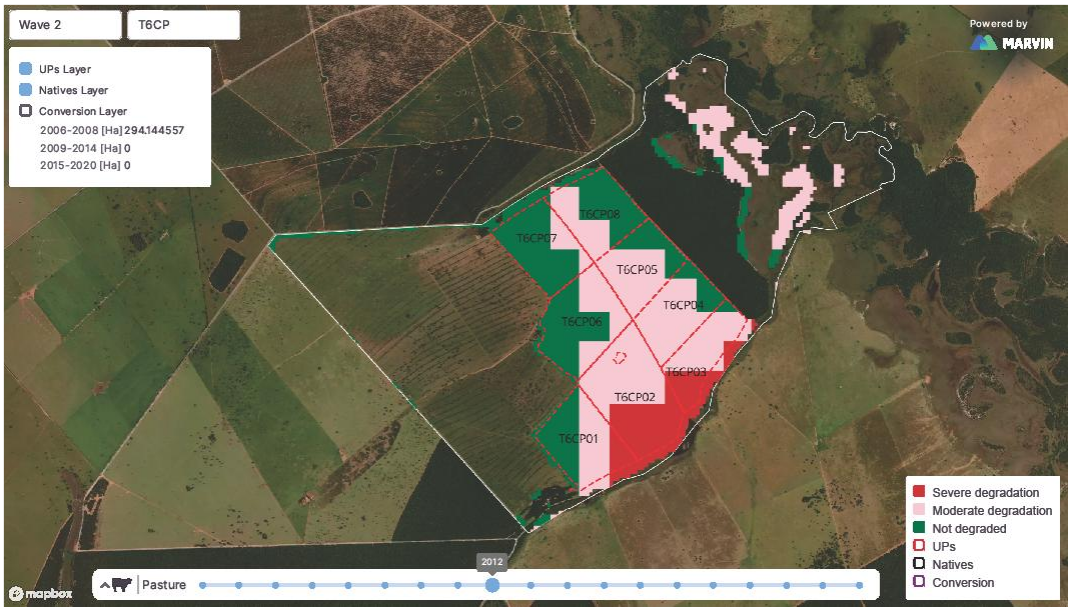


Figure 146 Degraded pasture area 10 years before the start of the verification period - ESPERANÇA

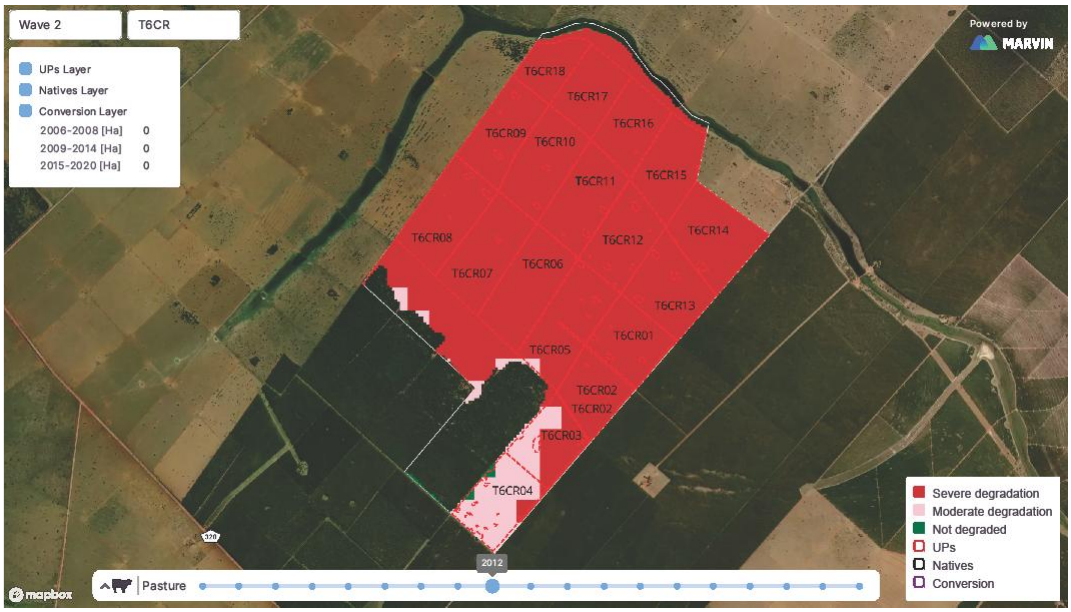


Figure 147 Degraded pasture area 10 years before the start of the verification period – SÃO LOURENÇO II

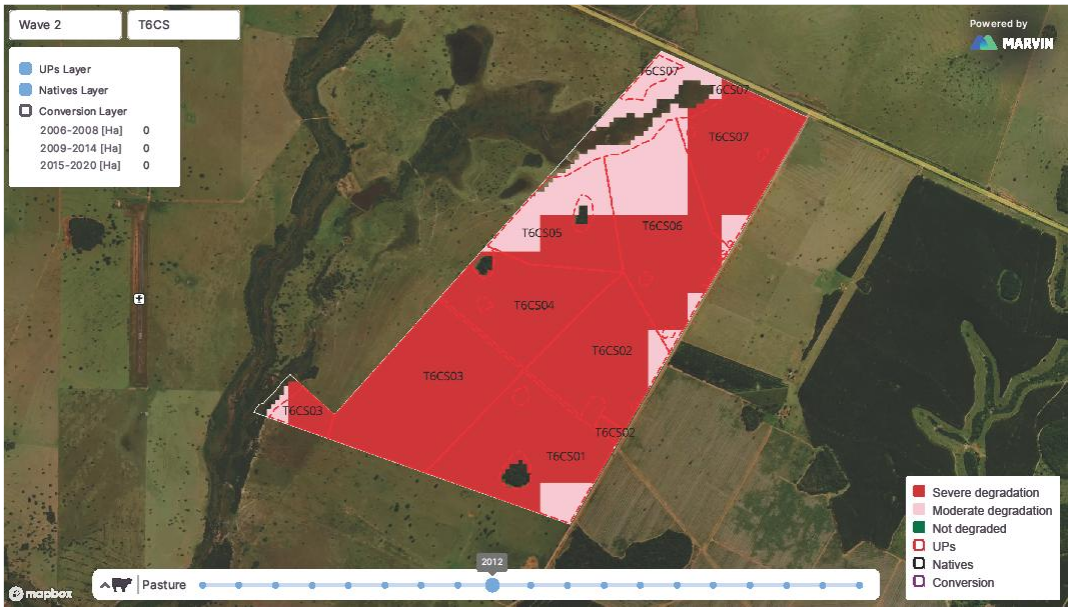


Figure 133 Degraded pasture area 10 years before the start of the verification period - MARIANA

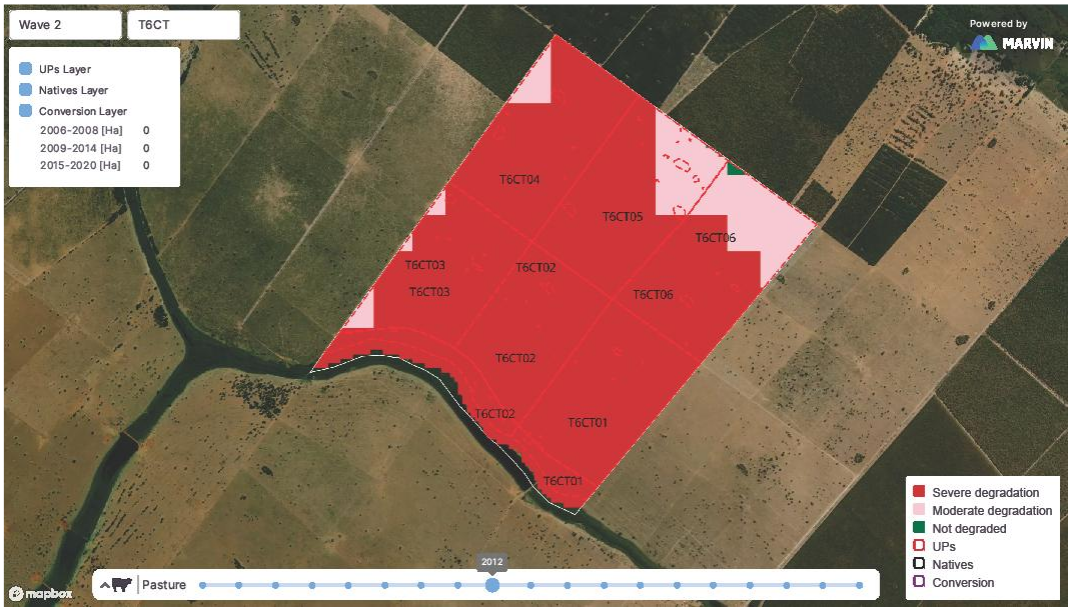


Figure 134 Degraded pasture area 10 years before the start of the verification period - SÃO LOURENÇO III

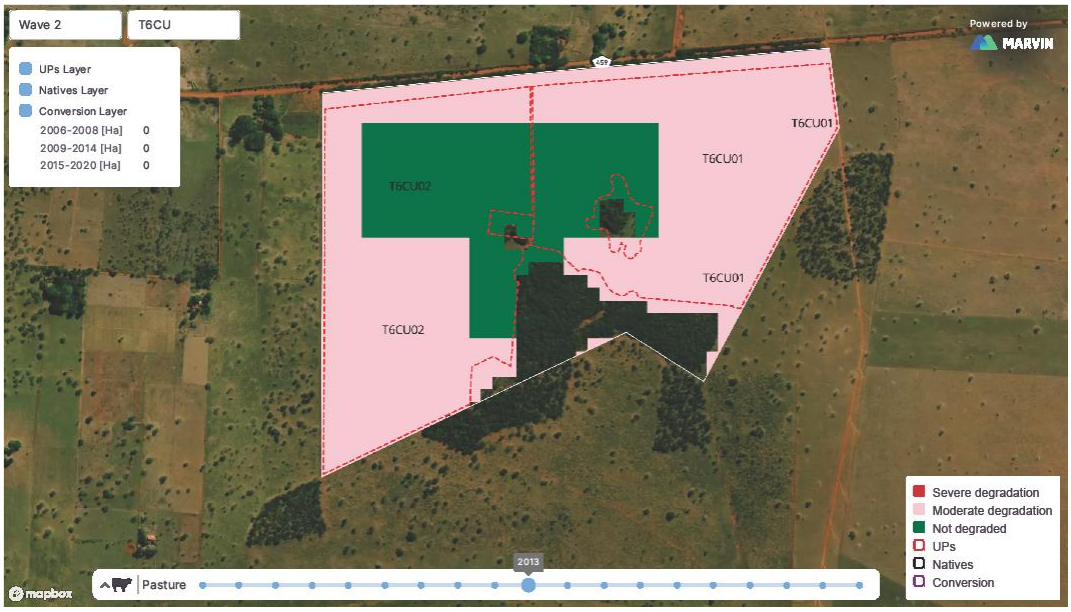


Figure 135 Degraded pasture area 10 years before the start of the verification period - RANCHO ALEGRE II



Figure 136 Degraded pasture area 10 years before the start of the verification period – LUA CHEIA

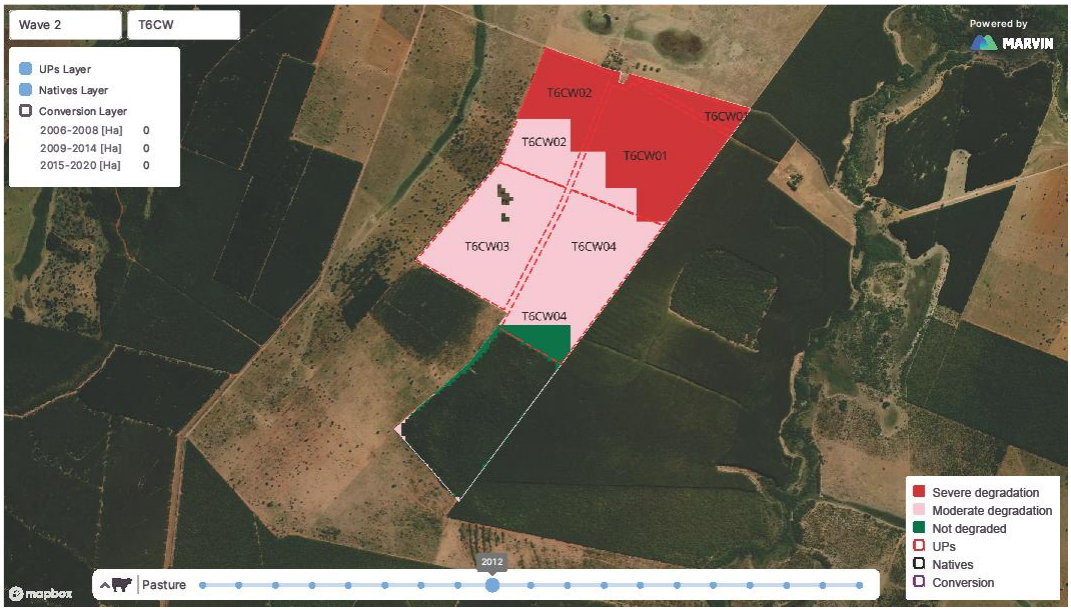


Figure 13752 Degraded pasture area 10 years before the start of the verification period - BANDEIRANTES

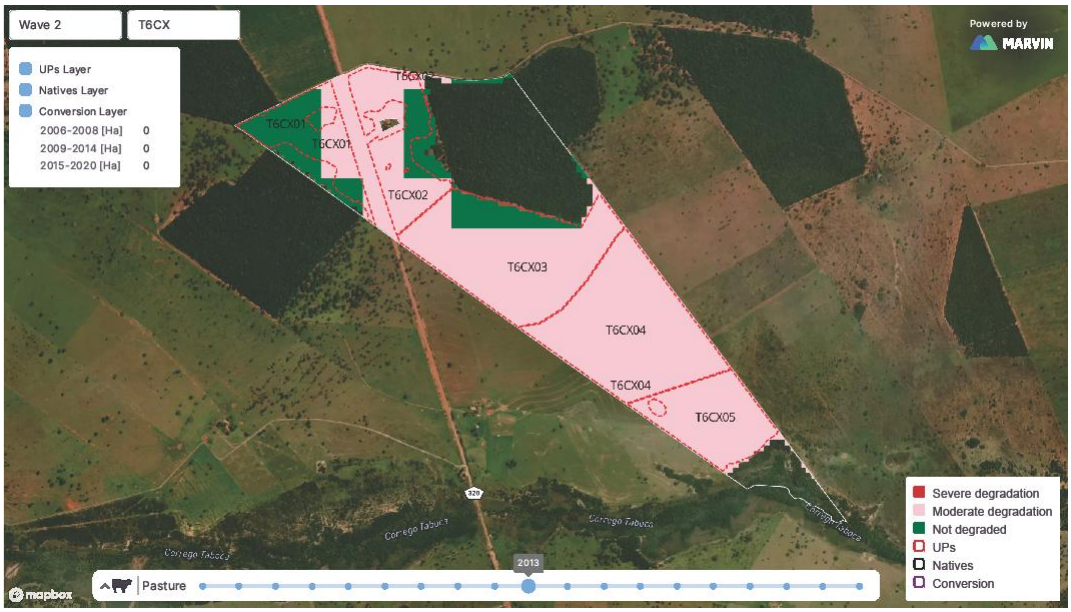


Figure 138 Degraded pasture area 10 years before the start of the verification period - MATA VERDE

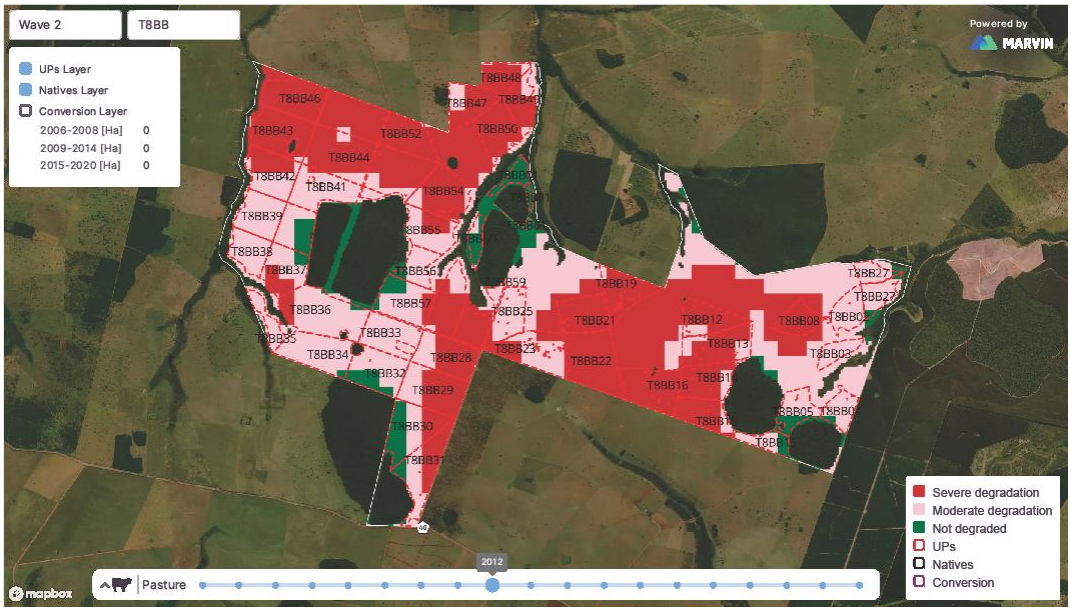


Figure 154 Degraded pasture area 10 years before the start of the verification period - JATIUCA

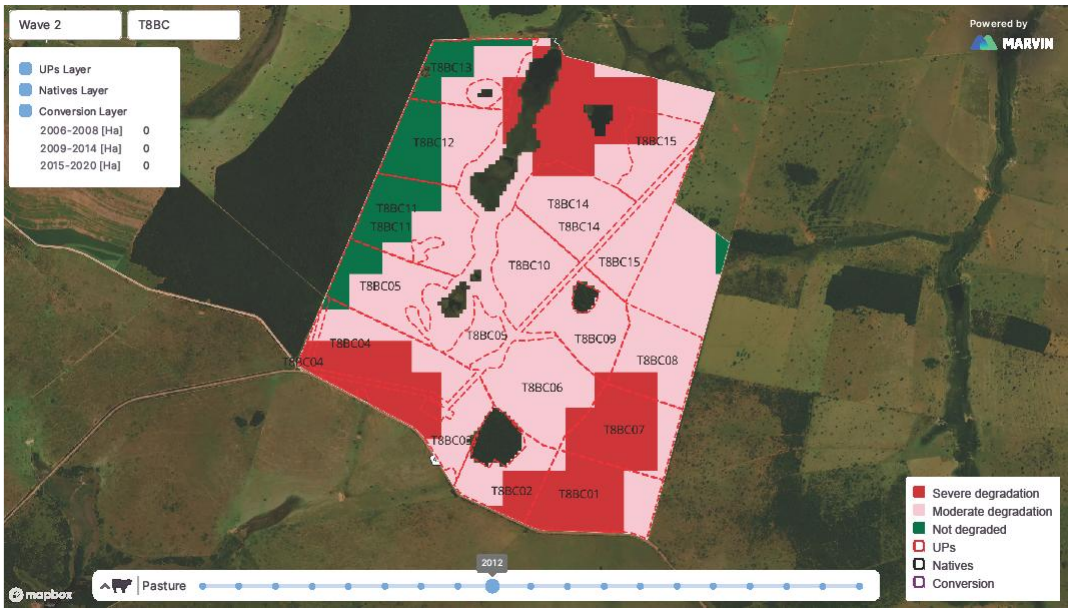


Figure 155 Degraded pasture area 10 years before the start of the verification period - VALE DOURADO II

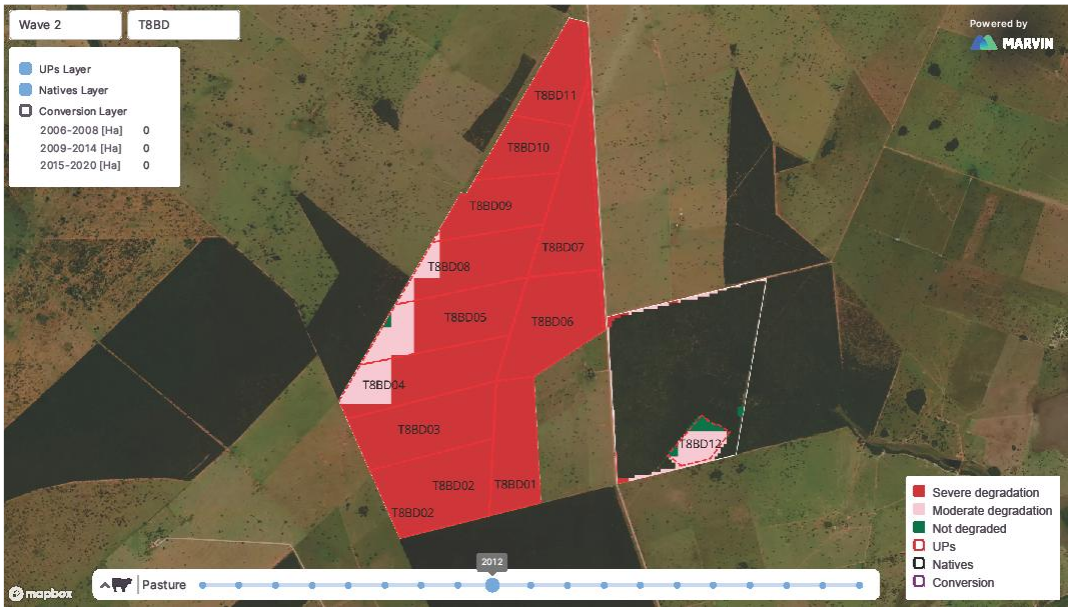


Figure 156 Degraded pasture area 10 years before the start of the verification period - PECUÁRIA FRD

The following set of criteria must be met regardless of the species to be planted at the project area.

- All news instances included in this monitoring period is land owned or leased by Suzano;

Table 3 - Farms owned by Suzano and its controlled companies included as new instances.

New instances included	Federal CAR Registration
Santa Lucia	CARMS0023478V5
Taquarussu	CARMS0000611
São João JY	CARMS0065858V4
J.	CARMS0004733
Palmito	CARMS0070628
Pouso	CARMS0019851
Nossa	CARMS0065785
Santa Angélica	CARMS0011573
Tio	CARMS0029375
São João Vale Do Pombo	CARMS0030082
Pombinho	CARMS0072519
Marca B2	CARMS0071652
Vale Dourado	CARMS0004205V6
Recanto	CARMS0067482
Nossa	CARMS0073796
Da Mata IV	CARMS0003365
Esperança	CARMS0006656
São Lourenço II	CARMS0082715
Mariana	CARMS0017634
São Lourenço III	CARMS0083672
Rancho Alegre II	CARMS0072472

Lua Cheia	CARMS0006030
Bandeirantes	CARMS0028182
Mata Verde	CARMS0013827
Jatiuca	CARMS0013870
Vale Dourado II	CARMS0004205
Pecuária FRD	CARMS0002424

- All news instances included in this monitoring period is Located at the Cerrado biome, state of Mato Grosso do Sul, highlighted by the map under the green dot area:

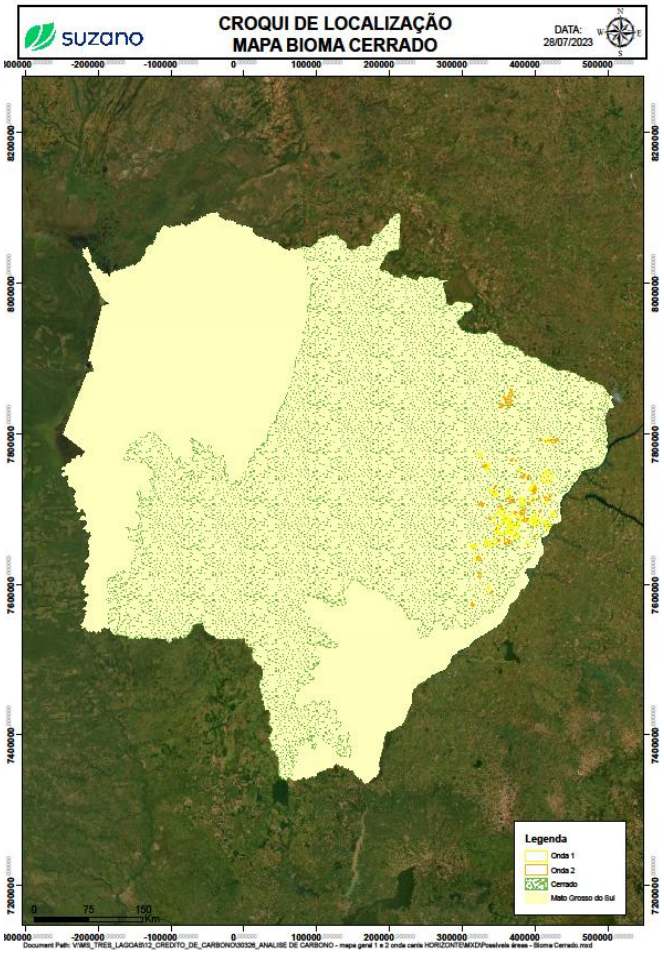


Figure 139 – New instances in the eligibility area.

- New instances areas meet the applicability conditions set out in the methodology and relevant tools applied to the project;
- New instances areas have characteristics in common under the additionality assessment according to the rationale applied in the project description:
    - Present at least the baseline scenario for the project activity as an alternative land use scenario, in addition to the scenario of the project without generating credits;
    - Are additional under a barrier analysis assessment;
- New instances included subject to the same baseline scenario as the determined by the project description;
- New instances included have a start date after the project start date of the first project instance of 02/11/2017.

  Santa Lucia instance is being included in this monitoring period due to the checks that occur for instances that are managed by funds, therefore requiring more time to be added into Suzano's database. Thus, until the final date of the last audit, as its registration was not recorded at the time into Suzano's database, it was not possible to consider it previously in the accounts, but despite this, as evidenced above, it meets the eligibility criteria and is therefore considered in this monitoring period.

New instances included	Planting date	Planting area	Latitude	Longitude
Santa Lucia	18/08/2021	1,627.07	-51,806864	-20,674891
Taquarussu	22/09/2022	156.02	-52,003357	-21,009189
São João Jy	16/09/2022	193.71	-51,98406	-20,958816
J.	22/02/2023	169.86	-51,970341	-21,129701
Palmito	06/02/2023	290.96	-51,89979	-20,829223
Pouso	14/11/2022	1,269.11	-52,709923	-21,389347
Nossa	07/10/2022	783,55	-52,800072	-21,939284
Santa Angélica	29/09/2022	171.33	-51,753728	-20,625294
Tio	01/11/2022	927.36	-52,096607	-20,930092
São João Vale Do Pombo	21/11/2022	435.74	-52,616568	-20,275078
Pombinho	15/11/2022	206.58	-52,485212	-20,523232
Marca B2	13/01/2023	133.49	-52,207786	-20,217602

Vale Dourado	16/05/2022	569.72	-52,123372	-20,410751
Recanto Dos Carvalhos	03/11/2022	148.25	-51,907322	-20,665875
Nossa Senhora Aparecida I	19/10/2022	170.41	-52,096582	-20,381134
Da Mata IV	07/10/2022	211.31	-52,0549	-20,719993
Esperança	01/09/2022	275.46	-52,418126	-20,767054
São Lourenço II	13/10/2022	942.05	-51,9687	-20,578931
Mariana	12/10/2022	362.48	-52,312953	-20,662302
São Lourenço III	22/11/2022	468.63	-51,953246	-20,550574
Rancho Alegre II	13/02/2023	64.62	-51,982094	-20,816893
Lua Cheia	01/02/2023	278.71	-51,96767	-20,543639
Bandeirantes	13/12/2022	246.85	-51,987243	-20,692173
Mata Verde	05/01/2023	154.73	-52,108154	-20,379321
Jatiuca	08/04/2022	2,804.97	-52,328803	-21,182238
Vale Dourado II	02/12/2022	583.04	-52,443236	-21,17071
Pecuária Frd	12/07/2022	669.53	-52,566442	-20,903739
TOTAL OF NEW INSTANCES		14.315,54		

GHG Benefit Resume Estimated

With the inclusion of new instances, the calculations for estimating net anthropogenic GHG removal by sink were redone according to equation 5 of the AR-ACM0003 v2.0 methodology. The updated estimation of net GHG emission reductions or removals for the grouped project is informed in the table below considering the necessary update of Joint PD&MR's section 4.4.

Table 4 - Estimated Net GHG benefit for the ARR Horizonte Project

Period	Year	Estimated baseline emissions or removals (tCO2e)	Estimated project emissions or removals (tCO2e)	Estimated Leakage emissions (tCO2e)	Estimated net GHG emission reductions or removals (tCO2e)
02/11/2017 to 31/12/2017	2017	11,444.02	17,645.63		6,201.61
01/01/2018 to 31/12/2018	2018	12,256.41	328,221.42		315,965.01
01/01/2019 to 31/12/2019	2019	12,256.41	739,627.41		727,370.99

01/01/2020 to 31/12/2020	2020	17,189.74	1,365,256.80		1,348,067.06
01/01/2021 to 31/12/2021	2021	24,317.47	1,990,081.83		1,965,764.36
01/01/2022 to 31/12/2022	2022	49,386.51	2,942,777.14		2,893,390.63
01/01/2023 to 31/12/2023	2023	58,401.37	4,395,654.26		4,337,252.89
01/01/2024 to 31/12/2024	2024	58,401.37	5,701,438.15		5,643,036.79
01/01/2025 to 31/12/2025	2025	58,401.37	5,320,234.53		5,261,833.16
01/01/2026 to 31/12/2026	2026	58,401.37	6,030,268.94		5,971,867.58
01/01/2027 to 31/12/2027	2027	58,401.37	6,002,578.30		5,944,176.93
01/01/2028 to 31/12/2028	2028	58,401.37	7,201,764.96		7,143,363.59
01/01/2029 to 31/12/2029	2029	58,401.37	6,381,609.81		6,323,208.45
01/01/2030 to 31/12/2030	2030	58,401.37	4,445,541.82		4,387,140.45
01/01/2031 to 31/12/2031	2031	58,401.37	5,701,438.15		5,643,036.79
01/01/2032 to 31/12/2032	2032	58,401.37	5,320,234.53		5,261,833.16
01/01/2033 to 31/12/2033	2033	58,401.37	6,030,268.94		5,971,867.58
01/01/2034 to 31/12/2034	2034	58,401.37	6,002,578.30		5,944,176.93
01/01/2035 to 31/12/2035	2035	58,401.37	7,201,764.96		7,143,363.59
01/01/2036 to 31/12/2036	2036	58,401.37	6,381,609.81		6,323,208.45
01/01/2037 to 31/12/2037	2037	58,401.37	4,445,541.82		4,387,140.45
01/01/2038 to 31/12/2038	2038	58,401,37	5,701,438.15		5,643,036.79
01/01/2039 to 31/12/2039	2039	58,401.37	5,320,234.53		5,261,833.16
01/01/2040 to 31/12/2040	2040	58,401.37	6,030,268.94		5,971,867.58
01/01/2041 to 31/12/2041	2041	58,401.37	6,002,578.30		5,944,176.93
01/01/2042 to 31/12/2042	2042	58,401.37	7,201,764.96		7,143,363.59
01/01/2043 to 31/12/2043	2043	58,401.37	6,381,609.81		6,323,208.45
01/01/2044 to 31/12/2044	2044	58,401.37	4,445,541.82		4,387,140.45
01/01/2045 to 31/12/2045	2045	58,401.37	5,701,438.15		5,643,036.79

01/01/2046 to 31/12/2046	2046	58,401.37	5,320,234.53		5,261,833.16
01/01/2047 to 01/11/2047	2047	58,401.37	6,030,268.94		5,971,867.58
01/01/2048 to 31/12/2048	2048	58,401.37	6,002,578.30		5,944,176.93
01/01/2049 to 31/12/2049	2049	58,401.37	7,201,764.96		7,143,363.59
01/01/2050 to 01/11/2050	2050	58,401.37	6,381,609.81		6,323,208.45
01/01/2051 to 31/12/2051	2051	58,401.37	4,445,541.82		4,387,140.45
01/01/2052 to 01/11/2052	2052	58,401.37	4,748,182.47		4,689,781.10

According to the standard requirements, for those areas where harvesting practices are considered in the project activity, the loss of carbon due to harvesting shall be included in the quantification of the project emissions. Because the eucalyptus planting considers a harvesting period every seven years, the long-term average (LTA) GHG benefit was calculated, without risk buffer discount, considering 35 years, estimated in 5,113,780.04 tCO_2e.

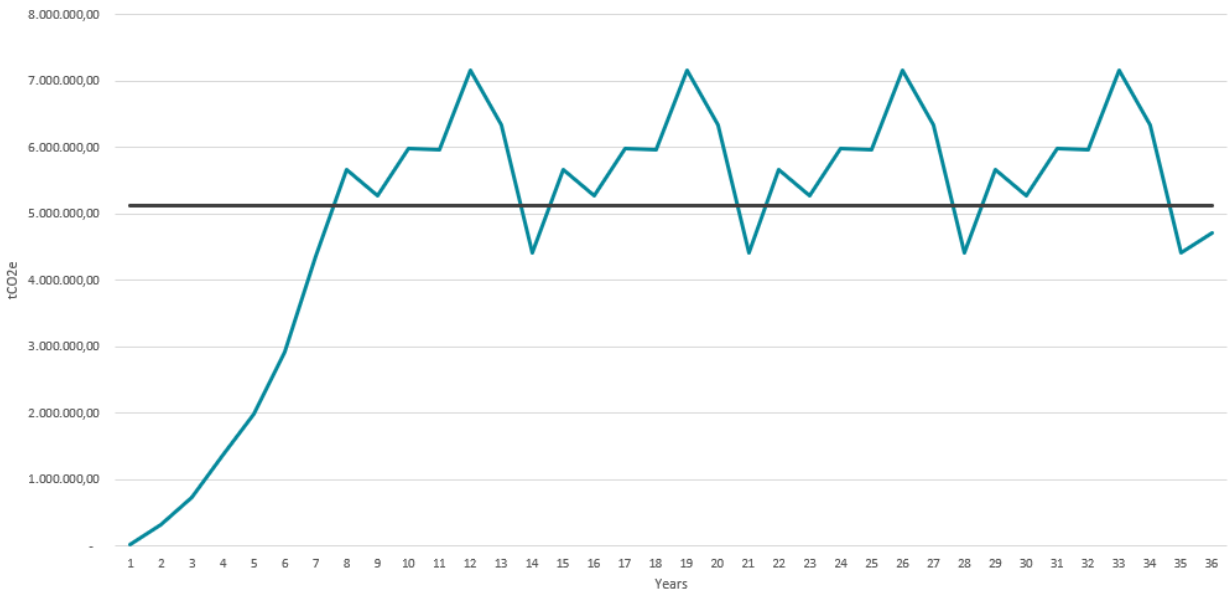


Figure 140 - Illustration of the expected total GHG benefit of the project's long-term average.

3.4 Baseline Reassessment

Did the project undergo baseline reassessment during the monitoring period?

☐ Yes ☒ No

4 DATA AND PARAMETERS

4.1 Data and Parameters Available at Validation

Data / Parameter	CF
Data unit	tC/t d.m.
Description	Biomass proportion corresponding to carbon, named Carbon Fraction
Source of data	AR-TOOL 14 "Estimation of carbon stocks and change in carbon stocks of trees and shrubs in A/R CDM Project activities", Version 4.2.
Value applied	0.47
Justification of choice of data or description of measurement methods and procedures applied	The default value from the AR-TOOL 14 was applied.
Purpose of Data	Calculation of Baseline Emissions and project emissions reduction and removals
Comments	-

Data / Parameter	b_{forest}
Data unit	t d.m./ha
Description	Mean above-ground biomass in forest in the region or country where the project is located
Source of data	MIRANDA, et al. 2014. Regional variations in biomass distribution in Brazilian Savanna woodland. Data for biomass above and below ground for forest formations.
Value applied	110.12

Justification of choice of data or description of measurement methods and procedures applied	Mean Value for forestlands biomass on the Cerrado biome, considering total aboveground biomass and total belowground biomass.
Purpose of Data	Calculation of Baseline GHG Emissions
Comments	-

Data / Parameter	R_{TREE}
Data unit	Dimensionless
Description	Root-shoot ratio for trees in the baseline
Source of data	AR-TOOL 14 "Estimation of carbon stocks and change in carbon stocks of trees and shrubs in A/R CDM Project activities", Version 04.2.
Value applied	0.25
Justification of choice of data or description of measurement methods and procedures applied	Default value indicated for the parameter under AR-TOOL14, equation 21
Purpose of Data	Calculation of Baseline GHG Emissions
Comments	-

Data / Parameter	$CC_{TREE\_BSL,i}$
Data unit	Dimensionless
Description	Crown cover of trees in baseline stratum i, at the start of the project activity, expressed as a fraction
Source of data	Shapefiles pointing trees authorized to be suppressed at the CANI, which are located inside the project area.
Value applied	1.01%
Justification of choice of data or description of	The crown cover of trees was estimated based on CANI authorizations and identified trees for suppression. The crown cover of trees was identified on a shapefile, and trees under the

measurement methods and procedures applied	project area, that compose the baseline, were considered for estimating the parameter.
Purpose of Data	Calculation of BaselineGHG Emissions
Comments	-

Data / Parameter	DF_{DW}
Data unit	Per cent
Description	Conservative default factor expressing carbon stock in dead wood as a percentage of carbon stock in tree biomass
Source of data	AR-TOOL 14 “Estimation of carbon stocks and change in carbon stocks of trees and shrubs in A/R CDM Project activities”, Version 04.2.
Value applied	1%
Justification of choice of data or description of measurement methods and procedures applied	Default value for tropical biomes, under 2.000m elevation, under 1.000 – 1.600 mm yr-1 of precipitation
Purpose of Data	Calculation of Baseline GHG Emissions and Project activity removals
Comments	-

Data / Parameter	DF_{LI}
Data unit	Per cent
Description	Conservative default factor expressing carbon stock in Litter as a percentage of carbon stock in tree biomass
Source of data	AR-TOOL 14 “Estimation of carbon stocks and change in carbon stocks of trees and shrubs in A/R CDM Project activities”, Version 04.2.
Value applied	1%
Justification of choice of data or description of	Default value for tropical biomes, under 2.000m elevation, under 1.000 – 1.600 mm yr-1 of precipitation

measurement methods and procedures applied	
Purpose of Data	Calculation of Baseline GHG Emissions and Project activity removals
Comments	-

Data / Parameter	A_{i_pa}
Data unit	ha
Description	Area of stratum is at project activity
Source of data	Projected planting areas by stratum and specie
Value applied	*See* Table 12
Justification of choice of data or description of measurement methods and procedures applied	The stratification for ex-post estimates will be based on the real implementation of the implementation of the project's planting/management plan. Considering the eventual need for adaptation of the strata within the project limit, according to management's evaluation. Thus, there is the possibility of several strata, to optimize costs and improve the results in forest inventories. New strata may also be defined.
Purpose of Data	Estimation of GHG Emission Reductions and Removals.
Comments	-

Data / Parameter	Mean annual Increment in Volume (IV)
Data unit	$m^3ha^{-1}yr^{-1}$
Description	It is the average annual net increment in volume of Eucalyptus trees to be planted on the project area, and it's used to calculate the Tree carbon stock on Eucalyptus plantations.
Source of data	Based on previous inventory data for areas near the Project area owned by Suzano.
Value applied	Eucalyptus grandis: 32.5 m^3.ha-1.year-1 Eucalyptus urophylla: 36.1 m^3.ha-1.year-1 Eucalyptus grandis x Eucalyptus urophylla: 34.8 m^3.ha-1.year-

	1 Eucalyptus spp: 34.6 m^3.ha-1.year-1
Justification of choice of data or description of measurement methods and procedures applied	An ex-ante parameter was applied given measurements for forest plantation within forest boundary are still under implementation. Forest inventory data from Suzano's PUs in the region were used to estimate GHG removals, as they portray the productivity patterns of the species (Eucalyptus ssp.), based on past experience. At the time of monitoring this value will be replaced for the actual growth of the forest. Suzano has no information available on its database for the Eucalyptus Grandis species. IPCC86 value was Applied considered it is the lowest value available. This approach is conservative
Purpose of Data	Estimation of GHG Emission Reductions and Removals.
Comments	-

Data / Parameter	Aboveground net biomass growth
Data unit	t.d.m/ha/yr
Description	It is the average annual net increment in volume of native trees to be planted on the project area, and it's used to calculate the Tree carbon stock on native restoration activities.
Source of data	Available at 2006 IPCC Guidelines for National Greenhouse Gas Inventories, chapter 4: Forest Land – table 4.9, value for tropical moist deciduous forest
Value applied	For natural forests ≤20y – 7.00 For natural forests >20y – 2.00
Justification of choice of data or description of measurement methods and procedures applied	
Purpose of Data	Estimation of GHG Emission Reductions and Removals.
Comments	-

Data / Parameter	Wood density (D)
Data unit	t.d.m/m³
Description	Wood density is used to convert the sparse trees volume into tree biomass under the project acitivity.
Source of data	Based on a databank which concentrates the information of density for species planted by Suzano.
Value applied	Eucalyptus grandis: 0.44 t d.m./m³ Eucalyptus urophylla: 0.48 t d.m./m³ Eucalyptus grandis x Eucalyptus urophylla: 0.44 t d.m./m³ Eucalyptus spp: 0.47 t d.m./m³
Justification of choice of data or description of measurement methods and procedures applied	Data for each specific species applied under the project activity.
Purpose of Data	Estimation of GHG Emission Reductions and Removals.
Comments	The density is estimated according to the internal procedure MA.36.03.0007. The process is composed by a few steps. 1. Reception, classification of the chips and granulometry. Equipment: a conventional chip classifier and a digital scale. 2. Determination of basic density. Equipment: semi analytical balance, vacuum saturation system, compressed air, stove. The maximum moisture content method is applied. 3. Determination of apparent density. Equipment: digital scale and a device for defining the apparent density.

Data / Parameter	$SOC_{REF,i}$
Data unit	tC/ha
Description	SOC stock at the beginning of the A/R CDM project activity in stratum i of the areas of land
Source of data	AR-TOOL16, version 1.1.0, table 3, value for tropical moist climate region and sandy soils.

Value applied	39.00
Justification of choice of data or description of measurement methods and procedures applied	Factor-based approach presented by the AR-TOOL16
Purpose of Data	Calculation of soil organic carbon stocks
Comments	-

Data / Parameter	$f_{LU,i}$
Data unit	dimensionless
Description	Relative stock change factor for baseline land-use in stratum i of the areas of land
Source of data	AR-TOOL16, version 1.1.0, table 6, value for all climate regime
Value applied	1.00
Justification of choice of data or description of measurement methods and procedures applied	Factor-based approach presented by the AR-TOOL16
Purpose of Data	Calculation of soil organic carbon stocks
Comments	-

Data / Parameter	$f_{MG,i}$
Data unit	dimensionless
Description	Relative stock change factor for baseline management regime in stratum i of the areas of land
Source of data	AR-TOOL16, version 1.1.0, table 6, value for severely degraded level
Value applied	0.70
Justification of choice of data or description of	Factor-based approach presented by the AR-TOOL16

measurement methods and procedures applied	
Purpose of Data	Calculation of soil organic carbon stocks
Comments	-

Data / Parameter	$f_{IN,i}$
Data unit	dimensionless
Description	Relative stock change factor for baseline input regime (e.g. crop residue returns, manure) in stratum i of the areas of land
Source of data	AR-TOOL16, version 1.1.0, table 6, value for Low/Medium level
Value applied	1.00
Justification of choice of data or description of measurement methods and procedures applied	Factor-based approach presented by the AR-TOOL16
Purpose of Data	Calculation of soil organic carbon stocks
Comments	-

4.2 Data and Parameters Monitored

Data / Parameter	A
Data unit	Ha
Description	Project Area (planted area).
Source of data	Survey databases of each polygon that is part of the Project and is under the control of the Project participants.
Description of measurement methods	Field measurement: the area shall be delineated either on the ground, using GPS or from geo-referenced remote sensing data.

and procedures to be applied	
Frequency of monitoring/recording	Each time a verification is conducted.
Value monitored	13,193.24 ha (accumulated from the current monitoring period with the previous one)
Monitoring equipment	GPS equipment (precision 1- 5 m) and Remote Sensing data.
QA/QC procedures to be applied	Quality control/quality assurance (QA/QC) procedures prescribed under national forest inventory are applied. In the absence of these, QA/QC procedures from published handbooks, or from the IPCC GPG LULUCF 2003, are applied.
Purpose of the data	Calculation of Project GHG emissions and removals.
Calculation method	Measurement
Comments	-

Data / Parameter	A_i
Data unit	Ha
Description	Area of stratum i
Source of data	Monitoring of strata and stand boundaries is done employing Geographical Information Systems (GIS) allowing the integration of data from different sources (including GPS coordinates and Remote Sensing data).
Description of measurement methods and procedures to be applied	Field measurement: the area shall be delineated either on the ground, using GPS or from geo-referenced remote sensing data.

Frequency of monitoring/recording	Each time a verification is conducted.
Value applied	**1st monitoring period:** Stratum 1 – 3,275.66 Stratum 2 – 2,438.70 Stratum 3 – 234.52 Stratum 4 – 714.07 Stratum 5 – 5,202.27 Stratum 6 – 256.65 **2nd monitoring period:** Stratum 1 – 3,275.66 Stratum 2 – 2,438.70 Stratum 3 – 234.52 Stratum 4 – 714.07 Stratum 5 – 5,202.27 Stratum 6 – 256.65 Stratum 7 – 1,071.37
Monitoring equipment	GPS equipment (precision 1- 5 m) and Remote Sensing data.
QA/QC procedures to be applied	Quality control/quality assurance (QA/QC) procedures prescribed under national forest inventory are applied. In the absence of these, QA/QC procedures from published handbooks, or from the IPCC GPG LULUCF 2003, are applied.
Purpose of data	Calculation of Project GHG emissions and removals.
Calculation method	Measurement
Comments	

Data / Parameter	Ap.i
Data unit	m^2
Description	Area of sample plot in stratum i.
Source of data	Field measurement
Description of measurement methods and procedures to be applied	Standard Operating Procedures (SOPs) prescribed under the national forest inventory are applied. In the absence of these, SOPs from published handbooks or from the IPCC GPG LULUCF 2003 are applied.
Frequency of monitoring/recording	Each time a verification is conducted.
Value applied	**1st monitoring period:** Stratum 1 – 41,200.00 Stratum 2 – 35,809.70 Stratum 3 – 9,600.00 Stratum 4 – 30,000.00 Stratum 5 – 200,800.00 Stratum 6 – 10,800,00 **2nd monitoring period:** Stratum 1 – 42,400.00 Stratum 2 – 36,800.00 Stratum 3 – 7,600.00 Stratum 4 – 20,400.00 Stratum 5 – 190,800.00 Stratum 6 – 9,200.00 Stratum 7 – 33,200.00
Monitoring equipment	Tape measure and GPS.

QA/QC procedures to be applied	Quality control/quality assurance (QA/QC) procedures prescribed under national forest inventory are applied. In the absence of these, QA/QC procedures from published handbooks, or from the IPCC GPG LULUCF 2003, are applied.
Purpose of data	Calculation of Project GHG emissions and removals.
Calculation method	Measurement
Comments	Provide any additional comments

Data / Parameter	N
Data unit	Dimensionless
Description	Number of plots to be established in the project area
Source of data	Field measurement
Description of measurement methods and procedures to be applied	Standard Operating Procedures (SOPs) prescribed under the national forest inventory are applied. In the absence of these, SOPs from published handbooks or from the IPCC GPG LULUCF 2003 are applied.
Frequency of monitoring/recording	Each time a verification is conducted.
Value applied	**1st monitoring period:** Stratum 1 – 103 Stratum 2 – 89 Stratum 3 – 24 Stratum 4 – 75 Stratum 5 – 502 Stratum 6 – 27 TOTAL– 820

	2nd monitoring period: Stratum 1 – 106 (remeasured) Stratum 2 – 92 (remeasured) Stratum 3 – 19 (remeasured) Stratum 4 – 51 (remeasured) Stratum 5 – 477 (remeasured) Stratum 6 – 23 (remeasured) Stratum 7 – 83 (new plots measured for the 1st time) TOTAL– 851
Monitoring equipment	Forest inventory spreadsheet
QA/QC procedures to be applied	Quality control/quality assurance (QA/QC) procedures prescribed under national forest inventory are applied. In the absence of these, QA/QC procedures from published handbooks, or from the IPCC GPG LULUCF 2003, are applied.
Purpose of data	Estimating the number of plots is required for granting the compliance with a sampling error lower than 10%
Calculation method	A/R Methodological Tool Calculation of the number of sample plots for measurements within A/R CDM project activities - Version 02.1.0,
Comments	

Data / Parameter	Plot location
Data unit	Latitude/longitude
Description	Localization for each sampling plot
Source of data	Data field sampling

Description of measurement methods and procedures to be applied	Measured with GPS
Frequency of monitoring/recording	Each time a verification is conducted.
Value applied	Please, see spreadsheet “Monitored ER”, Sheet “Parcels”, with detailed information
Monitoring equipment	GPS
QA/QC procedures to be applied	Quality control/quality assurance (QA/QC) procedures prescribed under national forest inventory are applied. In the absence of these, QA/QC procedures from published handbooks, or from the IPCC GPG LULUCF 2003, are applied.
Purpose of data	Calculation of project emissions
Calculation method	See section4.3.
Comments	The sample plot location is registered with a GPS and marked on the project map.

Data / Parameter	DBH
Data unit	centimeter
Description	Diameter at breast height of the trees
Source of data	Field measurements in sample plots
Description of measurement methods and procedures to be applied	The measurements are usually conducted 1.3 m aboveground. Measure all the trees above some minimum DBH in the permanent sample plots.

Frequency of monitoring/recording	Each time a verification is conducted.
Value applied	*Please, see spreadsheet "Monitored ER", Sheet "Parcels data", with detailed information*
Monitoring equipment	Digital caliper and measuring tape
QA/QC procedures to be applied	All personnel involved on the DBH measurement procedure must have received proper training for field data collection. Data collected must be verified by a qualified person in charge to prevent error making and grant best practices implementations. A process to control the accuracy of forest inventory data is carried out to assess the quality of the work performed in the field, analyze the measurement of variables (especially DBH and Height), verify the proper use of EPS, and calibrate the measuring instruments. This procedure is applied on two levels, both by a person responsible for the company contracted to perform the forest inventory and by an internal auditor from Suzano SA; ensuring compliance with technical and operational guidelines in practical activities. Controls are performed through monthly remeasurement of plots and calculation of the result of each variable in relation to a certain tolerance level, with acceptable average deviations for DBH and Height being less than or equal to 3% and 4%, respectively. In the event of non-conformities, action plans and appropriate measures are drawn up and implemented, such as remediation of areas and training.
Purpose of data	Calculation of project emissions
Calculation method	See section 4.3
Comments	

Data / Parameter	H

Data unit	meter
Description	Total height of trees
Source of data	Field measurements in sample plots
Description of measurement methods and procedures to be applied	Measure all the trees height in the permanent sample plots identified under the project area. Height measurements will be taken with a digital hypsometer.
Frequency of monitoring/recording	Each time a verification is conducted.
Value applied	*Please, see spreadsheet "Monitored ER", Sheet "Parcels data", with detailed information*
Monitoring equipment	Clinometer
QA/QC procedures to be applied	All personnel involved on the DBH measurement procedure must have received proper training for field data collection. Data collected must be verified by a qualified person in charge to prevent error making and grant best practices implementations. A process to control the accuracy of forest inventory data is carried out to assess the quality of the work performed in the field, analyze the measurement of variables (especially DBH and Height), verify the proper use of EPS, and calibrate the measuring instruments. This procedure is applied on two levels, both by a person responsible for the company contracted to perform the forest inventory and by an internal auditor from Suzano SA; ensuring compliance with technical and operational guidelines in practical activities. Controls are performed through monthly remeasurement of plots and calculation of the result of each variable in relation to a certain tolerance level, with acceptable average deviations for DBH and Height being less than or equal to 3% and 4%, respectively. In the event of non-conformities, action

	plans and appropriate measures are drawn up and implemented, such as remediation of areas and training.
Purpose of data	Calculation of project emissions
Calculation method	See section 4.3
Comments	

Data / Parameter	T
Data unit	Year
Description	Period between two successive estimations of carbon stock in trees and shrubs
Source of data	Verification records
Description of measurement methods and procedures to be applied	See section 4.3.
Frequency of monitoring/recording	Each time a verification is conducted.
Value applied	1 year
Monitoring equipment	N/A
QA/QC procedures to be applied	N/A
Purpose of data	Calculation of project emissions
Calculation method	T= t2-t1
Comments	

4.3 Monitoring Plan

The ARR Horizonte Carbon Project will apply the approved afforestation and reforestation baseline and monitoring methodology "AR-ACM0003 Afforestation and reforestation of lands other than wetlands (Version 2.0)", to guide the project monitoring plan.

The project monitoring plan also follows the general carbon accounting principles provided in Chapter 4 (AFOLU; Agriculture, Forestry and Other Land Use) of the 2006 IPCC Guidelines for National Greenhouse Gas Inventories and IPCC Good Practice Guidance (IPCC GPG 2006), specifically Chapter 4.3 Project Guidance. Over the project crediting period, carbon stock and stock change estimates will be derived from direct measurements on permanent plots and will therefore satisfy level 3 of the IPCC's highest accuracy criterion.

In accordance with IPCC guidance, the monitoring plan is designed to quantify and control uncertainty in estimates by employing sufficient sample plots and unbiased allocation to produce estimates with a known level of confidence. The monitoring plan must also include a Quality Assurance / Quality Control (QA/QC) plan to control errors in measurement and data analysis. The application of the QA/QC plan will provide documentation and consistency in data archiving to allow efficient third-party audit and evaluation against measurement and quantification standards throughout the monitoring period.

Organizational structure

The internal structure at Suzano for monitoring carbon stocks at the project area is composed by four main roles. Activities on site are conducted by an outsourced specialized company, whose forest technicians will perform the data collection for all parameters mentioned under section 4.2.

Suzano usually hires consolidated companies to perform its inventories or applies partnerships with universities to conduce the inventories at native reforestation areas. Nevertheless, the team involved in the monitoring activities receive prior training in Suzano's procedures from the service provider, as well as field safety instructions.

All the monitoring activities performed by this outsourced specialized partner will be supervised by the Suzano Supervisors and Auditors, through periodic audits performed to evaluate the quality of the field collection, where audit indicators are collected and compliance with the timeline is verified.

These activities are controlled and accompanied by the coordinator, and take place under the Forest, Logistics and Supplies board.

To standardize the measurement procedures, Suzano established a comprehensive manual for field activities, named Field Activities Manual. It indicates tools to be used, shows how activities must be done, and which must be followed by all personal conducing field measurement activities.

Internal audit

Suzano has internal auditing guidelines with the aim of minimizing business risks and helping to achieve results. In the document, Suzano undertakes to maintain impartiality and independence in the auditing processes and has three pillars:



Figure 141 - The three pillars of Suzano's internal audit.

In this way, the area responsible for internal auditing reviews the organization's current operations at least every four years, assessing the effectiveness of the policies and procedures established by senior management, as well as the efficiency and effectiveness of the internal controls established, guaranteeing compliance with ethical and integrity requirements and eliminating compliance-related deviations in activities. The policy was handed over to the VVB team.

For forest management activities, Suzano has an internal audit to promote best practices to minimize the risks associated with management certification, verifying adherence to legislation and international and national regulatory standards in forestry processes, guaranteeing the highest standards of integrity aligned with transparency in processes, identifying opportunities for improvement, with a focus on sustainable practices. The internal evaluation takes place annually and they have a Routine Management Program (field checks) that takes place monthly. The procedure is structured in the document with Code PO.25.01.0001, made available to the VVB team.

Monitoring plan

Suzano is used to a wide range of forest inventory types. For targeting the purpose of this project, it will implement the Continued Forest Inventory for monitoring parameters and estimating carbon stocks under the project area for the eucalyptus plantations activities. However, it is important to highlight that areas with forest age up to 2 years are not subject to a quantitative inventory such as the one mentioned. For this reason, such areas will follow all the procedures for qualitative inventories until they reach 2 years,

and the emission removals for the respective planted forests at these specific areas will only be accounted for and generate credits once the quantitative inventory is made, and all parameters required to estimate the carbon stocks are available.

This method is applied to estimate the forest stock, both in volume and number of trees. It is also used to monitor forest growth and enables adjustments of production projections models for forests.

Monitoring events will take place before any harvest event and annually, considering that monitoring events can only be made on areas older than 2 years from the planting date. Suzano intends to monitor the project area for eucalyptus plantations annually.

It is also important to mention that, based on the methodological criteria mentioned below, Suzano chooses not to conduct inventories in areas smaller than 5 hectares. The exclusion of areas smaller than 5 hectares from forest inventories is based on scientific and methodological criteria that ensure efficiency and reliability in the sustainable management of eucalyptus plantations.

1. Statistical representativeness: Areas smaller than 5 hectares have limited statistical significance in the overall forest stock. They exhibit greater variability and errors due to edge effects and spatial heterogeneity, making the application of precise sampling methods challenging.

2. Economic efficiency: The cost of inventory per hectare is disproportionately high for small areas, while their contribution to the total stock is minimal and can even hinder results. Prioritizing larger areas optimizes resource allocation and project outcomes.

3. Operational feasibility: Small areas pose logistical challenges, such as limited accessibility and irregular boundaries, which increase complexity and reduce the reliability of collected data.

4. Alignment with international standards: Certification guidelines and methodologies often exclude small areas due to their limited contribution to forest stock calculations and statistical impact.

5. Sustainability and planning: Exclusion does not compromise sustainable management, allowing the focus to remain on more significant areas for robust analyses and strategic decision-making.

This approach balances precision, efficiency, and cost-effectiveness, ensuring the technical quality of the project.

It is also worth mentioning that the dynamics for native restoration areas are conducted in a different way, more fit to the purpose of the activities. The monitoring of such areas will take place every 5 years, considering the year on which the stratum in question was planted. Such events will also monitor the biodiversity of the area, the carbon stock present at the stratums and its increase in time. It will also improve the knowledge and process available at Suzano for such activities.

Eucalyptus plantations monitoring plan

Size and type of sample plots

The sample plot specifications follow the AR-TOOL14: "Estimation of carbon stocks and change in carbon stocks of trees and shrubs in A/R CDM project activities" – Version 04.2.

Sample plots are circular and permanent and must have the size of 400m². Whenever it is not possible to install a parcel of 400m², given the shape or size of the stratum, it is accepted a sample plot of 200m². In cases where this reduction is not enough, it shall be closed with an observation of the occurrence.

Under each sample plot it must be measured a 100% of circumference at breast height, height of 4 normal trees, height of 4 dominant trees, treetop height of 4 trees, index for leaf area (IAF) and grassland competition.

Sample plots must be defined permanently for Eucalyptus plantations, in line with the Continued Forest Inventory.

Number of sample plots

Sample plot intensity follows basic premises, which can be altered whenever needed:

1 sample plot for areas from 5 to 12 ha

2 sample plots for areas from 12 to 25 ha, and

1 sample plot for each 10 ha for areas bigger than 25 ha.

According to A/R Methodological Tool Calculation of the number of sample plots for measurements within A/R CDM project activities - Version 02.1.0, the number of sample plots depends on the targeted precision and standard deviation for the parameter to be measured under the sample plots.

According to PEARSON et al (2005) [11], the acceptable precision level for forest inventories is between ±10 and ±20 per cent. For this project, it is assumed a minimum precision of 10%, associated with the sample plot intensity suggested by the forest inventory department of Suzano, which has a large experience on the matter and is used with good practices for this type of activity.

For each monitoring event, Suzano will estimate the uncertainty associated to the measurements, which enables the adjustment of sample plot intensity.

The minimal number of sample plots required by the AR-TOOL03 will be observed and assured for each monitoring event.

[11] PEARSON, T., Walker, S., & Brown, S. (2005). Sourcebook para uso da terra, mudança de uso da terra e projetos florestais. Winrock International e o Fundo BioCarbon do Banco Mundial, 57. Last access: 12th May 2022

$$n = \frac{N * t_{VAL}^2 * (\sum_i w_i * s_i)^2}{N * E^2 + t_{VAL}^2 * \sum_i w_i * s_i^2}$$

Where:

n	Number of sample plots required for estimation of biomass stocks within the project boundary; dimensionless
N	Total number of possible sample plots within the project boundary (i.e. the sampling space or the population); dimensionless
t_{VAL}	Two-sided Student's t-value, at infinite degrees of freedom, for the required confidence level; dimensionless
w_i	Relative weight of the area of stratum i (i.e. the area of the stratum i divided by the project area); dimensionless
s	Estimated standard deviation of biomass stock in stratum i; t d.m. (or t d.m. ha-1)
E	Acceptable margin of error (i.e. one-half the confidence interval) in estimation of biomass stock within the project boundary; t d.m. (or t d.m. ha-1), i.e. in the units used for si
i	1, 2, 3, … biomass stock estimation strata within the project boundary

If sampled areas represent less than 5% of the project area, the simplified equation can be used:

$$n = (\frac{t_{VAL}}{E})^2 * (\sum_i w_i * s_i)^2$$

Sample plot instalment

LOCATION – Sample plots are previously identified by the Forest Inventory team at Suzano through maps, which also point the geographic coordinates and program for the monitoring team. The monitoring team shall then identify the coordinates established through GPS and install the sample plots, identifying the center of it. A sample plot may be relocated only in cases where it represents a safety risk for staff.

Trees inside the sample plot must be identified with paint to allow an easier identification of following monitoring events.

SAMPLE PLOT ALLOCATION – The sample plot number must be written on the first tree of the carrier, at the entrance point of the stratum. The following steps shall be applied:

The center of the parcel must be located under two trees from the same planting line, which must be marked. It must be identified the sample plot number and number of coves in paint.

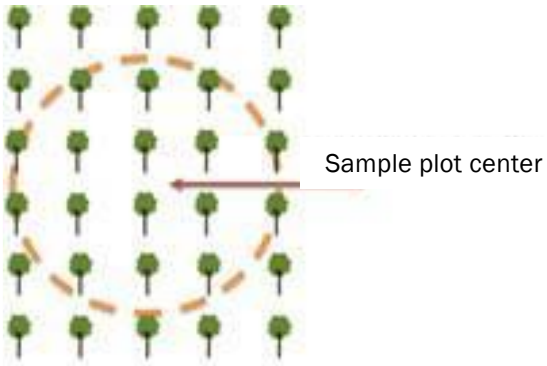


Figure 142 – Center of sample plot identification.

- Geographic coordinates and altitude at the center of the sample plot must be registered.
- From the center of the sample plot, the predefined radius must be identified with measuring tape, and limiting trees must be marked with the metallic pin.
- The first tree to be measured at the sample plot must always be the first tree to the lower left indicated on the mirror of the sample plot. The following measurements must be made following the planting lines, identifying the trees.
- Whenever it is difficult to define if a tree is inside a sample plot or not, this tree must be identified. The D and slash mark shall be used when the tree was considered, and the D mark when the tree was not considered inside the sample plot.
- When the end of planting line inside the sample plot is inconsistent, the previous tree shall be marked with an F. The number of occurrences shall also be indicated. For parcels with an inconsistent line, the previous or following line shall be marked, identifying the number of inconsistencies. When there is an inconsistency in the middle of the sample plot, the following tree must be marked with an F. A similar procedure must be applied for stumps, but with the T mark.
- When a parcel is located on an inconsistency area, the number of inconsistencies must be identified.

REMEASUREMENT OF PERMANENT SAMPLE PLOTS – Permanent sample plots must follow the same method described above, which enables de identification of measured stems and registration of tree mortality.

Measurement Procedures

For the Eucalyptus plantations, only the below and aboveground tree biomass will be monitored. Therefore, the growth in volumes will be monitored for each tree at the sample plots, based on the increment on the diameter at breast height and height of trees.

The carbon content on deadwood and litter at the project area will not be measured. This carbon stocks will be estimated as per AR-TOOL12: "Estimation of carbon stocks and change in carbon stocks in dead wood and litter in A/R CDM project activities" – Version 03.1.

The project will quantify and monitor the non-CO2 GHG emissions resulting from the occurrence of forest fire within the project boundary if the accumulated area affected by such fires in a year is ≥ 5% of the project area. These events will be monitored, and the affected area will be recorded.

Emission of non-CO2 GHG resulting from the loss of aboveground tree biomass due to fire will be calculated in each verification period by using the aboveground biomass in trees of relevant strata calculated in the previous verification and the default values for the combustion factor, the emission factors, and the global warming potential.

TREE DIAMETER AT BREAST HEIGHT (DBH): The DBH must be measured 1.3m above the ground. The equipment for this measurement are a post of 1.3m, measuring tape and suta. The measurement procedure must follow the steps:

- In regrowth areas, the post must not be positioned over stumps. In case of using the suta, it should be leaned on the bole. Two orthogonal measurements shall be made.
- The DBH must be measured at 1.3m, where a mark must be made on the position where the measurement took place, enabling future remeasurement events on the same position.
- Different occurrences can be observed when measuring the DBH. The procedures indicated at the image below must be followed. Measurement point is indicated by as measurement point.
- There are no lower limits for measurements under the sample plots. Dominant trees will be defined according to stem pattern inside the parcel.

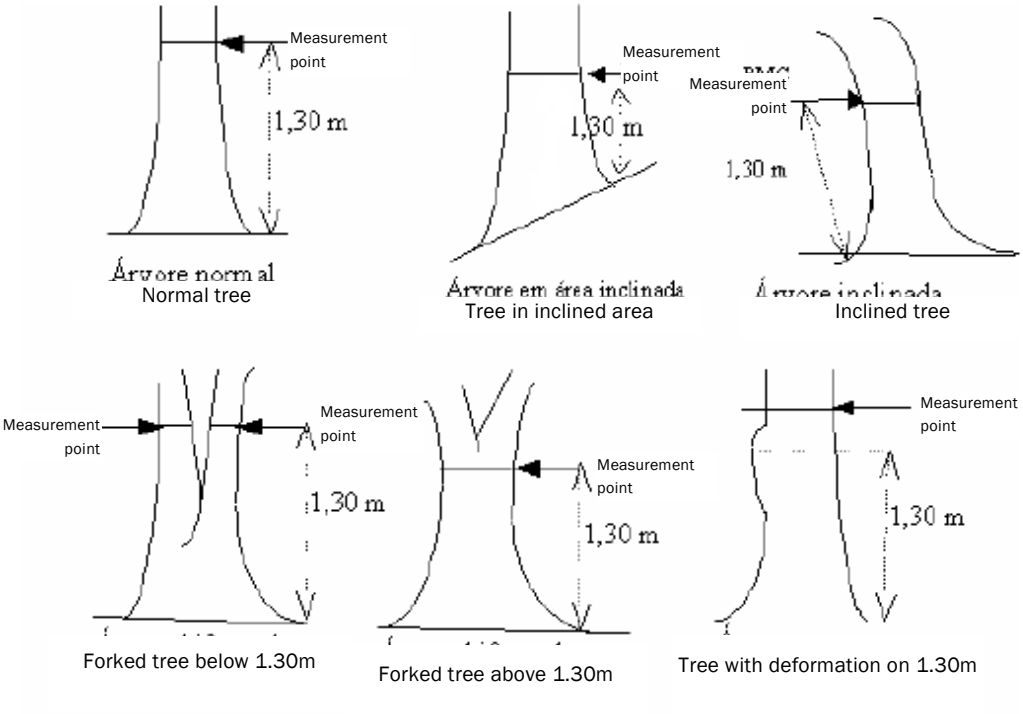


Figure 143 – Measurement point (PMC) in different conditions.

TREE HEIGHT (H): A clinometer must be used for assessing the tree heights. The following steps must be applied:

- The minimal distance of the operator must be equal to the tree height, assessed with a measuring tape.
- Measuring of tree heights must be made at the same level of the tree. The declivity of the area will be required as needed.
- The central line may be used as a reference for measuring the heights. If the central line does not present normal trees, the following line can be used.
- The dominant heights must be measured from the fist measuring event, as well as their treetop height.
- Measuring events must follow Table 6. In cases where a sample plot is composed of stumps or dead or alive burnt trees, the measuring event shall be made following the same procedures.
- Heights of all trees with broken treetops must be measured. This measuring event must be precisely at the broken point.
- In case of inclined trees, always measure perpendicularly to the inclination of the tree.

- Do not measure tree heights under strong winds.
- In some cases, where the tree basis visibility is compromised, the measuring point for the DBH can be used as a reference.
- On plane areas, where there is no level variation and the planting alignment is favourable, the measuring tape can be stretched perpendicularly to the planting line for indicating the measuring points.
- The direction and footage of where the measurement occurred must be informed.
- The treetop height will be obtained from the difference between the total height and the height until the beginning of the treetop, as indicated on the following image.

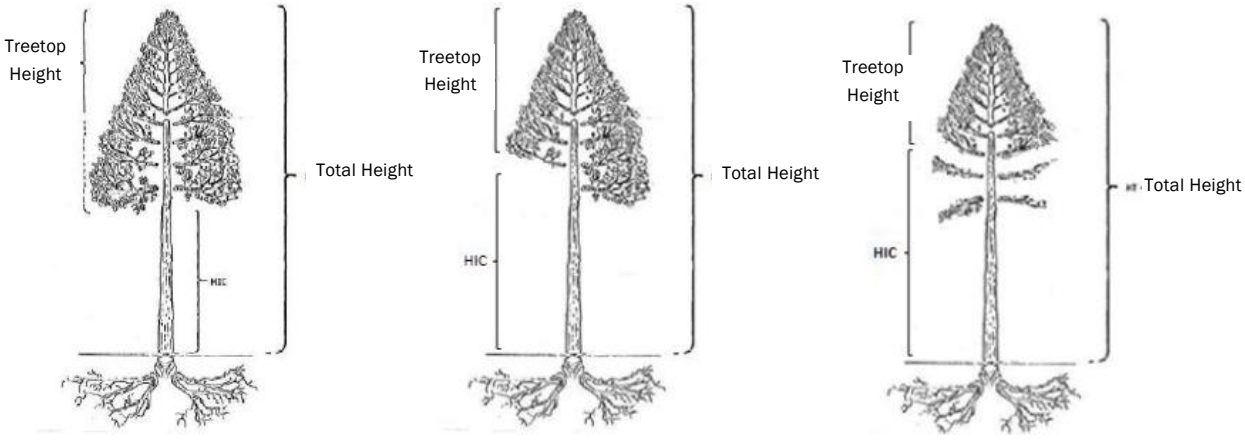


Figure 144 – Identification of the treetop height

STEM SITUATION CLASSIFICATION

Stem classification on site must follow the codification below.

Table 5 – Classification of stem situation

Code	Desciption	DAP	Height	Dominant	Exception
N	Normal	Measured	Yes	Yes	
F	Inconsistency	Not measured	Not measured	Not measured	
D	Dominated	Measured	Not measured	Not measured	
M	Dead	Measured	Not	Not	If there is no other option,

			measured	measured	height can be measured
Q	Broken	Measured	Measured	Not measured	Height measurement mandatory
A	Forked above DAP	Measured	Not measured	Not measured	
B	Forked below DAP	Measured	Measured	Measured	
RP	Replant	Measured	Not measured	Not measured	
FM	Ant	Measured	Measured	Measured	
L	Slight tortuosity	Measured	Measured	Measured	
TE	Strong tortuosity	Measured	Not measured	Not measured	
T	Stump	Não	Not measured	Not measured	
I	Inclined	Measured	Not measured	Not measured	
CI	Inclined toptree	Measured	Measured	Measured	
TV	Tumbled alive	Measured	Not measured	Not measured	
H	Dominant	Measured	Measured	Measured	Height measurement mandatory
E	Dry tip	Measured	Not measured	Not measured	
DD	Defornation of DAP	Measured	Not measured	Not measured	
XQ	Dead and burned	Measured	Not measured	Not measured	If there is no other option, height can be measured
XV	Alive and burned	Measured	Not measured	Not measured	If there is no other option, height can be measured
BR	Sprout	Measured	Not measured	Not measured	

MQ	Dead and broken	Measured	Measured	Not measured	Height measurement mandatory

SAMPLE PLOT OBSERVATION AND OCCURENCE

Sample plot observations are used to identify its conditions.

Table 6 – Codes for classifying observations on sample plots

Code	Description	Sample plot measurement	Sample plot allocation
1	None	Yes	**No**
10	Frost	Yes	**No**
11	Incompatible age	Yes	**No**
16	Standing dead tree	Yes	**No**
17	Wilt leaves	Yes	**No**
22	Broken	Yes, if there is no safety risk	**No**
23	Burnt	Yes	**No**
25	Replanted	Yes	**No**
28	Non identified silvopastoral	Yes	**No**
29	Native Shading	Yes	**No**
30	Dirty	Yes, if there is no safety risk	**No**
31	No bucket	Yes	**No**
32	**Wood pile**	**Yes**	**No**

Native reforestation activity monitoring plan

Size and type of sample plots

The sample plot specifications follow the AR-TOOL14: "Estimation of carbon stocks and change in carbon stocks of trees and shrubs in A/R CDM project activities" – Version 04.2.

Sample plots are rectangular and must have the minimum size of 2,500m² (25mx100m), as indicated on the figure below. This shape is important to capture the local productive gradient, and to ensure the georeferencing of the vertices of the plot, to allow future localization of the plots.

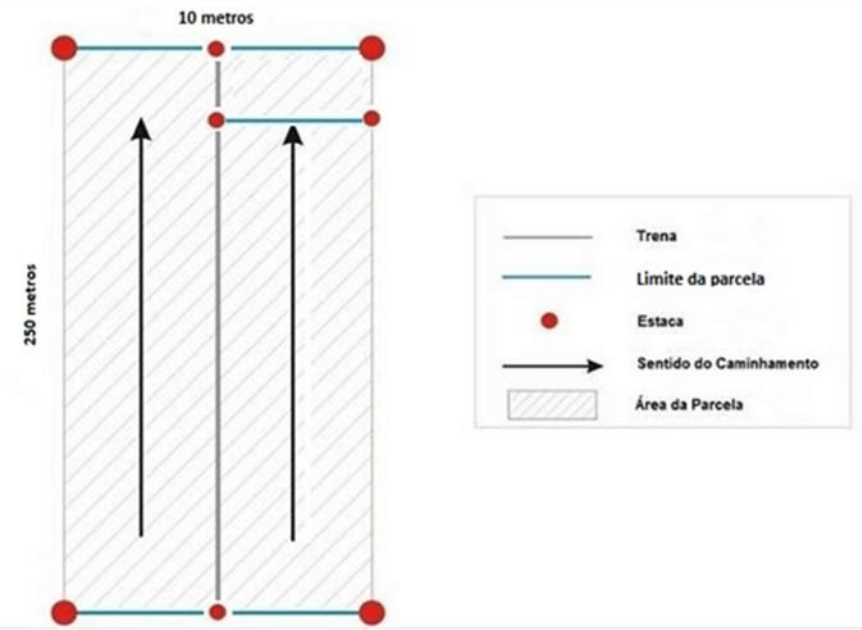


Figure 145 – Proposed sample plot size and distribution.

Number of sample plots

Sample plot intensity follows basic premises and seeks to meet the criteria set for the appliance of the AR-ACM0003.

According to A/R Methodological Tool Calculation of the number of sample plots for measurements within A/R CDM project activities - Version 02.1.0, the number of sample plots depends on the targeted precision and standard deviation for the parameter to be measured under the sample plots. For this project, it is assumed a minimum precision of 10%.

For each monitoring event, Suzano will estimate the uncertainty associated to the measurements, which enables the adjustment of sample plot intensity.

The minimal number of sample plots required by the AR-TOOL03 will be observed and assured for each monitoring event.

$$n = \frac{N * t_{VAL}^2 * (\sum_i w_i * s_i)^2}{N * E^2 + t_{VAL}^2 * \sum_i w_i * {s_i}^2}$$

Where:

n Number of sample plots required for estimation of biomass stocks within the project boundary; dimensionless

N Total number of possible sample plots within the project boundary (i.e. the sampling space or the population); dimensionless

t_{VAL} Two-sided Student's t-value, at infinite degrees of freedom, for the required confidence level; dimensionless

w_i Relative weight of the area of stratum i (i.e. the area of the stratum i divided by the project area); dimensionless

s Estimated standard deviation of biomass stock in stratum i; t d.m. (or t d.m. ha-1)

E Acceptable margin of error (i.e. one-half the confidence interval) in estimation of biomass stock within the project boundary; t d.m. (or t d.m. ha-1), i.e. in the units used for si

i 1, 2, 3, … biomass stock estimation strata within the project boundary

If sampled areas represent less than 5% of the project area, the simplified equation can be used:

$$n = (\frac{t_{VAL}}{E})^2 * (\sum_i w_i * s_i)^2$$

Sample plot instalment

LOCATION – When installing a sample plot, the monitoring team shall identify the coordinates stablished through GPS and register the information, for following inventories.

Measurement Procedures

For native vegetation plantation, only the aboveground tree biomass will be monitored. Belowground biomass will be estimated as per the AR-TOOL14. All trees with DBH ≥ 5m shall be measured. Therefore, the growth in volumes will be monitored for each tree at the sample plots, based on the increment on the diameter at breast height and height of trees.

It is important to highlight that the trees must be identified through labeling. Their botanical identification must also be assessed.

The carbon content on deadwood and litter at the project area will not be measured. This carbon stocks will be estimated as per AR-TOOL12: "Estimation of carbon stocks and change in carbon stocks in dead wood and litter in A/R CDM project activities" – Version 03.1.

The project will quantify and monitor the non-CO2 GHG emissions resulting from the occurrence of forest fire within the project boundary if the accumulated area affected by such fires in a year is ≥ 5% of the project area. These events will be monitored, and the affected area will be recorded.

Emission of non-CO2 GHG resulting from the loss of aboveground tree biomass due to fire will be calculated in each verification period by using the aboveground biomass in trees of relevant strata calculated in the previous verification and the default values for the combustion factor, the emission factors, and the global warming potential.

TREE DIAMETER AT BREAST HEIGHT (DBH): All tree DBHs equal or greater to 5cm must be measured, even if the tree is dead. The DBH must be measured 1.3m above the ground. The equipment for this measurement is a post of 1.3m, measuring tape and suta. The measurement procedure must follow the figure below:

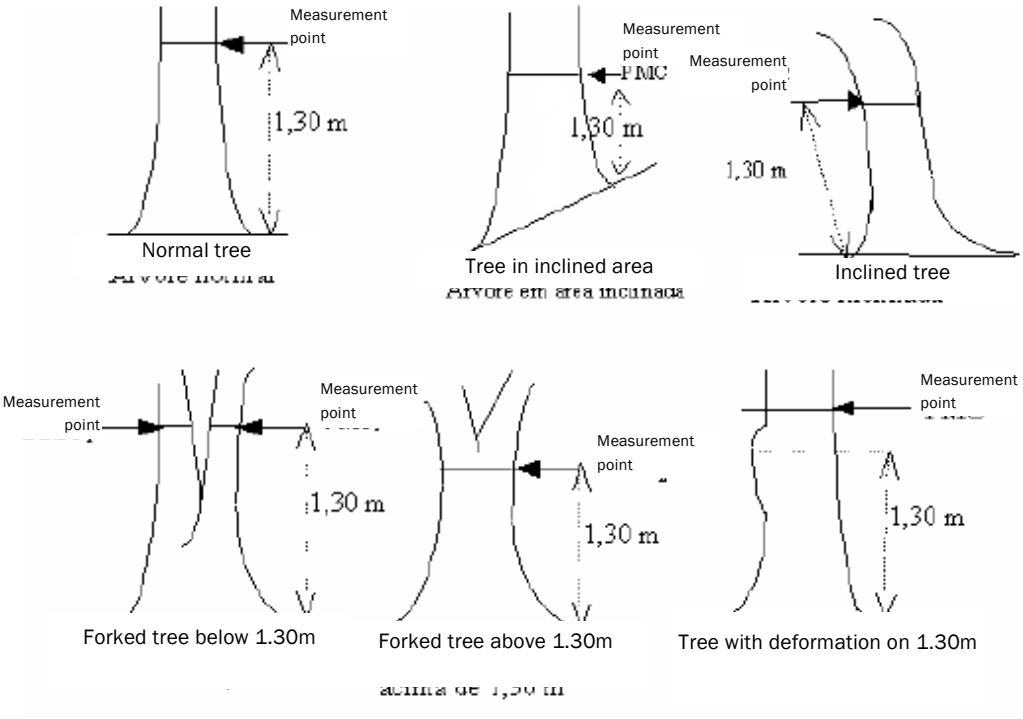


Figure 146 – Measurement point (PMC) in different conditions.

TREE HEIGHT (H): A telescopic stick must be used for assessing the total tree heights for all the stratums in an initial or medium regeneration stage. It is expected that the highest trees may have limited measurements, considered its height and other nearby trees.

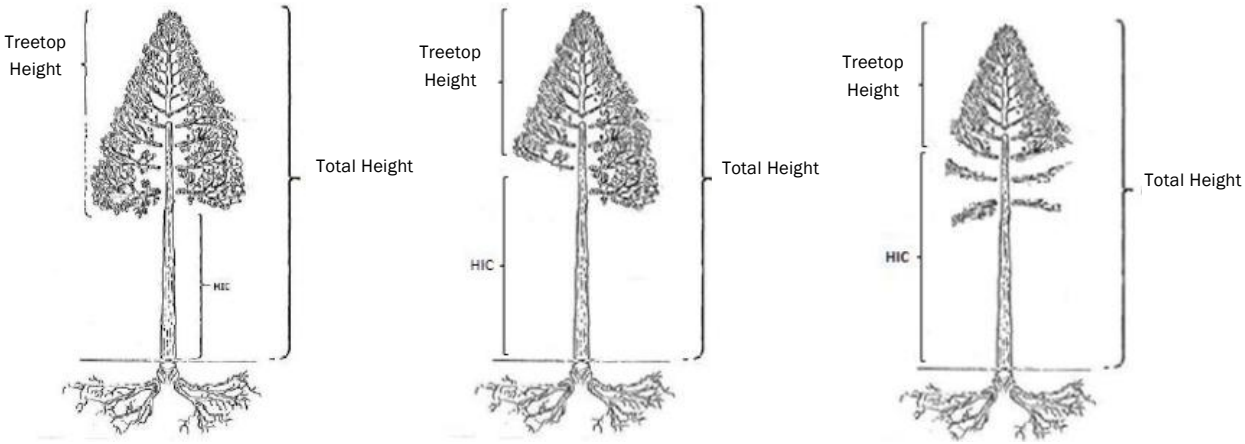


Figure 147 – Identification of the treetop height

Equipment calibration procedures

Measuring equipment must be submitted to calibration before usage for both the eucalyptus planting and for the native reforestation.

Measuring tape, surveyor cable and 1.3 posts must be measured and compared to a certified measuring tape. The procedure is done on site, during visits. When an equipment is outside of the allowed limits by Suzano, it must be substituted.

Clinometer must be calibrated on a post or tower with marks on 10, 20 and 30m. The operator must use a certified measuring tape to assure the marks and conduce the height measuring of the known values. When an equipment is outside of the allowed limits by Suzano, it must be substituted.

Table 7 – Limits allowed by Suzano.

Equipment	Limit
Measuring Tape – 20 cm	0.3 cm
Measuring Tape – 40 cm	0.3 cm
Measuring Tape – 60 cm	0.3 cm
DAB post – 1,3 cm	0.5 cm
Measuring tape – 10 cm	3 cm
Measuring Tape – 20 cm	3 cm

Measuring Tape – 30 cm	3 cm
Surveyor cable – 7,98 m	3 cm
Surveyor cable – 11,28 m	3 cm
Height Ruller– 3 cm	2 cm
Height Ruller – 5 cm	2 cm
Clinometer– 10 cm	0.5 cm
Clinometer – 20 cm	0.5 cm
Clinometer – 30 cm	0.5 cm
Telescopic stick	

Data validation, processing and storing (QA/QC)

It is of great importance to have procedures to deal with eventual mistakes that may occur during monitoring activities. Errors and inconsistencies from the data collection procedures can be identified internally during data processing, through the application of rigorous validation routines.

This validation routines take place during data import to the software EOL ZENIT SATA LOGGER, where information consistency is verified. This software is responsible for data storage for both the eucalyptus areas and for the native areas.

The software goes through each value, from tree to tree, to validate information and informs the possible inconsistencies. Consistent information validates the meeting or requirements for the forest inventory. Mathematical validation is also important to assess the consistency of the monitoring event with the real condition of the forest indicated by the forest register, comparing input data to the register and tabled values.

There are two types of inconsistencies: impeditive and non-impeditive ones. The first type requires the data assessment and correction. The second type require the analyst assessment, which can ask for data correction or opt to use this information with an associated disclaimer. Possible inconsistencies are listed below:

Table 8 – Types of inconsistencies and disclaimers

Inconsistencies	Disclaimer
Inco 01 – Measured Height and empty DAP	Trees which height was measured, but the DAP is empty or equal to zero.

Inco 02 - Tree with empty height and DAP	Tree which height and DAP are empty or equal to zero and stem condition different from ('F','S','FP', 'T')
Inco 03 – Dominated with DAP>0 or wrong DAP	DAP from stem dominated tree without the D mark on field “SITUACAOFUSTE”
Inco 04 – tree with disproportional DAP and height	Tree with disproportional Height and DAP
Inco 05 – Discrepant DAP or Height	Discrepant DAP or height without Q mark on stem condition
Inco 06 – Tree out of the sequence	Tree out of the sequence
Inco 07 – Number of Trees do not match the size	Number of Trees do not match the size
Inco 09 – Check width and length	Check width and length of sample plot
Inco 11 – Check date of measurements	Check date of measurements
Inco 12 – Dominant Height missing	Dominant Height data missing
Inco 13 – Few heights measured	Few Heights measured (except for the dominant trees)
Inco 17 – Dead tree with height measured	Dead tree with height measured
Inco 18 – Broken tree without height	Broken tree without height
Inco 25 – Dead tree with height variation on DAP	Dead tree with height variation on DAP in comparison to previous measurements
Inco 26 – Tree with unusual DAP growth	Tree with unusual DAP growth

In case of inconsistent measurements, indicated by inconsistent data, the batch will be returned to the measurement team for proper correction. Field activity might be necessary to correct the data if the auditing team requires so, and according to previous measurement data score rated for the sample plots audited. Scoring follows the criteria below:

Table 9 – Score Criteria for assessing quality of measurements from sample plots

Code	Criteria	Score	Description	Relevance	Relevance (%)
1	N. of coves altered (inclusion or exclusion of stumps)	0	Correct	25	37.3
		1	Incorrect		
2	Absolute mean deviation - CAP	0	Correct	5	7.5
		1	Incorrect		
3	Absolute mean deviation - HT	0	Correct	20	29.8

		1	Incorrect		
4	Codification of trees	0	Correct	2	3
		1	Incorrect		
5	XY spatial coordinates for the sample plots	0	Correct	2	3
		1	Incorrect		
6	Identification of limiting trees for sample plots	0	Correct	7	10.4
		1	Incorrect		
7	Tree mark identification on mirror (n. of sample plot, n. of coves, distance/direction, height measurement) and DAP identification	0	Correct	1	1.5
		1	Incorrect		
8	Inconsistencies identification (field data collection)	0	Correct	5	7.5
		1	Incorrect		

The scoring starts at 100, and when an inconformity is identified, the respective relevance is discounted from the score.

- Scores between 90 and 100 indicate measurements according to expected, with minor adjustments in cases where a simple inconsistency event occurs.
- Scores between 80 and 90 indicate that the batch must be returned to the field monitoring team to remeasure the inconsistent information for all the sample plots from the batch (same team and date).
- Scores under 80 indicate that the whole farm must be remeasured.

Data and monitored parameter Analysis

Registered data for the Project area are inputs for growth models that will define the total biomass stock at the project at the time of the monitoring event. Only areas with more than 2 years will be considered for eucalyptus activities, whereas native reforestation activities will be implemented every 5 years.

For ex-post calculation, the monitored data will be modeled through volume and biomass equations, specific for each tree species and project region, considering the conformity required by the AR-TOOL14 - Estimation of carbon stocks and change in carbon stocks of trees and shrubs in A/R CDM project activities, Version 04.2.

Considering all requirements listed under the AR-TOOL14, monitoring must consider the confidence level of 90%, and an error margin of 10%

Procedure for calculating uncertainty

Uncertainty from carbon stocks estimates will be assessed through equation 6 of the AR-TOOL14 - Estimation of carbon stocks and change in carbon stocks of trees and shrubs in A/R CDM project activities, Version 04.2:

$$u_c = \frac{t_{VAL} \times \sqrt{\sum_{i=1}^{M} w_i^2 \times \frac{s_i^2}{n_i}}}{b_{TREE}}$$

Where:

u_c	Uncertainty in C_{TREE}
t_{VAL}	Two-sided Student's t-value for a confidence level of 90 per cent and degrees of freedom equal to n – M, where n is total number of sample plots within the tree biomass estimation strata and M is the total number of tree biomass estimation strata
s_i^2	Variance of tree biomass per hectare across all sample plots in stratum i; (t d.m. ha^{-1})^2
n_i	Number of sample plots in stratum i.
$b_{TREE,i}$	Mean tree biomass per hectare in stratum i; t d.m. ha^{-1}

Monitoring of loss event due to biomass burning

Suzano is aware of the risk forest fires represent for this project activity and for its business in a whole. For this reason, it has a robust procedure (PO.12.02.2019) for keeping track of fire events and is determined to report them in a public way at its website[12].

According to the operational procedure, the team is equipped with a vehicle for reaching the fire spots, radio for communicating, a support team with equipment to extinguish the fire, such as dampers and water trucks.

[12] SUZANO. Número de Focos de incêndio nas áreas da Suzano. Available at: < https://centraldesustentabilidade.suzano.com.br/indicadores/?ind=numero-de-focos-de-incendios-nas-areas-da-suzano-625cec56bfc2e&filter_tag=temas_materiais;>. Last access: 05th July, 2022.

The team is responsible to patrol Suzano's areas, and to observe the occurrence of fire events. In addition to extinguishing and controlling the areas, they must keep reports on the events and investigate what caused the fire. They also count with monitoring towers that can provide alerts in case of fire events.

When a fire event takes place, the team must quantify the damage caused, and inform its superior, so they can specifically identify the area damaged, with the most accurate information available. The security team must also be informed immediately after identifying the fire spot. The coordinator will decide the proper management of the area after the event.

All fire events must be reported on the Accident and Incident Investigation Analysis Report. If 5% or more of the project area is lost due to fire events, the project proponents will follow all the procedures set out by the VCS Standard through the process for communicating and accounting for the loss event.

5 QUANTIFICATION OF GHG EMISSION REDUCTIONS AND REMOVALS

5.1 Baseline Emissions

The monitoring period of this report is from the start date 22/02/2022 to 03/04/2023, which is the date the last parcel from the inventory was measured.

The baseline emissions were determined as per AR-ACM0003, as detailed below:

$$\Delta C_{BSL,t} = \Delta C_{TREE_{BSL},t} + \Delta C_{SHRUB_{BSL},t} + C_{DW_{BSL},t} + \Delta C_{LI_{BSL},t}$$

Where:

$\Delta C_{BSL,t}$ Baseline net GHG removals by sinks in year t; tCO2-e

$\Delta C_{TREE_{BSL},t}$ Change in carbon stock in baseline tree biomass within the project boundary in year t, as estimated in the tool "Estimation of carbon stocks and change in carbon stocks of trees and shrubs in A/R CDM project activities"; t CO2-e

$+\Delta C_{SHRUB_{BSL},t}$Change in carbon stock in baseline shrub biomass within the project boundary, in year t, as estimated in the tool "Estimation of carbon stocks and change in carbon stocks of trees and shrubs in A/R CDM project activities"; t CO2-e

$C_{DW_{BSL},t}$ Change in carbon stock in baseline dead wood biomass within the project boundary, in year t, as estimated in the tool "Estimation of carbon stocks and change in carbon stocks in dead wood and litter in A/R CDM project activities"; t CO2-e

$\Delta C_{LI_{BSL},t}$ Change in carbon stock in baseline litter biomass within the project boundary, in year t, as estimated in the tool "Estimation of carbon stocks and change in carbon stocks in dead wood and litter in A/R CDM project activities"; t CO2-e

5.1.1. Carbon stock in tree in the baseline

Although the trees present under the baseline are sparse and limited, the phytophysiognomy of the area has been characterized as degraded pasture and exposed soil. The present sparse trees at the eucalyptus plantation areas will be removed by the project proponent. This removal is legally allowed through legal authorizations called CANI (in Portuguese, Cutting of Isolated Native Trees).

For this reason, tree stock under the baseline should be accounted for, for such trees to be removed. The Project will follow the approach of proportional canopy cover, described under section 8.3 of AR-TOOL14. This method is suitable for estimating baseline carbon stock in tree biomass where the average tree crown cover in the baseline is less than 20% of the threshold tree crown cover reported by the Host Party, considering the current definition of forest or forest formation.

The Brazilian Designated National Authority informed the following values for afforestation and reforestation project activities[13]:

Table 10 – Brazilian Afforestation/Reforestation information

Requirements	Host party's selected single minimum
Canopy cover	30 %
Minimum height	1m
Area	5 m

The mean pre-project tree crown cover is 1.10%, less than 20% of the threshold tree crown over defined by the DNA (6%), as required by the AR-TOOL0014, which requires under paragraph 49 that "This method is applicable only for estimation of the pre-project carbon stock in tree biomass in the baseline where the mean pre-project tree crown cover is less than 20 per cent of the threshold tree crown cover reported by the host Party under paragraph 8 of the annex to decision 5/CMP.1.".

[13]Countries Afforestation/Reforestation informations. Clean Development Mechanism. Brazil information. Available at: <https://cdm.unfccc.int/DNA/allCountriesARInfos.html>. Last access: 29th April 2022.

Considering the instances that were planted and inventoried, which are the objective of generating VCUs accounted for in this current section of the MR, no sparse trees were removed from the planting area. However, sparse trees had to be removed from instances that have not yet been inventoried and their canopy crown cover occupied an area of 140,87 ha, which were considered in the accounts of baseline emissions (Figure 148).

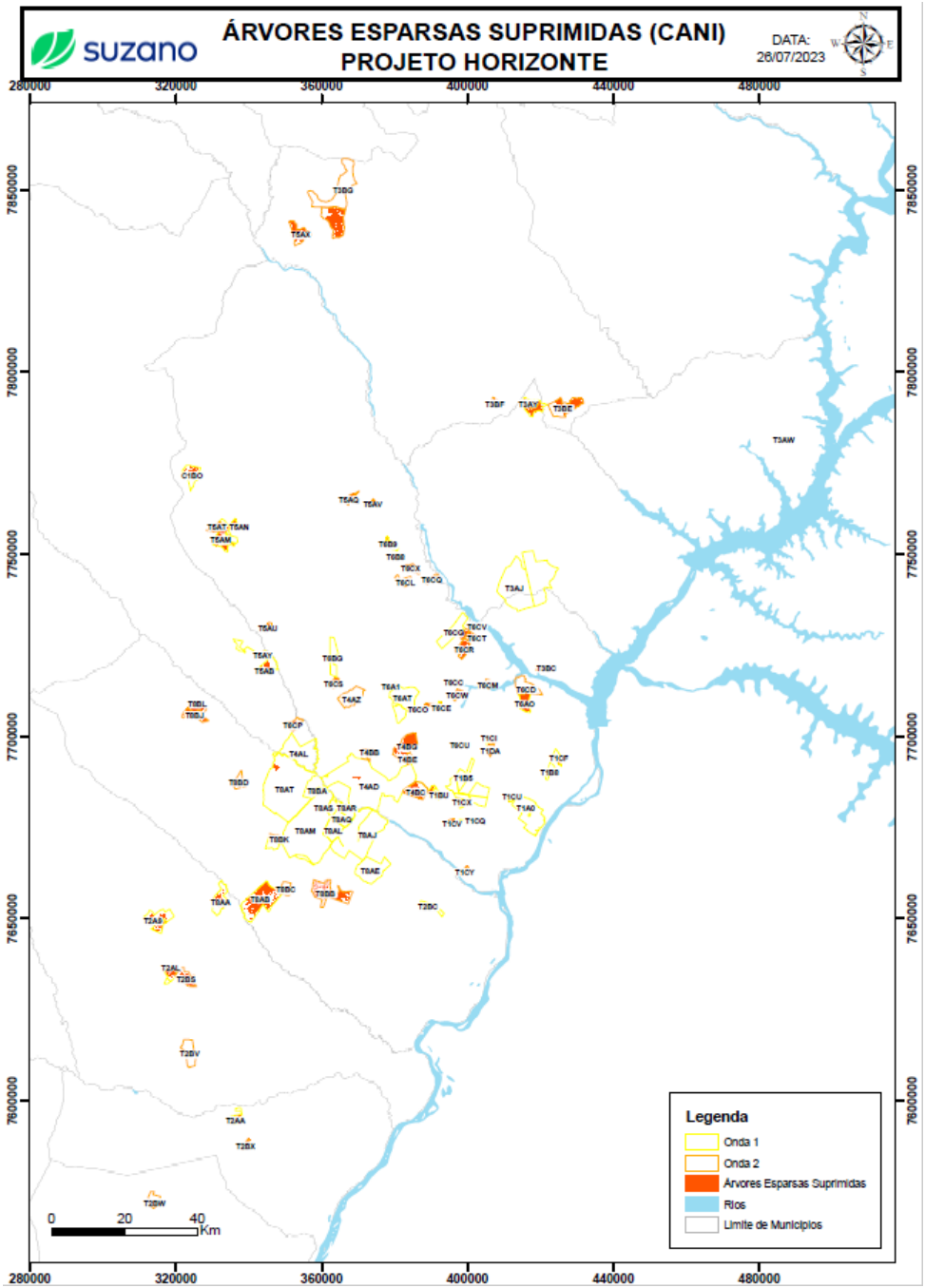


Figure 148 - Sparse trees to be removed from the project area, identified in orange.

Meeting the guidelines of AR-TOOL14 tool section 8.3, in paragraph 25, the change in tree carbon stock at baseline is estimated as follows:

$$C_{TREE\_BLS} = \sum_{t=1}^{M} C_{TREE_{BLS},i}$$

$$C_{TREE_{BLS,i}} = \frac{44}{12} * CF_{TREE} * b_{FOREST} * (1 + R_{TREE}) * CC_{TREE_{BLS},i} * A_i$$

Where:

C_{TREE_BLS} = Mean annual change in carbon stock in trees in the baseline; t CO2e yr^{-1}

$C_{TREE_{BLS,i}}$ = Mean annual change in carbon stock in trees in the baseline, in baseline stratum i; t CO2e yr^{-1}

CF_{TREE} = Carbon fraction of tree biomass; t C (t.d.m.)$^{-1}$.

b_{FOREST} = Mean above-ground biomass in forest in the region or country where the A/R CDM project activity is located; t d.m. ha^{-1} yr-1.

R_{TREE} = Root-shoot ratio for the trees in the baseline; dimensionless.

$CC_{TREE_{BLS},i}$ = Crown cover of trees in the baseline, in baseline stratum i, at the start of the A/R CDM project activity, expressed as a fraction; dimensionless

A_i = Area of baseline stratum i, delineated on the basis of tree crown cover at the start of the A/R CDM project activity; ha

The parameters applied are detailed below:

Table 11 - Parameters applied for calculating baseline carbon stock on trees

Parameter	Value	Unit	Reference
CFTREE	0.47	t C (t.d.m.)$^{-1}$	Default value defined by the AR-TOOL14.
bFOREST	110.12	t d.m. ha^{-1} yr-1	MIRANDA, et al. 2014. Regional variations in biomass distribution in Brazilian Savanna woodland. Data for biomass above and below ground for forest formations.

RTREE	0.25	Dimensionless	Default value defined by the AR-TOOL14.
CCTREEBLS,I	0.0110	Dimensionless	Measured for each farm. This is the average value
Ai	13,193.24	Ha	Inventoried/Measured

The AR-TOOL14 defines that changes in carbon stocks in trees and shrubs in the baseline may be accounted as zero for those lands where one or more indicators apply:

- Observed reduction in topsoil depth (e.g. as shown by root exposure, presence of pedestals, exposed sub-soil horizons);
- Presence of gully, sheet or rill erosion; or landslides, or other forms of mass-movement erosion;
- Presence of plant species locally known to be indicators of infertile land;
- Land comprises of bare sand dunes, or other bare lands;
- Land contains contaminated soils, mine spoils, or highly alkaline or saline soils.
- Land is subjected to periodic cycles (e.g. slash-and-burn or clearing-regrowing cycles) so that the biomass oscillates between a minimum and a maximum value in the baseline.
- Conditions under the previous paragraph apply (conditions a, b and c from paragraph 11 at AR-TOOL14).

Scenarios including erosion and base lands can be seen on project areas, both for the areas with eucalyptus planting planned and for native reforestation activities, as indicated by the map below. In addition, the baseline scenario was extensive cattle ranching, which often applies slash and burning procedures for both activities. For this reason, changes in carbon stock in shrubs and trees at the baseline could be estimated as zero.

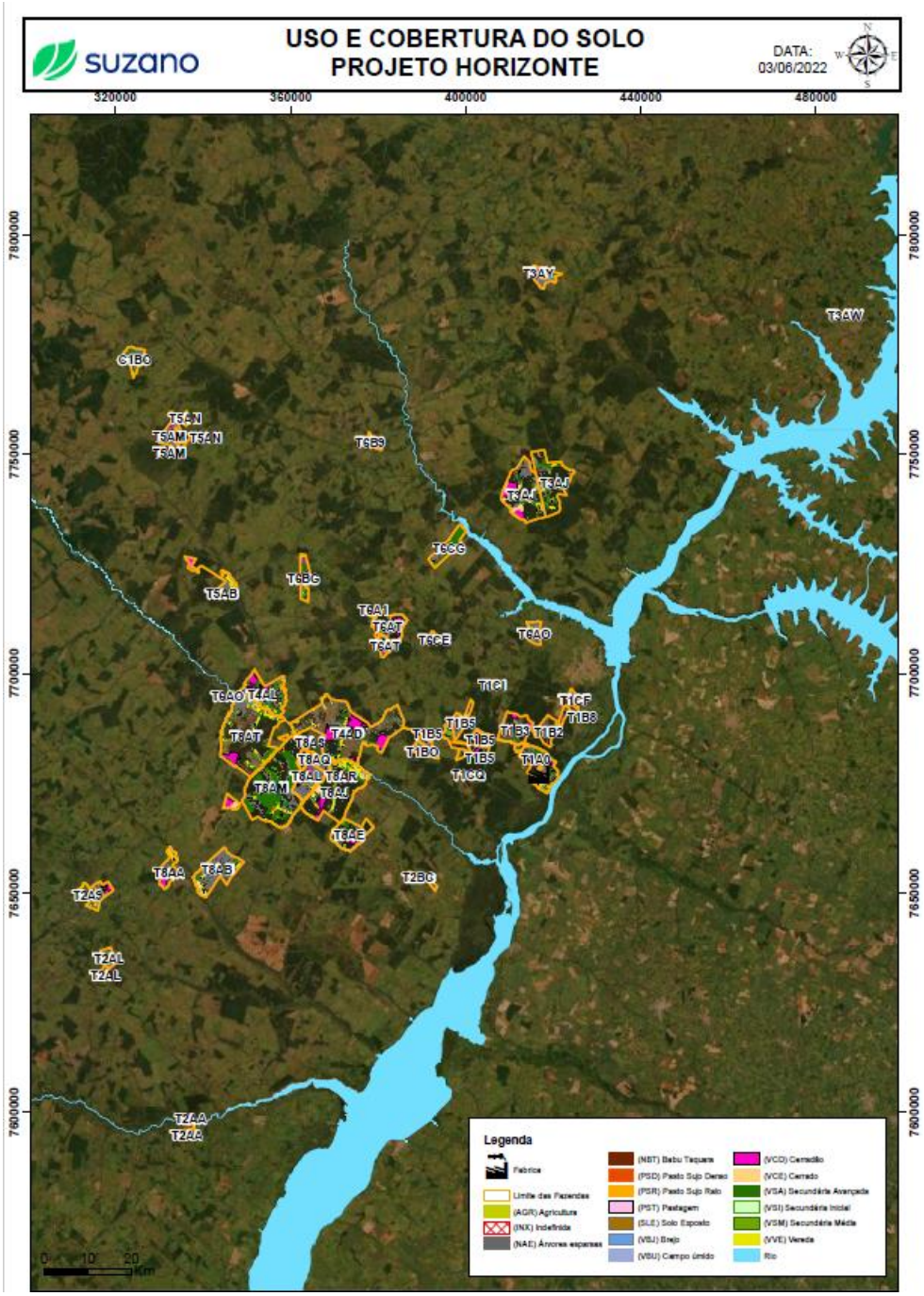


Figure 149 - Soil coverage of the project farms, with presence of exposed soil.

5.1.2 Carbon stock in shrubs

It is assumed that the carbon stock in shrub biomass is zero in the baseline scenario for the project activity, because changes in above- and below-ground biomass carbon stock of non-arboreal vegetation on degraded soil in the baseline scenario is not plausible.

5.1.3 Changes in carbon stock in trees, litter, and dead wood in baseline

For the estimates of carbon stock in dead wood and litter, the AR-TOOL12 topics 6.2 and 7.2 were applied, respectively, named the "conservative default-factor based method for estimation of carbon stock". The method allows for estimating carbon stocks under such pools based on conservative default factors, as outlined in the following equations:

$$C_{DW,i,t} = C_{TREE,i,t} * DF_{DW}$$

$$C_{LI,i,t} = C_{TREE,i,t} * DF_{LI}$$

Where:

$C_{DW_{BSL},t}$	Carbon stock in dead wood within the project boundary at a given point of time in year t; t CO_2e
$C_{LI\_BSL,t}$	Carbon stock in litter within the project boundary atat a given point of time in year t; t CO_2e
$C_{TREE,i,t}$	Carbon stock in trees biomass in stratum i at a point of time in year t, as calculated in the tool "Estimation of carbon stocks and change in carbon stocks of trees and shrubs in A/R CDM project activities"; t CO_2e
DF_{DW}	Conservative default factor expressing carbon stock in dead wood as a percentage of carbon stock in tree biomass; per cent
DF_{LI}	Default factor for the relationship between carbon stock in litter and carbon stock in living trees biomass; per cent

Through the guidelines of the AR-TOOL12, carbon stock under litter and dead wood pools were estimated by correlating them with the carbon stock in the tree biomass, applying the estimated data for the stock in trees at baseline within the project boundaries (as described earlier, in item 4.1.1) and conservative default factors presented by the tool. Dead wood and litter remain in situ and is not removed from the project boundary through any type of anthropogenic activities described in Suzano's internal forest implementation process (attachment 5). This document has been dully shared with VVB and will be available to Verra.

5.2 Project Emissions

The monitoring period of this report is from the start date 22/02/2022 to 03/04/2023, which is the date the last parcel from the inventory was measured.

The actual net GHG removals by pools are calculated using equation 2 of the AR-ACM0003 methodology as follows:

$$\Delta C_{ACTUAL,t} = \Delta C_{P,t} - GHG_{E,t}$$

Where:

$\Delta C_{ACTUAL,t}$	Actual net GHG removals by sinks, in year t; t CO2-e
$\Delta C_{P,t}$	Change in the carbon stocks in project, occurring in the selected carbon pools, in year t; t CO2-e
$GHG_{E,t}$	Increase in non-CO2 GHG emissions within the project boundary as a result of the implementation of the A/R CDM project activity, in year t, as estimated in the tool "Estimation of non-CO2 GHG emissions resulting from burning of biomass attributable to an A/R CDM project activity"; t CO2-e

5.2.1 Stratification

Stratification was defined according to section 5.3 of the "AR-ACM0003 A/R Consolidated Large Scale Methodology Afforestation and reforestation of lands except wetlands Version 02.0". The methodology states that if the distribution of biomass in the project area is not homogeneous, stratification should be performed to improve the accuracy of biomass estimation.

For actual net GHG removals, for the areas monitored under this monitoring event, the stratification was based on the project planting plan, considering the year of plantation and responsible for planting. Considering the current monitoring period, a new stratum was created representing the instances that were planted in 2021 by Suzano and inventoried by April 3, 2023. Thus, the total area of the project in which eucalyptus reforestation was carried out and inventoried is equivalent to 13,193.24 hectares, which is generating the VCUs presented in section 5.4. This represents an increase in 1,071.37 hectares compared to the 1st monitoring period, equivalent to Stratum 7.

Table 12 - Stratum for plot sampling under this monitoring period

Stratum	*Total area*	*Responsible for planting*	*Year of planting*
Stratum 1	3,275.66	Funds	2017
Stratum 2	2,438.70	Funds	2018
Stratum 3	234.52	Suzano	2017
Stratum 4	714.07	Suzano	2018
Stratum 5	5,202.27	Suzano	2019

Stratum 6	256.65	Suzano	2020
Stratum 7	1,071.37	Suzano	2021

Furthermore, considering the new instances that will be validated, as presented in section 3.3, it is important to highlight that there will be other stratums in the project for the next monitoring periods, representing plantings after 2021, such as 2022 and 2023, but have not been accounted for so far in this section 5.2 because they have not yet been inventoried.

5.2.2 Change in carbon stock in Project

Change in the carbon stocks in Project , $\Delta C_{P,t}$, occurring in the carbon pools in year t were calculated according to the equation 3 of AR-ACM0003 methodology:

$$\Delta C_{P,t} = \Delta C_{TREE\_PROJ,t} + \Delta C_{SHURB\_PROJ,t} + \Delta C_{DW\_PROJ,t} + \Delta C_{LI\_PROJ,t} + \Delta SOC_{AL,t}$$

Where:

$\Delta C_{P,t}$	Change in the carbon stocks in project, occurring in the selected carbon pools, in year t; t CO2-e
$\Delta C_{TREE\_PROJ,t}$	Change in carbon stock in tree biomass in project in year t, as estimated in the tool "Estimation of carbon stocks and change in carbon stocks of trees and shrubs in A/R CDM project activities"; t CO2-e
$\Delta C_{SHURB\_PROJ,t}$	Change in carbon stock in shrub biomass in project in year t, as estimated in the tool "Estimation of carbon stocks and change in carbon stocks of trees and shrubs in A/R CDM project activities"; t CO2-e
$\Delta C_{DW\_PROJ,t}$	Change in carbon stock in dead wood in project in year t, as estimated in the tool "Estimation of carbon stocks and change in carbon stocks in dead wood and litter in A/R CDM project activities"; t CO2-e
$\Delta C_{LI\_PROJ,t}$	Change in carbon stock in litter in project in year t, as estimated in the tool "Estimation of carbon stocks and change in carbon stocks in dead wood and litter in A/R CDM project activities"; t CO2-e
$\Delta SOC_{AL,t}$	Change in carbon stock in SOC in project, in year t, in areas of land meeting the applicability conditions of the tool "Tool for estimation of change in soil organic carbon stocks due to the implementation of A/R CDM project activities", as estimated in the same tool; t CO2-e

It is considered that the eucalyptus plantations will be harvested every 7 years and reestablished by replanting the area. It is important to highlight that soil preparation at Suzano S.A is carried out based on the principles of minimum cultivation (restricted to the planting lines or pits), achieving a balance between soil preparation quality and maintenance of forest residues (litter and dead wood) on the soil ensuring the conservation of the structure and biomass below the soil.

Due to the company's procedures of keeping the stumps and lowering them at the time of the soil preparation operation, the below-ground biomass is not compromised when the above-ground biomass is harvested, or during replanting. Thus, the maintenance of forest residues after harvest improves the physical-chemical attributes of the soil, incorporation of organic matter, besides increasing the cycling and efficiency of nutrient use[14]. In areas that receive fertilization and irrigation, as in the Project areas, it is possible to notice an increase in the carbon stored in the soil, attributed to the higher production of fine roots[15].. As long as the Eucalyptus stand is renewed and the above ground biomass grows again, the below ground biomass will be maintained in the area in relation to harvesting and replanting operations, and the same applies to the stock of litter and dead wood, which contributes to the maintenance of organic carbon. Due to the application of the methodology AR-ACM0003, this stock behavior cannot be clearly visualized, and are devalued for the eucalyptus activity. This consideration is conservative.

The Native reforestation activity will not include harvesting events or improved forest management techniques whatsoever. Hence, the Long Term Average GHG benefit will not be applied for this stratum, considered it will not be disturbed throughout the project lifetime. Also, carbon stock in soil organic carbon will be applied only for this stratum.

5.2.2.1 Estimation for Change in carbon stock in tree and shrub biomass

For ex-post assessment of carbon stock in tree biomass at a given moment, the guidelines on AR-ACM0003 and AR-TOOL14, “Estimating carbon stock in trees at a point of time”.

The assessment of above and below ground in tree biomass per hectare at a point in time (per year), considering the referenced parameters, was calculated based on the IPCC Equation 3.2.5[16]:

$$G_{Total} = G_w * (1 + R)$$

[14] ALVARENGA, Ramon Costa et al. Sistema integração lavoura-pecuária-floresta: condicionamento do solo e intensificação da produção de lavouras. 2010.

[15] GATTO, Alcides et al. Estoques de carbono no solo e na biomassa em plantações de eucalipto. Revista Brasileira de Ciência do Solo, v. 34, p. 1069-1079, 2010.

[16] IPCC, 2003. Good Practice Guidance for Land Use, Land-Use Change and Forestry. Chapter 3, Section 3.2. Available at: <https://www.ipcc-nggip.iges.or.jp/public/gpglulucf/gpglulucf_files/Chp3/Chp3_2_Forest_Land.pdf>. Last Access: 18th March 2022.

Where:

G_{total} average annual biomass increment above and belowground, tonnes d.m. ha-1 yr-1

G_w average annual aboveground biomass increment, tonnes d.m. ha-1 yr-1

R root-to-shoot ratio, dimensionless

$$G_w = I_v * d * BEF$$

Iv average annual net increment in volume suitable for industrial processing, m^3 ha^{-1} yr-1

d Basic wood density, tdm/m^3 merchantable volume

BEF Biomass expansion Factor for conversion of merchantable volume to aboveground tree biomass, dimensionless

In order to determine the ΔCtree, the equations 12, 13 and 14 of the ARR-TOOL14 were applied:

$$\Delta C_{tree} = \frac{44}{12} * \ CF_{tree} * \Delta B_{tree}$$

$$\Delta B_{tree} = A * \Delta b_{tree}$$

$$\Delta b_{tree} = \sum_{i=1}^{M} w_i * b_{tree,i}$$

Where:

CF_{tree} Carbon fraction of tree biomass; t C (t d.m.)-1

A Project area

ΔB_{tree} Tree biomass within the biomass estimation strata; t d.m.

Δb_{tree} Tree biomass per hectare within the biomass estimation strata; t d.m. ha-1

wi Ratio of the area of stratum i to the sum of areas of tree biomass estimation strata (i.e. ⁄); dimensionless

The Δb_{tree} parameter on the abovementioned equation is equivalent to the G_{total} variable previously mentioned multiplied by the forest age.

The BEF parameter is estimated through a linear correlation of default values from IPCC[17], based on the age of the trees:

$$BEF = -0{,}033928571 * age + 0{,}432857143$$

The R parameter is also estimated through a linear correlation of default values from IPCC, based on the age of the trees:

$$R = -0{,}020714286 * age + 0{,}367142857$$

For monitoring the carbon stock at the project are under this monitoring period, the values below obtained from the monitoring event for the Iv and from Suzano database for density are applied:

Table 13 – Parameter values applied for calculating Project emission removals

Stratum	Iv (m³/ha/year)	D (tdm/m³)	CF (tC/tdm)
Stratum 1	35.91	0.47	0.47
Stratum 2	36.50	0.46	0.47
Stratum 3	32.02	0.48	0.47
Stratum 4	34.45	0.46	0.47
Stratum 5	33.39	0.45	0.47
Stratum 6	36.32	0.47	0.47
Stratum 7	44.01	0.38	0.47

As required by the tool, the uncertainty of the calculation was assessed through the equation below.

$$u_c = \frac{t_{VAL} \times \sqrt{\sum_{i=1}^{M} w_i^2 \times \frac{s_i^2}{n_i}}}{b_{TREE}}$$

Where:

u_c Uncertainty in C_{TREE}

t_{VAL} Two-sided Student's t-value for a confidence level of 90 per cent and degrees of freedom equal to n – M, where n is total number of sample plots within the tree biomass estimation strata and M is the total number of tree biomass estimation strata

s_i^2 Variance of tree biomass per hectare across all sample plots in stratum i; (t d.m. ha^{-1})^2

[17] IPCC, 2003. Good Practice Guidance for Land Use, Land-Use Change and Forestry. Available at: <https://www.ipcc.ch/publication/good-practice-guidance-for-land-use-land-use-change-and-forestry/>. Last Access: 18th March 2022

n_i Number of sample plots in stratum i.

$b_{TREE,i}$ Mean tree biomass per hectare in stratum i; t d.m. ha^{-1}

Table 14 - Data of forest inventory.

Stratum	Number of plots (N)	Area of sample plot (Ap,i)	Mean VTCC (m³/ha)	Wi (%)	Si²
Stratum 1	106	42,400	192.19	6%	1,470.57
Stratum 2	92	36,800	199.66	3%	1,712.16
Stratum 3	19	7,600	168.79	0%	483.01
Stratum 4	51	20,400	163.63	0%	1,781.87
Stratum 5	477	190,800	98.17	16%	655.61
Stratum 6	23	9,200	99.04	0%	304.02
Stratum 7	83	33,200	24.25	1%	26.84
TOTAL	**851**	**340,400**	**148.85**	-	**4,324.13**

Considered a tval of 1.645, the uncertainty assessed for C_{TREE} was equal to 1,28%, under the 10% threshold. Hence, no discounts over the CTREE should be applied due to uncertainty.

For the current monitoring period, some differences can be identified between the values of the sample plots when compared to the previous monitoring period (Table 15). This is due to the optimization of the forest inventory after the plantations complete 4 years, causing fewer plots to be remeasured than in previous years. Occasionally, some plots may also not be remeasured due to risks identified to workers during the field, such as beehive or tall grass.

Table 15 - Comparison of sampling plots between monitoring periods

Stratum	Number of plots (N)		Area of sample plot (Ap,i)	
	1st monitoring period	2nd monitoring period	1st monitoring period	2nd monitoring period
Stratum 1	103	106	41.200,00	42.400
Stratum 2	89	92	35.809,70	36.800
Stratum 3	24	19	9.600,00	7.600
Stratum 4	75	51	30.000,00	20.400
Stratum 5	502	477	200.800,00	190.800
Stratum 6	27	23	10.800,00	9.200

Stratum 7	-	83	-	33.200
TOTAL	820	851	328.209,70	340.400,00

Note: the UP T1A058 was harvested in December 2022 and reforested on June 29, 2023. The harvest process was considered in the Monitored ER spreasheet, but the new planting for this PU will be considered in the next monitoring period as it happened on 29 June 2023.

Estimation for Change in carbon stock in litter and dead wood

For the assessment of carbon stock in dead wood and litter for the project area monitored under this monitoring report, the AR-TOOL12 topics 6.2 and 7.2 were applied, respectively, named the "conservative default-factor based method for estimation of carbon stock". This approach requires dead wood and litter not to be removed from the project area. Therefore, it is important to highlight that neither the carbon stocks will be removed from the project area, both for eucalyptus and native plantations, as identified at Suzano's operational procedures. On eucalyptus plantations, dead wood and litter may be slightly moved aside when they are located at planting lines, and stumps may be cut in half or deepened at the soil, but not removed, in line with the methods requirements.

The method allows for estimating carbon stocks under such pools based on conservative default factors, as outlined in the following equations:

$$C_{DW,i,t} = C_{TREE,i,t} * DF_{DW}$$

$$C_{LI,i,t} = C_{TREE,i,t} * DF_{LI}$$

Where:

$C_{DW,i,t}$ Carbon stock in dead wood within the project boundary i at a given point of time in year t; t CO_2e

$C_{LI,i,t}$ Carbon stock in litter within the project boundary i at a given point of time in year t; t CO_2e

$C_{TREE,i,t}$ Carbon stock in trees biomass in stratum i at a point of time in year t, as calculated in the tool "Estimation of carbon stocks and change in carbon stocks of trees and shrubs in A/R CDM project activities"; t CO_2e

DF_{DW} Conservative default factor expressing carbon stock in dead wood as a percentage of carbon stock in tree biomass; per cent

DF_{LI} Default factor for the relationship between carbon stock in litter and carbon stock in living trees; per cent

Through the guidelines of the AR-TOOL12, carbon stock under litter and dead wood pools were estimated by correlating them with the carbon stock in the tree biomass, applying the estimated data for the stock in trees within the project boundaries. For the dead wood and litter estimation, the conservative default factor identified by the tool was applied.

Estimation for Change in carbon stock in soil organic carbon

This stock was not considered under this monitoring report, considered only eucalyptus plantations took place on the project area, so far, for which no stock in soil organic carbon will be considered, as mentioned under section 3.3. Therefore, it is estimated as zero.

5.2.3 Increase in non-CO2 GHG emissions

The AR-ACM0003 defines that GHG emissions resulting from herbaceous vegetation, combustion of fossil fuel, fertilizer application, use of wood, decomposition of litter and fine roots of N-fixing trees, construction of access roads within the project boundary, and transportation attributable to the project activity shall be considered insignificant and therefore accounted as zero.

The AR-TOOL08 for estimating emissions from burning biomass indicates the following equation:

$$GHG_{E,t} = GHG_{SPF,t} + GHG_{FMF,t} + GHG_{FF,t}$$

Where:

$GHG_{E,t}$	Emission of non-CO_2 GHGs resulting from burning of biomass and forest fires within the project boundary in year t; t CO_2-e
$GHG_{SPF,t}$	Emission of non-CO_2 GHGs resulting from use of fire in site preparation in year t;t CO_2-e
$GHG_{FMF,t}$	Emission of non-CO_2 GHGs resulting from use of fire to clear the land of harvest residue prior to replanting of the land or other forest management, in year t; t CO_2-e
$GHG_{FF,t}$	Emission of non-CO_2 GHGs resulting from fire in year t; t CO_2-e

No burning activity was implemented by the project proponent in any of the project areas monitored, although this practice is usually widely implemented under the baseline scenario for deforestation and pasture regrowth stimulation.

Hence, fire was not used by the project proponent for site preparation, nor was biomass burned within the project boundary. Moreover, fire was not used to clear the land of harvest residue prior to replanting

of the land for the eucalyptus plantations or other forest management at both project area activities, although harvest events are foreseen for the project activity to be implemented.

In case of forest fires that surpasses a threshold of 5% of the project area, the AR-TOOL08 must be applied, and all the required procedures for loss events will be dully applied. It is important to highlight that no fire events were seen at the project areas monitored so far.

Under such conditions, $GHG_{SPF,t}, GHG_{FMF,t}\ and\ GHG_{FF,t}$, are accounted as zero. Therefore, project emissions, $GHG_{E,t}$ are also accounted as zero.

5.3 Leakage Emissions

The estimation of the increase in GHG emissions resulting from the displacement of pre-project agricultural activities within the boundaries of a forestry or reforestation (A/R) project is governed by the instrument "Estimation of the increase in GHG emissions attributable to the displacement of pre-project agricultural activities in the CDM/R project activity"; t CO2-e. considering the determination of the following parameter:

$$LK_t = LK_{AGRIC,t}$$

Where:

LK_t = Leakage emission due to the displacement of agricultural activities in year t

$LK_{AGRIC,t}$ = Leakage emission resulting from displacement of agricultural activities in year t; t CO2e

For the lands within the project boundary from which pre-project agricultural activities are to be moved outside the project boundary are delineated and their area is to be estimated. The leakage emission resulting from the displacement of the activities should be estimated considering equation 1 of the aforementioned tool:

$$LK_{AGRIC,t} = \frac{44}{12} * (\Delta C_{BIOMASS,t} + \Delta SOC_{LUC,t})$$

Where:

$LK_{AGRIC,t}$ = Leakage emissions resulting from displacement of agricultural activities in year t; t CO2e

$\Delta C_{BIOMASS,t}$ = Decrease in carbon stock in the carbon pools of the land receiving the activity displaced in year t; t d.m.

$\Delta SOC_{LUC,t}$ = Change in soil organic carbon (SOC) stock due to land-use change in the land receiving the displaced activity in year t; tC ha^{-1}

Considering the project area monitored under this monitoring report, it can be said that:

The project activity does not expect any displacement of the agricultural activities present within the project boundary before its start, so leakage emissions are considered negligible and therefore considered zero.

Since land acquisition, previous owners are required to remove any animals present on area, and the areas are expected to remain unoccupied until the project implementation start, which can take more than a year to take place. However, according to MapBiomas[18], an initiative of the Greenhouse Gas Emissions Estimation System (SEEG) from the Climate Observatory's produced by a collaborative network of co-creators made up of NGOs, universities and technology companies organized by biomes and cross-cutting themes, the land occupied with pasture activities in the cities where the project is located have been slowly reducing since 2005. Between 2005 and 2021, the land covered by pasture reduced almost 22%[18] in the Project region (see figure 168). So, it is likely that the animals that were removed from project area were relocated to existing pastures, that is, no forest areas were opened for grazing because of the implementation of the project. Moreover, the number of cattle decreased by 12%[19] since 2017 in the cities where the project is located, suggesting that the total number of animals on the receiving pastures (displaced and existing) has not exceeded the capacity of the pastures (condition “a” o the CDM AR-Tool 15, to consider insignificant and hence accounted as zero), which corroborates low probability of leakage.

[18] Plataforma MapBiomas, 2022, filtred by cities where the ARR Horizonte Carbon Project is located. Link here

[19] https://cidades.ibge.gov.br/brasil/ms/selviria/pesquisa/18/16459?tipo=grafico&indicador=16533 ; https://cidades.ibge.gov.br/brasil/ms/agua-clara/pesquisa/18/16459?tipo=grafico; https://cidades.ibge.gov.br/brasil/ms/bataguassu/pesquisa/18/16459?tipo=grafico&indicador=16533 ; https://cidades.ibge.gov.br/brasil/ms/brasilandia/pesquisa/18/16459?tipo=grafico&indicador=16533 ; https://cidades.ibge.gov.br/brasil/ms/santa-rita-do-pardo/pesquisa/18/16459?tipo=grafico&indicador=16533 ; https://cidades.ibge.gov.br/brasil/ms/aparecida-do-taboado/pesquisa/18/16459?tipo=grafico&indicador=16533 ; https://cidades.ibge.gov.br/brasil/ms/tres-lagoas/pesquisa/18/16459?tipo=grafico&indicador=16533 ;

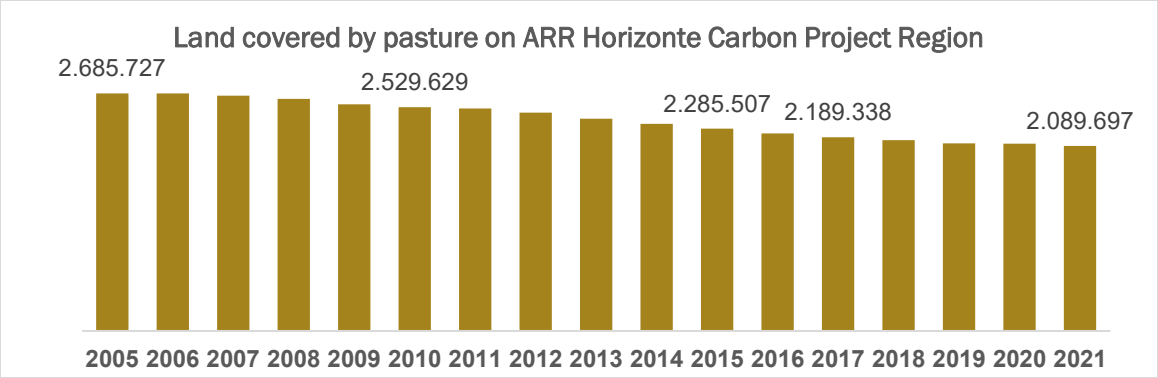


Figure 150 - Land covered by pasture in the region of ARR Horizonte Carbon Project[18]

In addition, it is known that the Cerrado biome is the second most impacted biome by deforestation in the country, with 33,5% of the deforested areas[20]. This can be noted by assessing images from the cities where the project is located, where most of the land can be easily identified as grasslands. Nevertheless, almost all forest areas near the project area belong to the project proponent.

It is also important to highlight that social activities to be implemented due to the project will bring another income for the local communities, so that they can raise independence from cattle ranching activities.

Therefore, Leakage emissions are considered insignificant and, therefore, accounted as zero under this monitoring event.

5.4 GHG Emission Reductions and Carbon Dioxide Removals

According to the equation 5 of the methodology AR-ACM0003 v2.0, the net anthropogenic GHG removal by sink is:

$$\Delta C_{AR-CDM,t} = \Delta C_{ACTUAL,t} - \Delta C_{BSL,t} - LK_t$$

Where:

$\Delta C_{AR-CDM,t}$ = Net anthropogenic GHG removals by sinks, in year t; t CO2-e

$\Delta C_{ACTUAL,t}$ = Actual net GHG removals by sinks, in year t; t CO2-e

$\Delta C_{BSL,t}$ = Baseline net GHG removals by sinks, in year t; t CO2-e

LK_t = GHG emissions due to leakage, in year t; t CO2-e

[20] MapBiomas, 2021. Relatório anual do desmatamento no Brasil - 2020. Available at: <https://s3.amazonaws.com/alerta.mapbiomas.org/rad2020/RAD2020_MapBiomasAlerta_FINAL.pdf>. Last access on 25 November 2021

Nevertheless, the non-permanence risk assessment conducted for this project determined that a percentage of 26% of the Net GHG emission reductions should be allocated at the Buffer pool, as indicated under the table below.

Additionally, according to the standard requirements, for those projects where harvesting practices are considered in the project area, the loss of carbon due to harvesting shall be included in the quantification of the project emissions. Because the eucalyptus planting considers an increase in project area during the first seven years of implementation and a harvesting period every seven years, the long-term average (LTA) GHG benefit was reassessed, considering the areas monitored so far, as follows:

$$LTA = \frac{\sum_{t=0}^{n} PE - BE_t}{n}$$

Where:

LTA = The long-term average GHG Benefit.

$\mathrm{PE_t}$ = The total to-date GHG emission reductions and removals generated in the project scenario (tCO2e). Project scenario emission reductions and removals shall also consider project emissions of CO_2, N_2O, CH_4, and leakage.

$\mathrm{BE_t}$ = The total to-date GHG emission reductions and removals projected for the baseline scenario (tCO_2e).

t = Year.

n = Total number of years in the established time period

The LTA (without risk buffer discount) is calculated considering 35 years.
The LTA estimated for the monitored area is 2,339,242.40 tCO_2e and according to the standard requirements the LTA indicates the total credits available to be issued.

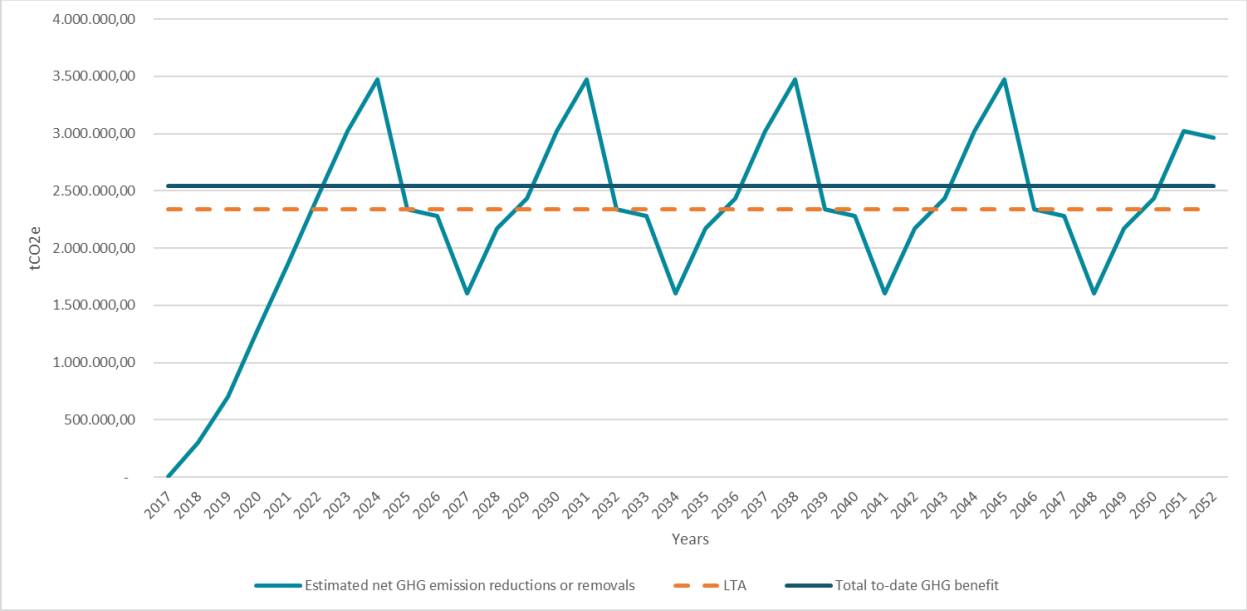


Figure 151 - Illustration of the expected total GHG benefit of the project's long-term average

State the non-permanence risk rating (%)	26%
Has the non-permanence risk report been attached as either an appendix or a separate document?	☒ Yes ☐ No
For ARR and IFM projects with harvesting, state, in tCO_2e, the Long-term Average (LTA).	2,339,242.40 tCO2e
Has the LTA been updated based on monitored data, if applicable?	☒ Yes ☐ No If no, provide justification.
State, in tCO_2e, the expected total GHG benefit to date.	2,541,411.00 tCO2e
If a loss occurred (including a loss event or reversal), state the amount of tCO_2e lost:	-

The following table shows the GHG emission reductions (reductions) and carbon dioxide removals (removals) for the monitoring period, considering section 5.4 of the VCS template v4.4. Considering all the GHG credits, which include VCUs and buffer units, issued from the previous and current monitoring period, the LTA was reached by the project.

Table 16 - Net GHG emission removals

Period	Baseline emissions or removals (tCO_2e)	Project emissions or removals (tCO_2e)	Leakage emissions (tCO_2e)	Buffer pool allocation (tCO_2e)	Reductions VCUs (tCO2e)	Removals VCUs (tCO2e)	Total VCU issuance (tCO2e)
22/02/2022 to 31/12/2022	42,485.93	503,023.00	0	130,786.00	-	170,068.00	170,068.00
01/01/2023 to 03/04/2023	58,401.37	137,480.00	0	35,745.00	-	101,735.00	101,735.00
Total	100,887.30	640,503.00	0	166,531.00	-	271,803.00	271,803.00

Vintage period	Ex-ante estimated reductions/ removals	Achieved reductions/ removals	Percent difference	Explanation for the difference
22/02/2022 to 31/12/2022	798,012.00	503,023.00	-37%	The difference between the removals achieved in the monitoring period is due to the inclusion of Stratum 8 in the calculations of the estimated reduced emissions. The removals from this stratum were not monitored within the current verification, as the forest inventory had not been completed by the end date of the monitoring period. For this reason, the removals achieved, which in the case of the project consist of areas that were inventoried in the field, are lower than the estimated removals.
01/01/2023 to 03/04/2023	364,068.00	137,480.00	-62%	
Total	1,162,080.00	640,503.00	-45%	

APPENDIX 1: COMMERCIALLY SENSITIVE INFORMATION

Use the table below to describe the commercially sensitive information included in the monitoring report to be excluded in the public version.

Section	Information	Justification
5	Project budget statements	The project budget statements used to demonstrate that Suzano has the financial means to secure the project until it reaches breakeven are internal company documents.
2	Land ownership documents	Land ownership documents, such as leases and land acquisition contracts for the development of project activities, are confidential to the company and cannot be made public.