FINCA LA PAZ II
LA VICHADA COLOMBIA
MONITORING REPORT

Project title	Finca La Paz II
Project ID	3594
Crediting period	01 December 2018 to 30 November 2071
Monitoring period	01 December 2018 to 30 November 2023
(CCB) GHG accounting period	GHG emission reductions and/or removals resulting from the Project activities are to be monitored for the crediting period of 53 years, with a start date of 01 December 2018 until 30 November 2071.
Original date of issue	21/07/2022
Most recent date of issue	TBD
Version	V4-0
VCS Standard version	VCS 4.7
CCB Standards version	CCB 3.1
Project location	Vichada, Colombia
Project proponent(s)	**Col La Paz** Diego Norato diego.norato@12tree.de **GmbH-1.2.TREE** Andreas Voss andreas.voss@12tree.de **Terra Global Capital, LLC**

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Validation/verification body	SCS Global Services
History of CCB Status	No issuance date(s) of earlier validation statements or dates of previous attempts at verification available, not applicable.
Gold Level criteria	Not applicable, the project is not applying for Gold Level Criteria
Prepared by	Terra Global Capital, LLC

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1 SUMMARY OF PROJECT BENEFITS

La Paz farm is a reforestation project managed by Reforestadora La Paz (Col La Paz). 12Tree (one of the farm's investors) purchased a total of 3,091 hectares to establish an extensive forestry plantation to recover degraded pastures. The First Project Activity Instance includes 2,378.48 hectares mainly planted with *Acacia mangium* which is a nitrogen fixing species that can rebuild the soil's fertility. The Project is applying sustainable practices such as low-level use of agrochemicals and soil conservation practices to recover the soil's properties. According to the Project's design and planning phases, the first rotation of Acacia will be replaced by a multiple species system that will incorporate Pine, and Eucalyptus. This project is part of a bigger reforestation plantation that covers a total of 15,000 hectares.

Currently, the Project employs a total of 18 fixed workers, who benefit from long-term contracts, free meals three times a day, and comfortable accommodation.

Col La Paz's main challenge remains to secure a good market price for the harvested wood products. Due to the farm's location in a remote area, selling options are limited and transportation prices are high. Thus, the Project works constantly to increase workers' sense of belonging and motivation, by improving wage levels with a salary scheme rewarding productivity, seniority, and loyalty. And the farm also works to strengthen its relationships with local stakeholders and communities, to improve their perception of afforestation projects' impact, especially regarding the biodiversity, soil, and water benefits.

From the biodiversity conservation benefits, Col La Paz Project facilitates the appropriation of local knowledge on wildlife and promotes the conservation of areas for habitat for wildlife (gallery forests and *Morichales* within the farm properties). The project's activities will provide greater mobility and connection for existing species due to the establishment of forest plantations.

The total GHG removals during the initial monitoring period (01 December 2018 to 30 November 2023) is 176,071 tCO_2e.

1.1 Unique Project Benefits

Anticipated benefits for the project, which are not accounted for in the standardized benefit metrics are presented in following table:

Outcome or Impact	Achievements during the Monitoring Period	Section Reference	Achievements during the Project Lifetime
1) Climate. Land rehabilitation & soil restoration through traditional forestry	Climate Benefits on adaptation and mitigation. The net estimated reductions for the	3.2	The net estimated reductions for the crediting period are

Outcome or Impact	Achievements during the Monitoring Period	Section Reference	Achievements during the Project Lifetime
plantation practices to restore degraded pastureland	initial monitoring period is 176,071 tCO_2e		expected to be 639,763 tCO_2e
2) Social. Increased income for employees (including women) through formal long-term employment	Increase income streams of 18 workers	4.2	Increase income streams of 18 workers
3) Biodiversity. Increase biodiversity and awareness of the importance of conservation of vulnerable species in the Project Activity Instance	Baseline number of species: 7 amphibian species, 17 reptile species, 111 bird species, and 15 mammals were observed. No policy initiatives were created during this monitoring period.	5.2	Maintain the number of species, 7 amphibian species, 17 reptile species, 111 bird species, and 15 mammals.

1.2 Standardized Benefit Metrics

The following table displays the standardized benefits targeted and achieved throughout the monitoring period.

Category	Metric	Achievements during Monitoring Period	Section Reference	Achievements during the Project Lifetime
GHG emission reductions & removals	Net estimated emission removals in the project area, measured against the without-project scenario	Climate Benefits on adaptation and mitigation. The net estimated reductions for the initial monitoring period is 176,071 tCO_2e	3	The net estimated reductions for the crediting period are expected to be 176.071 tCO_2e
	Net estimated emission reductions in the project area, measured against the without-project scenario	There will be no reductions during the project lifetime because of project typology	3	There will be no reductions during the project lifetime because of project typology
Forest[1] cover	For REDD[2] projects: Number of hectares of reduced forest loss in the project area measured against the without-project scenario	This is not a REDD project	3	This is not a REDD project
	For ARR[3] projects: Number of hectares of forest cover increased in the project area measured against the without-project scenario	2,378 ha of forest cover increased		2,378 ha of land rehabilitation & soil restoration

[1] Land with woody vegetation that meets an internationally accepted definition (e.g., UNFCCC, FAO, or IPCC) of what constitutes a forest, which includes threshold parameters, such as minimum forest area, tree height and level of crown cover, and may include mature, secondary, degraded and wetland forests (*VCS Program Definitions*)
[2] Reduced emissions from deforestation and forest degradation (REDD) – Activities that reduce GHG emissions by slowing or stopping conversion of forests to non-forest land and/or reduce the degradation of forest land where forest biomass is lost (*VCS Program Definitions*)
[3] Afforestation, reforestation and revegetation (ARR) – Activities that increase carbon stocks in woody biomass (and in some cases soils) by establishing, increasing and/or restoring vegetative cover through the planting, sowing and/or human-assisted natural regeneration of woody vegetation (*VCS Program Definitions*)

Category	Metric	Achievements during Monitoring Period	Section Reference	Achievements during the Project Lifetime
Improved land management	Number of hectares of existing production forest land in which IFM[4] practices have occurred as a result of the project's activities, measured against the without-project scenario	Not applicable because this is an ARR project	3	Not applicable because this is an ARR project
	Number of hectares of non-forest land in which improved land management has occurred as a result of the project's activities, measured against the without-project scenario	Not applicable because this is an ARR project	3	Not applicable because this is an ARR project
Training	Total number of community members who have improved skills and/or knowledge resulting from training provided as part of project activities	18 workers who are expected to have improved skills and/or knowledge resulting from training provided as part of project activities	4	18 workers who have improved skills and/or knowledge resulting from training provided as part of project activities
	Number of female community members who have improved skills and/or knowledge resulting from training provided as part of project activities of project activities	2 female workers women who have improved skills and/or knowledge resulting from training provided as part of project activities	4	2 female workers who have improved skills and/or knowledge resulting from training as part of project activities
Employment	Total number of people employed in of project activities,[5] expressed	18 people employed in project activities	4	18 people to be employed in project activities

[4] Improved forest management (IFM) – Activities that change forest management practices and increase carbon stock on forest lands managed for wood products such as saw timber, pulpwood, and fuelwood (*VCS Program Definitions*)

[5] Employed in project activities means people directly working on project activities in return for compensation (financial or otherwise), including employees, contracted workers, sub-contracted workers, and community members that are paid to carry out project-related work.

Category	Metric	Achievements during Monitoring Period	Section Reference	Achievements during the Project Lifetime
	as number of full-time employees[6]			
	Number of women employed in project activities, expressed as number of full-time employees	2 women employed in project activities	4	2 women will be employed in project activities
Livelihoods	Total number of people with improved livelihoods[7] or income generated as a result of project activities	18 people with improved livelihoods or income generated as a result of project activities	4	18 workers have improved livelihoods or income generated as a result of project activities
	Number of women with improved livelihoods or income generated as a result of project activities	2 women with improved livelihoods or income generated as a result of project activities	4	2 women (workers) have improved livelihoods or income generated as a result of project activities
Health	Total number of people for whom health services were improved as a result of project activities, measured against the without-project scenario	Not applicable because this project does not look for achievements in this category		Not applicable because this project does not look for achievements in this category
	Number of women for whom health services were improved as a result of project activities, measured against the without-project scenario	Not applicable because this project does not look for		Not applicable because this project does not look for

[6] Full time equivalency is calculated as the total number of hours worked (by full-time, part-time, temporary and/or seasonal staff) divided by the average number of hours worked in full-time jobs within the country, region, or economic territory (adapted from UN System of National Accounts (1993) paragraphs 17.14[15.102]; [17.28])

[7] Livelihoods are the capabilities, assets (including material and social resources) and activities required for a means of living (Krantz, Lasse, 2001. *The Sustainable Livelihood Approach to Poverty Reduction*. SIDA). Livelihood benefits may include benefits reported in the Employment metrics of this table.

Category	Metric	Achievements during Monitoring Period	Section Reference	Achievements during the Project Lifetime
		achievements in this category		achievements in this category
Education	Total number of people for whom access to, or quality of, education was improved as a result of project activities, measured against the without-project scenario	Not applicable because this project does not look for achievements in this category		Not applicable because this project does not look for achievements in this category
	Number of women and girls for whom access to, or quality of, education was improved as a result of project activities, measured against the without-project scenario	Not applicable because this project does not look for achievements in this category		Not applicable because this project does not look for achievements in this category
Water	Total number of people who experienced increased water quality and/or improved access to drinking water as a result of project activities, measured against the without-project scenario	Not applicable because this project does not look for achievements in this category		Not applicable because this project does not look for achievements in this category
	Number of women who experienced increased water quality and/or improved access to drinking water as a result of project activities, measured against the without-project scenario	Not applicable because this project does not look for achievements in this category		Not applicable because this project does not look for achievements in this category
Well-being	Total number of community members whose well-being8 was	18 workers community members whose well-being was	4	18 workers whose well-being has improved as a

[8] Well-being is people's experience of the quality of their lives. Well-being benefits may include benefits reported in other metrics of this table (e.g. Training, Employment, Health, Education, Water, etc.), but could also include other benefits such as empowerment of community groups, strengthened legal rights to resources, conservation of access to areas of cultural significance, etc.

Category	Metric	Achievements during Monitoring Period	Section Reference	Achievements during the Project Lifetime
	improved as a result of project activities	improved as a result of project activities		result of project activities
	Number of women whose well-being was improved as a result of project activities	2 women, whose well-being was improved as a result of project activities	4	2 women whose well-being has improved as a result of project activities
Biodiversity conservation	Change in the number of hectares significantly better managed by the project for biodiversity conservation,[9] measured against the without-project scenario	2,378 ha number of hectares significantly better managed by the project for biodiversity conservation	5	2,378 hectares managed significantly better by the project for biodiversity conservation, measured against the without-project scenario
	Number of globally Critically Endangered or Endangered species[10] benefiting from reduced threats as a result of project activities,[11] measured against the without-project scenario	0 Critically Endangered or Endangered species benefiting from reduced threats as a result of project activities	5	0 IUNC listed as Critically Endangered (CR) or Endangered Species (EN) that will benefit from Project Activities are expected to be found in and around the Project Area Instance.

[9] Biodiversity conservation in this context means areas where specific management measures are being implemented as a part of project activities with an objective of enhancing biodiversity conservation.
[10] Per IUCN's Red List of Threatened Species
[11] In the absence of direct population or occupancy measures, measurement of reduced threats may be used as evidence of benefit

2 PROJECT DETAILS

2.1 Summary Description of the Implementation Status of the Project

2.1.1 Summary Description of the Project (VCS, 2.1, 3.6; CCB, G1.2)

This monitoring period covered an area of 2,378 hectares. This Grouped ARR Project engages in afforestation initiatives on highly degraded lands and refrains from transforming native ecosystems to generate greenhouse gas credits. The baseline scenario in the project area would correspond to degraded pastures by extensive cattle ranching and periodic burning. Extensive cattle grazing has been common in the project zone since the 1960s-70s, due to a landscape characterized by sparse shrubs and natural grasslands. This land use has been accompanied by deliberately setting fires, more often in an uncontrolled manner, and up to 2-3 times a year, to make the regenerating grass more palatable to livestock. This common practice in the baseline scenario can be generally categorized as a degraded grassland, without input or management practices, such as fertilizer addition, improved grass species, and/or irrigation practices; conditions which can be expected to continue in the area in the absence of the project.

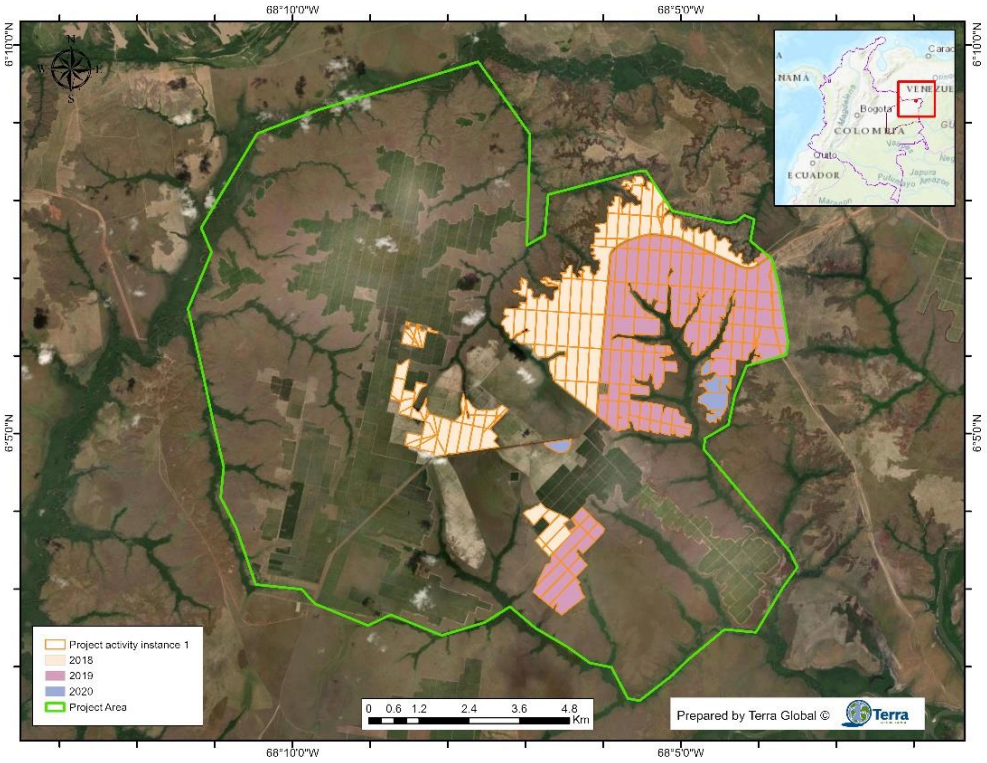
Non-permanence risk factors, including fire and other natural disturbances, are monitored for their potential impact on carbon loss. The report underscores the importance of managing these factors to ensure the success of the ARR project.

Areas included in this monitoring period correspond to Acacia trees planted between 2018 and 2020 which totals 2,378 hectares (as shown in Table 1). Harvesting of the Acacia trees, which will recover soil properties, will be followed by replacement planting of Pine and Eucalyptus. Ex-post projections included in this document estimates the fluctuation of biomass in the landscape and use the long-term average to estimate annual removals.

Table 1. Planting schedule and number of hectares being established under the system in the First Project Activity Instance

Year	Number of ha planted
2018	1003
2019	1304
2020	71
Total	**2,378**

Map 1 shows the location of the La Paz farm and the first Project Activity Instance. Planting parcels are color-coded to show planting years.



Map 1. Location of Project Area and Project Activity Instance 1 Planting Parcels.

The first Project Activity Instance has provided fixed employment to an average of 18 local individuals from the surrounding communities. Through the household survey, most fixed employees thought their income was insufficient and was in the low range, although they receive additional benefits (transportation, food, housing) besides the ones required by law.

The main objectives of the project are, 1) increase the carbon sequestration potential of the project area, 2) improve workers' livelihoods, and 3) preserve existing biodiversity in the project activity instances.
The estimated net removals (after leakage, before risk buffer) for this monitoring period are 176,071 tCO_2e.

2.1.2 Audit History (VCS, 4.1)

Audit Type	Period	Program	VVB Name	Number of years
Validation/ Verification	December 2018 to 30 November 2023	VCS and CCB	SCS	Five years

2.1.3 Sectoral Scope and Project Type (VCS, 3.2)

Sectoral Scope	14: Agriculture, forestry, and other land use
AFOLU Project Category	Afforestation, Reforestation, and Revegetation (ARR)

Project Activity Type	Establishing, increasing, or restoring vegetative cover through the planting, sowing, or human-assisted natural regeneration of woody vegetation

2.1.4 Project Proponent (VCS, 3.7; CCB, G1.1)

Organization name	Col La Paz
Contact person	Diego Norato
Title	Project Supervisor
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Organization name	Terra Global Capital, LLC
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Organization name	12Tree
Contact person	Andrea Voss
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2.1.5 Other Entities Involved in the Project

Organization name	Terra Global Investment Management, LLC
Contact person	Leslie Durschinger
Title	Founder and CEO
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Telephone	+1 415 400 4491
Email	info@terraglobalcapital.com

2.1.6 Project Start Date (VCS, 3.8)

Project start date	01-December-2018
Justification	This project conforms with the VCS Program requirements by meeting key criteria such as eligibility requirements, methodology compliance, additionality, validation, and verification. See details of implementation schedule in Section 2.1.19 of PD. The project will adhere to deadlines, maintain accurate documentation and monitoring, engage stakeholders, comply with legal requirements, and ensure transparency in its operations. Tree planting on the first Project Activity Instance started with planting of ~1,000 hectares of *Acacia mangium* in degraded grassland.

2.1.7 Benefits Assessment and Project Crediting Period (VCS, 3.9; CCB, G1.9)

Crediting Period	01 December 2018 to 30 November 2071
Start Date of First or Fixed Crediting Period	01-December-2018 to 30-November-2058
Total Number of Years of Crediting Period	53 years 53 years
CCB Benefits Assessment Period	53 years 53 years

2.1.8 Project Location (VCS, 3.11; CCB, G1.3)

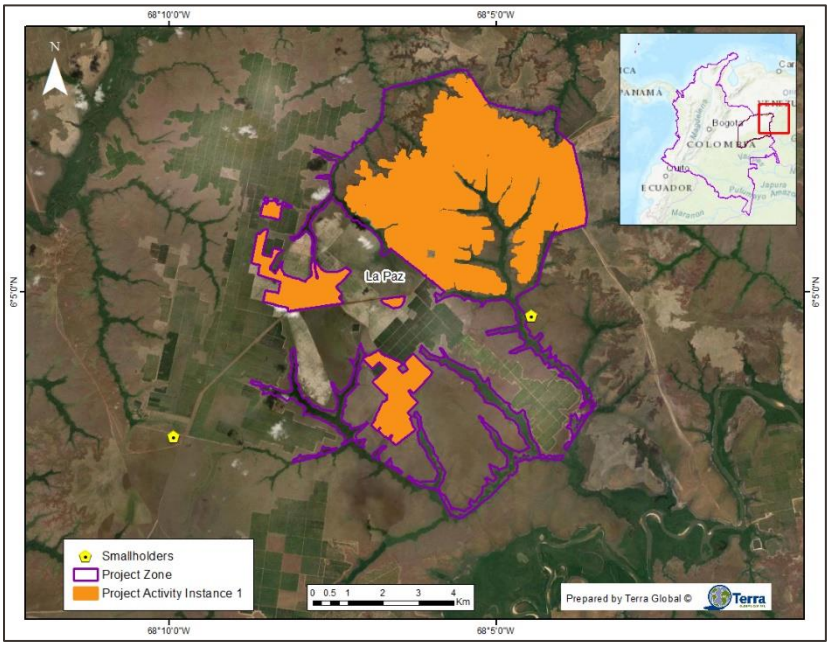
☒ KML file has been provided

La Paz farm is an afforestation project located at 6° 05' 38"N 68° 07' 32"W in Puerto Carreño city in the Department of Vichada. Geographically, the city is located at 6° 11' 16"N and 67° 28' 57"W with an altitude of 51 meters above sea level, at the confluence of the Meta and Orinoco rivers, becoming a border strip with the Republic. of Venezuela to the North and East, to the South with Santa Rita, and to the West with La Primavera. The farm is located on road 40th (direction to Villavicencio), 50 kilometers west of the urban area of Puerto Carreño (Map 2).

Map 2. Project Activity Instance 1 Location

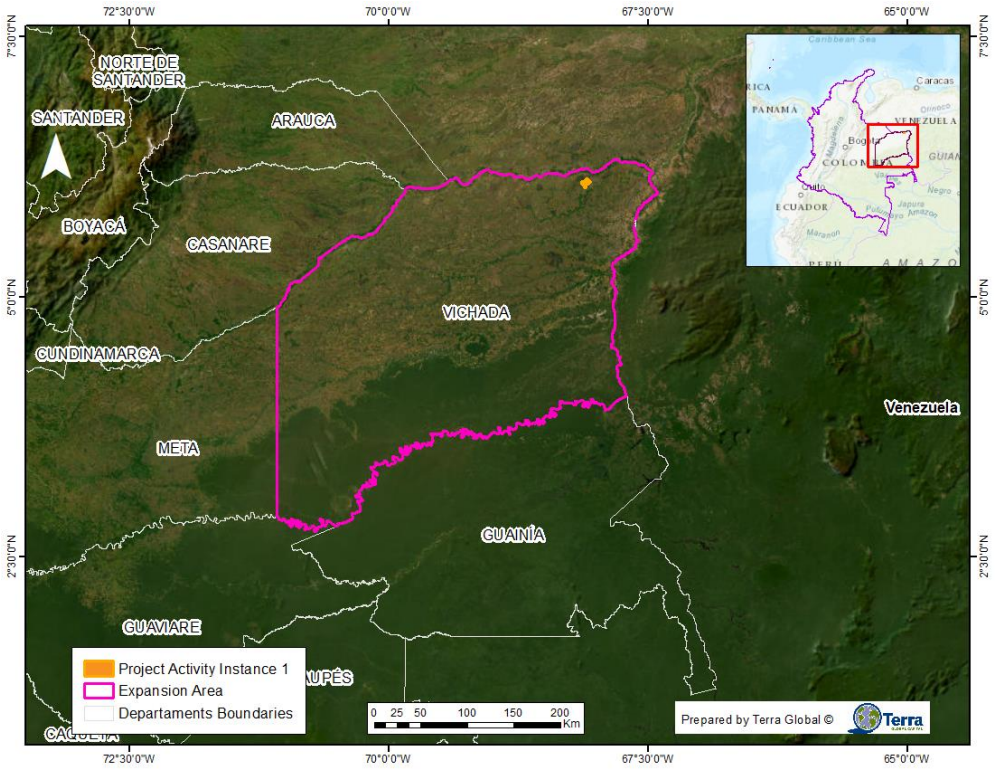
The project activity instance is defined as the area in which activities are implemented that generate GHG emission reductions or removals, which meets the applicability criteria and is being monitored and verified to generate VCUs.

Map 3 shows the project zone is defined as the area encompassing the project areas in which project activities directly affect land and associated resources, including activities related to provision of alternate livelihoods and community development. To delimit the project zone of Finca La Paz, the Gallery Forest and (Morichales are defined as areas of high conservation value, the project activity instances and the nearby areas where 2 small stakeholders were identified that benefit from the implementation of firebreaks were incorporated.



Map 3. Project Activity Zone 1

Map 4 shows the grouped project eligibility area defined as Vichada, being the geographic boundary where future project activity instances can be added.



Map 4. Grouped Project Eligibility Area, geographic boundary for potential future expansion

2.1.9 Title and Reference of Methodology (VCS, 3.1)

Type (methodology, tool, module)	Reference ID (if applicable)	Title	Version
Methodology	VM0047	VM0047 Afforestation, Reforestation, and Revegetation	V1.0
Module	VMD0054	Module for estimating leakage from ARR activities	V1.0
Tool	AR-AM-TOOL16	Estimation of change in soil organic carbon stocks due to the implementation of A/R CDM project activities	
Tool	AR-AM-TOOL14	Estimation of carbon stocks and change in carbon stocks of trees and shrubs in A/R CDM project activities	
Tool	AR-TOOL12	Estimation of carbon stocks and change in carbon stocks in dead wood and litter in A/R CDM project activities	

2.1.10 Double Counting and Participation under Other GHG Programs (VCS, 3.23; CCB, G5.9)

2.1.10.1 No Double Issuance

Is the project receiving or seeking credit for reductions and removals from a project activity under another GHG program, or any other form of community, social, or biodiversity unit or credit?

☐ Yes ☒ No

2.1.10.2 Registration in Other GHG Programs

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

☐ Yes ☒ No

2.1.10.3 Projects Rejected by Other GHG Programs

Has the project been rejected by any other GHG programs?

☐ Yes ☒ No

2.1.11 Double Claiming, Other Forms of Credit, and Scope 3 Emissions (VCS, 3.24)

2.1.11.1 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

2.1.11.2 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

2.1.11.3 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

Is the project proponent(s) or authorized representative a buyer or seller of the product(s) (goods or services) that are part of a supply chain?

☐ Yes ☒ No

Has the project proponent(s) or authorized representative posted a public statement on their website saying, “Carbon credits may be issued through Verified Carbon Standard project [project ID] for the greenhouse gas emission reductions or removals associated with [project proponent or authorized representative organization name(s)] [name of product(s) whose emissions footprint is changed by the project activities].”?

☐ Yes ☒ No

2.1.12 Sustainable Development Contributions (VCS, 3.17)

Table 2: Sustainable Development Contributions

Row number	SDG target	SDG indicator	Net impact on SDG indicator	Current project contributions	Contributions over project lifetime
1)	1.1	1.1.1 Proportion of population below the international poverty line	Implemented activities to decrease	Increased number of fixed employees (23 employees) from the average of the past 4 years (18 employees) to receive steady income	Increased number of fixed employees (23 employees) from the average of the past 4 years (18 employees) to receive steady income
2)	2.1	2.1.2 Prevalence of moderate or severe food insecurity in the population	Implemented activities to increase	13 of the fixed workers eat at Col La Paz' cafeteria	13 of the fixed workers eat at Col La Paz' cafeteria
3)	3.8	3.8.1 Coverage of essential health service	Implemented activities to increase	57% fixed workers receive social insurance and 23 fixed workers have access to healthcare	57% fixed workers receive social insurance and 23 fixed workers have access to healthcare
4)	8.2	8.2.1 Annual growth rate of real GDP per employed person	Implemented activities to increase	Increased number of fixed employees (23 employees) from the average of the past 4 years (18 employees) to receive steady income	Increased number of fixed employees (23 employees) from the average of the past 4 years (18 employees) to receive steady income
5)	12.2	12.2.2 Domestic material consumption, domestic material consumption per capita and domestic material consumption per GDP	Implemented activities to increase	Protocols for the use of agricultural inputs and other goods established	Protocols for the use of agricultural inputs and other goods established

Row number	SDG target	SDG indicator	Net impact on SDG indicator	Current project contributions	Contributions over project lifetime
6)	12.4	12.4.2 (a) Hazardous waste generated per capita, and (b) proportion of hazardous waste treated, by type of treatment	Implemented activities to decrease,	Protocols developed and adopted for the proper disposal of hazardous waste. All inputs used will be approved by the OMS and ICA (*Instituto Colombiano Agropecuario*)	Protocols developed and adopted for the proper disposal of hazardous waste. All inputs used will be approved by the OMS and ICA (*Instituto Colombiano Agropecuario*)
7)	12.5	12.5.1 National recycling rate, tons of material recycled	Implemented activities to increase	No activities were implemented during this monitoring period	No activities were implemented during he project lifetime
8)	12.6	12.6.1 Number of companies publishing sustainability reports	Implemented activities to increase	No activities were implemented during this monitoring period	No activities were implemented during the project lifetime
9)	12.8	12.8.1 Extent to which (i) global citizenship education and (ii) education for sustainable development are mainstreamed in (a) national education policies; (b) curricula; (c) teacher education; and (d) student assessment	Implemented activities to increase	100% fixed farm workers were present in trainings about sustainability actions taken in the farm	100% fixed farm workers were present in trainings about sustainability actions taken in the farm
10)	13.2	13.2.2 Total greenhouse gas emissions per year	Implemented activities to decrease	176,071 tCO_2e were removed during this reporting period	176,071 tCO_2e were expected to be removed during the project lifetime

2.2 Project Implementation Status

2.2.1 Implementation Schedule (VCS, 3.2; CCB, G1.9)

A comprehensive implementation workplan was developed and is included in Table 3 provides the timeline for the key milestones for initial implementation.

Table 3. Timeline for project development and implementation

Date	Milestone(s) in the project's development and implementation
2018	12Tree Investment-Col La Paz, national Company was established to manage the plantation
May, 2018	Delegated Administration Contract-La Paz Reforestation
2018	Social Impact Baseline done
2018	Soil preparation and planting of third phase of agroforestry system (1,003 hectares)
2019	Soil preparation and planting of fourth phase of agroforestry system (1,304.58 hectares)
2020	Soil preparation and planting of fifth phase of agroforestry system (70.97 hectares)
Aug, 2022	VCS/CCB Project start-Contract Terra Global
Sep, 2022	Confirm VCS project eligibility and proper methodology to be used
Oct, 2022	Define and review long term implementation plan
April-May 2023	Gather field data (Biodiversity, Biomass and Social assessments)
December 2023	Establish procedures for on-going monitoring responsibilities
Jan 2024	Develop 1st VCS/CCB monitoring report
Feb 2024	Project Dissemination
Jun 2025	Conduct and finalize VVB audit
Dec 2024	Issue VCUs
On-going	Monitor and report performance and impact

2.2.2 Baseline Reassessment (VCS, 3.2.6, 3.2.7)

Did the project undergo baseline reassessment during the monitoring period?

☐ Yes ☒ No

2.2.3 Methodology Deviations (VCS, 3.20)

There are no methodology deviations during this monitoring report.

2.2.4 Minor Changes to Project Description (CCB Program Rules, 3.5.6)

There are no climate, community or biodiversity changes to project design that require a project description deviation.

2.2.5 Project Description Deviations (VCS, 3.21; CCB Program Rules, 3.5.7 – 3.5.10)

No project description deviations applied during this monitoring period.

2.2.6 Grouped Projects (VCS, 3.6; CCB, G1.13-G1.15, G4.1)

This is a grouped project, no new areas or communities are added or removed, no change of management fo r this monitoring report.

2.2.7 Risks to the Project (CCB, G1.10)

Table 4. Risks to the Project

Identified Risk	Potential impact of risk on climate, community and/or biodiversity benefits	Actions needed and designed to mitigate the risk
Inadequate safety conditions for executing project activities.	Concerns regarding the safety of personnel and the production processes in the plantation.	Col La Paz will implement protocols and provide training to foster safe working conditions.
Natural risks caused by fire or pests and disease to the plantations	If the plantations experience fire, pest infestation, or diseases, it would impact the establishment, growth, and productivity of the trees.	Col La Paz will implement activities to mitigate natural risks, such as fire breaks and both holistic and direct disease/pest management measures.

2.2.8 Benefit Permanence (CCB, G1.11)

The project lifetime is 40 years; however, the project is designed to create benefits and impacts that are expected to last beyond this time frame.

The efforts to institute reforestation practices in Colombia are part of a larger, longer-term effort to effectively break the cycle of unstainable land management that has caused the continued degradation of these lands. The restoration of the soil, the increase in above and below ground biomass, the maintenance and conservation of remaining forested areas, and the efficient use and management of available

resources, all constitute practices that we hope will be adopted and maintained well after the crediting period of the project, and as part of a larger movement to revolutionize the way agriculture and food and fiber production are practiced in the region to finally bring about a much needed long-term sustainable natural resource management approach.

Comparing forestry and agricultural practices focused on maximizing short-term yields to the adoption of long- term carbon positive reforestation is beginning to show that the latter has lower costs, lower risks, and higher productivity, even without the added value of carbon revenue. The integrative sustainable forestry and carbon positive systems to be implemented and promoted in this landscape focus on critical components, such as soil health and fertility, which are prioritized to then build and maintain the long- term productivity of the land. Local employees will be afforded the practical and accessible knowledge and technologies needed to measure, monitor, and observe the changes of carbon in the soil, helping them to better understand the possible effects. Through the continued adoption of these sustainable carbon positive practices, future stakeholders in the region will be able to increase their long-yield and crop revenue while lowering their costs and reducing their risk.

These long-term practices and benefits are also all achieved by creating a more inclusive, modern, and sustainable supply chain where human rights are respected, existing biodiversity is protected and improved upon, and where local employees and farmers are given the opportunity to continue to improve upon their livelihoods. Achieving this goes beyond ensuring proper incomes and premiums are in place, and also involves supporting workers to increase their long-term productivity by helping them develop alternative farm models where communities can continue to find decent job opportunities and wages, and by building local capacity and providing on-going technical guidance and training for everyday farming decisions that will continue to reap benefits long after the project's crediting period is over. Through these longer-term capacity building and employment opportunities, local communities and stakeholders will continually be able to reduce their vulnerability through improved management and productivity approaches, will have more and better opportunities to access markets and commercialization systems, and will have access to more inclusive and beneficial sustainable development models for their hopes and aspirations.

2.3 Stakeholder Engagement & Safeguards

2.3.1 Stakeholder Identification (VCS, 3.18, 3.19; CCB, G1.5)

This section is not applicable since there was no change in stakeholders since validation, and the stakeholder were identified at verification.

2.3.2 Stakeholder Access to Project Documents (VCS, 3.18, 3.19; CCB, G3.1)

Reforestadora La Paz was responsible for making the Project accessible to stakeholders either through informational meetings, providing printed materials and/or facilitating access to digital forms. The Project summary was presented in meetings to the internal employees in February 2024. During that meeting, it

was also explained how the verification and validation process happens. For the external stakeholders, the Project summary was also shared along with the monitoring results relevant.

Stakeholders	Information Sharing, Document Dissemination (G3.1: 2.3.1, 2.3.2, 2.3.5)
Internal-Employees	• Project summary presented in informational meeting. Summary materials distributed directly or upon request (print) • Validation and Verification process explained in person meeting.
Connected: stakeholders who participate indirectly in the operation of La Paz: suppliers, banks, buyers, legal services, communities, etc.	• Project summary upon request: print or digital • Summary of monitoring results shared upon request (relevant aspects)
External: stakeholders: government, landowners, and development actors (NGOs, social services, etc.).	• Project summary should be shared (print or digital) • Validation and Verification process and progress summary shared in informational meeting (relevant aspects) • Monitoring results shared in informational meetings (relevant aspects)

2.3.3 Dissemination of Summary Project Documents (VCS, 3.18, 3.19; CCB, G3.1)

The summary project documentation was translated to Spanish and shared to the employees during inperson meetings in February,2024. The employees' comments were incorporated in the design and monitoring of the project. Additionally, the document is available in digital format at the public website www.verra.org. The summary of the monitoring results was also translated to Spanish and shared to the employees through person meetings in February,2024.

2.3.4 Informational Meetings with Stakeholders (VCS, 3.18, 3.19; CCB, G3.1)

Informational meetings were held in February 2024 for the employees and stakeholders to inform of the Project design and monitoring activities. The project ensured that all stakeholders have access to necessary information conveyed in an appropriate and accessible manner. For instance specific interventions undertaken as part of the Project will be monitored using disclosed progress and impact indicators (Monitoring and Reporting). Employees have been informed of results in periodic or topic-specific meetings.

2.3.5 Risks from the Project and No Net Harm (VCS, 3.18, 3.19)

Identified risk	Potential impact of risk	Mitigation or preventative measure(s)
Inadequate safety conditions for implementing	Threaten safety working conditions for employees	To mitigate this risk, to the project prioritizes safety measures such as providing personal protective equipment, establish safety protocols,

Identified risk	Potential impact of risk	Mitigation or preventative measure(s)
project activities-Human -induced risk		provide ongoing training to employees, and monitoring working conditions.
Natural risks caused by fire, pests and/or diseases	Threaten the project's goal and impact on local biodiversity, potentially hindering soil regeneration and the growth of forest species.	To mitigate these risks, the project has developed and adopt fire management strategies (installing fire breaks) and conducting pest monitoring controls to protect the trees and ecosystems.

2.3.6 Community Costs, Risks, and Benefits (CCB, G3.2)

The Human Resource Department from Finca La Paz deals with the risks and costs posed to the employees. There was no complaint regarding occupational health and safety, nor about labor rights and benefits during the monitoring period.

2.3.7 Information to Stakeholder on Verification Process (VCS, 3.18.6, 3.19; CCB, G3.3)

The employees were informed of the verification and validation process through in person meetings. It was informed that a VVB would be visiting the Project Instance Area, and employees were aware they will have the opportunity to interact with the VVB in a free manner. The in-person meeting was also an opportunity for the employees to discuss and review the Project document and monitoring results.

2.3.8 Site Visit Information and Opportunities to Communicate with Auditor (VCS, 3.18.6, 3.19; CCB, G3.3)

The employees and other stakeholders have received notifications and readiness training through meetings scheduled six weeks before the auditor's arrival, along with a follow-up session two weeks prior to the visit. Stakeholders were briefed on the impartiality of the VVB and encouraged to openly share their project experiences. They were be informed of their option to directly communicate with the VVB.

2.3.9 Stakeholder Consultation (VCS, 3.18; CCB, G3.4)

Ongoing consultation	During implementation, stakeholders including workers, and local authorities were informed on the verification process.
Date(s) of stakeholder consultation	06-09 February 2024
Communication of monitored results	Required reports (results) and summaries were shared during scheduled meetings with workers and small farmers, and spaces for open discussion were provided. These

	meetings occurred before the public comment period and VVB field visit.
Consultation records	The meetings included an explanation of the project activities, the results accomplished so far in the first monitoring period and an open space for questions and comments. Questions were answered verbally, and main feedback was written by the facilitators.
Stakeholder input	Employees were requested to familiarize themselves with how their actions contribute to emission reductions within the project. This topic was included as part of the training program.

2.3.10 Continued Consultation and Adaptive Management (VCS, 3.18; CCB, G3.4)

Through PRAs, the Project will continue assessing the impact and also determine if there are other meaningful inputs the workers will have. Employees' input is key for the continuation and implementation of the Project's activities.

Summary of comments received	Actions taken
Identification and description of HCVs by workers	HCVs areas related to cultural and biodiversity significance were located.
La Paz PRA process	Throughout this monitoring period, workers have actively participated in the implementation through various activities, including direct employment and participation in focus groups (PRAs). The PRA process will persist throughout the Project's implementation, with associated activities being regularly updated during verification events.

2.3.11 Stakeholder Consultation Channels (CCB, G3.5)

The approaches and processes developed for stakeholder communication and consultation in the project implementation phase are intended to serve as long-term, ongoing consultation channels. The consultation channels developed with the various stakeholders were tailored to their level of involvement in the project's activities based on the identified risks and benefits that the project conferred to them. The most consulted stakeholders included employees, for whom multiple channels of frequent consultation were developed. Although less directly involved and impacted stakeholders were included in aspects of the project that were relevant to them through appropriate communication channels. All stakeholders had access to important

summary documents upon request or on publicly available websites and had access to direct communication with the company through established questions and grievance mechanisms.

2.3.12 Stakeholder Participation in Decision-Making and Implementation (VCS, 3.18, 3.19; CCB, G3.6)

An interdisciplinary committee was formed to support the project activities' implementation. The committee is made out of Reforestadora Col La Paz's manager, Puerto Carrenos's community representatives, ICA members, SENA and Alcadia members. The latter members are only consulted for specific topics. This committee contains representatives from all stakeholders to ensure effective participation and decision making on project's implementation to assure consideration of different perspectives. The committee represents a point of communication and contact with all stakeholders to avoid negative impacts to all stakeholders involved.

2.3.13 Anti-Discrimination Assurance (VCS, 3.19; CCB, G3.7)

The Project established a Gender Equity policy, which manifests the company's commitment to preventing any type of discrimination and assumes the responsibility of treating all personnel under criteria of equality and equity in order to promote diversity and equal opportunities. COL LA PAZ S.A.S. has a delegated administration contract with Reforestadora La Paz S.A.S., for all plantation management issues, including the FSC certification process and everything derived for compliance with national regulations, as well as those required by FSC, for the above there is a document called Forest Management Plan -PMF- where the aforementioned policy is included. All decisions regarding job performance are based on the results and potential shown by the workers (Reforestadora La Paz, 2021).

The hiring managers of this project recognize their role in the defense and promotion of fair work in Colombia and the principles of equality and non-discrimination expressed in national legislation. Thus, the adoption of this policy to promote gender equality, as a mechanism to promote equal opportunities for men and women in access to employment, working conditions, professional development, training, and participation in decision-making processes has been instituted.

The employment policy at La Paz falls under the following guidelines:

- Promote a healthy and safe work environment, which ensures appropriate measures to prevent accidents and reduce risk.
- Include equal opportunities for men and women in recruitment procedures and processes for all staff.
- Ensure that under working conditions of equal value, women and men receive equal pay and the same social benefits.
- Offer equal opportunities in the promotion and development of professional, technical, and operational skills according to the job position, without gender discrimination.

- Reject any type of discrimination or violence and establish mechanisms for the prevention and care of the different forms of harassment within the organization.
- Guarantee the prioritization of local labor without distinction of gender, in the hiring of collaborators for activities in the area.

2.3.14 Grievances (VCS, 3.18.4; CCB, G3.8)

The Conflict Resolution Mechanism is a tool within the Social Policy that facilitates the development of forestry operations. It was an initiative by Reforestadora La Paz aimed at fostering a culture of establishing and maintaining good relations with neighbors through organized and peaceful intervention in situations that might lead to conflicts. It also served as a guide to addressing conflicts amicably, swiftly, and effectively in cases where negative impacts arose from the company to its neighbors or vice versa. The objectives of the mechanism were to promote a culture of peace and reconciliation between the Company and its neighbors and to facilitate a clear and streamlined process to address and resolve any reconcilable conflicts that might arise between the Company and its neighbors.

The mechanism is implemented with steps for prevention, early identification, and amicable resolution of conflicts, seeking a satisfactory outcome. A clear flow is presented for reporting negative impacts, suggesting avenues such as surveys, phone calls, or communication with employees. It emphasizes that illegal activities must be reported directly to the authorities. Next, the approach and initial agreement are addressed, where contact is established, information is validated, and an action plan is proposed to mitigate the impact. If the counterpart does not accept, mediation is sought. Subsequently, the follow-up to the initial agreement is detailed, and the stages of conciliation are outlined, where the conciliator is notified, a formalized agreement with an action plan is reached, and monitoring is carried out. Finally, the judicial or administrative process and litigation are considered in case of non-compliance with the conciliation agreement.

The instruments to complement the neighborhood conflict resolution mechanism are:

- Communication and Information Mechanism with Communities and Authorities: Designed by Reforestadora La Paz for a fluent dialogue with neighbors, social organizations, and local authorities near the company's properties.
- Periodic Sociocultural Survey for Impact Identification: Instrument to investigate negative and positive impacts generated by the company's forest operation in the area.
- Helpline: Telephone line available to address neighbors' PQRSF, directly managed by Social Coordination.
- Social Management Department: Directly and indirectly manages the Company's Social Policy, handling the reception, analysis, management, monitoring, and disclosure of conflicts caused by the Company to its neighbors or vice versa.

- Employees: Human resources responsible for the comprehensive operation of activities on the company's properties.
- Conciliator: Regional authority considered impartial and qualified by both parties to guide and propose solutions to conflicts, including entities like the Community Action Board, Municipal Ombudsman, Police Inspector, School Principal, People's Defender, Peace Judge, etc.
- Sensitization on Conflict Resolution: Opportunity to promote a culture of peaceful and amicable conflict resolution among neighboring communities through workshops on the topic.

2.3.15 Worker Training (VCS, 3.19; CCB, G3.9)

A Training Program was designed to ensure that all project's employees have the skills and technical knowledge to carry out activities safely, with quality and efficiency, preventing any possible risk. Col La Paz has a delegated administration contract with the La Paz reforestation plant, for all plantation management issues, including the FSC certification process and everything derived from compliance with national regulations, as well as those required by FSC. The plantation has developed a document called Occupational Health and Safety Management System-Roles and Responsibilities-SG-SST (Occupational Health and Safety Management System-Roles and Responsibilities-01-SG-SST, 2019).

The Occupational Health and Safety Management System SG-SST is under the responsibility of management with the support of:

- Designated Workplace Health and Safety Manager.
- Heads of areas or processes
- Joint Committee on Safety and Health at Work (COPASST).

2.3.16 Community Employment Opportunities (VCS, 3.19.13; CCB, G3.10)

Col La Paz, under the delegated management contract with Reforestadora La Paz, encouraged the latter to engage with the nearby community, particularly those situated in the urban area of Puerto Carreño. The aim was to communicate employment opportunities arising from the project's development, considering the significant labor requirements. To facilitate outreach to the community, Reforestadora La Paz collaborated with the municipal government of Puerto Carreño as a key mediator. Consequently, an agreement was formalized to prioritize employment opportunities for the local community.

In this document Col La Paz prioritize the following aspects:

a) Give preference to employing individuals from the community or the local region for the different tasks needed in the forestry project.
b) Provide the individual delegated by the Municipal Administration with information on the essential requirements and other conditions for hiring personnel in the forestry project.

c) Share with the person appointed by the Municipal Administration the necessary criteria and other terms for employing individuals in the forestry project.

d) Inform the person delegated by the Municipal Administration about the representatives from La Paz or the contracting firms responsible for receiving and handling the job applications of those interested in working on the forestry project.

2.3.17 Occupational Safety Assessment (VCS, 3.19; CCB, G3.12)

In order to implement a safety and health program at work, through Reforestadora la Paz, an analysis of the risks that arise in the development of forestry activities and other activities within the facilities was carried out. The risk matrix and the training program can be made available upon request.

2.4 Management Capacity

2.4.1 Required Technical Skills (VCS, 3.19; CCB, G4.2)

Table 5 describes technical skills required by the teams implementing the project.

Table 5. Required skills to implement and monitor the project

Core Project Component	Col La Paz	Terra Global
Project authorization, design oversight and financing	√	
Project design and planning	√	√
Community engagement and support for implementation of community program	√	
Field data collection and on-going monitoring	√	√
VCS/CCB program development and GHG quantification	√	√
Design and oversight of program's institutional arrangements (fiscal, legal and contractual)	√	√
Coordination with National GHG accounting and other government agencies		√

2.4.2 Management Team Experience (VCS, 3.19; CCB, G4.2)

- **Johana Perez - Project Control (Col La Paz)**

Professional in finance and International Relations with an MBA from Universidad San Antonio de Murcia-Spain. She has worked as administrative and financial director and controller for several companies in Latin America.

- **Pablo Reed – Senior Adviser (12Tree)**

Pablo is a senior adviser on all matters related to nature-based solutions, forest carbon, and sustainable development project design, implementation, and certification. He holds a B.S. in Forest and Ecological Engineering as well as a minor in Latin American Studies from the University of Washington in Seattle. He also obtained a Master of Environmental Management degree at the Yale School of Forestry & Environmental Studies. Prior to his return to graduate school, he spent the preceding six years working with conservation and development projects in various countries in Latin America. He served as country director for a joint USAID/Idaho State University community conservation project in the Alta Verapaz region of Guatemala and also spent time in Panama working as an environmental and GIS consultant. His also worked for the Peace Corps in Ecuador, where he served as program manager for the posts' natural resource conservation program. While at Yale, his program of studies centered on social and political ecology as well as natural resource management policy. His research and subsequent thesis centered on the development of REDD (Reducing Emissions from Deforestation and Degradation) policy frameworks, especially as they pertain to the inclusion of communal Indigenous territories and lands. Pablo is a Certified Validator/Verifier for land use change and forest carbon offset projects and forestry methodologies (ARB, CAR, ACR, VCS/Verra, CCBA, and Gold Standard). His most recent work efforts involve pioneering the development of market-based approaches to carbon Insets / Scope 3 removals within the food and agriculture sector via the incorporation of regenerative and climate smart practices.

- **Diego Norato - Project Supervisor (Col La Paz)**

Agricultural Engineer, master's degree in business administration (MBA), with more than 18 years of experience in managing, evaluating, and starting up agro-industrial enterprises. His expertise covers a diverse range of crops including avocado, coffee, citrus, coconut cocoa, agroforestry, plantain, potato, oil palm, and commercial social business. In his professional career, he has been involved in managing, operating, and evaluating various agro-industrial projects. He also led technical and administrative teams with a systemic approach to production chains, organizational and strategic development.

- **Jennifer Monroy - Forest Engineer (Col La Paz)**

Bringing 2 years of experience as a Forestry Engineer to Col La Paz, she leverages her engineering background to enhance proficiency in forestry, logging, and Forest Stewardship Council (FSC) certification. At Col La Paz, she contributes to the GHG Quantification team, overseeing the assessment of carbon eligibility and the quantification of greenhouse gas (GHG) reductions and removals in accordance with market standards.

- **Juan Miguel Jaramillo – Manager (Reforestadora La Paz)**

He specializes in Investment Management, holding a degree in the same field and a minor in International Business from Lynn University, where he maintained a GPA of 3.8/4.0. During his academic journey, he earned recognition, including placement on the Dean's List and invitations to esteemed honor societies like Sigma Beta Delta and Golden Key International.

In his current role as the General Manager at Crop Management SAS, based in Medellin, Colombia, Juan is responsible for executing projects related to crop technification, overseeing 1,830 hectares spanning projects in Colombia and Ecuador. His daily duties encompass budget management, project coordination, logistics, and the supervision of various operational aspects. Prior to this, he gained valuable experience as a Project Manager at 12Tree SAS, where he contributed to project acquisitions, managed finances, and handled reporting.

- **Paola Archila – Human Resources Manager Latam (12Tree and Col La Paz)**

Psychologist, specialist in Human Talent Management, specialist in Occupational Health and Safety Management and Master in People Management, with training as an auditor in integrated management systems. She has more than 15 years of experience in management positions of human talent, safety, and health at work in different leading companies in the Agroforestry Sector, Health, transportation and services.

2.4.3 Project Management Partnerships/Team Development (VCS, 3.19; CCB, G4.2)

2.4.4 The Project Proponents have very strong capacity for implementation for project activities. As the Project adds new Project Activity Instances (new farms), it will be determined whether other partners are needed. The Project uses short-term technical experts as needed to supplement the core team and bring specialized expertise.Financial Health of Implementing Organization(s) (CCB, G4.3)

The project's implementing organizations are 12Tree and Col La Paz (which is a subsidiary of 12Tree). 12Tree is a financially stable company with significant experience in managing sustainable forestry and agroforestry systems. . The financial health of Col La Paz is supported by 12Tree.

2.4.5 Avoidance of Corruption and Other Unethical Behavior (VCS, 3.19; CCB, G4.3)

Col La Paz has established measures and strategies, as detailed in the manual, to ensure that the project proponent and other entities involved in project design and implementation are not engaged in corruption. These measures are specifically designed to prevent various forms of corruption such as bribery, embezzlement, fraud, favoritism, cronyism, nepotism, extortion, and collusion. The manual, therefore, acts as a key component in providing assurance that the project and its stakeholders adhere to anti-corruption standards (See in Appendix 2: Commercially Sensitive Information: Manual de Politicas y Procedimientos Sagrilaft Col La Paz S.A.S. Document)

2.4.6 Commercially Sensitive Information (VCS, 3.5.2-3.5.4; CCB Program Rules, 3.5.13 – 3.5.14)

The Commercially Sensitive Information, created and submitted to the VVB, is outlined in Appendix 2: Commercially Sensitive Information.

2.5 Legal Status and Property Rights

2.5.1 National and Local Laws (VCS, 3.1, 3.6. 3.7, 3.14, 3.18, 3.19; CCB, G5.6)

Some of the most relevant laws concerning the agricultural and forestry sectors are the following:

1. Law 1753 of 2015, in its strategy of "transformation of the countryside" states as one of the objectives the "ordering of rural territory and access to land by settlers rural" Law 99 of 1993, Environmental Policy of Colombia
2. Decree 1076 of 2015, through which the Sole Regulatory Decree of the Environment and Sustainable Development Sector is issued.
3. Law 1776 of 2016 in article 4 establishes that "the Ministry of Agriculture and Rural Development will be responsible for leading and coordinating the formulation of the policy of rural development, based on criteria of productive and social ordering that allow to determine the priority areas of rural development". Also, it points out that "The Ministry of Agriculture and Rural Development will define the agricultural frontier taking into account the definitions of the environmental reserve zones and other restrictions on the use of land imposed by any governmental authority".
4. Law 99 of 1993 in article 5 numeral 1, establishes that it corresponds to the Ministry of Environment and Sustainable Development, among other functions, that of "Formulating the policy in relation to the environment and renewable natural resources, and establish the rules and criteria of environmental ordinance for the use of the territory and the adjacent seas, to ensure the sustainable use of resources renewable natural resources and the environment.
5. Law 99 of 1993 in article 5 numeral 1, establishes that it corresponds to the Ministry of Environment and Sustainable Development, among other functions, that of "Formulating the policy in relation to the environment and renewable natural resources, and establish the rules and criteria of environmental ordinance for the use of the territory and the adjacent seas, to ensure the sustainable use of resources renewable natural resources and the environment."

The project complies with all the labor laws related to payment of decent salaries, and all benefits required under the law (medical, social security, and retirement), occupational risk, and sexual harassment prevention.

The project also fulfills all the environmental regulations defined by Cormacarena related to the conservation of the forest areas (Decreto 1075 de 2015). This law identifies the regulatory entities, their roles, and responsibilities, as well as the guidelines on forest conservation, management and fauna and

flora preservation. The project receives a yearly monitoring visit who verifies that the project is following all the regulations defined under the law.

2.5.2 Relevant Laws and Regulations Related to Worker's Rights (VCS, 3.18, 3.19; CCB, G3.11)

The project complies with national labor laws regarding wages, social benefits included in the general pension, health, occupational risk, family allowance, and complementary social services defined by law. Employees are informed of all their rights and duties, as well as the employer's responsibilities, when signing the contract and during the introductory training session they receive. The most relevant legal norms that apply to the project are the following:

- Decree Law 2663/1950 that regulates the Substantive Labor Code.
- Decree 1072/2015 by which the Sole Regulatory Decree of the Labor Sector is issued.
- Law 1010/2016 by which measures are adopted to prevent, correct and punish workplace harassment and other harassment in the framework of labor relations. For the project it is important that all workers know their rights, duties and responsibilities within the legal framework, for this reason it is stipulated that the first day of work a complete induction is carried out to explain everything related to salary compliance. payments, social security, legal and extra-legal benefits, as well as communication channels.

2.5.3 Human Rights (VCS, 3.19)

Project activities will be implemented on private land, no LPs, LCs or customary right holders' rights were involved in the transaction.

2.5.4 Indigenous Peoples and Cultural Heritage (VCS, 3.18, 3.19)

The project area is not in IP territory and no heritage will be affected by project activities.

2.5.5 Recognition of Property Rights (VCS, 3.7, 3.18, 3.19; CCB, G5.1)

The Project has ensured that all property rights are recognized, respected, and supported.

2.5.6 Benefit Sharing Mechanism (VCS, 3.18, 3.19)

The project is implemented on private land, there will not be impacts on communities' property rights.

2.5.7 Free, Prior, and Informed Consent (VCS, 3.18, 3.19; CCB, G5.2)A

Consent	Project activities for this monitoring period were implemented on private land (First Project Activity Instance). This land was purchased from a single owner, no LPs.LCs or customary right holder rights were involved, thus no FPIC consent process was conducted.
Outcome of FPIC	The Project will not encroach uninvited on private property, community property, or any other government property. The Project is operated on

	private land that was purchased by Col La Paz who has all the legal permits and authorizations for use of land and water. The Project will follow the agreed guidelines for land use in all future Project Activity Instances and the Project Zone Instances without encroaching into any other properties. The Project Proponent has explicit and uncontested legal tenure and rights over the land, including the rights to benefit from income generating activities including carbon finance, and to oversee the benefits sharing available from the carbon finance. Resettlement is not a component of the Project design, nor would it be acceptable under Colombian Law.

2.5.8 Property Right Protection (VCS, 3.18, 3.19; CCB, G5.3)

The Project was not and will not involve the resettlement of any communities or households, since there are no communities living in the Project Activity Instance. Resettlement is not a component of the Project design, nor would it be acceptable under Colombian Law.

None of the Project Activities require relocation, either voluntary or involuntary.

2.5.9 Identification of Illegal Activity (VCS, 3.19, CCB, G5.4)

Col La Paz, under delegated administration, has established a continuous monitoring plan for the area to proactively prevent and identify any form of alteration, with a particular emphasis on environmental and social considerations. To facilitate these responsibilities, internal reporting processes are in place. Additionally, if needed, any detected illegal activities are reported to the relevant legal authorities.

2.5.10 Ongoing Disputes (VCS, 3.18, 3.19; CCB, G5.5)

No conflicts or disputes remain unresolved, and there haven't been any issues in this regard throughout the project's development.

3 CLIMATE

3.1 Monitoring GHG Emission Reductions and Removals

3.1.1 Data and Parameters Available at Validation (VCS, 3.16)

Data / Parameter	Project verification area (A)

Data unit	ha
Description	Project verification area for this monitoring period.
Source of data	Calculated from GIS data.
Value applied	2,378
Justification of choice of data or description of measurement methods and procedures applied	The project area was delineated using GIS coverages, ground survey data with GPS, and remote imagery.
Purpose of data	Calculation of project emissions.
Comments	None.

Data / Parameter	Root to shoot ratio (R)
Data unit	dimensionless
Description	Ratio of belowground (root) biomass to aboveground biomass, per unit area or per stem.
Source of data	Levan, C., Buimanh, H., Oluwasanmi Tope, B.-O., Xu, X., Nguyenminh, T., Lak, C., Nebiyou, L., Wang, J., & Buivan, T. (2020). Biomass and carbon storage in an age-sequence of Acacia mangium plantation forests in Southeastern region, Vietnam. Forest Systems, 29(2), e009. https://doi.org/10.5424/fs/2020292-16685
Value applied	0.27
Justification of choice of data or description of measurement methods and procedures applied	Value specific to the species.
Purpose of data	Calculation of project emissions.
Comments	None.

Data / Parameter	Carbon fraction (CF)

Data unit	tC/t d.m.
Description	Carbon fraction of dry biomass.
Source of data	IPCC 2006 Guidelines for National Greenhouse Gas Inventories.
Value applied	0.47
Justification of choice of data or description of measurement methods and procedures applied	IPCC is a reputable source approved under the VCS.
Purpose of data	Calculation of project emissions.
Comments	None.

3.1.2 Data and Parameters Monitored (VCS, 3.16)

Data / Parameter	Aboveground woody biomass ($B_{WP\text{-}woody\text{-}AB,t}$)
Data unit	t C/ha
Description	Average aboveground woody biomass stocks in the project scenario in year *t*.
Source of data	Field measurements.
Value applied	Results of calculation from field measurements.
Justification of choice of data or description of measurement methods and procedures applied	Average aboveground woody biomass is estimated using the allometric equation by Torres & Del Valle (2007) for *Acacia mangium* in Colombia. This equation was fed with measurements of tree diameter at breast height (DBH) in field plots.
Purpose of data	Calculation of project emissions.
Comments	None.

Data / Parameter	Average non-woody biomass ($DM_{WP\text{-}herb,t}$)
Data unit	t d.m./ha
Description	Average non-woody biomass in the project scenario in year *t*.

Source of data	Field measurements.
Value applied	Results of calculation from field measurements.
Justification of choice of data or description of measurement methods and procedures applied	Non-woody biomass is measured via plot-based sampling. Dry mass is determined by drying the entire wet sample to a constant weight.
Purpose of data	Calculation of project emissions.
Comments	None.

Data / Parameter	Uncertainty in carbon stock estimate ($U_{p,t}$)
Data unit	Percentage
Description	Percentage uncertainty (expressed as 90 percent confidence interval as a percentage of the mean) in carbon stock estimate of pool *p* in the project scenario in year *t*
Source of data	Calculations from field measurements.
Value applied	Results of calculation from field measurements.
Justification of choice of data or description of measurement methods and procedures applied	It is calculated as the standard error of the averaged plot Measurement multiplied by the t value for the 90 percent confidence level.
Purpose of data	Calculation of project emissions.
Comments	None.

Data / Parameter	Average biomass of standing dead wood ($B_{SDW,t}$)
Data unit	t d.m./ha
Description	Average biomass of standing dead wood in year *t*.
Source of data	Field measurements.
Value applied	Results of calculation from field measurements.

Justification of choice of data or description of measurement methods and procedures applied	Standing dead wood is measured via plot-based sampling. For each standing dead tree, biomass is estimated using the allometric equation by Chave et al. (2005) and density reduction factors recommended by VM0047. Chave J, Andalo C, Brown S, Cairns MA, Chambers JQ, Eamus D, Fölster H, Fromard F, Higuchi N, Kira T, Lescure JP, Nelson BW, Ogawa H, Puig H, Riéra B, Yamakura T. Tree allometry and improved estimation of carbon stocks and balance in tropical forests. Oecologia. 2005 Aug;145(1):87-99. doi: 10.1007/s00442-005-0100-x. Epub 2005 Jun 22. PMID: 15971085.
Purpose of data	Calculation of project emissions.
Comments	None.

Data / Parameter	Average biomass of lying dead wood ($B_{LDW,t}$)
Data unit	t d.m./ha
Description	Average biomass of lying dead wood in year *t*.
Source of data	Field measurements.
Value applied	Results of calculation from field measurements.
Justification of choice of data or description of measurement methods and procedures applied	Lying dead wood is measured via line intersect sampling. Biomass of lying dead is estimated using the allometric equation by Van Wagner (1968) and density reduction factors recommended by VM0047.
Purpose of data	Calculation of project emissions.
Comments	None.

Data / Parameter	Average litter dry mass ($DM_{WP\text{-}LI,t}$)
Data unit	t d.m./ha
Description	Average litter dry mass in the project scenario in year *t*.
Source of data	Field measurements.

Value applied	Results of calculation from field measurements.
Justification of choice of data or description of measurement methods and procedures applied	Litter (dead organic surface material of less than 10 cm diameter) is collected from within fixed-area sampling frames, harvested at ground level and dried at 70 °C to a constant weight to determine dry weight biomass.
Purpose of data	Calculation of project emissions.
Comments	None.

Data / Parameter	Average soil organic carbon (SOC) stock ($C_{WP\text{-}SOC,t}$).
Data unit	t C/ha
Description	Average soil organic carbon (SOC) stock in year *t*.
Source of data	Field measurements.
Value applied	Results of calculation from field measurements.
Justification of choice of data or description of measurement methods and procedures applied	Measured SOC is determined from samples collected from sample plots located within the project area. SOC stocks are estimated from measurements of both SOC content and bulk density taken at the same time.
Purpose of data	Calculation of project emissions.
Comments	None.

Data / Parameter	Tree diameter at breast height (DBH).
Data unit	cm
Description	Diameter of trees planted measured at 1.3m height.
Source of data	Field measurements.
Value applied	Results of calculation from field measurements.

Justification of choice of data or description of measurement methods and procedures applied	Diameter is measured at 1.30m height by technicians from the project team, for all trees planted in designated sample plots.
Purpose of data	Calculation of project emissions.
Comments	None.

Data / Parameter	Tree height (h).
Data unit	m
Description	Height of the trees planted.
Source of data	Field measurements.
Value applied	Results of calculation from field measurements.
Justification of choice of data or description of measurement methods and procedures applied	Tree height is measured by technicians from the project team, for all trees planted in designated sample plots.
Purpose of data	Calculation of project emissions.
Comments	None.

3.1.3 Monitoring Plan (VCS, 3.16, 3.20)

Carbon stocks are monitored at each verification event through biomass inventories paired with remote sensing and spatial data. Biomass inventories are carried out in plantation parcels inside the first Project Activity Instance, as well as at some points outside the project area to monitor the baseline land use (degraded grasslands). Data and procedures for estimating biomass include:

1) Field measurements
   a) Aboveground live tree
   b) Aboveground non-tree vegetation
   c) Standing deadwood
   d) Lying deadwood
   e) Litter
   f) Soil organic carbon
2) Allometric equations are used to estimate carbon in the following:
   a) Aboveground and below tree biomass
   b) Aboveground deadwood biomass
3) Destructive samples are taken from the following to determine their carbon content:

a) Non-tree vegetation and litter
b) Soil

4) Other measurements
a) Description and location of the plot

3.1.3.1 Equipment checklist

The equipment required for conducting biomass monitoring in the field is listed below:

- First aid kit.
- Compass with internal clinometer.
- 30m tape measure
- Five ropes of 10 m each; these ropes should be transported on a reel (for the temporary demarcation of the limits and the establishment of the transects).
- 1 GPS to register point 1 of each of the parcels. The GPS will be fixed in the UTM19N coordinate projection system and should be adjusted on the averaged waypoints until the sample confidence is 100%.
- Smartphone with camera to take geolocated photos.
- Extra batteries for all electronic instruments (at least 8 AA batteries, preferably NiMH lithium)
- 2 meter tapes.
- Form packets (printed on waterproof paper, if possible).
    - Parcel survey cover sheet listing the coordinates supplied for point 1 (1 leaf per plot).
    - Litter biomass (1 leaf per plot)
    - Living tree biomass leaf (3 leaves per plot)
    - Sheet for non-tree aboveground biomass and soil (2 sheets per plot)
- Hand pruners (and saws if necessary).
- Sample bags (with zip-lock, or closure) for collections of non-woody biomass, litter and soil samples.
- Brightly colored paint to mark the trees around point 1.
- Machetes.
- PVC cylinder of 100 cm3 for soil samples.
- Permanent markers.
- Bucket of resistant fabric (rope, agave, or a large tarp) to collect, mix, and weigh non-woody biomass.
- 1000 g table scale
- Support table.
- Radio (if necessary)

3.1.3.2 Field work personnel

The biomass inventories are conducted by a field work team consisting of the following personnel:

- 1 forest team leader.
- 1 forest assistant.
- 1 field assistant.

Each crew member has received training prior to field measurements to ensure the quality of measurements and the personnel safety. The main functions of the personnel are described below:

Forest team leader:

- Manage the field work team.
- Explain roles and responsibilities to other team members.
- Locate plot and subplots correctly.
- Verify plot boundaries.
- Identify tree species.
- Ensure the quality of measurements.
- Take notes and fill out forms.
- Collect, store, and manage information.

Forest assistant:

- Support the identification of plot boundaries.
- Outline the plot boundaries using a rope.
- Take measurements and report them to the team leader for recording.

Field assistant:

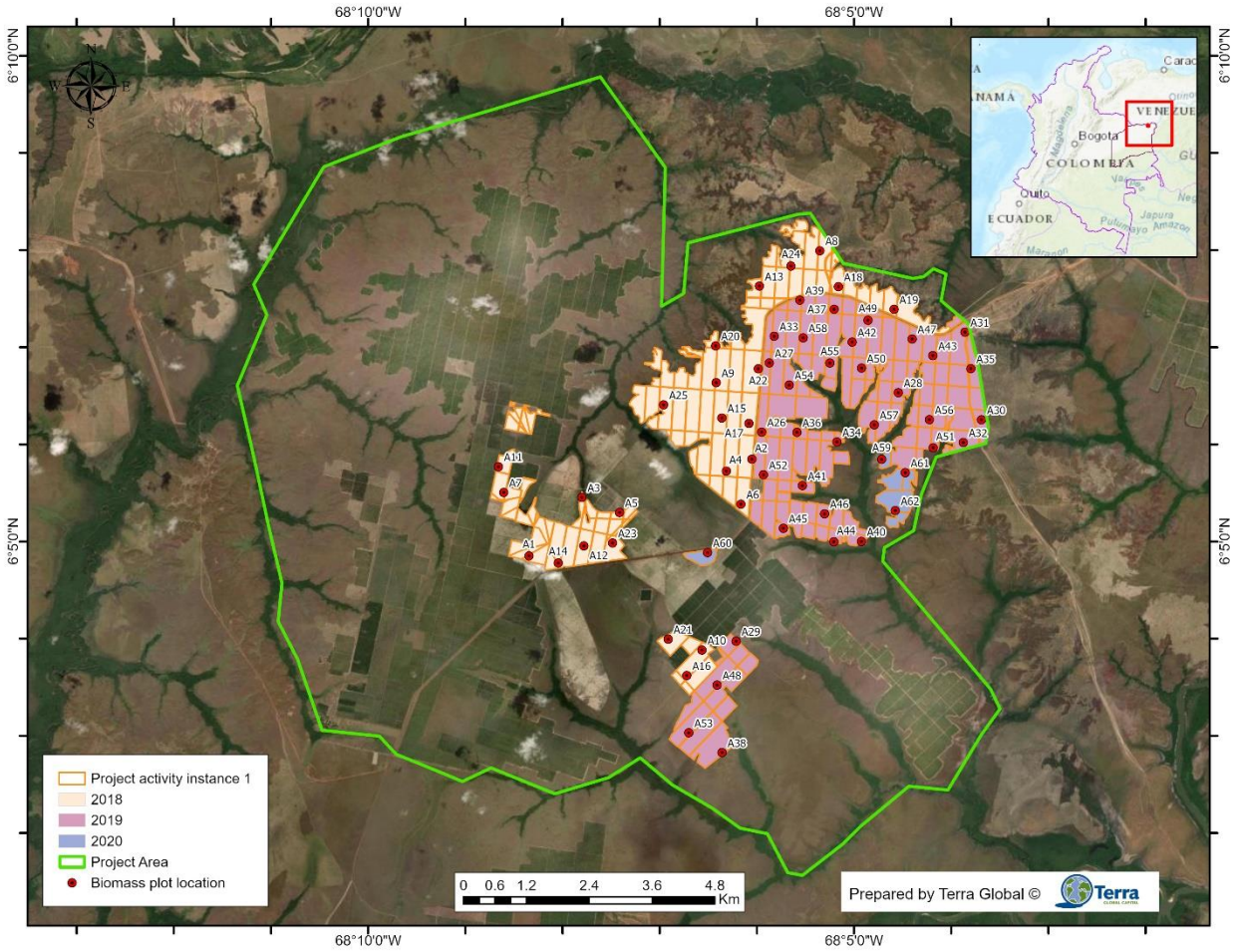
- Assist in taking measurements according to the leader's instructions.
- Outline the plot boundaries using a rope.
- Take measurements and report them to the team leader for recording.

3.1.3.3 Localization of biomass plots

Biomass inventory was carried out in 65 plots. 3 of these points were located in pasture areas outside the project area to monitor the baseline scenario. On the other hand, 62 points were located inside the *Acacia Mangium* plantations to monitor carbon stocks in Project Activity Instance 1. Table 6 shows the number of biomass plots established in each of the project strata and Map ***5*** shows the location.

Table 6. Biomass plots in project area.

Strata	Plantation year	Eligible area (ha)	Number of plots
1	2018	1,003	25
2	2019	1,304	33
3	2020	71	4
	Total	2,378	62



Map 5. Localization of biomass plots.

3.1.3.4 Desing of Biomass Plots

Biomass plots include the measurement of trees, non-woody biomass, soil organic carbon, litter, each measured with different procedures.

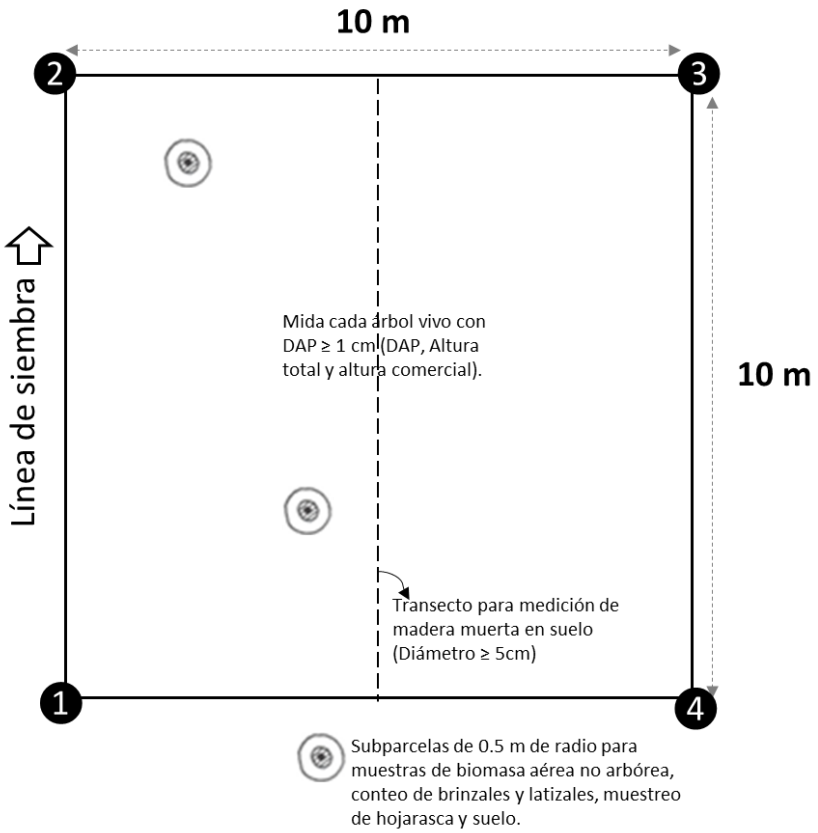


Figure 1. Biomass plots design

3.1.3.5 Creating a New Biomass Plot

The given coordinate for point 1 is provided on the map and should be noted in the forms folder. The crew leader will use the GPS, maps, and compass to locate that point as precisely as possible.

Sometimes it will be necessary to relocate the sample plot, if the GPS coordinates contain a road or other non-forest areas. The relocation must follow the following steps:

Note why the point should be relocated (for example, the parcel is located on a body of water, road, or drainage).

Move to coverage equal to that of the inaccessible parcel. The new position must be as close as possible to the original position required and follow the plot design requirements defined previously.

3.1.3.6 Establishment of Plot Boundaries

1) Once the leader locates the southwest corner of the biomass plot using GPS, it must register properly like point 1.

2) The crew leader will place the GPS at point 1 and will wait until the GPS has averaged a reading with 100% confidence. This takes between 1 and 5 minutes.

3) Mark the correct coordinates of the point 1 recording a waypoint in the GPS. Record three separate waypoints for point 1, averaging up to a 100% confidence level reading each time. Having the correct coordinates is crucial for field inventories.

4) Use the compass to locate the northerly direction, following the planting lines, the western side of the plot will be along the tree line that best correlates with the northerly direction. The western limit of the parcel will be point 1 to point 2. If north points in a direction that is not accessible, follow the procedure in step 2 of previous section for the relocation of the plot. Walk along the west side of the plot for 10 m and place the string on the ground outlining the west side of the plot.

5) Place a ribbon in a conspicuous location (on a tree or permanent spot such as a rock) in the southwest corner (point 1) as a permanent marker so the plot can be located in the future. You should try to place the bar exactly at the corner point of point 1 where the GPS coordinates were measured. Spray paint 4 nearby trees or rocks to point 1.

6) Place a temporary stake to mark point 2. Walk 10 m at an angle of 90 degrees in the east direction and place another temporary stake indicating point 3. Lay the string on the ground between point 2 and 3, delimiting the south side of the plot.

7) The forest leader returns to point 1 and walks 10m at a 90-degree angle to the east and places another temporary stake to mark point 4. Place the string between points 1 and 4 delimiting the southern part of the plot.

8) Walk between points 3 and 4 delimiting the south side of the plot. Check that the east side is 10m and adjust if necessary.

9) There may be an error in the distance between points. The biggest mistake will be on point 3 and must move to compensate for the error. If the rope between points 2 and 3, and the rope between points 4 and 3 are not at point 3, this should be moved. Follow the steps below to account for distance corrections to be made:
    a) If the error at point 3 is less than 1 meter, the ropes can be extended or cut to compensate for the error, or obstacles do not allow the ropes to be tightened.
    b) If the error at point 3 is greater than 1 meter, adjust the location of point 3 moving the ropes in or out to complete the square.

10) Once the plot has been delineated, the field team leader uses the GPS to correctly record the points 2,3 and 4 and waits until the GPS unit has averaged a reading with a sample confidence of 100%. This can take between 1 and 5 minutes each.

11) Please note that it is important that the plot is not larger than 10m x 10m, which could overestimate the biomass.

3.1.3.6.1 Establishment of subplot points within the biomass plots

Inside the plot, two subplots are established to measure leaf litter, non-tree aboveground biomass and collect soil samples. Because the subplots must be representative of the area, each one will be established in two different places in the plot, and the location of the samples must be random. Process is described below:

1) Randomize the location of the two subplot points by walking a random number of steps north and a random number of steps east. Use Table 7 to select the row of numbers not yet used. When you use a row, cross it off the list. Each row of random numbers must only be used once. If necessary, make a new list of random numbers when all the numbers in the list have been used.

Table 7. Randomized distances for biomass subplots establishment

Randomized North distance (m)	Randomized East distance (m)
5	3
2	2
4	7
3	9
4	2
2	7
2	2
4	2
9	3
2	9
7	8
2	3
7	3
7	9
4	4
8	8
3	2
1	7
7	3
6	3
8	5
8	7
8	2
7	9
5	1
1	1
9	2
9	2
5	2
8	3
5	3
3	2

2) Once the subplot is located, the crew leader will be careful not to disturb vegetation within a 0.5 m radius of the subplot point. Non-tree biomass will need to be collected in this area, so it should not be damaged prior to collection.

3) A temporary mark will be placed at each point of subsample and the process will be repeated starting at point 1 until the two subplot points are selected.

3.1.3.7 Additional data to record at biomass plots.

1) Photographs will be taken to show the type of plot cover and canopy. Take photos in the north, east, south, and west directions, at point 1. The photos will be taken showing manual signs to indicate the directions, against the cover of the folder where the number of the parcel is. Specifically:
   - A finger indicates that the photo was taken in a northerly direction.
   - Two fingers indicate that the photo was taken in an easterly direction.
   - Three fingers indicate that the photo was taken in a southerly direction.
   - Four fingers indicate that the photo was taken in a westerly direction.

An assistant will place one hand against the folder cover displaying the parcel number in the upper right-hand corner. The assistant will point their fingers to indicate the direction in which the photo was taken. The crew leader will be placed at least two meters from the assistant and will take the photos in the N, E, S, and W directions, taking care that the forest and fingers appear against the cover of the folder. In each plot, four photos will be taken at point 1. Each photo shows the coverage, fingers for address, and clearly shows the parcel number on the binder cover. The crew leader will record the file number of the photos in the appropriate place on the forms.

The file number is unique and is associated with each photo. After taking the photos, the name of the photo's metadata will be verified on the cell phone (example: “IMG_3649”). This process may vary slightly depending on the camera. Figure 2 shows an example.

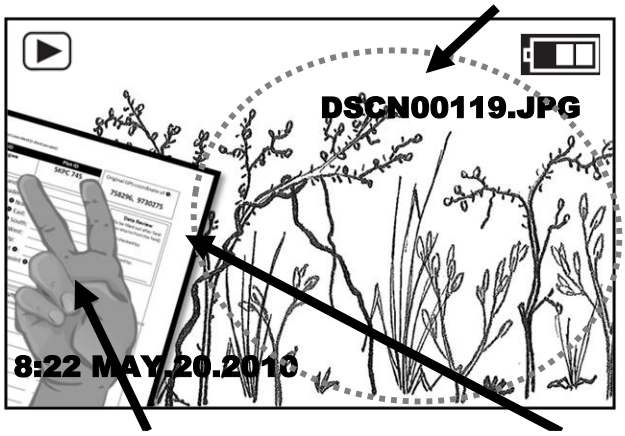


Figure 2. Example of photos to take in biomass plots.

2) Record the aspect of the plot from point 1. Aspect is the direction of the downslope from point 1, this can be expressed as "North" or Southwest". For forestry purposes, the aspect is the direction in which rainwater flows in a catchment.

3) Slope is measured is measured in degrees from point 1, but it must be representative of the plot. If the plot is on a very steep slope, the horizontal distance will be less than 25 m. If the land is flat, write “0” on the form.
   a) The crew leader will measure his eye height against an assistant when looking directly ahead on level ground (an example might be the leader's eye looking directly up the assistant's nose).
   b) The crew leader stands at point 1 and the assistant walks in the direction of the slope (aspect).
   c) The slope is measured once the assistant is about 2 to 8 meters from the leader.
   d) To use the clinometer, the compass dial is turned west, and the compass is held open and on its side. The black arrow on the compass will allow pointing down. When the angle is flat the black arrow points directly to 0.
   e) The crew leader will look over the top of the open compass at the same point where he measured the attendant's height in step a. The compass will move close to the eye so that it points to the angle of the viewing direction. The black arrow points to the degrees of slope. Another crew member reads the degrees while the leader is using the internal clinometer.

4) Place a ribbon in a conspicuous location (on a tree or permanent spot such as a rock) in the southwest corner (point 1) as a permanent marker so the plot can be located in the future. Try to place the bar exactly at the corner point of point 1 where the GPS coordinates were measured. Spray paint 4 nearby trees or rocks to point 1.

3.1.3.8 Procedures for measuring biomass within the main plot.

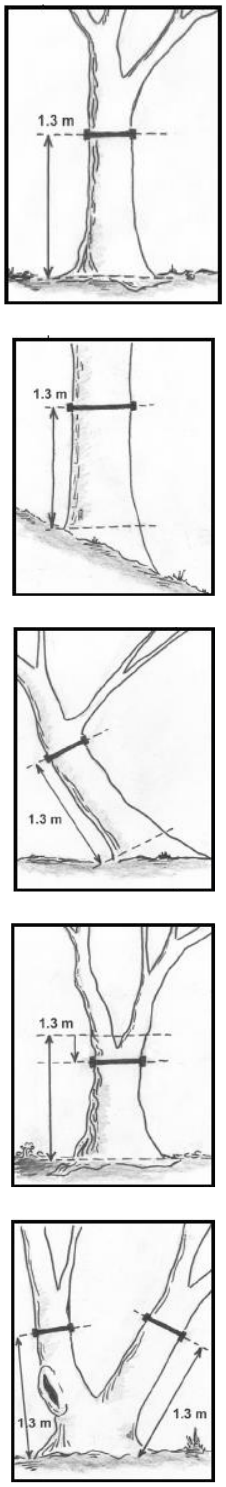
Living trees

The field team leader is responsible for taking notes, completing the live tree data sheet, and directing all measurement work. Assistants help the field team leader to take measurements and collect the required information. All trees that have a DBH greater than or equal to 1 cm must be measured following the procedure below:

For each tree greater than or equal to 1 cm DBH, the species, height and DBH are recorded regardless of the species or if they were planted.

1) The team leader records all the data at the designated location on the Living Trees data sheet.
2) If a tree is near a plot line, decide carefully whether the tree is inside or outside of a plot. If the pattern is within the parcel boundaries, the tree is considered within the parcel. If stems originating within the plot extend outside the plot boundaries, they are still measured. If the pattern of the tree or sapling is exactly on the edge of the plot, flip a coin to determine if it is inside or outside.

Below are some guidelines for correctly measuring DBH:



DBH always should be measured at 1.3 m from the ground.

If the tree is on a slope, always measure the DBH at 1.3 m from the ground at the upper side of the slope.

If the tree is tilted, the diameter tape should be perpendicular to the trunk according to the angle of inclination (thus, it should not be perpendicular to the ground).

If the tree forks at 1.3 m or just below, measure below the fork. Measuring forked trees as a single trunk is more accurate for biomass estimation.

If the tree forks at 1.3 m or less from the ground, each trunk is measured as if they were separate trees.

***Figure** 3. DBH measurement.*

Heights can be recorded with a rangefinder or using the internal clinometer inside the compass described below:

- The internal clinometer in the compass is used to find the height of the canopy. The compass dial is turned to the west and the compass is held open and on its side. Angles are measured with the black arrow on the compass. The black arrow on the compass will always point down. When the angle is flat, the black arrow points directly to 0.
- The field team leader looks over the open compass at the top of the tree. The compass is moved close to the eye so that it points to the angle of the viewing direction. The black arrow points to the angle.
- The field team leader walks away from the tree parallel to the slope, keeping the top of the tree visible. Move away from the tree as far as the tree is tall. This is done by visualizing the tree falling from its base directly towards the field team leader and having the top of the tree fall right at the feet of the field team leader. The field team leader will stand at a point that has an angel about 45° from the top of the tree.
- The field team leader uses the clinometer to measure a 45° angle with respect to the treetop. If the angle is less than 45°, he walks toward the tree until the angle is 45°. If the angle is greater than 45°, move away from the tree until the angle is 45°. Another field team member reads the degrees while the field team leader uses the internal clinometer.

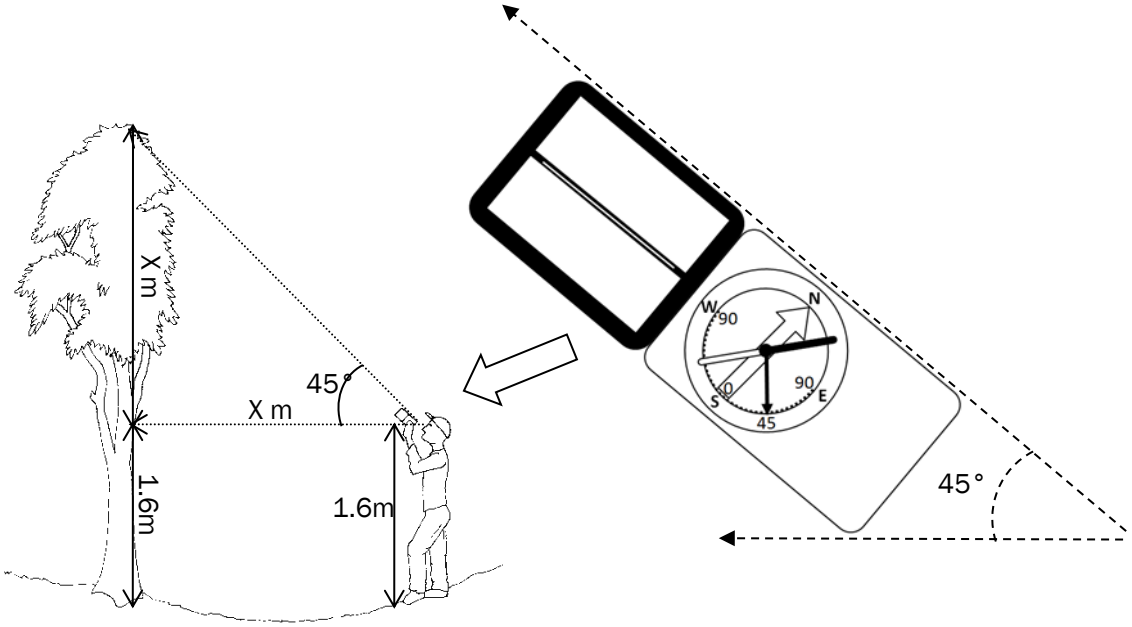


Figure 4. Tree height measurement.

Standing dead wood

The forest leader is responsible for taking notes, filling in the forms, and leading all measurement work. The assistants help the field crew leader with counting and measuring trees and call all information that the field crew leader needs to record.

1) Measure the DBH and height for a standing dead tree as explained. As for live trees, only measure dead trees with a DBH greater than or equal to 5 cm and record on the Standing Deadwood Datasheet.

2) Recording the species of the tree is not necessary for standing dead trees.

3) Estimate the decomposition state of the tree. Use the following guidelines to determine the decomposition class.

Table 8. Stading dead wood decomposition class

CLASS 1	Tree with branches and twigs but without leaves
CLASS 2	Tree with no twigs, but with small and large branches
CLASS 3	Tree with large branches only
CLASS 4	Bole (trunk) only, no branches
CLASS 1	Tree with branches and twigs but without leaves
CLASS 2	Tree with no twigs, but with small and large branches
CLASS 3	Tree with large branches only
CLASS 4	Bole (trunk) only, no branches

4) Estimate the height of the standing deadwood or measure the height using the procedure to find dominate canopy height in Living trees section above.

Lying dead wood

The forest leader is responsible for taking notes to complete the lying dead wood data sheet and directs all measurement work. Assistants help the forest leader count and measure trees and call all the needed information to record.

To measure dead wood, a 10-m string is placed in a north-south direction, 5 meters from the north-south boundaries of the plot.

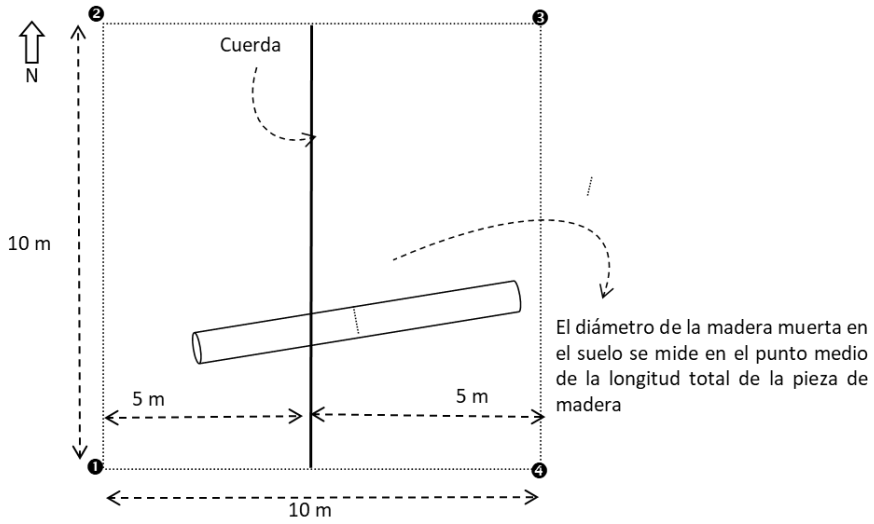


Figure 5.Lying dead wood sampling.

1) The field team leader walks between point 1 and point 4 and marks the location of the chord, 5 m east of point 1. The rope is then placed directly north of the point indicated by the field team leader.

2) Walk the length of the rope and analyze each intersecting piece of dead wood with a diameter greater than or equal to 5 cm at the point where the log crosses the rope. Dead wood that is less than 5 cm in diameter where it crosses the line is not measured. For each piece of dead wood that comes across, the field team leader records the following on the dead wood data sheet:

- The outer diameter at the center of the trunk,
- The length of the trunk,
- The density class,

3) Assign each piece of dead wood to one of the three density classes.

Table 9. Lying dead wood decomposition class

CLASS1	Healthy wood; a machete does not sink into wood with a single blow.
CLASS 2	Intermediate wood; a machete partially sinks into wood with a single blow
CLASS 3	Rotten wood; a machete cuts through wood with a single blow.

3.1.3.9 Procedures for measuring biomass within subplots.

Non woody biomass

1) At the undisturbed site of each of the two subplots, the forest leader carefully measures a circle around the subplot location with a radius of 0.5 m and places the tape measure from the center

of the plot to the north. Assistants help the field team leader by placing a rope on the ground around the circle measured by the field team leader (See Figure 6).

2) The field team leader weighs the empty bucket sack and records the weight of the empty bucket on the above-ground non-tree biomass data sheet.

3) The field team collects all non-tree vegetation, including ferns, herbs, grasses, etc., both alive and dead, standing at a height of less than 2 meters. Harvesting is done by cutting all the plants on the ground and placing them in the bucket. Ferns, dry grasses, and dead grasses are collected, while fallen leaves, twigs, and dead grasses are not collected. All seedlings, saplings and trees are left in the circle. Only the plants that are inside the circle or in the space of two meters above it is collected. If a plant hangs inside the circle, but the roots grow outside the circle, only the part of the plant that hangs inside the circle is collected. Similarly, if a plant is growing inside the circle, but hanging outside the circle.

4) The team leader weighs and records the bucket, filled with standing live and dead non-tree biomass, at the location designated on the data sheet.

5) Workers use the pruning shears to cut all collected standing non-tree biomass into pieces no larger than 5 cm by 5 cm and mix them into the bucket. The team leader then selects a 100 g sample of material that is representative of the composition of the material found in the bag. If the material is very wet, try shaking off the excess water. If there is less than 100 g of non-tree biomass, take all of it. If there is none, check the box indicating that there is no aboveground non-tree biomass on the subplot. The team leader places this sample in a bag and labels it with the plot identification and the subplot number (1 or 2) (to be taken to the laboratory to determine moisture content and dry mass).

6) The bucket is emptied of its contents away from the subplot and shaken to remove excess.

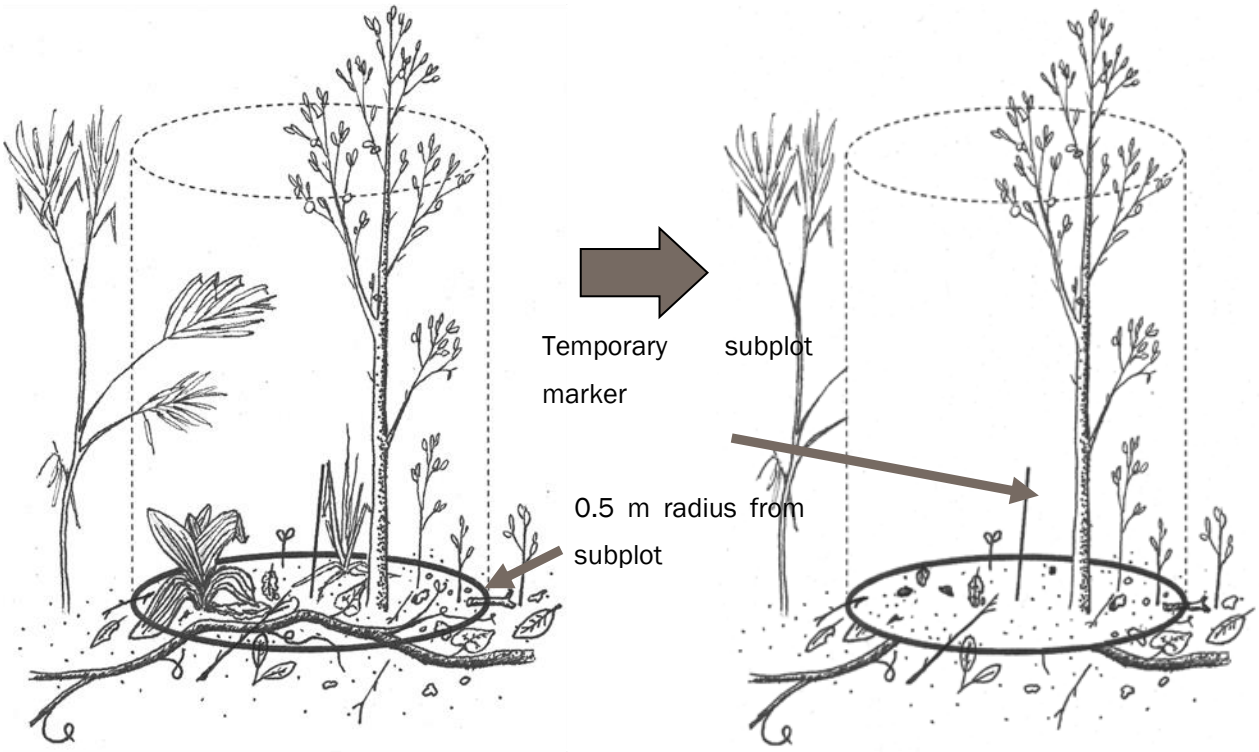


Figure 6. Non woody biomass sampling.

Litter

1) The amount of litter on the ground is measured and a sample is collected. This consists of collecting the entire layer of litter and humus found in each of the two subplots of 0.5m radius. After the non-tree biomass is removed, all dead and decaying material on the soil of the plot less than 5 cm in diameter should be collected.

2) The field team leader weighs the empty bag and records the weight of the empty bag on the Soil-Litter Data Sheet.

3) Assistants move around the subsample plot again starting with the tape measure and moving clockwise collecting all litter and humus including fallen leaves, cocoa berries, sticks, bark, etc., that is less than 5cm in diameter. Since there may be many roots in the humus layer, it may be necessary to use pruners to cut the roots and remove them from the sample. Live or dead/dry material (eg dry grass) is not collected from the plot floor.

4) The collection is completed by gathering all the lying material from the ground within the subplot and placing it in the bag. All seedlings, saplings and trees are left in the circle. Only fallen material that is inside the circle is picked up. If there are large pieces of litter inside and outside the circle, only collect the part of the litter inside the circle.

5) The bag and decomposed material are weighed and recorded by the team leader at the location designated on the data sheet.

6) Community workers use pruning shears to cut all the collected material into pieces no larger than 5 cm by 5 cm and mix it in the bag. The team leader then selects a 250 g sample of material that is representative of the composite material found in the bag. If the material is very wet try to shake off the excess water. If there is less than 250 g of the forest floor, take it all as a sample. If there is no material on the forest floor, check the box that there is none on the subplot. This sample is placed in a zip-lock bag and marked with the sample plot ID and plot number (1 or 2) by the team leader (to take to the lab/farm to determine the sample size). moisture content and dry mass).

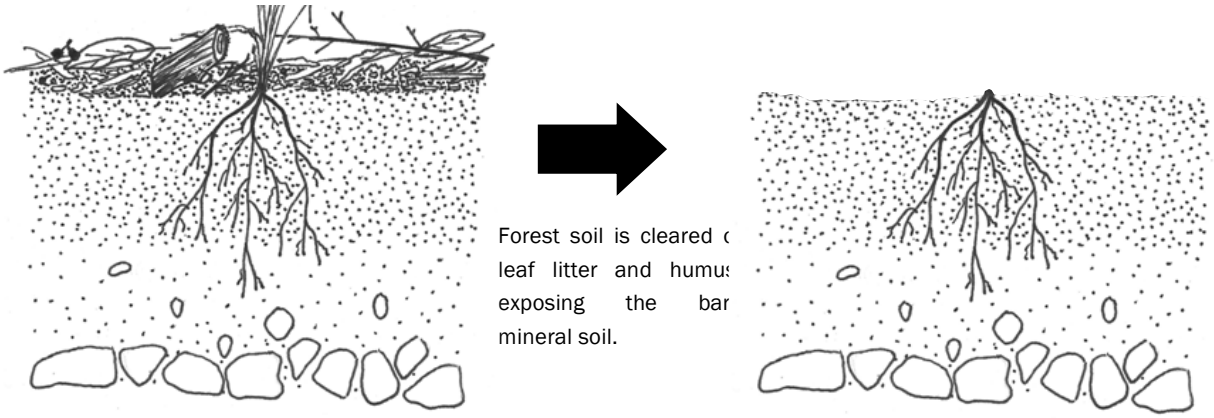


Figure 7. Litter sampling.

Soil sampling

A soil sample is taken from the center of each subsample plot.

1) The workers dig a hole in the center of the plot according to the instructions of the team leader. The hole does not need to be wider than the shovel, but it does need a clean vertical face cut into the ground 30cm deep.

2) The team leader uses the soil sample cylinder to collect three soil samples from each hole. Samples are taken at a depth of 1-10 cm, 10-20 cm and 20-30 cm.
   a) This is done by pressing the soil sample tube horizontally into the clean vertical face of the hole until the tube is filled with soil (the tube may need to be hammered into the face with a damper).
   b) Once the tube is full, it is carefully removed from the hole, allowing the soil to ooze out of each end.
   c) The team leader then carefully cuts off any soil sticking out from each end so that the tube is filled with soil and contains exactly 100 cm3 of soil.
   d) The soil within the tube is placed in a zip-lock bag, and the bag is closed and labeled with the plot identification and subsample number (1 or 2). Soil samples from each depth can be combined in the zip-lock bag so that there is only one zip-lock bag for each sub-sample.

3) This process is repeated twice so that each biomass inventory plot is in the center of each of the subplots.

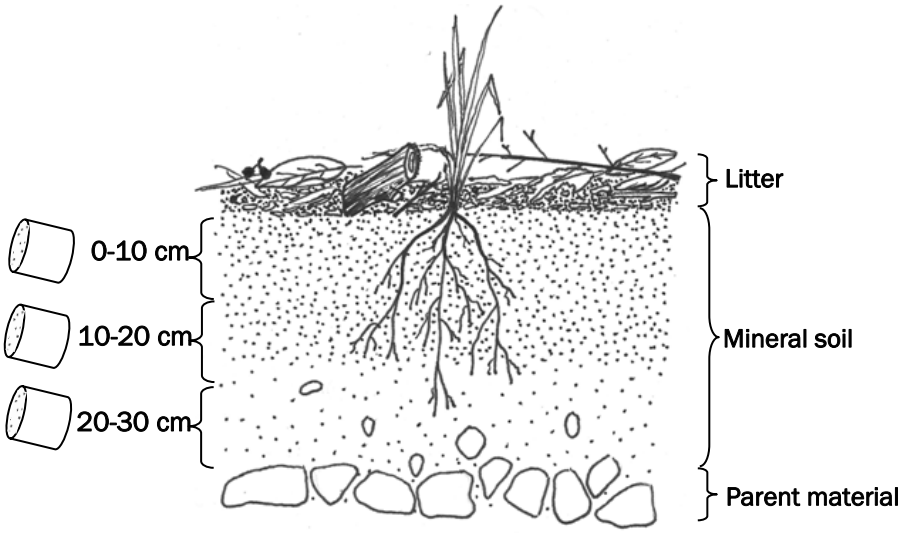


Figure 8. Soil sampling.

3.1.3.10 Field forms verification

The crew leader is responsible for reviewing and verifying all measurement work. The following procedures must be followed before the crew leaves the plot:

- Ensure that all lines on the forms are filled in. This is the leader's responsibility, and each form must be complete for the plot data to be acceptable.
- When the forms are completed, the leader will double-check the GPS coordinates, 30 cm diameter, DBH, and tree species for obvious outliers. • It must be ensured that the photos are not blurry and that the coordinates on the GPS screen are legible in the photos. It must be confirmed that each photo identifier is on the correct line of the form.
- Before leaving the plot, the crew leader will collect all forms and write the plot number on each sheet, front and back.
- To verify that the biomass plot is complete, the leader will sign their name on the gray cover of the Data Review box.

3.1.3.11 Desktop work

- Before separating the forms, ensure that they all have the correct plot identifications (in case they get mixed up, they can be reunited).
- Field forms will be reviewed for missing information (if information is missing, the data may be insufficient for biomass calculations and the plot will need to be remeasured).
- All data must be transferred to an Excel file. Each plot should have its own file, and each carbon reservoir or additional measured property will be listed as a separate sheet within the file. The naming convention will be consistent for all files and sheets.
- Field forms will be gathered in a folder.
- Common errors occur when handwriting is illegible or incorrectly interpreted. The crew leader should enter the data as it was recorded in the field. If the leader does not enter the data, any questionable data should be reviewed with the crew leader.

- After entering the data, it should be reviewed by another person who did not input information and is not the leader.
- Review the forms and save the files in the same folders as the photos. Ensure that all files and photos are correctly labeled following a consistent system and are saved in the corresponding folders.
- Download the GPS coordinates and save them in a file. The file should be kept in a separate folder from the data and photos.
- When downloading data from the GPS and camera, ensure that all data has been labeled following a consistent system and saved properly before clearing the internal memory of both devices.

3.1.3.12 Laboratory measurements

The purpose of this section is to measure samples of leaf litter that have returned from the field. These subsamples are measured both "wet" as soon as possible after returning from the field, and "dry" after drying to a constant weight. Weighing is done using the digital compact scale placed on a flat, dry surface.

1) Before measuring the biomass of the selected sample, verify that the plot ID and subsample number on the bag match the plot ID and subsample number on the data sheet.
   a) Ensure that the scale displays "0" and place the "wet" biomass bag on the scale. Weigh the bagged wet subsample.
   b) Record the weight to the nearest 0.01 g shown on the screen.

2) Bake the subplot sample in a conventional kitchen oven.
   a) Turn on the thermometer and place the temperature gauge in the oven frame and close it.
   b) Set the oven to 21°C and wait for 10 minutes for the oven to reach the desired temperature.
   c) If necessary, increase or decrease the temperature from 21°C using the digital thermometer display. The standard oven thermometer is not very accurate. Always use an external thermometer for more precise temperature readings.
   d) Place the subsample on the tray and bake it for one day, then reweigh it following steps 1 and 2a.
   e) Record the weight of the sample in the corresponding form, in the section "Dry weight of non-tree aboveground biomass, sample (g)", or weigh the dry forest floor sample (g)" after the correct baking period.

3) Repeat steps 2a to 2e, each time recording the dry weight of the subsamples on the forms after the appropriate period that each sample was baked. The sample will continue to bake, and each day it will be weighed until a constant weight is achieved. The sample will have reached a constant weight when the weight is within ± 0.05 g of the last recorded weight. Use the reverse side of the form if more than five days are needed.

3.1.4 Dissemination of Monitoring Plan and Results (VCS, 3.18; CCB, CL4.2)

The following meetings were held to disseminate the Monitoring Plan:

Participants	Purpose	Date
Workers	Informational meeting, socialize PD summary and process for comments and feedback	Feb. 2024
Local authorities	Writing communication	Feb. 2024

After finishing, the Monitoring Plans will be accessible to the public on the website www.verra.org. The outcomes of each Monitoring Period will be disclosed and communicated to local stakeholders, a task assigned to Reforestadora La Paz and 12Tree.

3.2 Quantification of GHG Emission Reductions and Removals

3.2.1 Baseline Emissions (VCS, 3.15)

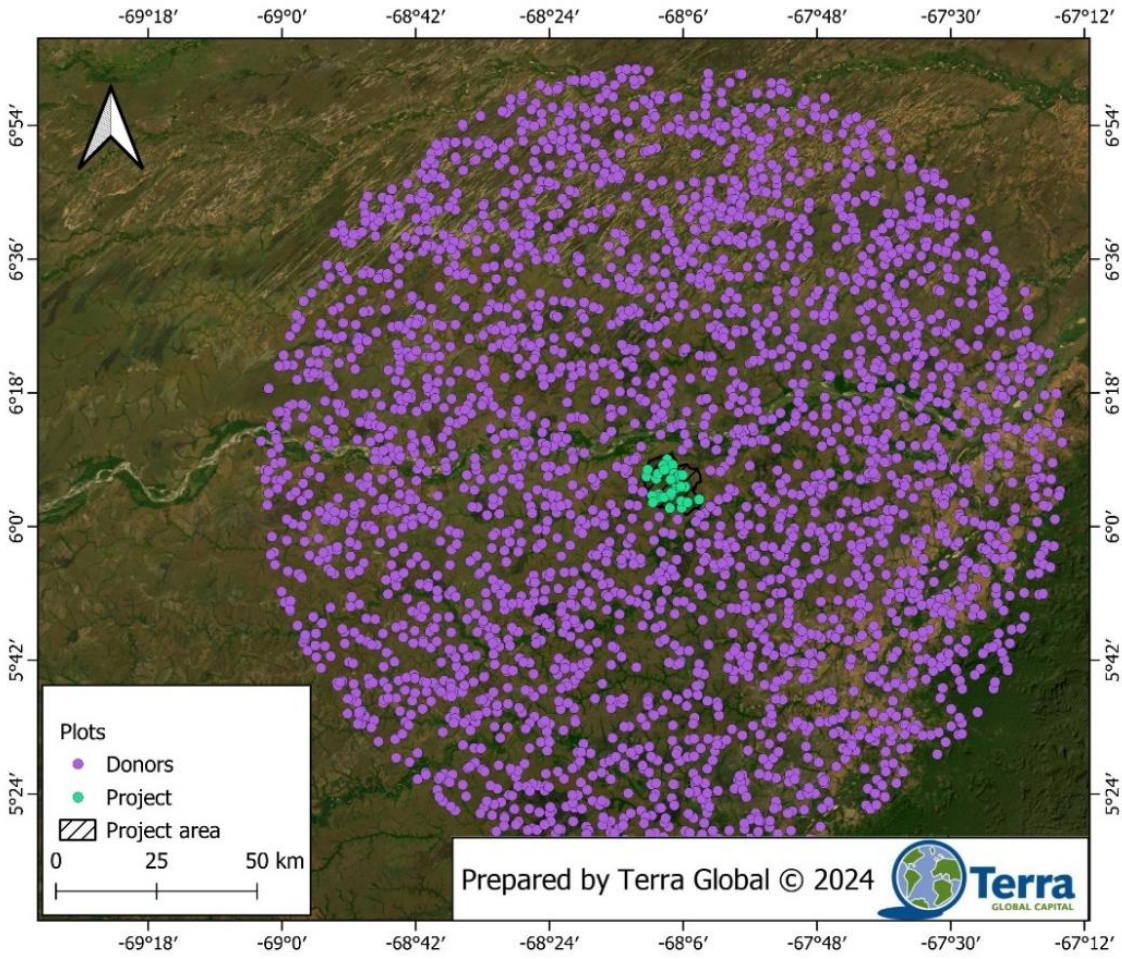
Quantify the baseline emissions and/or carbon stock changes for the monitoring period in accordance with the applied methodology. Baseline emissions may be negative where carbon stock increases (sinks) exceed baseline emissions. Specify the reductions and removals separately where the applied methodology provides procedures and equations to do so. Include all relevant equations here and provide sufficient information to allow the reader to reproduce the calculation. Include all calculations in the emission reduction and removal calculation spreadsheet.

As described in the Project Description Document, the baseline scenario of the project activity is the continuation of the pre-project land use. If the Project Activity Instances parcels were not purchased by 12Tree, the selling land holder would have continued to manage the land with the pre-project activities. The baseline scenario is degrading grasslands and annual crop cultivation. The baseline scenario was established using the performance benchmark method, representing the business-as-usual growth of carbon stocks monitored via remote sensing on control plots outside the project area. Business-as-usual changes in vegetation cover were quantified by the performance benchmark, calculated as the ratio of average change in Stocking Index (SI) of control plots to project plots. Control plots were selected to align with the project area's biophysical and management conditions, as well as historical stock trends. For the calculation of the performance benchmark the following steps were taken:

- A pool of 45 points in project area (project plots) were randomly selected.
- From a region within a ~100km radius around the centroid of the project area, a broader pool of 3000 points located outside the project area were randomly selected (referred to as donor plots). Subsequently, control plots were chosen by excluding donor plots with land use classifications that differed from any land use classification within the project area.
- The reflectance of each plot was extracted from a time series covering the 10 years prior to the project's initiation up to the latest monitoring year. This was accomplished using Landsat 7 data (for the years 2007 to 2013) and Landsat 8 data (for the years 2014 to 2023). To mitigate artifacts,

data were exclusively extracted between May and August. We chose this temporal window because it includes the main growing season in many regions of Colombia. Additionally, to ensure consistency between the two sensors, the analysis focused on spectral bands that are common to both Landsat 7 and Landsat 8.

- The SI for each plot for each year was derived by using linear unmixing by nonnegative matrix factorization (NMF) to automatically decompose the reflectance into 3 end members and used the combination that better correlated with ESA-CCB annual aboveground biomass estimated for the 2017-2020 time period.
- To match each project plots to a set of 4 unique, non-repeated, control plots a combination of nearest neighborhood and iterative optimization was used. Assignment of control plots to project plots was achieved by using Hungarian algorithm for minimizing overall Manhattan distance across plot pairs, based on their reflectance, SI, and other ancillary data (e.g. elevation, landuse), from t-10 (i.e. 2008) to t-1 (i.e. 2018).
- A timeseries was constructed from year t=0 to t=n. Since the project start date was December 2018, 2019 was used as year t=0. For each series, the delta SI control and delta SI project were estimated as the slope of the linear regression between SI and time. From each regression, the significance of the slope (p-value), the divergence between control and project plots (z-scores), and the performance benchmark (PB) were calculated.



Map 6. Distribution of project plots (45) and donor projects (candidates for being control plots, 3000)

Map 6 shows the comparison of *SI* for control and project plots before and after the project start date. The analysis shows that trends of changes of *SI* in the control area resulted to be non-significant (p-value =0.18), while the significance of the difference between control and project area since the establishment of project activities was significant (z-score >1.96).

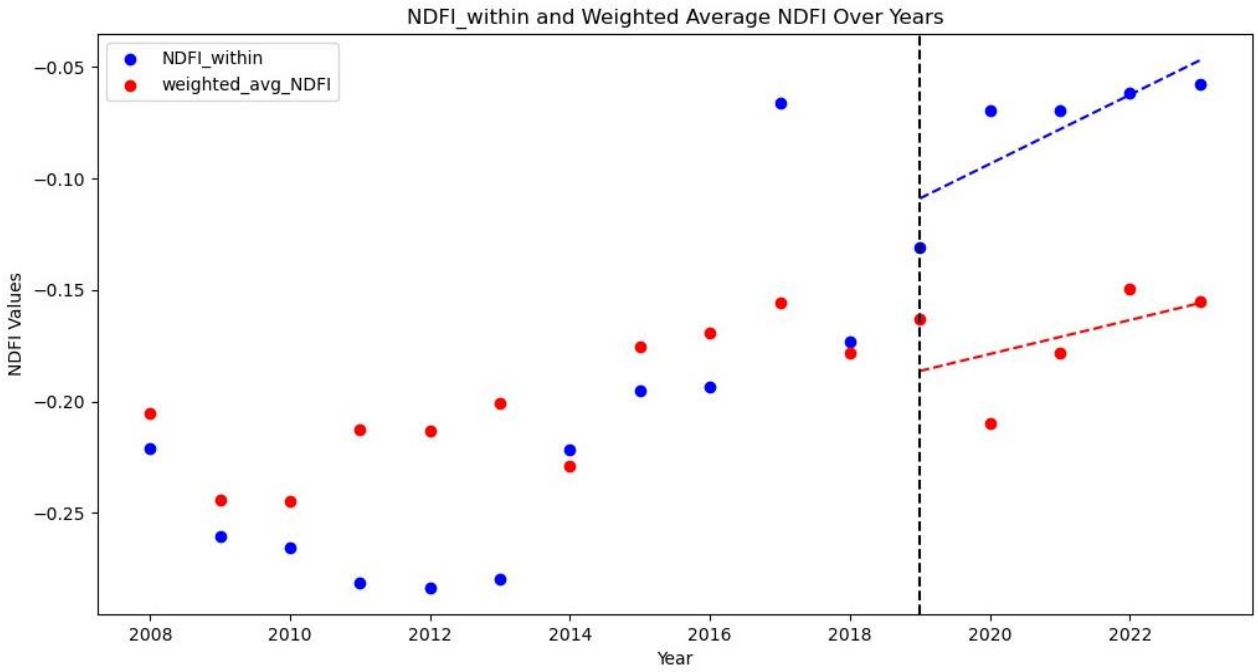


Figure 9. Pairing of SI for control (blue) and project plots (red) before and after of the and project start date. Trendlines from represent the dSI (i.e. the slope) of the regression from t=0 to t=5 for control (blue) and project (red) plots.

Calculations of performance benchmark after the project start date are presented in Table 10. The performance benchmark from year 0 to 4 is equal to zero.

Table 10. Estimation of SI from project (SI project) and control (SI control) plots for each year from t=0 (2019) to t=4 (2023).

Year	t	*SI* project	*SI* control	*dSI* project	*dSI* control	Z slopes	p-value control	PB calculated	PB selected
2019	0	-0.13							0.00
2020	1	-0.07	-0.21	0.05	-0.02	3.60	0.54	-0.31	0.00
2021	2	-0.07	-0.18	0.04	0.00	3.10	0.69	-0.13	0.00
2022	3	-0.06	-0.15	0.03	0.00	2.29	0.63	0.15	0.00
2023	4	-0.06	-0.16	0.02	0.01	2.19	0.36	0.24	0.00

3.2.2 Project Emissions (VCS, 3.15)

3.2.2.1 Carbon Stock Changes

The project carbon stock change in year t is calculated as follows:

$$\Delta C_{WP,t} = \left(\Delta C_{WP-biomass,t} - \Delta GHG_{WP-SOC,t}\right) * \frac{44}{12}$$

Where:

$\Delta C_{WP,t}$	=	Project carbon stock change in year t (t CO_2e)
$\Delta C_{WP-Biomass,t}$	=	Change in carbon stock in biomass carbon pools in the project scenario through year t (t C)
$\Delta C_{WP-SOC,t}$	=	Change in carbon stock in SOC in the project scenario through year t (t C)
$44/12$	=	Ratio of molecular weight of carbon dioxide to carbon (unitless)
t	=	1, 2, 3, …, t years elapsed since the project start date

$\Delta C_{WP-biomass,t}$ is calculated as follows:

$$\Delta C_{WP-biomass,t} = \Delta C_{WP-woody,t} + \Delta C_{WP-herb,t} + \Delta C_{WP-DW,t} + \Delta C_{WP-LI,t}$$

Where:

$\Delta C_{WP-biomass,t}$	=	Change in carbon stock in biomass carbon pools in the project scenario through year t (t C)
$\Delta C_{WP-woody,t}$	=	Change in carbon stock in woody biomass in the project scenario through year t (t C)
$\Delta C_{WP-herb,t}$	=	Change in carbon stock in non-woody biomass in the project scenario through year t (t C)
$\Delta C_{WP-DW,t}$	=	Change in carbon stock in dead wood in the project scenario through year t (t C)
$\Delta C_{WP-LI,t}$	=	Change in carbon stock in litter in the project scenario through year t (t C)
t	=	1, 2, 3, …, t years elapsed since the project start date

Woody biomass

The net carbon stock change in tree biomass in the project scenario estimation is estimated as follows:

$$\Delta C_{WP-woody,t} = A - \left(C_{WP-woody,t} - C_{WP-woody,t=0}\right)$$

$$C_{WP-woody,t} = C_{WP-woody-AB,t} * (1 + R)$$

Where:

$\Delta C_{WP-woody,t}$	=	Change in carbon stock in woody biomass in the project scenario through year t (t C)
A	=	Area (ha)

$C_{WP-woody,t}$	=	Average carbon stock in woody biomass in the project scenario in year t (t C/ha)
$C_{WP-woody-AB,t}$	=	Average carbon stock in woody biomass in the project scenario in year t (t C/ha)
R	=	Root to shoot ratio (t root d.m./t shoot d.m.)
t	=	1, 2, 3, …, t years elapsed since the project start date

Non-Woody biomass

The net carbon stock change in non-woody biomass in the project scenario estimation is estimated as follows:

$$\Delta C_{WP-herb,t} = A * \left(C_{WP-herb,t} - C_{WP-herb,t=0}\right)$$

$$C_{WP-herb,t} = DM_{WP-herb,t} * CF$$

Where:

$\Delta C_{WP-herb,t}$	=	Change in carbon stock in non-woody biomass in the project scenario through year t (t C)
A	=	Area (ha)
$C_{WP-herb,t}$	=	Average carbon stock in non-woody biomass in the project scenario in year t (t C/ha)
$DM_{WP-herb,t}$	=	Average non-woody biomass in the project scenario in year t (t d.m./ha)
CF	=	Carbon fraction of dry biomass (t C/t d.m.)
t	=	1, 2, 3, …, t years elapsed since the project start date

Dead Wood

The net carbon stock change in dead wood is estimated as follows:

$$\Delta C_{WP-DW,t} = A * \left(C_{WP-DW,t} - C_{WP-DW,t=0}\right)$$

Where:

$\Delta C_{WP-DW,t}$	=	Change in carbon stock in dead wood in the project scenario through year t (t C)
A	=	Area (ha)
$C_{WP-DW,t}$	=	Average carbon stock in dead wood in year t (t C/ha)
t	=	1, 2, 3, … t years elapsed since the project start date

Deadwood is comprised of both standing and lying deadwood. This is calculated as follows:

$$C_{WP-DW,t} = \left(B_{SDW,t} + B_{LDW,t}\right) * CF$$

Where:

$C_{WP-DW,t}$	=	Average carbon stock of dead wood in year t (t C/ha)

$B_{SDW,t}$	=	Average biomass of standing dead wood in year t (t d.m./ha)
$B_{LDW,t}$	=	Average biomass of lying dead wood in year t (t d.m./ha)
CF	=	Carbon fraction of dry biomass (t C/t d.m.)
t	=	1, 2, 3, … t years elapsed since the project start date

t	=	1, 2, 3, … t years elapsed since the project start date

Litter

The net carbon stock change in litter is estimated as follows:

$$\Delta C_{WP-LI,t} = A * \left(C_{WP-LI,t} - C_{WP-LI,t=0}\right)$$

Where:

$\Delta C_{WP-LI,t}$	=	Change in carbon stock in litter in the project scenario through year t (t C)
A	=	Area (ha)
$C_{WP-LI,t}$	=	Average carbon stock in litter in the project scenario in year t (t C/ha)
t	=	1, 2, 3, … t years elapsed since the project start date

The carbon stock in litter is calculated as follows:

$$C_{WP-LI,t} = DM_{WP-LI,t} * CF$$

Where:

$C_{WP-LI,t}$	=	Average carbon stock in litter in the project scenario in year t (t C/ha)
$DM_{WP-LI,t}$	=	Average litter dry mass per hectare in the project scenario in year t (t d.m./ha)
CF	=	Carbon fraction of dry biomass (t C/t d.m.)
t	=	1, 2, 3, … t years elapsed since the project start date

Soil organic carbon

Stocks of soil organic carbon (SOC) are estimated from direct measurements. The change in SOC stock in the project scenario is estimated as:

$$\Delta C_{WP-SOC,t} = A * \left(C_{WP-SOC,t} - C_{WP-SOC,t=0}\right)$$

Where:

$\Delta C_{WP-SOC,t}$	=	Change in carbon stock in SOC in the project scenario through year t (t C)
A	=	Area (ha)
$C_{WP-DW,t}$	=	Average carbon stock in in year t (t C/ha)
t	=	1, 2, 3, … t years elapsed since the project start date

The change in carbon stock for all the pools considered during the first verification period (2018-2023), along with their respective percentages of the total carbon stock, is presented in Table 11.

Table 11. Project carbon stock change

Planting year (Stratum)	Woody biomass ΔCwp-woody (tCO2e)	Non-woody biomass ΔCwp-herb (tCO2e)	Dead wood ΔCwp-dw (tCO2e)	Litter ΔCwp-li (tCO2e)	SOC ΔCwp-soc (tCO2e)	Total carbon stock (tCO2e)
2018	164,943	-780	3,313	-467	9,921	176,930
2019	138,932	-901	347	-417	-24,635	113,326
2020	3,209	-56	1	10	-2,292	872
Total	**307,085**	**-1,737**	**3,660**	**-874**	**-17,006**	**291,128**
Percentage of total carbon stock	**105%**	**-1%**	**1%**	**0%**	**-6%**	**100%**

Non-woody biomass, litter, and SOC showed negative values for carbon stock change in some stratum, however, it is expected that the carbon content in these pools will show an increase in future verification events.

On the other hand, the carbon stock changes in non-woody biomass, dead wood, and litter are less than 5% compared to the total carbon stock, so they can be considered negligible according to methodology VM0047. Similarly, SOC carbon stock can be considered negligible because there is only one soil preparation of the site during the project lifecycle, and it does not include soil inversion. According to the above, these optional pools will not be considered for the first verification of the project, but they will be continuously monitored and could be included in future verification events.

3.2.2.2 Project Emissions

Project emissions result from biomass burning and use of fertilizer, and they are estimated as follows:

$$PE_t = PE_{bburn,t} + PE_{fert,t}$$

Where:

PE_t	=	Project emissions from biomass burning and fertilizer in year *t* (t CO2e)
$PE_{bburn,t}$	=	Project emissions due to biomass burning in year t (t CO2e)
$PE_{fert,t}$	=	Project emissions from nitrogen fertilizer in year t (t CO2e)

In forest plantation activities, no biomass burning, or application of nitrogen fertilizers is carried out, so the project's GHG emissions are assumed to be zero.

3.2.3 Leakage Emissions (VCS, 2.5, 3.2, 3.6, 3.15, 4.3)

Step 1: Determine Foregone Production in Project Area

Baseline production in the project area is calculated as follows:

$$BP_{j,t} = \frac{\sum_{h=1}^{H} p_{j,h}}{H} * (1 + r_j)^t$$

Where:

$BP_{j,t}$	=	Baseline production in the project area for commodity *j* in year *t* (units of production)
$p_{j,h}$	=	Production in the project area for commodity *j* in year *h* of the historical reference period (units of production)
H	=	Duration of historical reference period (years)
r_j	=	Annual growth rate of yield for commodity *j* (percent)
t	=	1, 2, 3, …, t years elapsed since the project start date

Forgone production of cattle in project area is the difference between baseline production for each commodity produced in the project area and the monitored production of that same commodity in the project area:

$$FP_{j,t} = BP_{j,t} - MP_{j,t}$$

Where:

$FP_{j,t}$	=	Forgone production in the project area for commodity *j* in year *t* (units of production)
$BP_{j,t}$	=	Baseline production in the project area for commodity *j* in year *t* (units of production)
$MP_{j,t}$	=	Monitored production in the project area for commodity *j* in year *t* (units of production)
t	=	1, 2, 3, …, t years elapsed since the project start date

As the baseline scenario corresponds to livestock pastures where there is no crop rotation period per se, a historical period (H) of 3 years was chosen. On the other hand, according to Colombian Department of Statistics (DANE, 2020)[12], cattle production ($p_{j,h}$) in Vichada department was 3.18 cattle/ha in 2016, 2.03 cattle/ha in 2017, and 1.36 cattle ha in 2019. Based on these data and employing an exponential regression, cattle production for 2018 was estimated at 1.76 cattle/hectare (see Table 12).

Table 12. Production of cattle over the historical period in Vichada

[12] https://www.dane.gov.co/index.php/en/statistics-by-topic-1/agricultural-sector/national-agricultural-survey-ena

Year	Total production $p_{j,h}$ (cattle/ha)
2016	3.18
2017	2.03
2018*	1.76
2019	1.36

*Estimated by an exponential regression model

To estimate Baseline production in project area an annual growth rate for yield (r_j) of -23% calculated from the data of cattle production over the historical period was used. On the other hand, there is no production of cattle after the project start date, so Monitored production is zero. Forgone production is calculated for the first five years after the project start date as it is shown in Table 13.

Table 13. Forgone production of cattle in project area

Year	Forgone production $FP_{j,t}$ (cattle/ha)
2018	2.36
2019	1.82
2020	1.40
2021	1.08
2022	0.83

Step 2: Determine the Impact of Leakage Mitigation Activities

The project proponent may implement activities outside the project area that reduce the amount leakage. The amount of foregone production that may result in leakage is calculated as follows:

$$l_{j,t} = MAX(FP_{j,t} - LM_{j,t}; 0)$$

Where:

$l_{j,t}$ = Amount of foregone production subject to leakage for commodity *j* in year *t* (units of production)

$FP_{j,t}$ = Forgone production in the project area for commodity j in year t (units of production)

$LM_{j,t}$ = Leakage mitigation of commodity *j* in year *t* (units of production)

t = 1, 2, 3, …, t years elapsed since the project start date)

Since no leakage mitigation areas were considered for this project, the amount of displaced production of cattle that may result in leakage (l) is equivalent to the Forgone production in the project area (FP) which is presented in Table 13.

Step 3: Determine Amount of New Land Brought into Production

Where the amount of displaced production that may result in leakage (*l*) for commodity j in year *t* is greater than zero, the amount of new land that is brought into production outside the project area in year t is calculated as follows:

$$INL_{j,t} = \frac{l_{j,t} * IS * NL_j}{y_{j,t}}$$

Where:

$INL_{j,t}$	=	Area of new land brought into production in year *t* (ha)
$l_{j,t}$	=	Amount of foregone production subject to leakage for commodity *j* in year *t* (units of production)
IS	=	Share of leakage resulting in increased supply outside the project area, or default value of 0.75 (75 percent) for agricultural commodities or 1.00 (100 percent) for fuelwood
NL_j	=	Share of increased supply from new land brought into production for commodity *j*, or default value of 0.40 (40 percent) for agricultural commodities or 1.00 (100 percent) for fuelwood
$y_{j,t}$	=	Yield on new land brought into production for commodity *j* in year *t* (units of production/ha)
t	=	1, 2, 3, …, t years elapsed since the project start date

The area of new land brought into production ($INL_{j,t}$) must be summed across all commodities produced in the project area during the historical reference period to determine the total area generating leakage emissions. The area generating leakage emissions is calculated as follows:

$$AL_t = \sum_{j=1}^{T} INL_{j,t}$$

Where:

AL_t	=	Area generating leakage emissions in year *t* (ha)
$INL_{j,t}$	=	Area of new land brought into production in year *t* (ha)
T	=	Total number of commodities produced in historical reference period
t	=	1, 2, 3, …, t years elapsed since the project start date

Yield on new land brought into production for cattle (y) is assumed as 1.52 cattle/hectare according to data from Gonzalez et al. (2022)[13] and Vera & Ramírez (2022)[14] in the project region. Total area generating leakage emissions for the only commodity considered (cattle) is presented in Table 14.

Table 14. Total area generating leakage emissions.

Year	Total area AL_t (ha)
2018	0.46
2019	0.36
2020	0.28
2021	0.21
2022	0.16

Step 4: Determine Change in Carbon Stocks in New Lands Brought into Production

The module assumes that new land brought into production is forested land. The change in carbon stocks in the new land that is brought into production is calculated as follows:

$$CS = \Delta C_{biomass} + \Delta SOC$$

Where:

CS	=	Change in carbon stocks on new lands brought into production (t C/ha)
$\Delta C_{biomass}$	=	Change in forest biomass carbon stocks equal to the in the regional average stock in which the project is located (t C/ha)
ΔSOC	=	Change in soil organic carbon (SOC) stocks in the region in which the project is located (t C/ha)

The change in forest biomass carbon stocks in the area generating leakage emissions assumes the loss of above-ground biomass. A value of 71.5 Mg DM/ha equivalent to 33.6 t C/ha was assumed for Tropical shrublands according to Table 4.12 from *Refinement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories* (IPCC, 2019).

13 https://www.researchgate.net/publication/365866525_Carbon_Sink_Project_Regenerative_Radial_Soil_System_for_Livestock_in_the_Native_Savanna_of_Vichada_Colombia

14 https://www.researchgate.net/publication/362289660_Modelling_the_reproductive_performance_of_tropical_beef_herds_using_long-term_experimental_grazing_data_on_Urochloa_humidicola_pastures_in_the_Llanos_of_Colombia

The change in SOC stock is calculated as the difference between initial reference stocks and estimated future, steady-state stocks at the end of 20 years.

$$\Delta SOC = \Delta SOC_{REF} + (1.00 - f_{LU} * f_{MG} * f_{IN})$$

Where:

ΔSOC	=	Change in soil organic carbon (SOC) stocks in the region in which the project is located (t C/ha)
ΔSOC_{REF}	=	SOC stock corresponding to the reference condition in native ecosystems by climate region and soil type applicable to the land receiving the displaced activity (t C/ha)
$f_{LU}, f_{MG,} f_{IN}$	=	Relative SOC stock change factors over 20 years for land use, management practices and inputs respectively, applicable to the displaced production (dimensionless)

The change in SOC stock was calculated as 18.0 t C/ha based on the reference values of $\Delta SOC_{REF}, f_{LU}, f_{MG,} f_{IN}$ equivalents to 60.0 t C/ha, 1.0, 0.7, and 1.0 respectively for the land use and management over the previous 20 years in the project area. These calculations were based on mineral soils and degraded grassland without additional management inputs, according to the AR CDM Tool 14.

Step 5: Determine Leakage Emissions

The leakage emissions from new land that is brought into production and where *t* does not exceed 5 years beyond the last project instance start date are calculated as follows:

$$LK_t = AL_t * CS * 44/12$$

Where:

LK_t	=	Cumulative leakage up to year *t* (t CO2e)
AL_t	=	Area generating leakage emissions in year *t* (ha)
CS	=	Change in carbon stocks on new lands brought into production (t C/ha)
t	=	1, 2, 3, …, *t* years elapsed since the project start date, *t* must not exceed five years beyond the last project instance start date
$44/12$	=	Conversion factor from C to CO2e

Leakage emissions for the displacement of the baseline activities in the project area are shown in Table 15.

Table 15. Leakage emissions.

Year	Leakage emissions LK_t (tCO2e)
2018	87.95
2019	67.72
2020	52.15
2021	40.16
Total	**278.89**

The total leakage amount is less than 5% of the project's carbon removals. Therefore, in accordance with Appendix 2 of the VM0047 Methodology, it can be deemed negligible.

Uncertainty is calculated by propagating errors associated with estimates of included pools as:

$$UNC_t = MIN\left(100\%,\ MAX\left(0,\left(\sum_{p=1}^{n}\left(U_{p,t=0} * C_{p,t=0}\right)^2 + \sum_{p=1}^{n}\left(U_{p,t} * C_{p,t}\right)^2\right)^{1/2} * \left(\frac{1}{\Delta C_{WP-biomass,t} * \Delta C_{WP-SOC,t}}\right) - 10\%\right)\right)$$

Where:

UNC_t	=	Uncertainty in cumulative removals through year t (percent)
$U_{p,t}$	=	Percentage uncertainty (expressed as 90 percent confidence interval as a percentage of the mean) in carbon stock estimate of pool p (representing woody biomass, non-woody biomass, dead wood, litter, and SOC) in the project scenario in year t (percent)
$C_{p,t}$	=	Carbon stock estimate of pool p (representing woody biomass, non-woody biomass, dead wood, litter and SOC) in the project scenario in year t (t CO2e)
$\Delta C_{WP-biomass,t}$	=	Change in carbon stock in biomass carbon pools in the project scenario through year t (t C)
$\Delta C_{WP-SOC,t}$	=	Change in carbon stock in SOC in the project scenario through year t (t C)
t	=	1, 2, 3, ..., t years elapsed since the project start date

Uncertainty was calculated for each planting year (2018, 2019, and 2020). The overall uncertainty was then derived by averaging the uncertainties of each year, weighted by their respective areas. According to Section 3.2.2, only the woody biomass pool was considered for this calculation, obtaining a value of zero.

3.2.4 GHG Emission Reductions and Carbon Dioxide Removals (VCS, 3.15, 4.1)

State the non-permanence risk rating (%)	27%

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 tCO2e, the Long-term Average (LTA).	639,763
Has the LTA been updated based on monitored data, if applicable?	☐ Yes ☒ No Since this is the first monitoring report, it is not necessary update the LTA
State, in tCO2e, the expected total GHG benefit to date.	176,071
If a loss occurred (including a loss event or reversal), state the amount of tCO2e lost:	NA

The net anthropogenic GHG removals by sinks is calculated as follows:

$$CR_t = \left(\left(\Delta C_{WP,t} * (1 - PB_t) * (1 - UNC_t)\right) - LK_t\right) - PE_t$$

Where:

CR_t	=	Carbon dioxide removals from the project activity in year *t* (t CO_2e)
$\Delta C_{WP.t}$	=	Project carbon stock change in year *t*; t CO_2e
PB_t	=	Performance benchmark for the monitoring interval ending in year *t* (percent)
LK_t	=	Leakage through year *t* (t CO_2e)
PE_t	=	Project emissions from biomass burning and fertilizer in year *t* (t CO_2e)
UNC_t	=	Uncertainty in cumulative removals through year *t* (percent)
t	=	1, 2, 3, …, *t* years elapsed since the project start date

Table *16* shows the Net GHG emissions and reductions of the project for this monitoring period.

Table 16. Net GHG emissions and reductions

Vintage period	Baseline emissions (tCO_2e)	Project emissions (tCO_2e)	Leakage emissions (tCO_2e)	Buffer pool allocation (tCO_2e)	Project reductions (tCO_2e)	Project removals (tCO_2e)	Credits available VCUs (tCO_2e)
01-Dec-2018 to 30-Nov-2019	0	0	0	0	0	0	0
01-Dec-2019 to 30-Nov-2020	0	0	0	-6,384	0	23,643	17,260
01-Dec-2020 to 30-Nov-2021	0	0	0	-13,553	0	50,196	36,643

Vintage period	Baseline emissions (tCO_2e)	Project emissions (tCO_2e)	Leakage emissions (tCO_2e)	Buffer pool allocation (tCO_2e)	Project reductions (tCO_2e)	Project removals (tCO_2e)	Credits available VCUs (tCO_2e)
01-Dec-2021 to 30-Nov-2022	0	0	0	-13,801	0	51,116	37,315
01-Dec-2022 to 30-Nov-2023	0	0	0	-13,801	0	51,116	37,315
Total 1st verification	**0**	**0**	**0**	**-47,539**	**0**	**176,071**	**128,532**

Table 17 shows the comparison between the estimated removals and the achieved removals for the project in the current monitoring period.

Table 17. Estimated reductions/removals vs achieved reductions/removals

Vintage period	Ex-ante estimated reductions/ removals (tCO2e)	Achieved reductions/ removals (tCO2e)	Percent difference	Explanation for the difference
01-Dec-2018 to 30-Nov-2019	0	0	*0%*	No difference
01-Dec-2019 to 30-Nov-2020	7,615	23,643	*210%*	For ex-post estimates, values are interpolated between the project start and monitoring years, without annual measurements. Ex-ante values are modeled for each year.
01-Dec-2020 to 30-Nov-2021	33,192	50,196	*51%*	For ex-post estimates, values are interpolated between the project start and monitoring years, without annual measurements. Ex-ante values are modeled for each year.
01-Dec-2021 to 30-Nov-2022	56,424	51,116	-9%	For ex-post estimates, values are interpolated between the project start and monitoring years, without annual measurements. Ex-ante values are modeled for each year.
01-Dec-2022 to 30-Nov-2023	59,960	51,116	*-15%*	For ex-post estimates, values are interpolated between the project start and monitoring years, without annual measurements. Ex-ante values are modeled for each year.
Total for first verification	**157,190**	**176,071**	***12%***	Uncertainty of the ex-post estimates was zero, while the ex-ante estimates assumed a conservative uncertainty of 10%.

3.3 Optional Criterion: Climate Change Adaptation Benefits

This project does not apply to Climate Change Adaptation Benefits

3.3.1 Activities and/or processes implemented for Adaptation (CCB, GL1.3)

4 COMMUNITY

4.1 Net Positive Community Impacts

4.1.1 Community Impacts (CCB, CM2.1)

Complete the table below to describe all the impacts on each community group resulting from project activities under the with-project scenario. Impacts must include all those identified in the project description and any other unplanned impacts. Explain and justify key assumptions, rationale, and methodological choices. Explain how the affected groups have participated in the evaluation of impacts. Provide all relevant references. Copy and paste the table as needed.

Household surveys and Participatory Rural Appraisals were done to establish the progress of the indicators listed below. A total of 30 workers participated in the surveys, 14 of them were temporary workers , 14 of them were fixed workers, 1 intern and 1 with another type of contract. The data collected can be extrapolated to the entirety of the fixed workers participating in the project. The results below reflect the benefits and fixed workers' perceptions. The wellbeing indicators mentioned in the table below are detailed in Section 4.1.3

4.1.1.1 Project Targeted Outcome 1. Improve plantation workers' livelihoods (Indicator 2 Long Term Implementation Plan)

<table>
<tr><td>Community group</td><td>Plantation workers</td></tr>
<tr><td>Impact</td><td>
• Number of workers perceiving that their income is sufficient for maintenance of their livelihood (WS, Outcome 3)
The awareness that your income is enough to cover your expenses is correlated to your livelihood maintenance and salary received. A sufficient income would provide for the maintenance of the current livelihood expenses.
<table>
<tr><th></th><th>MR1</th></tr>
<tr><td>Number of workers perceiving their income is sufficient</td><td>29%</td></tr>
</table>
86% mentioned their salary was in the low range (< $505 USD)

• Number of workers with stable income (WS, Intermediate Outcome 3.1)
A stable income through full-time or part-time employment provides the worker with a solid basis for livelihood improvement. La Paz has
</td></tr>
</table>

two main types of workers, the fixed contracts and the temporary ones. There were 23 fixed contract employees from administrative and field workers in 2023. The temporary number of workers change during the year according to the farm's necessity, and those employees will not be considered in the project evaluations since, due to the nature of their work and the farm demands, their employment is only for a certain period of time.

	MR1
Number of workers with stable income	23

- Number of workers receiving extra-legal benefits (WS, Output 3.1.1)

Extra legal benefits are additional benefits that improve the workers livelihoods..

	MR1
Benefits	% of people
Life insurance	29%
Housing in the farm	100%
Food voucher	14%
Food at cafeteria	93%
Transportation benefits	43%

	MR1
Benefits (by law)	% of people
Paid vacation	100%
Annual bonus	0%
Christmas bonus	21%
Social Security	57%

- Number of workers employed in Project Instance and maintenance over the years (Operational Report, Activity 3.1.1.1)

The permanence of the same number of workers throughout the project lifetime facilitates the continuation of activities.

	MR1

Number of fixed workers employed on Project Instance	23

- Number of workers adopting practices from trainings (WS, Output 3.2.1)

The adoption of practices ensures an increase of knowledge which consequently improves the lives of the workers.

	MR1
Training Adoption	**% of people**
Pesticide use and application	20%
Safety work practices	10%
Agricultural practices (coffee/cacao/cardamom)	90%
Soil and water conservation	40%
Pruning	80%
Others	0%

- Number of workers attending multiple trainings of the same subject (Operational Reports, Intermediate Outcome 3.2)

Workers attending multiple training sessions on the same subject are more likely to adopt those trainings.

	MR1
Number of workers attending trainings on the same subject	23

From 2019 to 2023 there was a total of 78 trainings, 43 of them were about Health and Work Safety, 9 were about Silvicultural practices, 14 about environmental practices (management of flora and fauna, waste management, environmental contamination etc), and 12 were trainings regarding human resources.

- Number of workers aware of health and safety prevention system plan (WS, Output 3.3.1)

	MR1
Number of workers aware of Health and Work Safety Prevention plan	0

	• Number of work related accidents (Operational Reports, Output 3.3.1) The number of work related accidents are indirectly related to the conduction workplace safety trainings, and happenstance. Of the accidents on this monitoring period, most of them were related to falling objects or parts of trees. The number of accidents can be seen in the table below.

	MR1
Number of work-related accidents	40

Type of benefit/cost/risk	This is a predicted, direct benefit
Change in well-being	Financial capital 2.1: Income levels, variability over time, distribution withing society Human capital 4.2: Educational levels, skills

4.1.2 Negative Community Impact Mitigation (VCS, 3.19; CCB, CM2.2)

No negative community impacts were identified during this monitoring period.

4.1.3 Net Positive Community Well-Being (VCS 3.19; CCB, CM2.3, GL1.4)

The impact on the communities is expected to be positive. Well-being indicators below were adopted from the Sustainable Rural Livelihood (SRL) Framework from A Framework for Research and Sustainability Indicators for Agriculture and Rural Livelihoods by Phil Woodhouse, David Howelett and Dan Rigby (2000), and are used to demonstrate the significant benefits this project have produced for the workers. By determining how many workers gained access to higher income, training, company benefits and biodiversity, we observe an overall positive trend in the well-being indicators being impacted by the Project Activities.

By focusing on well-being as defined as natural, physical, human, financial and social capital, we can determine the positive well-being impacts derived from the implementation of Project activities (Table 18). The indicators numbers are relative to the Outcomes from the Workplan (Appendix 3: Project Activities and Theory of Change)

Table 18. Well-being indicators considered and link to project's impact indicators.

#	Component of Human Well-being	#	Indicators of Human Well-Being	Map to Community Impact Indicators
1	Natural capital:	1.1	Access to land, water, grazing.	N/A

#	Component of Human Well-being	#	Indicators of Human Well-Being	Map to Community Impact Indicators
		1.2	Ownership of herds, trees	N/A
		1.3	Productivity (per unit of land, per unit of water, per unit of inputs)	N/A
		1.4	Soil, water, rangeland, quality	Outcome 1
		1.5	Biodiversity	Outcome 3
2	Financial capital	2.1	Income levels, variability over time, distribution within society	Outcome 2
		2.2	Financial savings, access to credit	N/A
		2.3	Debt levels	N/A
3	Physical capital	3.1	Access to roads, electricity, piped water	N/A
		3.2	Ownership/access to productive equipment (oxen, tractor, irrigation pump etc.)	N/A
		3.3	Housing quality	N/A
4	Human capital	4.1	Total labor	N/A
		4.2	Educational level, skills	Outcome 2
		4.3	Health levels	N/A
5	Social capital	5.1	Membership of organizations	N/A
		5.2	Support from kin, friends	N/A
		5.3	Accountability of elected representation	N/A

4.1.4 Protection of High Conservation Values (CCB, CM2.4)

There are no HCV areas socially or relevant to cultural values in the Project area. However, there will be training sessions to raise awareness among the workers on the importance of morichales, an ecological HCV area.

4.2 Other Stakeholder Impacts

4.2.1 Mitigation of Negative Impacts on Other Stakeholders (VCS, 3.18, 3.19; CCB, CM3.2)

No negative impacts on other stakeholders have been identified during this monitoring period.

4.2.2 Net Impacts on Other Stakeholders (VCS, 3.18, 3.19; CCB, CM3.3)

There are two other stakeholders associated with La Paz: Two local families who live in the perimeters of the farm, provide goods (cheese and meat) and services (internet and commerce) to the farm. These

families have been impacted positively by the additional income they receive from providing goods and services. So far, no negative impacts have been recorded or reported.

4.3 Community Impact Monitoring

4.3.1 Community Monitoring Plan (CCB, CM4.1, CM4.2, GL1.4, GL2.2, GL2.3, GL2.5)

The workers surveys (WS) were conducted by a local third party contracted by Terra. The contractor received training from Terra on the use of KoboToolbox and the tools. The surveys were reviewed and revised by the contractor to make sure the content, vocabulary and scope were appropriate and relevant for La Paz project. The Standard Operation Procedures (SOP) for both assessments (WS and the Participatory Rural Appraisals (PRA)) were shared with the contractor, which provided clear instructions on the process to effectively collect the social data On this monitoring period, 30 employees were interviewed (93%) for the WS, and 30 employees participated in the PRAs, in two separate groups.

The contractor, generated reports for the PRA and WS. Then Terra completed a detailed analysis of the data and interpreted it in Section 4.1.1

On the PRAs, workers mentioned the importance of the project on employment opportunities, and the positive benefits it generates on the environment and the communities. It was also stated that the cultural HCV areas are located outside of the Project Area, therefore the project is not implementing activities related to them.

Community monitoring is described in the Monitoring Plan, which was created in parallel with the PD and was disseminated with the PD, in Spanish. Social impacts of the project will keep being monitored through WS and Participatory Rural Appraisals (PRAs) every monitoring period (every five years), and Operational Reports.

Meetings to present the Monitoring Plan and Monitoring Results were held along with the dissemination of the VCS/CCB Project Document. In those meetings, the workers were informed of the project's goals, objectives, and results, and they were incentivized to comment on what was presented. During those meetings, space for discussions on their perspective on health and safety at work, labor conditions and workers' well-being were facilitated. In addition, the Monitoring Plan and Reports will be publicly available on the Verra Registry for comments.

4.3.2 Monitoring Plan Dissemination (CCB, CM4.3)

The Monitoring Plan and summarized translated version, is available on the website www.verra.org. The project's monitoring results were shared by Col La Paz. with the workers and a summary wase provided as support.

4.4 Optional Criterion: Exceptional Community Benefits

The project does not apply to Exceptional Community Benefits.

5 BIODIVERSITY

5.1 Net Positive Biodiversity Impacts

5.1.1 Biodiversity Changes (VCS, 3.19; CCB, B2.1)

5.1.1.1 Project Target Outcome 4: Preserve conservation areas (only native forests under 12Tree property) for biodiversity purposes

Change in Biodiversity	Establish conservation strategy (Intermediate Outcome)
Monitored Change	We expect that the establishment of a conservation strategy will help to increase the flora and fauna in the Project Activity Instance. These activities will be implemented following the baseline evaluation and reported on in the next monitoring periods. The specific data for this long-term outcome include: # of ha under conservation (Outcome 4) Specific data for indicator Established Conservation Strategy includes: # trainings sessions on data collection methods (Operational Report, Intermediate Outcome 4.1) # of participants (Operational Report, Intermediate Outcome 4.1) Protocol implemented (Operational Report, Activity 4.1.1.1) # fires registered (Operational Report, Activity 4.1.1.2) # firebreaks (Operational Report, Activity4.1.1.2)

Justification of Change	The plantation is home to a diverse assortment of flora and fauna and the conservation of these species is imperative for the overall productivity and health of the system. Therefore, the establishment and implementation of a conservation strategy will help to maintain and increase the biodiversity in the area.

Change in Biodiversity	Restoration and conservation of biodiversity in the project area (Intermediate Outcome)
Monitored Change	Project activities that include an environmental policy to prevent hunting, fishing and illegal activities in the project area. These activities should increase the # of species of different taxa present in the Project Activity Instance and increase the number of new species observed to that area. # of species of the four main taxa (mammal, avian, reptile and amphibian) (Operational Reports, Activity 4.2.1.1) • 15 mammals • 111 avians • 17 reptiles • 7 amphibians Environmental Policy has been implemented and monitored. # new species observed (Biodiversity Assessment, Intermediate Outcome 4.2) (this cannot be reported on since this monitoring period was the baseline assessment) # individuals per taxa (Biodiversity Assessment, Intermediate Outcome 4.2) • 84 individuals of mammals • 71 individuals of avians • 41 individuals of reptiles • 59 individuals of amphibians # endangered species observed (Biodiversity Assessment, Intermediate Outcome 4.2) • 3 VU or EN mammal species (*Myrmecophaga tetradactyla, Priodontes maximus, Pteronura brasiliensis*) # trainings (Operational Report, Activity 4.2.1.3)

	• Unstructured wildlife interviews were conducted to identify trigger species within the farm and training was done to inform farm workers of the species present in the area. perception of wildlife presence (Operational Report, Activity 4.2.1.3)
Justification of Change	Uncontrolled illegal activities that occur in areas with high biodiversity can be detrimental to these populations. Uncensored hunting can lead to the decline of important species populations, especially those at risk of extinction. Illegal logging of timber can also degrade the habitats these species depend on and push them out of the Project Activity Instance. By implemented policies to prevent such activities and compliment with wildlife monitoring, population trends, species presence/absence can be more accurately assessed, and the prevention of illegal activities will also help to stabilize and improve certain wildlife populations.

Because the workers on the farm must adhere to policies implemented by Col La Paz, the environmental policy that is established and implemented should mitigate negative impacts on biodiversity and HCVs on the instances. Adherence to the policy will result in the good condition of the forests and the water resources of the HCV. The conservation and quality of the habitat are of vital importance for the maintenance of wildlife populations in the area.

5.1.2 Mitigation Actions (VCS, 3.19; CCB, B2.3)

Negative impacts on the HCV will be anticipated with the implementation of the project activities and environmental related policies on the La Paz. Workers that live on the property must adhere to the established policies (including those regarding biodiversity conservation). By implementing these policies and adhering to sustainable farming practices, the project will help to protect and maintain the wildlife diversity on the instance.

Integrated waste management (hazardous and non-hazardous) is implemented within the Project Activity InstanceThe system classifies the wastes produce by the project activities and dispose them properly. The system prevents soil and water pollution and reduces litter in the area,

Establishment of firebreaks and prevention of fires in the project activity instance.Forest fires that affect native and gallery forests which usually hold large quantities of biodiversity is avoided with the establishment of firebreaks and various fire prevention activities implemented. . These measures not only safeguard the biodiversity and ecosystem services provided by these unique habitats. Preventing wildfires

is often more effective and less costly than trying to manage them once they are already underway, making proactive fire prevention efforts a wise investment in conservation and sustainability for the farm.

Planting forest species

- Planting species can reduce habitat degradation, improve the structure and composition of the forest edges, and restore the health of the ecosystem. Forest edges are most commonly vulnerable to natural (i.e., more exposure to the elements) and anthropogenic disturbances (i.e., hunting, illegal logging). Planting suitable tree species helps mitigate the negative impacts of edge effects, such as increased exposure to wind, sunlight, and invasive species. It also enhances connectivity by restoring and improving the structure of forest edges. This creates more seamless transitions between different habitats, like the project activity instance to the gallery forests. This will benefit wildlife that relies on these transitional zones, allowing for easier movement and access to resources. Furthermore, planting established forest species in degraded areas can help preserve and enhance biodiversity. Degradation often leads to the loss of native plant species, which in turn affects the entire ecosystem as many animals rely on these plants for food and shelter.

Implementation of an environmental policy to prevent hunting, fishing, and illegal activities in the project activity instance

- Workers must adhere to policies implemented by Col La Paz, the environmental policy that is established and implemented mitigates negative impacts on the biodiversity and HCVs on the project activity instance. Adherence to the policy results in the improved health of the forests and the water resources of the HCV. The conservation and quality of the habitat are of vital importance for the maintenance of wildlife populations in the area.

5.1.3 Net Positive Biodiversity Impacts (CCB, B2.2, GL1.4)

The project seeks to improve the biodiversity in the Project Activity Instance and the impacts from the project have been and will be beneficial for biodiversity as compared to the without project scenario. The project activities that include the effective management of the farm and protection of the HCV areas will ensure the soil nutrient health of the Project Activity Instance which wildlife and plant species depend on. The protection of the HCV areas ensures suitable habitat is available for wildlife and support habitat corridors. In the without project scenario, the land would result in high degradation with low soil quality and nutrients, effectively excluding wildlife from that area as food availability and suitable habitat will be scarce.

Species and habitat	
Morichales forests and Non-flooded and flooded gallery forests ...	The project activities are protecting the areas of HCV from harm and restricting the use of its resources. This will

	positively impact these habitats and maintain them for wildlife species and help ensure good soil and water quality.
RTE Species	Due to the protection of the HCV areas and effective management of the farm, wildlife species will have suitable habitats and habitat corridors to move from one place to another. This will help maintain and improve endangered species populations as it will increase gene flow, increase habitat quality, and food availability. The specific RTE species can be found in Table 19.

5.1.4 High Conservation Values Protected (CCB, B2.4)

The HCVs in the Project Zone will not be negatively affected by the project as the activities on the farm will only benefit the HCV's on and off the property. This farm and surrounding area play important roles for endangered species and other wildlife in the region of Vichada. With the implementation of project activities on the farm, the HCVs will be improved during the Project's lifetime and continue to thrive after it.

The two HCVs that have been identified will continue to be monitored over the duration of the project.

HCV1. Concentrations of biological diversity that contain endemic species or species that are rare, threatened, or endangered and are of significant global regional or national importance.

The Project Zone is home to a several rare, endangered, or threatened (RTE) wildlife species that were observed during the first monitoring period (Table 19). These species have been observed in the first monitoring period in the farm and in the Project Zone near the important HCVs and water sources (Figure 10). With the implementation of project activities, we will ensure that these populations are maintained and thrive.

Table 19. Rare, Threatened and Endangered Species found in the Project Zone in the First Monitoring Period (Source: S.A.S. 2023)

Scientific Name	Common Name	N° inds.	CITES	IUCN	MADS 2017
Tapirus terrestris	Danto	1	II	VU	NA
Myrmecophaga tridactyla	Oso palmero	1	II	VU	VU
Tayassu pecari	Cafuche	1	II	VU	NA
Pteronura brasiliensis	Nutria de río	11	I	EN	EN
Myrmecophaga trydactyla	Oso palmero	1	II	VU	VU
Tayassu pecari	Cafuche	12	II	VU	NA
Priodontes maximus	Ocarro	1	I	VU	EN
Mitu tomentosum	Paujil	1	NA	NT	NA

Scientific Name	Common Name	N° inds.	CITES	IUCN	MADS 2017
Thamnophilus nigrocinereus	Batará ceniciento	1	NA	NT	NA
Chelonoidis carbonarius	Morrocoy	1	II	LC	VU

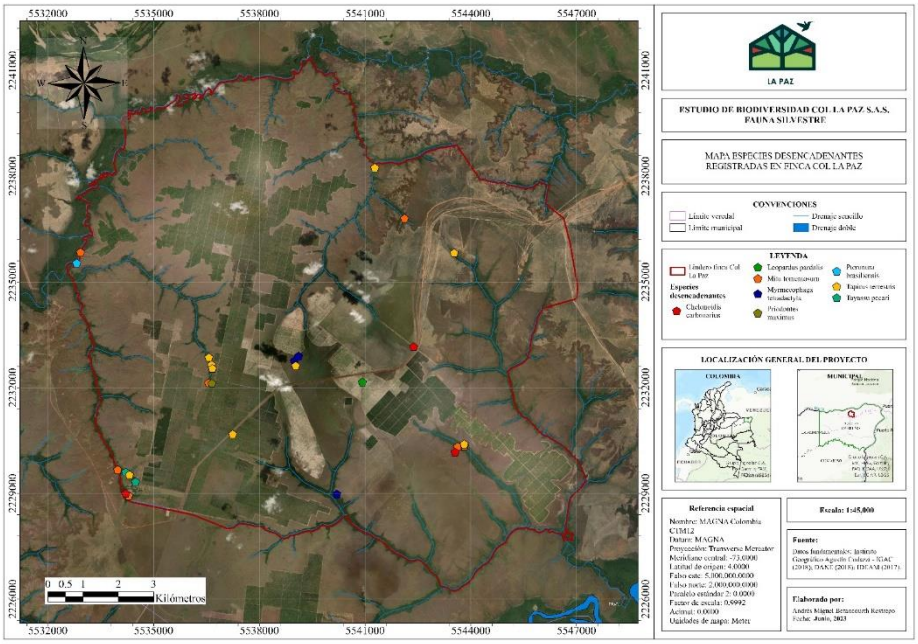


Figure 10. Sampling points where rare, endangered and threatened (RTE) species were observed in the first monitoring period (Source: S.A.S. 2023).

HCV2. Ecosystems and ecosystem mosaics that are large at the landscape scale and globally, regionally, or nationally important and contain viable populations of the most naturally occurring species under natural patterns of distribution and abundance.

The Non flooded and flooded gallery forest-morichales, and riparian forest along the Property line of the farm are very important ecologically to the wildlife there. They serve as local biodiversity hotspots for many wildlife and plant species, especially those adapted to both aquatic and terrestrial habitats (e.g., otter). They also provide migratory corridors for wildlife for daily movement, so they can move between the different habitats. Threats to these habitats and their inhabitants include hunting, forest fires, and illegal extraction of plants and animals. The implementation of the environmental policy for the workers, sustainable agricultural practices, and improved waste management practices will ensure the protection of these important habitats for generations to come.

5.1.5 Species Used (VCS, 3.19; CCB, B2.5, 2.6)

Species introduced	Classification	Justification for use	Adverse effects and mitigation
Acacia (*Acacia mangium Willd)*	Non-native	Non-native trees are used as a crop and are highly controlled under the plantation management. Pruning is also done periodically to control growth.	No adverse effects were observed or are expected to be observed.
Pinus caribaea	Non-native	These species are only grown within the farm and are effectively managed. They are also not known as invasive species and are safe to plant in agroforestry systems.	No adverse effects were observed or are expected to be observed.
Eucalyptus pellita	Non-native	These species are only grown within the farm and are effectively managed. They are also not known as invasive species and are safe to plant in agroforestry systems.	No adverse effects were observed or are expected to be observed.

5.1.6 Invasive Species (VCS, 3.19; CCB, B2.5)

No known invasive species were used by the project in this monitoring period. All future monitoring periods will monitor the presence of invasive species and enact mitigation measures if necessary, although unexpected.

5.1.7 GMO Exclusion (CCB, B2.7)

The project maintains their own nurseries, where they reproduce the tree species utilized in the project. It is important to note that no Genetically Modified Organisms (GMOs) are employed in the propagation process of the plants used within this project.

5.1.8 Inputs Justification (VCS, 3.19; CCB, B2.8)

The use of fertilizers and agrochemicals in the Project Activity Instance has been (will be) minimal. The application process adheres to proper instructions, timings, and safety protocols. The project staff monitors

the usage to minimize costs by applying only the necessary amounts. All fertilizers and agrochemicals are applied based on the specific requirements and growth stage of the trees while following applicable national and local regulations.

Name	NPK fertilizer
Justification of use	The use of biological compounds as fertilizers is used minimally and helps reduce the environmental impact that other complex fertilizers may have.
Potential adverse effect	Though not expected, the use of compounds may increase acidification of soil. The minimal use of the fertilizer in key stages of growth will ensure the potential adverse effects do not occur.

Name	Glyphosate
Justification of Use	The use of glyphosate is used to control grasses in the agroforestry system and the use are compliant and approved by the criteria of FSC® certification. All doses are applied with the recommendations set by the manufacturer under the required safety protocols.
Adverse Effect	If used incorrectly, the potential adverse effects include the accumulation of the product in the soil and degradation of microorganisms. However, the use of the pesticide is used sparingly and should not have these impacts on the farm.

5.2 Offsite Biodiversity Impacts

5.2.1 Negative Offsite Biodiversity Impacts (CCB, B3.1) and Mitigation Actions (CCB, B3.2)

Negative Offsite Impact	Mitigation Measure(s)
No negative impacts were identified	The project activities were designed so no mitigation actions were necessary. They will improve biodiversity connectivity, forest conditions, reduction of degraded lands, and the maintenance and even improvement of wildlife species, resulting in the increase of ecosystem services and net positive impacts.

5.2.2 Net Offsite Biodiversity Benefits (VCS, 3.19; CCB, B3.3)

The activities that will be implemented in the project aim to recover degraded land through the promotion of agroforestry, sustainable farming practices, and establishment of environmental policies that prohibit hunting and other illegal activities on the property, and fire management. These activities will have a positive impact on the farm, the HCVs (riparian gallery forests), and the wildlife that are present in the project. These project activities, once implemented, should positively impact the biodiversity inside and outside of the project area. Thus, the potential impacts on biodiversity that project activities will impact outside the Project Zone should be positive.

5.3 Biodiversity Impact Monitoring

5.3.1 Biodiversity Monitoring Plan (CCB, B4.1, B4.2, GL1.4, GL3.4)

The biodiversity studies of terrestrial wildlife and flora were conducted on First Project Activity Instance, situated in Puerto Carreño municipality, Vichada department, Colombia. The farm spans a total of 3,091 hectares, primarily consisting of Acacia (*Acacia mangium*) forest plantations, natural spaces like forests and morichales, and contains sections with pine and eucalyptus trees, as well as some areas used for cashew and corn cultivation. Additionally, there are several water sources, such as the Juriepe River, located within savanna areas adjacent to the plantations, which feed into larger rivers like the Meta River and the Bita River. This study area encompasses flat and highly dissected Altillanura Savannahs, Gallery and Morichales Forests ecosystems, with an average temperature ranging from 26 to 32 degrees Celsius and an average altitude of 60 meters above sea level (Figure 12).

5.3.1.1 Flora

Field Data Collection Methodology

A total of 10 plots were established in the Gallery and riparian forest cover (Table 20), each plot of 1000 m2 (50x20m) according to the methodologies of (Gentry, Patterns of Neotropical plant species diversity, 1982) (Gentry, 1996) and (Velazquez & Rangel-Ch. , 1997) subdivided into smaller sampling areas as follows: 1x1 m. for seedlings, 5x5 m. for saplings (DAP ≥1cm and <5cm), 10x10 m. for saplings (DAP ≥5cm and <10cm) and 50x20 m. for stems (DAP ≥10cm).

Table 20. Sampling units in the Fragmented Forest and woodland pastures covers.

Coverage	Plot	Altitude	Coordinates	
			X	Y
Gallery and riparian forest	P1	79,3	5543676,18	2230321,05
	P2	77,5	5544015,77	2229945,04
	P3	71,4	5544284	2229676,97
	P4	80,4	5543615,99	2235723,48
	P5	84,0	5544136,66	2235077,77

	P6	70,9	5542099,47	2236902,09
	P7	64,1	5541281,89	2238156,39
	P8	69,7	5536198,18	2234318,48
	P9	63,0	5534472,6	2235634,15
	P10	80,1	5534145,78	2229113,63

The sampling units were established using a 50-meter central axis (Figure 11), for the recording of information. For this central axis, the starting coordinate of the central point was georeferenced, with a GPS. From this axis, information was collected from all individuals in the different categories (Seedlings, Saplings, Stems and Stems present in a width of 10 meters on both sides of the central axis.

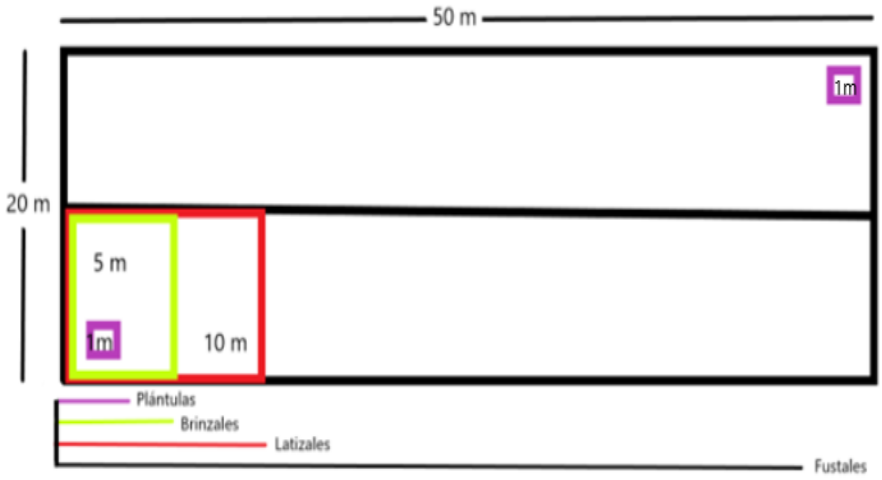


Figure 11. Sketch of the parcel and subdivisions (Source: (Paredes & Izursa, 2011))

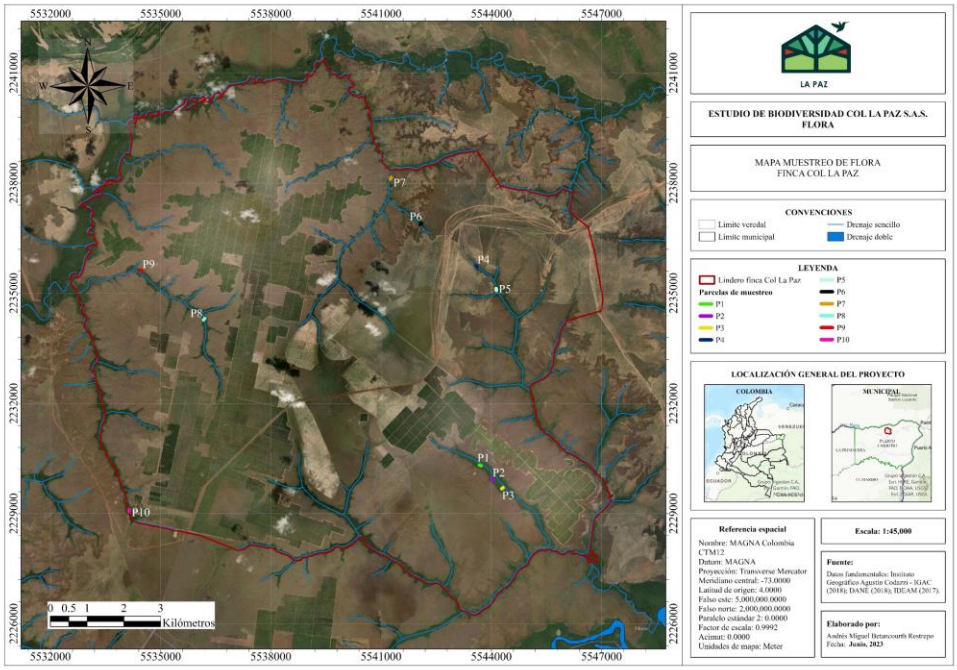


Figure 12. Sampling locations for flora sampling

The information obtained in the field includes data such as: location (municipality, village, property, vegetation cover unit and coordinates), CAP (circumference at chest height at a height of 1.3 meters from the base of the tree), total height (HT), commercial height (HC), individual number (ID), scientific name, observations and information concerning the collection of botanical samples for identification (Table 21).

Table 21 Data recorded in the field

State	Attribute	Characteristics
Shaft individuals (DAP >10cm) Latizales (DAP ≥5cm <10cm) Saplings (DAP ≥1cm and <5cm)	Tree Number	Consecutive number of the stem in the inventory, denoted with a consecutive, latizales and saplings were marked with a dot. All individuals were marked with yellow asphalt paint.
	Common name	Name given in the region (common or vernacular name).
	CAP (cm)	Calculated through centimeters at chest height (CAP): measurement of the thickness of each of the shafts of the tree, to be carried out at a height of 1.3 m above the ground, for this purpose there were auxiliaries who were instructed in the collection of information.
	Overall Height(m)	The length of the tree from the ground to its apex. This data was recorded for individuals in the regeneration category.
	Commercial Height(m)	Usable shaft height, from the stump to where the crown begins or where there is some limitation such as deformation, damage or injury.

State	Attribute	Characteristics
	Remarks	It corresponds to information such as bifurcations and phytosanitary status, latex, odor, color,

The materials and equipment used in the field for the survey of the plots were tape measures, GPS, camera, decameter, field notebook and yellow synthetic fiber. Each tree was marked with heavy-duty paint (Figure 13). For each of the plots, altitude data and geographical coordinates were recorded.

Figure 13. Data collection. A: Plot marking. B: Marking of shafts. C: Marking of saplings and saplings. D: Measurement of diameters for shafts. E: Measurement of diameters for latizales and stems. F: Taking Heights in Regeneration

Analysis

The phytosociological study contains the analysis of the characteristics of composition and structure. The characterization of the vegetation was carried out as follows.

Floristic composition

The floristic composition was analyzed based on the presence or absence of taxa; In addition, the distribution of taxa was considered, emphasizing the composition at the family level.

Relative Abundance

The relative abundance was analyzed by calculating the percentage ratio of each species to the total number of trees.

Diversity

Three levels of biodiversity have been distinguished: (i) Alpha diversity, which corresponds to diversity within the habitat or intra-community diversity; (ii) beta diversity or diversity between different habitats, which is defined as the change in species composition along environmental gradients; and (iii) range diversity includes the diversity of the entire landscape and can be considered as the combination of the previous two (Halffter, 1992; Crawley, 1997). Table 22 includes the different analyses used to calculate the three levels of diversity in the La Paz sampling sites.

Table 22. Calculated Diversity Indices

Index	Formula
Margalef Index (DMg)	**Dmg** = (Number of species – 1) / Ln (Number of individuals)
Menhinick Index (DMn)	Dmn= (S-1)/Ln N S=total number of species present N = is the total number of individuals.
Shannon-Wiener index (H')	H´= -Σ pi x Ln (pi) Pi = number of species / number of individuals
Simpson Index (D)	**D** = Σ pi2; Which is equivalent to the formula: D = Σ [ni(ni - 1) / N(N-1)] In both cases, you must: Pi = Proportional abundance of species i ni= Number of individuals of the nth species N = Total number of individuals of all species
Mixing coefficient	CM = Nsp / Ni Where: Nsp: is the number of species present in all sampling units Ni: is the total number of individuals of all species present in all sampling units
Jaccard Similarity (J)	J= c/a+b-c a= number of species at site A b= number of species at site B c= number of species present in both sites A and B, i.e. they are shared

Threatened or Endemic Species

To determine the threat category of species found in the forest inventory, environmental regulations were consulted. These include Resolution 0192 of 2014, Resolution 0801 of 1977, Resolution 316 of 1974, and Resolution 0096 of 2006 from the Ministry of Environment (formerly INDERENA and now MADS).

Additional sources were the CITES appendices (2023), and the IUCN Red List (2023). The risk and threat categories used are those established by the IUCN and are followed by the Ministry of Environment (MADS) and the Alexander von Humboldt Biological Resources Research Institute (IAvH).

Results

A total of 579 stem individuals were found, distributed in 34 botanical families, 67 genera and 89 species. The most abundant families were Arecaceae (87 individuals), Burseraceae (78 individuals), Fabaceae (42 individuals), Annonaceae (41 individuals), Moraceae (40 individuals), Apocynaceae and Myristicaceae with 34 individuals (Table 23). The species with the highest abundance were *Protium calanense* Quadruple. (42 individuals), *Euterpe precatoria* Mart. (36 individuals), *Oenocarpus bataua* Mart. (34 individuals*), Protium cf. crassipetalum* Quadruple. (31 individuals), *Inga alba* (Sw.) Willd (28 individuals) and *Parahancornia oblonga* (Müll.Arg.) Monach. with 27 individuals (Table 23,Figure 15). The family Arecaceae (palms) has a pantropical distribution, but it is in the Neotropical rainforests where this group of plants represents one of the most rich, diverse and endemic plant groups , are a very important element for fauna, since their leaves, flowers and fruits provide food, shelter and mating places for many animals for its architecture, They constitute the most striking element of the landscape, they have a wide range of uses such as the construction of houses, they serve as food and have been used industrially in the manufacture of oil, multiple handmade elements can be made from their leaves and seeds, they are used as ornamentals to embellish spaces and are used in some religious celebrations and rites.

Table 23. Floristic composition of the stems of the cover Gallery and riparian forest

Family	Species	Number of individuals
Anacardiaceae	*Tapirira guianensis*	8
Annonaceae	Annonaceae	1
Annonaceae	*Guatteria*	6
Annonaceae	*Guatteria* cf. *foliosa*	9
Annonaceae	*Guatteria schomburgkiana*	14
Annonaceae	*Xylopia aromatica*	7
Annonaceae	*Xylopia emarginata*	3
Annonaceae	*Xylopia polyantha*	1
Apocynaceae	*Aspidosperma excelsum*	4
Apocynaceae	*Himatanthus attenuatus*	1
Apocynaceae	*Parahancornia oblonga*	27
Apocynaceae	*Tabernaemontana flavicans*	2
Araliaceae	*Dendropanax arboreus*	7
Araliaceae	*Schefflera morototoni*	4

Family	Species	Number of individuals
Arecaceae	*Astrocaryum acaule*	1
Arecaceae	*Euterpe precatoria*	36
Arecaceae	*Mauritia flexuosa*	14
Arecaceae	*Oenocarpus bataua*	34
Arecaceae	*Socratea exorrhiza*	2
Bignoniaceae	*Jacaranda copaia*	18
Boraginaceae	*Cordia*	3
Burseraceae	*Protium calanense* Cuatrec.	42
Burseraceae	*Protium* cf. *crassipetalum*	31
Burseraceae	*Protium heptaphyllum*	3
Burseraceae	*Trattinnickia* cf. *rhoifolia*	2
Calophyllaceae	*Calophyllum brasiliense*	3
Calophyllaceae	*Calophyllum longifolium*	15
Calophyllaceae	*Caraipa llanorum*	7
Caryocaraceae	*Caryocar microcarpum*	2
Celastraceae	*Maytenus*	2
Chrysobalanaceae	*Hirtella elongata*	8
Chrysobalanaceae	*Hirtella racemosa*	1
Chrysobalanaceae	*Lycania* cf. *mollis*	2
Chrysobalanaceae	*Lycania hypoleuca*	7
Chrysobalanaceae	*Lycania*	1
Chrysobalanaceae	*Moquilea subarachnophylla*	11
Clusiaceae	*Garcinia madruno*	1
Clusiaceae	*Tovomita* cf. *brevistaminea*	6
Clusiaceae	*Tovomita* cf. *spruceana*	2
Euphorbiaceae	*Alchornea* cf. *latifolia*	1
Euphorbiaceae	*Alchornea discolor*	1
Euphorbiaceae	*Mabea* cf. *trianae*	3
Fabaceae	*Abarema cf.* adenophora	2
Fabaceae	*Abarema jupunba*	3
Fabaceae	*Anadenanthera peregrina*	1
Fabaceae	*Andira* cf. *surinamensis*	1
Fabaceae	Fabaceae	3

Family	Species	Number of individuals
Fabaceae	Fabaceae	1
Fabaceae	*Inga alba*	28
Fabaceae	*Inga*	2
Fabaceae	*Ormosia*	1
Hypericaceae	*Vismia macrophylla*	3
Lacistemataceae	*Lacistema aggregatum*	1
Lauraceae	*Aniba* cf. *panurensis*	1
Lauraceae	*Aniba*	5
Lauraceae	*Nectandra cuspidata*	1
Lauraceae	*Ocotea aurantiodora*	3
Lauraceae	*Ocotea schomburgkiana*	6
Lecythidaceae	*Eschweilera* cf. *tenuifolia*	2
Lecythidaceae	*Eschweilera parvifolia*	13
Lecythidaceae	Lecytidaceae	6
Malpighiaceae	*Bunchosia*	2
Malpighiaceae	*Byrsonima* cf. *japurensis*	4
Malpighiaceae	*Byrsonima crispa*	4
Malvaceae	*Pachira*	4
Melastomataceae	*Bellucia grossularioides*	5
Melastomataceae	*Henriettea* cf. *Goudotiana*	2
Moraceae	*Brosimum rubescens*	7
Moraceae	*Clarisia racemosa*	1
Moraceae	*Ficus mollicula*	1
Moraceae	*Maquira coriacea*	19
Moraceae	Moraceae	2
Moraceae	*Perebea xanthochyma*	9
Moraceae	*Pseudolmedia* cf. *laevis*	1
Myristicaceae	*Iryanthera laevis*	18
Myristicaceae	*Virola elongata*	16
Myrtaceae	*Calyptranthes*	1
Myrtaceae	*Myrcia*	3
Ochnaceae	*Ouratea castaneifolia*	3
Polygonaceae	*Coccoloba mollis*	7

Family	Species	Number of individuals
Primulaceae	*Myrsine guianensis*	1
Rubiaceae	*Amaioua guianensis*	3
Rubiaceae	*Rudgea crassiloba*	4
Salicaceae	*Casearia grandiflora*	3
Salicaceae	*Ryania*	1
Sapindaceae	*Matayba guianensis*	5
Sapotaceae	*Micropholis*	1
Simaroubaceae	*Simarouba amara*	14
Vochysiaceae	*Vochysia ferruginea*	2
		579

Relative abundance

In Figure 14, the relative abundance of the 15 species with the highest number of individuals sampled is presented. *Protium calanense* (7,25%), *Euterpe precatoria* (6.22%), *Oenocarpus bataua* (5,87%), *Protium cf. crassipetalum* (5.35%), *Inga alba* (4.84%) and *Parahancornia oblonga* (4.66%) had the highest relative abundance values for the study. These values are directly related to the density of species, where the most abundant species correspond to those with the highest density values.

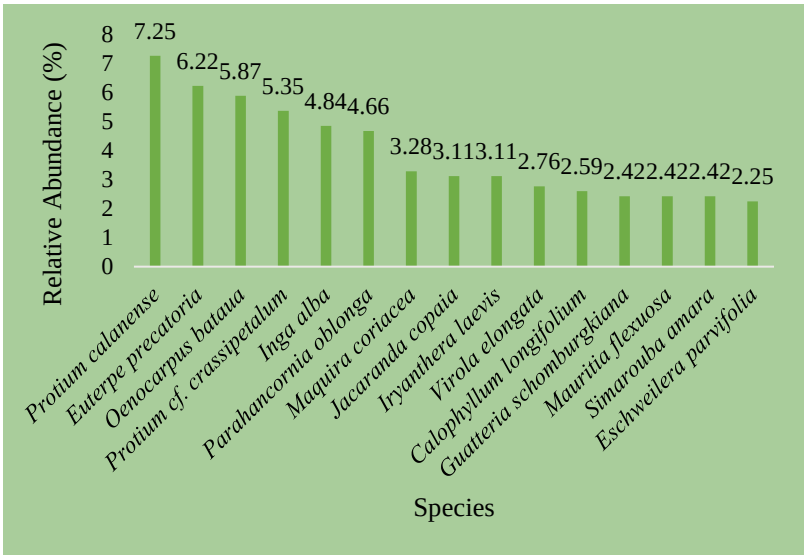


Figure 14. Relative Abundance of Cover Gallery and riparian forest.

The species of the genus *Protium* have fruits adapted for dispersal by animals, and adults are distributed in an aggregate manner in the forest (Rozo-Mara & Parrado-Rosselli, 2004). They are found on the edges of forest and high stubble, some species are used as food, medicinally with infusions of the resin for the treatment of neuralgia, they have analgesic and anti-inflammatory

properties, their wood is used for construction, their resin can be used as a Incense and have a high artisanal and ornamental potential (Ariza-Cortes, Castro-Lima, & Cepeda-Buitrago, 2016).

Protium calanense

Euterpe precatoria

Oenocarpus bataua

Protium cf. crassipetalum

Inga alba

Parahancornia oblonga

Maquira coriacea

Jacaranda copaia

Iryanthera laevis

Figure 15. Most abundant species recorded in the gallery and riparian forest for the stem category. (Source: Col La Paz, 2023)

Diversity

Table 24 shows the results of the alpha diversity indicators, which were calculated for the gallery and riparian forest cover. The coefficient of mixture indicates that for each individual registered there are 0.11 species; the Simpson Index (1-D), presented a high value (0.975), now, this index is understood as 1-D, where D is the dominance, of which values close to zero indicate the dominance of a single species in the ecosystem, while values close to one indicate a greater distribution of dominance among

different species. On the other hand, the Margalef index (14.32) and Menhinick index (3.39) show a high diversity, which is corroborated by the Shannon index (4.072) with a value of more than four units.

Table 24. Indices of diversity and richness for gallery and riparian forest cover (Source: Col La Paz, 2023).

N° pitches	N° of individuals	N° species	Mixing coefficient (CM)	Margalef Index (Dmg)	Menhinick Index (Dmn)	Simpson Index 1-D	Shannon Index
10	816	97	0,119	14,320	3,390	0,975	4,072

Threatened or Endemic Species

In total, 59 species were found in the threatened category Least Concern (LC) according to the IUCN (2023) and an endemic species *Henriettea cf. goudotiana* (Naudin) Penneys et al (Table 25). No species reported in Resolution 1912 of 2017 of the Ministry of Environment were found in the lists of national and regional closures and the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) Appendices I, II and III.

Table 25. Threat categories of species recorded in the Gallery and riparian forest cover.

Family	Species	IUCN	Origin
Anacardiaceae	*Tapirira guianensis*	Least Concern (LC)	Native
Annonaceae	*Guatteria cf. foliosa*	Least Concern (LC)	Native
Annonaceae	*Xylopia aromatica*	Least Concern (LC)	Native
Annonaceae	*Xylopia emarginata*	Least Concern (LC)	Native
Annonaceae	*Xylopia polyantha*	Least Concern (LC)	Native
Apocynaceae	*Aspidosperma excelsum*	Least Concern (LC)	Native
Apocynaceae	*Himatanthus attenuatus*	Least Concern (LC)	Native
Apocynaceae	*Tabernaemontana flavicans*	Least Concern (LC)	Native
Araliaceae	*Schefflera morototoni*	Least Concern (LC)	Native
Arecaceae	*Euterpe precatoria*	Least Concern (LC)	Native
Arecaceae	*Socratea exorrhiza*	Least Concern (LC)	Native
Bignoniaceae	*Jacaranda copaia*	Least Concern (LC)	Native
Boraginaceae	*Cordia nodosa*	Least Concern (LC)	Native
Burseraceae	*Protium heptaphyllum*	Least Concern (LC)	Native
Burseraceae	*Trattinnickia cf. rhoifolia*	Least Concern (LC)	Native
Calophyllaceae	*Calophyllum brasiliense*	Least Concern (LC)	Native
Calophyllaceae	*Calophyllum longifolium*	Least Concern (LC)	Native

Family	Species	IUCN	Origin
Caryocaraceae	*Caryocar microcarpum*	Least Concern (LC)	Native
Chrysobalanaceae	*Hirtella elongata.*	Least Concern (LC)	Native
Chrysobalanaceae	*Hirtella racemosa*	Least Concern (LC)	Native
Chrysobalanaceae	*Lycania, cf. mollis*	Least Concern (LC)	Native
Clusiaceae	*Garcinia madruno*	Least Concern (LC)	Native
Clusiaceae	*Tovomita cf. brevistaminea*	Least Concern (LC)	Native
Clusiaceae	*Tovomita cf. spruceana*	Least Concern (LC)	Native
Euphorbiaceae	*Alchornea cf. latifolia*	Least Concern (LC)	Native
Euphorbiaceae	*Alchornea discolor*	Least Concern (LC)	Native
Euphorbiaceae	*Mabea cf. trianae*	Least Concern (LC)	Native
Fabaceae	*Abarema cf. adenophora*	Least Concern (LC)	Native
Fabaceae	*Abarema jupunba*	Least Concern (LC)	Native
Fabaceae	*Anadenanthera peregrina*	Least Concern (LC)	Native
Fabaceae	*Andira cf. surinamensis*	Least Concern (LC)	Native
Fabaceae	*Inga alba*	Least Concern (LC)	Native
Hypericaceae	*Vismia baccifera*	Least Concern (LC)	Native
Hypericaceae	*Vismia macrophylla*	Least Concern (LC)	Native
Lacistemataceae	*Lacistema aggregatum*	Least Concern (LC)	Native
Lauraceae	*Nectandra cuspidata*	Least Concern (LC)	Native
Lauraceae	*Ocotea aurantiodora*	Least Concern (LC)	Native
Lauraceae	*Ocotea schomburgkiana*	Least Concern (LC)	Native
Lecythidaceae	*Eschweilera parvifolia*	Least Concern (LC)	Native
Malpighiaceae	*Byrsonima cf. japurensis*	Least Concern (LC)	Native
Malpighiaceae	*Byrsonima crispa*	Least Concern (LC)	Native
Melastomataceae	*Bellucia grossularioides*	Least Concern (LC)	Native
Melastomataceae	*Henriettea cf. goudotiana*	Least Concern (LC)	Endemic
Melastomataceae	*Miconia stenostachya*	Least Concern (LC)	Native
Meliaceae	*Guarea cf.guidonia*	Least Concern (LC)	Native
Moraceae	*Brosimum rubescens*	Least Concern (LC)	Native
Moraceae	*Clarisia racemosa*	Least Concern (LC)	Native
Moraceae	*Helicostylis tomentosa*	Least Concern (LC)	Native
Moraceae	*Maquira coriacea*	Least Concern (LC)	Native
Moraceae	*Perebea xanthochyma*	Least Concern (LC)	Native

Family	Species	IUCN	Origin
Myristicaceae	*Virola elongata*	Least Concern (LC)	Native
Piperaceae	*Piper cf. hostmannianum*	Least Concern (LC)	Native
Polygonaceae	*Coccoloba mollis*	Least Concern (LC)	Native
Rubiaceae	*Amaioua guianensis*	Least Concern (LC)	Native
Rubiaceae	*Rudgea crassiloba*	Least Concern (LC)	Native
Salicaceae	*Casearia grandiflora*	Least Concern (LC)	Native
Sapindaceae	*Matayba cf. guianensis*	Least Concern (LC)	Native
Siparunaceae	*Siparuna guianensis*	Least Concern (LC)	Native
Vochysiaceae	*Vochysia ferruginea*	Least Concern (LC)	Native

5.3.1.2 Fauna

Field Collection and Methodology

The selection of sampling sites for fauna was based on the predominant vegetation cover within the farm, categorized according to the Corine Land Cover nomenclature into gallery and riparian forest, forest plantation, and a mosaic of crops and pastures.

1. Gallery and/or riparian forest (BGR): This type of vegetation cover is characterized by the presence of natural vegetation typical of riparian forests, including the moriche palm. These forests typically contain streams and denser vegetation.

2. Forest plantation (PF): This category primarily includes Acacia forest plantations and some cleared areas. These areas have minimal undergrowth and a significant amount of leaf litter.

3. Mosaic of crops and pastures (MCP): This designation specifically applies to areas where cashew and corn crops border the plantations and riparian forests, as well as savanna areas.

Herpetofauna (Amphibians and Reptiles) Field Collection

Sampling was carried out through the visual encounter search technique (VES, Visual Encounter Survey). This consisted of an active search in order to reach the greatest number of microhabitats such as trees, bushes, grasses, fallen logs, rocks, ponds, streams, etc., so that each species had the same opportunity to be observed during the route and each individual of each species has, in turn, the same probability of being detected during the sampling.

16 transects of approximately 100m in length and 2m in width were made on each side of the transect (Figure 16). These species registration tours covered the periods of greatest activity of the organisms: daytime hours (between 8:30 a.m. – 11:30 a.m.) for most reptiles and at night (between 5:30 p.m. and 9:00 p.m.). The individuals were captured manually (amphibians) and by using herpetological tweezers

(snakes), identified according to AmphibiaWeb (2023) The reptile database and were subsequently temporarily deposited in moistened cloth bags with vegetation in its interior, so that the animals did not suffer damage while they were determined and photographed (Figure 17).

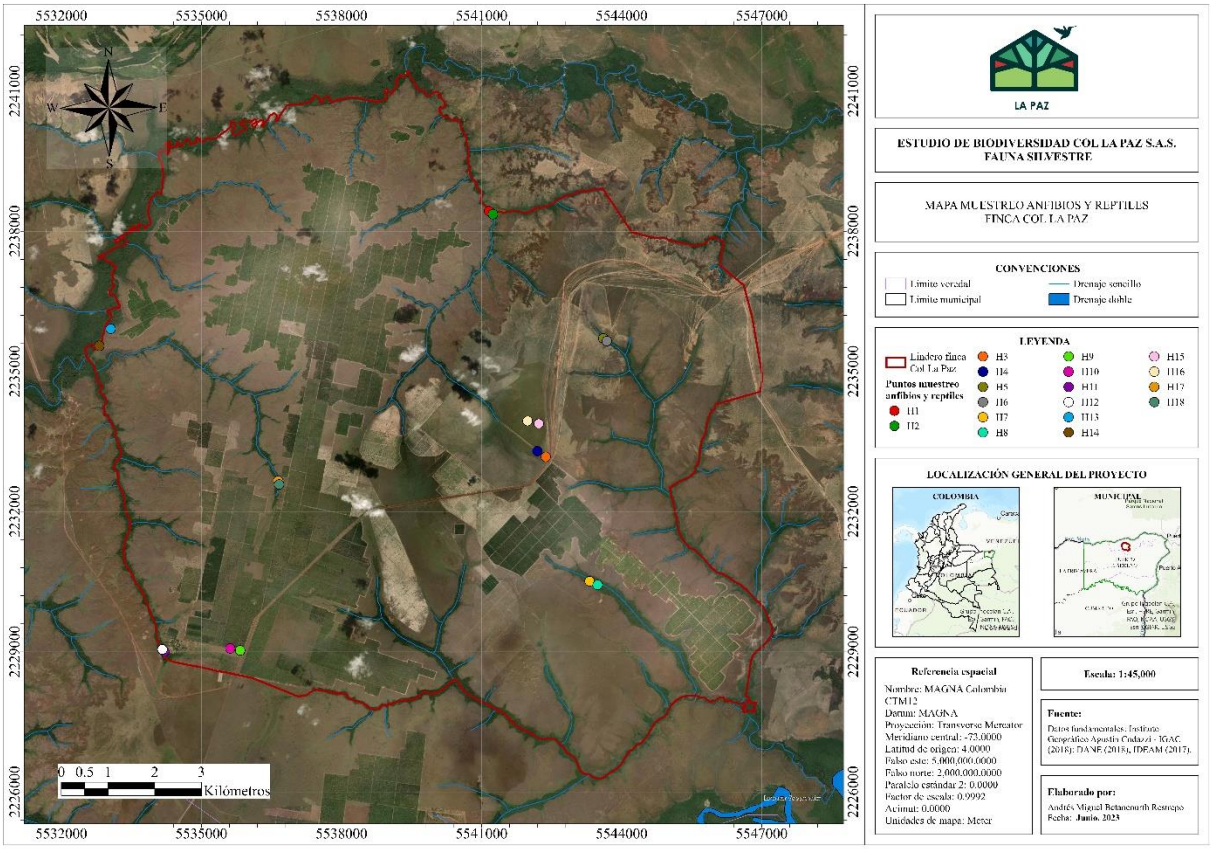


Figure 16. Sampling points for amphibians and reptiles in the study area. (Source: Col La Paz, S.A.S., 2023)

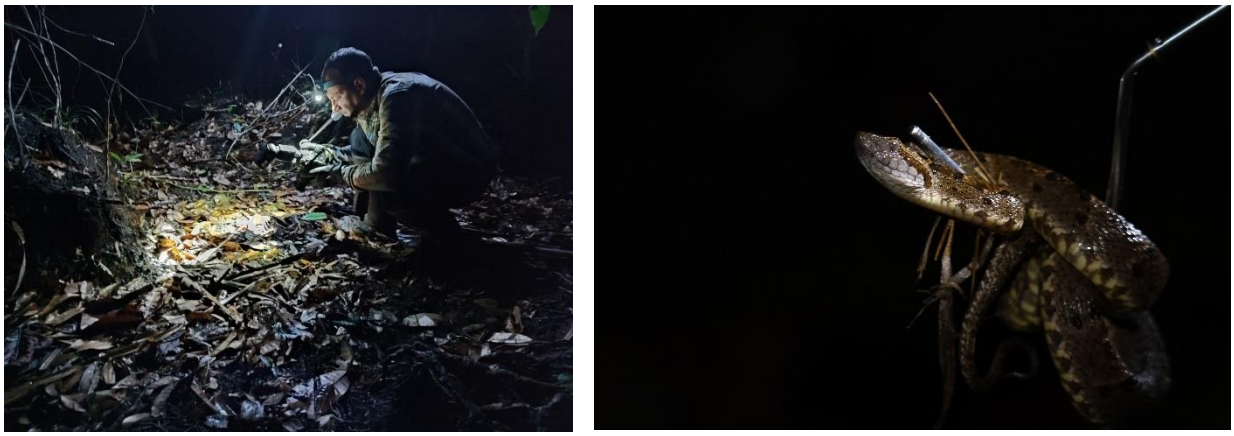


Figure 17. Sampling technique for amphibians and reptiles

Avians

Point count and transect techniques were used to detect birds in accordance with established protocols. In addition to ad libitum data collection (records outside transects). The sightings were made starting at 06:00 h with the help of binoculars (Nikon 10x42) and identification with different bird identification guides. Three (3) transects were established randomly associated with the PF and MCP vegetation covers (Figure 18) in which the species recorded visually and auditorily, number of individuals and other possible observations such as perching, feeding, and reproduction activities were noted. Also, 64 counting points of variable width (8 groups of 8 points each) were established in different units of the BGR coverage. To ensure independence between the observations made, the points were separated from each other by at least 100 m. The organisms where possible were photographed with a Nikon D500 professional camera and a Tamron 150-600mm lens (Figure 19).

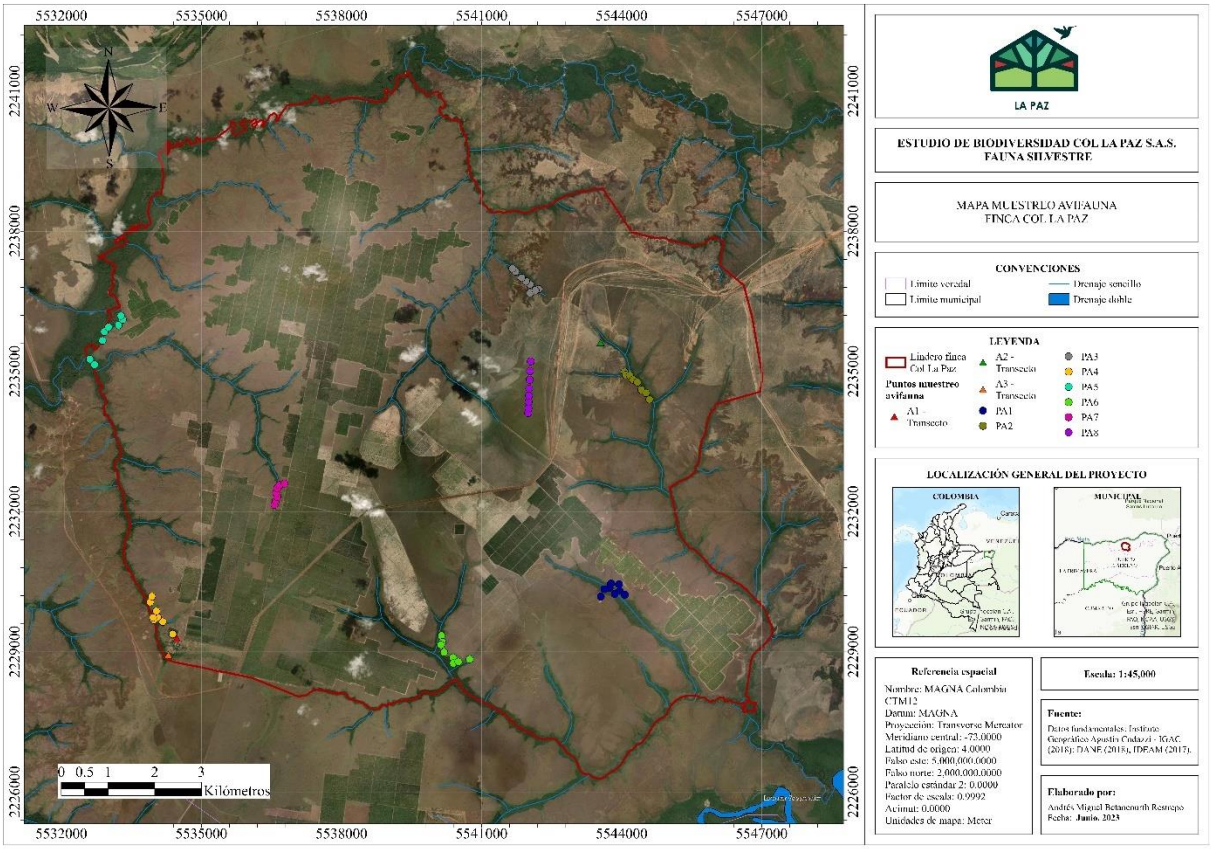


Figure 18. Sampling Points for Avian Surveys in COL La Paz Study area (Source: S.A.S. 2023).


Figure 19. Avian Sampling Methodology for point Counts and transects (source: COL La Paz, S.A.S. 2023)

Mammals

To evaluate the richness of non-flying terrestrial mammals, a combination of methods (transects, surveys, and camera traps) were used (May 12-24, 2023), seeking to obtain a better approximation to the real composition of species present in the study area. 12 day and night routes were carried out in transects between 1 and 2 km through the different vegetation covers, using direct and indirect methods in search of any indication that could confirm the presence of mammal species, such as: bones, burrows, feces, footprints, hair, among others; which were photographically recorded for later identification through the use of keys, books and specialized guides (Cuartas-Calle and Muñoz, 2003; Morales-Jiménez et al., 2004; Tirira, 2007) (Figure 20). In addition, data collection was carried out ad libitum when the species were not recorded within a transect (punctual records). Also, 12 camera traps were installed and distributed in different sectors of the study area (10 in Gallery forests and two (2) in Forest plantation, in order to have the largest number of records of mammals. The cameras were installed in places where traces and possible passages of fauna were evidenced following the guidelines of Díaz and Payán (2012) (Figure 21).

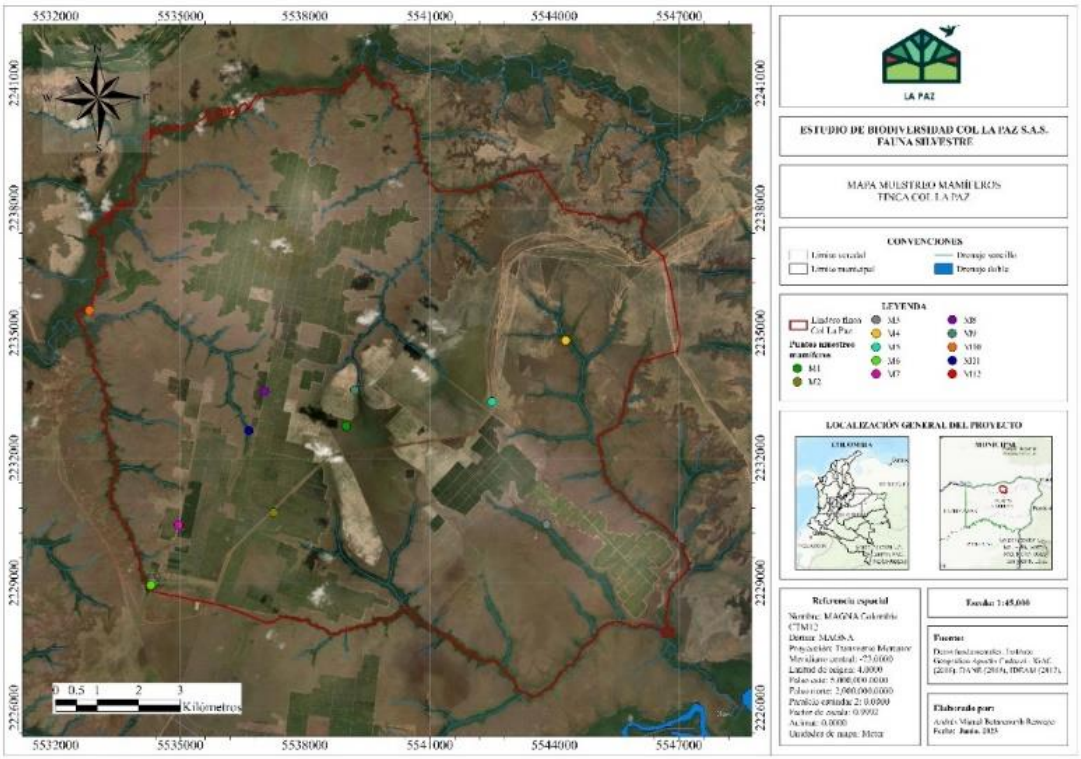


Figure 20. Locations of camera traps installed in the Project Activity Instance (Source: S.A.S. 2023)

Figure 21. Installation of camera traps for the observation of wildlife (Source: S.A.S. 2023)

Data Analysis

Alpha diversity was estimated through the Shannon-Wiener diversity index (H´), the Simpson dominance index and Equity, using the PAST 2.0 software. Furthermore, abundance was analyzed

To establish the threat category of the species found, Resolution 1912 of 2017 of the Ministry of Environment and Sustainable Development (MADS), the appendices of the Convention on International

Trade in Endangered Species of Wild Fauna and Flora and the red list of the International Union for Conservation of Nature.

Results

Amphibians

During the days of May 12 to 24, 2023, with a sampling effort of 48 hours / man, the amphibian sampling field phase was carried out in which a total of one (1) order, three (3) families and seven (7) amphibian species, as shown in Table 26. The most representative family was Leptodactylidae with three (3) species, followed by Bufonidae and Hylidae with two (2) each. The Leptodactylidae family is one of the groups with the highest representation in areas of low altitudes and, for this reason, one of the groups best adapted to the environmental conditions presented by the municipality of Puerto Carreño. It was also found that the species with the highest abundance was the Whistling Frog (*Leptodactylus fuscus*) with 32 individuals (54%), followed by the Helmeted Frog (*Osteocephalus taurinus*) with 13 (22%) and the Toad (*Rhinella marina*) with 7 (12%). The species L. fuscus, was the most common frog during sampling, a species typical of open savannas (Trujillo & Lasso, 2017), in addition to vocalizing constantly for long periods of time. As for the individuals of the most abundant family found (Leptodactylidae), they have reproductive habits related to the construction of foam nests and adaptability to lowland environments where rainfall levels are low (Trujillo & Lasso, 2017)(Figure 22).

Table 26. Amphibians registered during the first monitoring period (Source: Col La Paz S.A.S., 2023)

Species	Common name	N° inds.
Rhinella maragaritifera	South American common toad	1
Rhinella marina	Cane toad	7
Osteocephalus taurinus	Helmeted frog	13
Scinax wandae	Frog	4
Leptodactylus fuscus	Whistling frog	32
Pseudopaludicola boliviana	Bolivian dwarf frog	1
Pseudopaludicola llanera	Llanera dwarf frog	1

Seven species of the recorded presence of 19 possible species from secondary information was reported in the study area (Table 26), which corresponds to 37% of what was expected. However, this is a significant proportion, especially when considering the size of the Puerto Carreño region.

Whistling frog (*L. fuscus*) most abundant species in the study area.

Helmeted frog (*O. taurinus*) abundant species typical of gallery forest.

Toad (*R. marina*) common in areas of crops and pastures.

Frog (*S. wandae*) recorded in forests and open areas.

Figure 22. Some species of amphibians registered in biodiversity study Col La Paz S.A.S (Source: Col La Paz S.A.S, 2023)

Overall diversity for amphibians was low, being the highest in BGR coverage where 5 species were recorded (Table 27). According to the dominance index of D, the most equitable vegetation cover evaluated was BGR because the value when it approaches zero, means an equitable proportion of the community, while for the other two coverages the dominance by a species was very high, which in this case corresponds to the Whistling Frog (*L. fuscus*).

Table 27. Diversity indices for amphibians recorded in the study area (Source: Col La Paz S.A.S, 2023).

	BGR	MCP	PF
Species	5	3	1
Abundance	24	33	2
Dominance_D	0,3681	0,831	1
Shannon_H	1,222	0,3625	0

The Shannon index was also low for the evaluated sites, since values below 2 means sites of low diversity. One reason that may influence the finding of low amphibian diversity in the overall study area may be due to habitat conditions. In the case of acacia forest plantations, they offer few microhabitats for amphibians, due to their homogeneous structure and little diverse plant composition. However, the presence of abundant leaf litter may favor species of lower requirements than those frogs that depend on more specific humidity and habitat conditions, including nearby water bodies. Additionally, in most of the sampling days, very dry study areas were evidenced both in plantation, savannah and forest areas, which could also influence the absence of potential species in the area (for example, *Boana*). No globally or nationally endangered species or those threatened by international trade (CITES) were observed in the study area.

Reptiles

Between May 12 and 24, 2023, based on visual tours and with a sampling effort of 48 hours / man, the field phase of reptile sampling was carried out in which a total of three orders, 10 families and 17 species. The most representative family was Colubridae with five species, followed by Alligatoridae, Boidae and Gekkonidae with two each (**Table** 28).

Table 28. Reptiles registered in biodiversity study Col La Paz S.A.S (Source: Col La Paz S.A.S, 2023).

Species	Common name	N° inds.
Caiman crocodilus	Babilla	2
Paleosuchus trigonatus	Cachirre	6
Corallus ruschenbergerii	Macaurel	1
Epicrates maurus	Litmus Boa	1
Helicops angulatus	False water Mapanare	1
Hydrops triangularis	False Water Coral	1
Leptodeira annulata	Frog	1
Mastigodryas boddaerti	Loggerhead snake, Huntress	3
Pseudoboa neuwiedii	Catkin	1
Hemydactylus frenatus	Gekko	1
Hemydactyus palaichthus	Salamanqueja	3
Iguana iguana	Iguana	1

Species	Common name	N° inds.
Cnemidophorus lemniscatus	Lobito	5
Tropidurus spidus	Tuqueque	5
Bothrops atrox	Four noses	4
Podocnemis vogli	Galápaga	1
Chelonoidis carbonarius	Tortoise	4

The species with the highest abundance was the Cachirre (*P. trigonatus*) with 6 individuals (14%), followed by Lobito (*C. lemniscatus*) and Tuqueque (*T. spidus*), both with 5 (12%). The species *P. trigonatus*, was the most common during sampling, a species recorded exclusively in the morichales and riparian forest streams. The other two most common species, the Lobito (*C. lemniscatus*) and Tuqueque (*T. spidus*), were always associated with open areas of savannah and forest edges and forest plantation, habitats in which they are facilitated to hunt insects and warm themselves (Figure 23).

Cachirre (*P. trigonatus*) most abundant species in the study area.

Four noses (B. *atrox*) common species in savannah and crop areas.

Tuqueque (*T. spidus*) common in areas of crops and pastures.

Babilla (*C. crocodilus*) recorded in gallery forest.

Figure 23. Some species of reptiles recorded in biodiversity study Col La Paz S.A.S (Source: COL La Paz S.A.S., 2023).

Overall diversity for reptiles was low for MCP and FP (Table 29). According to the dominance index D, the most equitable vegetation cover evaluated was BGR because the value when it approaches zero, means a similar proportion of individuals between species which translates into a more equitable community of reptiles, while for the other two coverages the dominance by some species was very high, which in this case corresponds to the Tuqueque (*T. spidus*).

Table 29. Diversity indices for reptiles recorded in the study area (Source: Col La Paz S.A.S, 2023).

	BGR	MCP	PF
Species	10	6	2
Abundance	24	11	2
Dominance_D	0,1354	0,2727	0,5
Shannon_H	2,145	1,54	0,70

The Shannon index was low for the MCP and PF evaluated sites since values below 2 mean sites of low diversity. However, BGR presented a high diversity, mainly because this type of ecosystem has greater availability of habitats, greater supply of resources and therefore hosts more species. Even so, MCP and PF offer food and shelter resources for species that are housed in this type of habitats such as lizards and snakes that find resting and protection sites there in addition to food availability. Reptile species with some category of international and/or national threat, threatened by international trade, or with some degree of endemism, one species with Vulnerable national threat category (VU) was registered the Morrocoy (*Chelonoidis carbonarius*) and five species under CITES category II: *Caiman crocodilus*, *Chelonoidis carbonarius*, *Iguana iguana*, *Paleosuchus trigonatus* and *Podocnemis vogli* (Figure 24).

CITES category II iguana (I. iguana)

Morrocoy (*C. carbonarius*) Nationally vulnerable species and CITES category II

Figure 24. Some species of reptiles with special category registered in the study area (Source: Col La Paz S.A.S, 2023).

Avians

Between May 12 and 24, 2023, from counting points and transects and with a sampling effort of 48 hours per technician, the field phase of bird sampling was carried out in which a total of 17 orders, 38 families and 111 species (Table 30) were observed. The most representative family was Tyrannidae with 17 species, followed by Thraupidae with 13 species. These two families are the most diverse in Colombia, so they are usually the most representative in biodiversity studies, as in this study. The Tyrannidae family, for example, is characterized by being the one that houses the largest number of species in the New World, because its members occupy a wide variety of niches; for this reason, they exhibit different behaviors, present diets ranging from insects to fruits, move in different strata of the forest, among other characteristics (Hilty & Brown, 1986). The species *T. savana*, was the most common during sampling, an insectivorous species of open habitats. The other two most common species, the Common Honeyeater (*C. flaveola*) and the common Siriri (*T. melancholicus*), were recorded in the three evaluated covers, habitats in which they are facilitated to hunt insects, perch and shelter (Figure 25).

Table 30. Avifauna registered in biodiversity study Col La Paz S.A.S. V= visual, CT= camera trap (Source: Col La Paz S.A.S, 2023).

Species	Common name	N° Inds.	Type of record
Buteogallus meridionalis	Savannah hawk	3	V
Chondrohierax uncinatus	Snail piquiganchudo	10	V

Species	Common name	N° Inds.	Type of record
Geranoaetus albicaudatus	White-tailed Hawk	2	V
Geranospiza caerulescens	Stilt eagle	1	V
Leptodon cayanensis	Aguililla cabecigrís	1	V
Rupornis magnirostris	Hawk	4	V
Tachornis squamata	Palm swift	3	V
Anthracothorax nigricollis	Black-breasted mango	3	V
Chionomesa fimbriata	Amazilia buchiblanca	5	V
Chlorostilbon mellisugus	Emerald	2	V
Phaethornis hispidus	White-chinned hermit	15	V
Thalurania furcata	Purple nymph	1	V
Cathartes aura	Samuro	1	V
Coragyps atratus	Buzzard	5	V
Burhinus bistriatus	Garagara	2	V
Vanellus chilensis	Stone curlew	7	V
Jacana jacana	Swamp	1	V
Columbina passerina	Tortolite	20	V
Columbina squammata	Scaled lovebird	3	V
Geotrygon montana	Reddish partridge pigeon	1	CT
Leptotila rufaxilla	White-fronted pigeon	1	V
		1	CT
Patagioenas cayennensis	Purple pigeon	26	V
Zenaida auriculata	Torcaza	10	V
Crotophaga ani	Jiriguelo	5	V
Crotophaga major	Cook	3	V
Piaya cayana	Piscua	3	V

Species	Common name	N° Inds.	Type of record
Tapera naevia	Three feet	1	V
Eurypyga helias	Sun Swine	2	V
Caracara plancus	Caracara	7	V
Daptrius chimachima	Pigua	3	V
Falco femoralis	Aplomado falcon	1	V
Falco sparverius	Kestrel	1	V
Herpetotheres cachinnans	Guaco	2	V
Hypnelus bicinctus	Bobito	3	V
Galbula ruficauda	Jacamar	2	V
Mitu tomentosum	Curassow	7	V
		6	CT
Colinus cristatus	Partridge	9	V
Aramides cajaneus	Chilacoa	1	V
		1	CT
Dendrocincla fuliginosa	Trepatroncos brown	1	V
Synallaxis albescens	Pale Chamicero	3	V
Xiphorhynchus obsoletus	Trepatroncos list	4	V
Progne tapera	Savannah swallow	16	V
Pygochelidon cyanoleuca	Blue and white swallow	1	V
Cacicus cela	Blue-eyed jay	3	V
Gymnomystax mexicanus	Turpial lagoon	3	V
Icterus cayanensis	Black Turpial	7	V
Icterus nigrogularis	Turpial yellow	4	V
Molothrus bonariensis	Chamón	2	V
Mimus gilvus	Mockingbird	7	V
Geothlypis aequinoctialis	Masked Warbler	3	V
Ammodramus humeralis	Savannah Sparrow	7	V

Species	Common name	N° Inds.	Type of record
Ceratopipra erythrocephala	Golden-headed manakin	3	V
Polyoptila plumbea	Tropical warbler	6	V
Hypocnemoides melanopogon	Black-chinned anthill	2	V
Myrmotherula cherriei	Cherrie's ant	2	V
Sakesphorus canadensis	Batará copoetón	5	V
Thamnophilus nigrocinereus	Ashen beat	1	V
Coereba flaveola	Common honeyeater	54	V
Ramphocelus carbo	Black toche	28	V
Schistochlamys melanopis	Savannah slate	6	V
Sicalis flaveola	Rice buh	2	V
Sporophila angolensis	Buchicastaño rice cooker	1	V
Sporophila bouvronides	Lesson Mirror	8	V
Sporophila minuta	Brick mirror	1	V
Sporophila nigricollis	Capuchin spike	4	V
Sporophila plumbea	Leaden spike	5	V
Stilpnia cayana	Wheat tanager	24	V
Thraupis episcopus	Common tile	14	V
Thraupis palmarum	Palmero tile	18	V
Volatinia jacarina	Jumping spike	2	V
Pachyramphus polychopterus	White-winged cabezón	2	V
Tityra cayana	Black-tailed Titira	1	V
Campylorhynchus griseus	Egg-sucking cockroach	3	V
Cantorchilus leucotis	Foreed cockroach	10	V
Turdus ignobilis	Muddy peek	2	V

Species	Common name	N° Inds.	Type of record
Turdus leucomelas	Mirla buchiblanca	13	V
Turdus nudigenis	Caripelada mirla	11	V
Camptostoma obsoletum	Siggler Tiranuelo	2	V
Elaenia chiriquensis	Elaenia girl	11	V
Elaenia flavogaster	Elaenia copetona	13	V
Empidonomus varius	Veined flytrap	2	V
Legatus leucophaius	Pirate flytrap	10	V
Megarynchus pitangua	Bichofué picudo	5	V
Myiopagis gaimardii	Elaenia selvatica	3	V
Myiozetetes cayanensis	Black-crested weld	6	V
Myiozetetes granadensis	Weld header	1	V
Nesotriccus incomta	Murine tyranuelo	5	V
Pitangus sulphuratus	Christopy	14	V
Pyrocephalus rubinus	Robin	1	V
Todirostrum cinereum	Common spatula	4	V
Tolmomyias flaviventris	Yellow-breasted picoplane	5	V
Tolmomyias sulphurescens	Sulfur picoplane	2	V
Tyrannus melancholicus	Common Siriri	29	V
Tyrannus savana	Sirirí earwig	95	V
Cyclarhis gujanensis	Eyebrow greenfinch	1	V
Vireo chivi	Vireo chivi	2	V
Bubulcus ibis	Cattle heron	2	V
Butorides striata	Striped heron	1	V
Phimosus infuscatus	Coquito	7	V
Theristicus caudatus	Corocora	3	V
Celeus elegans	Hammer carpenter	7	V
Dryocopus lineatus	Royal Carpenter	6	V
Melanerpes rubricapillus	Carpenter habado	1	V

Species	Common name	N° Inds.	Type of record
Ramphastos vitellinus	White-breasted toucan	3	V
Amazonian Parrot	Yellow-faced parrot	8	V
Amazona ochrocephala	Yellow-fronted parrot	7	V
Ara chloropterus	Macaw	3	V
Eupsittula pertinax	Carisucio parakeet	22	V
Thectocercus acuticaudatus	Blue-fronted Parakeet	5	V
Crypturellus cinereus	Tinamú gloomy	9	V
Trogon viridis	Pavita montera	2	V

111 species of 267 possible species of birds observed in previous studies in the area were evidenced in the study area. This number of species corresponds to 41% of what was expected, an important percentage if the size of the Puerto Carreño region is considered.

Earwig (*T. savana*) is the most abundant species in the study area.

Well standing (*Nyctibius griseus*) nocturnal bird recorded in gallery forest.

Amazilia buchiblanca (*Chionomesa fimbriata*) recorded in gallery forest.

Bobito (*Hypnelus bicinctus*) recorded on the edge of gallery forest.

Figure 25. Species of birds recorded in biodiversity study Col La Paz S.A.S. (Source: Col La Paz S.A.S, 2023)

Overall diversity for birds was high, especially for BGR and MCP (
Table 31). According to the dominance index of D, the most equitable vegetation cover evaluated was BGR because the value when it approaches zero, means a similar proportion of individuals between species which translates into a more equitable bird community, while for PF coverage the equity is lower (0.6499) due to the strong abundance of the Sirirí colitijera (T. savana) species that was recorded very regularly in the plantations.

Table 31. Diversity indices for birds recorded in the study area (Source: Col La Paz S.A.S, 2023).

	BGR	MCP	PF
Species	106	42	17
Abundance	579	102	90
Dominance_D	0,9744	0,9604	0,6499
Shannon_H	4,116	3,482	1,762

The Shannon index was high for the BGR and MCP study sites. However, for PF it was low, as values below 2 mean low diversity sites. In this sense, BGR presented the greatest diversity (H: 4,116), mainly because this type of ecosystem has greater availability of habitats, greater supply of resources and therefore hosts more species. Even so, MCP and PF offer food and shelter resources for species that shelter in this type of habitats birds little susceptible to disturbance and adapted to open areas that find resting, nesting and protection sites there, in addition to food availability.

Regarding bird species with some category of international and/or national threat, threatened by international trade or with some degree of endemism, two species with Near Threatened (NT) international threat category were recorded: the Paujil (*Mitu tomentosum*) and the ashen Batará (*Thamnophilus nigrocinereus*). In addition to an almost endemic species: the Cherrie's Hormiguertio (*Myrmotherula*

cherriei) and 21 species under CITES category II were also observed, in the following families: Trochilidae (Hummingbirds), Falconidae (Hawks), Accipitridae (Hawks), Psittacidae (Parrots) and the White-breasted Toucan (*Ramphastos vitellinus*) (Figure 26).

White-breasted toucan (*R. vitellinus*) CITES category II

Cherrie's ant (*M. cherriei*) Species Almost endemic to Colombia

Figure 26. Some species of birds with special category registered in the study area (Source: Col La Paz S.A.S, 2023).

Mammals

Between May 12 and 24, 2023, from transects, surveys, camera traps and with a sampling effort of 48 hours / man, the mammal sampling field phase was carried out in which a total of nine (9) orders, 14 families and 15 species (**Table** 32). The most representative order was Carnivora with four (4) species, which play an important role in maintaining the health of tropical forests. The most representative family was Myrmecophagidae with two species, followed by the others with one species. it was found that the species with the highest abundance was the Deer (*O. cariacou*) with 24 individuals (28%), followed by white-lipped peccary (*T. pecari*) with 13 (15%), the River Otter (*P. brasiliensis*), with 11 (13%) and Danto (*T. terrestris*) with 10 (12%).

Table 32. Mammals registered in biodiversity study Col La Paz S.A.S. V= visual, CT= Camera trap; H= Footprint, CR= Skull, HE= Feces, R= Trace (Source: Col La Paz S.A.S, 2023).

Species	Common name	Type of record	N° inds.
Odocoileus cariacou	Deer	CT	6
		H	2
		V	15
		V, H	1
		CR	1

Species	Common name	Type of record	N° inds.
Tayassu pecari	Cafuche	CT	12
Cerdocyon thous	Fox	V	6
Leopardus pardalis	Ocelot	V	1
Pteronura brasiliensis	River otter	V	11
Potos flavus	Kinkayu	V	2
Priodontes maximus	Ocarro	And	1
Marmosa sp.	Opossum	V	1
Sylvilagus floridanus	Rabbit	I	1
Tapirus terrestris	Tapir	CT	5
		H	3
		V	2
Myrmecophaga tridactyla	Palm bear	CT	1
		H	2
		V	1
Tamandua tetradactyla	Anteater	R	1
Alouatta seniculus	Howler monkey	V	4
Cuniculus paca	Limpet	CT	2
		H	1
		V	1
Dasyprocta fuliginosa	Agouti	H	1

15 species of the 31 possible species of medium and large mammals in the area were observed. This corresponds to 48% of what was expected, an important percentage if the size of the Puerto Carreño region is considered.

The deer (*O. cariacou*) was the most common species during sampling, an herbivorous species easily detected through plantations and savannah. It was easy to observe in areas of corn and cashew crops, plant species that are usually included in their diet. The white-lipped peccaries (*T. pecari*) were recorded through camera traps, these animals move in herds of tens and even hundreds so their number in the study area may be greater than recorded. In the case of the giant river otter (*P. brasiliensis*) a group of 11 individuals was recorded in the Juriepe River, gregarious animals that usually go in families to feed and protect themselves. Finally, another common species was the Danto or Tapir (*T. terrestris*) species of great importance for its dispersal of seeds in forests. Of the latter, several individuals were observed, footprints and it was also recorded in camera traps (Figure 27).

Deer (*O. cariacou*) most abundant species in the study area.

Opossum (*Marmosa sp.*) registered in gallery forest.

Howler monkey (*A. seniculus*) recorded in gallery forest.

Fox (*C. thous*) registered in Forest plantation.

Figure 27. Some species of mammals recorded in biodiversity study Col La Paz S.A.S. (Source: Col La Paz S.A.S, 2023).

Additionally, camera traps and trails were key to the detection of animals, especially mammals. With these, several records of interest were obtained that complement the direct observations of the transects (Figure

28). The species recorded with camera traps were *Odocoileus cariacou*, *Cuniculus paca*, *Tapirus terrestris*, *Myrmecophaga tridactyla*, *Tayassu pecari*.

Macaw (*C. paca*) recorded in gallery forest.

Danto or Tapir (*T. terrestris*) recorded in gallery forest.

Figure 28. Some species recorded through camera traps located in the study area (Source: Col La Paz S.A.S, 2023).

Diversity for mammals was high for BGR and low for MCP and PF (Table 33). According to the dominance index of D, the most equitable vegetation cover evaluated was BGR because the value when it approaches zero, means a similar proportion of individuals between species which translates into a more equitable bird community, while for PF coverage the equity is lower (0.4102) due to the greater abundance of deer (*O. cariacou*) species that was recorded very regularly in the plantations.

Table 33. Diversity indices for mammals recorded in the study area. (Source: Col La Paz S.A.S, 2023)

	BGR	MCP	PF
Species	11	3	6
Abundance	53	7	23
Dominance_D	0,1577	0,3878	0,4102
Shannon_H	2,037	1,004	1,243

The Shannon index was high for BGR and low for MCP and PF. BGR presented the greatest diversity (H:2,037) since this ecosystem has greater availability of habitats and supply of resources. Even so, MCP and PF offer food and shelter resources for the species that are housed in this type of habitats, mammals that also use these ecosystems as biological corridors between forests, including the endangered palm bear (*Myrmecophaga tridactyla*).

Five species with international threat category were registered: the River Otter (*P. brasiliensis*), the Palm Bear (M. *tetradactyla*), the Cafuche *(T. pecari), the Tapir* (T. *terrestris*) and the Ocarro (*Priodontes maximus*). At the national level, two species are categorized as Endangered: the River Otter and the Ocarro and as Vulnerable (VU), the Palm Bear. Finally, under the CITES category, three species are found in CITES I (*P. brasiliensis, P. maximus, Leopardus pardalis*) and five in CITES II (*Alouatta seniculus, Cerdocyon thous, M. tetradactyla, T. terrestrial, T. pecari*) (Figure 29).

Rio nutría (*P. brasiliensis*) species in Danger and category I of CITES

Palm bear (*M. tetradactyla*) Vulnerable species and CITES category II

Figure 29. Some species of mammals with special category registered in the study area (Source: Col La Paz S.A.S, 2023).

5.3.2 Biodiversity Monitoring Plan Dissemination (CCB, B4.3)

The summary of the Biodiversity Monitoring Plan was developed, translated into Spanish, and shared with the workers. This monitoring plan was distributed alongside the Project Document with the assistance of on-the-ground project partners. Local stakeholders were invited to provide feedback on both the monitoring plan and the summarized translated Project Document. The Monitoring Plan was publicly accessible on the website www.verra.org. The results of the Monitoring Report will be made available to local stakeholders at the farm during a field trip.

5.4 Optional Criterion: Exceptional Biodiversity Benefits

This project does not apply to Exceptional Biodiversity Benefits

5.4.1 Trigger Species Population Trends (CCB, GL3.2, GL3.3)

6 ADDITIONAL PROJECT IMPLEMENTATION INFORMATION

Document any additional information that explains how the project has been implemented in accordance with the validated project description for all indicators that require implementation of an activity or process. Criteria and indicators shall be referenced for each statement made in this section.

6.1 Adopted regenerative climate-smart practices (1)

6.1.1 Aboveground and belowground biomass increase (1.1)

6.1.1.1 Establishment of forest species (1.1.1)

Acacia mangium and *Pinus caribae* were planted in 2018 through 2020. The other years (2021, 2022 and 2023) maintenance activities have been implemented. There was a 5% mortality rate of the new trees. The table below specifies the amount of areas planted.

Year	Number of ha planted
2018	1003
2019	1304
2020	71
Total	**2,378**

6.1.2 Degraded soil areas rehabilitated (1.2)

6.1.2.1 Establishment of forest management practices (1.2.1)

There is an updated and running Forest Management Plan from 2020 which La Paz created and updated according to changes in the forest management, if any. Regular forest management practices (pruning and thinning) are being done to maintain the trees; however the residue is left in the field to reduce emissions. Soil cover is also maintained with leaves to improve the carbon biomass in the soil. Additionally, there are two fertilizer applications: base fertilizing and maintenance fertilizing. The base fertilizers are applied 8 to 15 days after planting. While the maintenance fertilizers are applied according to the tree's needs and in multiple applications (year 2, 3 and 4 of plantation). Half of the fertilizers are applied during the winter months, and the other half after 5 months of the first application.

Pruning and thinning was conducted in existing trees in January 2019. Additionally, there was fertilizer application in 2019, 2020, 2021 and 2022. The table below summarizes the amount (kg/ha) of nitrogen fertilizers applied per year, and the type of fertilizers.

Type of fertilizer	Amount of N fertilizer
PL 2014	250
PL 2016	740
PL 2018	727
PL 2019	1649
PL 2020	1321

6.2 Improved plantation workers livelihoods (2)

6.2.1 Guarantee long-term economic income (minimum wages and extra legal benefits) to workers (2.1)

6.2.1.1 Increase in the number of workers receiving extra benefits (2.1.1)

23 fixed workers were employed by La Paz in 2023, and from the Workers Surveys, 100% state La Paz provides them housing at the farm, 93% ate the at the cafeteria, 43% received transportation benefits, 29% had life insurance and 14% received food vouchers.

6.2.2 Increased knowledge of workers (2.2)

6.2.2.1 Adoption of practices from trainings (2.2.1)

From 2019 to 2023, there was a total of 64 trainings conducted. With 16 trainings about environmental management, and 2 about agriculture/agroforestry practices.

Of the workers participating in them, 90% adopted practices from agricultural trainings, 80% adopted pruning practices, 40% adopted conservation practices, 20% adopted practices on pesticides use, and 10% adopted safety work practices.

6.2.3 Assurance of a safe and healthy work environment(2.3)

6.2.3.1 Establishment of health and safety prevention system plan (2.3.1)

As of this first monitoring, there is no health and safety prevention system plan, although 2 trainings sessions were provided on health, with 84 participants total, and 44 training sessions were about workplace safety, with 1,348 participants total.

6.3 Preserve conservation areas (only native forests under 12Tree property) for biodiversity purposes (3)

6.3.1 Established Conservation Strategy (3.1)

6.3.1.1 Develop and Document a comprehensive strategy (3.1.1)

No activities were conducted for this output during this monitoring period.

6.3.2 Restoration and conservation of biodiversity in the project area (3.2)

6.3.2.1 Implementation of habitat restoration and biodiversity conservation initiatives in the project area(3.2.1)

No activities were conducted for this output during this monitoring period.

6.4 Monitoring, reporting and verification (4)

6.4.1 Establish local capacity for the development of the monitoring plan on the collection and registration of information on the farm (4.1)

6.4.1.1 Strengthen local capacity for continuous data collection over time (4.1.1)

Monitoring data was reviewed, and feedback was provided to those that collected it.

6.4.1.2 Carry out biomass plot inventory and analysis of satellite images to define carbon reserves (4.2.1)

Figure 30 Biomass inventory being carried out

Training for biomass data collection was done for the contractor and farm workers. The data collected was analyzed and incorporated into this monitoring report.

6.4.1.3 Carry out social surveys according to VCS/CCB requirements (4.1.3)

There was a training session (virtual) for the contractors to collect the social data using KoboToolbox; the data collected was analyzed, QA/QC was done and results were reported as part of this monitoring period.

6.4.1.4 Conduct biodiversity monitoring according to VCS/CCB requirements (4.1.4)

The biodiversity monitoring for this report was done on the PRA using animal cards to establish a baseline of what animals are in the project area. Further training and data collection will be done in the following monitoring through patrolling activities.

6.4.1.5 Collect, prepare and disseminate monitoring reports according to VCS/CCB plans (4.1.5)

Monitoring report was written with the baseline data collected for biomass, social and biodiversity. The report was translated and disseminated to the stakeholders. Additionally, a summary of the monitoring report was translated and disseminated to the workers.

6.5 Validation and Verification Completed (5)

6.5.1 Validation and Verification conducted in participatory manner to support management and achieve a Validated REDD+ Project Document with an established baseline for on-going measurement results (5.1 and 5.2)

6.5.1.1 Prepare for VCS Validation and Verification requirements for VCS/CCB (5.1.1 and 5.2.1)

Non-carbon sections were written along with baseline calculations, ex-post carbon calculations, non-biomass emissions and estimation of leakage potential. The MR has also been translated into Spanish.

6.5.1.2 Conduct VCS/CCB Validation and Verification (5.2.1 and 5.2.2)

PD and MIR were translated and disseminated in Spanish, and stakeholders comments were incorporated in the PD and MIR.

7 ADDITONAL PROJECT IMPACT INFORMATION

Document any additional information that provides the results of monitoring and shows how the project meets all indicators that require demonstration of impacts. Criteria and indicators of the Climate, Community & Biodiversity Standards *or requirements of the* VCS Standard *shall be referenced for each statement made in this section.*

APPENDIX 1: PROJECT RISKS TABLE

	Identified risk(s)	Potential impact of risk on stakeholders, ecosystem health, and biodiversity	Mitigation or preventative measure(s) taken
Impacts on biodiversity and ecosystems	Inadequate safety conditions for implementing project activities- Human -induced risk	Threaten safety conditions for employees	To mitigate this risk, it is important to prioritize safety measures such as provide personal protective equipment, establish safety protocols, provide ongoing training to employees, and monitoring and of working conditions.
Soil degradation and soil erosion	Natural risks caused by fire, pests and/or diseases	Threaten the project's success and impact local biodiversity, potentially hindering soil regeneration and the growth of forest species.	To mitigate these risks, the project will develop and adopt fire management strategies (installing fire breaks) and conduct pest monitoring controls to protect the growing trees and ecosystems.

APPENDIX 2: COMMERCIALLY SENSITIVE INFORMATION

Section	Information	Justification
A	Monitoring Plan	Project Internal Protocol for monitoring
B	Long Term Implementation Plan	Project Defined Activities
C	TGC Anticorruption Policy	Project Internal process
D	La Paz Anticorruption Policy: Manual de la Política y Procedimientos Sagrilaft	Project Internal process
E	Usufruct Contract Document	Project Internal process

APPENDIX 3: PROJECT ACTIVITIES AND THEORY OF CHANGE

Activity description	Expected climate, community, and/or biodiversity			Relevance to project's objectives
	Outputs (short term)	Outcomes (medium term)	Impacts (long term)	
1.1.1.1 Development of forest reforestation plan	1.1.1 Establishment of forest species	1.1 Aboveground and belowground biomass increase	1. Adopted regenerative climate-smart practices	The implementation of the activities will ensure that La Paz establish and maintain their forest, along with the implementation and establishment of a residue, organic waste management plan. All of which increases the carbon removals.
1.1.1.2 Planting of established forest species				
1.1.1.3 Efficient fertilizer management (synthetic products, mineral amendments)				
1.2.1.1 Organic waste management (weeds, crop residues, litter)	1.2.1 Establishment of forest management practices	1.2 Degraded soil areas rehabilitated		
1.2.1.2 Carry out silviculture activities (thinning, maintenance pruning)				
2.1.1.1 Increase number of job opportunities in the project area	2.1.1 Increase in the number of workers receiving extra benefits	2.1 Guarantee long-term economic income (minimum wages	2. Improve plantation workers' livelihoods	By implementing the activities of this outcome, there will be

Activity description	Expected climate, community, and/or biodiversity			Relevance to project's objectives
	Outputs (short term)	Outcomes (medium term)	Impacts (long term)	
2.1.1.2 Payment of minimum wages to workers (labor)		and extra legal benefits) to workers		better working conditions with multiple extra benefits, which in turn increases the chances of permanence of workers which benefits the maintenance of the project during its duration
2.1.1.3 Provide accommodation for workers				
2.1.1.4 Provide daily meals (3) to workers				
2.1.1.5 Provide transportation to-workers				
2.1.1.6 Implement bonus program				
2.2.1.1 Provide training about health, work safety and environmental management	2.2.1 Adoption of practices from trainings	2.2 Increase knowledge of workers		
2.2.1.2 Facilitate formal or informal education for the workers' family (SENA and other entities)				
2.3.1.1 Design and develop a health and safety prevention system at the workplace (staffing, procedures) under	2.3.1 Establishment of health and safety prevention system plan	2.3 Assurance of a safe and healthy work environment		

Activity description	Expected climate, community, and/or biodiversity			Relevance to project's objectives
	Outputs (short term)	Outcomes (medium term)	Impacts (long term)	
national regulations				
2.3.1.2 Implement recreational activities				
3.1.1.1 Perform integrated waste management (hazardous and non-hazardous)	3.1.1 Develop and Document a comprehensive strategy	3.1 Established Conservation Strategy	3. Preserve conservation areas (only native forests under 12Tree property) for biodiversity purposes	The implementation of the activities for this outcome will ensure the conservation and maintenance of the native forests through creation and maintenance of firebreaks, establishment of wildlife tracking activities and creation of an environmental policy, which will conserve the biodiversity existent.
3.1.1.2 Establishment of firebreaks and prevention of fires in the project area				
3.1.1.3 Develop and reinforce Zero Deforestation policy of native forest (HCV areas), wetlands, or HCS				
3.2.1.1 Wildlife tracking log by workers	3.2.1 Implementation of habitat restoration and biodiversity conservation initiatives in the project area	3.2 Restoration and conservation of biodiversity in the project area		
3.2.1.2 Establishment of an environmental policy to prevent hunting and illegal activities in the area of operation of the project				
4.1.1.1 Design continuous	4.1.1 Strengthen local capacity for	4.1 Establish local capacity for		The implementation

Activity description	Expected climate, community, and/or biodiversity			Relevance to project's objectives
	Outputs (short term)	Outcomes (medium term)	Impacts (long term)	
training plan with La Paz staff	continuous data collection over time	the development of the monitoring plan on the collection and registration of information on the farm	4. Monitoring and reporting	of monitoring and reporting activities are aligned with the VCS and CCB requirements to collect, analyze and disseminate findings.
4.1.1.2 Annual trainings on monitoring and project management				
4.1.2.1 Carry out training on how to carry out biomass inventory and data collection	4.1.2 Carry out biomass plot inventory and analysis of satellite images to define carbon reserves			
4.1.2.2 Acquire and analyze satellite images				
4.1.2.3 Perform QA/QC on biomass inventory and incorporate into monitoring report				
4.1.3.1 Collect, review and analyze data collected on social surveys and rural participatory diagnosis	4.1.3 Carry out social surveys according to VCS/CCB requirements			
4.1.3.2 Carry out social surveys				
4.1.3.3 Perform QA/QC and incorporate into monitoring report				

Activity description	Expected climate, community, and/or biodiversity			Relevance to project's objectives
	Outputs (short term)	Outcomes (medium term)	Impacts (long term)	
4.1.4.1 Trainings on biodiversity monitoring	4.1.4 Conduct biodiversity monitoring according to VCS/CCB requirements			
4.1.4.2 Carry out biodiversity assessment				
4.1.4.3 Perform QA/QC and incorporate into monitoring report				
4.1.5.1 The project collects information on monitoring activities for which it is responsible	4.1.5 Collect, prepare and disseminate monitoring reports according to VCS/CCB plans			
4.1.5.2 Prepare and disseminate monitoring reports every quarter of the year				
4.1.5.3 Monitoring reports are disseminated with the community and other interested partners				
5.1.1.1 Compile data for regular reports and scan all hard copies of monitoring data	5.1.1 Prepare for VCS Validation requirements for VCS/CCB	5.1 Validation conducted in participatory manner to support	5. Validation and Verification Completed	The implementation of the activities for this outcome ensures that the

Activity description	Expected climate, community, and/or biodiversity			Relevance to project's objectives
	Outputs (short term)	Outcomes (medium term)	Impacts (long term)	
5.1.1.2 Review and finalize the draft of monitoring plans		management and achieve a Validated REDD+ Project Document with an established baseline for on-going measurement results		Project is able to validate and verify its findings, which enables the generation of carbon credits
5.1.1.3 Write non-carbon Sections of VCS/CCB PDD				
5.1.1.4 Perform carbon calculations for VCS/CCB PDD: Baseline calculation of carbon under the project scenario				
5.1.1.5 Perform carbon calculations for VCS/CCB PDD: ex-ante calculations of carbon under project scenario				
5.1.1.6 Perform carbon calculations for VCS/CCB PDD: Calculations of the non-biomass related emissions				
5.1.1.7 Perform carbon calculations for VCS/CCB PDD: Estimation of leakage potential				

Activity description	Expected climate, community, and/or biodiversity			Relevance to project's objectives
	Outputs (short term)	Outcomes (medium term)	Impacts (long term)	
5.1.1.8 Translate draft Combined Project Document into Spanish				
5.1.1.9 Finalize VCS/CCB Combined Program Design Document				
5.1.2.1 Disseminate Spanish draft combined PD to appropriate stakeholders using appropriate means	5.1.2 Conduct VCS/CCB Validation			
5.1.2.2 Gather stakeholder comments on draft combined PD				
5.1.2.3 Incorporate stakeholders comments into the combined PD				
5.1.2.4 Facilitate communities' engagement with VVB and assist with field visit logistics				
5.1.2.5 Communities				

Activity description	Expected climate, community, and/or biodiversity			Relevance to project's objectives
	Outputs (short term)	Outcomes (medium term)	Impacts (long term)	
activity engage with VVB				
5.1.2.6 Conduct field visit with VVB				
5.1.2.7 1st round of CARs for VVB				
5.1.2.8 2nd round of CARs for VVB				
5.2.1.1 Compile data for regular reports and scan all hard copies of monitoring data	5.2.1 Prepare for VCS Verification requirements for VCS/CCB	5.2 Verification conducted in participatory manner to support management and achieve VCUs with carbon assets with multiple co-benefits created and monetized based on agreements		
5.2.1.2 Write non-carbon Sections of VCS/CCB MIR				
5.2.1.3 Perform carbon calculations for VCS/CCB MIR: ex-post calculations of carbon				
5.2.1.4 Perform carbon calculations for VCS/CCB MIR: Calculations of the non-biomass related emissions				
5.2.1.5 Perform carbon calculations for VCS/CCB MIR:				

Activity description	Expected climate, community, and/or biodiversity			Relevance to project's objectives
	Outputs (short term)	Outcomes (medium term)	Impacts (long term)	
Estimation of leakage potential				
5.2.1.6 Translate draft Monitoring and Implementation Report into Spanish				
5.2.1.7 Review and finalize the CCB monitoring plans				
5.2.1.8 Finalize VCS/CCB Monitoring and Implementation Report				
5.2.2.1 Disseminate Spanish draft combined Monitoring and Implementation Report (MIR) to appropriate stakeholders using appropriate means	5.2.2 Conduct VCS/CCB Verification			
5.2.2.2 Gather stakeholder comments on draft MIR				
5.2.2.3 Incorporate stakeholders				

Activity description	Expected climate, community, and/or biodiversity			Relevance to project's objectives
	Outputs (short term)	Outcomes (medium term)	Impacts (long term)	
comments into the MIR				
5.2.2.4 Activity engage with VVB and assist with field visit logistics				
5.2.2.5 Communities activity engage with VVB				
5.2.2.6 Conduct field visit with VVB				
5.2.2.7 1st round of CARs for VVB				
5.2.2.8 2nd round of CARs for VVB				

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