2020-2021 CORAZÓN VERDE DEL CHACO GROUPED REDD+ PROJECT MONITORING REPORT

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GHG Accounting/ Crediting Period	1 July 2020 – 30 June 2050; 30-year GHG Accounting Period with option to extend.
Monitoring Period of this Report	01 July 2020 – 31 December 2021.
History of CCB Status	The Project has completed validation to the CCB and is now undergoing verification to the CCB.
Gold Level Criteria	The Biodiversity Gold Level criteria is used. The Corazón Verde del Chaco Project is an avoided deforestation project and thus, protects important habitat for a wide range of species including the vulnerable giant anteater (*Myrmecophaga tridactyla*), the vulnerable lowland tapir (*Tapirus terrestris*), and the near threatened and iconic jaguar (*Panthera onca*).

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1 SUMMARY OF PROJECT BENEFITS

Quadriz has implemented a large-scale, VCS-CCB avoided planned deforestation REDD+ project to alleviate pressure on natural forest habitat in the Chaco Region in Paraguay. Quadriz's actions are:

1) Reducing greenhouse gas (GHG) emissions from the agricultural conversion process;
2) Sustaining local and regional water quality by limiting nutrient and sediment inputs to local waterways which result from conversion of forest land to agriculture;
3) Conserving fast disappearing stream, wetland, and forest ecosystems;
4) Undertaking local consultations and developing community projects; and
5) Protecting local fauna and flora.

Quadriz's project is the first, large-scale carbon project in the Chaco region. The Corazón Verde del Chaco Project is a unique and high-impact REDD+ project, which conserves tropical forest under immediate threat of deforestation.

The Paraguayan Chaco consists of mainly privately owned land, and very few legally protected natural reserves. The Chaco is one of the largest carbon sinks; nonetheless, it ranks as one of the most deforested forest areas on earth.

Cattle ranching and soybean production are the primary drivers of deforestation in the Chaco and charcoal production provides a lucrative incentive to justify the upfront costs of clearing forest for cattle.

Through the latest technology, careful management, and on-the-ground monitoring, the Corazón Verde del Chaco Project protects the tropical forest of the Chaco, a true biodiversity hotspot, and home to endemic and endangered animal species who heavily rely on the forest for their existence. The area covered by the Corazón Verde del Chaco Project contains vital wildlife corridors that allow animals to move freely around their territories, without interaction with external threats from humans. The Chaco ecoregion has been described by Sir David Attenborough as "one of the last great wilderness areas in the world."[1]

On the social level, the Corazón Verde del Chaco Project aims to have the greatest benefit for local communities in the vicinity of the Project Area. This is primarily achieved by increasing the incomes of locals through new, well-paid job opportunities and secure employment that are required to manage the Project. These jobs cover a range of skills, from employing and training local forest rangers to hiring employees to work in a planned visitor center.

[1] World Land Trust, "Defending the Chaco: What's at Stake?" Available: https://www.worldlandtrust.org/news/2014/04/defending-chaco-what-is-at-stake/

1.1 Unique Project Benefits

The following are a few, brief summaries of expected benefits of the Project not captured by the standardized CCB benefit metrics in Section 1.2, below.

Outcome or Impact	Achievements during the Monitoring Period	Section Reference	Achievements during the Project Lifetime
1) Chaco Med Flights:	During the 2020-2021 monitoring period, Quadriz: began the initial design of Chaco Med; reviewed potential plane models; assessed landing sites and locations of hospitals; reviewed relevant laws and regulations; designed a Chaco Med survey; spoke to pilots; and contacted two medical professionals about their interest in participating.	4	Chaco Med flights are estimated to impact the local communities through providing improved access to health facilities, life-saving medicine, and medical professionals. To date, Quadriz: began the initial design of Chaco Med; reviewed potential plane models; assessed landing sites and locations of hospitals; reviewed relevant laws and regulations; designed a Chaco Med Survey; spoke to pilots; and contacted two medical professionals about their interest in participating
2) Visitors to the Visitor Center:	During the 2020-2021 monitoring period, Quadriz: began the initial design of a visitor center; reviewed potential locations for the visitor center; discussed the content to be included in the visitor center; reviewed relevant laws and regulations; designed a visitor center survey.	4	The Project Proponent is in discussions on establishing a visitor center in the future, which would help expand awareness of the Project, along with awareness of the region's unique

			cultures and biodiversity. To date, Quadriz: began the initial design of a visitor center; reviewed potential locations for the visitor center; discussed the content to be included in the visitor center; reviewed relevant laws and regulations; designed a visitor center survey.
3) Wildlife Cameras Deployed	During the 2020-2021 monitoring period, Quadriz: reviewed wildlife camera models; purchased the wildlife cameras; hired a wildlife biologist to oversee the wildlife camera study; installed the wildlife cameras in the Project Zone; and recorded vulnerable and threatened species.	5	The deployment of wildlife cameras throughout the Project Area is expected to demonstrate the impact of the conservation activities on wildlife, including the effect of conserved forest canopy and wildlife corridors. To date, Quadriz: reviewed wildlife camera models; purchased the wildlife cameras; hired a wildlife biologist to oversee the wildlife camera study; installed the wildlife cameras in the Project Zone; and recorded vulnerable and threatened species.

1.2 Standardized Benefit Metrics

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	Not applicable.	N/A	Not applicable.
	Net estimated emission reductions in the project area, measured against the without-project scenario	862,222 tCO_2e	3	5,861,365 tCO_2e
Forest[2] cover	For REDD[3] projects: Number of hectares of reduced forest loss in the project area measured against the without-project scenario	6,821 hectares	3	20,515 hectares
	For ARR[4] projects: Number of hectares of forest cover increased in the project area measured against the without-project scenario	Not applicable.	N/A	Not applicable.
Improved land management	Number of hectares of existing production forest land in which IFM[5] practices have occurred as a result of the project's activities, measured against the without-project scenario	Not applicable.	N/A	Not applicable.
	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.	N/A	Not applicable.
Training	Total number of community members who have improved skills and/or	Approximately 5-10 community	4	Approximately 5-10 community

[2] 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*)
[3] 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*)
[4] 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*)
[5] 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*)

Category	Metric	Achievements during Monitoring Period	Section Reference	Achievements during the Project Lifetime
	knowledge resulting from training provided as part of project activities	members (i.e., training was provided for forest guards, orientation was provided to local Maria Auxiliadora community; etc.)		members (i.e., training was provided for forest guards, orientation was provided to local Maria Auxiliadora community; etc.)
	Number of female community members who have improved skills and/or knowledge resulting from training provided as part of project activities of project activities	Approximately 2-5 community members (i.e., orientation was provided to local Maria Auxiliadora community)	4	Approximately 2-5 community members (i.e., orientation was provided to local Maria Auxiliadora community)
Employment	Total number of people employed in of project activities,[6] expressed as number of full time employees[7]	Approximately 5-10 full-time people (i.e., for instance, forest guards and Quadriz full-time staff)	4	Approximately 5-10 full-time people (i.e., for instance, forest guards and Quadriz full-time staff)
	Number of women employed in project activities, expressed as number of full time employees	2 full-time women (i.e., Quadriz full-time staff and wildlife biologist)	4	2 full-time women (i.e., Quadriz full-time staff and wildlife biologist)
Livelihoods	Total number of people with improved livelihoods[8] or income generated as a result of project activities	Approximately 25-50 people (i.e., income generation due to being hired as forest guards and due to being hired by	4	Approximately 25-50 people (i.e., income generation due to being hired as forest guards and due to being hired by

[6] 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.
[7] 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])
[8] 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
		Quadriz; local landowner will receive revenue; and local communities at Maria Auxiliadora benefitting from Project's forest conservation activities)		Quadriz; local landowner will receive revenue; and local communities at Maria Auxiliadora benefitting from Project's forest conservation activities)
	Number of women with improved livelihoods or income generated as a result of project activities	Approximately 10-25 women (i.e., income generation due to being hired by Quadriz; and women at Maria Auxiliadora benefit from Project's forest conservation activities)	4	Approximately 10-25 women (i.e., income generation due to being hired by Quadriz; and women at Maria Auxiliadora benefit from Project's forest conservation activities)
Health	Total number of people for whom health services were improved as a result of project activities, measured against the without-project scenario	Chaco Med is a future activity and during the 2020-2021 monitoring period, there were little, to no, people who benefitted from the Project's health services.	4	Chaco Med is a future activity and to date, there were little, to no, people who benefitted from the Project's health services.
	Number of women for whom health services were improved as a result of project activities, measured against the without-project scenario	Chaco Med is a future activity and during the 2020-2021 monitoring period, there were little, to no, women who benefitted from the Project's health services.	4	Chaco Med is a future activity and to date, there were little, to no, women who benefitted from the Project's health services.

Category	Metric	Achievements during Monitoring Period	Section Reference	Achievements during the Project Lifetime
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	The visitor center is a future activity and during the 2020-2021 monitoring period, there were little, to no, people who benefitted from the Project's educational services.	4	Approximately 2 people (although the visitor center is a future activity, Quadriz is working in 2022 to give two scholarships to girls from the Maria Auxiliadora community).
	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	The visitor center is a future activity and during the 2020-2021 monitoring period, there were little, to no, women who benefitted from the Project's educational services.	4	Approximately 2 women (although the visitor center is a future activity, Quadriz is working in 2022 to give two scholarships to girls from the Maria Auxiliadora community)
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	N/A	Not applicable
	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	N/A	Not Applicable
Well-being	Total number of community members whose well-being[9] was improved as a result of project activities	Approximately 25-50 community members (i.e., training and	4	Approximately 25-50 community members (i.e., training and

[9] 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
		employment was provided for forest guards, orientation was provided to local Maria Auxiliadora community; Maria Auxiliadora community will also benefit from Project's forest conservation activities; etc.).		employment was provided for forest guards, orientation was provided to local Maria Auxiliadora community; Maria Auxiliadora community will also benefit from Project's forest conservation activities; etc.).
	Number of women whose well-being was improved as a result of project activities	Approximately 10-25 women (i.e., orientation was provided to women at Maria Auxiliadora community; Maria Auxiliadora women will also benefit from Project's forest conservation activities; etc.).	4	Approximately 10-25 women (i.e., orientation was provided to women at Maria Auxiliadora community; two girls from the Maria Auxiliadora community will receive scholarships in 2022; Maria Auxiliadora women will also benefit from Project's forest conservation activities; etc.).
Biodiversity conservation	Change in the number of hectares significantly better managed by the project for biodiversity conservation,[10] measured against the without-project scenario	31,858.6 ha	3	31,858.6 ha

[10] 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.

Category	Metric	Achievements during Monitoring Period	Section Reference	Achievements during the Project Lifetime
	Number of globally Critically Endangered or Endangered species[11] benefiting from reduced threats as a result of project activities,[12] measured against the without-project scenario	0 endangered or critically endangered species were identified at the Project Zone during the monitoring period.	5	0 endangered or critically endangered species were identified at the Project Zone during the Project Lifetime. There is a possibility of 4+ species being present: Endangered Chacoan peccary (*Catagonus wagneri*), the endangered Crowned solitary eagle (*Buteogallus coronatus*), endangered Chaco side-necked turtle (*Acanthochelys pallidipectoris*), and endangered marsh seedeater (*Sporophila palustris*).

[11] Per IUCN's Red List of Threatened Species
[12] In the absence of direct population or occupancy measures, measurement of reduced threats may be used as evidence of benefit

2 GENERAL

2.1 Project Description

2.2 Implementation Description

Quadriz B.V., based in the Netherlands, and local affiliate Quadriz Paraguay S.A., has teamed with Atenil S.A., a large landowner in the Paraguayan Chaco to undertake a Verified Carbon Standard and Climate, Community & Biodiversity Standards (VCS – CCBS) avoided planned deforestation project, known as the Corazón Verde del Chaco ("Green Heart of the Chaco") Project. The Paraguayan Chaco consists of mainly privately owned land, and very few legally protected natural reserves. The scenario existing prior to the implementation of the Project is that many private lands are being deforested for cattle ranching or soybean production and Atenil was seeking such a buyer for their land.

While the initial project property is approximately 31,858.6 hectares (ha), it is the intention to scale this grouped project to over 300,000 ha of privately owned land. The conditions under which grouped project eligibility has been established are: the baseline agent of deforestation will be similar large agribusinesses implementing industrial scale cattle ranches, each additional project instance will meet the applicability conditions of each VM0007 module used to develop this Initial Project Instance, and quantification of baseline, with-project, and leakage will follow the equations outlined in the Project Document.

By undertaking these conservation initiatives, Quadriz Paraguay S.A. and Atenil S.A. will alleviate pressure on natural forest habitat in the Chaco Region in Paraguay. The Corazón Verde del Chaco Project will mitigate deforestation pressures and the associated greenhouse gas emissions in the region, which is the main climate objective of the Project. The main community objective of the Project is to provide social programs to improve the livelihoods of community members living in the vicinity of the Project Area. The main biodiversity objective of the Project is the preservation of biodiversity, particularly medium-to-large mammals in the project areas.

During the 2020-2021 monitoring period, the Project: engaged a private landowner and an agreement was signed between the private landowner and Quadriz for the landowner to forego selling the property for eventual conversion; avoided deforestation; preserved habitat for several threatened and vulnerable mammals; purchased wildlife cameras, hired wildlife biologist, installed wildlife cameras in the Project Zone, and recorded several threatened and vulnerable species; began designing Chaco Med and a visitor center; established a local headquarters; and provided extensive project awareness through local community consultations and engagement with stakeholders.

Leakage and non-permeance risk factors were monitored and managed during the 2020-2021 monitoring period. Risk factors, such as encroachment, fire and illegal harvesting/logging, were monitored by on-the-ground forest patrols and via satellite imagery analysis. Illegal poaching was also monitored via forest patrols, along with the use of wildlife cameras. There were no reported outbreaks of pests, disease or invasive species (except for a feral pig, see section 5.1.5) throughout the Project Zone. Activity-shifting leakage will be monitored by identifying all the areas that may be expected to be converted to non-forest land by the agent/class outside the project boundaries during the baseline period. This will be accomplished by examining remote sensing data, legal records, and/or survey information. Market

leakage values calculated ex-ante are also used ex-post. No market leakage is calculated for the initial project instance as there is no harvesting of timber for commercial markets.

The total emissions reduced by the Project over the course of the 2020-2021 monitoring period are 862,222 tCO_2e.

Period	GHG emission reductions (tCO_2e)
2020	247,488
2021	614,734

There were no changes (i.e., such as changes to the Project Proponent or Other Entities) during the 2020-2021 monitoring period.

2.1.2 Project Category and Activity Type

Project Scope 14: Agriculture, Forest and other Land Use (AFOLU)

Project Category: Reduction Emission from Deforestation and Degradation (REDD)

Type of Activity: Avoided Planned Deforestation (APD)

Grouped Project: Yes

This Project is being registered under the Verified Carbon Standard and Climate, Community & Biodiversity Standards (VCS – CCBS) as a Reducing Emissions from Deforestation and forest Degradation (REDD+) project and has been developed in compliance with the Verified Carbon Standard, Version 4.0.[13] The Project will reduce emissions from planned deforestation.

2.1.3 Project Proponent(s)

Organization name	Quadriz Paraguay S.A.
Contact person	Marcel van Heesewijk
Title	CEO
Address	Registered Legal Address: Avda. Aviadores del Chaco 2050, WTC, Torre 1, P9, Asunción, Paraguay Asunción new office address: Avda. Aviadores del Chaco 2581, SkyPark, Torre 2, Piso 12, Asunción, Paraguay
Telephone	+33 6 48 58 12 88

[13] Verra. 2019 VCS Standard. Version 4.0, 19 September 2019. Washington, D.C.

Email	Marcel.van.Heesewijk@quadriz.com

2.1.4 Other Entities Involved in the Project

Organization name	Atenil S. A.
Contact person	Kiantar Betancourt and Diego Puente
Title	Kiantar is Chairman of Atenil S.A. and Diego is the CEO of Atenil S.A.
Address	R.I. 3 Corrales 659, Barrio, Mariscal Estigarribia, Asunción, Paraguay
Telephone	+595 (21) 623857 / 9
Email	Kiantar Betancourt: kbetancourt@victoria.com.py; Diego Puente: dpuente@victoria.com.py
Role in the Project	Passive Landowner

Organization name	Ostrya Conservation Inc
Contact person	James Eaton
Title	Director
Address	Post Office Box 153 Scottsville, Virginia, 24590 – United States
Telephone	+1 (708) 703-2552
Email	James.Eaton@OstryaConservation.com
Role in the Project	Advisor and implementation partner responsible for VCS and CCBS project development and ongoing monitoring, reporting and verification of the project over the crediting period.

Organization name	The Universidad Nacional de Asunción (National University of Asuncion)
Contact person	Andrea Weiler
Title	Independent Consultant; FACEN Post Grade Director and General Coordinator of the Nucleo de Investigación en Biodiversidad (NIB)
Address	Campus Universitario, San Lorenzo, Paraguay
Telephone	N/A
Email	andreaweiler1@gmail.com
Role in the Project	Andrea Weiler is a wildlife biologist and implementation partner conducting the biodiversity impact monitoring plan with the use of motion-sensitive, wildlife cameras over the crediting period.

2.1.5 Project Start Date (G1.9)

The Corazón Verde del Chaco Project has a project start date of July 1, 2020. On this day, Quadriz Paraguay S.A. and Atenil S.A. agreed to terms for the development of a planned REDD+ forest conservation project. This start date is supported by a July 9, 2020 email from Marcel van Heesewijk to the law firm Livieres Guggiari stating an agreement has been reached between the parties for undertaking a REDD project in the project area and requesting Livieres Guggiari draw up a contract. GHG reduction/removal activities began on this date such that the project property will no longer be considered for conversion to a cattle ranching enterprise. This understanding was documented in the Letter of

Agreement for Verified Carbon Unit Credits, signed on September 28, 2020, between Quadriz Paraguay S.A. and Atenil S.A.

2.1.6 Project Crediting Period (G1.9)

The Corazón Verde del Chaco Project has an initial project crediting period of 30 years, starting on July 1, 2020. The initial baseline period started on July 1, 2020 and is set to continue through June 30, 2030. The initial project crediting period is set to end on June 30, 2050. The agreement with the landowner may be renewed, thus potentially extending the Project Crediting Period, Benefits Assessment Period, and Project Lifetime.

2.1.7 Project Location

The Corazón Verde del Chaco Project is located in the Departments of Presidente Hayes, Alto Paraguay, and Boquerón, with the first project instance located in the Department of Presidente Hayes. The Corazón Verde del Chaco Project's initial project instance is 160 kilometers (km) east of Filadelfia and 330 km north northeast of Asuncion. The initial Project Area (i.e., forested area of the property as of the project start date, and 10 years prior) is 20,515.0 hectares. This represents approximately 64% of the project property which totals 31,858.6 hectares. The remainder of the property is not eligible as a REDD+ project as it is protected as a riparian area, a set aside green reserve (i.e., 25% of the mesoxerophytic semi-deciduous forested area), or nonforest. Delineation of the Project Area is discussed in detail in Section 3.2.1 in the Section on the Legal Permissibility for Deforestation.

Map 2.1. Map of the Corazón Verde del Chaco project area and project property.

2.1.8 Title and Reference of Methodology

The Corazón Verde del Chaco Project is utilizing the Avoided Deforestation Partners' VCS REDD Methodology, entitled, "VM0007: REDD Methodology Modules (REDD-MF)." The only eligible activity as part of this Project is avoiding planned deforestation, hence only modules related to planned deforestation are required. This Project is eligible as an avoiding planned deforestation project because the forest land is expected to be converted to non-forest land in the baseline case and the land is legally permitted to be converted to non-forest. The specific modules applied to the Corazón Verde del Chaco Project are listed below.

REDD-MF, REDD Methodology Framework Version 1.6

<u>Carbon pool modules:</u>

CP-AB "VMD0001 Estimation of carbon stocks in the above- and belowground biomass in live tree and non-tree pools", version 1.1

CP-D, “VMD0002 Estimation of carbon stocks in the dead-wood pool,” version 1.0

CP-L “VMD0003 Estimation of carbon stocks in the litter pool”, version v1.0

CP-W, “VMD0005 Estimation of carbon stocks in the long-term wood products pool,” version 1.1

Baseline module:

BL-PL “VMD0006 Estimation of baseline carbon stock changes and greenhouse gas emissions from planned deforestation/forest degradation and planned wetland degradation”, version 1.3

Leakage modules:

LK-ASP “VMD0009 Estimation of emissions from activity shifting for avoided planned deforestation/forest degradation and avoided planned wetland degradation”, version 1.3

Monitoring module:

M-REDD “VMD0015 Methods for monitoring of greenhouse gas emissions and removals”, version 2.2.

Miscellaneous Modules:

E-BPB “VMD0013 Estimation of greenhouse gas emissions from biomass and peat burning”, version 1.2.

X -STR “VMD0016 Methods for stratification of the project area”, version 1.2.

X-UNC “VMD0017 Estimation of uncertainty for REDD project activities”, version 2.2.

Tools:

T-SIG, CDM tool “Tool for testing significance of GHG emissions in A/R CDM project activities,” version 1.0

T-ADD, “VT0001 Tool for the Demonstration and Assessment of Additionality in VCS Agriculture, Forestry and Other Land Use (AFOLU) Project Activities,” version 3.0

T-BAR, “VCS AFOLU Non-Permanence Risk Tool,” version 4.0,

Use of modules, REDD-MF, M-REDD, T-ADD, T-BAR, X-UNC, and X–STR, is always mandatory when using the VM0007 methodology. Further use of modules, BL-PL and LK-ASP, is mandatory in the case of projects focusing on planned deforestation. Use of the module T-SIG determines whether GHG emissions by sources and/or decreases in carbon pools are insignificant. Finally, CP-AB is mandatory in all cases and while CP-L and CP-D is optional as the litter and dead wood pool is greater in the project scenario than the baseline scenario.

2.1.9 Other Programs (G5.9)

The Project is not participating in any other emissions trading program or other mechanism that includes GHG allowance trading. Similarly, the Project is not generating any GHG emission reductions and removals to be used for compliance under any such programs or mechanisms. If an opportunity should arise for the Project to participate in a compliance program, such as under the Carbon Offset and Reduction Scheme for International Aviation (CORSIA) or under Article 6 of the Paris Agreement, then the Project will follow Verra’s prescribed procedures.

The Corazón Verde del Chaco Project has not sought, nor received, any other GHG-related environmental credits such as Renewable Energy Certificates (RECs), biodiversity offsets, or water credits, nor has it registered, nor is it seeking registration, under any other GHG Programs than VCS and CCBS.

Furthermore, the Corazón Verde del Chaco Project has not been rejected by other GHG Programs.

2.1.10 Sustainable Development

Paraguay aims to achieve the 17 Sustainable Development Goals (SDGs). The following SDGs are those that are most likely to be achieved by the Corazón Verde del Chaco Project, including during the 2020-2021 monitoring period:

1) No poverty - The Project is working to increase the communities' incomes by providing access to good paying jobs, such as the local forest monitors (i.e., forest guards or rangers) who were hired.
2) Zero hunger - The Project is working to increase the communities' incomes which will also help reduce hunger.
3) Good health and well-being - The Project is working to provide good paying jobs which will improve workers' health and well-being. Further, Chaco Med, which was partially designed during the 2020-2021 monitoring period, will provide an invaluable service to the remote communities throughout the Chaco.
4) Quality education - The Project will provide training and education to workers about workers' rights and workplace safety. The visitor center, which was partially designed during the 2020-2021 monitoring period, will also provide educational opportunities about the importance of forest conservation.
5) Gender equality - The Project has hired both men and women with advancement opportunities available to everyone.
6) Clean water and sanitation - Access to clean water and sanitation facilities are provided to all guests and workers. In addition, the Project's activities will reduce erosion and water runoff, including runoff from cattle ranches.
7) Affordable and clean energy - The Project's electricity is primarily supplied from the Foz Iguazu Hydroelectric Plant. In the future, solar panels might be installed throughout the Project's remote areas, such as at the guard stations and the visitor center.
8) Decent work and economic growth - The Project is providing work to local communities and is developing a sustainable economic model for the region.
9) Industry, innovation and infrastructure - The Project is developing a new, innovative industry for the region which is focused on giving financial value to standing forests.
10) Reduced inequalities - The Project is seeking to reduce inequalities by providing, amongst many things, good paying jobs.
11) Sustainable cities and communities - The Project is protecting the Chaco Forest and safeguarding this important cultural and natural heritage. The Chaco Forest is under grave threat from deforestation and the surrounding area of Puerto Casado and La Victoria are important historical sites.
12) Responsible consumption and production - The Project, as a forest conservation project, is promoting sustainable management and efficient use of the area's natural resources.
13) Climate action - One of the main goals of the Project, which were accomplished during the 2020-2021 monitoring period, is to reduce deforestation and its associated GHG emissions.

14) Life below water - The conservation activities will reduce erosion and water runoff, including runoff from cattle ranches, which will benefit local waters and the adjacent river ecosystems.
15) Life on land - One of the main goals of the Project is to reduce deforestation and to conserve the rich biodiversity of the surrounding Chaco forests, including jaguars.
16) Peace, justice and strong institutions - The Project will encourage strong institutions, including the rule of law.
17) Partnerships for the goals - The Project is the result of strong international and domestic partnerships including amongst the Project Proponent, local communities, local landowners, a local university, and government officials.

2.2 Project Implementation Status

2.2.1 Implementation Schedule (G1.9)

Below are some of the key dates and milestones in the Project's development and implementation, including current accomplishments during the 2020-2021 monitoring period:

Date	Milestone(s) in the Project's development and implementation
2013, January	Investancia Paraguay S.A. is established.
2013, May	Investancia Holding B.V. is established in the Netherlands.
2015, October	Construction of the local Chaco headquarters at Estancia Santa Rosanna is initiated.
2019, February	Quadriz B.V. is established in the Netherlands.
2020, February to April	Ostrya Conservation undertakes REDD+ feasibility study in Paraguay.
2020, April 29	Development Agreement signed between Ostrya Conservation and Investancia.
2020, July 1	Quadriz Paraguay S.A. and ATENIL S.A. agreed to terms for the development of a planned REDD+ forest conservation project.
2020, September 28	Letter of Agreement for Verified Carbon Unit Credits, signed between Quadriz Paraguay S.A. and ATENIL S.A.
2021, March	Quadriz conducts initial community survey, known as a Degradation Survey, around Corazón Verde del Chaco I.
2021, March 12	Quadriz Paraguay S.A. officially registered on March 12, 2021.
2021, June	Quadriz Paraguay S.A., in conjunction with Andrea Weiler, installs the first round of wildlife cameras as part of the biodiversity impact monitoring plan.
2021, August	Quadriz conducts followed up community surveys, known as a Participatory Rural Assessment (PRA), around Corazón Verde del Chaco I.
2021, November 18	Signature of updated Letter Agreement with DRSF between Atenil and Quadriz called "Acuerdo para créditos por unidades verificadas de carbono ATENIL – QUADRIZ."
2022 (anticipated)	Expected validation of grouped REDD+ project
2022 (anticipated)	Expected registration of grouped REDD+ project
2022	Initial monitoring and verification undertaken, with subsequent verifications to take place at least every five years thereafter.
2023 (anticipated)	The tentative, second round of community surveys to take place. The plan is to undertake the community surveys approximately every two years.
2025 (anticipated)	Second monitoring and verification undertaken, if not sooner.
2026 (anticipated)	The tentative, second round of using wildlife cameras to take place. The plan is to undertake the biodiversity impact monitoring plan using wildlife cameras approximately every five years.
2030 (anticipated)	Project's baseline revision to take place.

2.2.2 Methodology Deviations

The following deviations to the methodology are applied.

1) While sampling lying dead wood using the line intersect method:
    a. Two 100-meter transect lines were used rather than two 50-meter transect lines;
    b. The sampling lines did not bisect each sample plot, but rather ran from one plot center to the next; and
    c. The sampling lines were oriented to the north and east, and no randomization in the bearing of the first line was employed.

    This approach does not negatively impact the conservativeness of the quantification and improves the accuracy of the lying dead wood sampling by enlarging the sampling unit.
2) Rather than using a root to shoot ratio to estimate belowground biomass as per the CP-AB module, belowground biomass was estimated using an allometric equation developed by Cairns et al.[14] This alternative method is more efficient for the project-specific circumstances as only one equation is needed for the project. Further, Cairns et al. is appropriate for determining belowground biomass as this equation is published in a peer-reviewed scientific journal and is cited in IPCC 2006 Annex 4A.2 (page 4.116). This source is appropriate as we are using a more recent version of IPCC guidance similar to the VCS Standard guidance "Where external documents are referenced, such as the IPCC 2006 Guidelines for National GHG Inventories, and such documents are updated, the most recent version of the document shall be used." This deviation is likely to yield the same level of accuracy (or better) given the wide range of root-to-shoot ratios found in the IPCC GL AFOLU guidance as found in the methodology. In fact, guidance for methodologies as found in VCS AFOLU Requirements version 3.4 specifically mentions the Cairns et al. equations in reference to established procedures for quantifying belowground biomass, thus further indicating the appropriateness of this source.
3) Rather than monitoring Cpost using modules CP-AB and CP-D as described in the M-REDD modules, C(post) can conservatively be assumed to be zero in the with-project case, not only for natural disturbance (CP,Dist,q,i , as stated in the M-REDD module) but also for deforestation (CP,post,u,i). This deviation is conservative because subtracting zero from the baseline stocks, leads to the conclusion that ΔCpools,Def,u,i,t is equal to C(BSL,i), which leads to the maximum emission in the with-project case, which is conservative. This deviation may be used for the first and each subsequent monitoring period.
4) The forest inventory has deviated from the criteria for selection (i.e., the equation is based on a datasets comprising at least 30 trees, with an r^2 that is ≥ 0.8) and validation of the allometric equation related to palm biomass, however the equation used is likely to result in a conservative estimate of palm biomass for the following reasons:
    a. Volume is calculated as the volume of a paraboloid rather than the volume of a cylinder; and
    b. Only stem biomass is estimated, thus conservatively excluding other aboveground biomass including palm fronds.

[14] Cairns, M. A., S. Brown, E. H. Helmer, and G. A. Baumgardner. 1997. Root biomass allocation in the world's upland forests. Oecologia 111, 1-11.

5) This project deviates from using the default value for the carbon fraction of dry litter matter as provided in the CP-L module (VMD0003, Version 1.0). Rather, a value of 0.47 t C t^{-1} d.m was used for this project. This carbon fraction value is appropriate as it is in line with VCS guidance that where "external documents are referenced, such as the IPCC 2006 Guidelines for National GHG Inventories, and such documents are updated, the most recent version of the document shall be used." The default value provided in the CP-L module was sourced from IPCC 2003. The updated value of 0.47 t C t^{-1} d.m is derived from page 4.48 of the IPCC 2006 Guidelines for National GHG Inventories. This value corresponds with the value for "all parts of the tree" and was sourced from McGroddy[15] et al., 2004. Finally, this value of 0.47 was also cited as the carbon fraction for foliage component in tropical and subtropical forest in the IPCC table on page 4.48, as sourced from Feldpausch et al., 2004. This represents a deviation to "data and parameters available at validation". This methodology deviation is warranted as it increases the accuracy of the quantification of GHG emission reductions or removals.
6) This project deviated from the VM0007MF,v1.6 requirement "The starting date of this [Historical Reference Period] must be between 9 and 12 years in the past and the end date must be within two years before project start date". This idea of a historical reference period only makes sense in terms of an unplanned REDD project where the rate of deforestation is defined over a distinct period of time, as opposed to the "number of years over which deforestation occurred in land parcel pn in proxy area" as defined in the BL-PL module. Notably, there is no mention of a historical reference period in the BL-PL module. One of criteria for identifying proxy areas, as stated in BL-PL module is "Deforestation in the proxy area must have occurred within the 10 years prior to the baseline period" thus clearly conflicting with the VM0007MF,v1.6 Historical Reference Period requirement. This requirement does not specify the starting year for the deforestation in the proxy years. Rather, one of the parameters used in determining "D%planned,i,t" (i.e., the projected annual proportion of land that will be deforested in stratum i during year t) is the parameter "Yrspn". This parameter is the number of years over which deforestation occurred in land parcel pn in proxy area. This change represents a deviation to "parameters available at validation." This methodology deviation doesn't impact the project conservativeness or accuracy, since VMD0006-BL-PL requirements are met. Further, this deviation does not negatively impact the conservativeness of the quantification of GHG emission reductions or removals because it does not affect the quantification of GHG emission reductions or removals.

2.2.3 Minor Changes to Project Description (Rules 3.5.6)

There were no community or biodiversity changes to the Project's design during the 2020-2021 monitoring period.

[15] McGroddy, Megan E., Tanguy Daufresne, and Lars O. Hedin. "Scaling of C: N: P stoichiometry in forests worldwide: Implications of terrestrial redfield-type ratios." *Ecology* 85, no. 9 (2004): 2390-2401. McGroddy et al., 2004 investigated C, N, and P in forest foliage and litter and used a carbon value of 47% of reported biomass, based on the mean of reported data.

2.2.4 Project Description Deviations (Rules 3.5.7 – 3.5.10)

There are no deviations during the 2020-2021 monitoring period to the Project's project description.

2.2.5 Grouped Projects

Although this is a Grouped Project, no new project instances or communities have been added or identified since project submission.

1) **New Project Areas and Communities (G1.13)**

   No new project instances or communities have been added.

2) **Removed Project Areas and Communities (G1.13)**

   No project instances or communities have been removed.

3) **Eligibility Criteria for Grouped Projects (G1.14)**

   There are no new project instances or communities to demonstrate eligibility criteria for.

4) **Scalability Limits for Grouped Projects (G1.15)**

   Scalability limits for a 300,000+ hectares REDD+ project in the Chaco Region of Paraguay are not applicable.

5) **Risk Mitigation for Grouped Projects (G1.15)**

   There are no serious scalability limits, as each project instance will have their own funds and own management; more projects will result in more VCUs, which results in more funds and more funds will enable managing more projects. Quadriz, alongside its dedicated service providers, has an onsite, world-class team with in-depth knowledge of the Chaco, land rights, and other legal aspects related to running REDD+ projects. This said, incorporating 300,000 hectares, or more, is the goal of this grouped project, not the Project's threshold.

6) **Project Zone Map (G1.13)**

   Not applicable – no additional communities or project areas were added to the Project during the 2020-2021 monitoring period.

7) **Changes to Management (G4.1)**

   There were no changes to the management structure, roles, and/or responsibilities that resulted from new entities joining the Project during the 2020-2021 monitoring period.

2.2.6 Risks to the Project (G1.10)

The Project Proponent regularly discusses the natural and human-induced risks to the Project's expected climate, community and biodiversity benefits. Such risks, which were discussed during the monitoring period, include:

- Encroachment into the Project Areas by local farmers;
- The presence of anthropogenic fire in this dry forest ecosystem; and
- The potential for illegal logging, hunting, or other unapproved use of the land.

This said, there are no known risks throughout the Project Zone associated with invasive species, pest or disease infestation, or risks associated with in-migration from outside communities. None of these risks occurred during the monitoring period.

The Project will regularly monitor for deforestation via onsite forest guard patrols, camera traps, and periodic review of satellite imagery. This will ensure quick identification of encroachment by local farmers or fire. Further, guard houses were established in 2022 to deter individuals interested in illegal logging, hunting, or other unapproved use of the land.

Specifically, during the 2020-2021 monitoring period to identify the presence of fires, along with to mitigate encroachment and the potential for illegal logging, hunting, or other unapproved use of the land, the following measures were taken:

- A guard was hired in October 2021, to establish a presence and to initiate informal monitoring;
- Posters/signs were placed at strategic points; and
- A monitoring for deforestation template was designed.

Although outside the current monitoring period, in 2022, the following measures were taken:

- A guard house was built;
- A guard service, called "Los Guardianes" was hired for the area, who are in charge of patrols and in charge of the entrance to the property;
- A Fire Prevention and Control Plan was finalized in March 2022;
- Patrols officially started during the first quarter of 2022; and
- A patrol log started during the last quarter of 2022.

2.2.7 Benefit Permanence (G1.11)

The Project will mitigate deforestation pressures and the associated greenhouse gas emissions in the region, which is the main climate objective of the Project. The main community objective of the Project is to provide social programs to improve the livelihoods of community members living in the vicinity of the Project. The main biodiversity objective of the Project is the preservation of biodiversity, particularly medium-to-large mammals in the project areas. To ensure these climate, community and biodiversity benefits of the Project are maintained and enhanced beyond the project lifetime, the Chaco Forest,

particularly the Chaco Forest within the initial project instance, needs to remain as forest. To accomplish this overarching objective, the following measures are needed and designed:

- The continuing involvement and support of Quadriz, the landowner(s), universities, the Paraguayan Government, and local communities are needed to ensure ongoing management and monitoring of the project takes place. To this end, Quadriz has hired expert local staff, has training plans in place to ensure staff continuity, and ongoing stakeholder engagement plans to help ensure ongoing support. Such actions took place during the 2020-2021 monitoring period;

- Ongoing funding is needed to help finance some of the activities beyond the project lifetime, such as Chaco Med, monitoring community benefits, and monitoring medium-to-large mammals using wildlife cameras. Quadriz has developed a pro forma to model the ongoing costs and revenue associated with the Project. This pro forma has been refined throughout the 2020-2021 monitoring period;

- Purchasing the land, donating the land to a conservation organization, placing some type of conservation easement, or extending the Project Lifetime beyond the initial 30 years is needed to ensure ongoing conservation of the forest within the initial project instance. Quadriz is continuing to explore these potential, long-term options;

- Helping other landowners and the Paraguayan Government undertake additional conservation projects will help ensure other REDD+ projects are implemented (i.e., which would presumably last longer than the initial project instance) and such projects would further contribute to mitigating global climate change. Quadriz has actively reached out to such stakeholders during the 2020-2021 monitoring period; and

- The visitor center, Chaco Med, and the educational facilities are needed to remain to maintain the community benefits beyond the project lifetime. The visitor center and Chaco Med will be implemented, even if no other project instances are added to the grouped project. Further, there is a chance the daily operations of the visitor center and of Chaco Med could potentially be taken over by local organizations after the initial 30-year period. During the 2020-2021 monitoring period, there were reforms made to the visitor center in October 2021 and for Chaco Med, in 2021, Quadriz engaged with Danilo Costas, an expert pilot, to compile information about emergency flights, aircraft requirements, and minimum runway conditions. In 2022, professional fees were paid to Danilo Costa for his expert advice and also in 2022, the Quadriz team worked on a formal document with objectives, indicators, expected results and other information related to Chaco Med.

2.3 Stakeholder Engagement

2.3.1 Stakeholder Access to Project Documents (G3.1)

Project documentation, including the VCS-CCB project description and the VCS-CCB monitoring reports, have been, and will continue to be, made accessible to communities and other stakeholders throughout the Project Lifetime in the following manner:

- The project documents are posted online at the Verra website and on the Quadriz website. For the Project's validation, the public comment period dates were October 6, 2021 to November 5, 2021. Quadriz also posted the public comment period for the Project's validation announcement on its website on October 6, 2021. For the Project's verification of the 2020-2021 monitoring period, the public comment period dates were April 25, 2022 to May 24, 2022. Quadriz posted the public comment period for the Project's 2020-2021 verification announcement on its website on April 26, 2022.

- If possible, the project documents will also be registered and posted on the Paraguayan Government's designated website via MADES. Thus, on MADES' website (see here: http://dncc.mades.gov.py/registro-de-reduccion-de-emisiones-en-paraguay), there will be a link to the Project's page in Verra, which has the full project documents;

- Physical copies of project documents, as of 2021, are now available at Quadriz's headquarters, located at Estancia Santa Rosanna, at the visitor center in Puerto Casado, along with at Quadriz's Asunción office located at: Avda. Aviadores del Chaco 2581, SkyPark, Torre 2, Piso 12, Asunción, Paraguay;

- The project documents have been, and will continue to be, distributed to local communities and other stakeholders, including to local schools, the mayor's office, etc. For the initial project instance, the draft summary project document has been sent via WhatsApp to Patricia Villalba, the daughter of the Maria Auxiliadora community leader Hermenegildo Vera. Upon the Project achieving validation, the finalized summary documents and the finalized Project Description will be delivered in person to the Maria Auxiliadora community by Fredy Montoya and Gabriela Viñales. This action is expected to take place in Q4 2022 or Q1 2023; and

- Quadriz has, and will continue, to reach out to local Chaco TV and radio stations (i.e., such TV and radio station announcements mention to audiences how to access the full project documents), along with posting information on its LinkedIn page. For the initial project instance, for example, the radio announcement did mention that anyone can access the full project documents by searching for the VCS Project ID# 2611 at the Verra Registry or at the Quadriz website under the blog section.

This process will be followed for the initial project instance and for all future project instances under the grouped project over the project lifetime. Further, all communities within the project instance's project zone (i.e., within 20 kilometers of the project instance) will be eligible to receive the project's full project documents, if they are interested.

2.3.2 Dissemination of Summary Project Documents (G3.1)

As previously mentioned, the Chaco region where the Project is located is remote and there are few local communities. Nevertheless, the summary project documentation, including information required for G1.1-9, was, and will continue to be, actively disseminated to communities. This summary information and monitoring results was, and will continue to be, actively disseminated to communities by Federico ("Fredy") Montoya, the Field Manager at Investancia / Quadriz Paraguay S.A. and/or by Gabriela Viñales, the REDD+ Manager at Quadriz Paraguay S.A. Further, Fredy Montoya and/or Gabriela Viñales explain the audit process, solicit public comments, and inform the local communities and other stakeholders

about upcoming auditor visits. This process was followed for the initial project instance and will be followed for all future project instances under the grouped project over the project lifetime. Further, all communities within the project instance's project zone (i.e., within 20 kilometers of the project instance) will be eligible to receive the project's summary project documents, if they are interested.

For the initial project instance, the draft summary project document has been sent via WhatsApp to Patricia Villalba, the daughter of the Maria Auxiliadora community leader Hermenegildo Vera. Upon the Project achieving validation, the finalized summary documents and the finalized Project Description will be delivered in person by Fredy Montoya and Gabriela Viñales to the Maria Auxiliadora community. This action is expected to take place in Q4 2022 or Q1 2023.

If Fredy Montoya and/or Gabriela Viñales were to leave Quadriz, there will be another person hired and trained to conduct similar work for Quadriz.

2.3.3 Informational Meetings with Stakeholders (G3.1)

Quadriz holds a variety of informational meetings with communities and local stakeholders.

Meetings with government officials, such as MADES or INFONA, are set up in advance via email or phone calls and oftentimes, an agenda is shared in advance. Such meetings take place via virtual Zoom meetings or in person at the MADES or INFONA offices in Asuncion. Such information meetings throughout 2020 and 2021 included discussions about the status of Paraguay's national REDD+ work, what map layers and data sources are available, and how private projects can register with the Paraguayan Government (See Section 2.3.7. for additional information). More specifically, Quadriz received an acknowledgement letter from MADES about the Project in October 2021, Quadriz met with WWF in September 2021, Quadriz met with INFONA on November 9, 2021, and Quadriz met with MADES on November 29, 2021

Meetings with local landowners are set up in advance via word-of-mouth, phone calls, WhatsApp messages, or via email. Several meetings with the local landowner of the initial project instance, Atenil, have been held throughout 2020 and 2021. Such meetings included discussions about the project's costs, risks and benefits, about the minimum project lifetime, and how Atenil must forego deforesting and selling the property (see Section 2.3.7. for additional information).

Throughout 2020 and 2021, personnel meetings between Quadriz and Ostrya Conservation, including with local staff, are held every 1 - 2 weeks.

The first time Quadriz made contact with the Maria Auxiliadora community, Gabriela Viñales and Fredy Montoya spoke to another indigenous leader in Puerto Casado, Francisca Centurión, who knew the Maria Auxiliadora community well. Gabriela Viñales got the contact information for Francisca Centurión from the Atenil landowner. Francisca Centurión made the connection for Gabriela Viñales and Fredy Montoya with Hermenegildo Vera, the leader of the Maria Auxiliadora community. For the first visit, held in March 2021, Gabriela Viñales, Fredy Montoya, and Francisca Centurión visited the Maria Auxiliadora community together. During this first visit, Gabriela Viñales and Fredy Montoya met Hermenegildo Vera, Patricia Villalba (the daughter of Hermenegildo Vera), and with other people in the community. Gabriela Viñales and Fredy Montoya also did interviews via the Forest Degradation Surveys and via the Participatory Rural

Assessments with three people from the community. Also, during this first visit, Gabriela Viñales and Fredy Montoya got the cell phone / WhatsApp number for Patricia Villalba.

After the first visit to the Maria Auxiliadora community, Gabriela Viñales, Fredy Montoya and Francisca Centurión visited the nearby San Isidro community. Gabriela Viñales and Fredy Montoya mentioned they had just visited the Maria Auxiliadora, but the San Isidro community were not ready for outsiders and wanted more time to decide whether to participate in the Project.

A second visit to the Maria Auxiliadora community and to the San Isidro community took place in August 2021.

For all future visits to the Maria Auxiliadora community, including to inform the community about the upcoming validation and ongoing verifications, Gabriela Viñales and/or Florencia Arano will contact Patricia Villalba via her cell phone / WhatsApp and then Patricia Villalba will inform the Maria Auxiliadora community of Quadriz's upcoming visit.

2.3.4 Community Costs, Risks, and Benefits (G3.2)

There are two communities in the initial Project Zone and there are no communities living in the initial Project Area. The communities in the initial Project Zone are two small indigenous communities known as the Maria Auxiliadora and San Isidro. Maria Auxiliadora has approximately 20 families and San Isidro has approximately 14 families.[16]

The community at San Isidro has been visited twice by Quadriz, but the community would like more time to decide whether to participate in the Project.

Nevertheless, community surveys known as a Degradation Survey and a Participatory Rural Assessment (PRA) were administered in March and August 2021 at the Maria Auxiliadora community in order to help identify perceived costs or risks from the community, along with the desired benefits from the Project.

The PRAs were administered by Federico ("Fredy") Montoya, the Field Manager at Investancia / Quadriz Paraguay SA, and Gabriela Viñales, the REDD+ Lead Project Manager. Gabriela Viñales and Fredy Montoya are from Paraguay, speak the local languages, and visited the communities to discuss in person all aspects of the Project. The Maria Auxiliadora community did not foresee any costs or risks for their community and appreciated the benefits by the Project. The Project Proponent believes there are no costs or risks for the community at San Isidro. Further, the Project Proponent will continue to try to engage with the San Isidro to understand whether they foresee any potential costs or risks of the Project to their community and the Project Proponent will offer to provide the Project's benefits to their community.

2.3.5 Information to Stakeholder on Verification Process (G3.3)

The summary information with monitoring results were, and will continue to be, actively disseminated to communities by Federico ("Fredy") Montoya, the Field Manager at Investancia / Quadriz Paraguay S.A. and/or Gabriela Viñales, the REDD+ Manager at Quadriz Paraguay S.A. This took place for the October 6, 2021 to November 5, 2021 public comment period for the Project's validation and this took place for

[16] Federation for Self-Determination of Indigenous Peoples. "Map." Available: https://www.tierrasindigenas.org/Mapa

April 25, 2022 to May 24, 2022 public comment period for the Project's verification of the 2020-2021 monitoring period.

Further, Fredy Montoya and/or Gabriela Viñales explained the validation audit process, solicited public comments, and informed the local communities and other stakeholders about the upcoming auditor visits. The same process was followed for the 2020-2021 verification and will be followed for ongoing verifications. With this in mind and regarding communication methods used for the communities to inform them of the validation process, Gabriela Viñales and Fredy Montoya got the cell phone / WhatsApp number for Patricia Villalba, the daughter of the community leader, during their first visit to the Maria Auxiliadora community. For all future visits to the Maria Auxiliadora community, including to inform the community about the ongoing verifications, Gabriela Viñales and/or Florencia Arano will contact Patricia Villalba via her cell phone / WhatsApp and then Patricia Villalba will inform the Maria Auxiliadora community of Quadriz's upcoming visit.

Regarding other stakeholders, such as MADES and INFONA, these entities were informed of the validation process and the 2020-2021 verification via email, via phone calls, and/or in person meetings. The same process will be followed for ongoing verifications.

Further, local radio announcements were made in July 2021 about the Project and in October 2021 about the Project's public comment period.

2.3.6 Site Visit Information and Opportunities to Communicate with Auditor (G3.3)

Fredy Montoya and/or Gabriela Viñales explained the validation audit process, solicited public comments, and informed the local communities and other stakeholders about the upcoming auditor visits. The same process was followed for the 2020-2021 verification and will be followed for ongoing verifications. For the onsite validation, the 2020-2021 verification, and for all future verification audits, the auditors will have direct and independent communication with both the local communities and other stakeholders.

2.3.7 Stakeholder Consultation (G3.4)

The Project Proponent has held numerous stakeholder consultations with communities and other stakeholders, including several meetings which have influenced the overall project design. A sample of these stakeholder consultations are included below, including those undertaken during the 2020-2021 monitoring period:

August 16-22, 2019: Quadriz and Ostrya Conservation visit Paraguay to visit Quadriz's local Chaco headquarters and meet the local management team and local staff.

February 2-8, 2020: Quadriz and Ostrya Conservation visit Paraguay to: visit potential REDD+ project sites; meet local landowners; better understand local ecological and social conditions leading to deforestation; meet government officials in Asunción, including representatives from United Nations Development Programme (UNDP), Ministerio del Ambiente y Desarrollo (MADES; Ministry of Environment and Development) and Instituto Forestal Nacional (INFONA; National Forestry Institute); meet representative from a local forestry firm for potential forest carbon inventory work; and to meet with law firm Livieres Guggiari to better understand land ownership and carbon rights in Paraguay.

February – September 2020: Ongoing discussions with various Paraguay landowners.

June 4, 2020: Marcel van Heesewijk and Christian Nielsen of Quadriz and James Eaton of Ostrya Conservation held a call with Naomi Swickard from Verra about VCS jurisdictional baselines and Verra's work with Paraguay.

June 15, 2020: Marcel van Heesewijk, Christian Nielsen and James Eaton held a follow up call with Manuel Estrada and Angelo Sartori from Verra to further discuss VCS jurisdictional baselines and Verra's work in Paraguay.

July 1, 2020: A deal was verbally agreed upon, and within days after having reached the initial deal (on July 9), Marcel van Heesewijk informed by email Investancia/Quadriz's nominated lawyers Brigitte Urbieta and Pedro Bruno Guggiari at Paraguayan law firm Livieres Guggiari, about the details of the deal with a further request to proceed with establishing Quadriz Paraguay S.A. to lead the REDD+ project.

August 10, 2020: Christian Nielsen, Marcel van Heesewijk and James Eaton and Gabriela Viñales (Technical Specialist from UNDP) and Ulises Lovera Gaona (National Climate Change Director, MADES) met virtually to discuss VCS jurisdictional baselines for Paraguay and how to incorporate projects, how to avoid double counting.

August 13, 2020: Christian Nielsen, Marcel van Heesewijk and James Eaton gave a formal presentation to Kiantar Betancourt and Diego Puente from Atenil to explain the overall carbon markets and how REDD+ projects are developed to encourage expansion of the initial project instance under usufructo. This meeting led to Atenil requesting to change the Agreement from the original usufructo long term lease to an agreement to include Atenil as part of the project (passive landowner) with Quadriz in the role as land manager and developer of the carbon project.

September 29, 2020: Agreement signed between Quadriz and Atenil.

November 9, 2020: Marcel van Heesewijk met with Guido Cubilla, Karim Musalem (Director), Lucy Aquino (Director), and Calixto Saguier from WWF Paraguay to discuss biodiversity monitoring plans and to discuss the Indigenous Peoples charter that was prepared by WWF Paraguay.

November 10, 2020: Marcel van Heesewijk met with Pedro Bruno Guggiari from the Livieres Guggiari law firm about setting up Quadriz Paraguay and to discuss other potential REDD+ projects.

December 15, 2020: Quadriz communicated via email with WWF Paraguay for next steps, shared meeting minutes, and requested clarification on a number of points. Guido Cubilla, Karim Musalem (Director), Lucy Aquino (Director), and Calixto Saguier were included.

February 18, 2021: Christian Nielsen and Gabriela Viñales explained the Participatory Rural Assessment and the Degradation Surveys to Fredy Montoya, who was to later administer the surveys around Corazón Verde del Chaco I.

March – April 2021: Christian Nielsen visited Paraguay to meet local staff in Asuncion and at Santa Rosanna, along with to meet with a variety of stakeholders including Atenil, WWF, Andrea Weiler at the University, and additional potential project partners.

May – June 2021: James Eaton and Gabriela Viñales held an in-person training in regard to the forest carbon inventory for Fabrizio Radice Gorostiaga. James Eaton and Marcel van Heesewijk also visited additional, potential REDD+ sites during this trip.

August 2021: Fredy Montoya and Gabriela Viñales visited the San Isidro and Maria Auxiliadora communities to administer the Participatory Rural Assessments. The PRAs provided useful information on the Maria Auxiliadora community. The Project design did not change as a result of these PRAs, in part because the community is not reliant on the initial Project Area and the community did not seek additional benefits to the ones initially proposed by Quadriz. If the community was reliant on the initial Project Area, then the Project would have revised its GHG accounting and modified its deforestation patrols. If the community sought additional benefits, the Project would have considered whether the implementation of such benefits was feasible.

January 2022: Quadriz reached out to Guyra Paraguay / BirdLife International and Solidaridad Network, which are two additional "other stakeholders." More specifically, Gabriela Viñales contacted Solidaridad Network to learn more about their work, to inform them about Quadriz's work with REDD+ projects, and to see if there are any areas of cooperation. Regarding Guyra Paraguay / BirdLife International, Gabriela Viñales knows them from her time at UNDP and worked with them doing an environmental services project in 2018 and 2019. Gabriela Viñales reached out to Guyra Paraguay / BirdLife International again in January 2022 to inform them about Quadriz's work on REDD+ projects and to see if they have any suggestions for modifying the project design given their previous experience working on AFOLU projects in Paraguay.

2.3.8 Continued Consultation and Adaptive Management (G3.4)

The Project Proponent will continue to communicate and consult with local communities and other stakeholders about the Project. The processes the Project will use throughout the Project Lifetime, including during the 2020-2021 monitoring period, to consider this input and adapt management accordingly includes:

- Meeting stakeholders either in person, or at Quadriz's Asuncion headquarters, or at Quadriz's regional Chaco headquarters at Estancia Santa Rosanna, or at the local Chaco headquarters. Thus stakeholders, including local communities and local landowners, can meet at Estancia Santa Rosanna and this is specifically where constant feedback takes place, along with ongoing training and research. Quadriz met with stakeholders at Quadriz's Asuncion headquarters, at Estancia Santa Rosanna, and at the stakeholders' offices throughout 2020 and 2021;

- Using the ongoing Degradation Surveys (for communities dependent on the Project Area) and the Participatory Rural Assessments (PRAs) to identify the risks, costs, and benefits to local community members. The Degradation Surveys and PRAs were administered with the Maria Auxiliadora (and attempted to be administered with the San Isdrio communities) in March and August 2021. Additional visits by Quadriz to the Maria Auxiliadora community took place in April 2022, May 2022, July 2022, August 2022, and September 2022; and

- Using the wildlife camera studies to identify rare, threatened, and endemic species, along with High Conservation Value (HCV) species.

Quadriz understands that for some local communities, such as the community at Maria Auxiliadora, the distance and lack of transportation could be a major concern and could present a limitation for the community's participation. This concern was raised during the 2020-2021 monitoring period and is the main way the communities have thus far informed the project design and implementation. To assuage this concern, Quadriz committed to either meet in person with these communities or will offer to provide for their transportation. To date, all such meetings have taken place at the Maria Auxiliadora community.

2.3.9 Stakeholder Consultation Channels (G3.5)

Quadriz has used a variety of consultation channels depending on the particular stakeholder(s), including but not limited to:

- Extensive in person meetings held in both English and Spanish with the private landowner's legal representatives in Paraguay for the initial project instance;
- Several in person meetings held in both Spanish and Guarani with the Maria Auxiliadora indigenous community, including with the community leader Hermenegildo Vera, located in the initial Project Zone. Several attempts have also been made to meet in person with the San Isidro indigenous community;
- Information sharing about developments in the carbon markets via WhatsApp;
- Ongoing phone calls and videoconferences via Zoom, Teams, etc. with a variety of stakeholders including with the private landowner's legal representatives for the initial project instance, with the Project's partners, and with government officials;
- Newsletters;
- Announcements of Quadriz's accomplishments via LinkedIn and Press Releases;
- Press Releases:
    - Spanish: https://www.einpresswire.com/article/527957314/el-proyecto-redd-m-s-grande-del-chaco-paraguayo-ya-est-en-marcha
    - English: https://www.einpresswire.com/article/527899981/largest-redd-project-in-the-paraguayan-chaco-now-underway
    - https://quadriz.com/largest-redd-project-in-the-paraguayan-chaco/
- Informational videos produced (https://www.youtube.com/watch?v=Q0SW_J9tjs4); and
- Further, periodic announcements are made on local TV and radio stations (such as in July 2021 and October 2021).

The Spanish Press Release was also picked up by the Filadelfia-based Chaco Communication Network (Red Chaqueña de Comunicaciones or RCC in Spanish), which further distributed the press release via TV and radio.[17]

Thus, Quadriz has ensured that all consultations and participatory processes have been undertaken directly with communities and stakeholders with extensive levels of information provided about the Project.

2.3.10 Stakeholder Participation in Decision-Making and Implementation (G3.6)

There are several measures needed and designed to enable the effective participation of communities in a culture- and gender-sensitive manner. This includes:

- Quadriz's management team must, and currently does include, several local professionals, including Gabriela Viñales and Fredy Montoya, who were employed throughout the 2020-2021 monitoring period. Gabriela Viñales and Fredy Montoya are both from Paraguay, both speak Spanish and Guaraní, and they understand the local culture. Speaking Guaraní is perhaps the most important aspect to ensuring culturally-sensitive communication with local communities. Gabriela Viñales, who is originally from Asunción, works from Asunción and is in frequent communication with government officials and other stakeholders. In addition, Gabriela Viñales worked on REDD+ and social safeguards while at UNDP. Gabriela Viñales also worked on REDD+ strategy for indigenous peoples during a World Bank project and from 2013 to 2015, Gabriela Viñales worked directly with indigenous communities. Fredy Montoya, who is originally from the Chaco Region, also speaks the local language Guaraní, which further helps with culturally-sensitive communication throughout the Chaco;
- Quadriz will strive to have both a male and female representative present during meetings with local communities to help ensure gender-sensitivity. This male and female representation was, for example, done during the March and August 20201 meetings with the Maria Auxiliadora community; and
- Quadriz will either meet in person with communities or will provide for their transportation to mitigate the concerns over the lack of transportation. To date, including during the 2020-2021 monitoring period, all community visits have taken place at the Maria Auxiliadora community.

2.3.11 Anti-Discrimination Assurance (G3.7)

Quadriz is proud to be an equal opportunity employer and has an experienced local team of professionals. Furthermore, Quadriz is considering B corporation certification, which are "businesses that meet the highest standards of verified social and environmental performance, public transparency, and legal accountability to balance profit and purpose."[18] Anti-discrimination protocols will be filed on the Estancia Santa Rosanna office and are included in the safety manual for new hires.

Furthermore, all private landowners with suitable lands for conservation will be approached and will be considered for participation in the Project.

[17] https://rcc.com.py/chaco/ponen-en-marcha-proyecto-de-captura-de-carbono-mas-grande-del-chaco/
[18] B. Lab. "About B Corps." Available: https://bcorporation.net/about-b-corps

Thus, the measures needed and designed to ensure that all entities involved in project design and implementation are not involved in, or complicit in, any form of discrimination or sexual harassment with respect to the project are:

- The tone needs to, and is, set from the top. Thus, senior management at Quadriz has made it clear that any form of discrimination is not allowed;
- That discrimination is not allowed amongst any entities involved in project design and implementation must be clearly stated and written down. This has been done in Quadriz's new hire onboarding procedures and is contained within Quadriz's HSE Policy and Procedures manual;
- Independent assessment should take place. Thus, to help ensure discrimination is not taking place at the Project, Quadriz will continue to undertake ongoing independent CCBS verification audits and Quadriz will also have ongoing audits to B Corp certification (if applicable); and
- There must be a mechanism for any entity who feels they have been discrimination against or been sexually harassed. Thus, the Project has a feedback and grievance redress procedure (please see Section 2.3.12 below).

To date, and throughout the 2020-2021 monitoring period, Quadriz has not been complicit in any form of discrimination or sexual harassment.

2.3.12 Grievances (G3.8)

Project structuring is primarily based off an agreement between Quadriz and the private landowner, with each party fully aware of their roles and responsibilities. If a conflict arises, Quadriz and the private landowner will seek to resolve the issue. If the two parties are unable to resolve the issue, then mediation will be sought. If necessary, Quadriz will utilize the nationally competent courts, as outlined in Quadriz's Agreement with the landowners, as the third stage for any of the grievance processes.

If there are any grievances with staff (i.e., such as personnel issues), the issue will be initially handled by local Quadriz management. The office address and contact information is:

Quadriz Paraguay
Avda. Aviadores del Chaco 2581, SkyPark, Torre 2, Piso 12
Asunción, Paraguay
Phone: +595 984865500

Larger issues (i.e., such as investor issues, issues with local landowners, etc.) will be handled by the CEO of Quadriz.

If there is any unresolved grievance with a local community or other stakeholder, Quadriz will refer the matter to the Ministerio del Ambiente y Desarrollo Sostenible (MADES; Ministry of Environment and Sustainable Development), which will act as the Project's third-party ombudsman. This said, MADES has a Safeguards Information System and has a mechanism for receiving complaints and claims related to forest carbon projects. The contact information for MADES is as follows:

Ministerio del Ambiente y Desarrollo Sostenible (MADES)
Dirección Nacional de Cambio Climático
Avenida Madame Lynch N° 3500
esq. Reservista de la Guerra del Chaco
Phone: (021) 287-9000 Email: onccseampy@gmail.com

MADES has a draft process for receiving, hearing, responding to and attempting to resolve grievances within a reasonable time period which takes into account traditional conflict resolution methods. In 2021, MADES finished a draft of the grievance redress system and as of February 2022, this grievance redress system was still under development.

There are many channels for filing a complaint, claim, or grievance with MADES. Likewise, the process for MADES receiving grievances will be via phone (021 287-9000), email (onccseampy@gmail.com), a form provided by MADES when visiting communities, visiting MADES in person, or in the future, via a link on the MADES website (see here for additional information: http://dncc.mades.gov.py/sistema-de-informacion-de-salvaguardas).

MADES' hearing of the complaint, claim, or grievance will be done following the procedures, which are likely to be made public in 2022. MADES would likely give the case, depending on the nature of the case, to the relevant ministry or department. For example, if the matter concerned sexual harassment, then MADES would likely refer the matter to the Ministry of Women,[19] whereas if the matter concerned labor discrimination, then MADES would likely refer the matter to the Ministry of Labor, Employment and Social Security.[20]

Responding to and attempting to resolve the grievance will likely be done by MADES and will likely be done within 90 days. The specifics of responding to and attempting to resolve the grievance by MADES are in the draft plans. It is Quadriz's belief that for instance, the Ministry of Labor, Employment and Social Security would facilitate mediation, depending on the problem. Further, it is Quadriz's belief that such grievances referred to MADES and the Project's responses will be documented and made publicly available.

As of February 2022, the MADES grievance procedure is still in draft form and it is unclear whether MADES will utilize arbitration or the courts as part of its third stage for any of the grievance processes.

With respect to how the feedback and grievance redress procedure will be publicized and accessible, more detailed information about this grievance redress procedure (upon MADES' completion and public posting of its procedures) will be provided in future summary documents and future monitoring reports and will be communicated to directly to communities (particularly the Maria Auxiliadora community for the initial project instance) and other stakeholders.

No grievances were received by Quadriz during the 2020-2021 monitoring period.

2.3.13 Worker Training (G3.9)

There are numerous measures needed, and designed, to provide orientation and training. This includes:

- Orientation for a wide-range of stakeholders, from European and United States-based investors to local landowners, to local Quadriz employees, to Paraguay Government officials, about the importance of the Chaco, REDD+ projects, and how the carbon markets work, has been provided. This orientation took place throughout the 2020-2021 monitoring period;

[19] Ministry of Women. "Home." Available: http://www.mujer.gov.py/.
[20] Ministry of Labor, Employment, and Social Security. "Home." Available: https://www.mtess.gov.py/.

- Trainings have included, but are not limited to:
    - James Eaton of Ostrya Conservation and Gabriela Viñales of Quadriz provided in-person training on standard procedures for a forest carbon inventory to Fabrizio Radice Gorostiaga and his inventory team;
    - Guards were trained by local Quadriz management, and a Standard Operating Procedures (SOP) document will be developed by Quadriz. This SOP will provide guidance for what the guards should do, for instance, if they see deforestation, illegal logging, poaching, or in-migration;
    - The wildlife photography crew were briefed on the Project and were trained on how to identify particular species, such as the Chacoan Peccary;
    - Christian Nielsen and Gabriela Viñales explained the Participatory Rural Assessment and the Degradation Surveys to Fredy Montoya; and
    - Andrea Weiler from the Universidad Nacional de Asunción (National University of Asuncion) provided training to Fredy Montoya about how to conduct preventative maintenance on the wildlife cameras, along with how to replace the cameras' memory and batteries. In addition, Yolanda Ramos is a biologist and she was in charge of the biodiversity monitoring plan for Quadriz. In 2022, Quadriz hired a new biologist to help replace Yolanda Ramos.

Future orientations and trainings will include:

- Ongoing training for local guards on how to do their jobs (i.e., anti-poaching operations);
- Orientation to participants in Chaco Med; and
- Orientation at the visitor center.

The orientation and training that has taken place, along with future orientations and trainings, are intended to build locally useful skills and knowledge to increase local participation in project implementation. Quadriz has already hired local personnel, including for management positions, such as Florencia Arano, Fredy Montoya, and Gabriela Viñales. These Quadriz personnel have received orientation and training, for example, on implementing private forest carbon projects, conducting community surveys, and conducting biodiversity impact monitoring. These skills and knowledge are becoming even more locally useful as Quadriz seeks to expand into additional project instances and thus, there will be more career opportunities and more trainings for local GIS specialists, local forest inventory teams, local biologists, and local project managers. To help further their knowledge, ongoing training will take place on matters such as understanding new carbon methodologies, new approaches to forest inventory, and the latest developments in the voluntary carbon market industry. Further, the skills and knowledge being taught may also lead to local personnel pursuing degrees, or teaching, environmental engineering and forest engineering degrees at the university level.

Quadriz has a few approaches to help ensure local capacity is not lost through staff turnover. First, there is a lot of cross training. For instance, Gabriela Viñales is providing a lot of training and orientation to her colleague Florencia Arano, Gabriela Viñales also provided a lot of training and orientation to her former colleague Yolanda Ramos, and James Eaton of Ostrya Conservation is teaching several members of the forest carbon inventory teams. Second, there are written plans being developed (i.e., such as a general biodiversity monitoring plan and the HSE Policy and Procedures manual) and lots of information, sources, lessons learned, etc. are being documented in the Project's project documents. Most, if not all, of this information is being remotely backed up in case of staff turnover, so that such information is not lost. Lastly, Quadriz will request that all departing staff give a sufficient notice so that some of their local capacity can be properly handed over.

2.3.14 Community Employment Opportunities (G3.10)

Quadriz will employ people from the nearby villages of Puerto Casado, Vallemi and the vicinities, following Quadriz's standard company recruitment policies and procedures. This includes reaching out to indigenous communities in the vicinity. For example, during the 2020-2021 monitoring period, Quadriz hired one forest guard in October 2021. In 2022, a guard service, called "Los Guardianes" was hired.

People from these communities will be given an equal opportunity to fill all work positions, including management positions, if the job requirements are met. Workers will be selected for their positions based off their merit and availability. New hires start on a grace period and if everything works out, the new hire will stay on.

There are several measures needed, and designed, to ensure community members, including women, vulnerable, and/or marginalized people, are given a fair chance to fill positions for which they can be trained. These measures include:

- Positions are announced on the local radio to ensure everyone can hear about open positions and listeners are informed about how to apply; and

- Puerto Casado is a relatively small city, where word-of-mouth spreads fast.

With respect to measures designed to ensure community members, specifically indigenous community members from the Maria Auxiliadora, are given a fair chance to fill positions for which they can be trained:

- First, Quadriz has actively reached out to the Maria Auxiliadora community to inform the community about the Project, its goals, its potential impacts and benefits, and about potential positions available in the future. For example, this took place in March and August 2021;
- Next, this engagement and consultation process has led to trust between Quadriz and the Maria Auxiliadora community and there is now open communication between both. This is evidenced by more frequent communication and visits by Quadriz to the Maria Auxiliadora community in 2022; and
- Although there are not many positions to fill for the first project instance, Quadriz has committed to informing the Maria Auxiliadora community about open positions, such as when Fredy Montoya needs help in the field with building infrastructure and undertaking maintenance-related work.

Potential employment opportunities for local communities, include:

- Assistance with community and biodiversity studies;
- Project management positions;
- Forest patrols/guards;
- Helping with Chaco Med;
- Assistance to with the forest carbon inventory; and
- Workers to build and/or renovate the visitor center and/or health clinic.

To date, there are approximately 5-10 full-time Quadriz staff. As of December 31, 2021, there was one local guard was hired by the Project and this guard did not come from the Maria Auxiliadora community.

2.3.15 Relevant Laws and Regulations Related to Worker's Rights (G3.11)

According to the International Labour Organization, there are several relevant laws and regulations related to workers' rights in Paraguay. These include:

1. Constitution of the Republic of Paraguay (CRP), of 1992 as amended to 2011 - Constitución de la República de Paraguay de 1992;
2. Law establishing the Labor Code (CT), No. 213 of 1993 - Ley que establece el Código del Trabajo, No. 213 de 1993 1993;
3. Law (LNCSP) that regulates the Collective Bargaining of the Public Sector, No. 508 of 1994 - Ley que regula la Negociación Colectiva del Sector Público, No. 508 de 1994; and
4. Law (CPT) that sanctions the Labor Procedural Code, No. 742 of 1961 - Ley que sanciona el Código Procesal del Trabajo, No. 742 de 1961.[21]

To the best of Quadriz's knowledge, there were no additional new laws or regulations related to worker's rights passed during the 2020-2021 monitoring period.

The measures needed and taken by the project team to inform workers about their rights includes:

- Providing orientation to new hires;
- Providing a safety manual, which outlines worker's rights; and
- Posting what is required by law (i.e., for example, minimum salaries) on the wall at Estancia Santa Rosanna.

[21] ILO, "Paraguay – 2016," Available: https://www.ilo.org/dyn/irlex/en/f?p=LEGPOL:1000

Furthermore, phone numbers for emergency services are publicly posted at the headquarters. This said, Quadriz assures the Project meets or exceeds each of the relevant laws and regulations related to worker's rights in Paraguay.

2.3.16 Occupational Safety Assessment (G3.12)

Some of the relatively substantial risks to worker safety that could arise due to project implementation are detailed below.

Snake Bites - Snake bites, particularly several species of coral snakes and vipers, pose a substantial risk to all visitors to the Chaco.[22] To help mitigate this risk, snake bite anti-venom is stored at the Project's headquarters in Santa Rosanna. Further, snake bite anti-venom will eventually be located at the Chaco Med health clinic and project visitor center.

Other Wildlife - One potential occupational risk, particularly for biologists, forest inventory team, and forest guards is other wildlife, such as jaguars. However, these individuals are familiar with the working conditions in the Chaco.

Tropical Diseases - The main tropical diseases in the Gran Chaco are Chagas disease, dengue fever, and Zika virus. The Project Proponent, along with visitors and affiliates, will be encouraged to take precautions by using bug spray, sleeping with mosquito nets, and taking vaccines (if applicable).

Getting Lost - Getting lost in the Chaco is a real concern as navigation and mobile phones do not work well in many parts of the Chaco and the Chaco dry forests can be very dense. To mitigate the risk of getting lost, all project participants will be encouraged, if not required, to travel with locals who are familiar with the area and know the Chaco well.

Driving Around the Chaco – Driving at night, driving during flooded conditions, and driving on roads with dust clouds can create potentially hazardous conditions. To mitigate these risks associated with driving, Quadriz will only use drivers with extensive knowledge of these local conditions.

Heat and Dehydration Related Illnesses During Fieldwork – The Chaco's high summer temperatures can lead to heat and dehydration related illnesses, particularly during fieldwork. To mitigate the risk of heat and dehydration related illnesses, the following measures will be undertaken:

- Fieldwork, including forest inventory work and onsite independent audits, will be prioritized for transition periods during the wet and dry season to minimize the chances of heat related illnesses;
- Fieldwork will be prioritized for early morning or early evening to avoid the midday sun;
- Supplies, such as water and suntan lotion, will be provided to visitors by Quadriz; and
- All visitors to the Project will be informed of these potential risks.

Potential Hostile Confrontations with Illegal Hunters or Illegal Loggers – There is a potential for illegal hunting and illegal logging at the Project and inadvertent confrontation with these actors could lead to a hostile situation. To mitigate the potential of encountering illegal hunters or illegal loggers in the first place, the Project will employ forest guards who will regularly patrol the area for such activities. Further,

[22] Fauna Paraguay, "Gallery of Reptiles," Available: http://www.faunaparaguay.com/imagesreptiles.html

visitors will be informed of these risks and on most occasions, visitors will be accompanied by a representative from Quadriz, particularly Fredy Montoya, who is familiar with how to deescalate the situation.

These risks, including any future risks identified, will be added to the latest version of the HSE Policy and Procedures manual to help inform workers of the Project's known risks.

2.4 Management Capacity

2.4.1 Required Technical Skills (G4.2)

The key technical skills required to successfully implement the Project, include:

- Stakeholder identification and community engagement;
- Legal analysis of landownership documentation;
- Government policy;
- Biodiversity assessment and monitoring;
- Carbon stock measurement and monitoring;
- Regional deforestation and land-use modelling;
- Project management;
- Local knowledge and fluency in Spanish and Guarani; and
- Sales of carbon offset credits to raise climate finance.

The Project's management team and advisors have both the expertise and prior experience with financing, designing, and implementing forest carbon projects. Thus:

- Stakeholder identification and community engagement is being led by Quadriz, particularly Federico ("Fredy") Montoya and Gabriela Viñales in the initial stages of the Project;
- Legal analysis of landownership documentation is being led by Quadriz and the law firm Livieres Guggiari;
- Government policy is being led by Quadriz;
- Biodiversity assessment and monitoring is being led by Quadriz and Dr. Andrea Weiler;
- Carbon stock measurement and monitoring is being led by James Eaton of Ostrya Conservation and Fabrizio Radice Gorostiaga;
- Regional deforestation and land-use modelling is being led by James Eaton of Ostrya Conservation;

- Project management is being led by Quadriz;
- Local knowledge and fluency in Spanish and Guarani is being led by Quadriz and particularly Marcel van Heesewijk, Federico ("Fredy") Montoya, and Gabriela Viñales; and
- Sales of carbon offset credits to raise climate finance is being led by Quadriz, particularly Christian Nielsen.

Further, Quadriz plans to hire an advisor in 2022 to assist the Project with stakeholder engagement and community monitoring.

2.4.2 Management Team Experience (G4.2)

The management team, in conjunction with its partnerships, has extensive expertise and experience implementing land management and carbon projects at the scale of this Project.

Marcel van Heesewijk, Founder and CEO, Investancia and Quadriz

Marcel van Heesewijk is Founder and CEO of the Investancia group. Marcel van Heesewijk has extensive international business development experience focused on company creation, growth strategies, and financing. Marcel van Heesewijk holds a bachelor's degree in economics from the University of Groningen in the Netherlands and a master's degree from the ESCP Europe (École Supérieure de Commerce de Paris), a 3-year MBA course studying and working in Paris, Oxford and Berlin. Marcel van Heesewijk was born in Sao Paulo, Brazil from Dutch parents and is fluent in six languages.

Marcel van Heesewijk has broad working experience covering various industries such as packaged consumer products (Nestle), computer hardware (Siemens), computer software packages (B+S Multisoft), software development & consulting and Biofuel production from reforestation and carbon certification projects. In 1993, Marcel van Heesewijk founded SourcingLink, an electronic product sourcing software-as-a -service (SAAS) platform for worldwide retailers that went public on NASDAQ. SourcingLink was an innovative technology company based in California. It developed on-line catalogs and negotiation applications which revolutionized how large retailers source products globally. As one of the first b-2-b internet operators, the company reached a market value of over $300 million in 1999 and later formed strategic partnership with the largest e-commerce exchanges for retailers connecting with their suppliers in Europe, the US and Asia.

Since then, Marcel van Heesewijk has been mainly active in South America where he incorporated livestock trading and land real estate operations in Uruguay. In 2013, he founded Investancia.

Christian Nielsen, Head of Sales, Carbon Offsets

Christian Nielsen is the Head of Sales, Carbon Offsets at Quadriz. Christian Nielsen has over 10 years of experience in commodity sales and trading from different roles based in Denmark, UK, Dubai and Spain. Before joining Quadriz in early 2020, Christian Nielsen worked as a Carbon Trader at Vertis Environmental Finance, where he traded EU allowances in the compliance carbon market of the European Union Emissions Trading Scheme (EU ETS) as well as carbon offsets in the voluntary carbon market.

Federico ("Fredy") Montoya, Field Manager at Investancia / Quadriz Paraguay SA

Born in the Gran Chaco, Paraguay, Fredy Montoya knows the Chaco and its challenges more than most. For the past 20 years Fredy Montoya has been working within the areas of agriculture, livestock and reforestation. Since 2015, Fredy Montoya has been the Field Manager at Investancia Paraguay SA, in charge of the areas of logistics, development and the reforestation program. More recently, Fredy Montoya has been working to support the conservation efforts and monitoring of Quadriz Paraguay SA in relation to its REDD+ programs.

Gabriela Viñales, REDD+ Lead Project Manager

Gabriela Viñales is an Environmental Engineer and holds an MSc. in Natural Resources Management and Environmental Management of the Territory. Since February 2021, Gabriela Viñales joined the Quadriz team, as the REDD+ Project Manager. During the previous six years, Gabriela Viñales was working in the REDD+ preparation phase of Paraguay, in the United Nations Environment Programme (UNEP) for the implementation of the UN REDD National Program and lastly in the United Nations Development Programme (UNDP) for the execution of a Forest Carbon Partnership Facility (FCPF) project called Forests for Sustainable Growth (BCS). The results of both processes have allowed the country to access financing from the Green Climate Fund (GCF), through the results-based payment of 23,000,000 mtCO2eq.

During the last two years, in the role as UNDP technical specialist, Gabriela Viñales supported the process of preparing the National JNR Program and its monitoring report, managing the execution of technical actions and generating dialogue between stakeholders in the process (MADES, Verra, INFONA and others). In addition to stakeholder mapping and stakeholder engagement, Gabriela Viñales also worked on REDD+ and social safeguards while at UNDP. Gabriela Viñales also worked on REDD+ strategy for indigenous peoples during a World Bank project and from 2013 to 2015, Gabriela Viñales worked directly with indigenous communities.

Further, Gabriela Viñales supported the development of important tools for the carbon market such as MADES' Registry of Reductions and a proposal for a legal tool that addresses the ownership of carbon and the benefit sharing plan.

Gabriela Viñales' experience is based on the management and execution of projects, mainly in the area of climate change and environment, which implies a technical, operational and administrative management, accompanied by the relationship with the different actors that the execution of a project demands.

2.4.3 Project Management Partnerships/Team Development (G4.2)

James Eaton, Director, Ostrya Conservation

To help address the technical requirements associated with implementing land management and carbon projects at this scale, Quadriz has entered into a partnership with Ostrya Conservation.

Jamie decided to start Ostrya Conservation after working for nearly a decade developing and implementing ecosystems services projects around the world. He has extensive experience in the fields

of forest ecology, geographic information systems, soil biogeochemistry, land-use change science, and tropical ecology. For 14 years, Jamie has led the planning and design, and assisted with the implementation of, conservation projects which have conserved over a million acres of land throughout the world. These ecosystem service projects work with local communities and landowners to provide financing which enable these stakeholders to protect and conserve natural lands. While many of these projects have been in the realm of voluntary and compliance greenhouse gas mitigation projects, he has also developed nutrient banks, wetland mitigation banks, and stream mitigation banks. Project management skills and consulting experience has allowed Jamie to pull together diverse stakeholders' including private individuals, environmental non-governmental organizations, public companies, and government agencies in pursuit of these conservation efforts worldwide.

Jamie hails from the mid-west but he fell in love with the Virginia mountains, piedmont, and coastal regions upon moving there in 2001 after completing a B.A. in Biology from Saint Louis University. He obtained a M.S. in Environmental Science with a concentration in Forest Ecology from the University of Virginia, after spending three summers battling mosquitos while measuring biomass and soils in the dry tropical forests of Mexico's Yucatan Peninsula. As a 2005-2006 Fulbright Scholar, he worked to better understand ecological succession and land-use change in central Europe's Carpathian Mountains. In 2009, he was part of an interdisciplinary team to win the Sustainability Science Award from the Ecological Society of America.

Andrea Weiler

Andrea Weiler was born in Asunción and is a graduate of Bachelor of Science, Mention in Biology at the Faculty of Exact and Natural Sciences-National University of Asunción, Paraguay. She did her Master of Science's Degree in Wildlife at New Mexico State University. She is currently doing her PhD in Biology and Biodiversity Conservation, at the University of Salamanca, Spain. Her research is entitled: "Determination of the value of livestock landscapes for the conservation of biodiversity (beetles, amphibians, reptiles, birds and mammals) in the Paraguayan Dry Chaco". She is a Research Professor in the Department of Biology at the Faculty of Exact and Natural Sciences (FACEN), General Coordinator of the Biodiversity Research Nucleus (NIB) and Director of Postgraduate Studies at FACEN. In addition, she is a Tutor of the Scientific Initiation Program at the Faculty of Exact and Natural Sciences (FACEN-UNA). She is part of the PRONII: Level I-Res.: 148/2020. She currently participates as coordinator of several projects in areas of Ecology and Biodiversity Conservation and is dedicating her life to conservation and environmental education to raise awareness in society about the state of the local fauna.

2.4.4 Financial Health of Implementing Organization(s) (G4.3)

Quadriz has the financial health to ensure adequate financial support over the Project Lifetime. Quadriz B.V.'s financial statements are annually audited by Binder Dijker Otte (BDO), the international assurance, tax, and financial advisory services company. In the future, Quadriz Paraguay's financial statements will also be audited by BDO. Such audited financial statements will be provided to the Project's independent validation and verification body (VVB) upon request.

2.4.5 Avoidance of Corruption and Other Unethical Behavior (G4.3)

Quadriz is considering B corporation certification, which are "businesses that meet the highest standards of verified social and environmental performance, public transparency, and legal accountability to balance

profit and purpose."[23] Quadriz is not involved in, or complicit in, any form of corruption such as bribery, embezzlement, fraud, favoritism, cronyism, nepotism, extortion, and collusion. Ongoing B corporation certification, along with ongoing independent verification to the VCS and CCB, shall provide this assurance. Furthermore, and as previously mentioned, Quadriz Paraguay will be annually audited by BDO. No corruption or unethical behavior took place during the 2020-2021 monitoring period.

2.4.6 Commercially Sensitive Information (Rules 3.5.13 – 3.5.14)

Not applicable – there was no commercially sensitive information excluded from the public version of the Corazón Verde del Chaco Project's CCB VCS 2020-2021 Monitoring Report.

2.5 Legal Status and Property Rights

2.5.1 Recognition of Property Rights (G5.1)

The initial project area is owned by Atenil S.A. as documented in the Project's database. All land use and access rights are owned by Atenil S.A. as the project is implemented on private land. Atenil provided consent to Quadriz for access and use of the property and "provide[s] all necessary consent to Quadriz, as necessary, for the development of VERs" for the specific purpose of developing a REDD+ project in their Letter of Agreement for Verified Carbon Unit Credits.

2.5.2 Free, Prior and Informed Consent (G5.2)

The Project is taking place on private property and will not encroach on other private property, community lands, or government lands. This said, Quadriz undertook a Free, Prior, and Informed Consent process with the private landowner.

Free – Quadriz presented an agreement to the private landowners. The private landowners are a group of well-educated, sophisticated investors who are familiar with negotiating contracts. Likewise, the landowners were free to accept the agreement, to discuss with counsel, and to accept alternative offers.

Prior – Quadriz met with the private landowners several times, including visits to the property, and further discussed the Project's details on numerous occasions prior to presenting a draft agreement.

Informed - As previously mentioned, Quadriz met with the private landowners several times, and further discussed the Project's details on numerous occasions prior to proceeding with an Agreement. These discussions included:

- Informing the landowners about the potential risks, benefits and costs associated with undertaking a REDD+ project;
- The minimum Project Lifetime; and
- The potential volumes and pricing of Verified Carbon Units (VCUs).

[23] B. Lab. "About B Corps." Available: https://bcorporation.net/about-b-corps

Further, for undertaking a forest conservation project and foregoing the opportunity to convert the land to a cattle ranch, or to sell the land to ranchers, the private landowner will be compensated with a share of the revenue from the verified emission reductions (VERs).

Consent - Consent by the private landowners is formally demonstrated by a signed Letter of Agreement for Verified Carbon Unit Credits.

2.5.3 Property Right Protection (G5.3)

The Project's activities do not lead to any involuntary removal or relocation of property rights holders from their lands or territories and does not force rights holders to relocate activities important to their culture or livelihood. No such involuntary removal or relocation took place during the 2020-2021 monitoring period.

2.5.4 Identification of Illegal Activity (G5.4)

The three main potential illegal activities that could negatively affect the Project's climate, community and biodiversity impacts are encroachment, fire, and poaching. This said, there are no perceived positive benefits that will, or could be, derived from these illegal activities.

The measures designed and undertaken to reduce encroachment and fire are focused around on-the-ground monitors, periodic aerial surveillance, and satellite imagery analysis. With respect to poaching, the installation of guard houses and periodic biodiversity impact monitoring via wildlife cameras should be able to identify the presence of illegal poaching.

Specifically, during the 2020-2021 monitoring period to identify the presence of fires, along with to mitigate encroachment and poaching, the following measures were taken:

- A guard was hired in October 2021, to establish a presence and to initiate informal monitoring;
- Posters/signs were placed at strategic points; and
- A monitoring for deforestation template was designed.

Although outside the current monitoring period, in 2022, the following measures were taken:

- A guard house was built;
- A guard service, called "Los Guardianes" was hired for the area, who are in charge of patrols and in charge of the entrance to the property;
- A Fire Prevention and Control Plan was finalized in March 2022;
- Patrols officially started during the first quarter of 2022; and
- A patrol log started during the last quarter of 2022.

None of these illegal activities, to a significant degree, were identified at the initial project area during the 2020-2021 monitoring period. This said, during the 2020-2021 monitoring period, there was some evidence of a fire that came from the Easterly direction and evidence that there have been instances of

poaching occurring off the main road. With respect to poaching, this was likely subsistence poaching for consumption by local people and as of October 2021, when the guard was hired, there have been no signs of additional hunting. With respect to signs of fire, Quadriz is unsure exactly what happened, but monitoring for fire has been implemented, a Fire Prevention and Control Plan has been developed, and Quadriz cleaned up the firebreak roads that were already on the property.

2.5.5 Ongoing Disputes (G5.5)

To the best of the Quadriz and the landowner's knowledge, there are no ongoing or unresolved conflicts or disputes over the rights to the initial Project Area's lands and resources. In addition, there have been no such disputes that were resolved during the last twenty years at the initial Project Area.

2.5.6 National and Local Laws (G5.6)

The Project is in compliance with all laws, statutes, and regulatory requirements. The local and national government supports the efforts to conserve parts of the Chaco. As no project activity is mandated by law and the project activity does not involve the clearing of native ecosystems, the project activities are in compliance with all environmental laws. Compliance can be demonstrated via satellite imagery analysis and via firsthand observations.

The Ministry of Environment and Sustainable Development (MADES) is responsible for environmental regulations under the Environmental Impact Assessment Law (Law Nº 294/93). As part of this responsibility, rural properties larger than 20 hectares are subject to the assessment of environmental impacts and the environmental licensing process (Decree 954/2013 and Decree Nº 453/2013).

The most important law pertaining to land use in the Paraguay is the Forestry Law 422/73. As part of this law, the National Forest Institute (INFONA) and MADES approve forest clearing and non-forest use of cleared lands. To ensure compliance, Quadriz has been in regular contact with INFONA and MADES, particularly during the monitoring period.

Other pertinent and relevant laws stemming from the above regulation pertinent to conservation projects include:

- The 1973 Paraguay Forest Law, mentioned above, which also requires "landowners to set aside 25 percent of each parcel as forest and preserve natural greenery around rivers and streams as a bulwark against erosion and water pollution. Compliance with this law can be demonstrated via the project area maps and the alternative use map provided in section 2.1.5;"[24]

- Law Nº 4,241/10 and Decree Nº 9,824/12, provide for riparian and wetland buffers on properties cleared for agricultural production. This law is not directly applicable as the Project does not involve clearing for agricultural production;

[24] Alberto Yanosky, "The Challenge of Conserving a Natural Chaco Habitat in the Face of Severe Deforestation Pressure and Human Development Needs," Page 381.

- The 2004 Zero Deforestation Law which only affects part of the country was extended through 2018;[25] This law stops the conversion of natural forests to other land uses in Eastern Paraguay (Law Nº 2,524/2004 and subsequently Nº 3,139/ 2006, Nº 3,663/2008, Nº 5,045/2013, Nº 6,256/2018 and N°6676/2020). This law is not directly applicable as the Project is not located in Eastern Paraguay;

- Law N° 4890/13 Real Right of Forest Surface (Derecho real de superficie forestal)[26] allows the legally decoupling of forest ownership from land ownership; and

- 3001 Act for Payment for Ecosystem Services – "The rescheduling of the 2006 Act for Payment for Ecosystem Services (PES) to compensate for the environmental debt of landowners in the Eastern Region may be directed toward the Chaco territory."[27]

In addition to the aforementioned national laws, Paraguay is a party to the United Nations Framework Convention on Climate Change (UNFCCC). Paraguay has submitted a Nationally Determined Contribution (NDC) to the UNFCCC, with updates in 2021, which is essentially Paraguay's non-binding commitment for how it will seek to achieve GHG emission reductions.[28] A World Bank analysis indicates that Paraguay intends to seek involvement from the private sector, intends to include a carbon pricing / international market mechanism, and that Paraguay has an economy-wide goal (which includes the forestry sector) of reducing GHG emissions by 20% (as compared to business-as-usual) by 2030.[29]

As of July 1, 2022, Paraguay is a council member state of the International Civil Aviation Organization (ICAO) but has not agreed to participate in the voluntary phase of the Carbon Offset and Reduction Scheme for International Aviation (CORSIA).[30]

Quadriz is closely following all the developments of Paraguay's NDC and Paraguay's involvement with ICAO.

As previously mentioned, other project activities include Chaco Med and the visitor center. Quadriz consulted Livieres Guggiari to outline the relevant laws and regulations pertaining to Chaco Med and the visitor center.

For Chaco Med, a few applicable laws are:

- National Constitution of the Republic of Paraguay;
- Law No. 836/80 of the Sanitary Regulatory Code;
    - Regulatory Decrees of the Sanitary Code: Decree No. 10,735/91 which regulates Art. 270°;
    - Decree No. 1,635/99 which regulates Art. 175°; and

[25] World Wildlife Fund, "Paraguay extends Zero Deforestation Law to 2018," Available: http://wwf.panda.org/?210224/Paraguay-extends-Zero-Deforestation-Law-to-2018
[26] INFONA, "Ley N. 4890," Available: http://www.infona.gov.py/application/files/6914/2902/7121/Ley_N_4890_DERECHO_REAL_DE_SUPERFICIE_FORESTAL.pdf
[27] Alberto Yanosky, "The Challenge of Conserving a Natural Chaco Habitat in the Face of Severe Deforestation Pressure and Human Development Needs," Page 381.
[28] UNFCCC, Paraguay," Available: https://www4.unfccc.int/sites/NDCStaging/pages/Party.aspx?party=PRY
[29] World Bank Group's Climate Policy Team. "Paraguay: (Intended) Nationally Determined Contribution – (I)NDC." Available: spappssecext.worldbank.org/sites/indc/PDF_Library/PY.pdf
[30] International Civil Aviation Organization, "CORSIA States for Chapter 3 State Pairs," Available: https://www.icao.int/environmental-protection/CORSIA/Pages/state-pairs.aspx

    - Decree No. 7,441/00 by which Decree No. 6,967 is modified, by which Art. 206 is regulated;
- Decree No. 7,885/00 by which Art. 65 is regulated, which declares the obligation of prior medical control of the units authorized by the Ministry of Public Health and Social Welfare, to obtain licenses for drivers of land and river vehicles. or air; and
- Law No. 1,032/96 creating the National Health System;
    - Regulatory Decrees of Law No. 1,032/96: Decree No. 19,966/98, which regulates Local Health Decentralization, Citizen Participation and Self-Management in Health, as strategies for the development of the National Health System;
    - Law No. 1,032/96, Decree No. 22,385/98 which regulates the operation of the National Health Council and the Regional and Local Health Councils;
    - Decree No. 20,553/98 which regulates Articles 31 and 33 of Law No. 1,032/96, which establishes the Superintendence of Health;
    - Law No. 3,007/06 which modifies and expands Law No. 1,032/96 that creates the National Health System;
    - Law No. 2,319/06 that establishes the functions and powers of the Superintendence of Health created by Law No. 1,032/96; and
    - Decree No. 21,376/98 establishing the new functional organization of the Ministry of Public Health.

Upon initiation of Chaco Med, Quadriz will abide by all applicable laws and regulations, including those mentioned above, as they relate to Chaco Med.

For the visitor center, a few applicable laws are:

- National Constitution of the Republic of Paraguay; and
- Law No. 836/80 of the Sanitary Regulatory Code;
    - Regulatory Decrees of the Sanitary Code: Decree No. 10,735/91 which regulates Art. 270°;
    - Decree No. 1,635/99 which regulates Art. 175°; and
    - Decree No. 7,441/00 by which Decree No. 6,967 is modified, by which Art. 206 is regulated.

Upon initiation of the visitor center, Quadriz will abide by all applicable laws and regulations, including those mentioned above, as they relate to the visitor center.

3 CLIMATE

3.1 Monitoring GHG Emission Reductions and Removals

3.1.1 Data and Parameters Available at Validation

Data and parameters calculated during the course of project development include those listed in this section.

Data Unit / Parameter:	$\Delta C_{BSL,PAplanned}$
Data unit:	t CO_2-e
Description:	Net greenhouse gas emissions in the baseline from planned deforestation
Source of data:	Derived in Section 3.2 of PD
Value applied:	

Year	ΔCBSL,PA,planned
2020	286,132
2021	710,712
2022	1,273,924
2023	1,718,731
2024	1,351,192
2025	547,113
2026	130,617
2027	130,617
2028	130,617
2029	130,617
2030	124,702

Justification of choice of data or description of measurement methods and procedures applied:	Derived and justified in Section 3 of PD in which baseline is set
Purpose of Data	Calculation of baseline emissions
Comments	Needs to be updated every 10 years as part of the baseline revision

Data Unit / Parameter:	NewRi,t
Data unit:	Ha
Description:	New calculated forest clearance in stratum i at time t by the baseline agent of the planned deforestation where no leakage is occurring
Source of data:	Derived in Section 3.2.3 of PD
Value applied:	

Year	NewRi,t (ha)
2020	642,813
2021	953,504

Justification of choice of data or description of measurement methods and procedures applied:	Derived and justified in Section 3 of PD
Purpose of Data	Calculation of leakage emissions
Comments	Needs to be updated every 10 years as part of the baseline revision

Data Unit / Parameter:	CFn
Data unit:	t C t^{-1} d.m.
Description:	Carbon fraction of biomass
Source of data:	IPCC 2006GL
Value applied:	0.47
Justification of choice of data or description of measurement methods and procedures applied:	Global default
Purpose of Data	Calculation of baseline emissions
Comments	

Data Unit / Parameter:	fj(X,Y)
Data unit:	t d.m. $tree^{-1}$
Description:	Allometric equation for species j linking measured tree variable(s) to aboveground biomass of living trees.
Source of data:	Data resulting from the forest inventory.
Value applied:	See forest inventory excel workbook.
Justification of choice of data or description of measurement methods and procedures applied:	Chave, Jérôme, Christophe Andalo, Sandra Brown, Michael A. Cairns, Jeffrey Q. Chambers, Derek Eamus, Horst Fölster et al. "Tree allometry and improved estimation of carbon stocks and balance in tropical forests." Oecologia 145, no. 1 (2005): 87-99.
Purpose of data	Calculation of baseline emissions Calculation of project emissions
Comments	

Data Unit / Parameter:	Root Biomass Density
Data unit:	t d.m. ha^{-1}
Description:	Allometric equation for predicting root biomass density as a function of aboveground biomass density.
Source of data:	Data resulting from the forest inventory.
Value applied:	See forest inventory excel workbook.
Justification of choice of data or description of measurement methods and procedures applied:	Cairns et al. 1997 is a widely accepted peer reviewed scientific publication. Cairns, M. A., S. Brown, E. H. Helmer, and G. A. Baumgardner. 1997. Root biomass allocation in the world's upland forests. Oecologia 111, 1-11.

Purpose of data	Calculation of baseline emissions Calculation of project emissions
Comments	

Data Unit / Parameter:	LIF
Data unit:	t C m^{-3}
Description:	Logging infrastructure factor;
Source of data:	LK-ME
Value applied:	0.29
Justification of choice of data or description of measurement methods and procedures applied:	Default value in LK-ME
Purpose of data	Calculation of leakage emissions
Comments	

Data Unit / Parameter:	BEF
Data unit:	Dimensionless
Description:	Biomass expansion factor for conversion of merchantable volume to total aboveground tree biomass
Source of data:	N/A
Value applied:	N/A
Justification of choice of data or description of measurement methods and procedures applied:	N/A
Purpose of data	Calculation of baseline emissions Calculation of leakage emissions
Comments	While no timber harvest occurred in the baseline for the initial project instance, there is potential for timber harvest as part of the baseline land clearing for future project instances.

Data Unit / Parameter:	LDF
Data unit:	t C m^{-3}
Description:	Logging damage factor
Source of data:	LK-ME
Value applied:	0.53
Justification of choice of data or description of measurement methods and procedures applied:	Default value for broadleaf and mixed forests in LK-ME

Purpose of data	Calculation of leakage emissions
Comments	While no timber harvest occurred in the baseline for the initial project instance, there is potential for timber harvest as part of the baseline land clearing for future project instances.

Data Unit / Parameter:	LFME
Data unit:	Dimensionless
Description:	Leakage factor for market-effects calculations
Source of data:	LK-ME
Value applied:	0.4
Justification of choice of data or description of measurement methods and procedures applied:	The species that would be extracted in the project area are Chaco species, and could only be sourced from other native forest in the area.
Purpose of data	Calculation of leakage emissions
Comments	While no timber harvest occurred in the baseline for the initial project instance, there is potential for timber harvest as part of the baseline land clearing for future project instances.

Data Unit / Parameter:	SLFs
Data unit:	Dimensionless
Description:	Fraction of wood products that will be emitted to the atmosphere within 5 years of timber harvest for sawn wood
Source of data:	CP-W module
Value applied:	0.2
Justification of choice of data or description of measurement methods and procedures applied:	Default value from the CP-W module
Purpose of data	Calculation of baseline emissions Calculation of project emissions Calculation of leakage emissions
Comments	While no timber harvest occurred in the baseline for the initial project instance, there is potential for timber harvest as part of the baseline land clearing for future project instances.

Data Unit / Parameter:	OFts
Data unit:	Dimensionless
Description:	Fraction of wood products that will be emitted to the atmosphere between 5 and 100 years of timber harvest for sawn wood
Source of data:	CP-W module
Value applied:	0.84

Justification of choice of data or description of measurement methods and procedures applied:	Default value from the CP-W module
Purpose of data	Calculation of baseline emissions Calculation of project emissions Calculation of leakage emissions
Comments	While no timber harvest occurred in the baseline for the initial project instance, there is potential for timber harvest as part of the baseline land clearing for future project instances.

Data Unit / Parameter:	WWs
Data unit:	Dimensionless
Description:	The fraction immediately emitted through mill inefficiency for sawn wood
Source of data:	CP-W module
Value applied:	0.24
Justification of choice of data or description of measurement methods and procedures applied:	Default value from the CP-W module
Purpose of data	Calculation of baseline emissions Calculation of project emissions Calculation of leakage emissions
Comments	While no timber harvest occurred in the baseline for the initial project instance, there is potential for timber harvest as part of the baseline land clearing for future project instances.

Data Unit / Parameter:	VBSL,EX,i,t
Data unit:	m^3
Description:	Volume of timber projected to be extracted from within the project boundary during the baseline in stratum i at time t
Source of data:	Calculated
Value applied:	

Year	VBSL,EX,i,t (m^3)
2021	0
2022	0
2023	0
2024	0
2025	0
2026	0
2027	0
2028	0
2029	0
2030	0

Justification of choice of data or description of measurement methods and procedures applied:	Derived using Equation 4 of the LK-ME module
Purpose of data	Calculation of leakage emissions
Comments	While no timber harvest occurred in the baseline for the initial project instance, there is potential for timber harvest as part of the baseline land clearing for future project instances.

Data Unit / Parameter:	Dmn
Data unit:	t d.m. m^{-3}
Description:	Mean wood density of commercially harvested species
Source of data:	Calculated
Value applied:	N/A
Justification of choice of data or description of measurement methods and procedures applied:	This value uses site specific data on commercial log volume and estimates of wood density as found in Chave et al. 2006.
Purpose of data	Calculation of baseline emissions Calculation of project emissions
Comments	While no timber harvest occurred in the baseline for the initial project instance, there is potential for timber harvest as part of the baseline land clearing for future project instances.

Data Unit / Parameter:	PMLFT
Data unit:	%
Description:	Mean merchantable biomass as a proportion of total aboveground tree biomass for each forest type
Source of data:	Feldpausch, T. R., McDonald, A. J., Passos, C. A., Lehmann, J., & Riha, S. J. (2006). Biomass, harvestable area, and forest structure estimated from commercial timber inventories and remotely sensed imagery in southern Amazonia. Forest Ecology and Management, 233(1), 121-132
Value applied:	8%-12%
Justification of choice of data or description of measurement methods and procedures applied:	Volumetric weighted wood density as suggested by the methodology and volume by species.
Purpose of data	Calculation of baseline emissions Calculation of project emissions
Comments	While no timber harvest occurred in the baseline for the initial project instance, there is potential for timber harvest as part of the baseline land clearing for future project instances.

Data Unit / Parameter:	COMF i
Data unit:	dimensionless
Description:	Combustion factor for stratum i

Source of data:	Derived from Table 2.6 of IPCC, 2006.
Value applied:	0.50
Justification of choice of data or description of measurement methods and procedures applied:	Value is for primary moist tropical forest.
Purpose of the data	Calculation of baseline emissions Calculation of project emissions
Comment	For all new project instances located in areas with an average annual precipitation of less than 1000 mm/yr, a COMF value of 0.36 derived for "All primary tropical forests" will be used as there is no specific value listed in Table 2.6 for "Primary tropical dry forest".

Data Unit / Parameter:	Gg,i
Data unit:	kg t^{-1} dry matter burnt
Description:	Emission factor for stratum i for gas g
Source of data:	Derived from Table 2.5 of IPCC, 2006.
Value applied:	G,N20 (kg/t d.m. burnt): 0.2 G,CH4 (kg/t d.m. burnt): 6.8
Justification of choice of data or description of measurement methods and procedures applied:	Default parameter from IPCC
Purpose of the data	Calculation of baseline emissions Calculation of project emissions
Comment	None

3.1.2 Data and Parameters Monitored

Details on data and parameters monitored are provided below.

Data Unit / Parameter:	$\Delta C_{P,Def,i,t}$
Data unit:	t CO_2-e
Description:	Net carbon stock change as a result of deforestation in the project case in the project area in stratum i at time t
Source of data:	Calculated
Description of measurement methods and procedures to be applied:	As this parameter was calculated rather than measured, no measurements methods are noted. Monitoring responsibilities are listed in section 3.3, below.
Frequency of monitoring/recording:	Every ≤ 5 years
Value applied:	Year: 2020 ΔCP,DefPA,i,t (t CO2-e): 17.5

	2021	34.9	
Monitoring equipment:	None.		
QA/QC procedures to be applied:	Neither QA/QC procedures nor calibration are relevant for this calculated parameter.		
Purpose of data	Calculation of project emissions		
Calculation method:	Equation 3, VMD0015		
Comments	None		

Data Unit / Parameter:	$\Delta C_{P,DistPA,i,t}$		
Data unit:	t CO_2-e		
Description:	Net carbon stock change as a result of natural disturbance in the project case in the project area in stratum i at time t		
Source of data:	Calculated		
Description of measurement methods and procedures to be applied:	As this parameter was calculated rather than measured, no measurements methods are noted. Monitoring responsibilities are listed in section 3.3, below.		
Frequency of monitoring/recording:	Every ≤ 5 years		
Value applied:	Year	ΔCP,DistPA,i,t (t CO_2-e)	
	2020	0	
	2021	0	
Monitoring equipment:	None.		
QA/QC procedures to be applied:	Neither QA/QC procedures nor calibration are relevant for this calculated parameter.		
Purpose of data	Calculation of project emissions		
Calculation method:	Equation 20, VMD0015		
Comments	None		

Data Unit / Parameter:	$A_{DefPA,u,i,t}$			
Data unit:	Ha			
Description:	Area of recorded deforestation in the project area stratum i converted to land use u at time t			
Source of data:	Monitored at each monitoring/verification event through the use of classified satellite imagery			
Description of measurement methods and procedures to be applied:	Detailed procedures are provided below under monitoring plan description. Monitoring responsibilities are listed in section 3.3, below.			
Frequency of monitoring/recording:	Every ≤ 5 years			
Value applied:	Year	Paleo-Drainage ADefPA,u,i,t (ha)	Palm Savanna ADefPA,u,i,t (ha)	Forest ADefPA,u,i,t (ha)
	2020	0.00	0.00	0.04
	2021	0.00	0.00	0.08

Monitoring equipment:	ArcGIS
QA/QC procedures to be applied:	Detailed procedures provided below under monitoring plan description
Purpose of data	Calculation of project emissions
Calculation method:	Not relevant
Comments	None

Data Unit / Parameter:	AdefLK,i,t
Data unit:	Ha
Description:	The total area of deforestation by the baseline agent or class of agent of the planned deforestation in stratum i in year t
Source of data:	Calculated by determining the amount of land converted from forest to pasture in the Chaco Region of Paraguay in the time frame 2015-2016. Source: Larrosa, Carlos Antonio Giménez. 2018. Descripción de procesos y métodos utilizados para la reclasificación de ‘‘Tierras de cultivo’’ a ‘‘Cultivos Agrícolas’’, ‘‘Pasturas implantadas’’ y ‘‘Mosaico Agropecuario’’ de todo el territorio nacional, periodo 2000-2016. Proyecto “Colaboración para los Bosques y la Agricultura”. Report prepared for WWF, Instituto Forestal Nacional, and the Gobierno Nacional
Description of measurement methods and procedures to be applied:	Monitored as part of LKAplanned,i,t Monitoring responsibilities are listed in section 3.3, below.
Frequency of monitoring/recording:	Every ≤ 5 years
Value applied:	Year / AdefLK,i,t (ha) 2020 / 151,447.2 2021 / 151,447.2
Monitoring equipment:	None
QA/QC procedures to be applied:	Detailed procedures provided below under monitoring plan description
Purpose of data	Calculation of leakage
Calculation method:	Calculated as per LK-ASP
Comments	None

Data Unit / Parameter:	$A_{DistPA,q,i,t}$
Data unit:	Ha
Description:	Area impacted by natural disturbance in post-natural disturbance stratum q in stratum i, at time t
Source of data:	Monitored at each monitoring/verification event through the use of classified satellite imagery
Description of measurement methods and procedures to be applied:	Detailed procedures provided below under monitoring plan description. Monitoring responsibilities are listed in section 3.3, below.
Frequency of monitoring/recording:	Every ≤ 5 years
Value applied:	Year / $A_{DistPA,q,i,t}$ (ha)

	2020	0.0
	2021	0.0
Monitoring equipment:	ArcGIS	
QA/QC procedures to be applied:	Detailed procedures provided below under monitoring plan description	
Purpose of data	Calculation of project emissions	
Calculation method:	Not relevant	
Comments	None	

Data Unit / Parameter:	$C_{BSL,i}$	
Data unit:	t CO_2-e ha^{-1}	
Description:	Carbon stock in all pools in the baseline case in stratum i	
Source of data:	Estimated from forest carbon inventory.	
Description of measurement methods and procedures to be applied:	Detailed procedures provided below under monitoring plan description Monitoring responsibilities are listed in section 3.3, below.	
Frequency of monitoring/recording:	Every ≤ 10 years.	
Value applied:	Strata	CBSL,i (t CO_2-e ha^{-1})
	Paleo-Drainage	132.1
	Palm Savanna	136.7
	Forest	433.2
Monitoring equipment:	dbh tape, measuring tape, GPS, clinometer	
QA/QC procedures to be applied:	Detailed procedures provided below under monitoring plan description	
Purpose of data	Calculation of baseline emissions Calculation of project emissions	
Calculation method:	Use equations as stated in the forest inventory, including allometric equations as found in Chave et al. (2005), Cairns et al. (1997), Van Wagner (1968)	
Comments	None	

Data Unit / Parameter:	ΔCpools,Def,u,i,t
Data unit:	t CO_2-e ha^{-1}
Description:	Net carbon stock changes in all pools in the project case in land use u in stratum i at time t
Source of data:	Calculated.
Description of measurement methods and procedures to be applied:	As this parameter was calculated rather than measured, no measurements methods are noted. Monitoring responsibilities are listed in section 3.3, below.
Frequency of monitoring/recording:	Every ≤ 10 years.
Value applied:	317.2
Monitoring equipment:	None.

QA/QC procedures to be applied:	Detailed procedures provided below under monitoring plan description
Purpose of data	Calculation of baseline emissions Calculation of project emissions
Calculation method:	Equation 5, VMD0015
Comments	None

Data Unit / Parameter:	$A_{DegW,i,t}$
Data unit:	Ha
Description:	Area potentially impacted by degradation processes in stratum i
Source of data:	Delineated based on survey results indicating general area of project potentially accessed and typical depth of penetration of illegal harvest activities from points of access.
Description of measurement methods and procedures to be applied:	Detailed procedures provided below under monitoring plan description. Monitoring responsibilities are listed in section 3.3, below.
Frequency of monitoring/recording:	Repeated each time the PRA indicates a potential for degradation. PRA conducted every < 5 years or if verification occurs on a frequency of less than every 5 years PRA must occur prior to any verification event".
Value applied:	Year: 2020, $A_{DegW,i,t}$ (ha): 0.0 Year: 2021, $A_{DegW,i,t}$ (ha): 0.0
Monitoring equipment:	None.
QA/QC procedures to be applied:	Detailed procedures provided below under monitoring plan description.
Purpose of data	Calculation of project emissions
Calculation method:	Not relevant
Comments	PRAs indicated no degradation

Data Unit / Parameter:	$C_{DegW,i,t}$
Data unit:	t CO_2-e
Description:	Biomass carbon of trees cut and removed through degradation process from plots measured in stratum i at time t
Source of data:	Estimated from diameter measurements of cut stumps in sample plots
Description of measurement methods and procedures to be applied:	Detailed procedures provided below under monitoring plan description. Monitoring responsibilities are listed in section 3.3, below.
Frequency of monitoring/recording:	Every $\leq$ 5 years where surveys and limited sampling continue to indicate possibility of illegal logging in the project area
Value applied:	Year: 2020, $C_{DegW,i,t}$ (t CO_2-e): 0.0 Year: 2021, $C_{DegW,i,t}$ (t CO_2-e): 0.0
Monitoring equipment:	None.
QA/QC procedures to be applied:	Detailed procedures provided below under monitoring plan description.

Purpose of data	Calculation of project emissions
Calculation method:	Equation 8, VMD0015
Comments	PRAs indicated no degradation

Data Unit / Parameter:	AP_i
Data unit:	Ha
Description:	Total area of degradation sample plots in stratum i
Source of data:	Calculated as 3% of $A_{DegW,i,t}$
Description of measurement methods and procedures to be applied:	Detailed procedures provided below under monitoring plan description. Monitoring responsibilities are listed in section 3.3, below.
Frequency of monitoring/recording:	Every ≤ 5 years where surveys and limited sampling continue to indicate possibility of illegal logging in the project area
Value applied:	N/A
Monitoring equipment:	ArcGIS
QA/QC procedures to be applied:	Detailed procedures provided below under monitoring plan description.
Purpose of data	Calculation of project emissions
Calculation method:	Not relevant
Comments	None

Data Unit / Parameter:	$\Delta C_{P,Deg,i,t}$
Data unit:	t CO_2-e
Description:	Net carbon stock changes as a result of degradation in stratum i in the project area at time t
Source of data:	Calculated
Description of measurement methods and procedures to be applied:	As this parameter was calculated rather than measured, no measurements methods are noted. Monitoring responsibilities are listed in section 3.3, below.
Frequency of monitoring/recording:	Every ≤ 5 years where surveys and limited sampling continue to indicate possibility of illegal logging in the project area
Value applied:	0
Monitoring equipment:	None
QA/QC procedures to be applied:	Neither QA/QC procedures nor calibration are relevant for this calculated parameter.
Purpose of data	Calculation of project emissions
Calculation method:	Equation 8, VMD0015
Comments	PRAs indicated no degradation

Data Unit / Parameter:	Aburn,q,i,t.
Data unit:	Ha
Description:	Area burnt in post-natural disturbance stratum q in stratum i, at time t;
Source of data:	See parameter $A_{DistPA,q,i,t}$ and ADefPA,u,i,t

Description of measurement methods and procedures to be applied:	Monitored as part of $A_{DistPA,q,i,t}$ Monitoring responsibilities are listed in section 3.3, below.
Frequency of monitoring/recording:	Every ≤ 5 years
Value applied:	

Year	Paleo-Drainage ADefPA,u,i,t (ha)	Palm Savanna ADefPA,u,i,t (ha)	Forest ADefPA,u,i,t (ha)
2020	0.00	0.00	0.04
2021	0.00	0.00	0.08

Monitoring equipment:	None.
QA/QC procedures to be applied:	Detailed procedures provided below under monitoring plan description
Purpose of data	Calculation of project emissions
Calculation method:	Aburn,q,i,t.= $A_{DistPA,q,i,t}$ (area burnt in natural disturbance) + ADefPA,u,i,t (area burnt via deforestation in project ex post)
Comments	None

Data Unit / Parameter:	dbh
Data unit:	cm
Description:	diameter at breast height
Source of data:	Monitored during the course of each forest inventory
Description of measurement methods and procedures to be applied:	Detailed procedures provided in the Standard Operating Procedures Monitoring responsibilities are listed in section 3.3, below.
Frequency of monitoring/recording:	Every ≤ 10 years
Value applied:	See forest inventory excel sheet.
Monitoring equipment:	dbh tape, measuring tape,
QA/QC procedures to be applied:	Detailed procedures are provided below under monitoring plan description.
Purpose of data	Calculation of baseline emissions Calculation of project emissions
Calculation method:	Not relevant
Comments	None

Data Unit / Parameter:	dbasal
Data unit:	cm
Description:	Basal diameter
Source of data:	Monitored during the course of each forest inventory
Description of measurement methods and procedures to be applied:	Detailed procedures provided in the Standard Operating Procedures. Monitoring responsibilities are listed in section 3.3, below.
Frequency of monitoring/recording:	Every ≤ 10 years
Value applied:	See forest inventory excel sheet.

Monitoring equipment:	dbh tape, measuring tape,
QA/QC procedures to be applied:	Detailed procedures are provided below under monitoring plan description.
Purpose of data	Calculation of baseline emissions Calculation of project emissions
Calculation method:	Not relevant
Comments	Dbh may be used as a conservative estimate of dbasal

Data Unit / Parameter:	H
Data unit:	m
Description:	Height of tree
Source of data:	Monitored during the course of each forest inventory
Description of measurement methods and procedures to be applied:	Detailed procedures provided in the Standard Operating Procedures. Monitoring responsibilities are listed in section 3.3, below.
Frequency of monitoring/recording:	Every ≤ 10 years
Value applied:	See forest inventory excel sheet.
Monitoring equipment:	measuring tape, clinometer
QA/QC procedures to be applied:	Detailed procedures are provided below under monitoring plan description.
Purpose of data	Calculation of baseline emissions Calculation of project emissions
Calculation method:	Not relevant
Comments	None

Data Unit / Parameter:	Dn
Data unit:	cm
Description:	Diameter of piece n of dead wood along the transect
Source of data:	Monitored during the course of each forest inventory
Description of measurement methods and procedures to be applied:	Detailed procedures provided in the Standard Operating Procedures. Monitoring responsibilities are listed in section 3.3, below.
Frequency of monitoring/recording:	Every ≤ 10 years
Value applied:	See forest inventory excel sheet.
Monitoring equipment:	dbh tape, measuring tape
QA/QC procedures to be applied:	Detailed procedures are provided below under monitoring plan description.
Purpose of data	Calculation of baseline emissions Calculation of project emissions
Calculation method:	Not relevant
Comments	None

Data Unit / Parameter:	N
Data unit:	dimensionless
Description:	Total number of wood pieces intersecting the transect
Source of data:	Monitored during the course of each forest inventory
Description of measurement methods and procedures to be applied:	Detailed procedures provided in the Standard Operating Procedures. Monitoring responsibilities are listed in section 3.3, below.
Frequency of monitoring/recording:	Every ≤ 10 years
Value applied:	See forest inventory excel sheet.
Monitoring equipment:	None
QA/QC procedures to be applied:	Detailed procedures are provided below under monitoring plan description.
Purpose of data	Calculation of baseline emissions Calculation of project emissions
Calculation method:	Not relevant
Comments	None

Data Unit / Parameter:	L
Data unit:	m
Description:	Length of the transect
Source of data:	Monitored during the course of each forest inventory
Description of measurement methods and procedures to be applied:	Detailed procedures provided in the Standard Operating Procedures. Monitoring responsibilities are listed in section 3.3, below.
Frequency of monitoring/recording:	Every ≤ 10 years
Value applied:	200 m
Monitoring equipment:	measuring tape,
QA/QC procedures to be applied:	Detailed procedures are provided below under monitoring plan description.
Purpose of data	Calculation of baseline emissions Calculation of project emissions
Calculation method:	Not relevant
Comments	None

Data Unit / Parameter:	$U_{P,SS,i,pool\#}$
Data unit:	%
Description:	Percentage uncertainty (expressed as 95% confidence interval as a percentage of the mean where appropriate) for carbon stocks and greenhouse gas sources in the with-project case (1,2…n represent different carbon pools and/or GHG sources)
Source of data:	Calculations arising from field measurement data

Description of measurement methods and procedures to be applied:	Uncertainty in pools derived from field measurement with 95% confidence interval calculated as the standard error of the averaged plot measurements in each stratum multiplied by the t value for the 95% confidence level. Monitoring responsibilities are listed in section 3.3, below.
Frequency of monitoring/recording:	Monitored at least once every 10 years (on re-measurement of forest carbon stocks)
Value applied:	Same as UBSL,SS,i,pool# values below.
Monitoring equipment:	None
QA/QC procedures to be applied:	Neither QA/QC procedures nor calibration are relevant for this calculated parameter.
Purpose of data	Calculation of baseline emissions Calculation of project emissions
Calculation method:	Not relevant
Comments	Same as UBSL,SS,i,pool# values below as forest carbon stock growth was not tracked.

Data Unit / Parameter:	EBSL SS,i, pool#
Data unit:	t CO2-e
Description:	Carbon stock or GHG sources (e.g. trees, dead wood, soil organic carbon, emission from fertilizer addition, emission from biomass burning etc.) in the baseline case
Source of data:	Calculated
Description of measurement methods and procedures to be applied:	As this parameter was calculated rather than measured, no measurements methods are noted. Monitoring responsibilities are listed in section 3.3, below.
Frequency of monitoring/recording:	Every ≤ 10 years.
Value applied:	

Strata	Live aboveground tree biomass	Belowground biomass	Litter	Dead wood
EBSL,SS,Paleo-Drainage,pool# (tCO_2e)	59,651	14,981	4,755	9,116
EBSL,SS,PalmSavanna,pool# (tCO_2e)	784,689	196,111	96,826	12,049
EBSL,SS,Forest,pool# (tCO_2e)	6,890,151	1,573,708	242,007	282,083

Monitoring equipment:	None
QA/QC procedures to be applied:	Neither QA/QC procedures nor calibration are relevant for this calculated parameter.
Purpose of data	Calculation of baseline emissions Calculation of project emissions
Calculation method:	Not relevant
Comments	Baseline stocks and sources are estimated ex-ante for each baseline period

Data Unit / Parameter:	UBSL,SS,i,pool#
Data unit:	%

Description:	Percentage uncertainty (expressed as 95% confidence interval as a percentage of the mean where appropriate) for carbon stocks and greenhouse gas sources in the baseline case (1,2…n represent different carbon pools and/or GHG sources)
Source of data:	Calculated
Description of measurement methods and procedures to be applied:	As this parameter was calculated rather than measured, no measurements methods are noted. Monitoring responsibilities are listed in section 3.3, below.
Frequency of monitoring/recording:	Every ≤ 10 years.
Value applied:	

Strata	Live aboveground tree biomass	Belowground biomass	Litter	Dead wood
UBSL,SS,Paleo-Drainage,pool# (%)	95.9%	88.4%	45.7%	169.1%
UBSL,SS,PalmSavanna,pool# (%)	24.9%	23.2%	100.2%	0.0%
UBSL,SS,Forest,pool# (%)	4.1%	3.8%	18.1%	22.2%

Monitoring equipment:	None
QA/QC procedures to be applied:	Neither QA/QC procedures nor calibration are relevant for this calculated parameter.
Purpose of data	Calculation of baseline emissions Calculation of project emissions
Calculation method:	See equation 4 in the X-UNC module.
Comments	Baseline stocks and sources are estimated ex-ante for each baseline period

Data Unit / Parameter:	EBSL SS,i
Data unit:	t CO_2-e
Description:	Sum of combined carbon stocks and GHG sources in stratum i multiplied by the area of stratum i (Ai) in the baseline case
Source of data:	Calculated
Description of measurement methods and procedures to be applied:	As this parameter was calculated rather than measured, no measurements methods are noted. Monitoring responsibilities are listed in section 3.3, below.
Frequency of monitoring/recording:	Every ≤ 10 years.
Value applied:	

Strata	EBSL,SS,t,I (tCO_2e)
Paleo-Drainage	88,503
Palm Savanna	1,089,676
Forest	8,987,949

Monitoring equipment:	None
QA/QC procedures to be applied:	Neither QA/QC procedures nor calibration are relevant for this calculated parameter.
Purpose of data	Calculation of baseline emissions Calculation of project emissions

Calculation method:	Not relevant
Comments	Baseline stocks and sources are estimated ex-ante for each baseline period

Data Unit / Parameter:	UBSL,SS,i
Data unit:	%
Description:	Percentage uncertainty in the combined carbon stocks and greenhouse gas sources in stratum i in the baseline case
Source of data:	Calculated
Description of measurement methods and procedures to be applied:	As this parameter was calculated rather than measured, no measurements methods are noted. Monitoring responsibilities are listed in section 3.3, below.
Frequency of monitoring/recording:	Every ≤ 10 years.
Value applied:	Strata: UncertaintyBSL,SS,I (%) Paleo-Drainage: 68.6% Palm Savanna: 20.5% Forest: 3.3%
Monitoring equipment:	None
QA/QC procedures to be applied:	Neither QA/QC procedures nor calibration are relevant for this calculated parameter.
Purpose of data	Calculation of baseline emissions Calculation of project emissions
Calculation method:	See equation 5 in the X-UNC module.
Comments	Baseline stocks and sources are estimated ex-ante for each baseline period

Data Unit / Parameter:	Bi,t
Data unit:	tonnes d. m. ha^{-1}
Description:	Average aboveground biomass stock before burning stratum i, time t
Source of data:	Calculated using forest inventory data
Description of measurement methods and procedures to be applied:	Detailed procedures provided in the Standard Operating Procedures. Monitoring responsibilities are listed in section 3.3, below.
Frequency of monitoring/recording:	Every ≤ 10 years
Value applied:	Paleo-Drainage B,i,t (t d.m./ha): 63.7 Palm Savanna B,i,t (t d.m./ha): 65.0 Forest B,i,t (t d.m./ha): 207.3
Monitoring equipment:	None
QA/QC procedures to be applied:	Detailed procedures are provided below under monitoring plan description.
Purpose of data	Calculation of baseline emissions Calculation of project emissions Calculation of leakage

Calculation method:	Use equations as stated in the forest inventory, including allometric equations as found in Chave et al. (2005), Cairns et al. (1997), Van Wagner (1968)
Comments	Ex-ante Bi,t is the weighted average across all strata

Data Unit / Parameter:	AGB
Data unit:	tonnes d. m. ha^{-1}
Description:	Aboveground biomass density
Source of data:	Calculated using forest inventory data
Description of measurement methods and procedures to be applied:	Detailed procedures provided in the Standard Operating Procedures. Monitoring responsibilities are listed in section 3.3, below.
Frequency of monitoring/recording:	Every ≤ 10 years
Value applied:	Plot level values can be found in the Forest Inventory Report
Monitoring equipment:	None
QA/QC procedures to be applied:	Detailed procedures are provided below under monitoring plan description.
Purpose of data	Calculation of baseline emissions Calculation of project emissions
Calculation method:	Use equations as stated in the forest inventory, including allometric equations as found in Chave et al. (2005), Cairns et al. (1997), Van Wagner (1968)
Comments	None

Data Unit / Parameter:	Asp
Data unit:	ha
Description:	Area of sample plots in ha
Source of data:	Recording and archiving of number and size of sample plots
Description of measurement methods and procedures to be applied:	Detailed procedures provided in the Standard Operating Procedures. Monitoring responsibilities are listed in section 3.3, below.
Frequency of monitoring/recording:	Every ≤ 10 years
Value applied:	0.16619 ha or a 23m radius circle
Monitoring equipment:	M
QA/QC procedures to be applied:	Detailed procedures provided below under monitoring plan description
Purpose of data	Calculation of baseline emissions Calculation of project emissions
Calculation method:	Not relevant
Comments	None

Data Unit / Parameter:	Hsdw
Data unit:	M
Description:	Height of standing dead tree in m
Source of data:	Monitored during the course of each forest inventory

Description of measurement methods and procedures to be applied:	Detailed procedures provided in the Standard Operating Procedures. Monitoring responsibilities are listed in section 3.3, below.
Frequency of monitoring/recording:	Every ≤ 10 years
Value applied:	See forest inventory excel workbook.
Monitoring equipment:	measuring tape, clinometer
QA/QC procedures to be applied:	Detailed procedures are provided below under monitoring plan description.
Purpose of data	Calculation of baseline emissions Calculation of project emissions
Calculation method:	Not relevant
Comments	None

Data Unit / Parameter:	DDWdc
Data unit:	t d.m. m-3
Description:	Mean wood density of dead wood in the density class (dc) – sound (1),intermediate (2), and rotten (3); t d.m. m-3
Source of data:	Monitored during the course of each forest inventory
Description of measurement methods and procedures to be applied:	Detailed procedures provided in Appendix B of the project document. Monitoring responsibilities are listed in section 3.1.3, below.
Frequency of monitoring/recording:	Every ≤ 10 years
Value applied:	Density Class: Density (t d.m. m-3) Rotten (P): 0.358 Intermediary (I): 0.622 Solid (S): 0.716
Monitoring equipment:	dbh tape, measuring tape, drying oven
QA/QC procedures to be applied:	Detailed procedures provided below under monitoring plan description
Purpose of data	Calculation of baseline emissions Calculation of project emissions
Calculation method:	Not relevant
Comments	None

Data Unit / Parameter:	CP,Dist,q,i
Data unit:	t CO2-e ha-1
Description:	Carbon stock in all pools in post-natural disturbance q in baseline stratum i
Source of data:	Monitored
Description of measurement methods and procedures to be applied:	Detailed procedures provided in the Standard Operating Procedures. Monitoring responsibilities are listed in section 3.3, below.
Frequency of monitoring/recording:	Prior to each verification event and at least every 5 years.
Value applied:	0

Monitoring equipment:	dbh tape, measuring tape, GPS, clinometer
QA/QC procedures to be applied:	Detailed procedures provided below under monitoring plan description
Purpose of data	Calculation of project emissions
Calculation method:	Use equations as stated in the forest inventory, including allometric equations as found in Chave et al. (2005), Cairns et al. (1997), Van Wagner (1968). Carbon stocks must be measured and estimated using the methods given in module CP-AB and CP-D.
Comments	Alternatively, it can be conservatively assumed that a post-natural disturbance live and dead vegetation pool is equal to zero

Data Unit / Parameter:	Ai
Data unit:	ha
Description:	Total area of stratum i
Source of data:	GIS coverages
Description of measurement methods and procedures to be applied:	N/A
Frequency of monitoring/recording:	Every ≤ 10 years
Value applied:	

Strata in Initial Project Area	Ai (ha)
Paleo-Drainage	548.2
Palm Savanna	7,470.5
Forest	12,496.3

Monitoring equipment:	ArcGIS
QA/QC procedures to be applied:	Detailed procedures provided below under monitoring plan description
Purpose of data	Calculation of baseline emissions Calculation of project emissions Calculation of leakage
Calculation method:	N/A
Comments	Ex-ante, it shall be assumed that stratum area will remain constant for the baseline period

Data Unit / Parameter:	AAplanned,i,t
Data unit:	Ha
Description:	Annual area of baseline planned deforestation for stratum i at time t
Source of data:	Calculated
Description of measurement methods and procedures to be applied:	N/A

Frequency of monitoring/recording:	Every ≤ 10 years
Value applied:	

Year	AAplanned,i,t (ha)
2020	2,274
2021	4,547
2022	2,274
2023	4,547
2024	1,163
2025	1,163
2026	0
2027	0
2028	0
2029	0
2030	0

Monitoring equipment:	N/A
QA/QC procedures to be applied:	N/A
Purpose of data	Calculation of baseline emissions
Calculation method:	Uses Equation 3 in BL-PL
Comments	None

Data Unit / Parameter:	Aplanned,i
Data unit:	Ha
Description:	Total area of planned deforestation over the baseline period for stratum i
Source of data:	Monitored
Description of measurement methods and procedures to be applied:	Determined using a GIS
Frequency of monitoring/recording:	Every ≤ 10 years
Value applied:	31,858.6
Monitoring equipment:	GIS
QA/QC procedures to be applied:	None
Purpose of data	Calculation of baseline emissions
Calculation method:	N/A
Comments	This is the total area of the initial project property.

Data Unit / Parameter:	CWP100,i
Data unit:	t CO2/ha
Description:	Carbon stock entering the wood products pool at the time of deforestation that is expected to be emitted over 100-years from stratum i; t CO2-e ha-1
Source of data:	Calculated

Description of measurement methods and procedures to be applied:	N/A
Frequency of monitoring/recording:	Every ≤ 10 years
Value applied:	0
Monitoring equipment:	N/A
QA/QC procedures to be applied:	N/A
Purpose of data	Calculation of baseline emissions Calculation of project emissions Calculation of leakage
Calculation method:	Uses Equation 2 in the CP-W module
Comments	None

Data Unit / Parameter:	CWP,i
Data unit:	t CO2/ha
Description:	Carbon stock entering wood products pool at time of deforestation from stratum i
Source of data:	Calculated
Description of measurement methods and procedures to be applied:	N/A
Frequency of monitoring/recording:	Every ≤ 10 years
Value applied:	0
Monitoring equipment:	N/A
QA/QC procedures to be applied:	N/A
Purpose of data	Calculation of baseline emissions Calculation of project emissions Calculation of leakage
Calculation method:	Uses Equation 2 in the CP-W module
Comments	None

3.1.3 Monitoring Plan

This monitoring plan has been developed in close conjunction with module VMD0015 of the REDD Methodological Module, “Methods for monitoring of greenhouse gas emissions and removals (M-REDD).” This section focuses on establishing procedures for monitoring deforestation, illegal degradation, natural disturbance, and project emissions ex-post in the Project Area and leakage areas. Further, procedures for updating the forest carbon stocks and revising the baseline are also provided below.

For accounting purposes, the Project conservatively assumes stable stocks and no biomass monitoring is conducted in areas undergoing carbon stock enhancement, as permitted in the methodology monitoring module VMD0015, hence $\Delta C_{P,Enh,i,t}$ is set to 0.

Further, as no commercial harvest of timber (including FSC selective logging) occurs in the with-project case, the degradation due to harvest of timber will not be monitored, thus parameter $\Delta C_{P,SelLog,i,t}$ is set to 0.

A separate section on quality assurance/quality control and data archiving procedures covers all monitoring tasks.

Organizations responsible for monitoring are listed below in Table 3.8. These organizations are responsible for implementing all aspects of a particular monitoring task, as described in the monitoring sub-sections below.

Estimation of Ex-Post Net Carbon Stock Changes and Greenhouse Gas Emissions

Ex-post net carbon stock changes and greenhouse gas emissions can only be calculated after monitoring:

- The net carbon stock change as a result of deforestation in the Project Area;
- The net carbon stock change as a result of degradation in the Project Area;
- The net carbon stock change as a result of natural disturbance in the Project Area; and
- The greenhouse gas emissions as a result of deforestation and degradation activities within the Project Area.

<u>Monitoring Deforestation and Natural Disturbance</u>

Forest cover change due to deforestation and natural disturbance is monitored through periodic assessment of classified satellite imagery, see below, covering the Project Area. Emissions ($\Delta C_{P,Def,i,t}$ and $\Delta C_{P,DistPA,i,t}$ for deforestation and natural disturbance, respectively) are estimated by the multiplying areas $A_{DefPA,u,i,t}$ and $A_{DistPA,q,i,t}$, for deforestation and natural disturbance, respectively, by average forest carbon stock per unit area. Note that $A_{DistPA,q,i,t}$, is limited to the area where credits have been issued and is identified as the overlap between the delineated area of the disturbance and the summed area of deforestation in the Project Area to the year in which the disturbance occurred. Stock estimates from the initial field inventory are valid for 10 years (per VM0007). Table 3.1 shows the data and parameters monitored.

Table 3.1. Data and Parameters for Monitoring Deforestation and Natural Disturbance.

Parameter	Description	Units	Source/ Justification of Choice of Data or Description of Measurement Methods

$\Delta C_{P,Def,i,t}$	Net carbon stock change as a result of deforestation in the project case in the project area in stratum i at time t	t CO_2e	Calculated
$\Delta C_{P,DistPA,i,t}$	Net carbon stock change as a result of natural disturbance in the project case in the project area in stratum i at time t	t CO_2e	Calculated
$A_{DefPA,u,i,t}$	Area of recorded deforestation in the project area stratum i converted to land use u at time t	Ha	Monitored for each verification event
$A_{DistPA,q,i,t}$	Area impacted by natural disturbance in post-natural disturbance stratum q in stratum i, at time t	Ha	Monitored for each verification event
$C_{BSL,i}$	Carbon stock in all pools in the baseline case in stratum i	t CO_2e ha^{-1}	Estimated from the forest carbon inventory

Changes in forest cover ($A_{DefPA,u,i,t}$ and $A_{DistPA,q,i,t}$) will be monitored via classification of remotely sensed imagery and land use change detection procedures completed as part of each monitoring event. The definition of forest used in the classified dataset is in broad agreement with the Paraguayan definition of a forest,[31] as set by the Clean Development Mechanism Designated National Authority.

The classification methodology will outline atmospheric and geometric correction procedures and uses a supervised classification approach. Where Landsat Imagery is used, only images with cloud cover covering less than 10% of a scene will be downloaded. These images will be corrected for any atmospheric problems (using Carlotto HAZE algorithm) and geometric correction issues. Georeferencing will be conducted with the nearest neighbor method, using a minimum of 20 points, and had an error (RMS) of less than 1 pixel. The image processing phase will include image segmentation (into statistically homogeneous areas) using Landsat bands 3, 4 & 5 (Blue, green and red). Then representative samples (training sites) of Forest, Non-Forest, Water, Cloud and Cloud Shadow will be selected using expert knowledge whereby training sites are distributed throughout the image and represent the variability within each class. A supervised classification[32] approach will be used with the Support Vector Machine (SVM) classification algorithm. All processing will be implemented in ENVI + IDL 4.6 except georeferencing which will be carried out using ERDAS IMAGINE 9. Any deviations from the above approach will be detailed in the monitoring report.

Deforestation and natural disturbance will be distinguished using ancillary data which may include but is not limited to high resolution imagery, digital elevation models (to identify steep areas prone to landslides), information from local land managers, etc.

[31] The Clean Development Mechanism Designated National Authority in Paraguay has set the forest definition as:
1. Minimum tree crown cover of 25 per cent;
2. Minimum land area of 0.5 hectare; and
3. Potential to reach a minimum tree height of 5 meters at maturity

See http://cdm.unfccc.int/DNA/ARDNA.html?CID=30, accessed March 5, 2012.

[32] There is no overlap between the accuracy assessment points and the data used for classification.

The Project Area as set in the Project Description (PD), will serve as the initial "forest cover benchmark map" against which changes in forest cover will be assessed over the interval of the first monitoring period; the entire Project Area has been demonstrated to meet the forest definition at the beginning of the crediting period. For subsequent monitoring periods, change in forest cover will be assessed against the preceding classified forest cover map marking the beginning of the monitoring interval. Thus, the forest benchmark map is updated at each monitoring event.

Monitoring Illegal Degradation

Emissions due to illegal logging will be tracked by conducting surveys in the surrounding areas every two years. Locations surveyed will include:

- Families residing in areas adjacent to the project property; and
- Communities within 20 km of the project property.

Degradation surveys will be conducted for communities who give consent to being interviewed and are reliant on the project area. Surveys will produce information on wood consumers (fuel wood and wood for construction and charcoal production) in the surroundings areas, as well as general indications on the areas where wood is sourced from and maximum depth of penetration of harvest activities from access points. In the event that any potential of illegal logging occurring in the Project Area is detected from the surveys (i.e., ≥ 10% of those interviewed/surveyed believe that degradation may be occurring within the project boundary), then an estimation of emissions associated with illegal logging will be produced from the survey data and the T-SIG tool applied. The information collected in the Participatory Rural Assessments (PRAs) will be used to calculate logging emissions in conjunction with conservative assumptions/estimates including that all wood collected was live (unless otherwise stated), use of a regional charcoal recovery rate, use of a logging damage factor from the methodology, and that trees harvested were in the 99th percentile in terms of dbh (for the harvested species, if known).

In the event that the initial assessment indicated that illegal logging is occurring and significant in the area, the potential degradation area within the Project Area ($A_{DegW,i}$) will be delineated based on survey results, incorporating general area information and depth of penetration. Degradation monitoring plots will be allocated to achieve a 3% sample of this area. Rectangular plots 10 meters by 1 kilometer (1 ha area) will be randomly or systematically allocated in the area, sufficient to produce a 3% sample of the area, and any recently cut stumps or other indications of illegal harvest will be noted and recorded. Diameter at breast height, or diameter at height of cut, whichever is lower, of cut stumps will be measured. Biomass will be estimated from measured diameters (conservatively assuming that diameters of stumps cut below breast height are equivalent to diameter at breast height) applying the allometric equations and analytical procedures in the original forest inventory report. Emissions due to illegal logging ($\Delta C_{P,DegW,i,t}$) are estimated by multiplying area ($A_{DegW,i}$) by average biomass carbon of trees cut and removed per unit area ($C_{DegW,i,t}/AP_i$).

The 3% sample will be conducted once every 5 years where initial surveys continue to indicate possibility of illegal logging in the Project Area to produce an estimate of emissions resulting from illegal logging ($\Delta C_{P,DegW,i}$). Estimates of emissions will be annualized (to produce estimates in t CO_2e per year) by dividing the emission for the monitoring interval by the number of years in the interval.

Table 3.2. Data and Parameters for Monitoring Illegal Degradation.

Parameter	Description	Units	Source/ Justification of Choice of Data or Description of Measurement Methods
$A_{DegW,i,t}$	Area potentially impacted by degradation processes in stratum i	Ha	Delineated based on survey results indicating general area of project potentially accessed and typical depth of penetration of illegal harvest activities from points of access
$C_{DegW,i,t}$	Biomass carbon of trees cut and removed through degradation process from plots measured in stratum i at time t	t CO_2e	Estimated from diameter measurements of cut stumps in sample plots
AP_i	Total area of degradation sample plots in stratum i	Ha	Calculated as 3% of $A_{DegW,i,t}$
$\Delta C_{P,DegW,i,t}$	Net carbon stock changes as a result of degradation in stratum i in the project area at time t	t CO_2e	Calculated

Monitoring Project Emissions

With-project emissions are calculated as the sum of emissions from fossil fuel combustion (EFC,i,t) + non-CO_2 emissions due to biomass burning (EBiomassBurn,i,t) + direct N_2O emissions as a result of nitrogen application (N_2Odirect-N,i,t.). As stipulated in the methodology, fossil fuel combustion in all situations is an optional emission source. Further, no nitrogen is applied on pasture land in the with-project case and hence project emissions therefore equal EBiomassBurn and are calculated using the VMD0013, “Estimation of greenhouse gas emissions from biomass and peat burning (E-BPB)” of the AD Partners modular REDD Methodology.

Non-CO_2 emissions from biomass burning in the project case include emissions from burning associated with deforestation and burning associate with natural disturbance, i.e., forest fire. It will be conservatively assumed that the total area burnt during the deforestation process is equal to the area deforested, ADefPA,u,i,t. Thus, the area used when calculating E-BPB is equal to Aburn,i,t. (area burnt) = Aburn,q,i,t. (area burnt in natural disturbance) + ADefPA,u,i,t (area burnt via deforestation in project ex post).

Also, it is conservatively assumed that burning is a part of the forest conversion process in all incidents of deforestation taking place in the activity shifting leakage areas. Thus, the parameter $A_{burn,i,t}$ (Area burnt for stratum *i* at time *t*; ha) will be set equal to monitored parameter $A_{DefLK,i,t}$ (Area of recorded deforestation in the activity shifting leakage areas at time t; ha). The T-SIG tool can then be applied, and if parameter $E_{BiomassBurn,t}$ (Greenhouse emissions due to biomass burning as part of deforestation activities in stratum *i* in year *t*) is determined to be insignificant, $E_{BiomassBurn,t}$, can be assumed equal to zero.

Table 3.3. Data and Parameters for Monitoring Emissions from Biomass Burning.

Parameter	Description	Units	Source/ Justification of Choice of Data or Description of Measurement Methods
E BiomassBurn,t	Greenhouse emissions due to biomass burning as part of deforestation activities in stratum i in year t	tCO_2e of each GHG (CH_4, N_2O)	Calculated
Aburn,i,t	Area burnt for stratum i at time t	Ha	Monitored for each verification event
Bi,t	Average aboveground biomass stock before burning stratum i, time t	tonnes d. m. ha^{-1}	Conservatively assumed to be the carbon stock in all pools in the baseline case (CBSL,i).
COMF i	Combustion factor for stratum i; dimensionless	dimensionless	0.50 for primary moist tropical forest. Derived from Table 2.6 of IPCC, 2006.
Gg,i	Emission factor for stratum i for gas g	kg t-1 dry matter burnt	GCH_4 = 6.8 g kg-1 and GN_2O = 0.2 g kg-1. Derived from Table 2.5 of IPCC, 2006.
GWPg	Global warming potential for gas g	t CO_2/t gas g	Default values from IPCC 2014 AR5 GWP100: CH_4 = 28; N_2O = 265).

Monitoring of Leakage Carbon Stock Changes and Greenhouse Gas Emissions

Two sources of leakage will be monitored: activity-shifting leakage and market leakage.

<u>Activity-Shifting Leakage</u>

Activity-shifting leakage will be monitored by identifying all the areas that may be expected to be converted to non-forest land by the agent/class outside the project boundaries during the baseline period (Aplanned,i,OP). Further, the total area of deforestation by the baseline agent or class of agent of the planned deforestation (AdefLK,i,t) will be estimated for each monitoring period. This will be accomplished by examining remote sensing data, legal records, and/or survey information.

Table 3.4. Data and Parameters for Activity-Shifting Leakage.

Parameter	Description	Units	Source/ Justification of Choice of Data or Description of Measurement Methods
Aplanned,i,OP	Total area of planned deforestation outside the project boundaries over the entire project lifetime for stratum i	ha	Must be re-evaluated whenever the baseline is revised

AdefLK,i,t	The total area of deforestation by the baseline agent or class of agent of the planned deforestation in stratum i in year t	ha	Must be reexamined at least every 5 years or if verification occurs on a frequency of less than every 5 years examination must occur prior to any verification event. Must be re-evaluated whenever the baseline is revised

Market Leakage

Market leakage values calculated ex-ante are also used ex-post. No market leakage is calculated for the initial project instance as there is no harvesting of timber for commercial markets.

Table 3.5. Data and Parameters for Market Leakage.

Parameter	Description	Units	Source/ Justification of Choice of Data or Description of Measurement Methods
VBSL,EX,i,t	Volume of timber projected to be extracted from within the project boundary during the baseline in stratum i in year t (m3)	ha	Sources may include: 1. Timber harvest records and/or 2. Estimates derived from field measurements and/or 3. Assessments with aerial photography or satellite imagery.

Monitoring of Actual Carbon Stock Changes and Greenhouse Gas Emissions

Forest carbon stock estimates, including aboveground and belowground live tree, litter stocks, and dead wood stocks, will be derived from field measurements less than or equal to 10 years old. For each stratum, where the re-measured estimate is within the 90% confidence interval of the t=0 estimate, the t=0 stock estimate takes precedence and is re-employed, and where the re-measured estimate is outside (i.e., greater than or less than) the 90% confidence interval of the t=0 estimate, the new stock estimate takes precedence and is used for the subsequent period.

Sample plots will be randomly located and measured following the Project's standard operating procedures. Biomass will be estimated applying the following allometric equations and otherwise maintain consistency with analytical procedures applied in the original inventory.

For live trees, biomass is calculated as a function of diameter at breast height (DBH; in cm) and specific gravity (*SG*, g/cm^3) using the predictive model developed by Chave et al. (2005)[33] for tropical moist

[33]Chave, Jérôme, Christophe Andalo, Sandra Brown, Michael A. Cairns, Jeffrey Q. Chambers, Derek Eamus, Horst Fölster et al. "Tree allometry and improved estimation of carbon stocks and balance in tropical forests." Oecologia 145, no. 1 (2005): 87-99.

forest stands. Application of the "dry" equation reflects the annual precipitation for the inventoried area, 1000-1100mm/yr.

aboveground biomass (kg) Equation 3.1

=(*SG**EXP((-0.667)+(1.784*LN(DBH))+(0.207*(LN(DBH))^2)-(0.0281*LN((DBH))^3)))

For palms, height and basal diameter measurements are used to estimate the aboveground volume of a paraboloid and then species level specific gravity (SG, estimated by Chave[34] et al. 2006) will be applied. The estimate of biomass for palms is therefore to be limited to the main trunk (bole) of the palm. Thus, for palms

aboveground biomass (Mg) = 0.5*Π*(basal diameter(cm)/200)^2*height(m)*SG Equation 3.2

Root biomass density is estimated at the cluster sample level applying the equation developed by Cairns et al.[35] , where:

Root Biomass Density (t/ha) = EXP (-1.085 + 0.925 LN(aboveground biomass density)) Equation 3.3

The volume of lying dead wood per unit area is estimated using the equation (Warren and Olsen[36]) as modified by Van Wagner[37] separately for each dead wood density class:

$$V_{LDW} = \frac{\pi^2 * \left(\sum_{n=1}^{N} D_n^{\,2} \right)}{8 * L}$$ Equation 3.4

where:

V_{LDW} Volume of lying dead wood per unit area; m^3 ha^{-1}

D_n Diameter of piece n of dead wood along the transect; cm

N Total number of wood pieces intersecting the transect; dimensionless

L Length of the transect; m

Length of each transect was corrected for slope. The volumes per unit area of each dead wood density class are then multiplied by their respective densities to convert to a mass per unit area.

Biomass of standing dead wood is estimated using the allometric equation for live trees in the decomposition class 1. In decomposition class 2, the estimate of biomass was limited to the main trunk (bole) of the tree, in which case the biomass was calculated converting volume to biomass using dead

[34] Chave, Jérôme, Helene C. Muller-Landau, Timothy R. Baker, Tomás A. Easdale, Hans ter Steege, and Campbell O. Webb. "Regional and phylogenetic variation of wood density across 2456 neotropical tree species." *Ecological applications* 16, no. 6 (2006): 2356-2367.
[35] Cairns, M. A., S. Brown, E. H. Helmer, and G. A. Baumgardner. 1997. Root biomass allocation in the world's upland forests. Oecologia 111, 1-11.
[36] Warren, W.G. and Olsen, P.F. (1964) A line intersect technique for assessing logging waste. Forest Science 10: 267-276.
[37] Van Wagner, C.E. (1968). The line intersect method in forest fuel sampling. Forest Science 14: 20-26.

wood density classes. Volume was estimated as the volume of a cone, as specified in the VM0007 module, "Estimation of carbon stocks in the dead wood pool."

Density of dead wood is determined through sampling and laboratory analysis. Discs are collected in the field and decomposition class and green volume determined as per standard operating procedures. The resulting dry weight is recorded and used to calculate dead wood density as oven-dry weight (g) / green volume (cm^3) for each sample.

Dry mass is converted to carbon using the default carbon fraction of 0.47 t C/t d.m. (as recommended by IPCC[38] Guidelines for National Greenhouse Gas Inventories).

Table 3.6. Data and Parameters for Monitoring Carbon Stocks Changes and GHG Emissions.

Parameter	Description	Units	Source/ Justification of Choice of Data or Description of Measurement Methods
CWP100,i	Carbon stock entering the wood products pool at the time of deforestation that is expected to be emitted over 100-years from stratum i	t CO_2-e ha^{-1}	Calculated
ΔCAB_tree,i	Baseline carbon stock change in aboveground tree biomass in stratum i	t CO_2-e ha^{-1}	Estimated from the forest carbon inventory
ΔCBB_tree,i	Baseline carbon stock change in belowground tree biomass in stratum i	t CO_2-e ha^{-1}	Estimated from the forest carbon inventory
ΔCDW,i	Baseline carbon stock change in dead wood in stratum i	t CO_2-e ha^{-1}	Estimated from the forest carbon inventory

Revision of the Baseline

The baseline will be revised every 10 years from the Project's start date. Should an analysis of proxy areas be warranted to estimate a rate of deforestation, the BL-PL module will be consulted. Data collection procedures in regard to revision of the baseline will include Participatory Rural Appraisals, along with interviews and collaboration with MADES, INFONA, and municipal officials, where warranted. Deforestation maps will be prepared by classifying remotely sensed imagery, if warranted, to assist with development of the revised baseline. Other datasets used to substantiate aspects of the baseline will be from official government sources, peer reviewed publications, or other reputable sources.

Table 3.7. Data and Parameters for Revising the Baseline.

Parameter	Description	Units	Source/ Justification of Choice of Data or Description of Measurement Methods

[38] IPCC 2006 Guidelines for National Greenhouse Gas Inventories. Chapter 4 AFOLU (Agriculture, Forestry and Other Land-use).

ΔCBSL,planned	Net greenhouse gas emissions in the baseline from planned deforestation	t CO_2e	Calculated every 10 years
ΔCBSL,i,t	Net carbon stock changes in all pools in the baseline stratum i at time t	t CO_2-e	Calculated every 10 years
GHGBSL-E,i,t	Greenhouse gas emissions as a result of deforestation activities within the project boundary in the baseline stratum i during project year t	t CO_2-e $year^{-1}$	Calculated every 10 years
AAplanned,i,t,	Annual area of baseline planned deforestation for stratum i at time t	Ha	Calculated every 10 years
ΔCstocks,i	Baseline carbon stock change in stocks in stratum i	t CO_2-e ha^{-1}	Estimated from the forest carbon inventory.

Quality Assurance/Quality Control and Data Archiving Procedures

Monitoring Deforestation, Natural Disturbance, and Leakage

To ensure consistency and quality results, spatial analysts carrying out the imagery processing, interpretation, and change detection procedures will strictly adhere to best practices and good practice guidelines, when using the alternative method for quantifying deforestation. All data sources and analytical procedures will be documented and archived (detailed under data archiving below).

Accuracy of the classification, for both the baseline and monitoring, will be assessed by comparing the classification with ground-truth points or samples of high-resolution imagery. Any data collected from ground-truth points will be recorded (including GPS coordinates, identified land-use class, and supporting photographic evidence) and archived. Any sample points of high-resolution imagery used to assess classification accuracy will also be archived. Samples used to assess classification accuracy should be well-distributed throughout the Project Area (as far as is possible considering availability of high-resolution imagery and/or logistics of acquiring ground-truth data), with a minimum sampling intensity of 50 points each for the forest and non-forest classes.

The classification will only be used in the forest cover change detection step if the overall classification accuracy, calculated as the total number of correct samples / the total number of samples, is equal to or exceeds 90%.

All data sources and processing, classification and change detection procedures will be documented and stored in a dedicated long-term electronic archive.

Information related to monitoring deforestation maintained in the archive will include:

- Forest / non-forest maps;
- Documentation of software type and procedures applied (including all pre-processing steps and corrections, spectral bands used in final classifications, and classification methodologies and algorithms applied), if applicable; and

- Data used in accuracy assessment - ground-truth points (including GPS coordinates, identified land-use class, and supporting photographic evidence) and/or sample points of high-resolution imagery.

Forest Carbon Stocks and Degradation

The following steps will be taken to control for errors in field sampling and data analysis:

1. Trained field crews will carry out all field data collection and adhere to standard operating procedures. Pilot sample plots shall be measured before the initiation of formal measurements to appraise field crews and identify and correct any errors in field measurements. Field crew leaders will be responsible for ensuring that field protocols are followed to ensure accurate and consistent measurements. To ensure accurate measurements, the height of diameter at breast height (1.3 m) will be periodically re-assessed by personnel during the course of the inventory.

2. Field measurement data will be recorded on standard field data sheets and entered into an excel database for data management and quality control. Potential errors in data entry (anomalous values) will be verified or corrected consulting the original data sheets or personnel involved in measurement. Original data sheets will be permanently archived in a dedicated long-term electronic archive. The electronic database will also archive GIS coverages detailing forest and strata boundaries and plot locations.

Quality control procedures for sampling degradation will include steps 1 and step 3, above.

Personnel involved in the revising of the baseline will have detailed knowledge in regard to spatial modeling and land use change and deep familiarity with REDD methodologies. Remote sensing data used will include officially published dataset, or classified imagery, which meets accuracy assessment requirements as laid out in the methodology.

All measurement and monitoring equipment requiring calibration will be calibrated according to the equipment's specifications and/or relevant national or international standards.

Data Archiving

Data archived will be maintained through at least two years beyond the end of the Project's crediting period. All project records are secure and retrievable. This includes project documents saved on Quadriz staff computers. An identical version of the project documents is remotely saved on an external hard drive or in the cloud via DropBox (or a similar online storage platform). Furthermore, many project documents (e.g., VCS Project Description, Monitoring Reports, CCBS Project Design Document, Project Implementation Reports, Validation and Verification Reports, etc.) are publicly available and stored on both the Standards' and Quadriz's website.

Organization, Responsibilities, and Monitoring Frequency

For all aspects of project monitoring, Quadriz staff will ensure that data collection, processing, analysis, management and archiving are conducted in accordance with the monitoring plan.

Table 3.8. Type of Monitoring and Party Responsible for Monitoring.

Variables to be monitored	Responsible	Frequency
Monitoring deforestation and natural disturbance	Quadriz Paraguay S.A.	Prior to each verification
Monitoring illegal degradation	Quadriz Paraguay S.A.	Every two years
Monitoring project emissions	Quadriz Paraguay S.A.	Prior to each verification
Activity shifting leakage assessment	Quadriz Paraguay S.A.	Prior to each verification
Updating forest carbon stocks estimates	Quadriz Paraguay S.A.	At least every 10 years.
Revision of the baseline	Quadriz Paraguay S.A.	At least every 10 years.

3.1.4 Dissemination of Monitoring Plan and Results (CL4.2)

The climate monitoring plan and its results, in addition to being incorporated in the CCB-VCS Monitoring Reports, were also incorporated into the Spanish and English Summary Documents. These Summary Documents were shared with stakeholders, including local communities, and are physically available at Quadriz's Asuncion and Estancia Santa Rosanna offices. All of the Project's project documents, including monitoring results, are available online at the Verra Registry. Further, weblinks to the project documents were publicly distributed during the CCBS Public Comment Period and are available on Quadriz's websites.

3.2. Quantification of GHG Emission Reductions and Removals

3.2.1 Baseline Emissions

Emissions for the baseline project activities are found in Table 3.9 below. These baseline emissions were derived from Section 3.2 of the VCS PD and are set at the time of initial project validation.

Table 3.9. Baseline emissions in the project area.

Year	ΔCBSL,PA,planned
2020	286,132
2021	710,712
2022	1,273,924
2023	1,718,731
2024	1,351,192
2025	547,113
2026	130,617
2027	130,617
2028	130,617
2029	130,617
2030	124,702
2031	109,734
2032	80,638
2033	40,548
2034	10,252
2035	0
2036	0
2037	0
2038	0
2039	0
2040	0

3.2.2 Project Emissions

Project emissions are estimated by applying module M-REDD (VMD0015, Version 2.2) of Methodology VM0007.

Deforestation Data

The land cover data for monitoring deforestation was produced using ortho-rectified Sentinel 2 imagery with 10m spatial resolution, acquired on December 2, 2021, with 0% of cloud cover. Sentinel 2 imagery was used to monitor deforestation, as opposed to LandSat imagery, as allowed by the methodology[39] because “it is possible to change the source of the remotely sensed data” where “remotely sensed data

[39] See Step 1VMD0015, v2.2

[has] become available from new and higher resolution sources" during the monitoring period. This data was processed on the Google Earth Engine platform as described below.

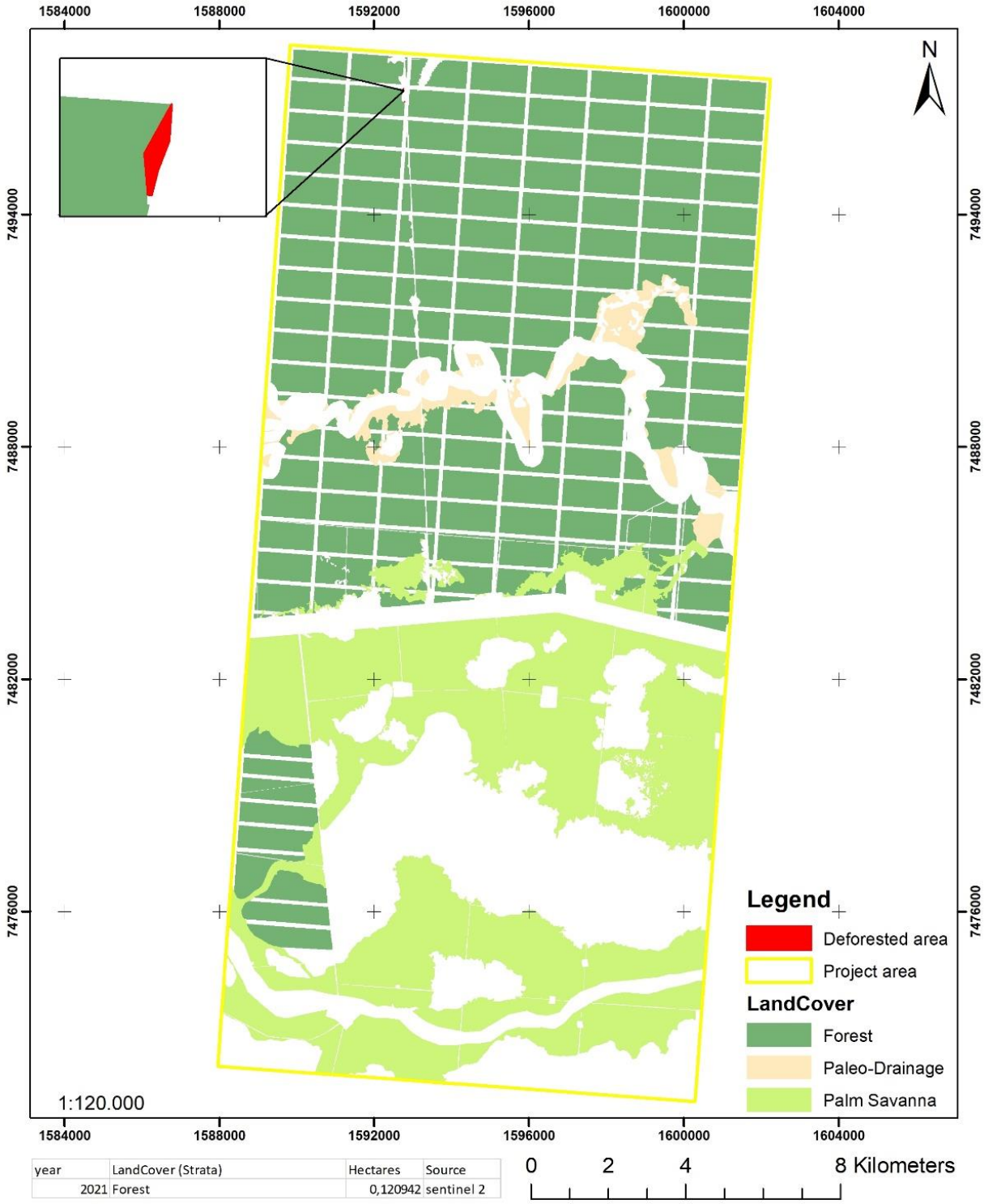
The procedure to generate the Forest/Non-forest layer was to generate a training sample dataset using the photointerpretation of the aforementioned Sentinel 2 image with help of high-resolution imagery for labeling the training samples in 3 classes: Forest, Palms, and Others. These samples were generated homogeneously over the monitoring area to avoid spatial autocorrelation and with at least 50 samples per class.

The sampled dataset was used to train a random forest algorithm using the bands: B2, B3, B4, B5, B6, B7, B8, and B8A. Finally, the preliminary result of the classification algorithm was verified and reclassified using photointerpretation of multitemporal imagery (before and after the date of the base image) in the area, so that a finer accuracy was achieved by this methodology by considering the temporal variations of the spectral signature of the vegetation in this area. The forest and non-forest map was elaborated by grouping the Forest and Palms classes into the Forest class and the remaining Others class to the Non-forest class.

The deforestation in the Project Area is derived by subtracting a) the non-forested area at the time of the last monitoring period from b) the non-forested area at the end of this monitoring period. Figure 3.1 shows the area of deforestation in the Project Area for this monitoring period. Figure 3.2a shows the initial benchmark map and forest cover at the start of the monitoring period. Figure 3.2b shows the forest benchmark map, which was produced using the aforementioned approach.

The project area was used to clip the results of the forest/nonforest classification, such that only Forest/Nonforest areas within the project area remained. Next, a union of 2021 land cover results was performed with the 2020 nonforest layer. This union of the 2021 forest/nonforest layer with the 2020 Non-forest layer allows stratification of the nonforest class by year. An intersect with the forest strata layer was then performed. Finally, the forest class and deforestation which occurred prior to this monitoring period was removed, thus leaving the amount of deforestation by strata which occurred during the course of this monitoring period. This above process ensures consistent GHG emission and removal estimates such that an area can not be deforested twice in the with-project case

Figure 3.1. Map of the deforestation over the project strata in the current monitoring period in the project area.



year	LandCover (Strata)	Hectares	Source
2021	Forest	0,120942	sentinel 2

Figure 3.2a. Existing forest cover at the end of the last monitoring period and start of the current monitoring period.

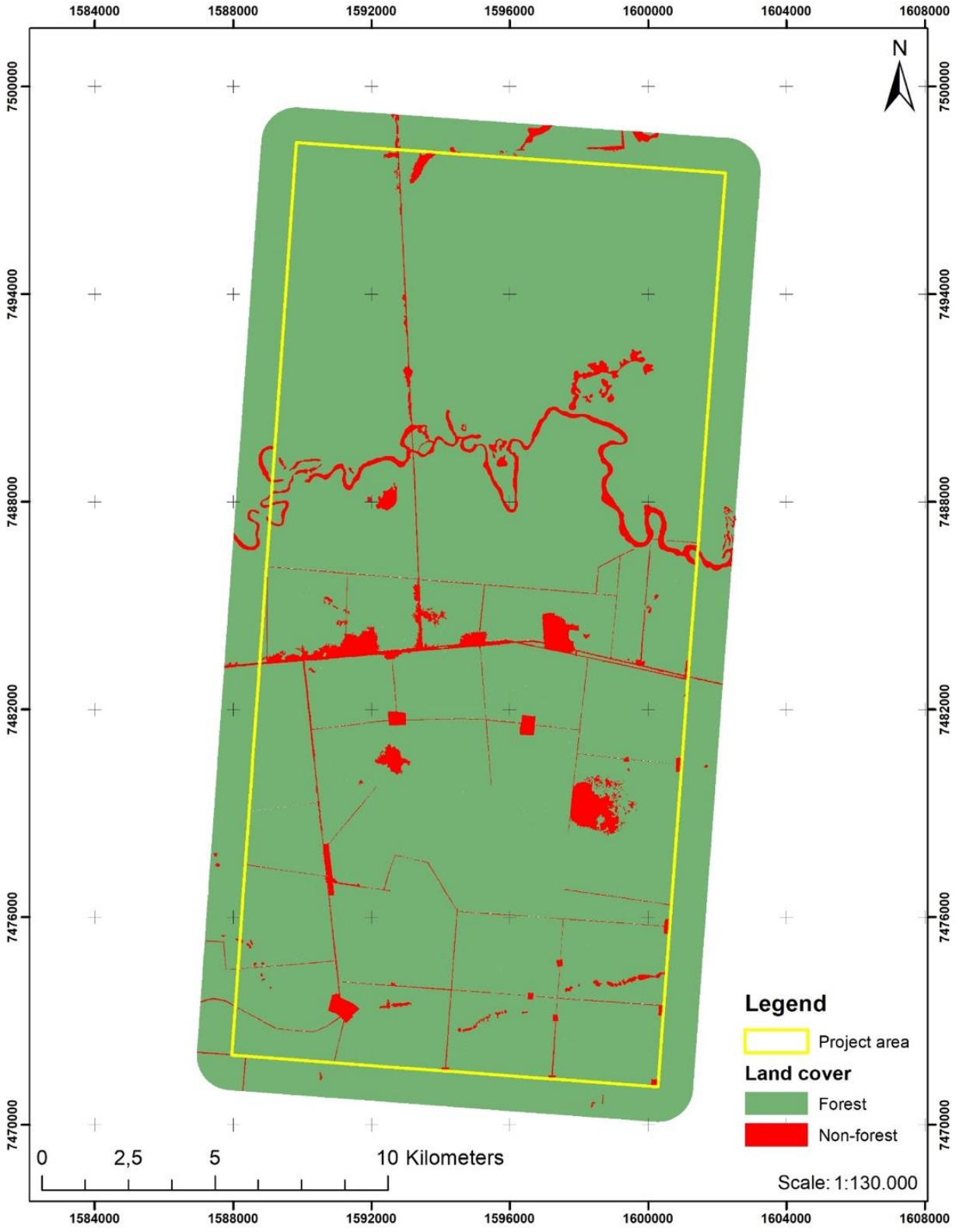
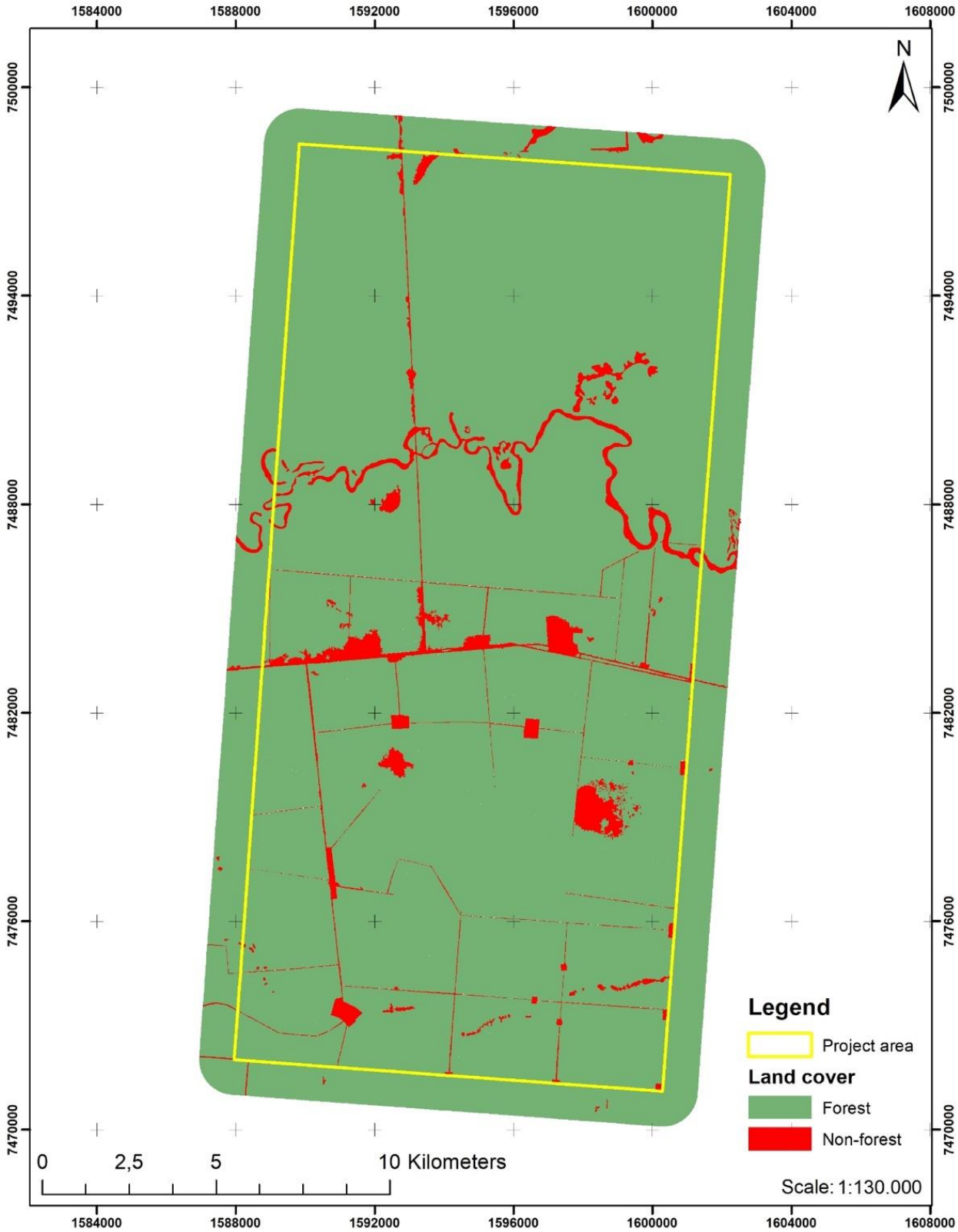


Figure 3.2b. Existing forest cover at the end of current monitoring period.



Accuracy Assessment

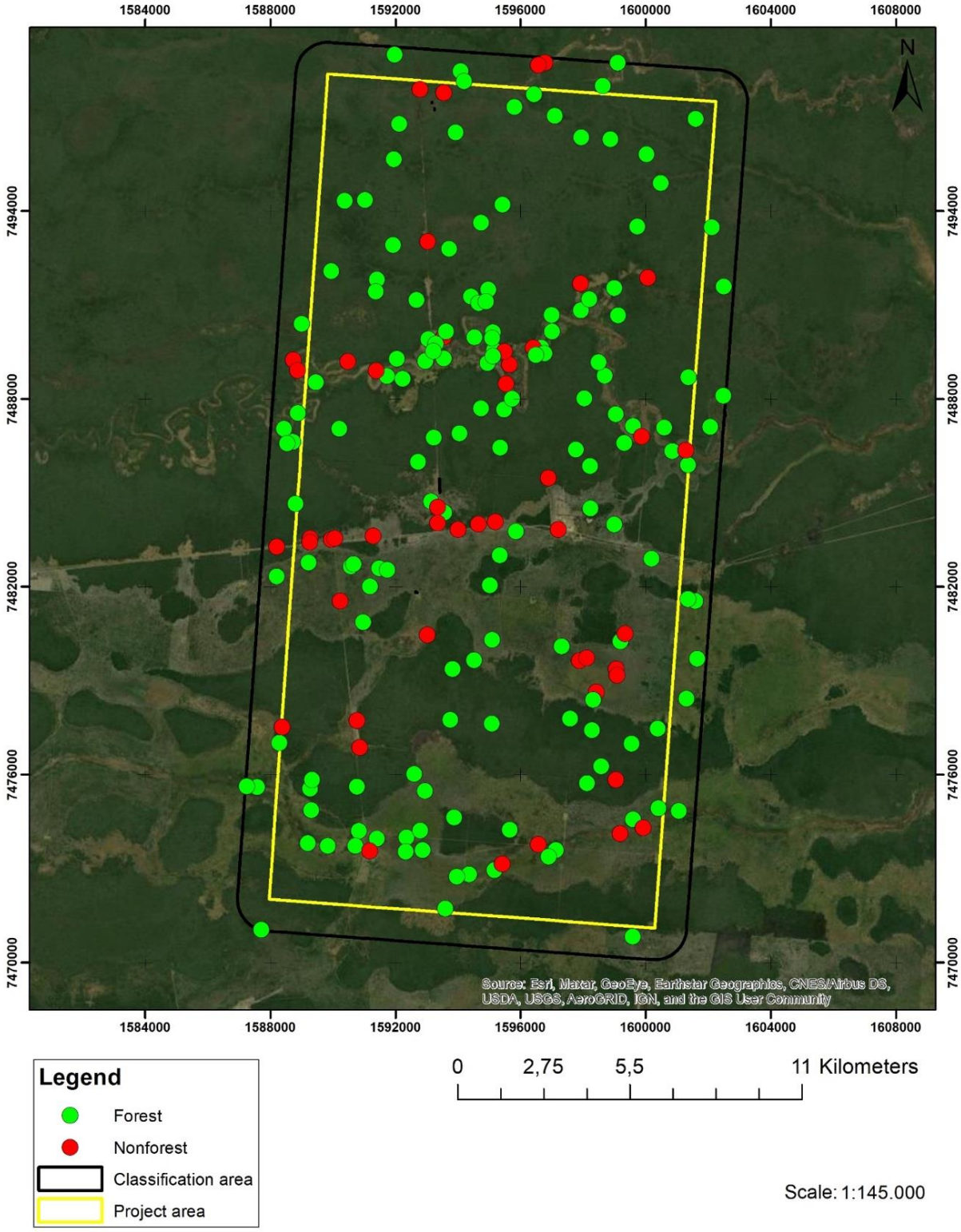
An accuracy assessment was conducted using high-resolution imagery < 5m. Planet Scope and the Qgis Software with the ACaTaMa plug-in. AcATaMa calculates the precision assessment using the formulas included in Olofsson et al. (2013, 2014). To carry out the procedure, a stratified random sampling was implemented in order to generate 200 reference points, 100 for forest and 100 for the nonforest Class in the area of interest. These points were then assessed as forest or nonforest and checked for accuracy. The sample points used to assess classification accuracy are recorded and archived (with an ID number, geographic position information, identified land-use class). Samples used to assess classification accuracy are well-distributed throughout the area considering the sampling scheme.

Results of the accuracy assessment are presented in the matrix below.

		Reference data			
	Classification	Forest	Non-forest	Total	User Accuracy
Map data	Forest	98	2	100	98.00%
	Non Forest	2	98	100	98.00%
	Total	100	100	200	
	Producer Accuracy	98.00%	98.00%		98%

The classification will only be used in the forest cover change detection step if the overall classification accuracy, calculated as the total number of correct samples/ the total number of samples, is equal to or exceeds 90%. The accuracy of the 2021 classification meets this criteria, with an overall accuracy of 98.00%.

Figure 3.3. Distribution of accuracy assessment points in the classification area.



Equation 3.5 is used to calculate ex-post project emissions, along with parameters listed in Table 3.10.
Equation 3.5. Equation for calculating the net GHG emissions within the project area under the Project scenario.

$$\Delta C_{WPS-REDD} = \sum_{t=1}^{t*} \sum_{i=1}^{M} \left(\Delta C_{P,DefPA,i,t} + \Delta C_{P,Deg,i,t} + \Delta C_{P,DistPA,i,t} + GHG_{P-E,i,t} - \Delta C_{P,Enh,i,t} \right)$$

Table 3.10. Parameters used to calculate ex-post project emissions.

Parameter	Description
$\Delta C_{WPS-REDD}$	Net greenhouse gas emissions within the project area under the project scenario; t CO_2e
$\Delta C_{P,DefPA,i,t}$	Net carbon stock change as a result of deforestation in the project area in the project case in stratum i at time t; t CO_2e
$\Delta C_{P,Deg,i,t}$	Net carbon stock change as a result of degradation in the project area in the project case in stratum i at time t; t CO_2e
$\Delta C_{P,DistPA,i,t}$	Net carbon stock change as a result of natural disturbance in the project area in the project case in stratum i at time t; t CO_2e
$GHG_{P-E,i,t}$	Greenhouse gas emissions as a result of deforestation and degradation activities within the project area in the project case in stratum i in year t; t CO_2e
$\Delta C_{P,Enh,i,t}$	Net carbon stock change as a result of forest growth and sequestration during the project in areas projected to be deforested in the baseline in stratum i at time t; t CO_2e

Deforestation

Emissions resulting from deforestation in the with-project case (ΔCP,DefPA,i,t) are calculated as the area of deforestation (ADefPA,u,i,t) multiplied by the net change in carbon stocks. All parameters in Table 3.11 are sourced from Section 3.1.1 and 3.1.2 of this report. The area deforested was derived from the 2021 forest/nonforest land cover layer (see above for detail) combined with the original strata map. CBSL, Cpost, and Cwp values were those derived in the original forest inventory and the project document, respectively.

Table 3.11. Net carbon stock change (t CO_2-e) as a result of deforestation in the project area (ΔCP,DefPA,i,t).

Year	Paleo-Drainage ADefPA, u,i,t (ha)	Palm Savanna ADefPA, u,i,t (ha)	Forest ADefPA ,u,i,t (ha)	Paleo-Drainage CBSL,i (t CO_2-e/ha)	Palm Savanna CBSL,i (t CO_2-e/ha)	Forest CBSL,i (t CO_2-e/ha)	Cpost (t CO_2-e/ha)	CWP,i With Project (t CO_2-e/ha)	ΔCP,DefPA,i,t (t CO_2-e)
2020	0.00	0.00	0.04	132.1	136.7	433.2	0.0	0.0	17.5
2021	0.00	0.00	0.08	132.1	136.7	433.2	0.0	0.0	34.9

A total of 0.12 ha were deforested in the Project Area over this monitoring period. These emissions were not attributable to the Project Proponents. As the amount of deforestation in the baseline over 2020-2021

(i.e. this monitoring period) was 6,821 ha (AAplanned,i,t), Project activities contributed to a reduction in deforestation of 6,821 ha – 0.12 ha = 6,821 ha.

Degradation

Net carbon stock change accounted as a result of degradation in the Project Area ($\Delta C_{P,Deg,i,t}$) is limited to emissions resulting from degradation due to illegal logging (ΔCP,DegW). No commercial logging occurs in the with-project case (i.e., ΔCP,SelLog,i,t is equal to zero). PRA degradation surveys conducted in the project zone indicated no local communities were reliant on the project area for charcoal, fuelwood, or timber. The net carbon stock change as a result of degradation in the Project Area ($\Delta C_{P,Deg,i,t}$) is therefore equal to zero for the 2020-2021 monitoring period.

Natural Disturbance

No areas of natural disturbance were reported during the current period by forest monitors or local land managers, nor was evident or could be distinguished (from anthropogenic deforestation, accounted for above) with remote sensing, and therefore $A_{DistPA,q,i,t}$ is assumed to be 0. As there is no ground based evidence of natural disturbance, net carbon stock changes resulting from natural disturbance in the Project Area in the Project case are reported to be zero (i.e., $\Delta C_{P,DistPA,i,t} = 0$).

GHG Emissions

As fire is commonly used to cleared land, N_2O and CH_4 emissions from biomass burning have been accounted for. Using parameters found in Section 3.1.1 and Table 3.3, emissions from biomass burning (EBB) were calculated as the product of the area burned, the aboveground carbon stocks, a combustion factor, a GHG emission factor, and the global warming potential. It was conservatively assumed that Aburn,i,t = ADefPA,u,i,t (i.e., all areas deforested in the project area were burnt).

Table 3.12. Calculation of E-BiomassBurning in the project area.

Year	Paleo-Drainage ADefPA, u,i,t (ha)	Palm Savanna ADefPA, u,i,t (ha)	Forest ADefPA,u,i,t (ha)	Paleo-Drainage B,i,t (t d.m./ha)	Palm Savanna B,i,t (t d.m./ha)	Forest B,i,t (t d.m./ha)	E-N_2O Biomass Burning (tCO_2e)	E-CH_4 Biomass Burning (tCO_2e)	E-Biomass Burning (tCO_2e)	GHGP-E,i,t (tCO_2-e)
2020	0.00	0.00	0.04	63.7	65.0	207.3	0.2	0.8	1.0	1.0
2021	0.00	0.00	0.08	63.7	65.0	207.3	0.4	1.6	2.0	2.0

As justified in Section 3.1.1, total Project GHG emissions (GHGP) equal emissions from biomass burning (EBB) as other sources are equal to zero.

Forest Growth and Sequestration

As stated in the Project document, it is conservative to exclude forest growth and sequestration during the project, hence the parameter $\Delta C_{P,Enh,i,t}$ has been set to zero.

Net Project Emissions

Net emissions within the Project Area are calculated in Table 3.13.

Table 3.13. Net project emission within the project area, ΔCP (t CO_2-e).

Year	ΔCP,DefPA,i,t (t CO_2-e)	ΔCP,Deg,i,t (t CO_2-e)	ΔCP,DistPA,i,t (t CO_2-e)	GHGP-E,i,t (t CO_2-e)	ΔCP,Enh,i,t (t CO_2-e)	ΔCWPS-REDD (t CO_2-e)
2020	17.5	0.0	0.0	1.0	0.0	18.5
2021	34.9	0.0	0.0	2.0	0.0	37.0

3.2.3 Leakage

Leakage emissions from displacement of planned deforestation are estimated in conformance with the VCS modular REDD methodology VM0007, specifically the LK-ASP module and LK-ME module. These modules provide for the accounting of activity shifting leakage resulting from the actions of the agent of deforestation and market effects leakage.

Activity Shifting Leakage

Activity-shifting leakage was tracked by monitoring areas of deforestation ($A_{defLK,i,t}$), across all lands outside of the Project Area owned or under management by the baseline agent. The parameter, NewRi,t or the calculated forest clearance by the baseline agent of the planned deforestation was determine in Section 3.2.3 of the Project Description for the entire baseline period. Activity-shifting leakage ($LKA_{planned,i,t}$) is calculated as the area of leakage in the with-project case ($A_{defLK,i,t}$) minus the leakage baseline (NewRi,t). Leakage emissions were then calculated as the difference between stocks before and after deforestation, as for project emissions. Emissions due to biomass burning were also calculated as per the procedures in the E-BB module. CBSL and Cpost values were those derived in the original forest inventory and the project document, respectively.

Table 3.14. Calculation of the area of activity shifting leakage and associated leakage emissions.

Year	AdefLK,i,t (ha)	NewRi,t (ha)	LKAplanned,i,t (ha)	ΔCBSL,i (t CO2-e/ha)	E-N2O Biomass Burning (tCO2e)	E-CH4 Biomass Burning (tCO2e)	E-Biomass Burning (tCO2e)	GHGLK-E,i,t (t CO2-e)	ΔCLK-AS,planned (t CO2-e)
2020	151,447.2	642,813	0.0	317.2	0.0	0.0	0.0	0.0	0
2021	151,447.2	642,813	0.0	317.2	0.0	0.0	0.0	0.0	0

Market Leakage

Market leakage values calculated ex-ante (in Section 3.2.3 of the PD) are also used ex-post as no with project harvesting of timber, fuel wood or charcoal is destined for commercial markets. Please see Table 3.15 for market leakage estimates.

Table 3.15. Market leakage estimates for the first baseline period.

Year	ΔCLK-ME (t CO_2-e)
2020	0
2021	0
2022	0
2023	0
2024	0
2025	0
2026	0
2027	0
2028	0
2029	0
2030	0

Total Leakage

Total project leakage for this monitoring period is calculated as the sum of activity shifting leakage and market effects leakage (Table 3.16).

Table 3.16. Estimation of total leakage due to the displacement of planned deforestation.

Year	ΔCLK-AS,planned (t CO_2-e)	ΔCLK-ME (t CO_2-e)	ΔCLK (t CO_2-e)
2020	0	0	0
2021	0	0	0

3.2.4 Net GHG Emission Reductions and Removals

Uncertainty was assessed applying module X-UNC.

Uncertainty in the baseline rate, parameter $Uncertainty_{BSL,RATE}$, is equal to 0.26%, as documented in Section 3.2.4 of the PD.

Total uncertainty in carbon stocks in forest (parameter $Uncertainty_{REDD\text{-}BSL,SS}$) is equal to combined uncertainty of forest carbon pool stock estimates, calculated using propagation of errors (equation 5 of VM0007 module X-UNC). Parameter $Uncertainty_{REDD,SS}$ is thus calculated to be 3.70% at the 95% confidence level (calculations detailed in Forest Biomass Carbon Inventory Report) for the initial forest inventory. Results of overall uncertainty calculations are presented below.

As stated in the uncertainty module “where no ex post (re-)measurements of carbon pools or GHG sources have been made, i.e. uncertainty from these sources is already included in UncertaintyBSL,t*, cumulative project uncertainty through time t is therefore equal to uncertainty in baseline estimates.” As no ex post measurements of carbon pools or GHG sources have occurred, parameters related to

calculating uncertainty in the with-project scenario, including EP,SS,i, Pool# and UP,SS,i,pool#, have not been included in the project.

Results of overall uncertainty calculations are presented below in Table 3.17. As the overall uncertainty calculations, 6.66%, are less than precision requirements of the methodology, +/- 15% of the mean (at a 95% confidence level), no uncertainty deduction was warranted or applied.

Table 3.17. Summary of uncertainty calculations.

X-UNC Eq. 1	X-UNC Eq. 5	X-UNC Eq. 6	X-UNC Eq. 15	X-UNC Eq. 16
$Uncertainty_{BSL,Rate}$ (%)	$Uncertainty_{REDD-BSL}$,SS (%)	$Uncertainty_{REDD_BSL}$,t (%)	$NER_{REDD+ERROR}$	$Adjusted_NER_{REDD+}$
0.26%	3.70%	3.7%	3.7%	100%

Estimates of GHG credits eligible for issuance as VCUs were calculated in Table 3.18, below; where

Estimated GHG emission reduction credits =

Baseline emissions, fixed for 10 years at validation *minus*

Project emissions *minus*

Leakage *minus*

Non-permanence Risk Buffer withholding (calculated as a percent of net change in carbon stocks prior to deduction of leakage)

Table 3.18. Estimate of Net Emission Reduction Credits with Risk Buffer. Values in this table have been rounded to the nearest whole number.

Years	Estimated baseline emissions or removals (tCO_{2e})	Estimated project emissions or removals (tCO_{2e})	Estimated leakage emissions (tCO_{2e})	CREDD,t (tCO2e)	Risk buffer (%)	Deductions for AFOLU pooled buffer account (tCO2e)	GHG credits eligible for issuance as VCUs (tCO_{2e})
2020	286,132	18	0	286,113	13.5%	38,625	247,488
2021	710,712	37	0	710,675	13.5%	95,941	614,734
Total	996,844	55	0	996,789		134,566	862,222

Table 3.19. Comparison of Ex-ante Emission Reduction Credits and Ex-post Emission Reduction Credits.

Years	Ex-Ante Emission Reductions derived from the Project Description (tCO2e)	GHG credits eligible for issuance as VCUs (tCO2e)
2020	247,504	247,488
2021	614,766	614,734

3.3 Optional Criterion: Climate Change Adaptation Benefits

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

Not applicable - The Project does not seek to be validated nor verified to the Gold Level for climate change adaptation benefits.

4 COMMUNITY

4.1 Net Positive Community Impacts

4.1.1 Community Impacts (CM2.1)

The community groups at Maria Auxiliadora – which could be categorized as ranchers, farmers, merchants (or traders), and subsistence hunters or as the five ethnic groups known as the Maskoi, Angaite, Zanapana, Guana, and Toba – are not being considered as distinct community groups because these community groups are all considered as harmonious community members of Maria Auxiliadora. Thus, the following will refer to all community groups living at the Maria Auxiliadora community and will describe all the impacts resulting from Project activities under the with-project scenario:

Community Group	All community groups living throughout the Project Zone. This will initially include the Maria Auxiliadora community and possibly include the San Isidro community in the future, if the community choses to participate in the Project.
Impact	The initial project instance's impact on the Maria Auxiliadora community will be better access to health services and improved health as a result of the Chaco Med Program. This includes access to doctors and potentially life-saving medicine (i.e., anti-venom). Although Chaco Med is a future activity, Quadriz consulted with the Maria Auxiliadora community and provided orientation to the Project during the 2020-2021 monitoring period.
Type of Benefit/Cost/Risk	Chaco Med is a predicted, direct benefit to the local community at Maria Auxiliadora as it will provide potentially life-saving health services.
Change in Well-being	The community's change in well-being will be the result of having access to professional doctors, dentists and nurses, along with evacuation services with the emergency airplane.

Community Group	All community groups living throughout the Project Zone. This will initially include the Maria Auxiliadora community and possibly include the San Isidro community in the future, if the community choses to participate in the Project.
Impact	The initial project instance's impact on the Maria Auxiliadora community will be increased and diversified income through employment opportunities, such as forest guards, offered to the Maria Auxiliadora community. Although there are few employment opportunities associated with the initial project instance, Quadriz consulted with the Maria Auxiliadora community and provided orientation to the Project, including about potential future employment opportunities, during the 2020-2021 monitoring period.

Type of Benefit/Cost/Risk	Employment opportunities are a predicted, direct benefit to the community at Maria Auxiliadora as it will provide both increased and diversified incomes.
Change in Well-being	The community's change in well-being will be the result of having access to professional employment opportunities, increased and diversified incomes, trainings, and promotional opportunities.

Community Group	All community groups living throughout the Project Zone. This will initially include the Maria Auxiliadora community and possibly include the San Isidro community in the future, if the community choses to participate in the Project.
Impact	The initial project instance's impact on the Maria Auxiliadora community will be increased awareness and educational opportunities as a result of the Project's outreach and visitor center. Although a visitor center is a future activity, Quadriz consulted with the Maria Auxiliadora community and provided orientation to the Project during the 2020-2021 monitoring period. In 2022, Quadriz provided the Maria Auxiliadora community with school materials and a computer for the community.
Type of Benefit/Cost/Risk	The visitor center is a direct and indirect benefit to the community at Maria Auxiliadora as it will provide a range of educational opportunities about the Chaco, the local cultures, and the local biodiversity.
Change in Well-being	The community's change in well-being will be the result of having access to educational opportunities provided at the visitor center.

Community Group	All community groups living throughout the Project Zone. This will initially include the Maria Auxiliadora community and possibly include the San Isidro community in the future, if the community choses to participate in the Project.
Impact	The initial project instance's impact on the Maria Auxiliadora community will be increased tree canopy cover and availability of Chaco Forest habitat, which will be more extensive in the initial project zone than in the without-project scenario of deforestation. Thus, in the baseline scenario, in the event of no REDD+ project, the landowner would have sold the land to a land purchaser who would have submitted a request to convert up to 75% of the native forest into a cattle ranch. During the 2020-2021 time period, it was monitored and demonstrated that tree canopy cover and the availability of Chaco Forest habitat was greater in the with-project scenario than in the without-project scenario.

Type of Benefit/Cost/Risk	Increased tree canopy cover and availability of Chaco Forest habitat is an indirect benefit to the community at Maria Auxiliadora.
Change in Well-being	The community's change in well-being will be the result of, for example: ongoing deforestation at the Project Areas would further shrink and degrade the habitat provided by the Chaco Forest, which could lead to fewer opportunities for subsistence hunting for the Maria Auxiliadora community; and similarly, without the Project's monitoring for outside encroachment, there could be an increase in poaching and illegal logging in the without-project scenario both at the Project Area and at the community of Maria Auxiliadora.

4.1.2 Negative Community Impact Mitigation (CM2.2)

To the best of the Quadriz's knowledge, there were no negative community impacts during the 2020-2021 monitoring period and there are no negative community impacts expected to result from the Project. Likewise, there are no communities living in the initial Project Area and through the Participatory Rural Assessment, it does not appear the communities are reliant on the initial Project Area for their livelihoods (i.e., communities do not collect fuelwood or use the area to hunt, etc.).

4.1.3 Net Positive Community Well-Being (CM2.3, GL1.4)

Although there are few communities living in the region, the Project had, and will continue to have, an overall net positive impact on community well-being at Maria Auxiliadora. This will result from the Project's employment opportunities provided to local community members, the establishment of a visitor center and its educational opportunities, and through the Chaco Med program. In contrast, in the without-project scenario, the Project Area's Chaco Forest would be deforested and converted to cattle ranches. First, this deforestation increases greenhouse gas emissions, which contributes to global climate change and more greenhouse gas emissions could lead to more droughts and floods impacting the Maria Auxiliadora community. This is presumably also true for the community at San Isidro. Second, ongoing deforestation at the Project Areas would further shrink and degrade the habitat provided by the Chaco Forest, which could lead to fewer opportunities for subsistence hunting. Third, and similarly, without the Project's monitoring for outside encroachment, there could be an increase in poaching and illegal logging in the without-project scenario both at the Project Area and at the community of Maria Auxiliadora. Fourth, in the without-project scenario, there would not be the establishment of Chaco Med and local employment opportunities offered. Thus, with the establishment of Chaco Med in particular, the community at Maria Auxiliadora will have greater access to doctors and potentially life-saving medicine (i.e., such as anti-venom). Fifth, in the without-project scenario, the conversion of the Project Areas to cattle ranches would increase soil erosion and degrade local water quality (i.e., due to the runoff of manure) and this would likely impact the local community at Maria Auxiliadora and presumably at the San Isidro community.

The community groups at Maria Auxiliadora – which could be categorized as ranchers, farmers, merchants (or traders), and subsistence hunters or as the five ethnic groups known as the Maskoi, Angaite, Zanapana, Guana, and Toba – were identified through community engagement, community consultations, and via the PRAs. These community groups are not being considered independently of each other because these community groups are harmonious and all these community groups are

considered community members of Maria Auxiliadora. However, it is assumed that ongoing deforestation at the Project Areas (i.e., which would further shrink and degrade the habitat provided by the Chaco Forest) would lead to fewer opportunities for subsistence hunting and this would particularly harm the subsistence hunters' community group. This said, all three interviewees from the Maria Auxiliadora community stated during the March and August 2021 Participatory Rural Assessments (PRAs) that the forests are important to them for wildlife consumption. Similarly, increasing droughts and floods, along with decreasing water quality, would particularly impact ranchers and farmers.

Thus, the Project is expected to have net positive community well-being impacts. Furthermore, although the Project is in the early stages, the Project had net positive community well-being impacts during the 2020-2021 monitoring period, particularly due to the Project reducing deforestation.

4.1.4 Protection of High Conservation Values (CM2.4)

As an avoided deforestation, forest conservation project, the Project will not have any negative impact on the community's High Conservation Values (HCVs). Likewise, no HCVs were negatively affected during the 2020-2021 monitoring period as a result of the Project. This claim will be demonstrated over time by the Basic Necessity Survey, the Participatory Rural Assessment, and by the review of satellite imagery to determine the extent of deforestation within the Project Area, along with regular independent assessments of the Project against the Verified Carbon Standard and the Climate, Community & Biodiversity Standards.

4.2 Other Stakeholder Impacts

4.2.1 Mitigation of Negative Impacts on Other Stakeholders (CM3.2)

As mentioned above, there are unlikely to be any major, negative impacts on Other Stakeholders and no such major, negative impacts were identified during the 2020-2021 monitoring period. This said, general negative impacts might include surrounding land values could go up, or down, as a result of Quadriz's conservation projects. Specific negative impacts, for example, would be additional work for MADES and competition with WWF Paraguay, Solidaridad Network, and/or Guyra Paraguay / BirdLife International for partners and financing. If such a scenario occurs, Quadriz will dedicate more time to understanding the ramifications. This said, the measures needed to mitigate the specific, negative well-being impacts on Other Stakeholders are as follows:

- Quadriz has, and will continue, to participate in ongoing consultations and dialogue with Other Stakeholders; and

- Quadriz has, and will continue, to provide regular updates on the Project by providing ongoing updates and by providing the ongoing project documentation, such as summary reports and monitoring reports.

4.2.2 Net Impacts on Other Stakeholders (CM3.3)

The net impacts on Other Stakeholders, due to the Project's reduction in deforestation, reduction in greenhouse gas emissions, along with the preservation of the Chaco's biodiversity and cultural heritage within the project areas, is positive. In contrast, there are no major, specific negative impacts envisioned

for Other Stakeholders. Thus, the net impact on Other Stakeholders during the 2020-2021 monitoring period is positive.

4.3 Community Impact Monitoring

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

The main community objective of the Project is to provide social programs to improve the livelihoods of community members living in the vicinity of the Project. Improving the livelihoods of community members living in the vicinity of the Project (i.e., the community objective) will be accomplished through providing healthcare services, raising project awareness, and through establishing a project headquarters.

There will be four community surveys used for the community monitoring plan. One survey is known as a Participatory Rural Assessment (PRA), one survey is known as a Degradation Survey, another survey will be eventually used at the visitor center, and the fourth survey will be eventually used with Chaco Med.

The Participatory Rural Assessment (PRA; also known as a Participatory Rural Appraisal) survey and the Degradation Survey were developed, reviewed in detail, and were then translated into Spanish throughout 2020-2021. The first Degradation Survey was administered to communities near the Corazón Verde del Chaco Project's initial project instance in March 2021, while the first PRA surveys were conducted in August 2021. The plan is to administer the Degradation Survey and the PRA every two years with communities near the Corazón Verde del Chaco Project's initial project instance, as well as communities near additional parcels.

The Degradation Survey asks questions about the communities' consumption of fuelwood, charcoal, and timber, including whether these are collected or purchased, and whether the communities sell any of the items.

The results of the first Degradation Survey, which was conducted in March 2021, indicated that:

- Many families have lived in the area for 10+ years;
- Families collect fuelwood (i.e., as opposed to charcoal);
- Families collect their own timber (i.e., as opposed to purchasing from a merchant);
- Families do not sell timber;
- The local families do not access, nor are they reliant on, the initial Project Area; and
- The families do not believe degradation is occurring throughout their area.

The Degradation Survey is not intended to monitor indicators of the Project's community objective. Rather, the Degradation Survey is a requirement of the VCS climate monitoring aspect of the Project.

The Participatory Rural Assessment is a guide to inform the communities about numerous aspects of the Project, along with to gather insights into their livelihoods and to solicit their comments about the Project. For example, the communities are informed about the:

- Overall Project description and the Project Proponent;
- Potential social projects and programs planned;
- Hiring process, potential vacant positions, and worker risks;
- Grievance Procedure; and
- Validation, verification, CCBS public comment period, and independent audit process.

The communities, as part of the ongoing PRA, are asked questions, including:

- How community-wide decisions are made,
- The community ranking of potential social projects and programs planned;
- What are your desired outcomes from the Project? How do you hope this project will improve your lives? What benefits are you hoping for from the project for your family and/or community? What would make this project a success for you?
- What are your concerns about the Project's potential negative impacts? How could this project make your lives worse? What would make this project a failure for you? What are your main concerns for the future without the project? What are your main concerns or issues with the project?
- Which areas provide critical ecosystem services (for example: hydrological services, erosion control, fire control, etc.) to your family and/or your community? What are these critical ecosystem services?
- Which topics or activities are most important for women?
- What is the best procedure for ongoing consultations? For example, would you prefer community-wide meetings or individual meetings? Prefer meetings on the weekends, in the morning, or in the evening? Would you like to be informed on the radio or in person by the local project manager?

The monitoring results of the initial Participatory Rural Assessment surveys conducted in August 2021 provided a wide-range of information about the local community at Maria Auxiliadora. These monitoring results include, but are not limited to:

- Community meetings, called by the community leader, are held at the school and decisions are made by the community;
- The community prefers in-person, face-to-face meetings, particularly on Sundays;
- The families at Maria Auxiliadora speak Guarani and there appear to be more young people and women, than men;
- The families at Maria Auxiliadora primarily grow subsistence crops, particularly pumpkin, manioc, and sweet potatoes. Some of the families sell their crops to Puerto Casado;
- In addition to growing crops, some of the families raise cattle, while others raise goats and chickens;
- Throughout the region, there are community members who are considered ranchers, farmers, merchants, and subsistence hunters;
- The top three priorities according to the Maria Auxiliadora community are employment opportunities, Chaco Med, and monitoring wildlife in the area; and
- The availability of wild fauna for local consumption (e.g., deer and peccaries) are very important.

The PRA contributes to the community objective, for example, by enabling Quadriz to better understand the community and to provide a formal process for the community to share their desired benefits from the Project. In addition, the process of identification and analysis of community groups within each community will be done through community engagement, community consultations, and via the Participatory Rural Assessment (PRA), as was done in August 2021. For instance, the community groups at Maria Auxiliadora – which could be categorized as ranchers, farmers, merchants (or traders), and subsistence hunters or as the five ethnic groups known as the Maskoi, Angaite, Zanapana, Guana, and Toba – were identified through community engagement, community consultations, and via the PRAs conducted in

August 2021. These community groups are not being considered independently of each other because these community groups are harmonious and all these community groups are considered community members of Maria Auxiliadora.

The visitor center and Chaco Med surveys were drafted in January 2021. The surveys will be administered on a regular basis once the visitor center is established and once the Chaco Med program is officially established.

The visitor survey, which was drafted in January 2021, will ask:

- Your name:
- Today's date:
- Your age:
- Where do you live:
- What brought you to the visitor center today:
- What are the top 3 things you most liked about your visit to the visitor center? Please briefly explain why you liked these three things?
- What are the top 3 things you would like to see added to the visitor center?
- What are the top 3 things you least liked about the visitor center? Why did you not like these three things?
- Do you have any other suggestions, recommendations, or comments for Quadriz's visitor center?
- On a scale of 1 to 10 (1 being the least favorable and 10 being the most favorable), how would you rate your visit to the visitor center today?
- Would you like to receive ongoing updates about Quadriz's Reducing Emissions from Deforestation and forest Degradation Project? If yes, please provide your contact information.

Similarly, the Chaco Med survey, which was drafted in January 2021, will ask:

- Your name:
- Today's date:
- What is your role with Chaco Med (are you a doctor, pilot, a patient, etc.)
- Your age:
- Where do you live:
- What services were provided today by Chaco Med:
- What are the top 3 things you most liked about Chaco Med? Please briefly explain why you liked these three things?
- What are the top 3 things you would like to see added to Chaco Med?
- What are the top 3 things you least liked about Chaco Med? Why did you not like these three things?
- Do you have any other suggestions, recommendations, or comments for Quadriz's Chaco Med?
- On a scale of 1 to 10 (1 being the least favorable and 10 being the most favorable), how would you rate your experience with Chaco Med?
- Would you like to receive ongoing updates about Quadriz's Reducing Emissions from Deforestation and forest Degradation Project? If yes, please provide your contact information.

Quadriz will also keep record of how many people have been hired to assist with the Project.

Furthermore, the Project will also regularly monitor forest canopy cover using satellite imagery analysis to demonstrate the ongoing efforts to mitigate deforestation in the project areas' Chaco Forest (i.e., a High Conservation Value). In 2022, Ostrya Conservation analyzed satellite imagery to determine that 6,821 hectares of deforestation were avoided during the 2020-2021 monitoring period.

High Conservation Values

The Chaco Forest within the project areas is one of the Project's HCVs and the Chaco Forest within the Maria Auxiliadora community lands was identified as an HCV for the Maria Auxiliadora community for the provisioning of food and fuel. To assess the effectiveness of the measures taken to maintain all identified HCVs related to community well-being (i.e., large contiguous forested areas near their communal lands), the following is needed and was accomplished during the 2020-2021 monitoring period:

- Quadriz needs (and has) a legally binding agreement in place with the private landowner to forego deforesting or selling of the property to a buyer who would covert the forest to a cattle ranch. This legally binding agreement was signed in September 2020 (i.e., during the 2020-2021 monitoring period).
- Quadriz will also (and has) monitor forest canopy cover via on-the-ground forest guards and via regular review of satellite imagery to help ensure the Chaco Forest within the project areas is protected. This said, in October 2021, Quadriz hired a local forest guard and in 2022, Ostrya Conservation analyzed satellite imagery to determine that 6,821 hectares of deforestation were avoided during the 2020-2021 monitoring period.
- The Project will also protect medium-to-large mammals, including wide-ranging species such as white-lipped peccaries that are hunted for subsistence. Thus, Quadriz will not allow hunting or illegal logging in the Project and Quadriz will monitor for deforestation (i.e., which would lead to a loss of contiguous, forested habitat for these trigger species) and monitor for illegal hunting (i.e., which would lead to further population decreases). In addition to hiring a local guard in October 2021, Quadriz, in 2022, built a guard house, hired a guard service called "Los Guardianes," started official patrols during the first quarter of 2022, and started a patrol log during the last quarter of 2022. Furthermore, wildlife cameras were installed at the initial project instance from June 2021 to May 2022.

With these measures in mind, Quadriz has been very effective. Thus, Quadriz has a legally binding agreement already in place with the private landowner, Quadriz has put in actions to ensure the project areas are protected (i.e., such as hiring forest guards), and Quadriz has identified numerous medium-to-large mammals in the project zone using wildlife cameras. This said, the combination of monitoring forest cover via satellite imagery and using wildlife cameras should be very effective at assessing the measures taken to maintain all identified HCVs (i.e., the Chaco Forest, particularly the Chaco Forest within the communal lands of the Maria Auxiliadora community) related to community well-being. Likewise, ongoing satellite imagery analysis will determine the project area's remaining forest cover vis-à-vis the deforestation baseline, and the wildlife cameras will help to monitor whether there are healthy populations of medium-to-large mammals (i.e., some of which require large, contiguous blocks of forest and some of which are hunted for subsistence by the Maria Auxiliadora community).

To clarify the frequency of monitoring and reporting of monitoring results for all aspects of the community monitoring plan, the plan is as follows:

- The Degradation Survey will be administered at least once every two years;
- The Participatory Rural Assessment (PRA) will be administered at least once every two years;
- The visitor center surveys will be administered on a regular basis. For instance, if there are visitors to the visitor center once a week, then the surveys will be administered once a week.
- The surveys with the Chaco Med program will also be administered on a regular basis.
- The reporting of the monitoring results from all four surveys will be done at each verification event. The initial monitoring, reporting of monitoring results, and verification is expected to be undertaken in May 2022, with subsequent monitoring, reporting of monitoring results, and verifications to take place at least every five years thereafter. Thus, the results of all four community surveys will be reporting in the Project's Monitoring Reports and in the Project's Summary Documents.

4.3.2 Monitoring Plan Dissemination (CM4.3)

The community monitoring plan and its results, in addition to being incorporated in the CCB-VCS Project Description and Monitoring Reports, were also incorporated into the Spanish and English Summary Documents. These Summary Documents were shared with stakeholders, including local communities, and were made physically available at Quadriz's Asuncion and Estancia Santa Rosanna offices. All of the Project's project documents, including monitoring results, are available online at the Verra Registry. Further, weblinks to the project documents were publicly distributed during the CCBS Public Comment Period and are available on Quadriz's website.

More specifically, for the Project's validation, the public comment period dates were October 6, 2021 to November 5, 2021. Quadriz also posted the public comment period for the Project's validation announcement on its website on October 6, 2021. For the Project's verification of the 2020-2021 monitoring period, the public comment period dates were April 25, 2022 to May 24, 2022. Quadriz posted the public comment period for the Project's 2020-2021 verification announcement on its website on April 26, 2022. The Summary Documents, with monitoring results, were and will continue to be, actively disseminated to communities by Federico ("Fredy") Montoya, the Field Manager at Investancia / Quadriz Paraguay S.A. and/or Gabriela Viñales, the REDD+ Manager at Quadriz Paraguay S.A. This took place for the October 6, 2021 to November 5, 2021 public comment period for the Project's validation and this took place for April 25, 2022 to May 24, 2022 public comment period for the Project's verification of the 2020-2021 monitoring period. Further, local radio announcements were made in July 2021 about the Project and in October 2021 about the Project's public comment period.

4.4 Optional Criterion: Exceptional Community Benefits

The Project does not seek to be validated nor verified to the Gold Level for exceptional community benefits because there are few, if any, local communities using the Project Area.

4.4.1 Short-term and Long-term Community Benefits (GL2.2)

No applicable.

4.4.2 Marginalized and/or Vulnerable Community Groups (GL2.4)

Not applicable.

4.4.3 Net Impacts on Women (GL2.5)

Not applicable.

4.4.4 Benefit Sharing Mechanisms (GL2.6)

Not applicable.

4.4.5 Governance and Implementation Structures (GL2.8)

Not applicable.

4.4.6 Smallholders/Community Members Capacity Development (GL2.9)

Not applicable.

5 BIODIVERSITY

5.1 Net Positive Biodiversity Impacts

5.1.1 Biodiversity Changes (B2.1)

The following tables describe all the changes in biodiversity resulting from project activities under the with-project scenario in the project zone during the 2020-2021 monitoring period.

Change in Biodiversity	Tree canopy cover and availability of Chaco Forest habitat.
Monitored Change	The tree canopy cover and availability of Chaco Forest habitat will be more extensive in the initial project area and in the initial project zone than in the without-project scenario of deforestation. This is an actual, positive and direct change that occurred as the result of Project activities. Thus, in the baseline scenario, in the event of no REDD+ project, the landowner would have sold the land to a land purchaser who would have submitted a request to convert up to 75% of the native forest into a cattle ranch. During the 2020-2021 time period, it was monitored and demonstrated that tree canopy cover and the availability of Chaco Forest habitat was greater in the with-project scenario than in the without-project scenario. Thus, it is estimated that 6,821 hectares would have been deforested over the 2020-2021 monitoring period, which would have emitted 800,000+ tonnes of carbon dioxide equivalent emissions.
Justification of Change	The core activity of the Project is to conserve the Chaco Forest, particularly the Chaco Forest within the Project Areas, and reduce deforestation. The tree canopy cover, and thus availability of Chaco Forest habitat, will be regularly monitored via satellite imagery, as was done during the 2020-2021 monitoring period.

Change in Biodiversity	Population of endemic, threatened and endangered species
Monitored Change	The population of endemic, threatened, and endangered species dependent on forested habitats, particularly the availability of Chaco Forest habitat, will be greater in the with-project scenario, including within the initial project instance and within the initial project zone. This is an actual, positive and direct change that occurred as the result of Project activities. During the 2020-2021 time period, it was monitored and demonstrated that tree canopy cover and the availability of Chaco Forest habitat, which benefit the population of many endemic, threatened and endangered species, was greater in the with-project scenario than in the without-project scenario. Thus, it is estimated that 6,821 hectares would have been deforested over the 2020-2021 monitoring period, but instead were conserved.
Justification of Change	Conserving the Chaco Forest and avoiding deforestation will help maintain tree canopy cover and expand availability of Chaco Forest habitat for endemic, threatened, and endangered species. According to Andrea Weiler, species such as the giant armadillo (*Priodontes maximus*; considered Vulnerable by the IUCN Red List) and the lowland tapir (*Tapirus terrestris*; considered Vulnerable) would not thrive in grasslands. Additional species which depend on the Project's forested habitats and which are of the greatest concern due to their conservation status are the jaguar and the ocelot. According to Andrea Weiler, as the initial project area would be deforested, the population of these four species would decrease until they disappeared entirely from the area. Furthermore, according to MADES, the following mammalian species which have been photographed at the initial project instance, are considered nationally endangered: the maned wolf (*Chrysocyon brachyurus*); the ocelot (*Leopardus pardalis*); the jaguar (*Panthera onca*); and the giant armadillo (*Priodontes maximus*).[40] According to Andrew Weiler, endemic birds that could be lost due to ongoing deforestation are: the brushland tinamou (*Nothoprocta cinerascens*) and the black-bodied woodpecker (*Dryocopus schulzi*). The presence of endemic, threatened, and endangered species will be monitored using wildlife cameras, including the first study which was initiated during the 2020-2021 monitoring period.

5.1.2 Mitigation Actions (B2.3)

As a forest conservation and avoided deforestation project, the Project is unlikely to have any negative impacts on biodiversity. Likewise, no such negative impacts on biodiversity were identified during the 2020-2021 monitoring period.

[40] MADES. "Endangered Species." Available: http://www.mades.gov.py/wp-content/uploads/2018/06/peligro_de_extincion.pdf

The measures needed to maintain the biodiversity HCV attributes, being the Chaco Forest and the vulnerable, threatened and endangered species, and to be consistent with the precautionary principle are as follows:

1. The landowner needs to forego deforesting or selling their land to a buyer who would covert the initial project instance's Chaco Forest to a cattle ranch. This includes installing little-to-no roads. This will maintain large areas of forested, contiguous habitat for jaguars and the white-lipped peccary and should reduce to impact of illegal hunting of species such as the lowland tapir. This is despite the Project not knowing how many jaguars and white-lipped peccaries exist in the initial project zone. During the 2020-2021 monitoring period, Quadriz signed an agreement with the landowner to forego deforestation or the selling of their land to a buyer, Quadriz hired a guard to monitor for deforestation in October 2021, and in 2022, Ostrya Conservation analyzed satellite imagery to determine that 6,821 hectares of deforestation were avoided during the 2020-2021 monitoring period.

2. Ideally, additional project instances are added to the grouped project to further expand the forested habitat available for wide-ranging species, such as jaguars and white-lipped peccaries. Quadriz was actively working on securing additional project instances during the 2020-2021 monitoring period. This included meeting with landowners throughout the Chaco and visiting potential project sites throughout the 2020-2021 monitoring period;

3. The Project needs to continue monitoring medium-to-large mammals using wildlife cameras to better understand the population and distribution of the trigger species throughout the project zone. The initial wildlife camera study was initiated during the 2020-2021 monitoring period. More specifically, the wildlife cameras were installed at the initial project instance from June 2021 to May 2022; and

4. In addition to monitoring medium-to-large mammals, the Project also needs to monitor forest canopy cover to make sure deforestation is not taking place and the Project needs to monitor for illegal hunting (i.e., which is currently being done by the forest guards), even though the extent of illegal hunting is not fully understood. Specifically, during the 2020-2021 monitoring period, to identify the presence of illegal hunting or deforestation, the following measures were undertaken:

- A guard was hired in October 2021, to establish a presence and to initiate informal monitoring;
- Posters/signs were placed at strategic points; and
- A monitoring for deforestation template was designed.

Although outside the current monitoring period, in 2022, the following measures were taken:

- A guard house was built;
- A guard service, called "Los Guardianes" was hired for the area, who are in charge of patrols and in charge of the entrance to the property;
- Patrols officially started during the first quarter of 2022; and
- A patrol log started during the last quarter of 2022.

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

The Project had, and is expected to continue to have, net positive biodiversity impacts due to the Project's conservation of the Chaco Forest within the project areas, conservation of important habitat, and its role in reducing topsoil runoff and its associated impact on water quality. In addition, the Project will monitor for deforestation and for illegal hunting. In contrast, without the Project, the likely land use scenario would have been forest clearing for cattle ranching. While some forest areas would remain in the without-project scenario (i.e., such as buffers around riparian areas), the impact would still largely be negative for biodiversity in the without-project scenario. For example, jaguars and white-lipped peccaries are species that require, large contiguous areas. Other species, such as the lowland tapir (*Tapirus terrestris*),[41] in the absence of protective forest cover and with the introduction of more roads, could become more susceptible to hunting pressures in the open grasslands.[42] The process of rapidly clearing land with bulldozers, including the potential use of fires to clear land, can quickly overcome slow-moving animals photographed at the initial project instance such as the yellow armadillo (*Euphractus sexcinctus*), the southern three-banded armadillo (*Tolypeutes matacus*) and the giant armadillo (*Priodontes maximus*). It is also important to note that many species, according to Andrea Weiler, would not thrive in grasslands (i.e., the without project land use scenario). This includes the giant armadillo (*Priodontes maximus*), the southern tamandua (*Tamandua tetradactyla*), the tayra (*Eira barbara*), and the lowland tapir (*Tapirus terrestris*).

Thus, the Project is expected to have net positive biodiversity impacts. Furthermore, although the Project is in the early stages, the Project had net positive biodiversity impacts during the 2020-2021 monitoring period, particularly due to the Project reducing deforestation of approximately 6,800 hectares.

Furthermore, the Project had a net positive impact on biodiversity impacts throughout the project instance's project zone (i.e., within 20 kilometers of the project instance). Thus, wildlife that exists in the project zone and outside the initial project area are able to migrate into the initial project area. In addition, Quadriz is working with landowners in the project zone to considering undertaking a REDD+ project and to preserve the forests in the project zone, instead of selling their lands to agribusinesses implementing industrial scale cattle ranches.

5.1.4 High Conservation Values Protected (B2.4)

The Project is a conservation project and thus, no HCVs related to biodiversity are negatively affected by the Project. Likewise, no HCVs related to biodiversity were negatively affected during the 2020-2021 monitoring period. The Chaco Forest within the project areas, which is one of the Project's HCVs, was protected during the 2020-2021 monitoring period and will continue to protected over the project lifetime. Thus, Quadriz has a legally binding agreement in place with the private landowner to forego deforesting or selling of the property to a buyer who would covert the forest to a cattle ranch. This legally binding agreement was signed in September 2020 (i.e., during the 2020-2021 monitoring period). Quadriz also did, and will continue to, monitor forest canopy cover via on-the-ground forest guards and via regular review of satellite imagery to help ensure the Chaco Forest within the project areas is protected. This said, in October 2021, Quadriz hired a local forest guard and in 2022, Ostrya Conservation analyzed

[41] IUCN Red List, "Lowland Tapir: Population," Available: https://www.iucnredlist.org/species/21474/45174127#population
[42] IUCN Red List, "Gray Brocket Deer: Population," Available: https://www.iucnredlist.org/species/29620/22154584#population

satellite imagery to determine that 6,821 hectares of deforestation were avoided during the 2020-2021 monitoring period. The Project did, and will continue to, protect vulnerable, threatened, and endangered species, which is the Project's other biodiversity HCV. Thus, Quadriz will not allow hunting in the Project and Quadriz will monitor for deforestation (i.e., which would lead to a loss of contiguous, forested habitat for these trigger species), monitor for illegal hunting (i.e., which would lead to further population decreases), and monitor the abundance and diversity of medium-to-large mammals, including vulnerable, threatened and endangered species. During the 2020-2021 monitoring period, there was some evidence of a fire that came from the Easterly direction and evidence that there have been instances of poaching occurring off the main road. With respect to poaching, this was likely subsistence poaching for consumption by local people and as of October 2021, when the guard was hired, there have been no signs of additional hunting. With respect to signs of fire, Quadriz is unsure exactly what happened, but monitoring for fire has been implemented, a Fire Prevention and Control Plan was finalized in March 2022, and Quadriz cleaned up the firebreak roads that were already on the property. In addition, wildlife cameras were installed at the initial project instance from June 2021 to May 2022. Furthermore, Quadriz will monitor the estimated population and population trends of jaguars.

Other project activities, such as Chaco Med, the visitor center, and the forest carbon inventory work, are not expected to have any impacts on the Project's HCVs.

5.1.5 Invasive Species (B2.5)

No invasive species will be used by the Project and no invasive species were used during the 2020-2021 monitoring period, except for a feral pig. According to the Global Invasive Species Database, the following invasive species have been identified in the Departments of Alto Paraguay and Presidente Hayes:

- Rock pigeons (*Columba livia*; Alto Paraguay and Presidente Hayes);
- Golden mussel (*Limnoperna fortunei*; Alto Paraguay and Presidente Hayes);
- Wild tomato (*Solanum sisymbriifolium*; Alto Paraguay);
- *Oxycaryum cubense* (Cuban bulrush; Presidente Hayes); and
- Guava (*Psidium guajava*; Presidente Hayes).[43]

This said, the Project will not introduce any of these known invasive species.

With respect to the feral pig (*Sus scrofa*) identified at the initial project instance, the feral pig is an invasive species that is considered a threat to native fauna as it is a disease reservoir, competitor, and potential predator for native fauna. Quadriz is working with its local biologist and exploring options with MADES.

[43] Global Invasive Species Database. "Search: Alto Paraguay, Presidente Hayes." Available: http://www.iucngisd.org/gisd/search.php

5.1.6 Impacts on Non-native Species (B2.56)

The Project has not used any non-native species in the Project Areas or Project Zones and thus, there have been no adverse effects. Likewise, no non-native species were used by the Project during the 2020-2021 monitoring period.

5.1.7 GMO Exclusion (B2.7)

Quadriz guarantees that no genetically modified organisms (GMOs) will be used in the Project to generate GHG emissions reductions or removals. No GMOs were used during the 2020-2021 monitoring period.

5.1.8 Inputs Justification (B2.8)

The Project does not anticipate using any inputs, including fertilizers, chemical pesticides, or biological control agents, during the Project Lifetime. Likewise, the Project did not use any such products during the 2020-2021 monitoring period.

5.2 Offsite Biodiversity Impacts

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

Not applicable - There are no negative offsite biodiversity impacts on biodiversity outside of the Project Zone resulting from project activities.

5.2.2 Net Offsite Biodiversity Benefits (B3.3)

The net effect of the Project, as a forest conservation project, on biodiversity is positive.

5.3 Biodiversity Impact Monitoring

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

The main biodiversity objective of the Project is the preservation of biodiversity, particularly medium-to-large mammals in the project areas. To accomplish the main biodiversity objective, the Project will reduce deforestation in the project areas and the Project's biodiversity monitoring plan will be centered around the use of wildlife cameras deployed throughout the Project Areas on a regular basis. The specific biodiversity variables to be monitored are:

- 1. The confirmed presence and diversity of medium-to-large mammalian species;
- 2. The abundance of medium-to-large mammalian species;
- 3. Habitat occupation, which incorporates species' detectability into distribution models; and
- 4. The population size and population trend will be estimated for jaguars, which is a species that can be identified at the individual level.

Satellite imagery analysis conducted by Ostrya Conservation in 2022 determined that 6,821 hectares of deforestation at the initial project instance were avoided during the 2020-2021 monitoring period.

The first study using wildlife cameras was initiated in June 2021 by Andrea Weiler from the Universidad Nacional de Asunción (National University of Asuncion). In addition to Andrea Weiler, the team that

carried out the fieldwork in June 2021 was made up of the representatives from Quadriz, including Gabriela Viñales and Federico Montoya, with technical assistance from Daniela Tabilo and María Paz Albertini.

After selecting the location for camera traps installation, ten camera traps (i.e., Browning Trail Cameras - Spec Ops Elite HP4 brand model BTC-8E-HP4) were placed on paths associated with the different ecological strata in the initial project area, including palm savannas, forests, and in riparian areas. Memory cards correspond to each camera and each photo-trapping station was georeferenced and registered in the field sheet for a better organization of the data.

Camera traps were installed in each of the sites following the monitoring protocol for medium and large mammals (Díaz-Pullido & Payán Garrido, 2012). The cameras were placed approximately 50 cm from the ground, on main roads or trails, with a minimum distance of 1 km, each camera in metal boxes with chains and padlocks in order to prevent loss. The cameras were programmed as follows: tracking camera; image quality: 8MP; multi-focus mode: two standard photos; temperature: ° C; image data: on; motion detection: normal range; battery type: alkaline; firing speed: normal; and flash power: long range.

Camera training and programming were carried out with Quadriz staff, who learned to equip each chamber with batteries, program according to the configuration established in the laboratory (FACEN-UNA), and place each chamber in the selected sites. Quadriz will be in charge of periodically checking the cameras and in the event of any technical failure, reprogram the cameras installed in the field. An installation and configuration manual were developed to outline the technical aspects to be considered during the monitoring and control of the cameras.

Going forward, every five years, the Project will deploy wildlife cameras at randomly selected, representative sites for up to one year (depending on the required trap-nights). The reporting of these monitoring results will take place after the conclusion of the monitoring (i.e., shortly after the wildlife cameras have been removed from the project instance). The results will be reported in a final report and included in both the summary reports and in the Project's monitoring report.

Photo 5.1. Installation of camera by Quadriz staff.

Every five years, the biodiversity monitoring plan using wildlife cameras will take place at one of the randomly selected project instances of this grouped project. For the specific, future location of the wildlife cameras within the randomly selected project instance, the objective of the project will be taken into account. Thus, for example, to determine the diversity and abundance of medium-to-large mammals in the selected project instance in order to observe the ecological value and suggest conservation actions within the project instance, the following measures will be followed per recommendations from Andrea Weiler:

- 1. Map the location of the wildlife camera stations based on the environment (i.e., such as the different ecological strata present) or the species that we want to sample. This will serve as an orientation, always taking into account the conditions in which the project area is found.
- 2. Define the number of wildlife cameras to be used. Quadriz will strive to use 10-12 wildlife cameras during each monitoring event.
- 3. Regarding the sampling period and the number of trap-nights (i.e., which will define the duration of the sampling), the ideal situation would be to cover the different seasons of the year, as well as the different environments, to increase the possibility of detecting the species or individuals present. Quadriz will keep in mind that the closer the wildlife cameras are to each other, the less area that will be covered, but Quadriz will have a greater possibility of detecting all the individuals that are in that particular area.
- 4. To maximize the probability of photographing medium-to-large mammals, the participation of local personnel who know the area and the species is required, as well as the experience of a biodiversity specialist, such as Andrea Weiler, to identify the ideal sites at each project instance to be monitored. Thus, the wildlife cameras can be placed unsystematically in places where one would expect it to be more likely to detect more species, such as by trails used by fauna, burrows, nests, salt ponds or waterholes.
- 5. It should be taken into account that not all the medium-to-large mammalian species present may be recorded, due to their habits.
- 6. Lastly, Andrea Weiler recommends that each biodiversity monitoring event should always be accompanied by analyzes such as species accumulation curves or rarefaction to have an idea of

what is already recorded and when it would be appropriate to change the location of the sampling stations.

June 2021-May 2022 Monitoring Results

The monitoring results and evaluation of the June 2021-May 2022 wildlife camera study are based off a total sampling effort of 3,329 trap-nights. In total, 66,423 photographs were obtained, of which 11,958 photographs corresponded to fauna and 6,581 photographs to medium and large mammals. Of these, a total of 3,082 records met the criteria to be considered independent.

Of the 31 probable species to be recorded in the study area, based on literature and previous monitoring in nearby sites, 27 species were recorded through the photo-trapping methodology (26 native and 1 exotic), belonging to 14 families and 7 orders of mammals. Indirectly (i.e., a carcass) one species (*Lontra longicaudis*) was recorded that was not captured through the camera traps, thus adding 28 species of medium and large mammals for the study area during the June 2021 to May 2022 time period.

The diversity of moderately abundant species, which corresponds to the Shannon diversity exponent (1D), was 21.6 for the forest site and 19.3 for the palm grove site, with no significant differences between these sites. Similarly, the 2D values (the inverse of the Simpson index) show that the aquatic site had the lowest number of dominant species (2D= 7.2), which differs significantly from the forest (2D= 18.8) and palm grove sites (2D= 17.1). According to the first-order Hill numbers, ‘’forest’’ and ‘’palm’’ sites were found to be more than twice as diverse as the ‘aquatic’’ sites, finding a significant difference in diversity between forest and palm versus aquatic. This behavior increases with the extrapolation of the curves, by increasing the sampling effort. Regarding the completeness of the sampling, according to the "Sample Coverage" measure, the values are higher than 85% in the three sites, which indicates that the sampling was efficient to describe these communities and from the point of view of diversity, there are no marked differences between forest and palm grove.

The species were ordered according to their relative importance with respect to the number of records (abundance). The rank-abundance curve denotes *Cerdocyon thous* as the most dominant species, while the less abundant or 'rare' species correspond to *Tayassu pecari* and *Sus scrofa;* however, the assemblage of mammals in the sampling area was diverse and it was observed that the distribution of the species was mostly equitable.

Being an opportunistic and generalist predator, the *Cerdocyon thous* makes use of a wide variety of resources and is present in open forests, dry forests, flooded savannahs, and grasslands, so it is widely distributed throughout Paraguay and is considered an adaptable species (Berta, 1982; Trovati et al., 2007; Weiler et al., 2019; Canesini et al., 2021). While the *Tayassu pecari* is considered a specialist species, its potential niche must have a range of environmental conditions and without anthropogenic disturbances so that the populations of this species persist in the area (Keuroghlianm & Eaton, 2008; Briceño-Méndez et al. al., 2014). Although the occasional record of *Sus scrofa* was obtained in the study area, the original distribution of this species does not correspond to the country and it is classified as an exotic-invasive species. Martínez-López et al. (2021) report that these pigs are found in free-range systems in some areas of the humid Paraguayan Chaco, such as the two extremes (northeast and southwest) of the Department of Presidente Hayes.

According to Andrea Weiler, the project's biologist, the biodiversity of the humid and transitional Chaco to the dry Chaco, where the Corazón Verde del Chaco Project is located, is closely linked to xerophytic forests, gallery forests that accompany watercourses and flooded savannahs of Copernicia alba. In recent decades, the main threat to these natural systems is the change in land use for agricultural purposes, which has increased to the point where it positions Paraguay as one of the countries with the highest rate of deforestation at the global level. That is why any alternative for the economic valuation of the forest remnants of the country is essential for the conservation of biological diversity. To date, there are few projects that seek economic development alternatives while conserving the forests, as is the case of the Corazón Verde del Chaco Project, through which the conservation of this forest area is guaranteed for at least thirty years. The Project not only conserves biodiversity by favoring connectivity and gene flow, but also guarantees the ecosystem services of these natural environments. In this baseline sampling, by means of photo-trapping, 27 species of native mammals were recorded from the 32 probable species in the study area, representing 84% of the medium and large mammals in the study area. Among them, four species were recorded that are under threat categories according to the International Union for the Conservation of Nature criteria: white-lipped peccary (*Tayassu pecari;* Vulnerable), giant armadillo (*Priodontes Maximus*; Vulnerable), giant anteater (*Myrmecophaga tridactyla*; Vulnerable), and lowland tapir (*Tapirus terrestris*; Vulnerable). Species of great national interest have also been registered since they face local threats to their conservation, such as jaguars (*Panthera onca*; nationally endangered) and the maned wolf (*Chrysocyon brachyurus;* nationally *v*ulnerable).

High Conservation Values (HCVs)

The two biodiversity HCVs identified for the Project are the Chaco Forest and the vulnerable, threatened and endangered species. To monitor the existing forest canopy cover of the Chaco Forest within each project instance, the Project has hired forest guards and will regularly monitor using satellite imagery analysis. This will demonstrate how effective the measures taken (i.e., agreement with private landowner, ongoing forest patrols, etc.) have been to maintain the Chaco Forest within the project areas. During the 2020-2021 monitoring period, for instance, Quadriz hired a local forest guard in October 2021, posters/signs were placed at strategic points, and a monitoring for deforestation template was designed. In 2022, a guard house was built, a guard service called "Los Guardianes" was hired for the area, patrols officially started during the first quarter of 2022, and a patrol log was started during the last quarter of 2022. Satellite imagery analysis conducted by Ostrya Conservation in 2022 determined that 6,821 hectares of deforestation of Chaco Forest (i.e., an HCV) at the initial project instance were avoided during the 2020-2021 monitoring period.

As previously mentioned, the Project will also monitor the diversity, abundance, and habitat occupation of medium-to-large mammals, including that of vulnerable, threatened and endangered species, and the Project will monitor estimated population size and population trend of jaguars. This said, the initial wildlife camera study took place from June 2021 to May 2022. Although the jaguar is only considered near threatened by the IUCN,[44] according to Andrea Weiler, the concentration of these species would qualify as HCVs at the national and regional levels. Further, according to MADES, jaguars are considered nationally endangered.[45] Thus, using wildlife cameras will demonstrate how effective the measures taken (i.e., agreement with private landowner, reducing deforestation, ongoing forest patrols, reduced hunting pressures, etc.) have been to maintain the quality of forested habitat for vulnerable, threatened and

[44] IUCN Red List. "Jaguar." Available: https://www.iucnredlist.org/species/15953/123791436
[45] MADES. "Endangered Species." Available: http://www.mades.gov.py/wp-content/uploads/2018/06/peligro_de_extincion.pdf

endangered species within the project areas. During the 2020-2021 monitoring period, several vulnerable, threatened and endangered species (i.e., an HCV) were photographed at the initial project instance. Such species include the giant anteater (*Myrmecophaga tridactyla*), the lowland tapir (*Tapirus terrestris*), the giant armadillo (*Priodontes maximus*), the white-lipped peccary (*Tayassu pecari*), and the jaguar (*Panthera onca*).

Trigger Species

The Project's trigger species are the giant anteater (*Myrmecophaga tridactyla*), the lowland tapir (*Tapirus terrestris*), the giant armadillo (*Priodontes maximus*), the white-lipped peccary (*Tayassu pecari*), and the jaguar (*Panthera onca*) (see section 5.4.1 for additional information).

As part of the biodiversity monitoring plan using wildlife cameras, the Project will monitor and estimate the population sizes and population trends of jaguars. Jaguars are selected because they are a species that can be identified at the individual level.

The main threat to all five of these trigger species is the availability of quality, forested habitat. For jaguars and white-lipped peccaries in particular, these species require, large contiguous areas. Thus, the Project will monitor the availability of forested habitat within the project areas via satellite imagery, which is the indicator of the threat (i.e., loss habitat and habitat fragmentation) to these five trigger species. The ongoing work of Quadriz with the private landowner to forego deforesting or selling of the property to a buyer who would convert the initial project instance, along with Quadriz's other activities (i.e., conducting forest patrols to reduce deforestation and illegal hunting, ongoing monitoring of forest canopy cover, and the monitoring and reporting of medium-to-large mammals using wildlife cameras), will demonstrate the effectiveness of these measures to maintain the population status of these trigger species.

5.3.2 Biodiversity Monitoring Plan Dissemination (B4.3)

The biodiversity monitoring plan, in addition to being incorporated in the CCB-VCS Project Description and Monitoring Reports, were also incorporated into the Spanish and English Summary Documents. These Summary Documents were shared with stakeholders, including local communities, and were made physically available at Quadriz's Asuncion and Estancia Santa Rosanna offices. All of the Project's project documents, including monitoring plans, are available online at the Verra Registry. Furthermore, weblinks to the project documents are publicly distributed during the CCBS Public Comment Period and are available on Quadriz's website.

The wildlife camera study was conducted from June 2021 to May 2022. The final biodiversity report, with the results and evaluation, was completed in July 2022. The biodiversity monitoring results are provided in the 2020-2021 CCB-VCS Monitoring Report and will also be incorporated into the final versions of the Spanish and English Summary Documents. These Summary Documents will be shared with stakeholders, including local communities, and will be made physically available at Quadriz's Asuncion and Estancia Santa Rosanna offices. All of the Project's project documents, including monitoring results, are available online at the Verra Registry. Furthermore, weblinks to the project documents are publicly distributed during the CCBS Public Comment Period and are available on Quadriz's website.

5.4 Optional Criterion: Exceptional Biodiversity Benefits

5.4.1 Trigger Species Population Trends (GL3.3)

The following will describe the population trends the following trigger species: giant anteater (*Myrmecophaga tridactyla*), lowland tapir (*Tapirus terrestris*), giant armadillo (*Priodontes maximus*), white-lipped peccary (*Tayassu pecari*), and jaguar (*Panthera onca*).

Trigger Species	Giant anteater (*Myrmecophaga tridactyla*)
Without-project Scenario	The giant anteater (*Myrmecophaga tridactyla*) is a Vulnerable species according to the IUCN Red List and its population trend is decreasing. This population trend is likely similar for the project zone. According to the IUCN, the giant anteater has experienced "population loss of at least 30% over the past 10 years {which} has been estimated based on local extinctions, habitat loss, and deaths caused by fires and road kills."[46] While 1-2+ giant anteaters have been photographed at the initial project instance from June to November 2021, there could be 54 to 390 individuals present. While several of the species photographed at the initial project instance, such as the giant anteater (*Myrmecophaga tridactyla*),[47] are adaptable to living in either forested landscapes, such as the Chaco Forest, or open grasslands, there is still a threat to these species if the initial project instance were converted to a cattle ranch. According to the IUCN, the giant anteater "(*Myrmecophaga tridactyla*) is locally uncommon to rare. Habitat loss, road kills, hunting, and wildfires have been substantially affecting the populations over the past 10 years, and there have been many records of population extirpation, especially in Central America and in the southern parts of its range."[48] Thus, the without-project scenario would involve loss of forested habitat and potentially more roads, which could lead to greater hunting pressures. This, in turn, would likely further decrease the population of giant anteaters in the project zone. The measures needed and designed to maintain the giant anteater's population and to reduce threats are as follows: • The landowner needs to forego deforesting or selling their land to a buyer who would covert the initial project instance's Chaco Forest to a

[46] IUCN Red List, "Giant Anteater: Habitat and Ecology." Available: https://www.iucnredlist.org/species/14224/47441961#habitat-ecology
[47] IUCN Red List, "Giant Anteater," Available: https://www.iucnredlist.org/species/14224/47441961
[48] IUCN Red List. "Giant Anteater: population in detail." https://www.iucnredlist.org/species/14224/47441961#population

	cattle ranch. This includes installing little-to-no roads. This will maintain forested habitat for the giant anteater; • The Project needs to continue monitoring medium-to-large mammals using wildlife cameras to better understand the population and distribution of giant anteaters throughout the project zone; and • In addition to monitoring medium-to-large mammals, the Project also needs to monitor forest canopy cover to make sure deforestation is not taking place and the Project needs to monitor for illegal hunting (i.e., which is currently being done by the forest guards). During the 2020-2021 monitoring period, Quadriz: engaged a private landowner and an agreement was signed between the private landowner and Quadriz for the landowner to forego selling the property for eventual conversion; avoided deforestation; preserved habitat for several threatened and vulnerable mammals; reviewed wildlife camera models; purchased the wildlife cameras; hired a wildlife biologist to oversee the wildlife camera study; installed the wildlife cameras in the Project Zone; and recorded several vulnerable and threatened species, including giant anteaters. At this time, the same threats (e.g., deforestation) apply to the population of giant anteaters.

Trigger Species	Lowland tapir (*Tapirus terrestris*)
Without-project Scenario	The lowland tapir (*Tapirus terrestris*) is a Vulnerable species according to the IUCN Red List and its population trend is decreasing. This population trend is likely similar for the project zone. According to the IUCN, "very little is known of lowland tapir populations. Populations are decreasing across its range, though numerous strongholds exist. However, there is insufficient information available to extrapolate population sizes across these regions."[49] While 2-3+ lowland tapirs have been photographed at the initial project instance from June to November 2021, there could be 60 to 1,110 individuals present. The without-project scenario would involve loss of forested habitat and potentially more roads, which could lead to greater hunting pressures. In the absence of protective forest cover and with the introduction of more roads, the lowland tapir could become more susceptible to hunting pressures in the open grasslands.[50] For instance:

[49] IUCN Red List. "Lowland tapir: population in detail." Available: https://www.iucnredlist.org/species/21474/45174127#population
[50] IUCN Red List, "Gray Brocket Deer: Population," Available: https://www.iucnredlist.org/species/29620/22154584#population

	Tapir are ecologically more prone to be impacted by hunting due to long gestation and generational time. Reproduction is slow enough to make recovery difficult for the species in areas where there is any prolonged hunting activity. Hunting is a serious threat along the numerous new road systems, settlement and along the agricultural frontier in the Amazon basin. Hunting also occurs around logging camps and can completely eliminate the species from seemingly viable habitat.[51] According to Andrea Weiler, the lowland tapir (*Tapirus terrestris*) would not thrive in the without-project scenarios of grasslands. Thus, in the without-project scenario, there would likely be a further decrease in the population of lowland tapirs. The measures needed and designed to maintain the lowland tapir's population and to reduce threats are as follows: • The landowner needs to forego deforesting or selling their land to a buyer who would covert the initial project instance's Chaco Forest to a cattle ranch. This includes installing little-to-no roads. This will maintain forested habitat for the lowland tapir; • The Project needs to continue monitoring medium-to-large mammals using wildlife cameras to better understand the population and distribution of lowland tapirs throughout the project zone; and • In addition to monitoring medium-to-large mammals, the Project also needs to monitor forest canopy cover to make sure deforestation is not taking place and the Project needs to monitor for illegal hunting (i.e., which is currently being done by the forest guards). During the 2020-2021 monitoring period, Quadriz: engaged a private landowner and an agreement was signed between the private landowner and Quadriz for the landowner to forego selling the property for eventual conversion; avoided deforestation; preserved habitat for several threatened and vulnerable mammals; reviewed wildlife camera models; purchased the wildlife cameras; hired a wildlife biologist to oversee the wildlife camera study; installed the wildlife cameras in the Project Zone; and recorded several vulnerable and threatened species, including lowland tapirs. At this time, the same threats (e.g., deforestation and hunting) apply to the population of lowland tapirs.

Trigger Species	Giant armadillo (*Priodontes maximus*)

[51] IUCN Red List. "Lowland tapir: Habitat and Ecology." Available: https://www.iucnredlist.org/species/21474/45174127

Without-project Scenario	The giant armadillo (*Priodontes maximus*) is a Vulnerable species according to the IUCN Red List and its population trend is decreasing. This population trend is likely similar for the project zone. According to the IUCN, "*Priodontes maximus* appears to be naturally rare where it occurs, with a very patchy distribution. {…} The wild population is decreasing."[52] While 1+ giant armadillos have been photographed at the initial project instance from June to November 2021, there could be 1,008 to 1,884 individuals present. The without-project scenario would involve loss of forested habitat in the initial project instance. The process of rapidly clearing land with bulldozers, including the potential use of fires to clear land, can quickly overcome slow-moving animals photographed at the initial project instance such as the giant armadillo (*Priodontes maximus*). Thus, in the without-project scenario, there would likely be a further decrease in the population of giant armadillos. The measures needed and designed to maintain the giant armadillo's population and to reduce threats are as follows: • The landowner needs to forego deforesting or selling their land to a buyer who would covert the initial project instance's Chaco Forest to a cattle ranch. This includes installing little-to-no roads. This will maintain forested habitat for the giant armadillo; • The Project needs to continue monitoring medium-to-large mammals using wildlife cameras to better understand the population and distribution of giant armadillos throughout the project zone; and • In addition to monitoring medium-to-large mammals, the Project also needs to monitor forest canopy cover to make sure deforestation is not taking place and the Project needs to monitor for illegal hunting (i.e., which is currently being done by the forest guards). During the 2020-2021 monitoring period, Quadriz: engaged a private landowner and an agreement was signed between the private landowner and Quadriz for the landowner to forego selling the property for eventual conversion; avoided deforestation; preserved habitat for several threatened and vulnerable mammals; reviewed wildlife camera models; purchased the wildlife cameras; hired a wildlife biologist to oversee the wildlife camera study; installed the wildlife cameras in the Project Zone; and recorded several vulnerable and threatened species, including a giant armadillo. At this time, the same threats (e.g., deforestation) apply to the population of giant armadillos.

[52] IUCN Red List. "Giant armadillo: population in detail." Available: https://www.iucnredlist.org/species/18144/47442343#population

Trigger Species	White-lipped peccary (*Tayassu pecari*)
Without-project Scenario	The white-lipped peccary (*Tayassu pecari*) is a Vulnerable species according to the IUCN Red List and its population trend is decreasing. This population trend is likely similar for the project zone. While 7+ white-lipped peccaries have been photographed at the initial project zone from June to November 2021, there could be 99 to 2,880 individuals present. The without-project scenario would involve loss of forested habitat, habitat fragmentation, and potentially more roads, which could lead to greater hunting pressures for white-lipped peccaries. This, in turn, would likely further decrease the population of white-lipped peccaries in the project zone. Further, according to the IUCN Red List, "the consensus is that white-lipped peccaries are clearly wide-ranging and require large areas for survival (Altrichter and Almeida 2002, Keuroghlian et al. 2004, Reyna-Hurtado 2007)."[53] Thus, in the without-project scenario, there would likely be a further decrease in the population of white-lipped peccaries. The measures needed and designed to maintain the white-lipped peccary's population and to reduce threats are as follows: • The landowner needs to forego deforesting or selling their land to a buyer who would covert the initial project instance's Chaco Forest to a cattle ranch. This includes installing little-to-no roads. This will maintain forested, contiguous habitat for the white-lipped peccary; • Ideally, additional project instances are added to the grouped project to further expand the forested habitat available for this wide-ranging species; • The Project needs to continue monitoring medium-to-large mammals using wildlife cameras to better understand the population and distribution of white-lipped peccaries throughout the project zone; and • In addition to monitoring medium-to-large mammals, the Project also needs to monitor forest canopy cover to make sure deforestation is not taking place and the Project needs to monitor for illegal hunting (i.e., which is currently being done by the forest guards). During the 2020-2021 monitoring period, Quadriz: engaged a private landowner and an agreement was signed between the private landowner and Quadriz for the landowner to forego selling the property for eventual conversion; avoided

[53] IUCN Red List. "White-lipped peccaries: habitat and ecology." Available: https://www.iucnredlist.org/species/41778/44051115#population."

	deforestation; preserved habitat for several threatened and vulnerable mammals; reviewed wildlife camera models; purchased the wildlife cameras; hired a wildlife biologist to oversee the wildlife camera study; installed the wildlife cameras in the Project Zone; and recorded several vulnerable and threatened species, including several white-lipped peccaries. At this time, the same threats (e.g., deforestation and hunting) apply to the population of white-lipped peccaries.

Trigger Species	Jaguar (*Panthera onca*)
Without-project Scenario	The jaguar (*Panthera onca*) is a Near Threatened species according to the IUCN Red List, an endangered species according to MADES, and its population trend is decreasing. This population trend is likely similar for the project zone. While 3-4+ jaguars have been photographed at the initial project zone from June to November 2021, there could be 6-8 individuals present. While several of the species photographed at the initial project instance, such as the jaguar (*Panthera onca*),[54] are adaptable to living in either forested landscapes, such as the Chaco Forest, or open grasslands, there is still a threat to these species if the initial project instance were converted to a cattle ranch. For example, jaguars (*Panthera onca*) are at times shot by ranchers because the cats present a direct threat to cattle and their calves. According to the IUCN, "jaguar populations in the Chaco region of northern Argentina and Brazil, and the Brazilian Caatinga, are low-density and highly threatened by livestock ranching and persecution (Altrichter et al. 2006, T. de Oliveira pers. comm. 2008)."[55] This is similar to the Paraguay Chaco and thus, in the without-project scenario, there would likely be a further decrease in the population of jaguars. The measures needed and designed to maintain the jaguar's population and to reduce threats are as follows: • The landowner needs to forego deforesting or selling their land to a buyer who would covert the initial project instance's Chaco Forest to a cattle ranch. This includes installing little-to-no roads. This will maintain large, contiguous, forested habitat for jaguars; • Ideally, additional project instances are added to the grouped project to further expand the forested habitat available for this wide-ranging species;

[54] IUCN Red List, "Jaguar: Population," Available: https://www.iucnredlist.org/species/15953/123791436#population
[55] IUCN Red List, "Jaguar: Population," Available: https://www.iucnredlist.org/species/15953/123791436#population

	• The Project needs to continue monitoring medium-to-large mammals using wildlife cameras to better understand the population and distribution of jaguars throughout the project zone; and • In addition to monitoring medium-to-large mammals, the Project also needs to monitor forest canopy cover to make sure deforestation is not taking place and the Project needs to monitor for illegal hunting (i.e., which is currently being done by the forest guards) of jaguar's prey (i.e, such as lowland tapirs and white-lipped peccaries). During the 2020-2021 monitoring period, Quadriz: engaged a private landowner and an agreement was signed between the private landowner and Quadriz for the landowner to forego selling the property for eventual conversion; avoided deforestation; preserved habitat for several threatened and vulnerable mammals; reviewed wildlife camera models; purchased the wildlife cameras; hired a wildlife biologist to oversee the wildlife camera study; installed the wildlife cameras in the Project Zone; and recorded several vulnerable and threatened species, including several jaguars. At this time, the same threats (e.g., "livestock ranching and persecution") apply to the population of jaguars.

6 ADDITIONAL PROJECT IMPLEMENTATION INFORMATION

N/A

7 ADDITIONAL PROJECT IMPACT INFORMATION

N/A

APPENDICES

Appendix 1: New Project Areas and Stakeholders

There were no new project areas or stakeholders since the Project's inception.

Stakeholder	Rights, interest, and overall relevance to the project	Demonstrate how they meet the eligibility criteria (G1.14)	Demonstrate how their inclusion does not violate the scalability limits (G1.15)
N/A	N/A	N/A	N/A

Appendix 2: Project Risks Table

Identify Risk	Potential impact of risk on climate, community and/or biodiversity benefits	Actions needed to mitigate the risk
Encroachment into the Project Area by local farmers.	Encroachment by farmers could result in accidental or intentional clearing of forest areas.	All conservation sites will be regularly monitored by local staff.
Fire	Fire is a risk throughout the Paraguayan Chaco. This potential fire risk is not a natural fire risk (i.e., started naturally by lightning strike), but rather would be started by nearby farmers.	The conservation sites will be regularly monitored to quickly identify potential fires. Fire breaks have been established and will be maintained alongside access roads. Further, an online tool with fire alerts will be used. Such online tools might include the Global Forest Watch or the Global Risk Assessment Services (GRAS), which uses data based on the Fire Information for Resource Management System (FIRMS) provided by NASA.
There could be some select illegal logging or hunting.	Illegal logging could reduce the amount of carbon dioxide being stored at the Project sites. Illegal hunting could reduce biodiversity.	Illegal logging is unlikely, as the Project Area is privately owned and will be regularly monitored. In addition, illegal hunting is also unlikely given the distance of local communities from the project area. Wildlife cameras will be placed at the Project sites to monitor medium-to-large mammals and such cameras will also be capable of identifying illegal hunting.
Disease or invasive species	Disease or invasive species could reduce tree growth and result in less canopy cover and fewer carbon dioxide emissions sequestered.	There are no known risks throughout the Project Zone associated with invasive species, pest or disease infestations, or risks associated with in-migration from outside communities. According to the Global Invasive Species Database, the following invasive species have been identified in the Departments of Alto Paraguay and Presidente Hayes: ● Rock pigeons (*Columba livia*; Alto Paraguay and Presidente Hayes); ● Golden mussel (*Limnoperna fortunei*; Alto Paraguay and Presidente Hayes); ● Wild tomato (*Solanum sisymbriifolium*; Alto Paraguay); ● *Oxycaryum cubense* (Cuban bulrush; Presidente Hayes); and ● Guava (*Psidium guajava*; Presidente Hayes).[56] The feral pig, Sus scrofa, is an invasive species that is considered a threat to native fauna as it is a disease reservoir, competitor, and potential predator for native fauna. The feral pig was

[56] Global Invasive Species Database. "Search: Alto Paraguay, Presidente Hayes." Available: http://www.iucngisd.org/gisd/search.php

		identified at the initial project instance and the situation is being monitored.