2016 MONITORING & IMPLEMENTATION REPORT FOR THE PURUS PROJECT

Document Prepared By

CarbonCo[1], LLC, East Aurora, NY - USA
and
TerraCarbon[2], LLC, Peoria, IL USA

Project Title	The Purus Project
Project Location	Acre, Brazil
Version	2.0
Report ID	N/A
Date of Issue	21 December 2017
Project ID	963
Project Start Date	23 May 2011
Monitoring Period and Project Lifetime	01-January-2016 to 31-December-2016; 60-year lifetime
Project Proponent	CarbonCo, LLC Brian McFarland 853 Main Street East Aurora, New York, 14052 - USA Email: BMcFarland@CarbonCoLLC.com Phone: (240) 247-0630
Prepared By	James Eaton[2] and Brian McFarland[1]
Verification Body	Environmental Services, Inc. Shawn McMahon, Lead Auditor 7220 Financial Way, Suite 100, Jacksonville, Florida, 32256 Phone: +1 (330) 833-9941 Email: SMcMahon@ESINC.CC
History of CCB Status	The Purus Project was validated to the CCBS (Second Version) in January 2013 and the Purus Project's initial verification to the CCB (Second Version) was achieved in December 2013. The Purus Project's second

	verification was achieved in October 2014, the third verification was achieved in November 2015, and the fourth verification was achieved in November 2016. This Report covers the fifth verification.
CCB Benefits Summary	The Purus Project successfully achieved net positive climate, community and biodiversity benefits between May 23, 2011 and December 31, 2012 which included, but were not limited to: a reduction in the Project Area's deforestation; preservation of biologically diverse habitats; local hires and transfer of technical knowledge; and the overall development of the first-ever, VCS-CCBS validated REDD+ project in the State of Acre, Brazil. Net positive climate, community and biodiversity benefits between January 1, 2013 and December 31, 2013 included, but were not limited to: a reduction in the Project Area's deforestation; preservation of biologically diverse habitats; deployment of ten motion-sensitive, wildlife camera traps; offering of agricultural extension courses to local communities; continuing progress towards legalization of local communities' land tenure; and achievement of the first-ever, VCS-CCBS verified REDD+ project in the State of Acre, Brazil. Net positive climate, community and biodiversity benefits between January 1, 2014 and December 31, 2014 included, but were not limited to: a reduction in the Project Area's deforestation; preservation of biologically diverse habitats; completion of study using ten motion-sensitive wildlife camera traps; installation of one permanent phone at the Project headquarters; medical assistance provided to local communities; and initiation of granting official land title to several local communities. Net positive climate, community and biodiversity benefits between January 1, 2015 and December 31, 2015 included, but were not limited to: a reduction in the Project Area's deforestation; preservation of biologically diverse habitats; construction of an onsite health clinic; acquisition of one large boat to provide free transport for the communities; installation of one potable water system at the Project's headquarters; and completion of land titling to first community members. Net positive climate, community and biodiversity benefits between January 1, 2016 to December 31, 2016 included, but were not limited to: a reduction in the Project Area's deforestation; preservation of biologically diverse habitats; completion of the onsite health clinic; continuing assistance to communities via free boat transport; initiation of negotiations with the Federal University of Acre and CEPLAC to undertake agroforestry and medical work, including a pilot cocoa project; and engagement with the Public Prosecutor's Office of the State of Acre to assist with land titling.
Gold Level Criteria	The Purus Project achieved Gold Level due to exceptional biodiversity benefits as there were at least two endangered flora species identified at the Purus Project as classified on the International Union for Conservation of Nature (IUCN) Red List. These endangered flora species are Car-cara

	(Aniba rosaeodora) and Baboonwood (*Virola surinamensis*). In addition, numerous IUCN vulnerable and near threatened species, including short-eared dogs, jaguars, giant anteaters, and lowland tapirs, have been photographed at the Purus Project.

Table of Contents

1 General 6
1.1 Summary Description of the Implementation Status of the Project (G3) 6
1.2 Project Location (G1 & G3) 9
1.3 Project Proponent (G4) 12
Table 1.1. List of Project Proponents. 13
1.4 Other Entities Involved in the Project (G4) 14
1.5 Project Start Date (G3) 16
1.6 Project Crediting Period (G3) 16
1.7 Sustainable Development 22
2 Implementation of Design 24
2.1 Sectoral Scope and Project Type 24
2.2 Grouped Project 24
2.3 Description of the Project Activity (G3) 24
2.4 Management of Risks to Project Benefits (G3) 50
2.5 Measures to Maintain High Conservation Values (G3) 58
2.6 Project Financing (G3 & G4) 58
2.7 Employment Opportunities and Worker Safety (G4) 59
2.8 Stakeholders (G3) 64
2.9 Deviations 81
2.9.1 Methodology Deviations 81
2.9.2 Project Description Deviations 82
3 LEGAL Status 83
3.1 Compliance with Laws, Statues, Property Rights and Other Regulatory Frameworks (G4 & G5) 83
3.2 Evidence of Project Ownership (G5) 93
3.3 Emissions Trading Programs and Other Binding Limits (CL1) 94
3.4 Participation under Other GHG Programs (CL1) 94
3.5 Other Forms of Environmental Credit (CL1) 94
3.6 Projects Rejected by Other GHG Programs (CL1) 94
3.7 Respect for Rights and No Involuntary Relocation (G5) 95
3.8 Illegal Activities and Project Benefits (G5) 95
4 Application of Methodology 96
4.1 Title and Reference of Methodology 96

4.2 Project Boundary (G1) 97
4.3 Baseline Scenario (G2) 98
4.4 Additionality (G2) 103
5 Monitoring Data and Parameters 106
5.1 Description of the Monitoring Plan (CL3, CM3 & B3) 106
5.2 Data and Parameters Available at Validation (CL3) 130
5.3 Data and Parameters Monitored (CL3, CM3 & B3) 135
6 Quantification of GHG Emission Reductions and Removals (CLIMATE) 155
6.1 Baseline Emissions (G2) 155
6.2 Project Emissions 156
6.3 Leakage 163
6.4 Net GHG Emission Reductions and Removals (CL1 & CL2) 165
6.5 Climate Change Adaptation Benefits (GL1) 166
7 Community 166
7.1 Net Positive Community Impacts (CM1) 166
7.2 Negative Offsite Stakeholder Impacts (CM2) 182
7.3 Exceptional Community Benefits (GL2) 185
8 Biodiversity 185
8.1 Net Positive Biodiversity Impacts (B1) 185
8.2 Negative Offsite Biodiversity Impacts (B2) 187
8.3 Exceptional Biodiversity Benefits (GL3) 190

1 GENERAL

1.1 Summary Description of the Implementation Status of the Project (G3)

The Purus Project seeks to help protect and conserve tropical forest by providing payments for ecosystem services. This type of project is known as a Reducing Emissions from Deforestation and forest Degradation project (REDD project). Project activities intended to reduce deforestation are implemented in and around a privately-owned property in the State of Acre, Brazil and are funded by payments related to emission reduction credits generated by the project. This VCS CCB Monitoring and Implementation Report for the Purus Project covers the monitoring, reporting, and verification period of January 1, 2016 to December 31, 2016.

This project was developed and registered under the Verified Carbon Standard (VCS) and the Climate, Community, and Biodiversity Standard (CCBS). Project development activities have included meeting with the local communities surrounding the project area, engaging Acre state officials working on similar strategies at a regional/state level, developing a plan which will result in lowering the pressure on land and forest resources in consultation with the local community, putting into operation the REDD+ project implementation plan with the help of local partners and Purus Project staff, undertaking a forest carbon inventory, and modelling regional deforestation. Activities implemented as part of the project to reduce deforestation include:

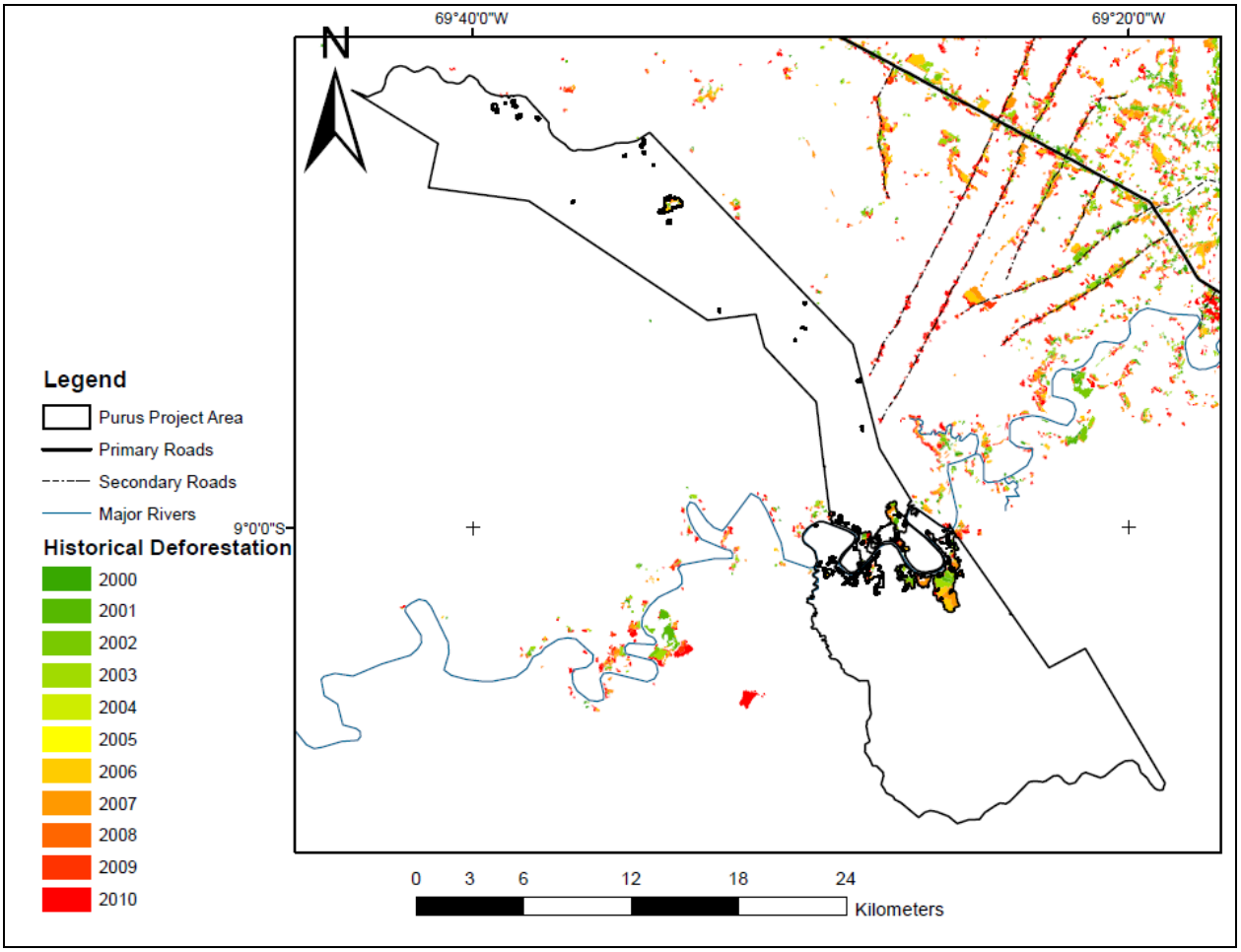
- Community outreach and education;
- Employment of local community members as project forest guards or other project staff (i.e., to replace other sources of income associated with deforestation and land use);
- Agricultural extension training which will help baseline agents to increase productivity on current lands (i.e., thus reducing the pressure to expand their farms in the adjacent forest);
- Reforestation of select non-forest areas and planting woodlots (i.e., to provide alternative sources of fuelwood); and
- Sharing a portion of carbon related revenue for communities living on the Moura & Rosa property (i.e., replacing other sources of income associated with deforestation and land use).

The above activities directly address deforestation pressures in the region which are becoming more prevalent.

While the State of Acre historically has a low deforestation rate and a high level of forest governance, the paving of two primary roads BR-364 and BR-317 has greatly increased destruction of primary forests and conversion to cattle pastures. Deforestation pressures on the Purus Project property have increased significantly in the past several years as the paving of BR-364 was nearing completion. BR-364 which runs northwest-southeast, across the north of the state of Acre, is only 20 kilometers distance from the Purus Project area. The section nearest the Project property, near the town of Manoel Urbano, was paved between March and August 2011 during the start of the project in May 2011. Now being fully paved, BR-364 will allow for year-round transportation and will most likely increase property values and market access. The Purus River, a major tributary of the Amazon River, runs through the project property

potentially connecting areas upstream and downstream from BR-364 to consumer markets. Further, secondary roads are fast approaching the project area (Figure 1.1) providing access to previously hard to reach areas for the agents of deforestation, small scale/subsistence farmers.

Figure 1.1. Deforestation in and around the Project area (outlined in black) in the historical reference period.



There are approximately 18 communities living on the Project property, all of which live along the banks of the Purus River. These small scale and subsistence farming communities are the agents of deforestation and clear a portion of forest (often annually) for land to engage in small scale farming and ranching for their livelihoods. Forest is generally cleared over a period of months. The process most often starts in May or June at the beginning of the dry season with the cutting of small trees and vines by machete. Next, the farmer or someone with a chainsaw cuts the larger trees down. The farmer then waits for the dead vegetation to dry for a period of time ranging from two weeks to several months. Some of the farmers then use fire to clear the land. Finally crops are planted for a year or two prior to conversion to pasture or the land is directly converted to pasture.

The project baseline has been developed after meeting with local communities to understand their use of the land, and in light of the above-mentioned increased accessibility of the Project area in the near future.

Further, the Purus Project is working closely with the State of Acre and is using a simple historic approach to setting the baseline to conform with the State of Acre's approach. Finally, data and information provided by the UCEGEO, the Climate Change Institute's GIS department, was used in the development of the baseline.

There are three project proponents undertaking the Purus Project including CarbonCo, LLC ("CarbonCo"), Freitas International Group, LLC ("Carbon Securities"), and Moura e Rosa Empreendimentos Imobiliários LTDA ("Moura & Rosa"). CarbonCo, the wholly-owned subsidiary of Carbonfund.org, is responsible for project finance and managing project development. Carbon Securities acts as a liaison between CarbonCo and Moura & Rosa and provides logistical support during site visits. Moura & Rosa, an Acre based organization created by the Landowners, is primarily responsible for implementation of project activities and day-to-day management of the Purus Project.

Implementation Status of the Project

The Purus Project was validated to the CCBS with Gold Distinction and validated to the VCS in January 2013. Activities resulting in net positive climate, community and biodiversity benefits between January 1, 2016 to December 31, 2016 included, but were not limited to: a reduction in the Project Area's deforestation; preservation of biologically diverse habitats; completion of the onsite health clinic; continuing assistance to communities via free boat transport; initiation of negotiations with the Federal University of Acre and CEPLAC to undertake agroforestry and medical work, including a pilot cocoa project; and engagement with the Public Prosecutor's Office of the State of Acre to assist with land titling.

GHG Emission Reductions and Removals for the current Monitoring Period

The net total emissions reduced by the Purus Project over the course of the 2016 monitoring period is 98,882 tCO_2e. Please see section 6 for the gross total emissions reduced by the Project in 2016.

Years	GHG Emission Reductions (tCO2e)
2016	98,882
Total	98,882

The overarching objective of the Purus Project is to generate sustainable economic opportunities for the local communities and to implement social projects, while mitigating deforestation (i.e., which results in less greenhouse gas emissions) and preserving the Project's rich biodiversity.

By mitigating deforestation, payments for ecosystem services are generated which enable the continued implementation of local social projects and the creation of economic opportunities for the communities. Similarly by improving local livelihoods and creating alternative economic opportunities, there is less pressure on the forests and a reduction in deforestation. Improving local livelihoods and reducing deforestation are key mechanisms to preserve the Project's biodiversity.

To achieve these overarching objectives, the following climate, community and biodiversity project activities were undertaken by the Project Proponents since May 23, 2011 (the Project Start Date) and particularly from January 1, 2016 to December 31, 2016.

Major Climate Objective

To mitigate deforestation and reduce the amount of greenhouse gas (GHG) emissions, the Project Proponents undertook the following project activities since May 23, 2011:

- Forest Carbon Inventory;
- Regional Land-use and Deforestation Modeling;
- Address Underlying Deforestation Drivers to Mitigate Release of GHGs;
- Develop Climate Monitoring Plan; and
- Monitor Deforestation.

Major Community Objective

To generate sustainable economic opportunities for the local communities living in and around the Purus Project and to implement local social projects, the Project Proponents have undertook, or began to plan for, the following project activities since May 23, 2011:

- Project Awareness, Meet Community, and Discuss Project;
- Design Social Projects and Programs for Community;
- Implement Social Projects and Programs for Community;
- Develop Community Monitoring Plan; and
- Monitor Community Impacts.

Major Biodiversity Objective

To preserve the Purus Project's rich biodiversity, the Project Proponents are generating sustainable economic opportunities for the local communities, implementing social projects, and mitigating the release of GHGs from deforestation. Furthermore, to achieve this biodiversity objective, the Project Proponents undertook the following project activities since May 23, 2011:

- Rapidly Assess Biodiversity on Project;
- Develop Biodiversity Monitoring Plan; and
- Monitor Biodiversity Impacts.

1.2 Project Location (G1 & G3)

The Purus Project area is located in Acre, Brazil along the banks of the Purus River about 20 kilometers southwest of Manoel Urbano. The Purus Project area consists of two contiguous properties known as the Seringal Itatinga and Seringal Porto Central. While the two properties total 35,797 hectares, the total

project area (i.e., forested area of the property as of the project start date, and 10 years prior) is 34,702 hectares.

Figure 1.2. . Map of the Seringal Itatinga and Seringal Porto Central Properties (Google Earth, accessed 2012).

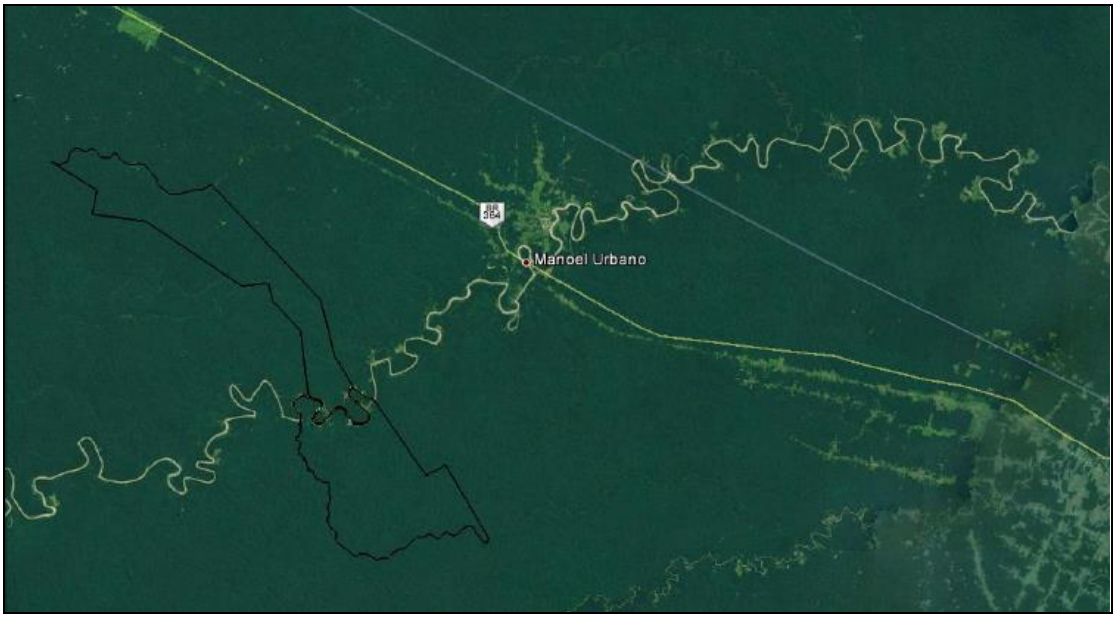


Figure 1.3. 2000 Image of the Purus Project Area, Forest Cover in Light and Dark Green, Deforestation in Pink/Red (ResourceSAT 2000 Image).

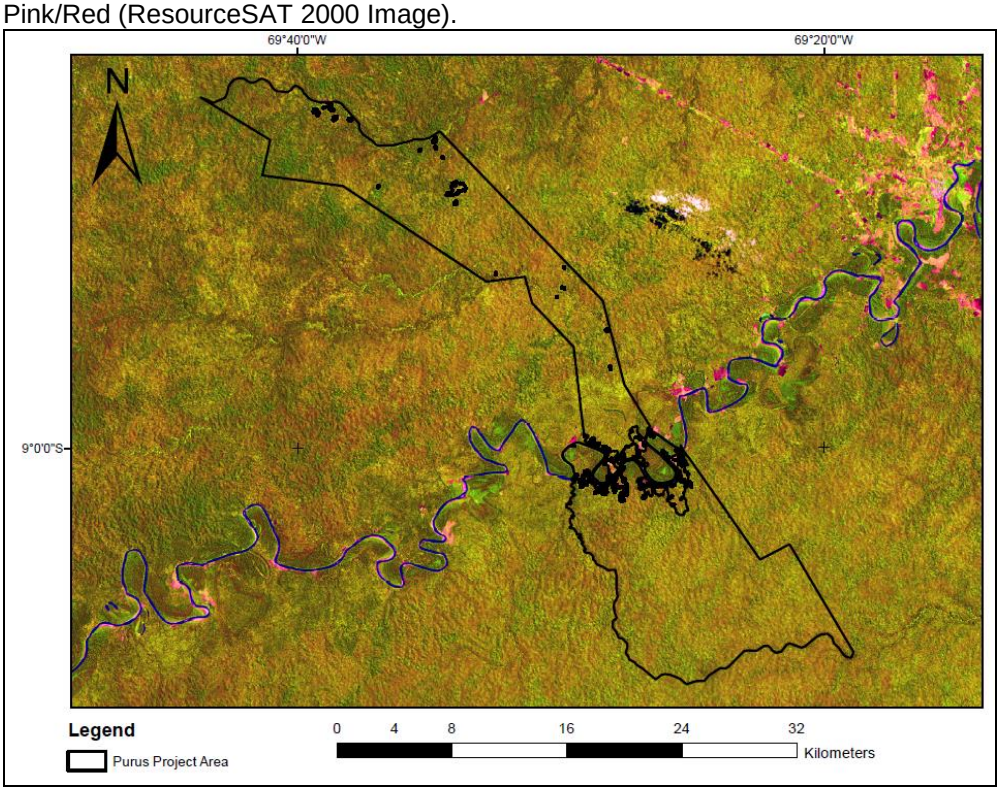
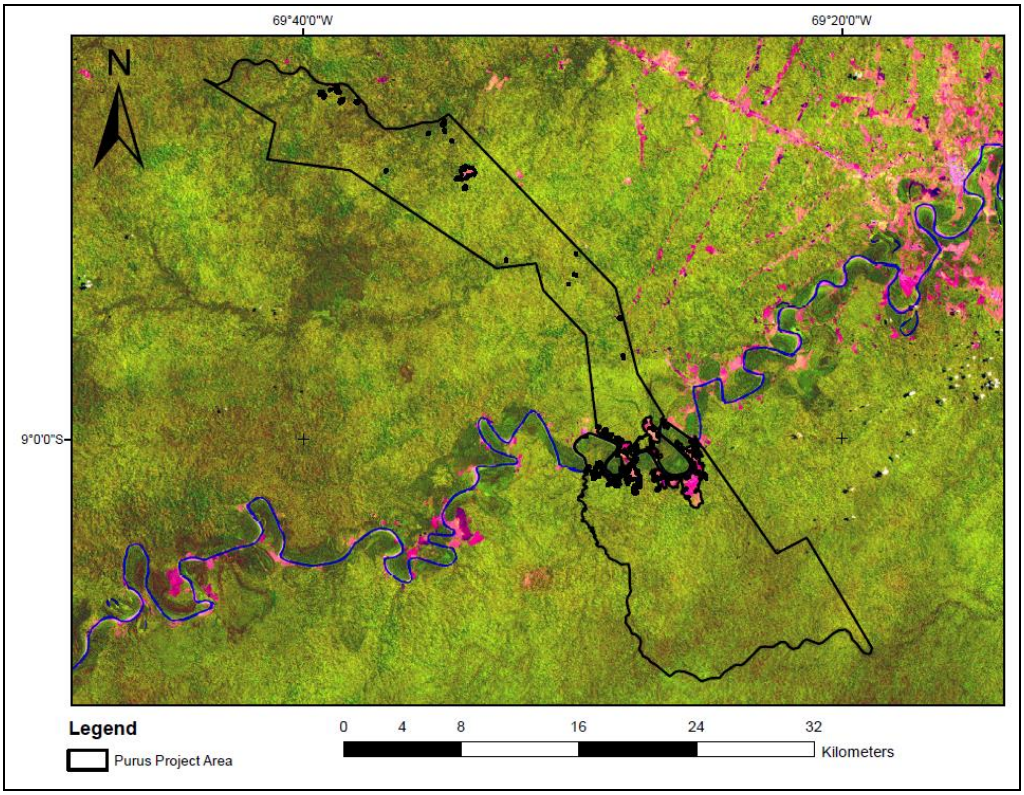


Figure 1.4. 2011 Image of the Purus Project Area, Forest Cover in Light and Dark Green, Deforestation in Pink/Red (ResourceSAT 2010 Image).



The geographic coordinates of these two contiguous properties are located below. The following map also identifies the Project Area and the Project Zone (i.e., the Project Area and the Leakage Area):

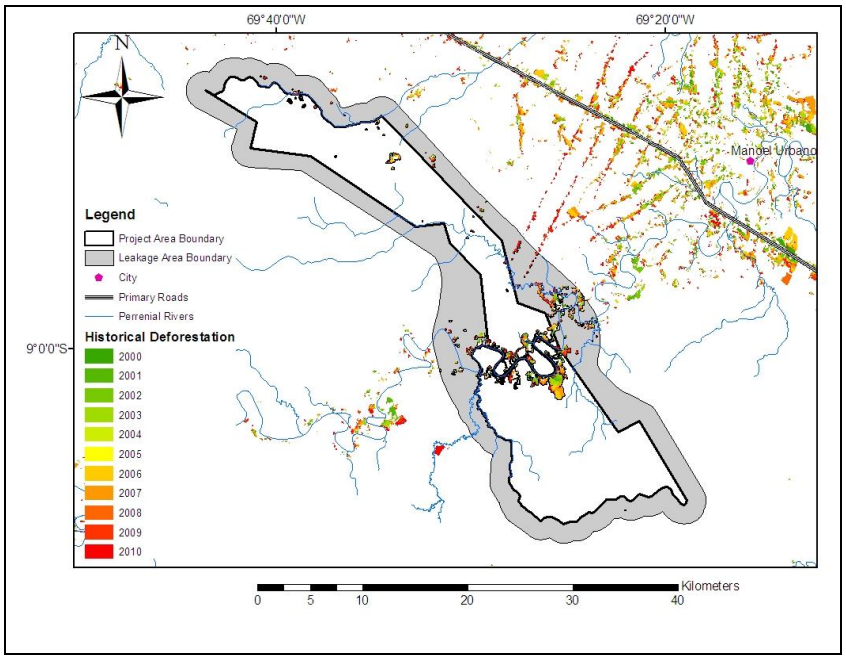


Figure 1.5: Map of Purus Project Area and Project Zone (Credit: Professor Antonio Flores)

Project activities since May 23, 2011 and particularly between January 1, 2016 and December 31, 2016 – for example, ongoing maintenance (including installation of the potable water system and completion of the health clinic) of the Project's headquarters and monitoring of deforestation – took place throughout the Project Area and Project Zone, with a particular emphasis on locations experiencing the greatest deforestation pressures (i.e., along the Purus River inside the Project Area). Furthermore, the Leakage Area is the land surrounding the Project Area that is predicted to be most impacted by the Purus Project activities.

Basic Physical Parameters

The two main types of vegetation strata identified within the Purus Project were open forest with palm and bamboo, along with open alluvial forest with palm; both of which are intact, primary forest:

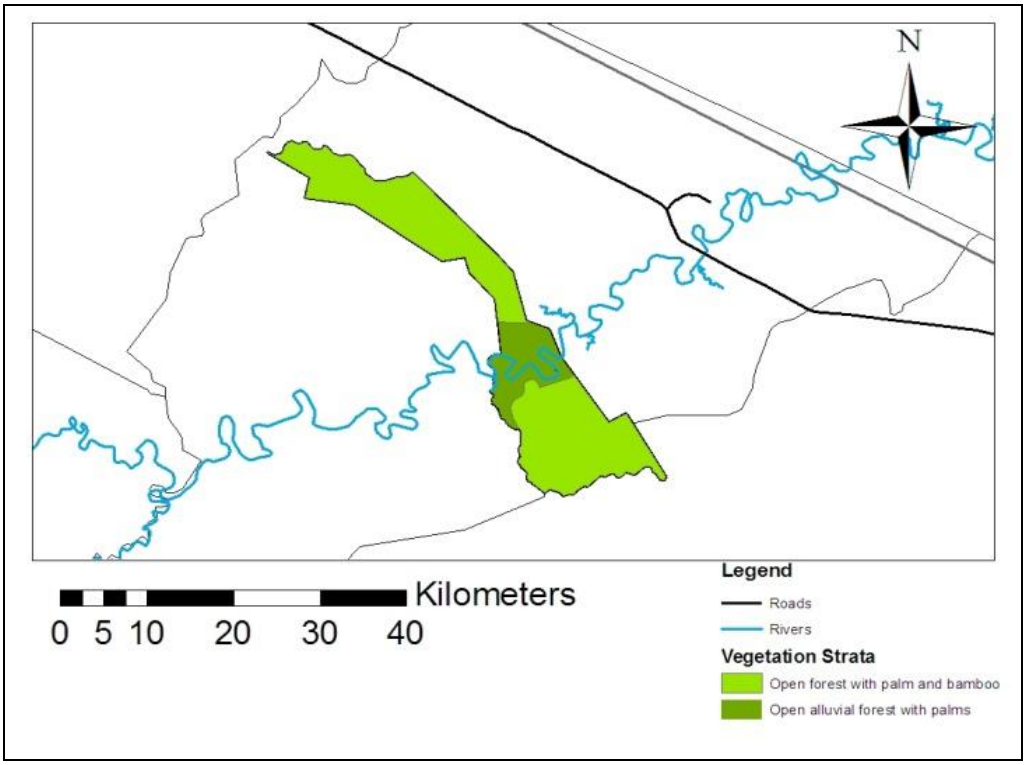


Figure 1.6: Stratification of Project Area (Credit: TerraCarbon and TECMAN)

The basic physical parameters of the Purus Project, including the soil, elevation and climate, remain unchanged from the validated Project Design Document (PDD). For this additional information on the Purus Project's basic physical parameters, please see the CCBS PDD here.

1.3 Project Proponent (G4)

The three main project proponents are CarbonCo, LLC ("CarbonCo"), Freitas International Group, LLC ("Carbon Securities"), and Moura e Rosa Empreendimentos Imobiliários LTDA ("Moura & Rosa").

CarbonCo, the wholly-owned subsidiary of Carbonfund.org, is responsible for getting the project certified and for project finance. Carbon Securities acts as a liaison between CarbonCo and Moura & Rosa, acts as a translator, and assists with logistics for site visits. Moura & Rosa is an Acre, Brazil-based organization created by the Landowners and is primarily responsible for day-to-day management of the Project and the implementation of activities to stop deforestation. Table 1.1, below, details the role and responsibilities of each project proponent.

Table 1.1. List of Project Proponents.

Organization name	CarbonCo, LLC
Contact person	Brian McFarland
Title	Director
Address	853 Main Street, East Aurora, New York, 14052 - USA
Telephone	+1 (240) 247-0630
Email	BMcFarland@CarbonCoLLC.com

Organization name	Moura e Rosa Empreendimentos Imobiliários LTDA (Moura & Rosa)
Contact person	Normando Sales and Wanderley Rosa
Title	Executive Directors
Address	Rua Melancia, 242 - Morada do Sol - Rio Branco, Acre - CEP: 69901.088
Telephone	+55 (68) 9972 3919 (Normando) and +55 (68) 9 9911 2102 (Wanderley)
Email	normandosales@hotmail.com and wanderleyrosa@uol.com.br

Organization name	Freitas International Group, LLC (Doing Business as Carbon Securities)
Contact person	Pedro Freitas
Title	Founder and President
Address	201 S. Biscayne Boulevard, 28th Floor, Miami, Florida, 33131 – USA
Telephone	+1 (305) 209-0909
Email	PedroFreitas@carbonsecurities.org

CarbonCo is the primary Project Proponent that was responsible for the Project's design and Moura & Rosa is the primary Project Proponent responsible for the Project's implementation.

1.4 Other Entities Involved in the Project (G4)

Figure 1.7 provides an overview of the relationship of the various project proponents and entities involved in the project. Table 1.2 lists the role of the other entities.

Figure 1.7. Organizational Chart for the Purus Project

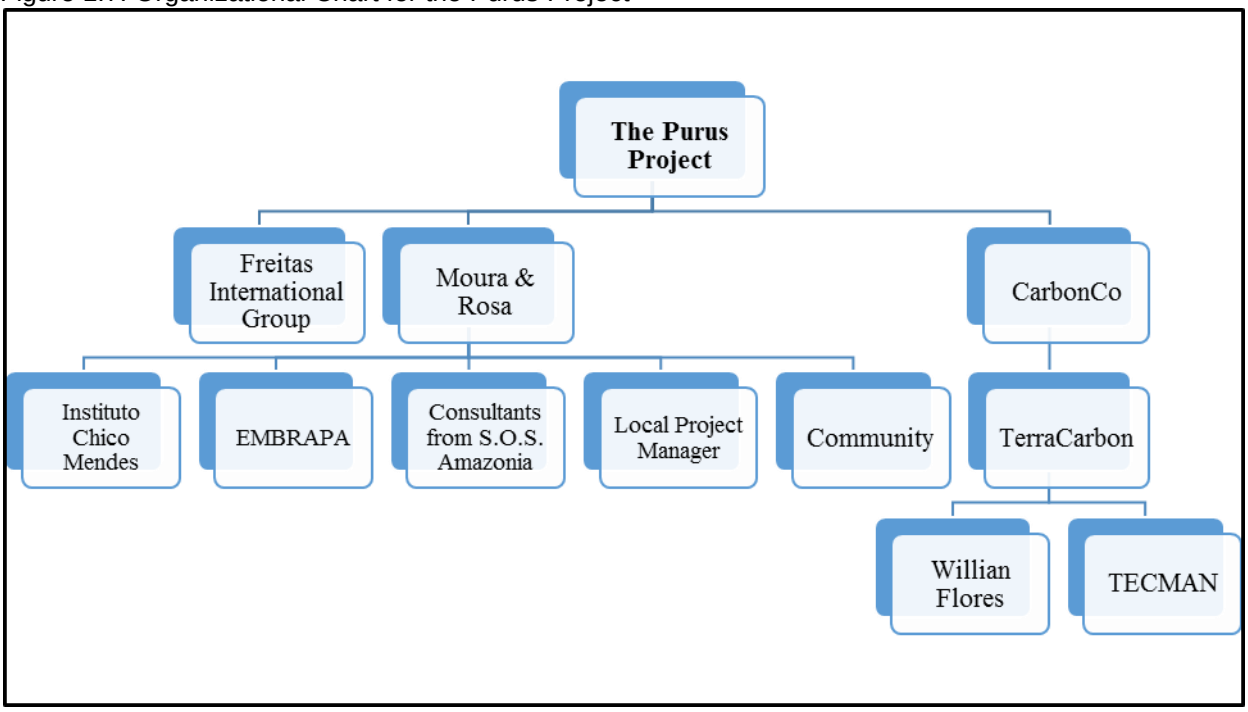


Table 1.2. List of Other Entities Involved in the Project.

Organization name	TerraCarbon
Role in the project	Co-lead project kickoff. Design and manage forest carbon inventory. Lead baseline development task. Develop project document and advise CarbonCo on all aspects of project development and monitoring.
Contact person	James Eaton
Title	Senior Manager, Forestry & Technical Services
Address	5901 N. Sheridan Rd. Peoria, Illinois 61614, USA
Telephone	+1 (434) 326-1144
Email	James.Eaton@terracarbon.com

Organization name	TECMAN

Role in the project	Lead and supervise collection of field data during the course of the forest carbon inventory.
Contact person	Igor Agapejev de Andrade
Title	Co-owner
Address	Rua Copacabana, nº 148, Sala 204, Conjunto Village Maciel, CEP 69.914-380 Rio Branco, Acre, Brasil
Telephone	+55 (68) 3227-5273
Email	IgorAgapejev@gmail.com

Organization name	N/A
Role in the project	Assist with review of the project baseline and data acquisition.
Contact person	Antonio Willian Flores de Melo
Title	Independent consultant
Address	Universidade Federal do Acre, Centro de Ciências Biológicas e da Natureza, Distrito Industrial, CEP 69.915-900, Rio Branco, Acre, Brasil
Telephone	+55 (68) 3901-2611
Email	WillianFlores@gmail.com

Organization name	Chico Mendes Foundation
Role in the project	Independent consultant
Contact person	Elenira Mendes
Title	Executive Director
Address	Xapuri, Acre, Brasil
Telephone	N/A
Email	N/A

Key Technical Skills and Staff

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

- Stakeholder identification and community engagement;
- Biodiversity assessment and monitoring;

- Carbon stock measurement and monitoring;
- Regional deforestation and land-use modelling;
- Project management;
- Local knowledge and fluency in Portuguese; and
- Carbon finance.

The Project's management team and advisors have both the expertise and prior experience with implementing forest carbon projects. For detailed staff biographies, please see the Purus Project's validated CCBS PDD, section G4. Management Capacity and Best Practices, subsection 2. Key Technical Skills and Staff.

1.5 Project Start Date (G3)

The Purus Project has a project start date of May 23, 2011 which is the date of the initial signing of the communities' "Declaration"[1] to join the project and when the first social survey took place to gather information on the habits, customs, and composition of the communities living in the Purus Project area. To strengthen this agreement, individual Memorandums of Understanding[2] with community members were later signed.

1.6 Project Crediting Period (G3)

The Purus Project has an initial project crediting period of 30 years[3], starting on May 23, 2011. The initial baseline period started on May 23, 2011 and is set to continue through May 22, 2021. The initial project crediting period is set to end on May 22, 2041. The initial Project Implementation Report (PIR) covers the monitoring and reporting period from May 23, 2011 to December 31, 2012. The second PIR covered the monitoring and reporting period from January 1, 2013 to December 31, 2013 and the third PIR covered the monitoring and reporting period from January 1, 2014 to December 31, 2014. The fourth PIR covered the monitoring and reporting period from January 1, 2015 to December 31, 2015. This fifth Report covers the monitoring and reporting period from January 1, 2016 to December 31, 2016.

<u>Project Lifetime and GHG Accounting Period</u>

The Project Start Date, which can be demonstrated via several signed Declarations and Memorandum of Understandings (MOUs) between Carbonfund.org, CarbonCo, (i.e., the wholly-owned subsidiary of Carbonfund.org), Carbon Securities (the doing-business-as name of Freitas International Group), Moura & Rosa and the communities, is May 23, 2011.

[1] A copy of the "Declaration" can be found in the project archive
[2] Copies of all signed MOUs can be found in the project archive.
[3] An addendum to the initial Tri-Party Agreement between CarbonCo, Carbon Securities and Moura & Rosa stipulates there will be a 60-year project lifetime, followed by two renewable terms of 25-years each.

The Tri-Party Agreement between Carbonfund.org, Carbon Securities and Moura & Rosa stipulates a 60-year Project Lifetime, followed by two renewable terms of 25-years each. Thus, the Project Lifetime is 60 years but the Project Proponents may decide in the future to extend the Project Lifetime to 110 years.

Implementation Schedule

The approximate implementation schedule for the Purus Project, with key accomplishments between January 1, 2016 and December 31, 2016, is as follows:

Pre- and Post-Validation: Years 1 and 2 (2011-2012)

- Signing of Tri-Party Agreement between Project Proponents
    - The Tri-Party Agreement was signed on March 17, 2011.
- Stakeholder Consultations, Community Visits by PAV
    - Stakeholder consultations have continuously taken place. For example, the Project Proponents visited the Project together and met the local communities in March 2011, August 2011, March 2012 and June 2012. CarbonCo also hired the independent group PAV to visit the communities in October 2012. Visits in 2013 included March-April 2013, June 2013 and August 2013. Visits in 2014 and 2015 included May 2014, August 2014, August 2015, while visits in 2016 included March 2016 and July 2016.
- Forest Carbon Inventory
    - TECMAN was contracted in July 2011, participated in classroom and field training in August 2011, and then TECMAN conducted the Purus Project's forest carbon inventory from August to November 2011. TECMAN was contracted again by CarbonCo from 2012 to 2014 to conduct forest carbon inventories at other CarbonCo projects.
- Land-use and Deforestation Modeling
    - Professor Flores was contracted in October 2011 and assisted with the Purus Project's modelling from approximately August 2011 to September 2012. Professor Flores was later contracted in April 2013, February 2014, March 2015, March 2016, and February 2017 to assist with data acquisition for the Purus Project.
- Project Design Documents Written
    - The Project Design Documents (PDDs) were written, reviewed, translated, and revised between May 23, 2011 and December 31, 2012. The PDDs were submitted for validation on April 29, 2012 and were officially validated in January 2013.

- Hire Project Manager
    - Moura & Rosa hired Miguel and Miguel's spouse Socorro in March 2012. In April 2012, Miguel and Socorro were officially registered as the initial full-time, onsite project managers for the Purus Project. Kidney was also contracted under a probationary training period by Moura & Rosa which began in November 2012. Kidney's employment was formalized in January 2013, Miguel and Socorro quit in March 2013 because they want to eventually move to Manoel Urbano, and Rogério was hired and started living at the Project's headquarters in November 2013. Kidney and Rogério worked for the Purus Project throughout 2014, 2015 and some of 2016. Rogério resigned on June 6, 2016 and Kidney resigned on July 26, 2016. Rosanio was hired to replace Rogério on July 16, 2016. Sadly, Rosanio passed away on May 19, 2017. Moura & Rosa, as of June 2017, are looking for a replacement for Rosanio. Edcarlo Pavia do Nascimento was hired on March 1, 2017 to replace Kidney as the local project manager.
- Initiate Patrols of Deforestation
    - Wanderley Cesário Rosa participated in training classes in São Paulo on how to operate a trike in April 2012. Moura & Rosa then purchased a trike in May 2012 and in June 2012, the trike was delivered to Rio Branco. Aerial monitoring of deforestation took place throughout 2012, 2013, 2014 and 2015. The trike was replaced by a drone in May 2016.
- Initial Agricultural Extension Trainings
    - The communities in and around the Purus Project were surveyed from March 10-12, 2012 to better understand which agricultural extension training courses would be of the most interest. Equipment, such as a projector with sound system, was purchased by Moura & Rosa in July 2012 to assist with the teaching the courses. A total of 5 courses (production / cultivation of bananas; rural property management; sustainable use of legumes; sustainable management of cattle pastures; and alternative system of establishing chicken coups) were taught to local communities in July and August 2013. A partnership with the Federal University of Acre (UFAC) was initiated on July 18, 2016 via conversations and negotiations (including with UFAC's Forestry and Agronomy Departments). This partnership will be formalized in 2017.
- Biodiversity and Community Impact Monitoring Plans Developed
    - The initial and full biodiversity and community monitoring plans were designed between May 2011 and December 2012 and the full plans were publicly posted to the CCBS in May 2013.
- Project Audited to CCBS and VCS Standards

- CarbonCo hired SCS Global Services in November 2011 to validate the Purus Project to the CCBS and VCS standards. A validation site visit was conducted in June 2012 and the Purus Project was officially validated in January 2013.
- CarbonCo hired Environmental Services, Inc. in April 2013 to verify the Purus Project to the CCBS and VCS standards. A verification site visit was conducted in August 2013 and the Purus Project was officially verified in December 2013.
- The second verification site visit was conducted in August 2014 and the Purus Project was officially verified in October 2014.
- The third verification site visit was conducted in August 2015 and the Purus Project was officially verified in November 2015.
- The fourth verification site visit was conducted in July 2016 and the Purus Project was officially verified in November 2016
- The fifth verification site visit was conducted in mid-July 2017.

- Help Communities Obtain Land Rights / Delineate Family Areas
  - In 2010, Willian Figueiredo Bittencourt from the company PLANTEC did a geo-reference of the property and also went to the Purus Project to geo-reference the communities. During the first semester of 2012, the process continued. From 2010 to 2012, PLANTEC was also contracted to start the process of legalizing the land for the communities, satellite imagery was purchased to determine the land-use and how long settlements were cleared to define the areas, and Brazilian Federal law was thoroughly reviewed. In 2013, Moura & Rosa continued to research the laws and to better understand the process of granting title to the local communities. Kidney continued to meet with the local communities to improve their trust. Moura & Rosa also reviewed the surveys and began to expedite the process of granting title to the local communities. In 2014, Moura & Rosa held numerous meetings with STR and local communities. On November 28, 2014, Moura & Rosa celebrated with Mr. José Artenizio da Silva a private gift agreement for an area of one hundred hectares. Moura & Rosa also celebrated with Mr. José Mariano Nunes Frota, on the same date of November 28, 2014, another special contract for the donation of an area of approximately one hundred hectares. Also on November 30, 2014, Moura & Rosa signed an agreement with Mr. Benedito Nunes da Silva granting the use and enjoyment of an area of twenty hectares. On December 29, 2015, Mr. Benedito Nunes da Silva was granted the public deed of donation for the twenty hectares. Moura & Rosa, throughout 2016 and 2017, began working with the Public Prosecutor's Office to help reach an understanding and grant titles to each of the remaining community members at the Purus Project.

Post-Validation: Years 3 to 5 (2013–2015)

The following medium-term activities took place since May 23, 2011 and particularly between January 1, 2013 and December 31, 2015:

- Social Assistance
    - A partnership was finalized with the fire department of Sena Madureira in 2012 to assist Moura & Rosa with the removal of trees from the Purus River in 2013. Although Moura & Rosa lacked the financial resources to provide assistance to the fire department to remove trees from the Purus River, alternative social assistance during 2013 included donating gasoline to local communities in June 2013, donating food to local communities in June 2013, painting the houses of local communities, and building stairs in July-August 2013 for Mr. Benedito's family to provide easier access to the Purus River. Moura & Rosa were unable to hire the fire department in 2014 due to political elections, but Moura & Rosa celebrated children's day at the Purus Project and donated presents to children at the Purus Project for Christmas. In 2015, soccer balls and clothes were donated to local communities, along with several food baskets. In 2016, the focus of social assistance was the completion of the onsite health clinic.
- Build an Office
    - The headquarters' initial construction began in May 2012. The contractor hired by Moura & Rosa worked in May and June 2012 to install a toilet, shower, kitchen, and a Purus Project sign at the headquarters. In 2013, the kitchen was expanded, bathroom and septic tank connections were completed, and the headquarters was maintained. In 2014, the phone tower was installed and agroforestry crops were planted around the headquarters. In 2015, the health clinic was constructed next to the headquarters. In addition, a potable water system was installed and corn was planted around the headquarters in 2015. In 2016, the health clinic was completed and further areas were designated for agroforestry in cooperation with UFAC.
- Improve School and Acquire School Bus Boat
    - A school bus boat was delivered to the Purus Project during the second semester of 2012, around June 2012. A smaller school bus boat was secured in late 2013 to replace the previous school bus boat which frequently broke down. The school bus boat was operational throughout 2014 and 2015. In addition, Moura & Rosa donated another motor for the school bus boat and also donated a blackboard and books to the school.
- Reforestation Activities

- Reforestation activities, particularly agroforestry, were conducted around the Purus Project headquarters in 2014. In 2015, corn and dwarf coconut were planted around the headquarters. A partnership with the Federal University of Acre (UFAC) was initiated on July 18, 2016 via conversations and negotiations (including with UFAC's Forestry and Agronomy Departments). This partnership will be formalized in 2017 and such a partnership will include reforestation activities.

Post-Validation: Years 5 to 10 (2016-2021)

Although intended to be medium-term activities, the following preliminary steps took place since May 23, 2011 and particularly between January 1, 2016 and December 31, 2016:

- Profit Sharing of Carbon Credits
  - The Purus Project was designed and the community was consulted about profit sharing of carbon credits between May 2011 and December 2012. The Purus Project was validated in January 2013, verified in December 2013, verified for the second time in October 2014 and then verified in November 2015, which are important milestones. In 2015 and 2016, a portion of the Project's profits were donated to the Chico Mendes Foundation.
- Build a Health Center and Dental Clinic
  - Although originally a longer term activity, Moura & Rosa expedited the health center and dental clinic. Moura & Rosa provided the Itinerant Health program in December 2014, which hosted approximately 180 community members. Construction of the health clinic began in May 2015. Roofing and the external walls were finished in December 2015. Construction of the internal dividing walls, flooring, and bathrooms began in March 2016 and was completed in mid-July 2016.
- Build New Houses
  - This was originally a longer term activity, but most community members no longer desire a new house.
- Ecotourism
  - This is a longer term activity. From 2011 to 2015, the Project Proponents discussed the potential of implementing a small-scale ecotourism outfit at the Purus Project. Moura & Rosa will eventually contact the State Agency of Tourism and Leisure (SETUL) to explore possibly collaborations.
- Reassessment of Baseline

- The Project's original baseline was designed and validated between 2011 and 2013. Many aspects of the original baseline (e.g., data sources, model inputs, project partners, etc.) will likely be used again in the reassessment of the baseline.

1.7 Sustainable Development

Brazil has participated in the development of the 17 Sustainable Development Goals (SDGs).[4] The following are the 17 SDGs and how the Purus Project is working towards helping to meet these voluntary SDGs:

- 1. No poverty
  - The Project is working to increase the communities' access to basic necessities and alleviate poverty.
- 2. Zero hunger
  - While the communities have access to crops, fish, and food from the forests, the Project is working to help improve the communities' agricultural techniques, while both increasing and diversifying incomes. For instance, this includes a pilot cacao project with UFAC.
- 3. Good health and well-being
  - The Project has built an onsite health clinic with frequent doctor and dentist visits, including the distribution of free medicine.
- 4. Quality education
  - The Purus Project has donated supplies to a local school and helped acquire a school bus boat.
- 5. Gender equality
  - The Projects are working to include more women in the project activities. One of the original project managers was Maria Souza de Moura (Socorro). In addition, the early priorities of doctor visits was to have gynecologists and pediatricians visit the Purus Project. In addition, a female nurse was hired to visit the Purus Project in 2016.
- 6. Clean water and sanitation
  - The Purus Project has installed a potable water system at the headquarters. In the future, the Project may explore rainwater catch basins as a method for collecting clean drinking water.
- 7. Affordable and clean energy

[4] Itamaraty. "Sustainable Development Goals (SDGs)." http://www.itamaraty.gov.br/en/politica-externa/desenvolvimento-sustentavel-e-meio-ambiente/6298-sustainable-development-goals-sdgs

  - The Purus Project has installed a generator at the Project headquarters and some of the local communities already have solar panels. In the future, Moura & Rosa would like to install solar panels at the headquarters, starting with a solar panel for the phone system. In addition, for the families that are participating in the Project, Moura & Rosa would like to help them structure the financing and installation of solar panels.

- 8. Decent work and economic growth
  - The Project has hired local project managers and local community members have been hired to assist with biodiversity studies, community studies, the forest carbon inventory, to build the health clinic, and to help visitors as guides and cooks.

- 9. Industry, innovation and infrastructure
  - In the future, Moura & Rosa would like to remove trees from the Purus River to improve river transport. Moura & Rosa have already secured a large transport boat to help improve access to the city of Manoel Urbano for the communities' crops. Furthermore, Moura & Rosa's partnership with UFAC (particularly with the Departments of Forestry and Agronomy) will promote innovations in sustainable agriculture.

- 10. Reduced inequalities
  - The Project is seeking to reduce inequalities by providing, amongst many things, free agricultural courses, access to an onsite health clinic, and land titles.

- 11. Sustainable cities and communities
  - The Project is promoting sustainable communities through providing land titles, agricultural extension courses, and health care services. These activities, in conjunction with other activities, will help reduce deforestation and improve the life quality of local communities which in turn, may reduce the pressure to migrate to neighboring cities such as Manoel Urbano.

- 12. Responsible consumption and production
  - As an avoided deforestation project and in conjunction with its UFAC partnership, the Purus Project is promoting responsible production of local crops.

- 13. Climate action
  - One of the main goals of the Project is to reduce deforestation and the associated GHG emissions.

- 14. Life below water
  - There is a relatively sustainable fishery near the Purus Project due to low population density. As previously mentioned, Moura & Rosa will attempt to clear the Purus River of trees in the near future. In 2017, Moura & Rosa installed large trash cans throughout the Project Area (e.g., 2 trash cans at the headquarters and 3 throughout

the Project Area) to promote proper garbage disposal, which shall contribute to a cleaner river. This garbage will be collected on a regular basis and brought to the city for proper disposal.

- 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 forests.
- 16. Peace, justice and strong institutions
  - The Project promotes peace, justice and strong institutions through the prohibition of illegal activities such as child exploitation, bribery, and corruption. In addition, the Project works with a wide-range of stakeholders and institutions.
- 17. Partnerships for the goals
  - The Project is the result of strong international and domestic partnerships.

2 IMPLEMENTATION OF DESIGN

See section 2.3 below for detailed information of the Project's activities during the monitoring period of January 1, 2016 to December 31, 2016. During this monitoring period, there were no significant events that negatively impact the Project's GHG emission reductions. Similarly, there were no changes in the Project Proponents or other entities. With respect to the monitoring and management of leakage and non-permanence risk factors, see the Project's non-permanence risk report and sections 4 and 5 for an assessment of leakage.

2.1 Sectoral Scope and Project Type

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

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

Type of Activity: Avoided Unplanned Deforestation (AUDD)

This project is registered under the Verified Carbon Standard (VCS) as a Reducing Emissions from Deforestation and Degradation (REDD) project and has been developed in compliance with the Verified Carbon Standard, Version 3.3 and VCS AFOLU Requirements. The project reduces emissions from unplanned frontier deforestation.

2.2 Grouped Project

This section is not applicable to the Purus Project, as it is not a grouped project.

2.3 Description of the Project Activity (G3)

The following section will further describe each major climate, community and biodiversity project activity since May 23, 2011 with a particular emphasis on the activities between January 1, 2016 and December

31, 2016 and how they are relevant to achieving the overarching climate, community and biodiversity objectives.

Major Climate Objective

To achieve the major climate objective of mitigating deforestation and the subsequent release of GHG emissions, the Project Proponents continued to address the underlying deforestation drivers to mitigate the release of GHGs and continued with ongoing monitoring.

Forest Carbon Inventory

The forest carbon inventory was conducted by the renowned local forestry company TECMAN and was overseen by both CarbonCo and the international experts at TerraCarbon. TECMAN was contracted by CarbonCo in July 2011, participated in classroom and field training provided by TerraCarbon in August 2011, and then TECMAN conducted the Purus Project's forest carbon inventory from August to November 2011.

TECMAN is an example of a local hire; TECMAN received a transfer of technical knowledge and know-how from TerraCarbon; and TECMAN's employees also received certificates of completion to demonstrate their knowledge of conducting a forest carbon inventory. TECMAN was later contracted by CarbonCo in 2013 to conduct the forest carbon inventory at two other REDD+ projects in Acre and then again in 2014 for the fourth CarbonCo REDD+ Project in Acre.

Regional Land-use and Deforestation Modeling

Similar to the need for a measurement of carbon stocks, there was a need to develop a regional land-use and deforestation model to determine a performance baseline for the Project Proponents. Such models now allow the Project Proponents to predict where (i.e., location), when, from what (i.e., drivers and agents) and how much deforestation is expected, along with where to assist with leakage mitigation and primarily where to monitor.

The Purus Project's regional land-use and deforestation modeling was conducted by Professor Flores from the Federal University of Acre and was overseen by CarbonCo and TerraCarbon.

Professor Flores was contracted by CarbonCo in October 2011 and assisted with the Purus Project's modeling from approximately August 2011 to September 2012. Professor Flores was contracted again in April 2013, February 2014, March 2015, March 2016, and February 2017 to assist with data acquisition for the Purus Project.

Professor Flores is another example of a local hire; Professor Flores received a transfer of technical knowledge and know-how from TerraCarbon; and Professor Flores also received a certificate of completion demonstrating his knowledge of deforestation modeling for a validated REDD+ project.

Address Underlying Deforestation Drivers to Mitigate Release of GHGs

While understanding the Purus Project's carbon stocks and deforestation scenario, the Project Proponents began to address the underlying deforestation drivers to mitigate the release of GHGs (See Social Projects and Programs within this section).

Addressing the underlying deforestation drivers - for example, providing agricultural extension trainings, engaging local communities and working on officially granting land title – is relevant to achieving the climate objective of reducing net GHG reductions by reducing the communities' dependence on forest resources through intensification of agricultural and livestock practices, by providing alternative income, along with providing education about the effects of deforestation and benefits of protecting forest resources.

Develop Climate Monitoring Plan and Ongoing Monitoring of Deforestation

The Project Proponents will constantly monitor deforestation by aerial surveillance using a trike, via on-the-ground monitors, as well as from the State of Acre's Landsat satellite imagery (See Social Projects and Programs within this section). This climate monitoring plan was devised between May 23, 2011 and December 31, 2012.

Developing a climate monitoring plan and monitoring deforestation have assisted the Project Proponents with achieving the climate objective. Thus, the climate monitoring plan and monitoring of deforestation result in net GHG emission reductions because such activities provide an early detection of deforestation, while enabling the Project Proponents to identify the specific drivers and agents of deforestation and to implement the appropriate actions to mitigate such deforestation and subsequent release of GHG emissions.

Major Community Objective

To generate sustainable economic opportunities and to implement local social projects for communities living in and around the Purus Project, the Project Proponents have undertaken, or began to plan for, the following project activities: Project Awareness, Meet Community, and Discuss Project; Design Social Projects and Programs for Community; Implement Social Projects and Programs for Community; Develop Community Monitoring Plan and Monitor Community Impacts.

Project Awareness, Meet Community and Discuss Project

Between May 23, 2011 and December 31, 2012, the Project Proponents visited the Purus Project together and met with the local communities in March 2011, August 2011, March 2012, and June 2012. In addition, CarbonCo hired the independent group PAV Comércio e Serviços Ltda ("PAV") to visit the communities in October 2012.

Between January 1, 2013 and December 31, 2013 the Project Proponents visited the Purus Project together and met with the local communities in March-April 2013 and August 2013. Starting around

February 2013, Kidney da Cunha Aires ("Kidney"), the local project manager, visited the communities approximately once a month for fifteen days. Overall, Kidney visited the Purus Project approximately twenty times in 2013 and once stayed at the Purus Project for approximately one consecutive month.

Between January 1, 2014 and December 31, 2014 the Project Proponents visited the Purus Project together and met with local communities in May 2014 and August 2014. Furthermore, Kidney visited the Purus Project approximately 32 times in 2014.

Between January 1, 2015 and December 31, 2015 the Project Proponents visited the Purus Project together and met with local communities in August 2015. Furthermore, Kidney visited the Purus Project approximately 22 times in 2015.

Between January 1, 2016 and December 31, 2016 the Project Proponents visited the Purus Project together in March 2016 and July 2016. Furthermore, Kidney visited the Purus Project approximately six times in 2016, including a few long visits to complete the onsite health clinic.

The communities are an essential component of the Purus Project and likewise, it has been absolutely necessary to openly and frequently discuss the Project with the communities.

Through meeting with the communities, the Project Proponents have been able to gain the communities' insights about project design and to better incorporate the communities into the Project. As a result, the community objective of generating sustainable economic opportunities and implementing social projects and programs will be best achieved with active, on-going participation and input from the local communities.

Design and Implementation of Social Projects and Programs for Community

Social projects and programs for the local communities, which not only generate sustainable economic opportunities, will also result in: less pressure on the local forests; a reduction in deforestation; mitigation of greenhouse gas emissions; and the preservation of biodiversity.

Over the Project Lifetime, Moura & Rosa would like to further design and implement the following project activities:

- Hire Project Manager;
- Forest Patrols of Deforestation;
- Training Courses for Communities and Agricultural Extension Trainings;
- Help Communities Obtain Land Rights / Delineate Family Areas;
- Social Assistance;
- Profit-Sharing of Carbon Credits;

- Reforestation Activities of Areas of Permanent Preserve near Purus River;
- Build an Office;
- Improve School and Create a School Bus Boat;
- Build a Health Center and Dental Clinic;
- Build New Houses for Families that Have Joined Project; and
- Ecotourism.

Hire Project Manager

During the initial monitoring and reporting period of May 2011 to December 2012, Moura & Rosa hired two full-time, onsite project managers from the local communities at the Purus Project. More specifically in March 2012, Moura & Rosa hired Sebastião Marques da Silva (Miguel) and Miguel's spouse Maria Souza de Moura (Socorro). In April 2012, Miguel and Socorro were officially registered as the initial full-time, onsite project managers for the Project.

Miguel and Socorro were contracted for maintenance of the Purus Project headquarters and to assist the Project Proponents during site visits. Socorro worked more on hospitality such as cooking for visitors and cleaning the headquarters' facilities. Miguel's primary role was to maintain the headquarters' security by providing a presence and protecting the local infrastructure.

Miguel and Socorro no longer wanted to participate in the Project starting March 2013, because Miguel and Socorro want to eventually move to Manoel Urbano.

José Rogério de Oliveira Sabóia ("Rogério") was hired and began living at the Project headquarters starting November 2013 to assume the responsibilities of: maintaining the facilities at the headquarters; monitoring for possible deforestation and burning; listening to the local communities and; serving as an intermediary between the communities and Moura & Rosa, in the absence of the Kidney. Rogério received the worker rights explanation letter.

Kidney da Cunha Aires ("Kidney"), who lives in Rio Branco, was contracted by Moura & Rosa under a probationary training period which was formalized in January 2013. This probationary training period began in November 2012 and Kidney received the worker rights explanation letter. Kidney's official title is "Onsite Project Manager." Kidney is responsible for onsite logistics, transportation to and from the Purus Project, communication with the local communities about the Project, assistance with the community and biodiversity monitoring plans, and monitoring for deforestation along the Purus River.

Kidney was contracted to work a revolving schedule which includes working onsite at the Purus Project for fifteen days and then returning to Rio Branco for fifteen days. Kidney visited the Purus Project once in November 2012 during an initial visit to see the Project and to meet the local communities. Kidney also visited the Purus Project twice in December 2012.

In 2013, Kidney's accomplishments included: improving relations with the local communities and engaging communities in the leakage belt; overseeing of local projects including the building of stairs, painting of houses, and offering of agricultural extension courses; and monitoring for deforestation. Kidney also organized a soccer match that included donated jerseys and donated food in November 2013.

Photos of Soccer Match (Photo Credit: Kidney da Cunha Aires)

In 2014, Kidney's accomplishments included: improving relations with the local communities and engaging communities in the leakage belt; overseeing of local projects including the installation of the phone tower, providing assistance to doctors, and planting fruit trees around the Project headquarters; monitoring for deforestation; and assisting with wildlife cameras.

Uniforms were also purchased for local staff in May 2014.

Staff Uniforms (Photo Credit: Brian McFarland)

In 2015, Kidney's accomplishments included: continuation of work to improve relations with the local communities and engaging communities in the leakage belt; overseeing of local projects including the installation of the health clinic and installation of potable water system at the Project's headquarters; and ongoing monitoring for deforestation.

In 2016, Kidney's greatest accomplishment was the completion of the onsite health clinic. In addition, Kidney continued to work with the communities and provided ongoing monitoring of deforestation during the first half of 2016.

Rogério resigned, due to personal reasons, on June 6, 2016 and Kidney resigned on July 26, 2016. Kidney still works with Moura & Rosa, but was replaced in order to seek a different approach to garner more community support. Rosanio was hired to replace Rogério on July 16, 2016. Sadly, Rosanio passed away on May 19, 2017. Moura & Rosa, as of June 2017, are looking for a replacement for Rosanio. Edicarlo Pavia do Nascimento was hired on March 1, 2017 to replace Kidney as the local project manager.

Initiate and Continue Patrols of Deforestation

Between May 2011 and December 2012, the Project Proponents designed a monitoring plan, purchased a trike for aerial monitoring, participated in training on how to fly the trike, and initiated the patrols of deforestation.

Wanderley Cesário Rosa, a Managing Director of Moura & Rosa, participated in training classes in São Paulo on how to operate a trike in April 2012. Moura & Rosa then purchased a trike in May 2012. In June 2012, the trike was delivered to Rio Branco.

Aerial monitoring of deforestation began in August 2012 with Wanderley and the instructor flying the trike over the Purus Project. In September 2012, another flight of the trike with Wanderley and the instructor took place over the Purus Project. In October 2012, Wanderley did his first solo flight of the trike but was unable to fly over the Purus Project due to inclement weather. The last trike flight of 2012 took place in November 2012.

Between January 1, 2013 and December 31, 2013, the Project Proponents continued to monitor deforestation via trike, by boat, and by satellite imagery. For example, Wanderley flew the trike over the Purus Project on January 30th, May 18th, July 6th, August 28th, and November 24th.

Wanderley's son, Leonardo Silva Cesário Rosa, was also trained on how to operate the trike in January 2013. Wanderley is still the primary operator of the trike, but Leonardo was trained as a potential back-up operator if necessary.

Between January 1, 2014 and December 31, 2014, the Project Proponents continued to monitor deforestation via plane, by boat, and by satellite imagery. Despite the trike being broken and wrong parts being delivered, Wanderley did flyovers with a rented plane over the Purus Project on September 22nd, October 8th, October 29th, November 2nd and December 13th.

Between January 1, 2015 and December 31, 2015, the Project Proponents monitored deforestation via plane, by boat, and by satellite imagery. Wanderley did flyovers with a rented plane over the Purus Project six times in 2015 on August 10th, September 3rd, October 3rd, October 20th, November 30th and December 28th.

In 2016, the trike – due to its frequent breakdowns and difficulty of obtaining replacement parts – was replaced by a drone that was purchased on May 6, 2016. More specifically, the drone is the Drone Phantom 3 Standard that has presented better results in this monitoring activity.

Purus Project's Drone (Photo Credit: Brian McFarland)

Between January 1, 2016 to December 31, 2016, the Project Proponents flew the drone ten times on June 8th, June 21st, June 22nd, June 23rd, June 24th, July 16th, July 23rd, August 16th, September 29th and November 24th.

To complement this aerial monitoring, climate impact monitoring was also informally conducted by boat and by ground. Such terrestrial monitoring by Kidney or Rogério took place approximately every two weeks.

If and when deforestation is identified, Moura & Rosa will immediately document and transfer this information to Carbon Securities and CarbonCo. Collectively, CarbonCo and Moura & Rosa will discuss the appropriate actions to undertake to counteract any reported deforestation.

The monitors write down observations in a notebook, document the community meetings, input this data into the monitoring template, and upload the document onto a shared DropBox account among the Project Proponents. The monitoring template includes:

- Name of Monitor;
- Date of Monitor;
- Communities Visited;
- Meeting Notes with Community;
- Grievances and Concerns of Community;
- Location and Date of Deforestation;
- Responsible Actor for Deforestation;
- Observations Pertaining to Deforestation;
- Biodiversity Observed; and
- Other Notes Related to the Project.

A total of eleven official monitoring templates were completed between May 23, 2011 and December 23, 2012. A total of five official monitoring templates were completed between January 1, 2013 and December 31, 2013. A total of five official monitoring templates were completed between January 1, 2014 and December 31, 2014. A total of six official monitoring templates were completed between January 1, 2015 and December 31, 2015. A total of ten official monitoring templates were completed between January 1, 2016 and December 31, 2016.

Moura & Rosa also purchased a fast boat in June 2012 which provides transportation for the Project Proponents and allows for deforestation monitoring by the Purus River.

The monitoring of deforestation will continue to help the Project Proponents achieve both the climate and community objective. Thus, monitoring will result in net GHG emission reductions because such activities will provide an early detection of deforestation, while enabling the Project Proponents to identify the specific drivers and agents of deforestation and to implement the appropriate actions to mitigate such deforestation and the subsequent release of GHG emissions.

Furthermore, the reduction in deforestation will provide diversified and alternative incomes to local communities via sharing of carbon credit revenue, and enable Moura & Rosa to implement a variety of social projects and programs (i.e., for example, to build a local health clinic).

<u>Agricultural Extension Trainings</u>

The communities in and around the Purus Project were surveyed from March 10-12, 2012 to better understand which agricultural extension training courses would be of the most interest. A total of 32 courses, ranging from rotational pasture management to organic coconuts, were offered.

Moura & Rosa then purchased these top-ten courses on March 30, 2012 from the Center for Technical Production. Equipment, such as a projector with a sound system, was purchased by Moura & Rosa in July 2012 to assist with the teaching of these courses.

Moura & Rosa's intention was to begin teaching the most desired agricultural extension trainings in order of importance starting November 2012; however, this initial timing was delayed because SENAR was not

available until 2013. It was then later determined that Adair Pereira Duarte and Mirlailson Andrade would be better equipped to provide the agricultural extension trainings.

In July 2013, courses on the production / cultivation of bananas, rural property management and the sustainable use of legumes were taught by Adair Pereira Duarte. In August 2013, courses on the sustainable management of cattle pastures and alternative system of establishing chicken coups were taught by Mirlailson Andrade.

The course on bananas focused on: the origin of bananas; the different species of bananas; proper planting, spacing, and tillage systems; identification and control of diseases; harvesting and transportation techniques; and market access. The rural property management course taught how to manage one's property and the need to plan each phase including site preparation, implementation, procurement, sales and receipts. The course on sustainable use of legumes taught how to fertilize using locally-sourced manure, humus, and compost, and how legumes are nitrogen-fixation species. The sustainable management of cattle pastures course focused on how to use the pasture without degrading the pasture, how to implement a sustainable pasture rotation system, and proper division of grazing paddocks. The course of chicken coups taught how to: raise chicks; slaughtering techniques; how to maintain a semi-confined and confined chicken coup; types of feed; treatment of diseases; and the communities that participated were built a chicken coup, and received chicks and feed.

A total of five to seven people participated in each of the trainings, including residents of the leakage belt. The results and feedback are being monitored via the Project's local project manager, as well as via the community impact monitoring plans' community surveys. Many of the teachings are currently being implemented by the local communities. For example, the family of Mr. Benedito has improved the management of their land by starting to properly prune crops and have expanded their banana plantations in lieu of cattle pastures. In addition, several chicken coups were built and hundreds of chicks, with feed, were given away to the local communities.

Photos of Chicken Coup and Chickens at Purus Project

In 2015, Moura & Rosa tried to conduct additional agricultural courses but there was no interest from the community. Therefore, these courses were not continued in 2015. A partnership with the Federal University of Acre (UFAC) was initiated on July 18, 2016 via conversations and negotiations (including with UFAC's Forestry and Agronomy Departments). This partnership will be formalized in 2017. This partnership will offer agricultural knowledge and techniques to existing communities throughout the Purus Project and Leakage Belt. For instance, Moura & Rosa intend to do several pilot projects near the Project headquarters UFAC, including with crops such as: cocoa, Brazilian nuts, açaí, banana, coffee, cashew, and passion fruit. Ideally, with the support of the UFAC's Department of Agronomy, these pilot projects will demonstrate to the local communities the feasibility of increasing their families' income.

Photo of Cacao (Credit: Wanderley Rosa)

Moura & Rosa ordered another boat (i.e., in addition to the aforementioned fast boat) in late September or early October 2012 and its construction was completed in early 2013. This particular boat was originally purchased to help increase the local communities' market access by transporting the communities' crops to Manoel Urbano, but was later given to Miguel as part of a severance package. Miguel ended up selling this large transportation boat back to Moura & Rosa. In 2016, this large transportation boat provided free transportation for the communities' crops. More specifically, this included four trips in 2016 for Mr. Benedito's bananas and trips for Mr. Ribamar's cattle.

Agricultural extension trainings and increased market access will assist the Project Proponents with continuing to achieve both the climate and community objectives of the Purus Project. These activities result in net GHG emission reductions by reducing the communities' dependence on forest resources through intensifying agriculture and livestock, while also providing the communities with alternative incomes.

<u>Help Communities Obtain Land Rights / Delineate Family Areas</u>

As previously mentioned, community members that have been living on the land and who made the land productive (e.g., by growing agriculture or raising animals) for ten years have the right to be titled to land. Moura & Rosa will voluntarily recognize whatever area is currently deforested and under productive use by each family. The minimum area to be titled to each family is one hundred hectares which is the minimum size that INCRA says a family in the State of Acre needs for a sustainable livelihood. Those communities who have deforested and put under productive use over one hundred hectares will receive the full area that has been deforested. All communities, whether they join the Purus Project or not, will be titled the land they have put under productive use.

Helping communities obtain land rights and delineating family areas will assist the Project Proponents with facilitating the communities' sustainable economic opportunities. This formal recognition of the community's land tenure and the ability of communities to access credit (i.e., due to their property collateral) will reduce GHG emissions as communities will have greater responsibility and ownership over their land.

To help the communities obtain land rights and to delineate family areas, the first step took place in 2010 when Willian Figueiredo Bittencourt from the company PLANTEC did a geo-reference of the property and also went to the Purus Project to geo-reference the communities.

During the first semester of 2012, the process continued. PLANTEC was contracted to start the process of legalizing the land for the communities. Satellite imagery was purchased twice in 2012 from Mr. Adalberto, an independent contractor to Moura & Rosa, to determine the land-use and how long settlements were cleared to define the communities' areas.

In addition, Brazilian Federal law was also reviewed by Moura & Rosa from 2010 to 2012 to determine the appropriate authorities with respect to titling local communities, what exactly needs to be done in order to title local communities, and the rights of such rural communities. The institutions INCRA, the Public Ministry, FETACRE, and Sindicato dos Trabalhadores Rurais de Manoel Urbano (STR – Manoel Urbano; in English: Rural Workers Union of Manoel Urbano) were contacted by Moura & Rosa.

During the second semester of 2012, the President of STR – Manoel Urbano visited the communities of the Purus Project to better explain the goals of the Project and clarify to the community how land tenure regularization will work.

STR – Manoel Urbano has been identified as the intermediaries to assist Moura & Rosa and the communities with titling land to the communities along with other institutions such as ITERACRE and the Climate Change Institute.

In 2013, Moura & Rosa continued to research the laws and to better understand the process of granting title to the local communities. Kidney continued to meet with the local communities to improve their trust. Moura & Rosa also reviewed the surveys and began to expedite the process of granting title to the local communities.

In 2014, Moura & Rosa met several times with STR and the local communities to fully explain the land title situation. On November 28, 2014, Moura & Rosa celebrated with Mr. José Artenizio da Silva a private gift agreement for an area of one hundred hectares. Moura & Rosa also celebrated with Mr. José Mariano Nunes Frota, on the same date of November 28, 2014, another special contract for the donation of an area of approximately one hundred hectares. Also on November 30, 2014, Moura & Rosa signed an agreement with Mr. Benedito Nunes da Silva granting the use and enjoyment of an area of twenty hectares.

A total of three families as of September 1, 2015 were in the process of receiving official land title from Moura & Rosa. As of September 1, 2015, Moura & Rosa went as far as possible to award the title to the

first three communities and now the granting of the final, official title is in the hands of INCRA and the Cartório. Moura & Rosa drafted an Agreement and signed this Agreement with the first three families. Moura & Rosa then went to INCRA and applied for a new registration number for these first three families. This registration number is known as the CCIR (acronym translates into Certificate of Registration of Rural Property) number. From there the process goes from INCRA to the Cartório where the Cartório will review everything and eventually issue all the new titles and landownership documents such as the Memorial Descritivo. Then, the landowners sign off on this final documentation from the Cartório. On December 29, 2015, Mr. Benedito Nunes da Silva was granted the public deed of donation for the twenty hectares.

Picture of Mr. Benedito Receiving Title to His Land (Credit: Wanderley Rosa)

Moura & Rosa, throughout 2016 and 2017, began working with the Public Prosecutor's Office, particularly the Environmental and Agrarian Issues Coordination Division, to help reach an understanding and grant titles to each of the remaining community members at the Purus Project. Moura & Rosa met with the division and the local communities on January 30, 2017 with a second meeting scheduled for April 28, 2017.

Social Assistance

Because there are a high volume of trees in the bed of the Purus River during the dry season, the trees cause serious harm to navigation and consequently, disrupt the flow of production and supply of coastal communities. Moura & Rosa will facilitate the removal of these trees from the Purus River as part of the Social Project. The removal of trees can only be done in September and October of each year, because that is when the Purus River is at its lowest water level and the removal of trees is the least dangerous.

In May 2012, Moura & Rosa's conversation with the fire department of Sena Madureira focused on making logistical arrangements (i.e., what needs to be provided from Moura & Rosa such as housing and transportation) and tentative scheduling. Moura & Rosa were then put on a waiting list and were pre-scheduled for September 2013.

However, the removal of the trees was not in completed in 2013 because Moura & Rosa lacked the financial resources to provide assistance to the fire department. Instead, social assistance during 2013 included giving gasoline to the local communities in June 2013, donating food to the local communities in June 2013, painting the houses of local communities, and building stairs in July-August 2013 for Mr. Benedito's family to provide easier access to the Purus River.

Stairs Built at Purus Project for Mr. Benedito (Photo Credit: Brian McFarland)

Moura & Rosa were unable to contract the fire department of Sena Madureira in 2014 because it was an election year in Acre. However, Moura & Rosa provided social assistance by sponsoring a children's day celebration (organizing a football tournament and barbeque, and distributing medicine) and by delivering presents for Christmas.

Moura & Rosa will attempt to contract the fire department of Sena Madureira and DERACRE (Departamento de Estradas e Rodagem, Infraestrutura Hidroviária e Aeroportuária do Acre or the Department of Highways, Waterways Infrastructure, and Airport of Acre) in 2015.

In 2015, soccer balls and clothes were donated in August 2015 by Carbon Securities and CarbonCo. In addition, Moura & Rosa delivered some food baskets throughout 2015.

In 2016, the main social assistance was health services. For instance, a dentist visited the Purus Project on July 2nd and 3rd, 2016 and attended to 14 people from the community. This visit included removing teeth, cleanings, and teaching oral hygiene. In addition, a nurse also visited the communities to distribute de-worming medicine, vitamins, and chlorine. The nurse taught proper water care for drinking and cooking.

In 2017, Moura & Rosa intends to initiate the procedure with the Fire Department and with DERACRE, because of their specialized personnel and equipment, to assist with the removal of trees from the Purus River. Assuming financial resources are available and the schedule availability, this will be done in 2017. In addition, the Purus Project's partnership with UFAC will see additional social assistance related to medicine and agriculture.

Social assistance is relevant to achieving the community objective of the Purus Project because social assistance is one of the main social programs that Moura & Rosa seek to establish. Furthermore, removing trees from the bed of the Purus River will increase the communities' market access due to better transportation on the Purus River and this should increase the incomes of the local communities.

Profit-Sharing of Carbon Credits

Moura & Rosa will participate in profit-sharing of carbon credits with the local communities.

The Purus Project was validated to the VCS and CCB with Gold Distinction in January 2013 and the Project was successfully verified to the VCS and CCB with Gold Distinction in December 2013, October 2014, November 2015 and November 2016 which are very important milestones towards the profit-sharing of carbon credits.

In 2015 and 2016, all three Project Proponents donated a portion of their proceeds from the Purus Project to the Chico Mendes Foundation. The Chico Mendes Foundation is an informal advisor to the Project and per the Tri-Party Agreement, the Project Proponents will donate on an annual basis a portion of the proceeds to the Foundation. This donation will assist the Chico Mendes Foundation with its operating expenses, continuing environmental education, and with its maintenance of the Chico Mendes Museum in Xapuri.

In 2016, Moura & Rosa intended to donate a portion of their proceeds from the Purus Project to the local communities who joined the Purus Project and helped stop deforestation. However, no communities fulfilled all of the criteria – such as completely stopping deforestation – to receive a portion of the proceeds. This donation of proceeds will be re-examined in 2017.

Carbon revenue will primarily enable Moura & Rosa to implement social projects and programs, while the small portion of revenue shared with the communities will contribute both to slightly increased and diversified income for communities. For example, carbon revenue received by Moura & Rosa will primarily be used to construct and operate the health clinic, purchase and maintenance of the fast boat and drone, maintaining the headquarters, and paying the local project managers. In contrast, communities who join the Purus Project and have regularized their lands, along with foregoing the use of fire and not deforesting will be eligible for a share of the revenue earned by Moura & Rosa.

Build an Office

Moura & Rosa built an office at the Purus Project to serve as the Project's headquarters. The headquarters' initial construction began in May 2012. The contractor hired by Moura & Rosa worked in May and June 2012 to install a toilet, shower, kitchen, and a Purus Project sign at the headquarters.

The Purus Project Headquarters (Photo Credit: Brian McFarland)

In 2013, the kitchen was expanded, the connections for the bathroom and septic tank were completed, and a chicken coup was built. Moura & Rosa also purchased a phone tower for the Project headquarters in November 2012 to enable cellular phone communication, purchased and treated the wood in 2013.

In May 2014, the phone tower was installed.

Installation of Phone Tower (Photo Credit: Brian McFarland)

Agroforestry crops, including bananas and coconuts, were planted around the Project headquarters in 2014.

Agroforestry Crops Around Project Headquarters (Photo Credit: Brian McFarland)

Throughout 2014, Kidney encouraged the local community to start using the phone tower. Also in August 2014, a TV and DVD player were installed at the Project headquarters.

In 2015, the local onsite health clinic was constructed at the Project headquarters. In addition to the health clinic, Moura & Rosa also installed a potable water system at the headquarters and planted corn around the headquarters in 2015.

In 2016, the onsite health clinic was completed at the headquarters. In addition, the area initially planned at the headquarters for agroforestry has been increased to implement the pilot projects of the crops (e.g., açaí, cacao, and oranges) that will be shown to the local community and will be implemented with the support and guidance of the Faculty of Agronomy at the UFAC. This UFAC partnership was initiated in July 2016.

Furthermore, the headquarters was maintained throughout 2013, 2014, 2015, and 2016.

Building an office contributes to the community objective because the office serves as a centralized headquarters and facilitates Moura & Rosa's social projects and programs.

Improve School and Create a School Bus Boat

In the future, Moura & Rosa will build a local primary school, with separate rooms for each grade. The establishment of a library will emphasize environmental studies and a cafeteria for students will also support the development of students. This school will aim at a differentiated learning, including field courses, digital inclusion, and programs for medical and dental care.

Building a local primary school is a longer-term project activity. There used to be no school bus boat for the school on the Purus Project; however, Moura & Rosa were able to secure one school bus boat for the school. While Normando Sales was getting letters of support, Normando presented the Purus Project to the then-mayor of Manoel Urbano. At that time, the mayor said he would help Normando to acquire a bus boat for the school located within the Purus Project. This school bus boat was delivered during the second semester of 2012, around June 2012.

Example of School Bus Boat (Photo Credit: Soudaquimanga)[5]

[5] Soudaquimanga, "Barco Escolar," Available: http://soudaquimanga.wordpress.com/2011/11/20/barco-escolar-mais-uma-novidade-para-subsidiar-a-educacao-publica-de-manga/

This school bus boat frequently broke because the boat was too large for the Purus River and often ran aground. A smaller, lighter school bus boat was acquired in late 2013.

The school bus boat was operational throughout 2014. Moura & Rosa donated another engine for the school bus boat, and also donated a box of books and a blackboard to the local school.

It is important to note that there are a few schools within the Project Zone of the Purus Project. The school bus boat and the donated school supplies were given to Mr. Ribamar Sabóia who does transportation for the Municipal School Antônio Sabóia. One of the other schools, known as the Municipal School Francisco Soares Moreira, is directed by Professor Sales, a son of Mr. Antonio Guita, and Professor Sales does not want anything from the Purus Project. Despite this objection, the Project Proponents donated soccer balls and clothes to the Municipal School Francisco Soares Moreira in August 2015.

Moura & Rosa intended to focus on education in 2016. For example, Moura & Rosa wanted to build a soccer (i.e. football) field for the children near the headquarters because it was believed this would help improve social cohesion and community bonds. In addition, Moura & Rosa wanted to offer films and educational videos about environmental protection via the television and DVD player that was installed at the headquarters. However, Moura & Rosa decided to focus on finishing the health center at the headquarters. Educational opportunities will be re-examined in 2017 in collaboration with UFAC.

Improving the local school and securing school bus boats is relevant to the community objective because this is one of the main social projects that Moura & Rosa would like to facilitate. Many people move to cities in search of better schools; instead, children can remain with their families in rural areas and will be able to obtain a better education. Trade between families might increase due to more community cohesion. Furthermore, the local school will eventually offer employment opportunities.

<u>Build a Health Center and Dental Clinic</u>

There are two different health and dental programs. There is an “Itinerant Health” program where the State of Acre, in conjunction with the Purus Project, brings doctors and nurses from Rio Branco to the Purus Project headquarters, which serves as a temporary health center. The second program is a permanent health and dental clinic.

The original target date for completion of the health clinic was May 2015, but Acre experienced severe flooding in early 2015. Instead, construction of the health clinic began in May 2015. Roofing and the external walls were finished in December 2015. Construction of the internal dividing walls, flooring, and bathrooms began in March 2016 and was fully completed by mid-July 2016.

The “Itinerant Health” was held in December 2014. A total of approximately 180 local community members attended this first Itinerant Health program. These local community members came from within the Purus Project Area and its leakage belt areas. Basic check-ups were given to everyone that attended the “Itinerant Health” program in December 2014. However, women and children were in the most need of medical assistance and there was a specific need for a gynecologist and a pediatrician.

Inside the Purus Project's Headquarters Where Doctors and Nurses Interviewed Patients and a Temporary Hospital Bed was Constructed to Examine Patients

Doctors Interviewing Adults about their Medical History and
About any Symptoms they were Experiencing at the Time

Picture in Front of Purus Project Headquarters.
Food and Drinks were Provided to Community Members

Another Picture of the Front of the Purus Project Headquarters. Medical Supplies, such as Bandages, Gauze and Medicines, were Provided Free of Charge to Local Community Members.

Due to the State of Acre's lack of financial resources, the ""Itinerant Health" program was not conducted in 2016.

The constructed health clinic will be a "socio-cultural space" which will serve to carry out various activities. In addition to providing medical and dental care, Moura & Rosa intend to have the health clinic provide a space for training courses along with socio-cultural events and recreational activities such as movies, community interest lectures, weddings, baptisms, and community gatherings.

Construction of Health Clinic (Photo Credit: Brian McFarland)

In 2016, the health clinic was completed. The facility was used, amongst many things, for a visit by Dr. Valdo Aires, a dentist, who treated 14 people on July 2nd and 3rd, 2016. This visit included removing teeth, cleanings, and teaching oral hygiene. In addition, a nurse also visited the communities to distribute de-worming medicine, vitamins, and chlorine. The nurse taught proper water care for drinking and cooking. Additional health courses will be taught in 2017 in collaboration with the Faculty of Medicine of UFAC.

Completed Health Center (Photo Credit: Brian McFarland)

The health center and dental clinic is also relevant to the community objective because this is another main social project that Moura & Rosa would like to facilitate. The clinics will ultimately improve health, life quality, and increase life expectancies which will result in more productive community members.

Develop Community Monitoring Plan and Monitor Community Impacts

The community monitoring plan essentially helps the Project Proponents better understand if the social projects and programs for the communities are able to generate sustainable economic opportunities and overall positive outputs, outcomes and impacts. The initial and full community monitoring plans were designed between May 2011 and December 2012 and the full community monitoring plan was publicly posted on May 15, 2013.

Major Biodiversity Objective

To preserve the Project's rich biodiversity, the Project Proponents will generate sustainable economic opportunities for the local communities and implement local social projects with the goal of addressing the underlying causes of deforestation and reducing the release of GHGs. In addition, the Project Proponents will rapidly assess biodiversity on the Project and develop a biodiversity monitoring plan.

Rapidly Assess Biodiversity on Project

A rapid assessment was conducted in August and September 2009 of the Project's biodiversity. This rapid assessment of biodiversity contributes to the objective of preserving the Project's rich biodiversity by providing an understanding of what flora and fauna exist within the Project.

Develop Biodiversity Monitoring Plan and Monitor Biodiversity Impacts

The biodiversity monitoring plan essentially helps the Project Proponents better understand if the climate and community objectives are aligned with preserving the Project's rich biodiversity.

The initial and full biodiversity monitoring plans were designed between May 2011 and December 2012 and the full biodiversity monitoring plan was publicly posted to the CCBS on May 15, 2013.

André Luis Botelho de Moura was contracted in May 2013, 12 Bushnell Trophy Cam High Definition with Security Package wildlife cameras were purchased in May 2013, and then the wildlife cameras were deployed to the Purus Project from June 2013 to May 2014.

André developed a Standard Operating Procedure and trained Kidney da Cunha Aires in June 2013 on proper camera installation and how to conduct preventative maintenance.

Wildlife Camera Training at Purus Project (Photo Credit: André Luis Botelho de Moura)

The first period, consisting of 90 camera days, was from June to September 2013. The cameras were then removed from the Purus Project, placed into a dehumidifier, the photographs were analyzed, and the cameras were redeployed to the Purus Project from December 2013 to May 2014.

André Luis Botelho de Moura is another example of a local hire. It is also important to note that André Luis Botelho de Moura was also hired by CarbonCo from 2014 to 2015 to assist with a similar wildlife camera study at two other REDD+ projects in Acre.

In 2016 and 2017, the Project Proponents began to map out the next wildlife camera study which will take place in 2018 at the Purus Project. This included analyzing new camera models, preparing to assess which of the previously purchased cameras are salvageable, and reaching out to potential stakeholders.

2.4 Management of Risks to Project Benefits (G3)

Between May 2011 and December 2012, the Project Proponents conducted an extensive risk analysis and identified the potential natural, anthropogenic and project risks to the climate, community and biodiversity benefits of the Purus Project.

Between January 1, 2013 and December 31, 2016, the Project Proponents reviewed these potential natural, anthropogenic and project risks to the climate, community and biodiversity benefits of the Purus

Project. The overall risks associated with the Purus Project are considered low and justified a low Verified Carbon Standard buffer reserve established for any verified emission reductions.

Natural Risks

Although no natural risks are known to have significantly impacted the Purus Project between May 2011 and December 2016, the following are some potential future natural risks that could impact the Purus Project:

- Seedling, sapling and tree survival;
- Drought and flooding;
- Severe weather;
- Forest fire; and
- Disease, invasive species, and pest infestations.

Due to the fact that the Purus Project is primarily a conservation project, there is limited risk of seedling, sapling and tree survival because reforestation is not the major climate objective. While there will be some reforestation activities, the carbon sequestration of these activities will not be counted towards the generation of verified emission reductions.

With respect to drought and flooding, the Purus River basin is a wetland ecosystem where the native habitat thrives under periodically flooded conditions. Being a tropical climate, the Purus Project is not prone to snowstorms and there are no volcanoes in the general vicinity. Furthermore, the State of Acre historically has not experienced hurricanes, monsoons, or tornadoes with only minimal effects from Chilean earthquakes.[6]

Another risk to the Purus Project is a forest fire. Forest fire historically has not been a problem in the Project Area. Most of the Project Area is un-fragmented forest, with few areas of bordering pasture/non-forest. Most forest fires that occur in the region are anthropogenic, and thus sources of fire outbreaks in the Project Area are limited. No forest fires were identified during the trike flights, rented plane flyovers, or via the drone.

Incidence of fire in the Amazon has increased with recent severe droughts of 1998, 2005 and 2010, all of which preceded the Purus Project's validation date and informed the risk assessment. While drought conditions facilitate forest fire, fire still requires sufficient fuel loads (typically produced from previous disturbance) and an ignition source, both of which can reasonably be assumed to be less (and by extension, fire incidence should be less) in the large, intact block of forest at the Purus Project (and maintained through project-funded protection activities) than in the surrounding land use matrix. Aragao and Shimbukuro (2010) show that the state of Acre, which has large blocks of intact forest, has no observed increase in fire incidence from 1998 to 2006, as compared with more developed and impacted

[6] Center for Weather Prediction and Climate Studies, "Home," Available: http://www1.cptec.inpe.br/
National Observatory, "Seismic Data," mhttp://www.on.br/conteudo/modelo.php?endereco=servicos/servicos.html

areas of the Eastern and Central Amazon (e.g. Para, Mato Grosso, Rondonia and Maranhao).[7] Consequently, the rates of fire incidence referenced in the Purus Project's VCS risk report (Cochrane and Laurance 2002), based on data from Para state, should be considered overestimates of expected incidence in Acre, and therefore conservative.

Aragao and Shimbukuro (2010) further observe that "fire-free land-management can substantially reduce fire incidence by as much as 69%." The state of Acre, as part of its State System of Incentives for Environmental Services (SISA), has instituted state-wide fire control and monitoring activities since 2010, and should be expected to show results similar to those areas of fire-free land-management witnessed (between 1998 and 2006) by Aragao and Shimbukuro. The Purus Project Area should be expected to benefit in terms of reduced fire risk from decreased fire incidence and proximal ignition sources in the surrounding land use matrix.

The original validated severity score for forest fire (Minor; < 25% loss of carbon stocks) is consistent with expected severity with increased incidence of droughts (and likely conservative). A severe burn (subsequent to initial lighter burns) can result in up to 40% mortality of stems. Assuming this represents ~40% of aboveground biomass (often mortality will be mostly in smaller, less resilient stems), equivalent to ~33% reduction of total above- and belowground biomass (assuming an average belowground component equal to 20% of aboveground biomass), a 25% loss of project carbon stocks would require a severe burn on ~3/4 of the entire project area (26,289 ha = 34,702 ha * 0.25 * (1/0.33)). A fire covering this extent of the project area would be highly unlikely – not only would it be an exceptionally large area for a single burn, but it would have to cross the Purus River to affect 26,289 hectares of the Project Area.

Furthermore in a study[8] of fires in the Amazon, Cochrane and Laurance documented a relationship between fire incidence and distance from forest edge, with decreasing fire return intervals with increasing distance from edge.

They also found that effects of forest fires depend on the extent and condition of fuel sources. In general, drought conditions need to be present prior to the initiation of rainforest fires. While initial fires can have a significant effect on the smaller diameter (<40 cm dbh) trees, it is only with subsequent burns, that significant losses (mortality of up to 40% of trees) of forest biomass can be expected.[9] Despite fire induced tree mortality, tree mortality itself is unlikely to result in the loss of substantial biomass due to incomplete combustion of live aboveground biomass. Biomass is merely transferred from the live biomass to dead biomass pool, which is also accounted for in this project.

Further as fire is unlikely to affect the whole Project Area, the significance of any single fire event is likely to be minor and result in less than 25% loss in carbon stocks in the project area.

---

[7] Luiz E. O. C. Aragão and Yosio E. Shimabukuro, "The Incidence of Fire in Amazonian Forests with Implications for REDD." *Science* 328, 1275 (2010); DOI: 10.1126/science.1186925

[8] Cochrane M.A.& Laurance W.F., 2002. Fire as a large-scale edge effect in Amazonian forests, Journal Of Tropical Ecology, 18:311-325.

[9] Cochrane M.A., Alencar A., Schulze M.D., Souza C.M., Nepstad D.C., Lefebvre P. & Davidson E.A., 1999. Positive feedbacks in the fire dynamic of closed canopy tropical forests, Science, 284(5421):1832-1835.
Cochrane M.A.& Schulze M.D., 1999. Fire as a recurrent event in tropical forests of the eastern Amazon: Effects on forest structure, biomass, and species composition, Biotropica, 31(1):2-16.

The Cochrane and Laurance study[10] mentioned above, calculated a fire return intervals in another part of the Amazon as 10 to 15 years. While the agents of deforestation (and fire) are similar between region of the study (Para) and the project region (Acre), deforestation rates and likely incidences of fire are greater in Para. This fire return interval therefore is likely to represent a conservative estimate of the fire return interval in the project region with the actual interval likely being longer than 15 years.

It is also important to note that the State of Acre has some of the highest precipitation levels in the world with annual rainfall ranges from 1,600 – 2,750 millimeters (i.e., approximately 63 – 108 inches).[11]

With regard to disease, invasive species and insect infestation, Brazil's Department of the Environment has approved a permanent technical committee known as the National Biodiversity Commission (CONABIO) which carefully monitors these developments.[12] The Project Proponents will carefully monitor any invasive species known to exist in Acre and will not extract any known species from the Project that are considered native species but which are invasive species elsewhere. For more information on the risk of invasive species, please see the VCS Appendix A Non-Permanence Risk Report. The Project Proponents have not identified any invasive species at the Purus Project and the wildlife camera traps, according to the local biologist André Luis Botelho de Moura, did not photograph any invasive species in 2013 or 2014.

Anthropogenic Risks

Although no anthropogenic risks are known to have significantly impacted the Purus Project between May 2011 and December 2016, the following are some potential future anthropogenic risks that could impact the Purus Project:

- Illegal logging;
- Illegal hunting of endangered fauna;
- Illegal collection of endangered flora; and
- Expansion of Ramal, located to the Northeast of the Project, expanding into Project Area.

The Project Proponents will regularly monitor the climate, community and biodiversity objectives of the Project and thus, will be able to identify early on if there are illegal logging or hunting activities taking place. Furthermore to participate in the benefits of the Purus Project, the communities have agreed to stop using fire as a means of clearing forest.

There is a ramal (i.e., a small, seasonal road) that is approaching the Project Area from the Northeast. This ramal was originally constructed for the Liberdade INCRA settlement and families are allowed to move to the INCRA settlement on condition that the families put the land into productive use (i.e., deforest the land for agriculture and/or livestock). Expansion of this ramal and encroaching settlements pose a

[10] Cochrane M.A.& Laurance W.F., 2002. Fire as a large-scale edge effect in Amazonian forests, Journal of Tropical Ecology, 18:311-325.
[11] State Government of Acre Portal, "Geographic Data,"
[12] National Biodiversity Commission, "Technical Committee," Available: http://www.mma.gov.br/sitio/index.php?ido=conteudo.monta&idEstrutura=15&idConteudo=7474&idMenu=368

risk to the Project Area because deforestation could increase. To mitigate this risk, Kidney da Cunha Aires, Normando Sales and Paulo Silva Cesário Rosa have all visited the ramal. In the past, there was monitoring of the ramal via fly-overs with the trike or via a rented plane. Going forward, this monitoring of the ramal will now take place via the drone and via annual review of satellite imagery.

In 2015, Moura & Rosa rented a motorcycle to improve access to the communities living at the end of the ramal to regularly discuss the Project with the communities. Moura & Rosa took GPS points on the border of the Project Area to make sure encroachment are not taking place. If encroachment into the Purus Project is confirmed, Moura & Rosa will install a sign explaining the Project. Moura & Rosa will continue to visit the communities to explain the benefits offered by the Project and the goal of conserving the forest. If necessary, Moura & Rosa will also build a fence and small headquarters where the Ramal approaches the Purus Project. In 2016, Moura & Rosa used a drone to monitor for encroachment.

Project Risks

Although no project risks are known to have significantly impacted the Purus Project between May 2011 and December 2016, the following are a few of the potential future project risks identified by the Project Proponents:

- Communities with greater than one hundred hectares see reduction in land.
- A fixed plot of land per family is given, but an increasing family population results in less land per capita.
- As incomes increase, the use of illicit drugs, alcoholism and violence might increase.
- "An influx of relatively large cash sums in areas with weak governance or where local organizations lack appropriate systems runs the risks of mismanagement, corruption, and 'elite capture."[13]
- "Increased land speculation or in-migration, thus creating conditions for increased competition and social conflict within and between communities."[14]
- Restriction of cattle, results in lower wages, less assets and lower food security; similarly, crops could be less profitable than cattle.
- Contractors might not be effective at providing agricultural extension to communities.
- If many communities throughout the Project Area start producing the same crop, the price might fall due to supply-demand mismatch; similarly, the price of carbon could fall.
- Project Proponents build new school, but children do not go; similarly, health and dental clinic gets established, but no staff nor medicine available.

To address these aforementioned risks, the Project Proponents originally met in March 2012 to develop mitigation plans and periodically review the Project's risks.

[13] Richards, M. 2011. Social and Biodiversity Impact Assessment (SBIA) Manual for REDD+ Projects: Part 2 – Social Impact Assessment Toolbox. Climate, Community & Biodiversity Alliance and Forest Trends with Rainforest Alliance and Fauna & Flora International. Washington, DC. Page 6.
[14] Richards, M. 2011. Social and Biodiversity Impact Assessment (SBIA) Manual for REDD+ Projects: Part 2 – Social Impact Assessment Toolbox. Climate, Community & Biodiversity Alliance and Forest Trends with Rainforest Alliance and Fauna & Flora International. Washington, DC. Page 6.

As previously discussed, community members that have been living on the land and who made the land productive (e.g., by growing agriculture or raising animals) for ten years, have the right to be titled. Moura & Rosa will voluntarily recognize whatever area is currently deforested and under productive use by each family. The minimum area to be titled to each family is one hundred hectares which is the minimum size that INCRA says a family in the State of Acre needs for a sustainable livelihood. Those communities who have deforested and put under productive use over one hundred hectares will receive the full area that has been deforested. All communities, whether they join the Purus Project or not, will be titled the land they have put under productive use. This process will be facilitated by an independent group, which in 2016-2017 was the Public Prosecution Office of the State of Acre. Thus, this titling of land to local communities should prevent conflicts over local landownership because communities will receive at least the full amount of area recommended by INCRA and those communities with over 100 hectares will not see a reduction in their land.

In addition, the one hundred hectares is a relatively large parcel of land for a community and combined with improved agricultural techniques, this size of land should be sufficient to take care of the families for the lifetime of the Project. Furthermore, job creation should allow for less dependency on the land.

The design of the Project's health clinic will educate the communities about the social problems surrounding illicit drugs, alcoholism and family violence. If worse comes to worse, there are federal and civil police who will take care of illicit drug use and violence.

To minimize corruption and 'elite capture,' the first rule acknowledged by Moura & Rosa is to treat everyone fairly and equally. For example, a minimum of one hundred hectares will be given to everyone. In addition, everyone was given an equal opportunity to choose agricultural classes and all benefits (e.g., access to health clinic and school) will be offered to everyone. The Basic Necessities Survey, which was initially designed and implemented in March 2012 and then implemented again in 2014 and 2016, will also monitor the distribution of assets, inequality and poverty.

Agricultural training courses were offered, and will continue to be offered, to surrounding communities as one method to counteract potential in-migration. Some of the Project's benefits (for example, access to health clinic) will be offered to surrounding communities. Ultimately, the Purus Project is privately-owned land and in-migration is not allowed. The deforestation monitoring plan will ensure the rapid identification and resolution of in-migration.

Carbon finance will ideally supplement the reduction in income that may result from fewer cattle. Agricultural trainings will also help diversify crops and increase food security. One course of interest among the communities is rotational pasture management which would allow for cattle using less land. Protein can also be supplemented via chicken, fish and pigs. Ultimately, the goal is to not increase the overall number of cattle expanding into primary forest.

The contractors hired by the Purus Project, including the faculty from UFAC, and the classes from the Center for Technical Production are leading institutions and are experts at providing agricultural extension trainings and researching cutting-edge sustainable agriculture and pasture management. Thus, the risk of their efforts failing is minimal.

The overall crop production among communities is relatively small and should not create a downward pressure on prices of a given crop throughout the Project Zone. Diversity of crop production should act as an insurance mechanism against the price drop of a given crop. If carbon prices fall, the Project Proponents will seek alternative sources of funding to continue the Project and compliment the then-reduced funding from carbon finance.

Brazilian law requires children to go to school and Moura & Rosa will make the school a very good environment for children; thus, increasing their desire to attend school. This improvement includes division of classrooms for different grades. Moura & Rosa have also established the physical infrastructure for the health and dental clinic, while the government is now responsible for staffing the facilities. If for some reason the clinic is unable to be staffed or sourced with medicine by the government, Moura & Rosa will assume this responsibility.

Describe Measures to Maintain and Enhance the Benefits beyond the Project Lifetime

There are a variety of measures, both in place and planned, to ensure the Purus Project's climate, community and biodiversity benefits are maintained and enhanced beyond the Project Lifetime. This includes:

- The Tri-Party Agreement's Longevity;
- Creation of Moura e Rosa Empreendimentos Imobiliários LTDA;
- Social Projects; and
- Education and Outreach.

<u>Tri-Party Agreement's Longevity</u>

The Tri-Party Agreement between Carbonfund.org, Carbon Securities and Moura & Rosa stipulates a minimum 60-year Project Lifetime, followed by two renewable terms of 25-years each. Within these contractual time periods, the initial Project Crediting Period will be for 30-years which started on May 23, 2011 and ends on May 22, 2041. The Project Proponents are committed to maintaining forest cover within the Purus Project beyond both the Project Crediting Period and the initial Project Lifetime. This Tri-Party Agreement was signed on March 17, 2011.

Furthermore in 2013, the Project and its PDDs (both VCS and CCBS) were submitted to the State of Acre's Climate Change Institute (IMC in Portuguese) and was officially pre-registered with the IMC in 2014. According to new guidelines issued by IMC, the Purus Project will re-pre-register with IMC in 2017.

<u>Creation of Moura e Rosa Empreendimentos Imobiliários LTDA</u>

Normando Sales and Wanderley Rosa created the legal entity Moura & Rosa on February 27, 2009 to specifically ensure the Purus Project is managed beyond their lifetime by their children, particularly Felipe Moura Sales and Paulo Silva Cesário Rosa. The company has been active ever since its creation, including throughout 2013 to 2017.

Social Projects

The social projects are designed to provide long-lasting climate, community and biodiversity benefits beyond the Project Lifetime. Such social projects throughout 2013 include offering agricultural extension training courses throughout the Project Zone and working towards granting official land title to local communities. Social projects throughout 2014 include facilitating doctor visits, installing a phone tower, and submitting Agreements to INCRA and the Cartório in order for land titles to be granted to the first three local communities. Social projects throughout 2015 included building a local, onsite health clinic, along with donating soccer balls, clothes, and food baskets to local communities. In 2016, the health clinic was completed.

Education and Outreach

There are a variety of education and outreach activities which will both maintain and enhance the climate, community and biodiversity benefits beyond the Project Lifetime. In addition, it is the Project Proponents' hope that such benefits will not only extend temporally (i.e., beyond the Project Lifetime), but also in a spatial manner (i.e., beyond Project Zone, across State of Acre, across the country of Brazil and internationally).

For example, two additional REDD+ projects in Acre known as the Valparaiso Project and the Russas Project underwent validation in 2013 as a result of the Purus Project. The Russas and Valparaiso Projects were verified in 2014. In addition, another REDD+ project in the State of Acre by CarbonCo and Carbon Securities, known as the Envira Amazonia Project, underwent validation in 2014. In 2015, the Envira Amazonia Project achieved validation and then later in 2016, the Envira Amazonia Project achieved verification.

In addition, agricultural extension courses will provide benefits to local communities beyond the Project Lifetime. Although agricultural courses were not offered in 2015, Moura & Rosa are developing partnerships with UFAC in 2016 through which knowledge, new techniques of work, research, etc., will be brought to the Purus Project via small pilot projects between university staff (i.e., students and teachers) and local communities. This collaboration will ideally lead to improvements in the communities by teaching them cultivation techniques of fruits and vegetables, implementation of septic tanks, construction of semi-artesian wells for drinking water, and better forms of personal hygiene and hygiene for children (e.g., washing hands).

Furthermore, Carbonfund.org and its subsidiary CarbonCo are both climate change organizations and regularly educate the public about climate change and the vital role of forest conservation projects through blog postings, newsletters, presentations, and during outreach discussions with partners. For example, the Project Proponents presented the Purus Project at the United Nations Conference on Sustainable Development Rio+20 Conference in Rio de Janeiro, Brazil in June 2012. Brian McFarland of CarbonCo presented at numerous industry events from 2013 to 2016, which included highlighting the Purus Project.

2.5 Measures to Maintain High Conservation Values (G3)

The Purus Project has several qualifying attributes of High Conservation Values and this includes threatened species, threatened or rare ecosystems, critical ecosystem services, and a direct importance to the local communities living within the Project.

The Purus Project, with a primary objective of mitigating deforestation, has at the very least maintained – if not enhanced – these High Conservation Value attributes. Although "only" a rapid biodiversity assessment and an initial wildlife camera trap study was conducted at the Purus Project, the Project Proponents are acting in accordance with the precautionary principal because despite the lack of a robust longitudinal biodiversity study, the Project still has a core objective of preserving the Project's rich biodiversity and particularly the High Conservation Value (HCV) attributes. The precautionary principal – as defined in the Preamble to the Convention on Biological Diversity – is "that where there is a threat of significant reduction or loss of biological diversity, lack of full scientific certainty should not be used as a reason for postponing measures to avoid or minimize such a threat."[15]

Specific measures to ensure the maintenance or enhancement of HCV attributes include the integration of HCVs into the Purus Project, along with training programs and monitoring plans which incorporate HCVs.[16] For example, the Purus Project proponents have:

- Integrated HCVs into the Purus Project's main objectives. This includes preserving the Project's biodiversity and mitigating deforestation despite limited understanding of the Project's threatened and rare species, along with endemic species.

- Trained Kidney, the former local project manager, to assist with monitoring biodiversity with wildlife camera traps. This training took place in June 2013. In addition, the Project Proponents will focus additional conservation measures in areas where threatened and/or endemic species are identified.

- Monitored deforestation and community impacts and undertaken actions to mitigate deforestation of the Project's threatened and rare ecosystems.

By maintaining forest cover and mitigating deforestation, this will facilitate water cycling, filtration and storage along with oxygen production. In addition, maintaining forest cover will maintain habitat for biodiversity and promote wildlife activities such as pollination.

2.6 Project Financing (G3 & G4)

Carbonfund.org Foundation has funded 70+ carbon reduction and tree-planting projects including the co-development and co-financing of several forest carbon projects. Thus, Carbonfund.org's wholly-owned subsidiary CarbonCo is well aware of the financial mechanisms required for successful project

[15] Convention on Biological Diversity, "Preamble," Available: http://www.cbd.int/convention/articles/?a=cbd-00
[16] HCV Resource Network, "Part 3: Identifying and managing High Conservation Values Forests, a guide for forest managers," Available: http://www.hcvnetwork.org/resources/global-hcv-toolkits/hcvf-toolkit-part-3.pdf

implementation. A detailed pro forma for the Project's minimum 30-year crediting period was also developed. Furthermore, Carbonfund.org's Internal Revenue Service Form 990 – which demonstrates the organization's financial health - is publicly available. The primary source of financing for the Purus Project will come from Carbonfund.org's existing unrestricted funding, potential in-kind donations and grants, along with sales of verified carbon units (VCUs).

Document the Financial Health of the Implementing Organization(s)

Carbonfund.org provided financial resources to its wholly-owned subsidiary CarbonCo to implement REDD+ projects and particularly the Purus Project.

Carbonfund.org's independently audited IRS Form 990s are publicly available and document Carbonfund.org's financial health. See here for access to Carbonfund.org's 2009 to 2015 IRS Form 990s. Carbonfund.org's 2016 IRS Form 990 will be posted as soon as it is completed. In the meantime, the Public Inspection Copy of Carbonfund.org's 2016 IRS Form 990 was presented to ESI, the validation and verification firm. See here for Carbonfund.org's website and see here for CarbonCo's website.

Furthermore, contractual agreements outlining the financial arrangement between the Project Proponents, along with detailed pro forma, were provided to the Project's independent validation and verification firms.

2.7 Employment Opportunities and Worker Safety (G4)

The Purus Project Proponents provided orientation and training for the Project's employees and relevant community members. Since May 23, 2011 and particularly between January 2016 and December 2016, orientation and trainings included:

- Normando and Wanderley met with the local communities for over five years to provide orientation to the Purus Project and conservation activities.
- CarbonCo, Carbon Securities and TerraCarbon had a kick-off meeting and orientation in August 2011 with Moura & Rosa, TECMAN, and Professor Flores prior to initiating the forest carbon inventory and regional deforestation modelling.
- TerraCarbon provided both classroom and field training, along with a Standard Operating Procedure (i.e., in Portuguese and English) for TECMAN's forest carbon inventory.
- CarbonCo, Carbon Securities and Moura & Rosa met with Dr. Armando Muniz Calouro (Biology Professor at UFAC) to discuss his ability, or his graduate students' ability, to offer trainings to the local community on the Project's biodiversity monitoring plan.
- Wanderley was trained and licensed in April 2012 by the organization Aeroclub de Campinas on how to operate/pilot a trike. Wanderley's son, Leonardo Silva Cesário Rosa, was also trained on how to operate the trike in January 2013.

- PAV provided additional orientation to the community about the Purus Project throughout October 2012.

- Kidney, the local Project Manager, was trained about the Project during three trips to the Purus Project from October through December 2012 to discuss what happens if deforestation is identified, the goals of the Project, to show Kidney the headquarters, and to explain the needs of the community, etc.

- Kidney was trained by André Luis Botelho de Moura on the proper setup of the wildlife cameras and preventative maintenance of the cameras.

- CarbonCo trained Carbon Securities and Moura & Rosa in 2013 on the use of the Markit Environmental Registry.

- Agricultural training courses were conducted in July-August 2013.

- Trainings on how to use the phone tower and trainings from doctors during the Itinerant Health program on how to use medicine occurred in 2014.

- Brian McFarland of CarbonCo has given numerous presentations from 2012 to 2017 and thus provided orientation to a diverse group of stakeholders from Greek foresters to Maryland business students about CarbonCo's Acre REDD+ Projects.

- In 2015, Kidney provided personal safety equipment (e.g., gloves, helmets, boots and goggles) and provided orientation on how to use this equipment to workers hired to help build the health clinic.

- In July 2016, the Project Proponents provided orientation to Elenira Mendes from the Chico Mendes Foundation by bringing Elenira to the Purus Project.

- In 2016, Brian McFarland wrote a book entitled *Conservation of Tropical Rainforests: A Review of Financial and Strategic Solutions*. This book included a case study of the Purus Project and thus, provides orientation to a wide range of stakeholders.

- The new project manager Edicarlo used to be a boat driver, so he was already a little familiar with the Purus Project and the headquarters. Nevertheless, Moura & Rosa provided Edicarlo with a general orientation on how carbon projects work, explanation of the annual audits, and discussed the ongoing challenge with the Guitas.

Furthermore, Moura & Rosa will train new workers when there is staff turnover.

Community Involvement

The Purus Project Proponents recognize the communities are a central element to the Purus Project's success and to achieve the Project's objective, the communities will be given an equal opportunity to fill all employment positions.

The Project Proponents hire locally as much as possible. This includes CarbonCo hiring TECMAN, Professor Willian Flores, the biologist Andre Botelho, and the community specialist Ayri Rando who all reside(d) in Rio Branco. In 2014, 2015 and 2016, the local doctors, dentists, and nurses that visited the Purus Project were also from Rio Branco. These positions are filled by engaging the Project Proponents' network and engaging stakeholders to identify the most qualified firms and/or individuals. Although these firms and/or individuals are selected based off merit, substantial orientation and training was provided.

The Project Proponents also attempt to hire and/or contract services from local families and marginalized families. Since May 23, 2011 and particularly between January 2016 and December 2016, the communities were involved in the Purus Project by:

- Acting as guides;
- Providing lodging, food and transportation services;
- Choosing the particular crops and techniques they would like to learn more about from the Centro de Produções Técnicas (Center for Technical Production) and the communities participated in agricultural extension courses;
- Engaging in solving land tenure arrangements;
- Discussing the Project design, benefits of the project, how they would like to participate;
- Hired as local project managers;
- Assisting with installation of phone tower, providing transportation to doctors and nurses for the Itinerant Health program, and building the large transportation boat; and
- Helping to build the onsite health clinic.

More specifically, Moura & Rosa hired Kidney from Rio Branco and hired Rogério from a nearby community outside the Project Zone. When Kidney and Rogério resigned, Moura & Rosa then hired Rosanio and Edicarlo from Manoel Urbano. The Project Proponents have also hired boat drivers, cookers, assistants with the installing the wildlife cameras, and laborers (i.e., to build the headquarters and stairs) from the local community. These positions are advertised in advance via radio announcements and by going door-to-door. Under-represented groups, such as women and young adults, will be given a fair chance to participate in any employment positions. Radio announcements will be targeted to all families living throughout the Project Zone and door-to-door visits will ensure all family members (i.e., both men and women, as well as young adults) are aware of the positions. For example, one of the original local project managers (Socorro) was a woman and the hired cookers are often women.

In 2015 and 2016, jobs were created at the Purus Project for assistance with building the onsite health center. The construction of the health clinic, for the most part, was done by contractors. The first part,

involving the health clinic's foundation, pillars, roofing, external walls, two-story masonry, and counter-flooring, was entered into with Mr. Clóvis and was executed at the end of 2015. The second contract, which involved the creation of internal divisions (i.e., rooms), was also executed by Mr. Clóvis and lasted thirty days. The third contract was executed by Mr. Augustin Brandão da Silva and involved making the floor, installing the doors, and painting, and lasted forty days. In addition to these contractors, Kidney, Rogério and Rosário participated actively in this work by transporting materials, cleaning the place, demarcation and excavation for the columns, external painting, hydraulic and electrical installations, and final cleaning.

In the future, there will be staffing opportunities at the health center. Moura & Rosa will attempt to hire under-represented groups for these upcoming positions.

Comprehensively Assess Situations and Occupations that Pose a Substantial Risk to Worker Safety

Between May 2011 and December 2012, the Purus Project Proponents comprehensively assessed the situations and particular occupations that could pose risks to worker safety. Between January 2016 and December 2016, the Purus Project Proponents reviewed these situations and particular occupations that could pose risks to worker safety. The Project Proponents will continue to inform workers of such risks, explain how to minimize such risks, and the Project Proponents will use best work practices.

The main potential risks to workers identified by the Project Proponents include:

- Drowning;
- Heat Exhaustion and Dehydration;
- Getting lost in Remote Forest;
- Venomous Snake Bites;
- Tropical Diseases; and
- Getting Hurt While Constructing Health Clinic.

<u>Drowning</u>

It is important to note, that all boats travel relatively slow on the Purus River, many participants know how to swim, and life preservers are always onboard in case a boat does capsize.

<u>Heat Exhaustion and Dehydration</u>

Workers and Project Proponents are familiar with tropical rainforests (for example, high levels of humidity and tropical temperatures) and prepare for each trip with sufficient food and water.

Getting Lost

Global positioning systems (GPS) are used during trips into the deep forest to minimize the risk of getting lost. Local guides from the community and the Purus Project Landowners' familiarity with the area also helps to minimize the chances of getting lost.

Venomous Snake Bites

The most substantial risk to workers was the potential encounter with venomous snake bites. Snake bites are relatively common in South America[17] and specifically within the State of Acre.[18] The snake species of greatest concern among riverside communities of the lower Purus River in Amazonas, Brazil were the fer-de-lance (*Bothrops atrox*) and the South American bushmaster (*Lachesis muta*).[19] To mitigate such risk, all TECMAN's employees were equipped with and required to wear protective snake chaps.

TECMAN's Employees with Snake Chaps (Photo Credit: Brian McFarland)

Tropical Diseases

There are many tropical diseases in Acre, Brazil such as zika, malaria, yellow fever and chagas disease. The Project Proponents are encouraged to get yellow fever vaccinations, malaria pills are available, and mosquito nets are frequently used. In addition, CarbonCo provides each visitor with a document outlining

[17] J.-P. Chippaux. "Reviews/Analyses," Available: http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2305789/pdf/bullwho00388-0084.pdf
[18] Pierini SV et al., "High incidence of bites and stings by snakes and other animals among rubber tappers and Amazonian Indians of the Juruá Valley, Acre State, Brazil,"
[19] Fabiano Waldez and Richard C. Vogt, "Ecological and epidemiological aspects of snakebites in riverside communities of the lower Purus River, Amazonas, Brazil," Available: http://piagacu.org.br/?attachment_id=416

health and safety issues and this document also includes photographs of tropical disease transmitters such as several species of mosquitos.

Getting Hurt While Constructing Health Clinic

Many people were hired to help build the health clinic. Specific risks included falling off ladders while constructing the roof, pulling muscles while carrying heavy equipment, and getting hurt from falling materials. To mitigate these hazards, Kidney provided personal safety equipment (e.g., helmets, goggles, back braces, etc.) and provided orientation on how to use this equipment to workers hired to help build the health clinic.

Other Potential Risks to Worker Safety

An additional situation that could pose a substantial risk to worker safety is the social assistance project activity related to removing trees from the bed of the Purus River. However, any workers from the community who voluntarily assist with the tree removal will be limited to providing assistance with transportation and providing food. Any activities involving substantial risk - such as diving into the Purus River or operating the on-shore, heavy-duty winch - will be performed by trained, experienced professionals employed by the State of Acre.

To mitigate potential risks to these workers, there are state requirements which include having the necessary equipment (e.g., boat and heavy-duty winch), safety equipment (e.g., life preservers), and proper training. For example to become a firefighter in the State of Acre, all personnel need to pass both a health inspection and take a specialized course. Furthermore, the firefighters who will assist with the removal of trees from the bed of the Purus River are informed about the risks and are specifically trained in emergency response and specifically trained to safely dive into rivers and remove wood.

2.8 Stakeholders (G3)

Between May 2011 and December 2012, the Project Proponents conducted an extensive stakeholder identification and stakeholder engagement or involvement process. The Purus Project Proponents continued to engage stakeholders throughout January 2013 to December 2016.

For a discussion of the Project's stakeholder identification and for a comprehensive list of the Purus Project's stakeholders, please refer to Appendix A, Stakeholder Identification of the validated CCBS PDD.

These following stakeholders, considered primary and secondary stakeholders, were involved in project design to optimize climate, community and biodiversity benefits while ensuring the Purus Project was properly aligned with the State of Acre. Consultations with all stakeholders, but especially these following stakeholders, shall continue throughout the Project Lifetime:

- Moura e Rosa Empreendimentos Imobiliários LTDA;
- Communities living within the Purus Project;
- Carbonfund.org Foundation, Inc. and CarbonCo, LLC;

- Freitas Group International LLC and Carbon Securities;
- TerraCarbon;
- Chico Mendes Foundation;
- TECMAN LTDA;
- Professor Antonio Willian Flores de Melo of UFAC;
- PAV Comércio e Serviços Ltda ("PAV"), particularly Ayri Saraiva Rando;
- Landowners and Communities living around the Purus Project;
- State of Acre, particularly the:
    - Climate Change Institute of Acre (IMC);
    - EMBRAPA, ITERACRE and STR;
- State of California
    - California Air Resources Board (ARB);
    - REDD Offset Working Group (ROW);
    - Governors' Climate and Forest Task Force;
- Verified Carbon Standard Association;
- Climate, Community and Biodiversity Alliance; and
- Environmental Services, Inc.

It is important to note that the Project Proponents used socially and culturally appropriate methods for stakeholder consultations and these stakeholder consultations were inclusive of gender, inter-generations, and language. High conservation values were also respected, along with local customs and values. In addition, meetings often took place at the most convenient locations (for example, both at the Purus Project and in Rio Branco).

A brief summary of project meetings and stakeholder comments have been provided below which took place during since 2011 and particularly during the monitoring and reporting period from January 1, 2016 to December 31, 2016.

January 21, 2011 - Normando Sales initially met Pedro Freitas in Brasilia, Brazil. Normando Sales was familiar with the process of developing a REDD+ project and was interested in developing this project. Pedro Freitas later presented a draft Tri-Party Agreement to Normando Sales for review, while Normando offered his Project Identification Note for the Purus Project. The Tri-Party Agreement, which is a cornerstone document of the Purus Project, was revised and mutually accepted based off discussions among Moura & Rosa, Carbon Securities and CarbonCo.

March 9-18, 2011 - CarbonCo, Carbon Securities and TerraCarbon traveled to Acre, Brazil to conduct a preliminary assessment of the Purus Project. A few key milestones included:

- CarbonCo, Carbon Securities and TerraCarbon held initial meetings with PESACRE (Grupo de Pesquisa e Extensão em Sistemas Agroflorestais do Acre), IPAM (Instituto de Pesquisa Ambiental da Amazônia), FUNTAC (Fundacao de Tecnologia do Estado do Acre), and SISA (System of Incentives for Environmental Services) to gain an understanding of the agents

and drivers of deforestation in Acre state, how forest biomass stocks vary across the state, and local REDD+ and forest conservation initiatives;

- CarbonCo and TerraCarbon then visited the Purus Project property for an initial assessment on Wednesday, March 16th. This visit included firsthand observations of the forest and local drivers of deforestation, along with some initial casual conversations with a few local community members in the Project Area;

- CarbonCo, Carbon Securities, and TerraCarbon met with Moura & Rosa and the Chico Mendes Foundation on Thursday, March 17th to discuss forest conservation and payment for ecosystem services schemes, such as REDD+; and

- Carbon Securities and TerraCarbon met with Acre State Officials, including Monica Julissa De Los Rios de Leal and Eufran Amaral, on Friday, March 18th.

- The Project was revised based off this initial site visit in March 2011. For example, the Project Proponents: began to design the Project around the identified drivers and agents of deforestation (i.e., selection of appropriate VCS methodology); chose the source of satellite imagery (i.e., FUNTAC/Climate Change Institute); incorporated the Chico Mendes Foundation into the Project; and began a close relationship with the State of Acre.

March 17, 2011 - Tri-Party Agreement was executed by CarbonCo, Carbon Securities, and Moura & Rosa on March 17th, 2011.

May 9, 2011 – Moura & Rosa met with the State of Acre's General Prosecutor Patricia Rego to discuss the Purus Project. This included a general introductory discussion of the Project, the expectations of the State for the Project's area of permanent preserve (APP) being destroyed by the local coomunities and how to legalize the destruction, how to improve quality of the communities' livelihoods, how the State can help the Purus Project, how the State can offer protection for this sort of Project, and the outcomes of a successful Project.

May 13-14, 2011 - CarbonCo and Carbon Securities met with Moura & Rosa in Goiânia, Goiás, Brazil to discuss elements of the VCS Project Description and the CCBS Project Design Document.

August 1-12, 2011 - CarbonCo, Carbon Securities, and TerraCarbon visited Rio Branco and the Purus Project site during a project implementation trip. A few key milestones included:

- TerraCarbon led a classroom forest carbon inventory training for TECMAN field crew;

- CarbonCo, Carbon Securities, Moura & Rosa, TerraCarbon, and TECMAN met with Acre State officials, including Monica Julissa De Los Rios de Leal and Lucio Flavio, on Wednesday, August 3rd to discuss how to best design the forest carbon inventory to align with the State of Acre's goals and future forest inventory plans. The Project's forest carbon

inventory design (for example, the size of each plot and the plot design) was revised based off the State of Acre and TECMAN's input;

- CarbonCo, Carbon Securities, TerraCarbon, and Moura & Rosa visited the Purus Project area from Thursday, August 4th through Monday, August 8th.
    - TerraCarbon trained TECMAN field crew members in forest inventory practices and standard operating procedures
    - Moura & Rosa, CarbonCo and Carbon Securities met with the local community to discuss the project and get feedback on how to best implement measures to reduce deforestation. The communities were overall receptive of reducing deforestation in exchange for alternative income and assistance, but were nervous about monitoring for local deforestation because it appeared as a local police force. Based off this input, the monitoring plan was revised so that Moura & Rosa would undertake the initial monitoring via a trike instead of having the initial monitoring conducted by local community members.

Community Meeting (Photo Credit: Brian McFarland)

- CarbonCo, Carbon Securities, and TerraCarbon met with Willian Flores to discuss the VCS methodology, VM0007 the REDD Methodology Modules, applicable to modeling regional deforestation
- CarbonCo, Carbon Securities, Moura & Rosa, TerraCarbon, and Willian Flores met with Acre State officials, including Monica Julissa De Los Rios de Leal, Eufran Amaral and Lucio Flavio on Tuesday, August 9th to discuss how to best develop the project-level baseline; how private

projects will nest with a forthcoming state level baseline; and the type of GIS data available from the State of Acre.

October 17, 2011 - Moura & Rosa and Professor Flores met EMBRAPA in Rio Branco, Acre. During this meeting Moura & Rosa introduced the Purus Project via a PowerPoint Presentation, discussed the local communities' needs and presented ideas for mitigating deforestation pressures. Additionally, Moura & Rosa discussed the possibility of EMBRAPA sending two technicians, one a specialist in reforestation and the minimization of degradation and the other a specialist in agriculture and livestock, to the Purus Project.

November 21, 2011 – CarbonCo spoke with Shaina Brown, Project Director at the Green Technology Leadership Group and Tony Brunello, the REDD Offset Working (ROW) Group's facilitator to better understand the developments in the State of California and how they relate to the State of Acre.

November 30, 2011 – Carbon Securities and CarbonCo held a call with Maria José Miranda de Souza Noquelli from Tenóryo Dias e Alternativa Ambiental to learn more about the rapid biodiversity assessment that was conducted at the Purus Project, the specific species which were identified on the Purus Project site, whether there were occurrences of globally threatened species, along with the available methodologies and approximate costs to perform regular biodiversity monitoring plans.

Early December 2011 – Moura & Rosa met with EMBRAPA to discuss what EMBRAPA needs from Moura & Rosa and EMBRAPA gave a general presentation on how they could assist Moura & Rosa. This included free-range, rotational cattle pastures and intensified agriculture. EMBRAPA also requested an official letter from the Project Proponents.

Late December 2011 - Moura & Rosa again met with EMBRAPA. This discussion focused on the timing of when EMBRAPA could help, costs of EMBRAPA's assistance, and how EMBRPA could officially sponsor the project.

February 6, 2012 – Brian McFarland spoke to Dan Bisaccio, Director of Science Education at Brown University, to better understand wildlife camera traps and biodiversity monitoring plans. The biodiversity monitoring plan - particularly the specific types of cameras, duration of the biodiversity plan, and the number of cameras to be used – was revised.

February 10, 2012 – CarbonCo spoke with Natalie Unterstell, the focal point for REDD+ at Brazil's Federal Ministry of Environment. Discussions were based around:

- The role of Brazil's Federal Government in the REDD+ context; Progress of the Amazon Fund; How States, particularly Acre, might nest into National Government; How Brazil's domestic cap-and-trade market is shaping up; Market mechanisms and REDD+ as potentially eligible offset; Where to go for REDD+ information on Federal government updates and how to inform Government of our Project.

March 9-15, 2012 – CarbonCo, Carbon Securities and Moura & Rosa visited the Purus Project for the following tasks:

- Met with 16 communities who participated in a Participatory Rural Assessment (PRA) to better understand the activities which contribute to deforestation, the cycle of deforestation, and how far communities enter the forest to collect wood;
- These same 16 communities also participated in a Basic Necessities Survey (BNS) which shall serve as a baseline for the community impact monitoring plan to ensure the communities' poverty scores, poverty index, average owned assets, and average owned assets per capita are positively impacted as a result of the Project;
- The Project Proponents also surveyed these 16 communities on which agricultural extension training courses would be of most interest and thus, which proper crops and agricultural techniques that EMBRAPA should focus upon;
- The onsite project managers Sebastião Marques da Silva and Maria Souza de Moura were officially hired;
- CarbonCo, Carbon Securities and Moura & Rosa also met with Prof. Dr. Armando Muniz Calouro, Professor at UFAC, about biodiversity monitoring plans using wildlife camera traps to assess the population and distribution of medium-to-large mammals;
- CarbonCo, Carbon Securities and Moura & Rosa also with the Vice Governor of Acre, Mr. César Correia Messias to explain the Purus Project and to ask for a Letter of Support
- The community impact monitoring plan was revised based off the PRAs, BNS and agricultural survey. In addition it was decided that instead of eliminating all cattle from the Project, it would be better to allow the communities to keep their cattle and instead to encourage the communities to not increase the overall number of cattle.

March 26, 2012 – CarbonCo and TerraCarbon held a follow up call with Monica Julissa De Los Rios de Leal to discuss a variety of topics, including:

- How the State of Acre's baseline is coming along?
- How should we register the Purus Project with the State of Acre?

May 2012 – Moura & Rosa met with SENAR. During this visit, Moura & Rosa: presented the draft CCBS PDD; discussed the Purus Project; explained what is needed in regards to technical, education, and training support and specifically talked about the agricultural extension training courses; and discussed timelines.

June 2012 – CarbonCo and Moura & Rosa met with André Luis Botelho de Moura, a former graduate student of Dr. Armando Muniz Calouro, to begin refining the full biodiversity plan. Such discussions included: the proper locations of cameras; a short, Standard Operating Procedures (SOPs) guidance document needs to be developed that will be used as a training manual for the communities; wildlife camera traps need to be brought to the Purus Project, the communities need to be trained on the proper placement and preventative maintenance of such cameras, and the cameras need to be setup in the field; periodic movement of cameras to different strata; assistance for one year to periodically identify species that the Purus Project team is unable to identify.

June 2012 - The Purus Projet was presented at United Nations Conference on Sustainable Development (UNCSD) Rio+20 Conference in Rio de Janeiro.

July to December 2012 – CarbonCo identified an independent firm to visit the communities twice to ensure the local communities were fully aware of the Purus Project, were able to contribute to the Project design, able to openly express desired outcomes and concerns, understood the third-party grievance procedure, were able to give free, prior and informed consent. The Purus Project was revised by: giving all communities at least 100 hectares and communities with over 100 hectares are allowed to keep the land they put under productive use; identifying an independent group (i.e., the Public Ministry of Acre) during the titling process as desired by some communities; making sure to address the communities general concerns about no longer being able to use fire which could reduce crop production by incorporating this discussion into the agricultural extension training courses; ensuring the local project managers (instead of via radio announcements) are the primary means of conveying information about the project to the local communities; and scheduling community-wide discussions on the weekends as requested by most local communities.

March 25 – April 12, 2013 – CarbonCo, Carbon Securities and Moura & Rosa visited the Purus Project. The Project Proponents met with the local communities. The second Participatory Rural Assessment (PRA), which focused on degradation, was also administered at the Purus Project.

April 5, 2013 - CarbonCo, Carbon Securities, and Ilderlei Souza Rodrigues Cordeiro (owner of Russas Project) met again with Eufran Amaral from the Climate Change Institute to give an update on all the Projects, including informing about moving forward with the Envira Amazonia Project, and received updates on the work of the Climate Change Institute.

April 30, 2013 – CarbonCo held another call with Natalie Unterstell of Brazil's Ministry of Environment to update her that the Purus Project became the first dual VCS-CCBS validated REDD+ Project in Acre and that the Envira Amazonia Project would undergo VCS-CCBS validation later in 2014.

June 9-21, 2013 – CarbonCo, Carbon Securities and Moura & Rosa met in Rio Branco, Acre to discuss the Purus Project. The wildlife camera traps were installed at the Purus Project.

August 13-15, 2013 – Brian McFarland travelled to San Francisco, California to meet with REDD+ industry representatives including Code REDD and members of the REDD Offset Working Group.

August 18-31, 2013 – CarbonCo, Carbon Securities and Moura & Rosa participated in verification site visit. This visit included meetings with S.O.S Amazônia and the Climate Change Institute.

November 27 and 28, 2013 - There is a Ramal (which translates into "small road" in English) that is nearing the Project Zone from the Northeast boundary of the Purus Project. This Ramal will encourage new communities to settle near the Project Zone. The Ramal was planned and funded by the municipality of Manuel Urbano and Moura & Rosa met with the mayor of Manuel Urbano on November 28, 2013 to re-explain the Project and specifically educate the mayor about the impact the Ramal could have on the Project with respect to increased deforestation. In addition, the local project manager Kidney visited the communities living along the Ramal on November 27th and 28th, 2013 to inform the communities of the Project and that forest conservation is the cornerstone of the Project.

January 31, 2014 – Brian McFarland of CarbonCo presented at the Forests as Capital Conference hosted by the Yale School of Forestry & Environmental Studies' Chapter of the International Society of Tropical Foresters. Brian's presentation gave an introduction to CarbonCo, described CarbonCo's Acre REDD+ Projects, and discussed REDD+ and other conservation financing instruments.

May to October 2014 - Moura e Rosa Empreendimentos Imobiliários LTDA met with STR – Manoel Urbano several times to discuss titling land to the local communities at the Purus Project.

May 8, 2014 – CarbonCo, Carbon Securities and TerraCarbon met with the Climate Change Institute to give an update on all Acre REDD+ projects, including the Purus Project, and received updates on the latest developments at the Climate Change Institute. More specifically, this meeting was with Monica Julissa De Los Rios de Leal and Magaly Medeiros, the new director of the Climate Change Institute.

May 19, 2014 – Carbon Securities met with Rodrigo Fernandes das Neves, the State Prosecutor, to discuss the Acre REDD+ Projects including the Purus Project, and to get an update on the state-level baseline.

May 20-21, 2014 – CarbonCo and Carbon Securities met Maron Greenleaf to introduce the Project Proponents, give an overview of all Acre REDD+ projects underway (particularly the Purus Project), and discussed Maron Greenleaf's anthropological research in Acre for her PhD at Stanford University.

June 24, 2014 – Brian McFarland of CarbonCo presented at Ecosystem Marketplace's State of the Voluntary Carbon Market and gave an overview of CarbonCo's work in Acre, Brazil.

September 3, 2014 - CarbonCo and TerraCarbon held a call with the VCSA to give an update on the Acre REDD+ Projects, including the Purus Project, and discussed the future developments necessary to best position the Acre REDD+ Projects for their potential inclusion in a California compliance carbon market.

January 30, 2015 - Brian McFarland of CarbonCo presented at the US-China Business and Cultural Exchange Center and gave an overview of forest carbon projects and particularly CarbonCo's work in Acre, Brazil.

June 23, 2015 - Brian McFarland of CarbonCo presented "A Global Perspective on the Voluntary Carbon Markets" in Thessaloniki, Greece which included a case study on the Purus Project.

August 28, 2015 - Normando Sales and his son attended climate change conference in Acre, Brazil organized by State Representative Jenílson Leite with Professor Foster Brown, Mayor Marcus Alexandre, meteorologist Devid Friale, Senator Jorge Viana, Eufran Amaral and Marina Silva.

August 29, 2015 - Brian McFarland of CarbonCo presented "Investing in the Voluntary Carbon Markets and Developing Forest Carbon Projects" for the Sustainability & Investing course at the University of Maryland's Robert H. Smith School of Business.

September 28 – October 2, 2015 – Andre Botelho presented a poster entitled, "Composition and Relative Abundance of Medium and Large Mammals in REDD+ areas in Acre" at the 8th Brazilian Congress of Mammalogy, held in João Pessoa the capital city of Paraíba.

December 5-12, 2015 - CarbonCo and Carbon Securities attended COP21 in Paris, France.

February 23 - March 3, 2016 – CarbonCo and Carbon Securities met several stakeholders in Brazil including the Climate Change Institute of Acre, the Amazon Fund, USAID, and the Ministry of Environment. Such meetings included a presentation of our Acre REDD+ Projects and a discussion on recent developments in Acre and/or Brazil with respect to REDD+.

July and August 2016 – Moura & Rosa start negotiation to celebrate the three agreements with UFAC - Federal University of Acre, involving the Faculties of Agronomy, Forest and Medicine.

November 17, 2016 – Brian McFarland presented to two classes at Cornell University on "Global Carbon Markets and Developing Forest Conservation Projects" which included highlighting CarbonCo's projects in Acre.

CarbonCo, Carbon Securities and Moura & Rosa hold monthly check-in calls and will hold calls more regularly if necessary. Historically, Moura & Rosa visited the Purus Project over ten times per year to help implement the Project including showing project staff, contractors, and visitors the Project Area, meet with and engage the surrounding communities, and to further establish a local project base. Starting around February 2013, the local project manager Kidney, visited the communities on behalf of the Moura & Rosa approximately once a month for fifteen days. Overall, Kidney visited the Purus Project approximately twenty times in 2013 and visited the Purus Project approximately thirty two times in 2014. In 2015, Kidney visited the Purus Project approximately 22 times. In 2016, Kidney visited the Purus Project approximately six times, including a few long visits to complete the onsite health clinic.

As an illustration of Kidney's visits, the following are several examples of the documented meetings and visits to the Purus Project by Kidney in 2013:

- **On January 10, 2013**, Wanderley and Kidney met with Miguel and Socorro to make payment for their services as the onsite local, Project Managers.

- **On April 12, 2013**, Kidney along with Girley from SENAR visited all the communities, including communities in the leakage belt, to inquire about their desired participation in an outboard motor maintenance course and a course on the production of bananas.

- **On April 22, 2013**, Kidney and the engineer Charles from EMBRAPA visited the project headquarters and Miguel in order to do a preliminary assessment of where bamboo was most dense.

- **On June 5, 2013**: Kidney made a wage payment to Mr. Jorge, fixed the water pump that malfunctioned, and checked on the progress of the services at the headquarters.

- **On June 14, 2013**, Kidney, the biologist Andre Botelho, Wilson and Raimundo installed the wildlife cameras.

- **On July 7, 2013**, Wanderley and Kidney visited several families, including the house of Dona Celina and Raimundo, to ask whether anyone wanted to assist in sawing wood to build stairs. Kidney eventually contracted Rogério to assist.

- **On July 13, 2013**, Kidney visited the headquarters and the family of Benedito. Kidney checked on the near completion of the headquarters' bathroom and replaced the batteries and memory of the wildlife cameras. On August 2, 2013, Kidney painted and cleaned the house of Mr. Benedito and also met with Chico do Brabo.

- **On August 8, 2013**, Kidney and Mirlailson da Silva Andrade from S.O.S. Amazonia visited all the communities to invite them to participate in the agricultural extension courses on raising chickens and pasture management.

- **On August 14, 2013**, Kidney visited with the Benedito family and installed the stairs.

- **On September 10, 2013**, Kidney visited Benedito, the Project headquarters, Dona Celina and Raimundo Baltazar.

- **On November 20, 2013**, Kidney and several stakeholders visited the Project headquarters, Benedito, D. Celina and Mamoeiro to discuss the Project and explained the importance of collecting garbage such as batteries, plastic bags and cans.

CarbonCo, Carbon Securities, and Moura & Rosa are committed to meet in person at least once per year at the Purus Project property with the local community to discuss project activities, project management, and meet with the local community to get their feedback, ideas, and provide a platform for discussion. These visits to the Purus Project took place in 2011, 2012, 2013, 2014, 2015 and 2016. This yearly visit also includes meetings with other stakeholders such as: the Climate Change Institute (IMC); IMAC (Institute of Environmental Affairs for Acre); the Federal University of Acre (UFAC); the Mayor of Manoel Urbano and the Mayor of Sena Madureira; the State Department of Acre; and/or EMBRAPA.

The Project Proponents have discussed a process and specific milestones to enable the continued, effective communications with the local communities with the goal of establishing a long term relationship between the Project Proponents and the communities. It is important to note that communication with the local communities has steadily improved over time. This improved communication resulted, in part, from the hiring of the independent community specialist PAV in October 2012 to better explain the Project to the communities and with the hiring of the local project manager Kidney. As part of the communication process, Kidney will regularly visit the communities which will help build trust, confidence and establish a long term relationship between Moura & Rosa and the community. The key to this successful, long term relationship between Moura & Rosa and the community is the continuous demonstration of tangible, net positive community benefits. For example, the regularization of the communities' land tenure will end the fear the communities have of being forced out of the Project Area. Although the communities were never to be removed from the Project, this regularization of land title, which will be a major milestone, will greatly improve communication with the communities. Other short term, major milestones were the building of the health clinic and teaching of agricultural extension training courses by contractors and this staff also listened to the communities to understand new areas of interest for new courses.

The Project Proponents also discussed the actions needed to confirm with the communities that the project activities being implemented are leading to net positive community benefits and that the project activities are targeting the explicit, local needs of the community. This said, the Project Proponents, particularly the former local project manager Kidney and the new local project manager Edicarlo, are in regular communication with the local communities. Collectively these community meetings, the Basic Necessity Survey and the Participatory Rural Assessment provided an initial understanding of the most desired benefits the communities would like to obtain from the Project. While these benefits – such as

titling land to the communities, building a health clinic, and providing agricultural extension training courses – will continue on the agreed-upon schedule, the Project Proponents will attempt to expedite some of the most desired benefits such as titling land. In addition, community meetings specifically discussing benefits from the Project will be implemented and the Basic Necessity Survey was administered again in 2016 and 2014 which revealed the communities' local needs remained basically the same as in 2012.

In addition, there is a Ramal (which translates into "small road" in English) that is nearing the Project Zone from the Northeast boundary of the Purus Project. This Ramal may encourage new communities to settle near the Project Zone and the Project Proponents discussed the following action items to engage these communities living along the Ramal. The Ramal was planned and funded by the municipality of Manuel Urbano and Moura & Rosa met with the mayor of Manuel Urbano to re-explain the Project and specifically educate the mayor about the impact the Ramal could have on the Project with respect to increased deforestation. This meeting took place on November 28, 2013. Next, the local project manager Kidney visited the communities living along the Ramal in November 27th and 28th, 2013 to inform the communities of the Project and that forest conservation is the cornerstone of the Project.

Wanderley Meeting with Mayor of Manoel Urbano (Photo Credit: Wanderley Rosa)

Moura & Rosa visited the communities at the end of the ramal in 2014 and 2015 by renting a motorcycle which enables Moura & Rosa to more regularly visit the ramal during the dry season. In 2016, Moura & Rosa monitored for encroachment via the ramal with drone flyovers.

The Project Proponents will continue communication throughout the Project Lifetime with the goal of monitoring the success of Project activities in achieving the climate, community and biodiversity objectives. As the Project unfolds, the Project Proponents will practice adaptive management techniques to constantly assess the Project's ongoing successes and shortcomings.

Adaptive management is necessary for the Purus Project in part because many aspects of REDD+ are still unfolding and being decided. This said, as country-specific indicators of the REDD+ Social and Environmental Standards are developed by the State of Acre, the Purus Project shall attempt to harmonize its biodiversity and community monitoring plans. In addition, the Purus Project has frequently met with the State of Acre to position the Purus Project for possible nesting into the jurisdiction in anticipation of a possible link to the California Cap-and-Trade Program.

Describe Methods to Publicize CCBA Public Comment Period and to Facilitate Submission of Comments

A variety of communication methods were utilized to publicize the CCBA Project Implementation Reports' (PIRs) Public Comment Period to stakeholders of the Purus Project, including the local communities. In addition, the Project Proponents played an active role in distributing the Purus Project's CCBS PIRs. Such specific steps include:

- First and foremost, the Project Documents (i.e., PDDs, Full Monitoring Plans, Project Implementation Report, etc.) were made available in both English and Portuguese. This allowed for a wider-range of stakeholder participation including local communities and government officials in Acre, Brazil.

- Secondly, the Project Documents were communicated to community members in an appropriate manner to overcome the fact that some community members might be illiterate. A copy of the Portuguese CCBS PDD was also left at Purus Project's headquarters. In addition, a summary document of the Project Implementation Report was also made.

- The CCBS PIRs were publicly posted for a minimum of 30 days on the CCBA website and comments were solicited. The CCBS PDD 30-day Public Comment Period officially ran from October 20th through November 19th, 2012 and the initial CCBS PIR 30-day Public Comment Period officially ran from July 12th and August 11th, 2013. The CCBS PIR Public Comment Period for the Purus Project's second verification officially ran from July 14th to August 13th, 2014. The CCBS PIR Public Comment Period for the Purus Project's third verification officially ran from July 14th to August 13th, 2015. The CCBS PIR Public Comment Period for the Purus Project's fourth verification officially ran from June 22, 2016 to July 22, 2016. The Public Comment Period for the Purus Project's fifth verification officially ran from June 15 to July 15, 2017.

- CarbonCo's parent company Carbonfund.org Foundation publicized the project documents on its website and solicited comments on the Project via a newsletter announcement to Carbonfund.org's 11,000+ members. Carbonfund.org's newsletter for the first CCBS PIR Public Comment Period announcement was sent on July 22, 2013; the announcement for the second CCBS PIR Public Comment Period was sent on July 21, 2014; the announcement for the third CCBS PIR Public Comment Period was sent on July 29, 2015; and the announcement for the fourth CCBS PIR Public Comment Period was sent on June 30, 2016. In addition, the CCBA announced the Purus Project's Public Comment Period via the International Institute for Sustainable Development listserv on July 15, 2014 and then again

on July 16, 2015. Carbonfund.org announced the fifth Public Comment Period in its newsletter on June 30, 2017.

- Furthermore, the project documents were sent to a variety of specific stakeholders including Acre State Government officials, TECMAN and Professor Flores to ensure accuracy of statements and encourage their submission of comments to the CCBS.

With respect to other stakeholders, Moura & Rosa announced the CCBS Public Comment Period for the Project Implementation Report on the "Rádio Oásis" radio station of Manuel Urbano from July 20th to August 14th, 2013. These radio stations are widely listened to throughout the municipalities of Manoel Urbano and Sena Madureira. Such an announcement informed listeners about the Purus Project and about the CCBS, encouraged listeners to review the Project, and asked for comments to be submitted. Furthermore, twenty copies of the Summary Report were printed and hand-delivered to each family by Kidney during the Public Comment Period. This same process happened in 2014, 2015, and again in 2016. More specifically, in 2016, Kidney delivered the Summary Report to community members in June 2016 and the radio announcements took place between June 20th and July 20th, 2016. In June 2017, Edicarlo delivered the Summary Reports to the community members and another radio announcement was made on the Radio Boas Novas of Manoel Urbano from June 16 to July 14, 2017.

Clear Process for Handling Unresolved Conflicts and Grievances

Between May 2011 and December 2012, the Purus Project's grievances procedure was designed and communicated to the local communities. This includes a visit to the Purus Project by the Climate Change Institute. Between January 2013 and December 2015, the Purus Project's grievances procedure was reviewed and communicated again to the local communities. More specifically, the following grievance procedure was included in the Summary Report and twenty copies of the Summary Report were printed and hand-delivered to the families throughout the Purus Project by Kidney in July and August 2013. The grievance procedure was also included in the Summary Report that was distributed in 2014.

To reiterate the grievance procedure, community members received Summary Documents from the Project Proponents during the 2015 CCBS Public Comment Period which outlined the grievance procedure and provided contact information for the Climate Change Institute. In addition, a phone tower was installed at the Project headquarters in 2014 which is freely available for everyone in the community to use, including if they want to contact the Climate Change Institute with any complaints. Furthermore, a sign that is visible from the Purus River was posted at the Project headquarters stating the number of the Climate Change Institute. In addition, Kidney hand delivered this same contact information to each family.

In 2016, the grievance procedure was again included in the Summary Documents for the CCBS Public Comment Period. Furthermore, Moura & Rosa launched the following Purus Project website: www.projetopurus.com.br. On this site, anyone can communicate directly with Moura & Rosa, without any intermediaries, and post their criticism and suggestions. In 2016 and thus far in 2017, there were no reported problems with the Indians who navigate the Purus River within the Purus Project Area. This said, a forward action request was issued in 2016 due to the presence of a few signs that forbid Indians

from visiting a few, specific communities. Kidney nor Edcarlo heard any complaints in 2017 from the communities about the Indians. In contrast, sometimes the Indians ask to use the Project headquarters' phone or ask for water to drink, because they have heard about the water quality at the Project headquarters.

Essentially if conflicts or grievances are unable to be resolved by the Project Proponents (particularly Moura & Rosa), the State of Acre's Climate Change Institute – acting as a third party to prevent any conflict of interest - will hear, respond to, and help resolve all reasonable grievances with the Purus Project through an impartial and accessible process.

More specifically, the State of Acre's Climate Change Institute has an Ombudsman who is the specific person to receive and refer any grievances about the Purus Project. Any stakeholder is free to contact or visit the Climate Change Institute with any unresolved conflicts or grievances. Below is the physical address, phone numbers, fax numbers and email address:

Instituto de Mudanças Climáticas e Regulação de Serviços Ambientais
Address: Rua Floriano Peixoto, nº 460, Primeiro Andar, Centro, Acre, Brazil
Telephone: +55 (68) 3223-1933 / +55 (68) 3223 9962 / +55 (68) 3223 1903
Fax: +55 (68) 3223 9962 Email Address: gabinete.imc@ac.gov.br

The Climate Change Institute's process for hearing, responding to, and resolving reasonable grievances is as follows:

- Receiving: Any person may visit or contact the Climate Change Institute. Any person who makes contact with the Ombudsman over the internet will receive a notification of receipt by email.

- Verification and Acceptance: The Ombudsman will decide whether a complaint is considered reasonable and whether the complaint should be accepted by the Climate Change Institute.

- Referral to Internal Areas: When deciding to accept a demand, the Ombudsman records the compliant and informs the person raising the complaint of the protocol number and the deadline for a response. If the demand is accepted, the demand will be internally referred to the appropriate specialist. If the demand is rejected, the Ombudsman will inform the person of the reason for the rejection.

- Monitoring: The Ombudsman will monitor the protocol and will monitor the internal areas responsible for collecting the answers to the compliant.

- Resolution: When the settlement is decided, the Ombudsman will make contact with the person who raised the complaint and the Ombudsman will close the protocol. All complaints received by the Ombudsman are usually answered within five working days and the person can call to know the progress of their protocol.

Each month the Ombudsman shall prepare a report and forward it to Board and President of the Climate Change Institute. In this report, the Ombudsman will: summarize actions taken to address complaints; quantify complaints and provide graphics to compare number of complaints against previous months; report amount of open and closed protocols; and provide relevant suggestions for process improvements and final considerations of the Ombudsman.

Furthermore, all conflicts or grievances will be addressed within a reasonable timeframe, the resolutions will be documented, and this process has been publicized to all stakeholders and especially to the local communities.

In 2015, 2016, and thus far in 2017, no grievances were received by the Project Proponents through this official grievance process.

There are a few specific processes being developed in order to address particular conflicts.

Moura & Rosa acknowledge that they must maintain the peace in the community while also protecting the Project rules.

Upon learning of any deforestation within the Project Area, the Project Manager - residing at the Headquarters of the Project - shall adopt the following procedures:

- A.1 - Notify the fact immediately, by telephone, via email or in-person, to the Board of Moura & Rosa (i.e., the landowners of the Project)

- A.2 - Trigger field team to conduct an immediate inspection of the site by land or by air via the drone in order to identify the exact location of deforestation (i.e., using GPS), its extent, and its agent. The field team shall make photographic record of everything and every operation, and whether the agent has the legal authority from an environmental agency (IBAMA or IMAC) to deforest.

- A.3 - If the agent did not receive the legal authority for such deforestation, the Project Manager informs the agent to immediately stop deforestation, under threat of legal repercussions;

- A.4 - If there is resistance to stop the deforestation, the Project Manager should report it immediately to the officer on duty or the Chief of Forestry Police in Manoel Urbano and IMAC, requesting to move a team to the site immediately, providing all necessary means; for example, a motorboat to the city of Manoel Urbano, food, a guide to the deforested site, and to provide the necessary evidence to register the occurrence with the police and IMAC.

- A.5 - The Director of Moura & Rosa, upon learning of deforestation, should report it immediately to the Legal Advisor to the Project who moves to the city of Manoel Urbano and take appropriate legal steps, following the case, and personally taking the knowledge to the prosecutor, thereby initiating the due process of law.

- A.6 - The Director of Moura & Rosa must report such fact to Carbon Securities and CarbonCo in writing, sending them a copy of all actions taken.

Moura & Rosa spoke with the former commander Cel QOBM Flavio Ferreira Pires of the Military Fire Department in Rio Branco. In the future upon learning of any fire that exceeds the allowable limit for rural communities within the Project Area, the Project Manager would take the following steps:

- B.1 - The Project Manager shall first notify the fact by telephone, via e-mail or in-person, to the Board of Moura & Rosa.

- B.2 – If help is needed, the Project Manager will ask for support from the Fire Department of the State of Acre and the Forestry Police of Manoel Urbano, by phone, providing the means of transport to the location of fire.

- B.3 - After fire is under control, the Project Manager will ask the resident to submit the legal authority to carry out the burning and if this authorization is not presented, the Project Manager should make an immediate notice ordering the residents to refrain from making new burning, under threat of legal repercussion.

- B.4 - If there is recurrence of fire from the same resident, the Project Manager should immediately report it to the Fire Department of the State of Acre and the Forestry Police of Manuel Urbano requesting the immediate movement of a team to the site, for any legal proceedings, providing all necessary means; for example, a motorboat to the city of Manoel Urbano, food, a guide to the deforested site, and to provide the necessary evidence to register the occurrence with the police.

- B.5 - The Director of Moura & Rosa, upon learning of the fire, should report it immediately to the Legal Advisor of the Project who moves to the city of Manoel Urbano and take appropriate legal steps, following the case and personally taking the knowledge to IMAC, in writing, thus initiating the due process of law and criminal fine against the violator.

- B.6 - The Director of Moura & Rosa must report such fact to Carbon Securities and CarbonCo in writing, sending them a copy of all actions taken.

Upon learning of any in-migration of Project Area, the Project Manager should adopt the following procedures:

- C.1 - Shall report the fact immediately, by telephone, via e-mail or in-person, to the Board of Moura & Rosa.

- C.2 - Trigger field team to conduct an immediate inspection of the site by land or by air (via drone) in order to identify the person, the exact location of the invasion (i.e., GPS points), the extent of the invaded area, the improvements already made onsite, the goal of the invasion, making detailed photographic record of everything and using the means necessary to stop

the in-migration; for example, to notify the Public Ministry and presenting them with all the necessary evidence for the formation of the police investigation (e.g., the instruments used in the invasion such as chainsaws, photos, exact location, witnesses, etc.).

- C.3 - The Director of Moura & Rosa, upon learning of the in-migration, should report it immediately to the Legal Advisor of the Project who moves to the city of Manoel Urbano and take appropriate legal steps, following the case personally by the Public Ministry and bringing it to the prosecutor, in writing, thereby initiating the due process of law.

- C.4 - The Director of Moura & Rosa must report such fact to Carbon Securities and CarbonCo in writing, sending them a copy of all actions taken.

Upon learning of the occurrence of illegal logging or poaching in the Purus Project, the Project Manager should adopt the following procedures:

- D.1 - Notify the fact immediately by telephone, via e-mail or in-person, to the Board of Moura & Rosa.

- D.2 - Trigger field team to conduct a site survey by land or by air via drone in order to identify its agent, the exact location of the illegal occurrence (i.e., using GPS), the extracted or hunted species, the purpose of such extraction or hunting, performing detailed photographic record of everything and to use the necessary and proper means to prevent the continuation of illegal logging or poaching. All necessary evidence will be provided to IMAC and the District Police of Manoel Urbano for the formation of the police investigation; for example tools used in logging or poaching (i.e., chainsaw, machete, rifle, etc.), photos, exact location, witnesses, etc.

- D.3 - The Director of Moura & Rosa, taking note of the illegal logging or poaching, should report it immediately to the Legal Advisor of the Project who moves to the city of Manoel Urban and take appropriate legal steps, following the case personally by IMAC or the Police and bringing it to the prosecutor, in writing, thereby initiating the due process of law.

- D.4 - The Director of Moura & Rosa must report such fact to Carbon Securities and CarbonCo in writing, sending them a copy of all actions taken.

2.9 Deviations

2.9.1 Methodology Deviations

The following deviations to the methodology were applied.

Trees in the Cecropia genus were not measured as part of the forest inventory. This has been proposed as a deviation as it stands in conflict with the CP-AB requirement that "all the trees above some minimum DBH in the sample plots" be measured.

While sampling lying dead wood using the line intersect method:

- Two 92-meter transect lines were used rather than two 50-meter transect lines;
- The sampling lines did not bisect each sample plot, but rather ran from one plot center to the next; and
- The sampling lines were oriented to the north and east, and no randomization in the bearing of the first line was employed.

For validation of the allometric equation, commercial height were estimated from total height measured in the field by applying a factor of 62.9%. This commercial height to total height ratio is Amazon specific and was developed by Higuchi et al. 1998 (n = 315 trees).

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.[20]

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 r2 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:

-Volume is calculated as the volume a parabaloid rather than the volume of a cylinder;

-Only stem biomass is estimated, thus conservatively excluding other aboveground biomass; and

- A conservative measure of basal diameter (i.e., dbh) was used.

A calibration factor of 0.985 was applied to the Brown (1997) equation to ensure use of this equation results in conservative estimates of live aboveground biomass.

In the with-project case, C(post) can conservatively be assumed to be zero, not only for natural disturbance (CP,Dist,q,i , as stated in Section 5.2.3 of the M-MON 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.

AVFOR will be stratified using information and data derived from official (government) publications, peer-reviewed published sources, or other verifiable sources. Stratification is not limited to the delineation of different strata where contiguous areas of at least 100 ha differ in stocks by ≥20%.

2.9.2 Project Description Deviations

Rather than initially assessing the significance of illegal logging using temporary sample plots covering 1% of the potential degradation area (*ADegW,i*) as proposed in the project document and monitoring module of the VM0007 methodology; information gathered during the course of the participatory appraisals including amounts of fuelwood, charcoal, and timber collected by communities members will be used along with conservative assumptions to assess whether emissions due to degradation are

[20] 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.

significant using the T-SIG tool, and plot level monitoring of degradation is warranted. This deviation will be used for the first and each subsequent monitoring period. This deviation was added during the course of the first verification event. This deviation was included as it was our understanding that T-SIG could be used to determine the significance of any with-project emissions. Further, this deviation was warranted due to the significant amount of work necessary to monitoring degradation using temporary plots and the likely insignificant amount of emission resulting from degradation.

3 LEGAL STATUS

3.1 Compliance with Laws, Statues, Property Rights and Other Regulatory Frameworks (G4 & G5)

The Purus Project meets, or exceeds, all applicable laws and regulations covering worker rights in Brazil and the Project Proponents will inform all workers about their rights. The following is a list of Brazil's relevant laws and regulations covering worker's rights as of June 1, 2017:

- The Brazilian Constitution, Chapter II-Social Rights, Articles 7- 11.[21]

In addition to the Constitution, there are two additional decrees related to Brazilian labor laws.

- Consolidação das Leis do Trabalho (CLT): DECRETO-LEI N.º 5.452, DE 1º DE MAIO DE 1943 (Consolidate of Working Laws).[22]

- Estatui normas reguladoras do trabalho rural: LEI Nº 5.889, DE 8 DE JUNHO DE 1973 (Establishes Regular Norms for Rural Workers).[23]

<u>Compliance with Law</u>

Agreements between the Project Proponents as well as Agreements between CarbonCo and its contractors stipulate firms to abide by labor laws (for example, wages above Brazil's federal minimum wage) and an assurance that all Brazilian employment taxes and insurance are paid.

In addition, CarbonCo has an employee handbook to ensure proper guidelines are followed by its employees. Moura & Rosa have an explanatory letter on labor rights that will be presented to all of their employees to ensure workers are informed about their rights. Furthermore, CarbonCo's contracts with service providers outlines the relevant labor laws and stipulates no harassment of any kind will be accepted.

[21] Massachusetts Institute of Technology, "Brazilian Constitution," Available: http://web.mit.edu/12.000/www/m2006/teams/willr3/const.htm
[22] Presidency of the Republic, "DECRETO-LEI N.º 5.452, DE 1º DE MAIO DE 1943, Available: http://www.planalto.gov.br/ccivil_03/decreto-lei/Del5452.htm
[23] Presidency of the Republic. "LEI Nº 5.889, DE 8 DE JUNHO DE 1973," Available: http://www.planalto.gov.br/ccivil_03/leis/L5889.htm

CarbonCo undergoes a financial audit by an independent accountant to ensure all taxes, including employment, social and corporate, are paid. Furthermore, Moura & Rosa have provided "Certificado de Regularidade do FGTS – CRF" and the "Certidão Negativa de Débitos Relativos às Contribuições Previdenciárias e às de Terceiros," which certify that all taxes (including employee and business) and insurance (including social) are paid.

The Project Proponents will forever continue to work with the well-being of the communities in mind. This shall differ from historical employment arrangements where there were indentured servant arrangements of extractive reserves. In contrast, the communities will be offered meaningful employment, have the ability to directly shape the Project, and an ability to express any and all grievances.

The Purus Project is compliant will all relevant laws (i.e., including worker rights and laws) and the Project is founded on a solid legal framework. In addition, the Project Proponents are constantly communicating with local, regional and national authorities, there will be no involuntary relocations, and the Project Proponents have discussed actions to take in case illegal activities are discovered.

List of all Relevant International, National and Local Laws, Regulation, Treaties and Agreements

The following is a list of all the international, national and state-level laws and regulatory frameworks identified by the Project Proponents between May 2011 and December 2012 which are relevant to the Purus Project. Between January 2013 and December 2016, these international, national and state-level laws and regulatory frameworks were reviewed once again.

International Laws and Regulatory Frameworks

Brazil is a party to numerous international conventions and treaties such as the:

- Convention on Biological Diversity;
- United Nations Framework Convention on Climate Change;
- Convention on International Trade in Endangered Species of Wild Fauna and Flora;
- International Tropical Timber Organization (i.e., Brazil is a Producing Member);
- Ramsar Convention on Wetlands;
- Universal Declaration of Human Rights;
- Convention on the Elimination of All Forms of Discrimination Against Women; and
- International Labor Organization Convention.

There was also a Memorandum of Understanding (MOU) signed on March 3, 2010 between Brazil and the United States of America on "cooperation regarding climate change."[24]

[24] The Government of Brazil and the Government of the United States of America, "Memorandum of Understanding Between the Government of the Federative Republic of Brazil and the Government of the United States of America on Cooperation Regarding Climate Change," http://www.brazilcouncil.org/sites/default/files/MOUonCooperationRegardingClimateChange-Mar032010.pdf

Furthermore, there was an international MOU between California (United States), Chiapas (Mexico) and Acre (Brazil) signed on November 16, 2010.[25] The State of Acre is also an active member in the Governors' Climate and Forest Task Force.[26]

National Laws and Regulatory Frameworks

The Purus Project will continue to abide by Brazilian national laws and especially the Brazilian Constitution. This includes Chapter 6 of the Brazilian Constitution which specifically discusses environmental issues in Article 225.[27]

Compliance with Law

Although the Purus Project is privately-owned and Paragraph 1 of Article 225 specifically states "it is incumbent upon the Government," the Project Proponents will nevertheless seek to preserve the Project's ecosystems, preserve the diversity of fauna and flora, and promote environmental education. This preservation can be documented via satellite imagery, firsthand observations, and via the Project's biodiversity monitoring plan, while the local schools within the Purus Project will incorporate environmental education.

The Brazilian Forest Code is of particular importance to the Purus Project. This includes:

- The original Brazil Forest Code entitled, Law No. 4771, September 15, 1965.[28]
- Revision of Brazil Forest Code under Law No. 7803, July 18, 1989.[29]
- Provisional Measure entitled 2166-67, August 24, 2001.[30]
- Revision of Brazil Forest Code under Law No. 12.651 of May 25, 2012.[31]

Title of Law

Law Number 4771 of September 15, 1965, entitled "Establishing the new Forest Code."

[25] The State of Acre, the State of Chiapas, and the State of California, "Memorandum of Understanding on Environmental Cooperation between the State of Acre of the Federative Republic of Brazil, the State of Chiapas of the United Mexican States, and the State of California of the United States of America," http://www.gcftaskforce.org/documents/MOU_Acre_California_and_Chiapas.pdf
[26] Governors' Climate and Forest Task Force, "About GCF," http://www.gcftaskforce.org/about.php
[27] Georgetown University, "1988 Constitution, with 1996 reforms in English," Available: http://pdba.georgetown.edu/Constitutions/Brazil/english96.html#mozTocId920049
[28] Presidency of the Republic, "Law No. 4771, September 15, 1965," Available: http://www.planalto.gov.br/ccivil_03/Leis/L4771.htm
[29] Presidency of the Republic, "Law No. 7803, July 18, 1989," Available: http://www.planalto.gov.br/ccivil_03/leis/L7803.htm
[30] Presidency of the Republic, "Provisional Measure 2166-67, August 24, 2001," Available: https://www.planalto.gov.br/ccivil_03/MPV/2166-67.htm
[31] Presidency of the Republic, Civil House Cabinet Subcommittee for Legal Affairs, "Law No. 12,651, OF 25 MAY 2012," Available: http://www.planalto.gov.br/ccivil_03/_Ato2011-2014/2012/Lei/L12651.htm

Summary of Law

Law Number 4771 of September 15, 1965 was the original Brazil Forest Code. A few major provisions of the Forest Code were the establishment of permanent preservation areas (APP), establishment of legal reserves of 50% on properties in the Legal Amazon, and designation of Acre State (among others) as within the Legal Amazon territory.[32] Many of these provisions have been revised since 1965.

Compliance with Law

The Purus Project, as can be documented via satellite imagery or firsthand observations, has respected the Project's permanent preservation areas and legal reserves.

Title of Law

Law Number 7803 of July 18, 1989 entitled, "Change the wording of Law No. 4771 of September 15, 1965, and repealing Laws Nos. 6535 of June 15, 1978, and 7511 of 7 July 1986."

Summary of Law

Law Number 7803 was the first significant amendment to the original 1965 Forest Code. For example, the permanent preserve areas were reclassified. The Law also stipulated that "the exploitation of forests and succeeding formations, both public domain and private domain, will depend on approval from the Brazilian Institute of Environment and Renewable Natural Resources - IBAMA, and the adoption of techniques of driving, exploitation, reforestation and management compatible with the varied ecosystems that form the tree cover.[33]

Compliance with Law

The Purus Project will abide by the new guidance on permanent preserve areas such as to not clear forests on steep slopes or within one hundred meters proximity to rivers. Any such clearing that has taken place in the past, will be reforested by Moura & Rosa.

Title of Law

The Provisional Measure Number 2166-67 of August 24, 2001 entitled, "Changes the arts. 1, 4, 14, 16 and 44, and adds provisions to Law No. 4771 of September 15, 1965, establishing the Forest Code and amending art. 10 of Law No. 9393 of December 19, 1996, which provides for the Property Tax Territorial Rural - ITR, and other measures."

[32] Presidency of the Republic, "Law No. 4771, September 15, 1965," Available: http://www.planalto.gov.br/ccivil_03/Leis/L4771.htm
[33] Presidency of the Republic, "Law No. 7803, July 18, 1989," Available: http://www.planalto.gov.br/ccivil_03/leis/L7803.htm

Summary of Law

The Provisional Measure Number 2166-67 of August 24, 2001 was one of the latest revisions to the original 1965 Forest Code and to the amendments of Law Number 7803. The most relevant change to the Purus Project was the revision of the legal reserve requirement in the Legal Amazon (i.e., including the State of Acre) from 50% to 80% which shall be conserved.[34]

Compliance with Law

As mentioned previously, the Purus Project - as can be documented via remote sensing or firsthand observations - has respected both the Project's permanent preservation areas and the recently revised legal reserve requirement.

Title of Law

Law Number 12.651 of May 25, 2012 is the latest Brazilian Forest Code and supersedes earlier versions in 1965, 1989, and 2001.[35]

Summary of Law

The latest Brazilian Forest Code, "Provides for the protection of native vegetation; amends Laws Nos. 6938 of August 31, 1981, 9,393, of December 19, 1996, and 11,428 of December 22, 2006, repealing the Laws No. 4771, 15 September 1965 and 7754, of April 14, 1989, and Provisional Measure No. 2.166-67, of August 24, 2001, and other provisions." Key tenets of the Brazilian Forest Code include:

- Chapter 1. General Provisions
    - Article 1-A. This act lays down general rules on the protection of vegetation, Permanent Preservation Areas and Legal Reserves, forest exploitation, the supply of forest raw materials, control the origin of forest products and the prevention and control of forest fires, and provides economic and financial instruments for the achievement of its objectives.
    - VI. This act states the creation and mobilization of economic incentives to encourage the preservation and restoration of native vegetation and to promote the development of sustainable productive activities.
    - Article 3. For the purposes of this Act, the following definitions apply:

[34] Presidency of the Republic, "Provisional Measure 2166-67, August 24, 2001," Available: https://www.planalto.gov.br/ccivil_03/MPV/2166-67.htm
[35] Presidency of the Republic, Civil House Cabinet Subcommittee for Legal Affairs, "Law No. 12,651, OF 25 MAY 2012," Available: http://www.planalto.gov.br/ccivil_03/_Ato2011-2014/2012/Lei/L12651.htm

        - I - Amazon: the states of Acre, Pará, Amazonas, Roraima, Rondônia, Mato Grosso and Amapá and the regions north of latitude 13 ° S, the states of Goiás and Tocantins, and west of 44 ° W , State of Maranhão;
        - II - Permanent Preservation Area - APP: protected area, or not covered by native vegetation, with the environmental function of preserving water resources, landscape, geological stability, biodiversity, facilitate gene flow of fauna and flora, soil protection and ensure the well-being of human populations;
        - III - Legal Reserve area located within a rural property or ownership, demarcated according to Article 12, with the function of ensuring a sustainable economic use of natural resources of rural property, assist the conservation and rehabilitation of ecological processes and to promote the conservation of biodiversity, as well as shelter and protection of wildlife and native flora;

- Chapter 2. Area of permanent preservation
    - Section I. Delimitation of Areas of Permanent Preservation
        - Licensing is done by a competent environmental authority.
        - The property will be registered in the Rural Environmental Registry (i.e., CAR).
- Chapter 4. Legal reserve area
    - Section I. Delimitation of the Legal Reserve Area
        - Article 12. All property must maintain native vegetation cover in rural area, as a legal reserve, without prejudice to the application of the rules on the Permanent Preservation Areas, subject to the following minimum percentages in relation to the area of the property, except as specified in art. 68 of this Act: (Amended by Law No. 12,727, 2012).
            - 80% of properties located in the Amazon
            - 35% of properties located in the Cerrado
            - 20% of properties located in other regions of the country.[36]

<u>Compliance with Law</u>

The Purus Project is in compliance with the latest Brazil Forest Code. Acre is considered part of the Legal Amazon and thus the property will maintain 80% forest cover as a legal reserve. Similar to

[36] Presidency of the Republic, Civil House Cabinet Subcommittee for Legal Affairs, "Law No. 12,651, OF 25 MAY 2012," Available: http://www.planalto.gov.br/ccivil_03/_Ato2011-2014/2012/Lei/L12651.htm

previous versions of the Forest Code, the Project's compliance with the law is demonstrated via firsthand observations and review of satellite imagery.

In addition to the Forest Code, Brazil's National Environmental Policy is also relevant to the Purus Project.[37]

Title of Law

Law Number 6.938 of August 31, 1981 entitled, "Provides for the National Environmental Policy, its aims and mechanisms for the formulation and implementation, and other measures."

Summary of Law

Law Number 4771 of August 21, 1981 is based off Brazil's constitution and established Brazil's National Environmental Policy. Essentially, the "National Policy on the Environment is aimed at the preservation, improvement and restoration of environmental quality conducive to life, to ensure, in the country, conditions for the socio-economic development, the interests of national security and protecting the dignity of life human." Agencies were also established to carry out the National Environmental Policy.[38]

Compliance with Law

The Purus Project have identified, consulted and shall continue to work with the relevant agencies responsible for environmental protection, particularly with respect to REDD+ projects. Furthermore, the Purus Project will seek to conserve soil and water resources, protect rare and threatened ecosystems, and promote the recovery of degraded areas and encourage environmental education.

Another important national Brazilian law that is relevant to the Purus Project is the National Climate Change Policy (NCCP).[39]

Compliance with Law

A key component of Brazil's National Climate Change Policy is the voluntary reduction in greenhouse gas emissions. The Purus Project is in compliance with this voluntary target because the Purus Project is a Reducing Emissions from Deforestation and Degradation (REDD+) project. Furthermore, this compliance is demonstrated via periodic verifications of the Purus Project.

Related to the National Climate Change Policy, is a recent Brazilian federal decree addressing REDD+.

[37] Presidency of the Republic, "Law No. 6.938, August 31, 1981," Available: http://www.planalto.gov.br/ccivil_03/leis/L6938.htm
[38] Presidency of the Republic, "Law No. 6.938, August 31, 1981," Available: http://www.planalto.gov.br/ccivil_03/leis/L6938.htm
[39] World Bank, "State and Trends of the Carbon Market 2010," Available: http://siteresources.worldbank.org/INTCARBONFINANCE/Resources/StateAndTrend_LowRes.pdf.

Title of Law

The title of the Decree 8.576, of 26 November 2015, is "Establishing the National Commission for the Reduction of Greenhouse Gas Emissions from Deforestation and Forest Degradation, Conservation of Forest Carbon Stocks, Sustainable Management of Forests and Increase Forest Carbon Stocks - REDD+."

Summary of Law

The Brazilian Federal Decree 8.576/2015 establishes "the National Commission for REDD+" which "creates a committee responsible for coordinating, monitoring, and implementing the National Strategy for REDD+." See here for the complete Federal Decree 8.576/2015: http://pesquisa.in.gov.br/imprensa/jsp/visualiza/index.jsp?data=27/11/2015&jornal=1&pagina=1&totalArquivos=232

Compliance with Law

The Project Proponents have spoken numerous times to the State of Acre's Climate Change Institute and Brazil's Federal Ministry of the Environment and neither entity informed the Project Proponents of any restrictions placed on their private, voluntary REDD+ projects – particularly the Purus Project - as a result of Federal Decree 8.576/2015. The Project Proponents will continue to follow and report on this Decree as it applies to the Project.

State Laws and Regulatory Frameworks

The Project Proponents of the Purus Project abide by Acre's state laws and regulatory frameworks. The two most relevant laws are Acre's State Forestry Law (Bill Number 1.426 of December 27, 2001) and Bill Number 2.308 of October 22, 2010 entitled, The State System of Incentive for Environmental Services (SISA). SISA was "created, with the aim of promoting the maintenance and expansion of supply of the following ecosystem products and services:

> I - sequestration, conservation and maintenance of carbon stock, increase in carbon stock and decrease in carbon flow;
>
> II - conservation of natural scenic beauty;
>
> III - socio-biodiversity conservation;
>
> IV - conservation of waters and water services;
>
> V - climate regulation;
>
> VI - increase in the value placed on culture and on traditional ecosystem knowledge;

VII - soil conservation and improvement."[40]

Compliance with Law

As a tropical forest ecosystem services project, otherwise known as REDD+, the Purus Project is conserving the forests' carbon stock, while also conserving the natural scenic beauty, biodiversity, water and soil resources, along with working alongside the local communities. Such compliance is demonstrated via remote sensing, firsthand observations, and via the periodic verifications of the Project.

Related to SISA is a Normative Instruction that was released by the Climate Change Institute (IMC) to provide guidance for how special projects should register with the State of Acre.

Title of Law

IMC's Normative Instruction nº 01, of 19 October 2015. – "Regulating the item IV of the art. 7 of Law No. 2308 of 22 October 2010, disciplining the admission procedure of special projects and linked within the Environmental Services incentive program – Carbon (ISA-Carbon), State System of Incentives for Environmental Services-SISA."

Summary of Law

The Normative Instruction outlines how special projects shall register with the State of Acre including the review of the methodology, review of project documents, fees required to be paid to the State of Acre, etc.

Compliance with Law

The Project Proponents are working closely with the State of Acre's Climate Change Institute and their SISA-Carbono Program. As of December 31, 2016, the Purus Project was not incorporated into the State of Acre's jurisdictional program and thus, the Project was not yet officially participating in any GHG Program. To prevent double-counting, this voluntary private REDD+ project is using the Markit Environmental Registry to issue and trade verified carbon units (VCUs). If in the future the Purus Project is nested into the State of Acre's SISA-Carbono Program, then the Project will follow the guidance of the VCSA and/or the State of Acre.

The Project Proponents have done the following to conform to the State of Acre's SISA legislation and more specifically, the IMC Normative Instruction #1 of October 19, 2015:

- 1. Original signed, notarized copy in English and Portuguese of "Formulário de Cadastro de Desenvolvedores" (Developers Registration Form) was submitted to the IMC.
- 2. Physical copy of Project Proponents' (CarbonCo and Carbon Securities) Good Standing.

[40] State of Acre, "Unofficial Translation, State of Acre, Bill No. 2.308 of October 22, 2010," Available: http://www.gcftaskforce.org/documents/Unofficial%20English%20Translation%20of%20Acre%20State%20Law%20on%20Environmental%20Services.pdf

- 3. Physical copy of Representative's Brazilian visa and/or passport. This was done for Brian McFarland of CarbonCo and Pedro Freitas of Carbon Securities.

- 4. There was also a "Term Assignment of Use of Information" form signed between CarbonCo and the Climate Change Institute (IMC) that allowed access to the classified satellite imagery.

- 5. The landowners submitted their landownership documentation (i.e., titles, geo-referencement, etc.) to the IMC.

- 6. The IMC then received electronic copies of our VCS and CCBS Project Documents (i.e., VCS PDs and Monitoring Reports; CCBS PDDs and PIRs).

- 7. The VCS Methodology VM007, which was used by the Purus Project, was translated into Portuguese and submitted to the IMC for review on April 1, 2016.

Going forward and where required, the Project Proponents will continue to follow the IMC Normative Instruction; this includes submitting updated documents in 2017 of the Developers Registration Form, the certificates of Good Standing, copies of passports/visas and a large print out of the property map.

Acre's State Forestry Law (Bill Number 1.426 of December 27, 2001) essentially, "provides for the preservation and conservation of State forests, establishing the State System of Natural Areas, creates the State Forest Fund and other measures."[41] The Law also established the institutional responsibility for the management of State Forests, defines forests, and outlines the administrative penalties for non-compliance.

Compliance with Law

The Purus Project is on private property and thus, this law is not relevant. Nevertheless, the Project Proponents shall contribute to the sustainable use of forest resources, preserve biodiversity, and also "promote ecotourism, recreation, forestry research and education."[42]

Approval from Appropriate Authorities

Since May 2011, the Purus Project received approval from Moura & Rosa who privately own the Purus Project property and the Project Proponents also received approval from the local communities. Such approvals are evidenced by the Tri-Party Agreement between the Project Proponents, along with the initial Declarations and Memorandum of Understandings with the local communities.

Furthermore, to ensure the local communities were fully aware of the Purus Project, were able to contribute to the Project design, able to openly express desired outcomes and concerns, understood the

[41] The Governor of the State of Acre, "Acre Forestry Law, December, 27, 2001," Available: http://webserver.mp.ac.gov.br/?dl_id=800
[42] The Governor of the State of Acre, "Acre Forestry Law, December, 27, 20 01," Available: http://webserver.mp.ac.gov.br/?dl_id=800

third-party grievance procedure, and were able to voluntarily give free, prior and informed consent (i.e., for example, a written MOU is not always culturally appropriate because some community members are illiterate), CarbonCo hired the independent group PAV to visit the communities in October 2012. During this visit, communities were asked by PAV whether they would like to voluntarily join the Project.

The Project Proponents were also in active communication with the State of Acre between May 2011 and December 2016. An official, information approval letter from the Climate Change Institute for the Project Proponents to use the State's data was received on February 13, 2012. The Project Proponents also received letters of support from the Public Department of the State of Acre and the Vice-Governor of the State of Acre during this time period.

3.2 Evidence of Project Ownership (G5)

The Project Proponents have clear, uncontested title to both property rights and the carbon rights.

A review of the Landowners and the Purus Project property was conducted between May 2011 and December 2012 to ensure full title validity and accuracy. Such documentation satisfies the VCS Standard as rights of use "arising by virtue of a statutory, property or contractual right"[43] and a letter of support attesting to these rights of use has been developed.

Carbon Securities conducted an initial search for any pending cases, lawsuits, or other problems associated with the Landowners, their CPF numbers (i.e., Cadastro de Pessoas Físicas which is equivalent to a social security number in the US), their property, or their company's CNPJ number. Federal tax issues and liens associated with the Landowners and the project property, were assessed using the Cadastro de Pessoas Físicas[44] and INCRA[45] websites. INCRA, or Instituto Nacional de Colonização e Reforma Agrária, is a Brazilian Federal Institute and their website states what types of certifications are required to document appropriate landownership and who can ask for such certifications. Finally, Carbon Securities visited the IBAMA, or Instituto Brasileiro do Meio Ambiente e dos Recursos Naturais Renováveis, website[46] to ensure IBAMA has not blocked landownership titles due to noncompliance with environmental laws and regulation associated with a particular property. State and municipality level documentation[47] further demonstrated authentic land ownership. These local authorities in Acre are able to provide up to a 100-year history of landownership for the properties.

With respect to private ownership of carbon rights in Brazil, a Presidential Decree on July 7, 1999 by the Brazilian Government established the Inter-ministerial Commission on Global Climate Change as the

[43] VCS. 2012 VCS Standard. Version 3.2, 01 February 2012. Verified Carbon Standard, Washington, DC.
[44] Secretariat of the Federal Revenue of Brazil, "CPF - Cadastro de Pessoas Físicas," Available: http://www.receita.fazenda.gov.br/PessoaFisica/CPF/ CadastroPF.htm
[45] Secretariat of the Federal Revenue of Brazil, "Certidão Negativa - Imóvel Rural," Available: http://www.receita.fazenda.gov.br/guiacontribuinte/cnd_%20itr.htm
[46] IBAMA, "Certidão Negativa de Débito," Available: http://www.ibama.gov.br/sicafiext/sistema.php
[47] Ministry of Justice of Brazil, "Cadastro de Cartório do Brasil," Available: http://portal.mj.gov.br/CartorioInterConsulta/consulta.do?action=prepararConsulta&uf=AC

Designated National Authority for approval of projects under the UNFCCC Kyoto Protocol's Clean Development Mechanism (CDM).[48]

José D.G. Miguez, Executive Secretary of the Brazilian Interministerial Commission on Global Climate Change, presented on March 18, 2003 at the Organisation for Economic Co-operation and Development (OECD) Global Forum on Sustainable Development: Emissions Trading Concerted Action on Tradeable Emissions Permits (CATEP) Country Forum. Within in presentation, Mr. Miguez specifically indicated the private sectors ability "to design, develop and implement CDM project activities" in Brazil.[49] This said, there are currently numerous private sector CDM and voluntary carbon market projects in Brazil including projects within the Agricultural, Forestry and Other Land-use (AFOLU) sector.

The Tri-Party Agreement documents the transfer of some portion of these carbon rights from Moura & Rosa to CarbonCo and Carbon Securities.

3.3 Emissions Trading Programs and Other Binding Limits (CL1)

This section is not applicable because Brazil does not have an emissions trading program and REDD+ projects are currently not eligible for any compliance market. In contrast, the Purus Project was validated to the VCS and CCBS and shall be regularly verified to both the VCS and CCBS. The issuance of Verified Carbon Units (VCUs) onto the VCS-approved Markit Environmental Registry helps to ensure the avoidance of GHG emissions being double counted.

3.4 Participation under Other GHG Programs (CL1)

This section is not applicable because the Purus Project is not participating in any other GHG programs other than the VCS and CCBS.

3.5 Other Forms of Environmental Credit (CL1)

This section is not applicable because the Purus Project is not generating any other forms of environmental credits such as biodiversity offsets, watershed protection payments, or renewable energy certificates (RECs).

3.6 Projects Rejected by Other GHG Programs (CL1)

This section is not applicable because the Purus Project has not been rejected by any other GHG program.

[48] Ministry of Science, Technology and Innovation, "Designated National Authority (Interministerial Commission on Global Climate Change)," Available: http://www.mct.gov.br/index.php/content/view/14666.html
[49] José D.G. Miguez, "CDM in Brazil," Available: www.oecd.org/dataoecd/9/6/2790262.pdf

3.7 Respect for Rights and No Involuntary Relocation (G5)

The Purus Project - as a forest conservation project - will not encroach uninvited on private, community or government property. The Purus Project has been delineated and will specifically target the conservation of Moura & Rosa's private property within the Purus Project.

The areas where communities have traditionally lived on the Purus Project will also not be encroached upon as communities are voluntarily allowed to join the Project. The Project Proponents were given free, prior and informed consent from the communities interested in joining the Project and this is demonstrated via Declarations, Memorandum of Understandings, and verbal expressions to the independent firm PAV. In addition, Moura & Rosa will voluntarily recognize whatever area is currently deforested and under productive use by each family. The minimum area to be titled to each family is one hundred hectares which is the minimum size that INCRA says a family in the State of Acre needs for a sustainable livelihood. Those communities who have deforested and put under productive use over one hundred hectares will receive the full area that has been deforested. All communities, whether they join the Purus Project or not, will be titled the land they have put under productive use. Furthermore, the Project Proponents have engaged surrounding communities outside of the Purus Project Area. As opposed to encroach, Purus Project will contribute and enhance surrounding areas' climate, community and biodiversity benefits

<u>Non-Involuntary Relocation</u>

The Purus Project does not require the involuntary relocation of people nor important activities related to the communities' livelihoods and culture. Community houses, which are illegally too close to the banks of the Purus River, will be voluntarily moved and rebuilt further away from the river banks.

3.8 Illegal Activities and Project Benefits (G5)

The following are the illegal activities that could affect the Project's climate, community and biodiversity benefits.

- Hunting, fishing or collecting endangered flora and fauna;
- Illegal logging; and
- Cultivation, transportation or distribution of illegal drugs.

While conducting deforestation monitoring along with community and biodiversity impact monitoring, the Project Proponents will also keep their eyes open for illegal activities.

Ultimately, illegal activities of any kind will not be allowed in the Purus Project and the appropriate authorities will be contacted. No such illegal activities were identified at the Purus Project since May 23, 2011 and particularly between January 2016 and December 2016.

4 APPLICATION OF METHODOLOGY

4.1 Title and Reference of Methodology

The Purus Project is utilizing the Avoided Deforestation Partners' VCS REDD Methodology, entitled, "VM0007: REDD Methodology Modules (REDD-MF)." The specific modules applied to the Purus Project are listed below.

REDD-MF, REDD Methodology Framework Version 1.3

Carbon Pool Modules:

CP-AB, "VMD0001 Estimation of carbon stocks in the above- and belowground biomass in live tree and non-tree pools," Version 1.0

CP-D, "VMD0002 Estimation of carbon stocks in the dead-wood pool," Version 1.0

Baseline Modules:

BL-UP, "VMD0007 Estimation of baseline carbon stock changes and greenhouse gas emissions from unplanned deforestation," Version 3.1

Leakage Modules:

LK-ASU, "VMD0010 Estimation of emissions from activity shifting for avoided unplanned deforestation," Version 1.0

Monitoring Module:

M-MON, "VMD0015 Methods for monitoring of greenhouse gas emissions and removals," Version 2.1,

Miscellaneous Modules:

X –STR, "VMD0016 Methods for stratification of the project area," Version 1.0

X-UNC, "VMD0017 Estimation of uncertainty for REDD project activities," Version 2.0

E-BB, "VMD0013 Estimation of greenhouse gas emissions from biomass burning" Version 1.0

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, "Tool for AFOLU non-permanence risk analysis and buffer determination," Version 3.2

Use of modules, REDD-MF, M-MON, T-ADD, T-BAR, X-UNC, and X–STR, is justified as these modules are always mandatory when using the VM0007 methodology. Further use of modules, BL-UP and LK-ASU, is mandatory in the case of projects focusing on unplanned deforestation. Use of the module T-SIG is justified as it determines whether GHG emissions by sources and/or decreases in carbon pools are insignificant. Finally, CP-AB is justified as it is mandatory in all cases and CP-D is justified as it is

mandatory as the dead wood pool is greater in the baseline than project scenario. The above modules are applicable because they meet the applicability conditions of the modules.

4.2 Project Boundary (G1)

4.2.1 Sources of GHG Emissions Associated with the Baseline, Project and Leakage

GHG emission sources included in the project boundary are listed in Table 4.1. Justifications are provided when excluded from the project boundaries.

Table 4.1. GHG Emission Sources Included in the Project Boundary.

Source	Gas	Included	Justification/ Explanation
Biomass burning	CO_2	No	CO_2 emissions are already considered in carbon stock changes.
	CH_4	Yes	While CH4 and N2O emissions are conservatively excluded in the baseline, they are included in the with project case where fires occur
	N_2O	Yes	
Fossil Fuel Combustion	CO_2	No	Emissions from fossil fuel combustion in the baseline and project case are minimal. As per methodology module E-FCC “Fossil fuel combustion in all situations is an optional emission source.”
	CH_4	No	Emissions are small and negligible.
	N_2O	No	
Use of fertilizers	CO_2	No	Emissions are small and negligible.
	CH_4	No	
	N_2O	No	Excluded. No increase in fertilizer use is contemplated in the project case as part of leakage mitigation or any other activity.

4.2.2 Carbon Stock Associated with the Baseline, Project and Leakage

This project will include the following carbon pools (see Table 4.2).

Table 4.2. Carbon Pools Included in the Project Boundary.

Carbon pools	Included / Excluded	Justification / Explanation of Choice
Aboveground	Included	Mandatory to include. Tree biomass only is included, which is the most significant pool. Non-tree woody biomass (e.g. shrubs) is less in the baseline (pasture and cropland) than the project case (forest) and is conservatively excluded.
Belowground	Included	Included and treated together with aboveground biomass for completeness to include whole tree (aboveground and belowground) biomass.
Dead Wood	Included	This pool was included as it can represent a significant component of forest biomass.
Harvested Wood Products	Excluded	Excluded as no commercial harvesting for wood products[50] takes place in the baseline (as part of the forest conversion process) or with project scenarios.
Litter	Excluded	Conservatively omitted, as allowed by methodology.
Soil Organic Carbon	Excluded	As per the methodology, exclusion is always conservative. Significant changes in this pool are not expected to occur in the baseline – note that the IPCC default stock change factor for permanent grassland is 1.0, which signifies no change from original, undisturbed (forest) stocks (IPCC 2006GL Vol 4 AFOLU Chapter 6 Grassland, Table 6.2)

1. As noted in the table above, this project will consider three pools of carbon and the applicable modules are: CP-AB "VMD0001 Estimation of carbon stocks in the above- and belowground biomass in live tree and non-tree pools," Version 1.0 and CP-D, "VMD0002 Estimation of carbon stocks in the dead-wood pool," Version 1.0.

4.3 Baseline Scenario (G2)

The VCS "Tool for the Demonstration and Assessment of Additionality in VCS Agriculture, Forestry and Other Land Use (AFOLU) Project Activities" is applied to identify the baseline scenario of the project.

As per Step 1 of the tool, the following alternative land use scenarios were identified.

1. Continuation of pre-project land use with unabated threat of illegal deforestation.
2. Conversion of part of the project area to pasture by the landowners.
3. Sustainable forestry on part or all of the project area.

[50] The results of the community surveys indicated 0 of 16 communities responded yes to the question, "Do you sell timber?"

4. Project activity on the land within the project boundary performed without being registered as a VCS AFOLU project.

All land use scenarios identified above are in compliance with applicable legal and regulatory requirements, except #1, which represents illegal deforestation not undertaken by the landowners or project proponents.

4.3.1 Continuation of the Pre-Project Land Use with Unabated Threat of Illegal Deforestation

While the pre-project land use for the project area was moist tropical forest, this land use is unlikely to continue in the future given land use change patterns and deforestation pressures in the area. Considering the recent increase in deforestation on other parts of the Moura & Rosa property (i.e., those areas outside the project area) and in the region in general brought on by the paving of Brazilian Highway 364 (20 km directly northeast of the property) in 2011, portions of the project area are increasingly likely to be deforested and converted to pasture and cropland by small scale farmers.

There are approximately 18 small scale and subsistence farming communities living on the project property. These farming communities are the agents of deforestation. These communities clear a portion of forest for land to engage in small scale farming and ranching for their livelihoods. Forest is generally cleared over a period of months. The process most often starts in May/June at the beginning of the dry season with the cutting of small trees and vines by machete. Next, the farmer uses their own chainsaw or hires someone with a chainsaw to cut the larger trees down. The farmer then waits for the dead vegetation to dry for a period of time ranging from two weeks to several months. A portion of the farmers, then use fire to clear the land. Finally crops are planted for a year or two prior to conversion to pasture or the land is directly converted to pasture. In cases where fire is not used, the land is planted or grazed without full clearing. In addition to clearing land, the agents of deforestation also rely on the forest surrounding their homesteads for fuelwood to make charcoal, for hunting and gathering, and on occasion for timber.

As the agent of deforestation is small scale farmers, rather than the landowners themselves, this deforestation is unplanned. This deforestation is technically illegal as these agents of deforestation do not have the permission to convert forest land to pasture or cropland; however, this deforestation is rarely prosecuted by authorities. The most likely baseline scenario is continued conversion of moist tropical forest to pasture and cropland by small scale farmers.

Noncompliance with private properties laws is widespread and laws are systematically not enforced in Acre State. Numerous inquiries have been made to relevant state and local authorities to obtain data on levels of enforcement (or e.g., percentage of illegal land invasions resolved) of private property laws. To our knowledge no institutions currently track these cases in a systematic fashion. However, in general, in the Brazilian Amazon there is considerable uncertainty in property rights, owing to the lack of enforcement of laws to protect property rights. Hence, 100% of the areas of the municipality of Manoel Urbano and Sena Madureira (as well as the state of Acre) have insufficient levels of government enforcement of property rights sufficient to prevent or remove illegal land invasions and stop deforestation in accessible areas, as the legal institutions responsible for enforcement have uniform jurisdiction across the municipality and state of Acre. This is evidenced by historic illegal deforestation as documented in

Section 3.1. This is further supported by a letter[51] from, the President of the Acre Lawyers Association, Dr. Florindo Poersch where he states:

> In my professional opinion, illegal deforestation in the State of Acre, and particularly in the Municipalities of Manoel Urbano and Sena Madureira are rarely controlled and/or prevented by institutions of environmental control, due to lack of technical personnel and staff of the State Acre to perform this control…

Furthermore, the right to property in rural areas, in the case of invasion is difficult to apply in the State of Acre, due to lack of the judiciary's structure to escalate these demands quickly, and promptly remove invaders.

4.3.2 Conversion of Part of the Project Area to Pasture

Prior to the conception of the Purus Project, the landowners had expressed an interest in conversion of up to 20% of their property to pasture for grazing and rearing of livestock. While this is the most likely scenario for many privately held land in Acre state, this was not the case with the landowners due to perceived difficulty with ready access to markets for livestock and the strong desire to maintain the property as primary tropical rainforest.

4.3.3 Sustainable Forestry on part or all of the Project Area

Prior to the conception of the Purus Project, the landowners had also expressed an interest in sustainable forestry on 80% to 100% of the property. Again, perceived difficulty with access to domestic and international markets for timber and the strong desire to maintain the property as primary tropical rainforest made this option unappealing.

4.3.4 Project Activity on the Land within the Project Boundary Performed without being Registered as the VCS AFOLU Project

Establishment of effective forest conservation in the project area would be unlikely under any non carbon market-related scenario. The implementation of project activities to reduce deforestation pressures is tailored to the communities nearest the project area. It is possible to implement certain social and environmental programs without carbon financing, such as government assistance with agricultural extension. However, these measures on their own are not sufficient to incentivize small scale farmers in the area or new settlers to stop deforestation in and around the project area. It is only through the implementation of significant social and environmental programs, as well as implementation of forest protection measures, such as those documented in Section 1.8, that illegal deforestation can be reduced or prevented in the project area.

The following will briefly explain the land-use, project benefits, and carbon stocks, along with community and biodiversity scenarios if the Purus Project was not implemented as an ecosystem services forest conservation project (i.e., REDD+ project).

[51] A copy of this letter is contained in the project database.

Land Use without Project

To develop a defensible and well-documented baseline projection with respect to the 'without-project' reference scenario, the Purus Project utilized the Avoided Deforestation Partners' VCS REDD Methodology, entitled, "VM0007: REDD Methodology Modules (REDD-MF), v1.3." Ultimately, the Purus Project – without the Project – would continue to experience unplanned, frontier deforestation.

For a more detailed explanation of the regional land use and deforestation patterns in the 'without project scenario,' please see the validated VCS Project Description and particularly section 1.10 Conditions Prior to Project Initiation and section 2.4 Baseline Scenario.

Carbon Stock Exchanges without Project

For the detailed carbon stock changes associated with the 'without project' reference scenario and specifically the estimation of carbon stocks and the specific carbon pools included in the forest carbon inventory, please see the validated VCS Project Description. A discussion of the net change in the emissions of non-CO_2 GHG emissions is also included.

The specific carbon pools included in the forest carbon inventory was aboveground biomass, belowground biomass and deadwood. The carbon stocks in the open forest with bamboo and palm strata is estimated to be 325.5 metric tonnes of carbon dioxide equivalent ($mtCO_2e$) per hectare, while the total carbon stock for the open alluvial forest with palm strata is estimated to be 411.3 $mtCO_2e$ per hectare.

The Project Proponents used the Clean Development Mechanism "Tool for testing significance of GHG emissions in A/R CDM project activities"[52] which can be used to test the significance of non-CO_2 emission sources and tested the significance of emissions of CH_4 and N_2O from the following sources: fossil fuel combustion and biomass burning. As the relative contributions of emissions from biomass burning and fossil fuel combustion are less than 5% of the Project's GHG emissions reductions and removals, these sources can be considered insignificant and are excluded from the project boundary.

A summary of the GHG emission calculations are provided below:

Pool / Emission Source	Without Project (mtCO2e)	With Project (mtCO2e)	Leakage (mtCO2e)	Net Emissions Reductions (mtCO2e)	Percent Contribution to 10-year Total GHG Benefits (%, Relative Contribution Parameter from CDM A/R Significance Tool)
Forest Biomass	1,709,253	368,048	308,406	1,032,799	96.4%
Fossil Fuel	0	168		(168)	0.0%

[52] Clean Development Mechanism, "Tool for testing significance of GHG emissions in A/R CDM project activities" (Version 01)," Available: http://cdm.unfccc.int/EB/031/eb31_repan16.pdf

Combustion					
Biomass Burning	58,182	10,321	8,907	38,954	3.6%
Sum	-	-	-	1,071,585	-

Local Communities without Project

The local communities obtain a variety of benefits from the Purus Project and there are numerous social projects being planned as result of payments for ecosystem services.

The 'without project' scenario would be the continued unplanned, frontier deforestation activities of subsistence agriculture and cattle pastures by the local communities. The communities undoubtedly receive benefits from these activities such as locally-produced food and income generation through the sale of their crops and cattle.

However in the 'without project' scenario the communities, without a secure and legal title to land, are marginalized and vulnerable. Thus, the communities could legally be removed from the Purus Project and the communities would either need to relocate to a new patch of forest (i.e., most likely alongside the Purus River) or move to a city such as Manoel Urbano or Rio Branco.

Water and Soil

If the Landowners, instead of undertaking a forest conservation project, allowed unplanned deforestation to continue from communities, there would be significant impacts on the local water cycle and soil quality – both of which would have negative impacts on the community. Such impacts include, but are not limited to less trees to store water, resulting in potential localized flooding and additional debris from clear-cut could be swept into the river causing increased challenges of boat transportation.

Trees Impeding River Transport and Erosion of Purus River Banks
(Photo Credit: Brian McFarland)

Other Locally Important Ecosystem Services

In addition to an impact on water and soil, other locally important ecosystem services that could be impacted without the Purus Project include a loss of wildlife habitat. This wildlife habitat loss, which would also reduce the availability of game for the local community, will be discussed in greater detail in the next section.

Biodiversity without Project

There is a high-level of biodiversity in and around the Purus Project. If unplanned deforestation by the communities was allowed to continue, there would be reduced availability of habitat, a fragmented landscape, and potentially more threatened species.

Habitat Availability

If the Landowners allowed for the continuation of unplanned, frontier deforestation, the resulting open cattle pastures would provide a poor habitat for the region's biodiversity except for domesticated animals and wild species that exist in transitional forests and open grasslands. Thus, forest dependent species and especially flora would have less available habitat.

Landscape Connectivity

If the 'without project," unplanned frontier deforestation scenario continued, there would be a negative impact on landscape connectivity due to increased pressure on surrounding intact forests to the South of the Purus Project.

Threatened Species

There are several threatened flora and fauna species in the Project Area. If the Purus Project were converted to cattle pasture via unplanned frontier deforestation, these particular threatened species would likely disappear from the Purus Project due to a reduction in habitat. These threatened species could move to a higher level of extinction risk according to the IUCN. In addition, species currently considered to be at a low level of risk could move into a threatened category if the additional deforestation pressures were placed on the surrounding landscape.

4.4 Additionality (G2)

The VCS "Tool for the Demonstration and Assessment of Additionality in VCS Agriculture, Forestry and Other Land Use (AFOLU) Project Activities" is applied to demonstrate additionality for the Purus Project.

4.4.1 Simple Cost Analysis

As the project proponents of this VCS AFOLU project generate no financial or economic benefits other than VCS related income through the project activity, a simple cost analysis is justified.

Forest carbon projects, particularly REDD projects, involve substantial upfront costs ranging from $325,000 to over $650,000. This includes major items such as:

Feasibility Assessments: $10,000 to $25,000
Legal Fees and Translation Costs: $20,000 to $50,000
Site Visits and Project Design Documents Preparation: $100,000 to $250,000
Technical Work: $150,000 to $250,000
Validation Services: $40,000 to $80,000

The project activity produces no revenue, as the project area will be managed for conservation purposes, rather than for commercial timber production, livestock, or crop production. Costs associated with implementing project activities, project development, and VCS project validation are significant, as stated above. Additionally, while the project will incur ongoing costs (related to management and implementation of project activities including forest patrols, social programs, and payments for environmental services), it will not generate future financial benefits other than VCU related income. The project proponents thus generate no financial benefits, and therefore the outcome of a simple cost comparison shows significant project expenditure with no financial return in the absence of VCS-related income, thus making this REDD project impractical in the absence of carbon finance.

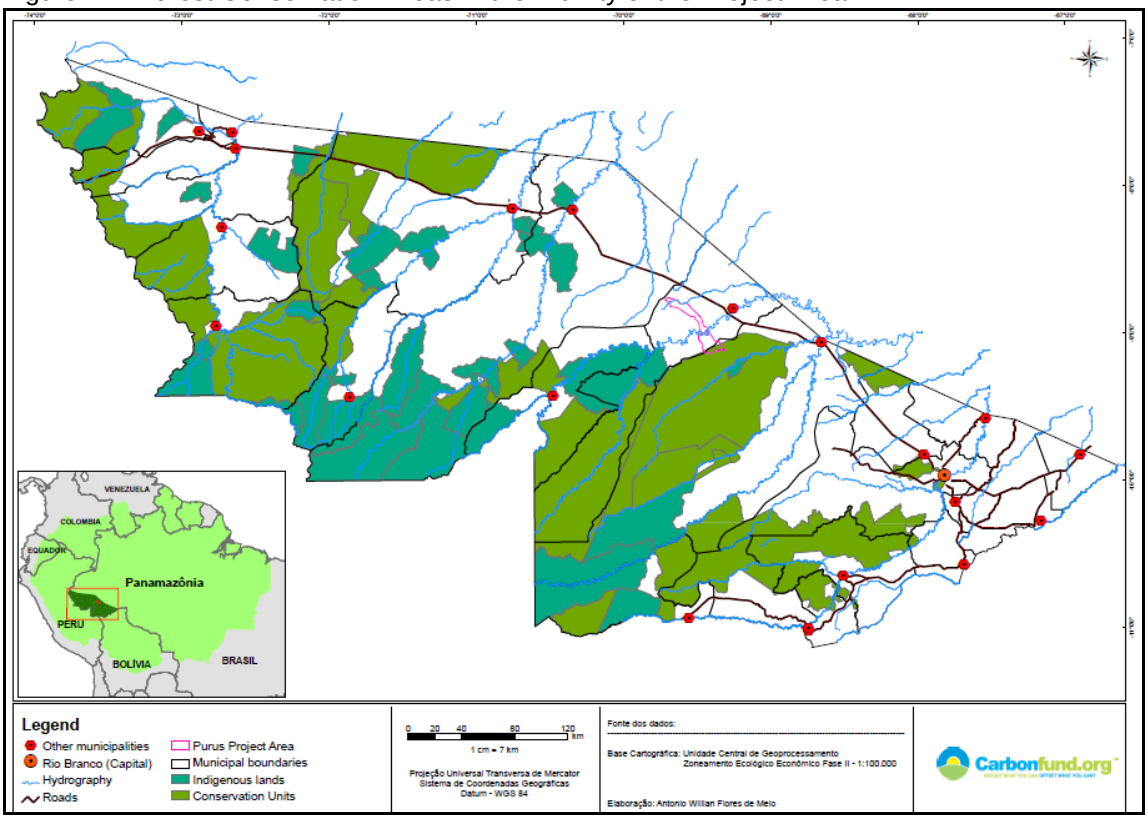
4.4.2 Common Practice

Conservation of privately owned forest land in Acre state is generally limited to designated areas of permanent protection (APP). One requirement of the Brazilian Forest Code is for landowners to maintain 80% of privately owned property as an APP. Regardless of this designation or the property owner's intentions to comply with the law, the APP areas continue to be subject to pressure from illegal deforestation.

Publicly-funded forest conservation efforts on government lands exist. Other forest conservation efforts within Acre state include a series of national, state, and local conservation areas, extractive reserves, and indigenous reserves (see Figure 4.1, below). However, to our knowledge, there are no privately funded projects on private lands with the aim of stopping unplanned deforestation in Acre state without the aid of carbon finance.

While the conservation areas and extractive reserves have had some successes at maintaining forest cover, the essential distinction between these lands and the project area is that the project area is privately owned and does not have access to government resources to deter unplanned deforestation pressures on its land.

Figure 4.1. Forest Conservation Areas in the Vicinity of the Project Area.



4.4.3 Results of the Additionality Analysis

As demonstrated above, the project activity, without revenue from carbon credits, is unlikely to occur and is not a common practice in the region. The project is therefore additional.

The predominant land-use among medium-to-large landowners along the BR-364 and BR-317 highways is the conversion of primary forests to cattle pastures. The pressure on the Purus Project is increasing with each passing year as BR-364 has now been paved. Thus, BR-364 allows for year-round transportation and most likely increase property values and market access for landowners' cattle.

Similarly, the Purus Project Landowners' initial desire was to deploy a livestock project, which would have involved clear-cutting 20% of the area to accommodate 10,000 to 12,000 head of cattle, and a forest management project for logging. However, these activities would have involved the relocation of all local residents and thus, would have increased the marginalized urban population, without qualification, education, nor employment. This conversion of such land to cattle pastures would have been in full compliance with the Brazilian Forest Code.

Without a payment for ecosystem services forest conservation project, the Purus Project Landowners would continue to pay taxes on their property without generating any economic returns unless planned forest conversion took place. If forest conversion took place, the Purus Project's biodiversity would surely be reduced and the communities' might be forced to relocate. This community relocation could have

resulted due to expanding economic activities (for example, cattle ranches expand into areas traditionally used as hunting grounds or into areas used for charcoal collection) or at the request of a new landowner.

Even if planned forest conversion by the Landowners did not take place, there would still be increasing pressure on the Purus Project's forests via unplanned, frontier deforestation from the community and neighboring landowners. This is the most likely 'without-project' scenario. Thus, the communities within the Project Area would continue to expand unsustainable subsistence agriculture and cattle-ranching practices, while surrounding communities encroached on the Project Area and in-migration continued.

The lack of economic returns in the 'without project' scenario would result in the Landowners' inability to provide a range of social projects (e.g., offering agricultural courses and establishing a health clinic) for the communities along with an inability to research the Purus Project's biodiversity. In addition, there are significant financial and institutional resources required to develop a validated and verified REDD+ project. Furthermore without a REDD+ project, the communities would not receive agricultural extension trainings (i.e., which shall assist with increasing and diversifying incomes) nor a share of the Project's carbon offset revenue.

For a more detailed discussion of the Purus Project's additionality, please also see the validated VCS Project Description section 2.5 Additionality.

5 MONITORING DATA AND PARAMETERS

5.1 Description of the Monitoring Plan (CL3, CM3 & B3)

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-MON)." This section focuses on establishing procedures for monitoring deforestation, illegal degradation, natural disturbance, and project emissions ex-post in the project area and leakage belt. 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 baseline or 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. As such, parameters related to calculating emissions from commercial timber harvest, including ADECKS,I,t; AROAD,i,t; CAB_tree_dest, i; CBB_tree_dest, i; CS/U,lg; CB,lg; Lsk; VEXT,z,i,t; VEXT,j,z,i,t; and WSKID, are not included in the project.

None of the project area has been or will be registered under another carbon trading scheme during the VCS project lifetime, other than CCBA. Further, the property is under the private ownership of Moura & Rosa, a project proponent, and registration under the CDM or under any other carbon trading scheme is not feasible without their consent.

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

Monitoring Deforestation and Natural Disturbance

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 multiplying areas $A_{DefPA,u,i,t}$ and $A_{DistPA,q,i,t}$,, for deforestation and natural disturbance, respectively, by the forest carbon stock remaining after deforestation or disturbance. 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 unplanned deforestation in the project area to the year in which the disturbance occurred. Stock estimates from the initial field inventory completed in 2011, are valid for 10 years (per VM0007). Table 5.1 shows the data and parameters monitored.

Table 5.1 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
ARRL,forest,t	Remaining area of forest in RRL at time t	Ha	Updated prior to each verification event

Changes in forest cover ($A_{DefPA,u,i,t}$ and $A_{DistPA,q,i,t}$) will be monitored using data provided by the State of Acre. UCEGEO, the Central Unit of GIS and Remote Sensing within the Climate Change Institute (IMC in Portuguese) in Acre, produces an annual dataset on the extent and spatial location of all deforestation within the state using Landsat images. This dataset extends back to 1988. The definition of forest used in the classified dataset is in broad agreement with the Brazilian definition of a forest[53] as set by the Clean Development Mechanism Designated National Authority.

The UCGEO classification methodology includes atmospheric and geometric correction and uses a supervised classification approach. Landsat images with cloud cover covering less than 10% of a scene were downloaded and corrected for any atmospheric problems (using Carlotto HAZE algorithm) and geometric correction (using images Geocover 2000). Georeferencing was 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 includes 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 are selected using expert knowledge that are distributed throughout the image and represent the variability within each class. A supervised classification[54] approach was used with the Support Vector Machine (SVM) classification algorithm. All processing was implemented in ENVI + IDL 4.6 except georeferencing which was carried out using ERDAS IMAGINE 9.

Deforestation and natural disturbance may 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.

In the case where this dataset ceases to be available, or if newer and/or higher quality data becomes available, ex-post deforestation will be determined by classification of remotely sensed imagery and land use change detection procedures.

The project area (and leakage belt boundary), as set in the 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.

The area of remaining forest in the RRL (ARRL,forest,t) is derived by subtracting the nonforested area within the RRL, as found in the forest benchmark map (updated at each monitoring event), from the total area of the RRL (2,394,108 ha).

[53] The Clean Development Mechanism Designated National Authority in Brazil has set the forest definition as:
1. Minimum tree crown cover of 30 per cent;
2. Minimum land area of 1 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.

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

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 on the Moura & Rosa property adjacent to the project area; and
- Nearby ranches and rural properties, along the Purus River and secondary roads approaching 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 PRAs will be used to calculate logging emissions in conjunction with conservative assumptions/estimates including that all wood collected was live, 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, ≥ 69cm.

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 of Brown (1997) and otherwise maintain consistency with analytical procedures applied 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 carried out 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 5.2 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 emission from fossil fuel combustion (EFC,i,t) + non-CO_2 emissions due to biomass burning (E BiomassBurn,i,t) + direct N_2O emissions as a result of nitrogen application (N2Odirect-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 alternative land uses in the with-project case and hence project emissions therefore equal E BiomassBurn and are calculated using the VMD0013, “Estimation of greenhouse gas emissions from biomass burning (E-BB)” 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-BB 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)."

Table 5.3 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 average aboveground biomass stock in the baseline case.
COMF i	Combustion factor for stratum i; dimensionless	Dimensionless	0.45 for primary open 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 SAR: CH_4 = 21; N_2O = 310).

Monitoring Leakage

Leakage by local agents of deforestation is quantified in the leakage belt. The area deforested in the leakage belt (ADefLB,i,t) is estimated in the same manner as the area deforested in the with-project case ($A_{DefPA,u,i,t}$) using the procedures outlined above in the monitoring deforestation section. Aburn,i,t is assumed to be equal to ADefLB,i,t unless monitoring and on the ground observations demonstrate otherwise. Activity shifting leakage within the leakage belt (ΔCLK-ASU-LB) is then calculated as the with-project emissions in the leakage belt (ΔCP,LB) minus the baseline emissions in the leakage belt (ΔCBSL,LK,unplanned).

Table 5.4 Data and Parameters for Monitoring Activity Shifting Leakage.

Parameter	Description	Units	Source/ Justification of Choice of Data or Description of Measurement Methods
ΔCP,LB	Net greenhouse gas emissions within the leakage belt in the project case	t CO_2e	Calculated
ADefLB,i,t	Area of recorded deforestation in the leakage belt at time t	Ha	Monitored for each verification event
$\Delta C_{P,Def,i,t}$	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

Immigrant leakage is calculated using a series of equations found in the LK-ASU module. Most of the data for calculating immigrant leakage has been derived for the ex-ante estimates (including ΔCBSL,LK,unplanned; AVFOR; TOTFOR; PROTFOR; MANFOR; PROPLB; LBFOR; COLB; CLB; PROPCS; and ABSL,PA,unplanned,t) or gathered in the course of monitoring activity shifting leakage within the leakage belt and deforestation in the project area (including ADefPA; ADefLB,i,t; and ΔCP,LB).

The monitoring parameters MANFOR, PROTFOR, TOTFOR will be sourced from official data, peer reviewed publications or other verifiable sources, such as the Brazil Global Forest Resources Assessment Report published by the FAO and these monitoring parameters will be updated on review of

current literature at least every 5 years. Demonstration that managed and protected forests will be protected against deforestation will further be demonstrated, as stipulated in the LK-ASU module.

Monitoring immigrant leakage will therefore consist of implementing surveys in communities living within 2 kilometers of the boundaries of the leakage belt and project area to determine what proportion of the agents of deforestation have been resident in and around the leakage belt and project area for ≥ 5 years (PROPRES) and the proportion of area deforested by population that has migrated into the area in the last 5 years (PROPIMM). As it is extremely sensitive to ask explicit questions regarding responsibility for deforestation, "the proportion of area deforested by population that has migrated into the area in the last 5 years" is assumed to be equal to the percentage of recent immigrants among local population with potential access to the project area (i.e. without directly asking if they are deforestation agents). Similarly, the "proportion of baseline deforestation caused by population that has been resident for ≥5 years" is assumed to be equal to the percentage of the local population residing in the area longer than 5 years with potential access to the project area.

Table 5.5 Data and Parameters for Monitoring Immigrant Leakage.

Parameter	Description	Units	Source/ Justification of Choice of Data or Description of Measurement Methods
PROPIMM	Proportion of area deforested by immigrant agents in the leakage belt and project area	proportion	Monitored prior to each verification event and at least every 5 years
PROPRES	Proportion of baseline deforestation caused by population that has been resident for ≥5 years	proportion	Monitored prior to each verification event and at least every 5 years
TOTFOR	Total available national forest area	ha	Monitored prior to each verification event and at least every 5 years
PROTFOR	Total area of fully protected forests nationally	ha	Monitored prior to each verification event and at least every 5 years
MANFOR	Total area of forests under active management nationally	ha	Monitored prior to each verification event and at least every 5 years

Updating Forest Carbon Stocks Estimates

Forest carbon stock estimates will be derived from field measurements less than or equal to 10 years old. Sample plots will be randomly located in areas within the Purus Project and measured following standard operating procedures located in Appendix B of the project document. Biomass will be estimated applying the following allometric equations and otherwise maintain consistency with analytical procedures applied in the original inventory ("Forest biomass carbon inventory for the Purus REDD Project, Acre State, Brazil," 2011).

For live trees, biomass is calculated as a function of diameter at breast height (DBH; in cm) using the predictive model developed by Brown[55] for tropical moist forest stands. Results of this equation are conservatively adjusted downward using a calibration factor of 0.985. Application of the "moist" equation reflects the annual precipitation for the inventoried area, 2100mm.

aboveground biomass (kg) = ((42.69-12.8*(DBH)+1.242*(DBH)^2))*0.985 Equation 5.1

For palms, height and dbh (a conservative estimate of basal diameter) measurements are used to estimate the aboveground volume of a paraboloid and then mean (species level) Amazonian palm specific gravity of 0.31 g/cm3 estimated by Baker et al (2004) 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)*0.31 Equation 5.2

Root biomass density is estimated at the cluster sample level applying the equation developed by Cairns et al.[56] , where

Root Biomass Density (t/ha) = EXP (-1.085 + 0.925 LN(aboveground biomass density)) Equation 5.3

The volume of lying dead wood per unit area is estimated using the equation (Warren and Olsen[57]) as modified by Van Wagner[58] separately for each dead wood density class:

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

Equation 5.4

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

[55]Brown, S., 1997. Estimating biomass and biomass change of tropical forests: A primer. FAO Forestry Paper: vii, 55 p.
[56] 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.
[57] Warren, W.G. and Olsen, P.F. (1964) A line intersect technique for assessing logging waste. Forest Science 10: 267-276.
[58] Van Wagner, C.E. (1968). The line intersect method in forest fuel sampling. Forest Science 14: 20-26.

(bole) of the tree, in which case the biomass was calculated converting volume to biomass using dead 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 protocols (see Appendix B of the project document for more details). 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[59] Guidelines for National Greenhouse Gas Inventories).

Revision of the Baseline

The baseline as outlined here in the Project Description is valid for 10 years, through May 23, 2021. The baseline will be revised every 10 years from the project start date.

Data collection procedures in regards to revision of the baseline will include participatory rural appraisals, interviews and collaboration with the Acre State government, UCEGEO, the GIS department within the Climate Change Institute, and municipal officials. In the case, where the Acre State government no longer produces the annual dataset on the extent and spatial location of all deforestation within the state, deforestation maps will be prepared by classifying remotely sensed imagery. Other datasets used to substantiate aspects of the baseline with be from official government sources, peer reviewed publications, or other reputable sources.

Quality Assurance/Quality Control and Data Archiving Procedures

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

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 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.

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

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 (Landsat 3,4 & 5) 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.

<u>Forest Carbon Stocks and Degradation</u>

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. An opportunistic sample of plots will be re-measured to identify and correct any field measurement issues which arise during implementation of the monitoring plan and to assess measurement errors. Re-measurement for this purpose will be done by different field personnel.
3. 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.

Quality control procedures related to monitoring leakage include conducting a review of the current literature at least every 5 years to source information on the area of the monitoring parameters MANFOR, PROTFOR, and TOTFOR. Further, participatory rural appraisals used to assess the length of time people have been living in the project area and leakage belt will be implemented by personnel with experience conducting community surveys in rural Brazil.

Personnel involved in the revising of the baseline will have detailed knowledge in regards 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.

Data Archiving

Data archived will be maintained through at least two years beyond the end of the project crediting period. Given the extended time frame and the pace of production of updated versions of software and new hardware for storing data, electronic files will be updated periodically or converted to a format accessible to future software applications, as needed.

Organization, Responsibilities, and Monitoring Frequency

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

Table 5.6. Type of Monitoring and Party Responsible for Monitoring.

Variables to be Monitored	Responsible	Frequency
Monitoring deforestation and natural disturbance	MouraRosa	Prior to each verification
Monitoring illegal degradation	Moura & Rosa	Every two years
Monitoring project emissions	CarbonCo	Prior to each verification
Activity shifting immigrant leakage assessment	Moura & Rosa	Prior to each verification event and at least every 5 years.
Updating forest carbon stocks estimates	CarbonCo	At least every 10 years.
Revision of the baseline	CarbonCo	At least every 10 years.

Climate Impact Monitoring

Between January 2016 and December 2016, the Purus Project Proponents continued to implement the climate impact monitoring plan which identifies the types of measurements, sampling method, and frequency of measurements.

Initial Monitoring Plan

The Purus Project has a complete and detailed climate impact monitoring plan which accounts for leakage and the required carbon pools. Leakage monitoring, which will be done via aerial monitoring from the drone, by conducting participatory rural assessments, as well as from reviewing satellite imagery, will continue for at least five years after all activity displacement or other leakage causing activities have taken place.

Full Monitoring Plan

For the Purus Project's full climate impact monitoring plan, which also addressed the initial monitoring plan requirements, please see the VCS Project Description section 4 Monitoring. This full climate impact monitoring plan, and its ongoing monitoring results, was made publicly available on the internet and was made available to the communities and the Purus Project's other stakeholders.

Community Impact Monitoring

Between May 2011 and December 2012, the Project Proponents designed an initial community impact monitoring plan and committed to developing a full community impact monitoring plan. The full community impact monitoring plan was submitted to the CCBS on May 15, 2013. The Project Proponents disseminated this full community impact monitoring plan and the results of the monitoring plan specifically to the local communities and other stakeholders, along with making the plan and results publicly available via the internet to the general public.

Initial Community Monitoring Plan

The initial community monitoring plan involved regular communication between Moura & Rosa and the communities. With respect to outside stakeholders, the initial monitoring plan involved informal conversations with outside stakeholders and reviewing the Brazilian Census' socio-economic variables for the municipalities of Manoel Urbano and Sena Madureira.

Initial High Conservation Values Plan

The PRA and BNS were designed to measure the communities' high conservation values (HCVs) and the Project Proponents will continue to monitor these HCVs. The BNS and PRA will be administered every two years and the Purus Project will be fully discussed with each family prior to re-administering the BNS and PRA. This includes a discussion of the Project's benefits (i.e., particularly the HCVs) and implemented activities, along with the communities' costs and risks to participation.

The BNS was originally administered in March 2012 and illustrated what the local communities viewed as basic necessities. Each time the BNS is re-administered, the local communities will be re-asked which items are considered basic necessities and this will allow the Project Proponents to monitor whether what are locally considered basic necessities remain constant or change over time. The second BNS that was conducted in 2014 revealed that local needs remained basically the same as in 2012. The third BNS was conducted in 2016.

The Project Proponents were aware of the Ramal entering the Project Zone, as this was picked up during the preliminary deforestation modeling and via regular monitoring. Unfortunately, communities will not be offered land title in the leakage belt because this land is not owned by Moura & Rosa and nor will land be granted to communities who recently settled onto the Purus Project because the law states that families must have made the land productive (i.e., establish a house, raising cattle, and planting crops) for at least ten years. Other benefits offered by the Purus Project, such as access to the health clinic or doctor visits, will be offered to everyone and families living at the end of the Ramal will be invited via radio and via personal visits.

In addition, Moura & Rosa are respecting the communities' access to HCVs such as fuelwood and fishing. In contrast, the Guitas are illegally deforesting and persuading their families to line up against the Purus Project even though the Purus Project would deliver significant benefits to all the communities except the wealthiest Guita who stands to benefit from continued illegal deforestation. The wealthy Guita does not want the Purus Project because the wealthy Guita wants more land and the only way to get more land is to continuously deforest, which is illegal. This said, the Purus Project is starting to deliver real, tangible benefits and the Guitas will increasingly have a difficult time to persuade the communities from not joining the Project.

Ultimately, if the situation is solved with the Guitas, then the eight families who are Guitas (including two of the families upriver) will be much more receptive to the Purus Project. In 2016 and especially in 2017, Moura & Rosa convened meetings with Public Prosecution Office of the State of Acre and these meetings were attended by the Guitas. The Public Prosecution Office is assisting with titling land to the local communities and assisting with stopping the illegal deforestation by the Guitas.

Full Monitoring Plan

While Moura & Rosa will continue to be in regular communication with the communities, the Purus Project's full community monitoring plan is to monitor the indicators derived from the PRA, BNS and Theory of Change's activities, outputs, outcomes and community impacts. The frequency of monitoring and reporting to ensure that these indicators are directly linked to the Purus Project's major community objectives and are leading to the anticipated net positive impacts will take place approximately every two years.

The Project's community impact monitoring baseline was established in March 2012, when the PRA and BNS were conducted by the Project Proponents with the local communities.

The following are the Purus Project's indicators of activities, outputs, outcomes and community impacts which demonstrate net positive community impacts:

Indicators of Activities

- Signed Tri-Party Agreement between Project Proponents
    - The Tri-Party Agreement was signed on March 17, 2011.
- Completion of Forest Carbon Inventory
    - TECMAN was contracted in July 2011, participated in classroom and field training in August 2011, and then TECMAN conducted the Purus Project's forest carbon inventory from August to November 2011. TECMAN was also contracted by CarbonCo in 2013 to conduct the forest carbon inventory at two other REDD+ projects in Acre and again in 2014 for the fourth CarbonCo REDD+ project in Acre.
- Completion of Regional Deforestation and Land-Use Modeling
    - Professor Flores was contracted in October 2011 and assisted with the Purus Project's modelling from approximately August 2011 to September 2012. Professor

Flores was later contracted in April 2013, February 2014, March 2015, February 2016, and February 2017 to assist with data acquisition for the Purus Project.

- Completion of VCS Project Description and CCBS Project Design Document
  - The Project Design Documents (PDDs) were written, reviewed and revised between May 23, 2011 and December 31, 2012. The PDDs were submitted for validation on April 29, 2012 and were officially validated in January 2013.
- Completion of the Agricultural Survey, Basic Necessities Survey and Participatory Rural Appraisal
  - These aforementioned surveys were conducted in March 2012. Additional PRAs with a focus on degradation were conducted in 2013 and 2015. An additional BNS was conducted in 2014 and 2016.

<u>Indicators of Outputs</u>

- Validation Statement for VCS Project Description and CCBS Project Design Document
  - Validation Statement was received in January 2013.
- Spreadsheet with Top-10 Agricultural Courses Identified
  - Conducted March to April 2012.
- Invoice for Top-10 Agricultural Courses Purchased
  - Courses Purchased in March 2012.
- Agricultural Extension Trainings / Courses Conducted
  - Agricultural Extension Trainings / Courses were initially conducted in July-August 2013. Moura & Rosa engaged and later partnered with UFAC's School of Agronomy in 2016 and 2017 to assist with demonstration projects of various crops including cacao.
- Spreadsheet Compiling Data on Basic Necessities including: What are Considered Basic Necessities; Total Value of Owned Assets and Total Value of Owned Assets per Capita; Price of Assets; Poverty Score and Poverty Index
  - Conducted in March and April 2012, Second BNS Conducted in 2014, and Third BNS Conducted in 2016.
- Summary Statistics on: Income/Asset Inequality; Most Disadvantaged Communities; Most Under-Owned Assets; Most Desired Basic Necessities
  - Conducted in March and April 2012, Second BNS Conducted in 2014, and Third BNS Conducted in 2016.
- Qualitative Surveys and Spreadsheet Compiling Data on: Land-Use; Patterns of Deforestation and Yearly Cycle of Deforestation; Why and Where Deforestation and Degradation Occurs; Deforestation from Residents vs. Recent Migrants
  - Conducted in March and April 2012; Additional PRAs focused on degradation were conducted in 2013 and 2015.

<u>Indicators of Outcomes</u>

- Value of Carbon Finance Generated

    - Carbon Finance was generated in December 2013 upon successful verification and more carbon finance was generated throughout 2014, 2015, and 2016.
- Communities Gain New Knowledge, Practices and Skills About Sustainable Agricultural and Rotational Cattle Pastures
    - Initial agricultural courses were taught in July and August 2013. Moura & Rosa engaged and later partnered with UFAC's School of Agronomy in 2016 and 2017 to assist with demonstration projects of various crops including cacao.
- Prioritization and Implementation Plan for Social Projects and Programs to Reduce Deforestation and Improve Community Benefits
    - Achieved between January 2013 and December 2016.
- Baseline for Monitoring Community Benefits
    - Achieved in March and April 2012.
- Formulation of Plan to Mitigate Leakage
    - Achieved between May 2011 and December 2012.
- Formulation of Plan to Monitor Deforestation
    - Achieved between May 2011 and December 2012.

<u>Indicators of Impacts</u>

- Community Income Diversified
    - Local project managers hired from community in March 2012, and two replacement personnel (Kidney and Rogério) were hired in 2013. Upon the resignation of Kidney and Rogério, two replacement personnel (Rosanio and Edicarlo) were hired in July 2016 and March 2017.
    - Over the years, several local community members have been hired as cooks, guides, and to help build the health clinic.
    - The School of Agronomy at UFAC, which was engaged in 2016 and will participate in the Purus Project in 2017, will teach communities different agricultural techniques, which should help diversify incomes.
- Increased Income Generation
    - Local project managers hired from community in March 2012, and two replacement personnel (Kidney and Rogério) were hired in 2013. Upon the resignation of Kidney and Rogério, two replacement personnel (Rosanio and Edicarlo) were hired in July 2016 and March 2017.
    - Over the years, several local community members have been hired as cooks, guides, and to help build the health clinic.
    - The School of Agronomy at UFAC, which was engaged in 2016 and will participate in the Purus Project in 2017, will teach communities different agricultural techniques, which should help increase income generation.
- Reduced Deforestation
    - Achieved between May 2011 and December 2016
- Intensified Agricultural Practices
    - Future activity, with initial agricultural courses taught in July and August 2013.

- Rotational Cattle Pastures Implemented
    - Future activity, with initial agricultural courses – including a course on sustainable cattle pastures – taught in July and August 2013.
- Diversified Crops
    - Future activity, with initial agricultural courses taught in July and August 2013.
- Increasing Communities' Owned Assets and Owned Assets per Capita
    - Follow-up BNS conducted in 2014 and 2016; owned assets remained nearly the same.
- Improved Poverty Figures and Poverty Scores
    - Follow-up BNS conducted in 2014 and 2016; poverty scores and figures remained nearly the same.
- Increased Access to Basic Necessities
    - Follow-up BNS conducted in 2014 and 2016; access to basic necessities – particularly access to a health clinic - are improving.
- Increase in School Attendance
    - Future activity.
- Increased Rural Electrification
    - Future activity.
- Increased Access to Health and Dental Clinic
    - Itinerant Health program administered in December 2014 and onsite health clinic constructed in 2015 and 2016. Several visits by doctors, dentists, and nurses have occurred since 2014.

Although very limited leakage is predicted outside of the Project Zone due to the project activities of the Purus Project, the other stakeholders who might be negatively impacted due to the Purus Project are the communities and landowners living adjacent to the Project Zone and within the municipalities of Sena Madureira and Manoel Urbano.

To quantify and document changes in the social and economic well-being of these outside stakeholders which result from the project activities, the Project Proponents will review the Brazilian Census approximately every four years to document the socio-economic variables in the municipalities of Sena Madureira and Manoel Urbano. These specific socio-economic variables to be monitored include:

- Total employed personnel;
- Resident population;
- Gross Domestic Product (GDP) per capita at current prices;
- Value of average nominal monthly income of permanent private households with household income, by status of the housing unit – Rural;
- Value of average nominal monthly income of permanent private households with household income, by status of the housing unit – Urban;
- Resident population – literate;
- Enrollment - Elementary school;

- Enrollment - High school;
- Number of Health institutions;
- Percentage of Permanent private housing units, by existence of piped water and type of water supply - With water supply; and
- Percentage of Permanent private housing units - with energy supply.[60]

The Project Proponents will then interview the outside stakeholders adjacent to the Project Zone every four years to quantify their socio-economic variables (i.e., the same socio-economic variables described above). Next, the Project Proponents will conduct a statistical analysis to determine whether the outside stakeholders' socio-economic variables are significantly worse off than the residents throughout the municipalities of Sena Madureira and Manoel Urbano due the project activities of the Purus Project.

The Brazilian 2010 census was used to establish a baseline of these socio-economic variables for outside stakeholders living in Sena Madureira and Manoel Urbano and the results can be found below. It was originally thought the next Brazilian census was scheduled for 2014. However, the next Brazilian census is actually not planned until 2020 (i.e., every 10 years). Nevertheless, the Project Proponents interviewed eight outside stakeholders living in Sena Madureira and Manoel Urbano in 2016.

Select Socio-Economic Variables from Brazil's 2010 Census for Sena Madureira and Manoel Urbano

	Variable	Sena Madureira	Manoel Urbano
1	Total employed personnel	1,996	508
2	Resident population	38,029	7,981
3	Gross Domestic Product (GDP) per capita at current prices	10,356.72	8,453.30
4	Value of average nominal monthly income of permanent private households with household income, by status of the housing unit – Rural	864.22	668.51
5	Value of average nominal monthly income of permanent private households with household income, by status of the housing unit – Urban	1,651.25	1,689.40
6	Resident population – literate	24,980	4,392
7	Enrollment - Elementary (2009)	8,777	2,048
8	Enrollment - High school (2009)	1,514	216
9	Number of Health institutions	14	5
10	Percentage of Permanent private housing units, by existence of piped water and type of water supply - With water supply	58.26%	64.44%
11	Percentage of Permanent private housing units - with energy supply	85.54%	79.44%

Below are the results of the 2016 outside stakeholder surveys:

Select Socio-Economic Variables from 2016 Outside Stakeholder Surveys

	Variable	Sena Madureira	Manoel Urbano

[60] IBGE, "Click here to get information about municipalities at Cities@," Available: http://www.ibge.gov.br/estadosat/perfil.php?sigla=ac#

1	Total employed personnel	6	7
2	Resident population	12	16
3	Gross Domestic Product (GDP) per capita at current prices	R$23,950	R$4,630
4	Value of average nominal monthly income of permanent private households with household income, by status of the housing unit – Rural	N/A	N/A
5	Value of average nominal monthly income of permanent private households with household income, by status of the housing unit – Urban	R$6,950	R$1,500
6	Resident population – literate	8	11
7	Enrollment - Elementary school	3	2
8	Enrollment - High school	0	2
9	Number of Health institutions	18-19	3
10	Percentage of Permanent private housing units, by existence of piped water and type of water supply - With water supply	100%	100%
11	Percentage of Permanent private housing units - with energy supply	100%	100%

Biodiversity Impact Monitoring

The Project Proponents have an initial biodiversity monitoring plan and a full biodiversity impact monitoring plan was implemented within a year of project validation. This full biodiversity monitoring plan was submitted to the CCBS on May 15, 2013. The Project Proponents disseminated this full biodiversity impact monitoring plan and the results of the monitoring plan specifically to the local communities and other stakeholders, along with making the plan and results publicly available via the internet to the general public.

Initial Biodiversity Monitoring Plan

The Project Proponents initial plan was to monitor forest loss (i.e., habitat availability) in the Project Area and Project Zone on a yearly basis using the State of Acre's remote sensing data. The Project Proponents historically monitored deforestation using aerial surveillance via a trike or rented plane approximately once per month. Starting in 2016, the Project Proponents now monitor via a drone.

Initial High Conservation Values Plan

The Project Proponents recognize the particular importance of the Project's High Conservation Values and will assess the effectiveness of the Project's conservation activities vis-à-vis the Project's High Conservation Values.

The measures to maintain or enhance the significant concentrations of biodiversity – particularly threatened species, endemic species and threatened ecosystems - within the Purus Project are the various deforestation mitigation activities.

The initial plan to assess the effectiveness of these various deforestation mitigation activities included:

- Review satellite imagery for deforestation and aerial monitoring via trike of deforestation to ensure effective conservation of forest cover (i.e., a threatened or rare ecosystem).
- Incorporate analysis of the population and distribution of threatened and endemic species identified with wildlife camera traps into full biodiversity monitoring plan.
- Review ongoing Participatory Rural Assessments and Basic Necessity Surveys to ensure effectiveness of maintaining or enhancing community HCVs.

Additional mechanisms to ensure effective maintenance or enhancement of HCVs will be developed utilizing adaptive management and stakeholder consultation.

Full Monitoring Plan

The Project Proponents' full biodiversity impact monitoring plan will continue to monitor forest cover and habitat availability on an annual basis via satellite imagery and monthly flights over the Purus Project with a trike, rented plane, or drone. In addition, the Project Proponents will continue to monitor the diversity, distribution, and populations of medium-to-large mammals with wildlife camera traps. Furthermore, a Theory of Change shall be used to link the Projects activities to outputs and outcomes, and to the overall biodiversity impacts.

From May 2011 to December 2012, the basic process of developing this full biodiversity impact monitoring plan was:

- 1. Review the Rapid Biodiversity Assessment Study done at Purus Project;
- 2. Conducted background research; and
- 3. Identify local partners and community members to assist with monitoring plan.

The first two steps informed the monitoring plan on which biodiversity variables to monitor. Likewise, the rapid biodiversity assessment identified threatened flora and fauna at the Purus Project site. Background research included: Reviewing the wildlife camera trap techniques deployed by other REDD project developers;[61] How to position cameras, sampling designs, and field crews;[62,63] Technical elements of

[61] Waldon, Jeff, Bruce W. Miller and Carolyn M. Miller, "A model biodiversity monitoring protocol for REDD projects," September 2011, Tropical Conservation Science Vol. 4(3):254-260.
[62] Grant Harris et. al, "Automatic Storage and Analysis of Camera Trap Data," Available: http://dx.doi.org/10.1890/0012-9623-91.3.352
[63] TEAM Network. 2011. Terrestrial Vertebrate Protocol Implementation Manual, v. 3.1. Tropical Ecology, Assessment and Monitoring Network, Center for Applied Biodiversity Science, Conservation International, Arlington, VA, USA.

mammalian diversity and populations using wildlife camera traps,[64,65] along with reviewing wildlife camera trap models.[66]

From January 2013 to December 2013, the Project Proponents:

- Reviewed vegetation maps of the Purus Project to identify general areas within the Project to set up wildlife camera traps.
- Consulted local communities and contracted André Luis Botelho de Moura (the former graduate student of Dr. Armando Muniz Calouro) to identify the specific locations to set up wildlife camera traps.
- Purchased 12 wildlife cameras and placed 10 wildlife cameras (keeping 2 cameras as back-ups) throughout the Project Area, rotating the cameras to different vegetation strata as necessary.
- Worked with André Luis Botelho de Moura to train community and the local project manager Kidney da Cunha Aires on wildlife cameras such as preventative maintenance, periodic movement of cameras between different locations, along with regular retrieval and replacement of camera memory and batteries.
- Photographs were organized, identified and analyzed by André Luis Botelho de Moura.
- Disseminated the full biodiversity impact monitoring plan and the results of the monitoring plan specifically to the local communities and other stakeholders, along with making the plan and results publicly available to the general public.

More specifically, the wildlife cameras were purchased in May 2013, André Luis Botelho de Moura was contracted in May 2013, the community and the local project manager Kidney da Cunha Aires was trained by André in June 2013 and the wildlife cameras were deployed throughout the Purus Project in June 2013. Kidney, with assistance from community members José Rogério de Oliveira Sabóia ("Rogério") and Raimundo Nonato, periodically checked the cameras' batteries, retrieved the memory sticks, and conducted preventative maintenance.

From January 2014 to December 2014, the Project Proponents:

- Had the wildlife cameras installed in the Purus Project until May 2014.
- Removed the wildlife cameras from the field in May 2014 and had the cameras placed in a dehumidifier.
- The local biologist André Luis Botelho de Moura completed a final report that analyzed the composition of medium-to-large mammalian species, their abundances, and activity patterns. This final report also examined endemic species, keystone species, and threatened species.

[64] C. Carbone et. al, "The use of photographic rates to estimate densities of tigers and other cryptic animals," Available: nationalzoo.si.edu/.../024ebe33-5a96-49f6-9080-33bbdb0c92c0.pdf
[65] Tim O'Brien, "Wildlife Picture Index: Implementation Manual Version 1.0," Available: static.zsl.org/files/wcs-wpno39-wildlifepictureindex-928.pdf
[66] TrailCamPro, "Trail Camera Selection Guide," Available: http://www.trailcampro.com/trailcameraselectionguide.aspx

- Discussed how André Luis Botelho de Moura, Luiz Henrique Medeiros Borges, and Brian McFarland of CarbonCo could write up an article for publication based off the findings of the biodiversity study.

Adaptive management will be incorporated into the biodiversity monitoring plan in order to allow for a change in the camera locations and camera models based off results.

Activities

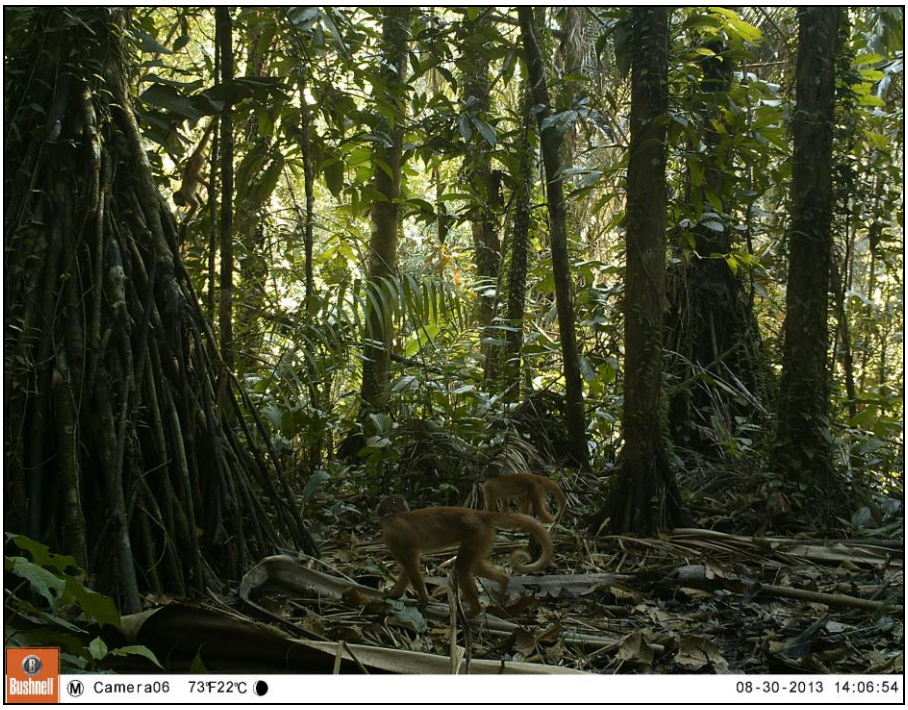
The main activities from January to December 2014 were identified above. In 2014 and 2015, André Luis Botelho de Moura was hired by CarbonCo to assist with a similar wildlife camera study at two other REDD+ projects in Acre. In 2016 and 2017, the Project Proponents began to map out the next wildlife camera study which will take place in 2018 at the Purus Project. This included analyzing new camera models, preparing to assess which of the previously purchased cameras are salvageable, and reaching out to potential stakeholders.

Outputs

The main outputs of the biodiversity monitoring plan are photographs from the wildlife camera traps and deforestation monitoring reports to document forest cover and habitat availability. In addition, an analysis of the diversity, population and distribution of any threatened and endemic species identified by the wildlife camera traps was completed in 2014 after removal of the cameras from the field.

Below are a few, of the many, photographs taken with the wildlife camera traps during 2013 and 2014 at the Purus Project:

Photograph of Tayra



Photograph of White-Fronted Capuchin

Photograph of Black Agouti

Photograph of Collared Peccary

Photograph of Coati

Photograph of Long-Nosed Armadillo

Outcomes

The outcomes based off the outputs were an analysis of medium-to-large mammal diversity and populations and a better understanding of their distribution throughout the Purus Project. This analysis, which was presented in a final report by Andre Botelho, was completed in 2014. Below is a summary of the results and discussion of Andre Botelho's final report:

Over two sampling campaigns, June 2013 to September 2013 and December 2013 to May 2014, 253 records of vertebrates with an effort of 1,859 trap-nights were obtained. These records are 182 medium-to-large mammals and 64 birds. The camera traps recorded 22 taxa of medium-to-large mammals distributed across nine orders. The cumulative species curve shows a stabilization trend, which demonstrates that the sampling effort employed was sufficient to record most terrestrial, medium-to-large mammalian species.

The most specious was the Primates order with seven species, followed by the Carnivora order with six species. The most abundant species were white-winged trumpeter (*Psophia leucoptera*) with 32 records, collared peccary (*Pecari tajacu*) with 29 and black agouti (*Dasyprocta fuliginosa*) with 28. Among the species recorded, the lowland tapir (*Tapirus terrestris*) and giant anteater (*Myrmecophaga tridactyla*) are vulnerable. In addition, 12 of the recorded species are endemic to the Amazon and one is endemic of Acre.

The results are valuable for species management within the Purus Project and provide important information for its conservation. Faunal inventories and monitoring are extremely scarce in the Amazon

and in particular in the state of Acre. The Purus River in Acre lacks biological inventories, thus this initial monitoring of mammals in the Purus Project area may serve as a basis for understanding the conservation status of mammals in the region, especially in the stretch from Manoel Urbano to the Chandless River.

The Purus Project had considerable wealth of medium-to-large, terrestrial mammals. Inventories with camera traps in the Amazon "are a wealth" with 10 - 25 species (Martins et al 2007; Tobler et al 2008; Botelho et al 2012; Botelho 2013); the Purus Project recorded 19 species, a quantity that resembles the protected areas such as the Upper RESEX Tarauacá with 23 (Botelho 2013), and 25 in Los Amigos, Peru (Tobler et al. 2008).

This finding is of high importance because private areas can be of great value for conservation of mammals (Negrões et al. 2011). The number of species recorded in the Purus Project may be related to the fact that the area is a bit cleared with a low population density, which features a quality habitat and low hunting pressure.

Impacts

The ultimate impact is continuing preservation of biodiversity and particularly, the preservation of the Project's high conservation values such as vulnerable and threatened species.

The Purus Project shall monitor biodiversity impacts both spatially throughout the Purus Project as well as temporally over the Purus Project Lifetime. The goal is to annually review satellite imagery and habitat availability, while conducting a biodiversity impact monitoring project with wildlife cameras every four years (next camera deployment will be approximately June 2018).

Offsite Impacts

The Project Proponents will monitor offsite biodiversity impacts, which were minimal, using satellite imagery to assess leakage.

5.2 Data and Parameters Available at Validation (CL3)

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

Data Unit / Parameter:	$\Delta C_{BSL,PA,unplanned}$
Data unit:	t CO_2-e
Description:	Net CO_2 emissions in the baseline from unplanned deforestation in the project area
Source of data:	Derived in Section 3.1 of PD
Value applied:	Year | ΔCBSL,PA (tCO2-e)

	2011 126,240 2012 142,812 2013 137,409 2014 158,897 2015 202,300 2016 176,865 2017 185,232 2018 169,285 2019 201,212 2020 209,001
Justification of choice of data or description of measurement methods and procedures applied:	Derived and justified in Section 3 of VCS Project Description (PD) in which baseline is set
Purpose of the data	Calculation of baseline emissions
Comment	None

Data Unit / Parameter:	$\Delta C_{BSL,LK,unplanned}$
Data unit:	t CO_2-e
Description:	Net CO_2 emissions in the baseline from unplanned deforestation in the leakage belt
Source of data:	Derived in Section 3.1 and 3.2 of PD
Value applied:	Year ΔCBSL,LB (tCO2-e) 2011 205,406 2012 225,355 2013 199,533 2014 225,397 2015 243,503 2016 233,368 2017 278,548 2018 271,569 2019 212,852 2020 245,941
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 the data	Calculation of baseline emissions Calculation of leakage
Comment	None

Data Unit / Parameter:	*CF*
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 the data	Calculation of baseline emissions
Comment	None

Data Unit / Parameter:	C_{OLB}
Data unit:	t CO_2-e ha^{-1}
Description:	Area-weighted average aboveground tree carbon stock for forests available for unplanned deforestation outside the Leakage Belt
Source of data:	Derived from source data found in FAO. 2009. Global Forest Resources Assessment 2010, Brazil Country Report. Forestry Department, Food and Agriculture Organization of the United Nations, Rome.
Value applied:	372.3 t CO_2-e ha^{-1}
Justification of choice of data or description of measurement methods and procedures applied:	Derived above in Section 3.3 of the PD
Purpose of the data	Calculation of leakage
Comment	None

Data Unit / Parameter:	$C_{P,LB}$
Data unit:	t CO_2-e ha^{-1}
Description:	Area weighted average aboveground tree carbon stock for forests available for unplanned deforestation inside the Leakage Belt
Source of data:	Stock estimates of strata represented in the

	project area were derived from measurements from the forest carbon inventory of the project area, in addition to data from Salimon et al. for one unsampled forest strata. Salimon et al. 2011. Estimating state-wide biomass carbon stocks for a REDD plan in Acre, Brazil. Forest Ecology and Management 262: 555-560.
Value applied:	351 t CO_2e ha-1
Justification of choice of data or description of measurement methods and procedures applied:	Derived above in Section 3 of the Project Description
Purpose of the data	Calculation of leakage
Comment	None

Data Unit / Parameter:	ABSL,PA,unplanned,i,t
Data unit:	Ha
Description:	Projected area of unplanned baseline deforestation in the project area in stratum i at time t
Source of data:	Derived in Section 3.1 of PD
Value applied:	

Year	Aunplanned,i,t, FAB + FAP	AAunplanned,i,t, FAP-alluvial
2011	223.0	251.5
2012	247.7	277.8
2013	295.2	212.3
2014	293.4	274.8
2015	457.3	282.6
2016	358.2	257.9
2017	430.8	217.6
2018	351.4	211.6
2019	449.3	231.9
2020	532.9	180.2

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 the data	Calculation of baseline emissions
Comment	None

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:	0.45
Justification of choice of data or description of measurement methods and procedures applied:	Value is for primary open tropical forest.
Purpose of the data	Calculation of baseline emissions Calculation of project emissions
Comment	None

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)	G,CH4 (kg/t d.m. burnt)
	0.2	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	

Data Unit / Parameter:	GWPg	
Data unit:	t CO_2/t gas g	
Description:	Global warming potential for gas g	
Source of data:	Default values from IPCC SAR	
Value applied:	GWP,N20 (t CO2/t gas g)	GWP,CH4 (t CO2/t gas g)

	310	21
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	

5.3 Data and Parameters Monitored (CL3, CM3 & B3)

Details on data and parameters monitored are provided below. Note that for climate:

Data / 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.
Frequency of monitoring/recording	Every ≤ 5 years
Value applied:	Year / ΔCP,DefPA,i,t (t CO2-e) 2011 / 13,960 2012 / 30,119 2013 / 48,295 2014 / 76,110 2015 / 79,149 2016 / 33,915
Monitoring equipment:	None.
QA/QC procedures to be applied:	Neither QA/QC procedures nor calibration are relevant for this calculated parameter.
Purpose of the data	Calculation of project emissions
Calculation method:	Equation 3, VMD0015
Comment	None

Data Unit / Parameter:	$\Delta C_{P,DefLB,i,t}$
Data unit:	t CO_2-e

Description:	Net carbon stock change as a result of deforestation in the project case in the leakage belt 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.
Frequency of monitoring/recording:	Every ≤ 5 years
Value applied:	Year / ΔCP,LB (t CO2-e) 2011 / 25,256 2012 / 58,379 2013 / 44,811 2014 / 76,686 2015 / 102,940 2016 / 49,747
Monitoring equipment:	None.
QA/QC procedures to be applied:	Neither QA/QC procedures nor calibration are relevant for this calculated parameter.
Purpose of the data	Calculation of leakage
Calculation method:	Equation 4, VMD0015
Comment	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.
Frequency of monitoring/recording:	Every ≤ 5 years
Value applied:	Year / ΔCP,DistPA,i,t (t CO2-e) 2011 / 0 2012 / 0 2013 / 0 2014 / 0 2015 / 0 2016 / 0
Monitoring equipment:	None.

QA/QC procedures to be applied:	Neither QA/QC procedures nor calibration are relevant for this calculated parameter.
Purpose of the data	Calculation of project emissions
Calculation method:	Equation 20, VMD0015
Comment	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.
Frequency of monitoring/recording:	Every ≤ 5 years
Value applied:	

Year	FAP-alluvial ADefPA,u,i,t (ha)	FAB +FAP ADefPA,u,i,t (ha)
2011	36.2	2.7
2012	70.2	16.3
2013	61.3	70.9
2014	71.9	143.0
2015	97.9	119.4
2016	44.9	52.9

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

Data Unit / Parameter:	$A_{DefLB,u,i,t}$
Data unit:	Ha
Description:	Area of recorded deforestation in the leakage belt 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 provided below under monitoring plan description.
Frequency of monitoring/recording:	Every ≤ 5 years
Value applied:	

Year	FAP-alluvial ADefLB,u,i,t (ha)	FAB +FAP ADefLB,u,i,t (ha)	FAP + FAB ADefLB,u,i,t (ha)
2011	34.3	45.8	0.0
2012	93.4	87.4	0.0
2013	62.3	59.0	0.0
2014	114.4	91.1	0.0
2015	64.3	235.0	0.0
2016	69.0	65.7	0.0

Monitoring equipment:	ArcGIS
QA/QC procedures to be applied:	Detailed procedures provided below under monitoring plan description
Purpose of the data	Calculation of leakage
Calculation method:	Not relevant
Comment	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 and land managers observations
Description of measurement methods and procedures to be applied:	Detailed procedures provided below under monitoring plan description.
Frequency of monitoring/recording:	Every ≤ 5 years
Value applied:	

Year	$A_{DistPA,q,i,t}$ (t CO2-e)
2011	0
2012	0
2013	0
2014	0
2015	0
2016	0

Monitoring equipment:	None
QA/QC procedures to be applied:	Detailed procedures provided below under monitoring plan description
Purpose of the data	Calculation of project emissions
Calculation method:	Not relevant
Comment	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
Frequency of monitoring/recording:	Every ≤ 10 years.
Value applied:	FAP-alluvial CBSL,i (t CO2-e/ha): 411.3 FAB +FAP CBSL,i (t CO2-e/ha): 325.5 FAP + FAB CBSL,i (t CO2-e/ha): 512.9
Monitoring equipment:	dbh tape, measuring tape, GPS, clinometer
QA/QC procedures to be applied:	Detailed procedures provided below under monitoring plan description
Purpose of the 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 Brown (1997), a volumetric based palm equation, Cairns et al. (1997), Van Wagner (1968)
Comment	None

Data Unit / Parameter:	*ΔCpools,Def,u,i,t*
Data unit:	t CO_2-e ha^{-1}

Description:	Carbon stock in all pools in post-deforestation land use *u* in stratum *i*
Source of data:	Calculated
Description of measurement methods and procedures to be applied:	None
Frequency of monitoring/recording:	Every ≤ 10 years.
Value applied:	Stratum specific values calculated as $C_{BSL,I}$-Cpost
Monitoring equipment:	None.
QA/QC procedures to be applied:	Detailed procedures provided below under monitoring plan description
Purpose of the data	Calculation of baseline emissions Calculation of project emissions Calculation of leakage
Calculation method:	Stratum specific values calculated as $C_{BSL,I}$-Cpost
Comment	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.
Frequency of monitoring/recording:	Repeated each time the PRA indicates a potential for degradation. PRA conducted every ≤ 2 years
Value applied:	0
Monitoring equipment:	None.
QA/QC procedures to be applied:	Detailed procedures provided below under monitoring plan description.
Purpose of the data	Calculation of project emissions
Calculation method:	Not relevant

Comment	None

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.
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:	Detailed procedures provided below under monitoring plan description.
Purpose of the data	Calculation of project emissions
Calculation method:	Equation 8, VMD0015
Comment	None

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.
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:	ArcGIS
QA/QC procedures to be applied:	Detailed procedures provided below under monitoring plan description.

Purpose of the data	Calculation of project emissions
Calculation method:	Not relevant
Comment	Not used in this monitoring period

Data Unit / Parameter:	$\Delta C_{P,DegW,i,t}$
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.
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:	Year / ΔCP,Deg,i,t (t CO2-e): 2011 – 0; 2012 – 0; 2013 – 0; 2014 – 0; 2015 – 0; 2016 – 0
Monitoring equipment:	None
QA/QC procedures to be applied:	Neither QA/QC procedures nor calibration are relevant for this calculated parameter.
Purpose of the data	Calculation of project emissions
Calculation method:	Equation 8, VMD0015
Comment	None

Data Unit / Parameter:	$PROP_{IMM}$
Data unit:	Proportion
Description:	Estimated proportion of baseline deforestation caused by immigrating population
Source of data:	Calculated based on results of survey of communities in the area around the project.
Description of measurement methods and	Detailed procedures provided below under

procedures to be applied:	monitoring plan description.
Frequency of monitoring/recording:	Every ≤ 5 years
Value applied:	0.188
Monitoring equipment:	None
QA/QC procedures to be applied:	Detailed procedures provided below under monitoring plan description
Purpose of the data	Calculation of leakage
Calculation method:	Not relevant
Comment	None

Data Unit / Parameter:	$PROP_{RES}$
Data unit:	Proportion
Description:	Estimated proportion of baseline deforestation caused by population that has been resident for ≥5 years
Source of data:	Calculated based on results of survey of communities in the area around the project.
Description of measurement methods and procedures to be applied:	Detailed procedures provided below under monitoring plan description.
Frequency of monitoring/recording:	Every ≤ 5 years
Value applied:	0.812
Monitoring equipment:	None
QA/QC procedures to be applied:	Detailed procedures provided below under monitoring plan description
Purpose of the data	Calculation of leakage
Calculation method:	Not relevant
Comment	None

Data Unit / Parameter:	*TOTFOR*
Data unit:	ha
Description:	Total available national forest area
Source of data:	Official data, peer reviewed publications, remotely sensed imagery (coarse scale imagery is appropriate) or cadastral maps and other

	verifiable sources
Description of measurement methods and procedures to be applied:	Not applicable
Frequency of monitoring/recording:	Prior to each verification event and at least every 5 years.
Value applied:	533,073,000
Monitoring equipment:	None
QA/QC procedures to be applied:	Detailed procedures provided below.
Purpose of the data	Calculation of leakage
Calculation method:	Not relevant
Comment	See page 3, Table 1 of the FAO published Global Forest Resources Assessment 2015.

Data Unit / Parameter:	*PROTFOR*
Data unit:	ha
Description:	Total area of fully protected forests nationally
Source of data:	Official data, peer reviewed publications and other verifiable sources
Description of measurement methods and procedures to be applied:	Not applicable
Frequency of monitoring/recording:	Prior to each verification event and at least every 5 years.
Value applied:	0
Monitoring equipment:	None
QA/QC procedures to be applied:	Detailed procedures provided below.
Purpose of the data	Calculation of leakage
Calculation method:	Not relevant
Comment	None

Data Unit / Parameter:	*MANFOR*
Data unit:	ha
Description:	Total area of forests under active management

	nationally
Source of data:	Official data, peer reviewed publications and other verifiable sources
Description of measurement methods and procedures to be applied:	Not applicable
Frequency of monitoring/recording:	Prior to each verification event and at least every 5 years.
Value applied:	0
Monitoring equipment:	None
QA/QC procedures to be applied:	Detailed procedures provided below.
Purpose of the data	Calculation of leakage
Calculation method:	Not relevant
Comment	None

Data Unit / Parameter:	*ARRL,forest,2016*
Data unit:	ha
Description:	Remaining area of forest in RRL 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.
Frequency of monitoring/recording:	Prior to each verification event and at least every 5 years.
Value applied:	2,220,029
Monitoring equipment:	ArcGIS
QA/QC procedures to be applied:	Neither QA/QC procedures nor calibration are relevant for this calculated parameter.
Purpose of the data	Calculation of project emissions
Calculation method:	Calculated as the total area of the RRL minus all nonforested areas.
Comment	None

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* $A_{DistPA,q,i,t}$
Description of measurement methods and procedures to be applied:	Monitored as part of $A_{DistPA,q,i,t}$
Frequency of monitoring/recording:	Every ≤ 5 years
Value applied:	

Year	FAP-alluvial Aburn,q,i,t. (ha)	FAB +FAP Aburn,q,i,t. (ha)
2011	36.2	2.7
2012	70.2	16.3
2013	61.3	70.9
2014	71.9	143.0
2015	97.9	119.4
2016	44.9	52.9

Monitoring equipment:	None.
QA/QC procedures to be applied:	Detailed procedures provided below under monitoring plan description
Purpose of the 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)
Comment	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 Appendix B of the project document
Frequency of monitoring/recording:	Every ≤ 10 years
Value applied:	Detailed in the 2011 Purus Project forest inventory
Monitoring equipment:	dbh tape, measuring tape,
QA/QC procedures to be applied:	Detailed procedures are provided below under monitoring plan description.
Purpose of the data	Calculation of baseline emissions

	Calculation of project emissions
Calculation method:	Not relevant
Comment	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 Appendix B of the project document
Frequency of monitoring/recording:	Every ≤ 10 years
Value applied:	Detailed in the 2011 Purus Project forest inventory
Monitoring equipment:	dbh tape, measuring tape,
QA/QC procedures to be applied:	Detailed procedures are provided below under monitoring plan description.
Purpose of the data	Calculation of baseline emissions Calculation of project emissions
Calculation method:	Not relevant
Comment	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 Appendix B of the project document
Frequency of monitoring/recording:	Every ≤ 10 years
Value applied:	Detailed in the 2011 Purus Project forest inventory
Monitoring equipment:	measuring tape, clinometer
QA/QC procedures to be applied:	Detailed procedures are provided below under monitoring plan description.

Purpose of the data	Calculation of baseline emissions Calculation of project emissions
Calculation method:	Not relevant
Comment	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 Appendix B of the project document
Frequency of monitoring/recording:	Every ≤ 10 years
Value applied:	Detailed in the 2011 Purus Project forest inventory
Monitoring equipment:	dbh tape, measuring tape
QA/QC procedures to be applied:	Detailed procedures are provided below under monitoring plan description.
Purpose of the data	Calculation of baseline emissions Calculation of project emissions
Calculation method:	Not relevant
Comment	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 Appendix B of the project document
Frequency of monitoring/recording:	Every ≤ 10 years
Value applied:	Detailed in the 2011 Purus Project forest inventory
Monitoring equipment:	None

QA/QC procedures to be applied:	Detailed procedures are provided below under monitoring plan description.
Purpose of the data	Calculation of baseline emissions Calculation of project emissions
Calculation method:	Not relevant
Comment	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 Appendix B of the project document
Frequency of monitoring/recording:	Every ≤ 10 years
Value applied:	184 m
Monitoring equipment:	measuring tape,
QA/QC procedures to be applied:	Detailed procedures are provided below under monitoring plan description.
Purpose of the data	Calculation of baseline emissions Calculation of project emissions
Calculation method:	Not relevant
Comment	None

Data Unit / Parameter:	Cpost
Data unit:	t CO_2-e ha^{-1}
Description:	Average carbon stocks remaining after deforestation.
Source of data:	Calculated
Description of measurement methods and procedures to be applied:	None
Frequency of monitoring/recording:	Every ≤ 10 years.
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 the data	Calculation of baseline emissions Calculation of project emissions Calculation of leakage
Calculation method:	See Table 3.12 of the PD.
Comment	None

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 forest inventory procedures are provided in Appendix B of the project document
Frequency of monitoring/recording:	Every ≤ 10 years
Value applied:	FAP-alluvial B,i,t (t d.m./ha): 196.2 FAB +FAP B,i,t (t d.m./ha): 155.0 FAP + FAB B,i,t (t d.m./ha): 244.8
Monitoring equipment:	None
QA/QC procedures to be applied:	Detailed procedures are provided below under monitoring plan description.
Purpose of the 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 Brown (1997) and a volumetric based palm equation, Van Wagner (1968)
Comment	None

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

Parameter	Live aboveground tree biomass	Belowground biomass	Standing dead wood	Lying dead wood
EBSL,SS,FAB+FAP,pool# (tCO2e)	7,504,145	1,750,860	95,312	410,491
EBSL,SS,FAP-A,pool# (tCO2e)	1,508,604	345,310	34,569	51,694

Monitoring equipment:	None
QA/QC procedures to be applied:	Neither QA/QC procedures nor calibration are relevant for this calculated parameter.
Purpose of the data	Calculation of baseline emissions Calculation of project emissions
Calculation method:	See X-UNC module.
Comment	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	As this parameter was calculated rather than measured, no measurements methods are noted.

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

Parameter	Live aboveground tree biomass	Belowground biomass	Standing dead wood	Lying dead wood
UBSL,SS,FAB+FAP ,pool# (%)	14.0%	12.9%	58.0%	98.7%
UBSL,SS,FAP-A ,pool# (%)	16.3%	15.1%	60.5%	45.4%

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

Data Unit / Parameter:	E BiomassBurn,t
Data unit:	tCO2-e
Description:	Greenhouse emissions due to biomass burning as part of deforestation activities in stratum i in year 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.
Frequency of monitoring/recording:	Every ≤ 10 years
Value applied:	

E BiomassBurn2016,PA	1,567
E BiomassBurn2016,LB	2,185.4

Monitoring equipment:	None
QA/QC procedures to be applied:	Neither QA/QC procedures nor calibration are relevant for this calculated parameter.

Purpose of the data	Calculation of project emissions Calculation of leakage
Calculation method:	Use equation 1 as found in the E-BB module of VM0007
Comment	None

Note that for community:

Data / Parameter	
Data unit	Poverty score and poverty index
Description	The poverty score is determined by the number of basic necessities owned by the community member multiplied by the weighted indicator (a fraction derived from the percentage of communities who believe the asset is a basic necessity). The poverty index is determined by dividing the poverty score by the highest possible poverty score (if the community member owned all of the basic necessities; i.e., by adding up the weighted indicators).
Source of data	Basic Necessity Survey
Description of measurement methods and procedures to be applied	See above description for how poverty score and poverty index are calculated.
Frequency of monitoring/recording	The Basic Necessity Survey will be administered approximately every two years.
Value monitored	Poverty score and poverty index are monitored for each family surveyed in the Project.
Monitoring equipment	The only equipment used is a printed template of the Basic Necessity Survey and an excel spreadsheet to compile and analyze the results.
QA/QC procedures to be applied	CarbonCo and Carbon Securities re-asked questions to ensure accurate responses. Calculations were conducted by hand and via excel sheet to ensure accurate results.
Purpose of the data	The purpose of the data was to assess the impacts (positive and negative) of the Project on the local communities.
Calculation method	The only calculation methods were basic arithmetic.
Comments	The initial Basic Necessity Survey was conducted in 2012. A follow up Basic Necessity Survey was then conducted in 2014 and 2016.

Data / Parameter	
Data unit	R$
Description	The total owned assets (both on a per family and per capita basis) will be assessed.
Source of data	Basic Necessity Survey
Description of measurement methods and procedures to be applied	The total owned assets is determined by the number of owned assets multiplied by the community price. The total owned assets are then added up. In addition, the total owned assets per capita are determined by dividing the total owned assets by the number of family members.
Frequency of monitoring/recording	The Basic Necessity Survey will be administered approximately every two years.
Value monitored	The total owned assets are monitored for each family (on a per family and per capita basis) surveyed in the Project.
Monitoring equipment	The only equipment used is a printed template of the Basic Necessity Survey and an excel spreadsheet to compile and analyze the results.
QA/QC procedures to be applied	CarbonCo and Carbon Securities re-asked questions to ensure accurate responses. Calculations were conducted by hand and via excel sheet to ensure accurate results.
Purpose of the data	The purpose of the data was to assess the impacts (positive and negative) of the Project on the local communities.
Calculation method	The only calculation methods were basic arithmetic.
Comments	The initial Basic Necessity Survey was conducted in 2012. A follow up Basic Necessity Survey was then conducted in 2014 and 2016.

Note that for biodiversity:

Data / Parameter	
Data unit	Number and species
Description	Number and species of medium-to-large mammals photographed in the Project.
Source of data	Motion-sensitive, wildlife cameras.
Description of measurement methods and procedures to be applied	Andre Botelho, a trained biologist, established the measurement methods and procedures. Cameras were placed approximately one kilometer apart and at a height

	of approximately one meter above the ground. The cameras were deployed to the field for one year and were regularly checked on by Kidney da Cunha Aires.
Frequency of monitoring/recording	Monitoring via motion-sensitive wildlife cameras was done on a continuously basis for one year. Going forward, the use of wildlife cameras will take place approximately once every four years.
Value monitored	Number and species of medium-to-large mammals.
Monitoring equipment	The specific type of motion-sensitive wildlife camera used at the Project was the Bushnell Trophy Cam HD Essential, with a security package.
QA/QC procedures to be applied	Kidney da Cunha Aires regularly conducted preventative maintenance on the cameras (e.g., clearing vegetation, checking batteries, and removing memory cards). Andre Botelho conducted quality assurance and quality control with respect to uploading and organizing the images, analyzing the images, coding the images, and documenting the findings via a final report.
Purpose of the data	The purpose of the data was to identity medium-to-large mammals within the Project and to establish a baseline for ongoing assessment with respect to the Project's impacts (positive and negative) on biodiversity.
Calculation method	N/A
Comments	N/A

6 QUANTIFICATION OF GHG EMISSION REDUCTIONS AND REMOVALS (CLIMATE)

6.1 Baseline Emissions (G2)

Baseline emissions for the project activities are found in Table 6.1 below (derived from Section 3.1 of the VCS PD)

Table 6.1. Baseline emissions in the project area and leakage belt.

Year	ΔCBSL,PA,unplanned	ΔCBSL,LK,unplanned
2011	126,240	205,406
2012	142,812	225,355
2013	137,409	199,533
2014	158,897	225,397
2015	202,300	243,503
2016	176,865	233,368
2017	185,232	278,548
2018	169,285	271,569

2019	201,212	212,852
2020	209,001	245,941

6.2 Project Emissions

Project emissions are estimated by applying module M-MON (VMD0015, Version 2.0) of Methodology VM0007.

Deforestation Data

Monitoring results reported here used classified satellite imagery produced by UCEGEO[67], the GIS department within the Climate Change Institute, Acre State government, which produces an annual dataset on the extent and spatial location of all deforestation within the state. This dataset is based on classification of a series of Landsat imagery. Each image selected for classification contains less than 10% cloud cover. This is followed by processing of the images by applying the filter HAZE. This algorithm was developed by Carlotto[68] and aims to improve visibility by reducing the effect of atmospheric haze and smoke. This algorithm was applied using the software ENVI, version 4.6. This step was followed by geometric correction using base the NASA GeoCover 2000 product as the base data. ENVI + IDL, version 4.6 were used to group multispectral bands (the blue, green, and red Landsat bands), while ERDAS IMAGINE 9.1 software was used for georeferencing. The RMS error of the georeferenced product was < 1 pixel, meeting good practice standards in remote sensing. Additional details on pre-processing can be found in the UCEGEO methodology[69].

As mentioned in the monitoring plan, changes in forest cover were determined using the 2016 Acre deforestation database provided UCEGEO. Figure 6.1 shows the area of deforestation in the project area and leakage belt for this monitoring period. Figure 6.2 shows the 2016 forest benchmark map (covering both the project area and leakage belt) which was produced using the aforementioned deforestation dataset.

The deforestation in the project area and leakage belt is derived by subtracting the non-forested area at the time of the project start from the non-forested area at the end of 2016.

[67] Note that the original dataset provided was corrected so the dataset included all 2012 data.
[68] CARLOTTO, M. J. Reducing the effects of space-varying wavelength-dependent scattering in multispectral imagery. International Journal of Remote Sensing, v. 20, n. 17, p. 3333-3344, 1999.
[69] ACRE - Governo do Estado do Acre (no prelo). REVISÃO DA DINÂMICA DO DESMATAMENTO NO ESTADO DO ACRE: ANÁLISE TEMPORAL DE 23 ANOS (PERÍODO DE 1988 A 2010). Rio Branco: (UCEGEO - FUNTAC/SEMA), 2011 .

Figure 6.1. Map of 2016 deforestation in the project area and leakage belt.

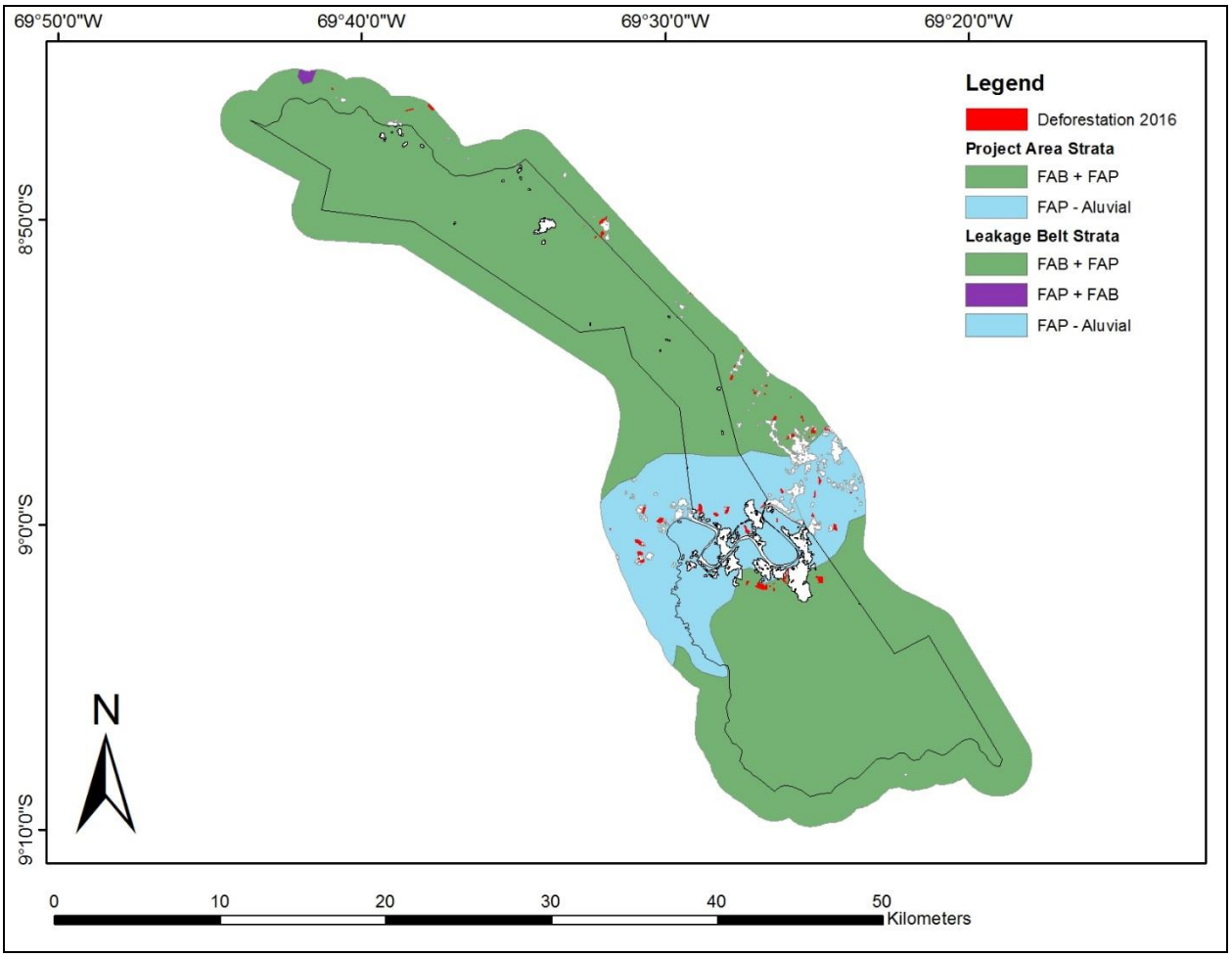
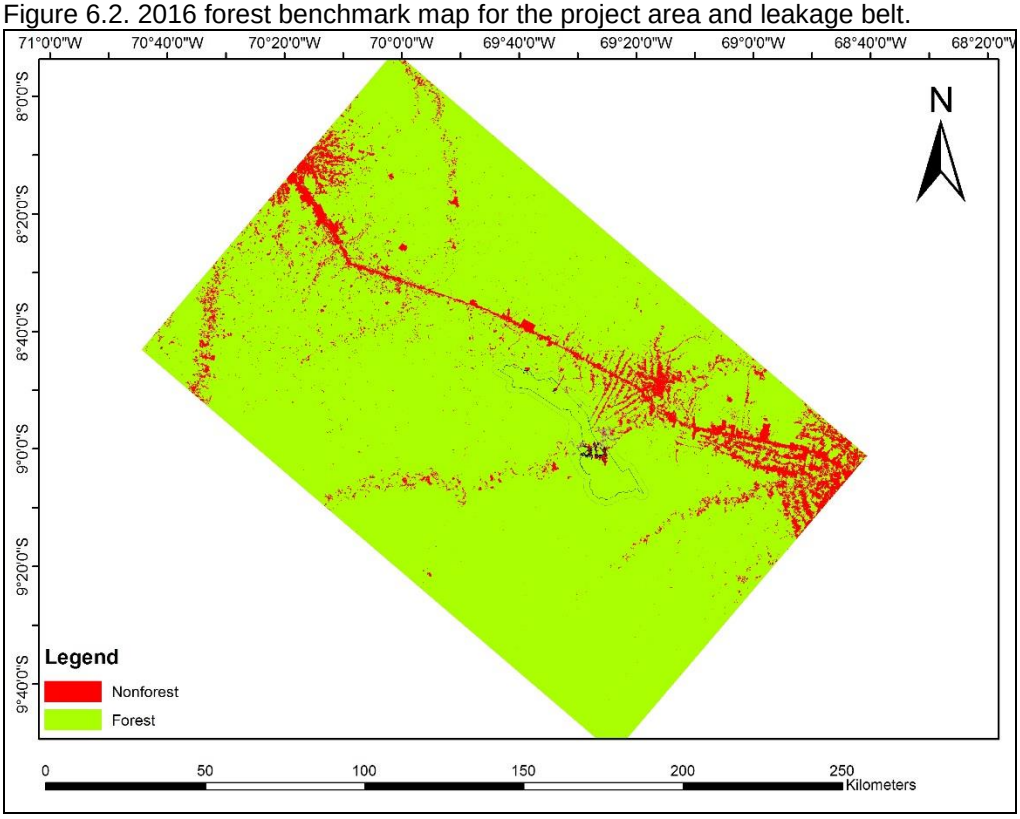


Figure 6.2. 2016 forest benchmark map for the project area and leakage belt.



Accuracy Assessment

Accuracy of the most recent UCGEO data set (including data on deforestation through 2016) was assessed by comparing the classification with ground truth points collected using high-resolution imagery (e.g. Digital Globe). The Digital Globe satellite collects multispectral imagery at 2 meter resolution. Sample points of high resolution imagery used to assess classification accuracy were recorded and archived (with an ID number, geographic position information, identified land-use class). Samples used to assess classification accuracy were 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). Figure 6.3 below shows the distribution of these points. All verification samples gathered from high-resolution imagery are from images as close as possible to classification date.

Results of the accuracy assessment are presented and analyzed in a matrix below, such that the following errors are presented:

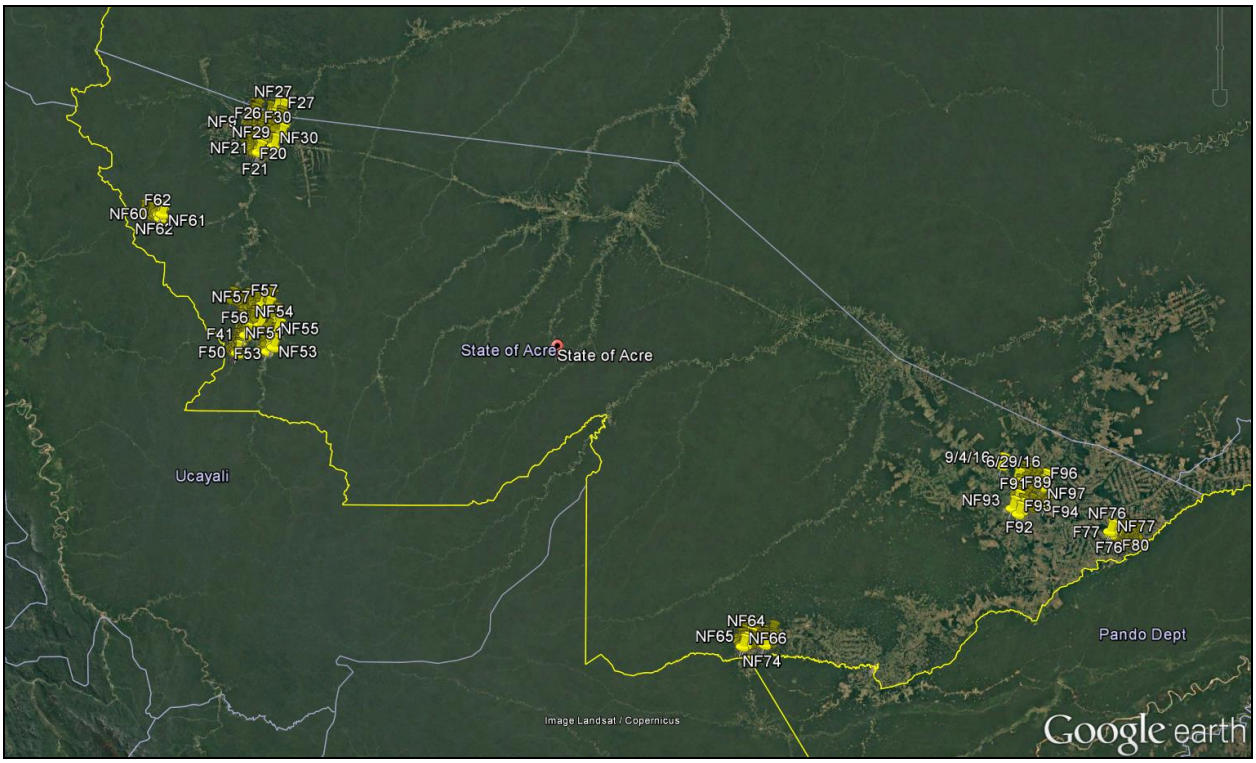
- Classification accuracy
- Error of omission of each land-use category (forest and non-forest)
- Error of commission of each land-use category (forest and non-forest)

Land-use class as determined from ground-truth points	Classification		Total	Accuracy (%) *User's accuracy (# correct/ row total)*	Error of Commission (%)
	Forest	Non-forest			
Forest (100)	97	3	100	97	3

Non-forest (100)	4	96	100	96	4
Total	101	99	200		Overall Accuracy
Accuracy (%) ***Producer's accuracy (# correct/ column total)***	96.04	96.97			96.5
Error of Omission (%)	3.96	3.03			

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 2016 classification meets this criteria with overall accuracy of 96.5%.

Figure 6.3. Distribution of accuracy assessment points across Acre state.



Equation 6.1 is used to calculate ex-post project emissions, along with parameters listed in Table 6.2.

Equation 6.1. Equation for calculating the net GHG emissions within the project area under the project scenario.

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

Table 6.2. Parameters used to calculate ex-post project emissions.

Parameter	Description
ΔC_P	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 6.3 are sourced from Section 5.2 and 5.3 of this report. The area deforested was derived from the 2016 Acre deforestation dataset (see above for additional Information) combined with the original strata map. CBSL and Cpost values were those derived in the original forest inventory and the project document, respectively.

Table 6.3 Net carbon stock change (t CO2-e) as a result of deforestation in the project area (ΔCP,DefPA,i,t).

Year	FAP-alluvial ADefPA,u,i,t (ha)	FAP-alluvial CBSL,i (t CO2-e/ha)	FAB +FAP ADefPA,u,i,t (ha)	FAB +FAP CBSL,i (t CO2-e/ha)	Cpost (t CO2-e ha-1)	ΔCP,DefPA,i,t (t CO2-e)
2016	44.9	411.3	52.9	325.5	0.0	35,668

While deforestation decreased relative to the baseline case, a total of 97.8 ha were still deforested over this monitoring period. There were numerous areas of deforestation in the project area, mostly in close proximity to the Purus River.

This deforestation took place despite deforestation monitoring efforts. Forest monitoring at the Purus Project took place via a rented plane and via boat along the Purus River. The rented plane allowed for aerial monitoring throughout the Project Zone, while monitoring via boat focused on the Project Zone adjacent to the Purus River. Upon discovering deforestation, the local project manager Kidney would talk to the communities about the importance of stopping deforestation in order for the implementation of social projects and programs.

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 either the baseline or with-project case (i.e., ΔCP,SelLog,i,t is equal to zero).

Degradation surveys were conducted by CarbonCo and Carbon Securities, with assistance from Moura & Rosa, in June and August, 2015. As greater than 10% of these survey respondents collect wood for charcoal within the project boundary, degradation was assessed using the T-SIG tool. Using conservative assumptions and further survey information on the amount of charcoal/timber collected, emissions from degradation were estimated. Degradation emission estimates were very small due to the low population pressures and insignificant amounts of charcoal and timber collected[70]. Using the T-SIG tool, degradation emissions (7.5 t CO2) are determined to be de minimis because they are less than five percent of the total GHG benefits generated during the monitoring period, and thus are not accounted in net GHG benefit calculations. 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 monitoring period, 2016.

Natural Disturbance

No areas of natural disturbance were reported in the project area during the 2016 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 forest monitors reported evidence of fire on recently cleared land, N2O and CH4 emissions from biomass burning have been accounted for. Using parameters found in Section 5.2 and 5.3 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).

[70] See “2016_PurusDegradation 2017.06.05.xls” in the project database for details of the de minis analysis.

Table 6.4. Calculation of N2O emissions resulting from burning.

Year	FAP-alluvial Aburn,i,t (ha)	FAP-alluvial B,i,t (t d.m./ha)	FAB +FAP Aburn,i,t (ha)	FAB +FAP B,i,t (t d.m./ha)	COMF	G,N20 (kg/t d.m. burnt)	GWP,N20 (t CO2/t gas g)	E-N2O BiomassBurn (tCO2e)
2016	44.9	196.2	52.9	155.0	0.45	0.2	310.0	474

Table 6.5. Calculation of CH4 emissions resulting from burning.

Year	FAP-alluvial Aburn,i,t (ha)	FAP-alluvial B,i,t (t d.m. /ha)	FAB +FAP Aburn,i,t (ha)	FAB +FAP B,i,t (t d.m. /ha)	COMF	G,CH4 (kg/t d.m. burnt)	GWP,CH4 (t CO2/t gas g)	E-CH4 BiomassBurn (tCO2e)
2016	44.9	196.2	52.9	155.0	0.45	6.8	21.0	1,092

Table 6.6. Calculation of E BiomassBurning in the project area.

Year	E-N2O BiomassBurn (tCO2e)	E-CH4 BiomassBurn (tCO2e)	E-BiomassBurn (tCO2e)	GHGP-E,i,t (t CO2-e)
2016	474	1,092	1,567	1,567

As justified in Section 6.2, total project GHG emissions (GHGP) equal emissions from biomass burning (EBB), as other potential 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 calculated in Table 6.7.

Table 6.7. Net project emission within the project area, ΔCP (t CO2-e).

Year	ΔCP,DefPA,i,t (t CO2-e)	ΔCP,Deg,i,t (t CO2-e)	ΔCP,DistPA,i,t (t CO2-e)	GHGP-E,i,t (t CO2-e)	ΔCP,Enh,i,t (t CO2-e)	ΔCP (t CO2-e)
2016	35,668	0	0	1,567	0	37,234

6.3 Leakage

Leakage emissions from displacement of unplanned deforestation are estimated in conformance with the VCS modular REDD methodology VM0007, specifically the LK-ASU module. This module provides for accounting for activity shifting leakage resulting from both local and immigrant deforestation agents.

Activity shifting from local agents in the leakage belt was tracked by monitoring deforestation and stock changes in the leakage belt. Much of the deforestation in the leakage belt is attributable to a recent INCRA settlement. This INCRA settlement is located partially within the leakage belt and abuts the project area's north northwest boundary. This INCRA settlement is likely to represent a large percentage of the project's leakage emissions for the foreseeable future. Emissions were 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. As justified in Section 3.3, total project GHG emissions (GHGP) equal emissions from biomass burning (EBB) as other sources are equal to zero. The area deforested was derived from the 2016 Acre deforestation dataset combined with the original strata map. CBSL and Cpost values were those derived in the original forest inventory and the project document, respectively.

Table 6.8a. Calculation of E BiomassBurning in the leakage belt.

Year	COMF	G,N20 (kg/t d.m. burnt)	GWP,N20 (t CO2/t gas g)	E-N2O Biomass Burning (tCO2e)	G,CH4 (kg/t d.m. burnt)	GWP,CH4 (t CO2/t gas g)	E-CH4 Biomass Burning (tCO2e)	E-Biomass Burning LB (tCO2e)
2016	0.45	0.2	310.0	661.6	6.8	21.0	1523.8	2,185.4

Table 6.8b. Area (ha) deforested in the leakage belt (ADefLB,u,i,t) and resulting emissions ΔCP,DefLB,i,t (t CO2e).

Year	FAP-alluvial ADefLB,u,i,t (ha)	FAP-alluvial CBSL,i (t CO2-e/ha)	FAB +FAP ADefLB,u,i,t (ha)	FAB +FAP CBSL,i (t CO2-e/ha)	FAP + FAB ADefLB,u,i,t (ha)	FAP + FAB CBSL,i (t CO2-e/ha)	Cpost (t CO2-e ha-1)	E-Biomass Burning LB (tCO2e)	ΔCP,LB (t CO2-e)	ΔCBSL,LK,unplanned (t CO2-e)	ΔCLK-ASU-LB (t CO2-e)
2016	69.0	411.3	65.7	325.5	0.0	512.9	0.0	2,185	51,933	233,368	0

The net greenhouse gas emission in the project case for the leakage belt, parameter *ΔCP,LB*, is equal to the sum of stock changes dues to deforestation through 2016, equal to 51,933 t CO2e. Estimated baseline annual emissions in the leakage belt in 2016 were 233,368 t CO2e. Emissions from deforestation in the leakage belt were less than the projected emissions from deforestation in the leakage belt, and thus no leakage from activity shifting within the leakage belt has occurred.

Activity shifting leakage outside the leakage belt was tracked by monitoring deforestation in the project area ($A_{DefPA,i,t}$) and leakage belt ($A_{DefLB,i,t}$). The area deforested by immigrants outside the Leakage Belt and project area under the project scenario (ALK-OLB) is then calculated as the difference between the total area deforested by immigrant agents in the baseline scenario in the project area (ALK-IMM,t) and the area deforested by immigrants in the project area and leakage belt under the project scenario (ALK-ACT-IMM,t). This area (ALK-OLB in Table 6.9) is then multiplied by the difference between stocks before and after deforestation outside the leakage belt to yield the estimate of emissions due to activity shifting immigrant leakage ΔCLK-ASU,OLB.

Table 6.9. Emissions calculations for activity shifting immigrant leakage outside the leakage belt

Year	PROPIMM	ABSL,PA,unplanned,t (ha)	ALK-IMM,t (ha)	ADefPA,i,t (ha)	ADefLB,i,t (ha)	ALK-ACT-IMM,t (ha)	ALK-OLB,t (ha)	COLB (t CO2-e ha-1)	Cpost (t CO2-e ha-1)	ΔCLK-ASU,OLB (t CO2-e)
2016	0.188	616.1	115.5	97.8	134.6	43.6	71.9	372.3	0.0	26,784

Total leakage (26,784 t CO2-e) is then calculated as the sum of activity shifting leakage resulting from both local and immigrant agents (Table 6.10). GHG emissions from leakage mitigation activities (GHGLK) equal zero as none of the mitigation activities involve biomass burning or fertilizer usage.

Table 6.10. Estimation of total leakage due to the displacement of unplanned deforestation

Year	ΔCLK-ASU-OLB (t CO2-e)	ΔCLK-ASU-LB (t CO2-e)	GHGLK,E (t CO2-e)	ΔCLK-AS,unplanned (t CO2-e)
2016	26,784	0	0	26,784

6.4 Net GHG Emission Reductions and Removals (CL1 & CL2)

Uncertainty in baseline carbon stock estimates, GHG emission estimates, and baseline deforestation projections were calculated applying the VM007 module X-UNC.

As stated in the methodology, “it is here assumed that there is zero uncertainty in baseline rate of deforestation or degradation where numbers are equal to a long-term average (BL-UP)”, hence uncertainty associated with the baseline deforestation projections are equal to zero.

As GHG emission sources in the baseline are conservatively assumed to be zero, uncertainty surrounding this estimate is also considered to be zero.

Uncertainty is therefore limited to the baseline carbon stock as determined by the Purus Project forest carbon inventory[71]. Overall, the inventory produced an estimate of biomass carbon stocks at the project level of 92.0 t C/ha (or 337.2 tCO2/ha) with a precision level of +/- 10.1% of the mean at the 95% confidence level.

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.

As the precision surrounding estimates of forest carbon stocks, 10.1% of the mean (at the 95% confidence level) are less than precision requirements of the methodology, +/- 15% of the mean (at a 95% confidence level), no uncertainty deduction was warranted or applied.

Estimates of GHG credits eligible for issuance as VCUs were calculated in Table 6.11, below; where

Estimated GHG emission reduction credits =

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

Project emissions *minus*

Leakage *minus*

[71] Eaton and Agapejev. 2012. Forest biomass carbon inventory for the Purus REDD Project, Acre State, Brazil.

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

Table 6.11. Estimate of Net Emission Reduction Credits. 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})	Risk buffer (%)	Deductions for AFOLU pooled buffer account (tCO2e)	GHG credits[72] eligible for issuance as VCUs (tCO_{2e})
2016	176,865	37,234	26,784	10%	13,964	98,882

6.5 Climate Change Adaptation Benefits (GL1)

This section is not applicable to the Purus Project.

7 COMMUNITY

7.1 Net Positive Community Impacts (CM1)

The Purus Project generated net positive community impacts since May 23, 2011 and particularly between January 1, 2016 and December 31, 2016 and the Project will also maintain, or enhance, High Conservation Values (HCVs) important to the communities.

Community Impacts

The Project Proponents utilized stakeholder identification and consultation, along with a Participatory Rural Assessment (PRAs) and the Basic Necessities Survey (BNS) methodology to develop a Theory of Change for estimating the community impacts of the Project for the with-project scenario vis-à-vis the without-project scenario. The activities, outputs, outcomes and community impacts of the Project shall also be regularly monitored to ensure positive net benefits for all communities.

The general process between May 23, 2011 and December 31, 2012 of identifying community impacts was:

- Moura & Rosa met with Community to Discuss Project;
- Rapid Community Assessment conducted by Moura & Rosa;
- Project Proponents met Community to Further Discuss Project;

[72] Value has been rounded down as per VCS guidance.

- CarbonCo Reviewed Background Studies on Appropriate Methodologies, Particularly the Social and Biodiversity Impact Assessment (SBIA) Manual for REDD+ Projects;
- PRAs and BNS Assessment Conducted by Project Proponents;
- Casual Analysis to Develop a Theory of Change; and
- Theory of Change Modified, as Necessary, After PAV Meeting with Community.

Throughout 2013 and 2014, the Project Proponents continued to meet with the local communities and re-administered the Basic Necessity Survey in 2014 and 2016 to quantify community impacts.

Participatory Rural Assessment

A Participatory Rural Assessment (PRA, also known as a Participatory Rural Appraisal) was conducted by CarbonCo, Carbon Securities, and Moura & Rosa from March 10-12, 2012. The Project Proponents attempted to sample each community living within the Purus Project Area, along with all adjacent communities living along the Purus River and within the Project Zone. A total of 16 communities - 13 communities within the Purus Project Area and three communities living alongside the Purus River and in the Project Zone - were interviewed as part of the PRA.

The aggregated results of this initial PRA, which serves as a baseline, were as follows:

Grand Totals (Inside Project and Outside Project)	How Many Years Have You Lived Here?	Do You Participate in Agriculture?	Do You Participate in Cattle Ranching?	Do You Participate in Fuel Wood Collection?	Do You Participate in Charcoal Production?	Do You Participate in Timber Extraction / Logging?	
Total of Yes Responses	N/A	16	10	5	14	12	
Total of No Responses	N/A	0	6	11	2	4	
Percentage of Yes Responses	N/A	100.00%	62.50%	31.25%	87.50%	75.00%	
Percentage of No Responses	N/A	0.00%	37.50%	68.75%	12.50%	25.00%	
Average	17.83	N/A	N/A	N/A	N/A	N/A	
Number Over 5 Years	13	N/A	N/A	N/A	N/A	N/A	
Percentage Over 5 Years	81.25%	N/A	N/A	N/A	N/A	N/A	
Grand Totals (Inside Project and Outside Project)	Do You Sell Crops or Cattle Outside Property?	Do You Use Fuel Wood for Cooking?	Do You Have a Sustainable Fuel Wood Lot?	Do You Make Charcoal?	Do You Sell Charcoal?	Do You Sell Timber?	How Far into Forest to Collect Wood (In Meters)
Total of Yes Responses	14	4	0	14	0	0	N/A
Total of No Responses	2	12	16	2	16	16	N/A
Percentage of Yes Responses	87.50%	25.00%	0.00%	87.50%	0.00%	0.00%	N/A
Percentage of No Responses	12.50%	75.00%	100.00%	12.50%	100.00%	100.00%	N/A
Average	N/A	N/A	N/A	N/A	N/A	N/A	631.33
Number Over 5 Years	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Percentage Over 5 Years	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Figure 7.1: Aggregated Results of Participatory Rural Assessment (Credit: Brian McFarland)

As one can observe, all community members practice agriculture and nearly two-thirds participate in cattle-ranching. It is also important to note that although no communities sell timber or charcoal outside

of the community, a significant majority of the communities sell either crops or cattle and a significant majority also make charcoal.

This PRA helps to establish a baseline of economic activities and land-use practices that the communities practice, along with a mechanism to assess leakage.

In April 2013, the Project Proponents administered a follow-up PRA that focused on fuel-wood consumption, charcoal consumption, and leakage to better understand if degradation was occurring throughout the Project Area.

In June 2015, the Project Proponents administered a follow-up PRA that focused on fuel-wood consumption, charcoal consumption, and leakage to better understand if degradation was occurring throughout the Project Area. A total of 9 people were surveyed from within the Project Area and within the Project's leakage belt. Similar to the April 2013 survey, the June 2015 PRA survey found that there is little, if any, leakage occurring as a result of the Purus Project and the majority of communities produce charcoal, while fewer communities collect fuelwood.

Basic Necessities Survey

CarbonCo, Carbon Securities, and Moura & Rosa also conducted a Basic Necessities Survey (BNS) from March 10-12, 2012 among the aforementioned sixteen communities. Essentially, a focus group was created among the Project Proponents and the community to identify the top 25 assets or services which were believed to be basic necessities or things that no one should have to live without. The Project Proponents then individually surveyed each of the 16 communities and only those assets or services which at least 50% of the communities deemed a basic necessity were included in the final calculations of a poverty index and poverty score.

The aggregated results of this initial BNS among the thirteen communities living inside the Purus Project, which serves as a baseline, were as follows:

Aggregated Data from Basic Necessities Survey (Communities Inside Project)							
	Total Surveys: 13						
	Asset or Service	Item	Are Basic Necessities? (Total Number of No Responses)	Are Basic Necessities? (Total Percentage of No Responses)	Are Basic Necessities? (Total Number of Yes Responses)	Are Basic Necessities? (Total Percentage of Yes Responses)	Weighting (Fraction)
1	Service	Access to Enough Food	0	0.0%	13	100.0%	1.000
2	Asset	House	0	0.0%	13	100.0%	1.000
3	Service	Access to School	2	12.5%	11	84.6%	0.846
4	Asset	Electricity (PV or Generator)	3	18.8%	10	76.9%	0.769
5	Service	Access to Clean, Drinking Water	0	0.0%	13	100.0%	1.000
6	Service	Access to Health Clinic	2	12.5%	11	84.6%	0.846
7A	Asset	Boat	2	12.5%	11	84.6%	0.846
7B	Asset	Engine for Boat	3	18.8%	10	76.9%	0.769
8	Asset	Machete	1	6.3%	12	92.3%	0.923
9	Asset	Planting Tool	3	18.8%	11	84.6%	0.846
10	Asset	Chain Saw	4	25.0%	9	69.2%	0.692
11	Asset	Diesel or Gasoline	2	12.5%	11	84.6%	0.846
12	Asset	Television	4	25.0%	9	69.2%	0.692
13	Asset	Refrigerator	3	18.8%	10	76.9%	0.769
14	Asset	Radio	3	18.8%	10	76.9%	0.769
15	Asset	Fishing Pole	5	31.3%	8	61.5%	0.615
16	Asset	Fishing Net	5	31.3%	8	61.5%	0.615
17	Asset	Chicken Coop	6	37.5%	7	53.8%	0.538
18	Asset	House for Pigs	8	50.0%	5	38.5%	0.385
19	Service	Access to Medicine	3	18.8%	10	76.9%	0.769
20	Asset	Cooking Stove	1	6.3%	12	92.3%	0.923
21	Asset	Clothes	0	0.0%	13	100.0%	1.000
22	Asset	Hammock	0	0.0%	13	100.0%	1.000
23	Asset	Furniture (Table, Chairs, Bench)	2	12.5%	11	84.6%	0.846
24	Asset	Bed	2	12.5%	11	84.6%	0.846
25A	Asset	Telephone	2	12.5%	11	84.6%	0.846
25B	Asset	Tower for Telephone	4	25.0%	9	69.2%	0.692
Yellow Highlighted Indicates Item is Not a Basic Necessity							

Figure 7.2: Aggregated Results of 2012 Basic Necessity Survey (Credit: Brian McFarland)

Rearranging the data from above, the top 15 Basic Necessities among the communities living within the Purus Project were as follows:

Top 15 Basic Necessities						
	Item	Are Basic Necessities? (Total Number of Yes Responses)	Are Basic Necessities? (Total Percentage of Yes Responses)	Weighting (Fraction)	Have Basic Necessities? (Total Number of Yes)	Have Basic Necessities? (Total Percentage of Yes)
1	Access to Enough Food	13	100.0%	1.000	12	92.31%
2	House	13	100.0%	1.000	13	100.00%
3	Access to Clean, Drinking Water	13	100.0%	1.000	9	69.23%
4	Clothes	13	100.0%	1.000	13	100.00%
5	Hammock	13	100.0%	1.000	13	100.00%
6	Machete	12	92.3%	0.923	13	100.00%
7	Cooking Stove	12	92.3%	0.923	13	100.00%
8	Access to School	11	84.6%	0.846	10	76.92%
9	Access to Health Clinic	11	84.6%	0.846	1	7.69%
10	Boat	11	84.6%	0.846	11	84.62%
11	Planting Tool	11	84.6%	0.846	9	69.23%
12	Diesel or Gasoline	11	84.6%	0.846	9	69.23%
13	Furniture (Table, Chairs, Bench)	11	84.6%	0.846	7	53.85%
14	Bed	11	84.6%	0.846	7	53.85%
15	Telephone	11	84.6%	0.846	5	38.46%

Figure 7.3: Top 15 Basic Necessities in 2012 (Credit: Brian McFarland)

The assets or services which have a higher percentage of communities considering them a basic necessity than the number of communities actually possessing those assets or services shall be considered higher priority social projects or programs for Moura & Rosa. For example, this includes the access to a telephone (i.e., installed at the Project's headquarters in May 2014), access to school (i.e., a school bus boat was secured and supplies donated in 2014), and access to a health clinic (Moura & Rosa facilitated visits by doctors in 2014 and health clinic was built in 2015-2016).

For analytical and comparative purposes, the summary statistics for both the communities within and adjacent to the Purus Project are as follows:

Summary Statistics for Inside Project			Summary Statistics for Inside Project	
Highest Total Value of Owned Assets	37,759.00		Highest Total Value of Owned Assets Per Capita	7,635.00
Lowest Total Value of Owned Assets	7,635.00		Lowest Total Value of Owned Assets Per Capita	1,133.97
Total Value of Owned Assets Range	30,124.00		Total Value of Owned Assets Per Capita Range	6,501.03
Average Total Value of Owned Assets	17,389.32		Average Total Value of Owned Assets Per Capita	4,202.39
% Above Total Value of Owned Assets Ave.	38.46%		% Above Total Vale of Assets Per Capita Average	53.85%
% Below Total Value of Owned Assets Ave.	61.54%		% Below Total Value of Assets Per Capita Average	46.15%

Figure 7.4: Summary Statistics of the 2012 Basic Necessities Survey (Credit: Brian McFarland)

A two-sample F-test of variance was performed by Dr. Frederic Lemieux of The George Washington University to test the hypothesis that the two independent samples (i.e., communities inside Purus Project versus communities outside Purus Project) come from normal distributions with the same variance, against the alternative hypothesis that they come from normal distributions with different variances. The

results, which can be found in the CCBS PDD, are robust and clearly show that the two groups are comparable on poverty score, poverty index, total assets, and per capita assets.

A follow-up Basic Necessity Survey was conducted in 2014. This second Basic Necessity Survey revealed the communities' local needs remained essentially the same as in 2012.

Aggegated Data from Basic Necessities Survey (Communities Inside Project)

Total Surveys: 5

	Asset or Service	Item	Are Basic Necessities? (Total Number of No Responses)	Are Basic Necessities? (Total Percentage of No Responses)	Are Basic Necessities? (Total Number of Yes Responses)	Are Basic Necessities? (Total Percentage of Yes Responses)	Weighting (Fraction)
1	Service	Access to Enough Food	0	0.0%	5	100.0%	1.000
2	Asset	House	0	0.0%	5	100.0%	1.000
3	Service	Access to School	0	0.0%	5	100.0%	1.000
4	Asset	Electricity (PV or Generator)	1	20.0%	4	80.0%	0.800
5	Service	Access to Clean, Drinking Water	0	0.0%	5	100.0%	1.000
6	Service	Access to Health Clinic	0	0.0%	5	100.0%	1.000
7A	Asset	Boat	1	20.0%	4	80.0%	0.800
7B	Asset	Engine for Boat	1	20.0%	4	80.0%	0.800
8	Asset	Machete	1	20.0%	4	80.0%	0.800
9	Asset	Planting Tool	0	0.0%	5	100.0%	1.000
10	Asset	Chain Saw	1	20.0%	4	80.0%	0.800
11	Asset	Diesel or Gasoline	1	20.0%	4	80.0%	0.800
12	Asset	Television	1	20.0%	4	80.0%	0.800
13	Asset	Refrigerator	1	20.0%	4	80.0%	0.800
14	Asset	Radio	1	20.0%	4	80.0%	0.800
15	Asset	Fishing Pole	1	20.0%	4	80.0%	0.800
16	Asset	Fishing Net	1	20.0%	4	80.0%	0.800
17	Asset	Chicken Coop	2	40.0%	3	60.0%	0.600
18	Asset	House for Pigs	2	40.0%	3	60.0%	0.600
19	Service	Access to Medicine	1	20.0%	4	80.0%	0.800
20	Asset	Cooking Stove	0	0.0%	5	100.0%	1.000
21	Asset	Clothes	0	0.0%	5	100.0%	1.000
22	Asset	Hammock	1	20.0%	4	80.0%	0.800
23	Asset	Furniture (Table, Chairs, Bench)	1	20.0%	4	80.0%	0.800
24	Asset	Bed	1	20.0%	4	80.0%	0.800
25A	Asset	Telephone	1	20.0%	4	80.0%	0.800
25B	Asset	Tower for Telephone	1	20.0%	4	80.0%	0.800

Yellow Highlighted Indicates Item is Not a Basic Necessity

Figure 7.5: Aggregated Results of 2014 Basic Necessity Survey (Credit: Brian McFarland)

Top 24 Basic Necessities						
	Item	Are Basic Necessities? (Total Number of Yes Responses)	Are Basic Necessities? (Total Percentage of Yes Responses)	Weighting (Fraction)	Have Basic Necessities? (Total Number of Yes)	Have Basic Necessities? (Total Percentage of Yes)
1	Access to Enough Food	5	100.0%	1.000	3	60.00%
2	House	5	100.0%	1.000	5	100.00%
3	Access to School	5	100.0%	1.000	5	100.00%
4	Access to Clean, Drinking Water	5	100.0%	1.000	4	80.00%
5	Access to Health Clinic	5	100.0%	1.000	0	0.00%
6	Planting Tool	5	100.0%	1.000	1	20.00%
7A	Cooking Stove	5	100.0%	1.000	5	100.00%
7B	Clothes	5	100.0%	1.000	5	100.00%
8	Electricity (PV or Generator)	4	80.0%	0.800	1	20.00%
9	Boat	4	80.0%	0.800	4	80.00%
10	Engine for Boat	4	80.0%	0.800	4	80.00%
11	Machete	4	80.0%	0.800	5	100.00%
12	Chain Saw	4	80.0%	0.800	2	40.00%
13	Diesel or Gasoline	4	80.0%	0.800	3	60.00%
14	Television	4	80.0%	0.800	0	0.00%
15	Refrigerator	4	80.0%	0.800	0	0.00%
16	Radio	4	80.0%	0.800	4	80.00%
17	Fishing Pole	4	80.0%	0.800	3	60.00%
18	Fishing Net	4	80.0%	0.800	1	20.00%
19	Access to Medicine	4	80.0%	0.800	0	0.00%
20	Hammock	4	80.0%	0.800	5	100.00%
21	Furniture (Table, Chairs, Bench)	4	80.0%	0.800	1	20.00%
22	Bed	4	80.0%	0.800	2	40.00%
23	Telephone	4	80.0%	0.800	1	20.00%
24	Tower for Telephone	4	80.0%	0.800	0	0.00%

Figure 7.6: Top 24 Basic Necessities in 2014 (Credit: Brian McFarland)

A simple t-test was performed by James Eaton of TerraCarbon to compare the means for the communities inside the Purus Project in 2012 versus communities inside the Purus Project in 2014. There was no significant difference in the means for either “Total Owned Assets” or “Total Per Capita Assets” using a t-test assuming unequal variances.

Summary Statistics for Inside Project			Summary Statistics for Inside Project	
Highest Total Value of Owned Assets	21,260.00		Highest Total Value of Owned Assets Per Capita	4,292.23
Lowest Total Value of Owned Assets	9,880.00		Lowest Total Value of Owned Assets Per Capita	2,410.84
Total Value of Owned Assets Range	11,380.00		Total Value of Owned Assets Per Capita Range	1,881.40
Average Total Value of Owned Assets	15,599.48		Average Total Value of Owned Assets Per Capita	2,864.31
% Above Total Value of Owned Assets Ave.	40.00%		% Above Total Vale of Assets Per Capita Ave.	40.00%
% Below Total Value of Owned Assets Ave.	60.00%		% Below Total Value of Assets Per Capita Ave.	60.00%

Figure 7.7: Summary Statistics of the 2014 Basic Necessities Survey (Credit: Brian McFarland)

The third BNS was performed in February – March 2016. This third Basic Necessity Survey revealed the communities’ local needs remained essentially the same as in 2012 and 2014.

Total Aggegated Data from Basic Necessities Survey (Communities Inside and Outside Project)						
	Total Surveys: 5					
	Asset or Service	Item	Are Basic Necessities? (Total Number of No Responses)	Are Basic Necessities? (Total Percentage of No Responses)	Are Basic Necessities? (Total Number of Yes Responses)	Are Basic Necessities? (Total Percentage of Yes Responses)
1	Service	Access to Enough Food	0	0.0%	5	100.0%
2	Asset	House	0	0.0%	5	100.0%
3	Service	Access to School	0	0.0%	5	100.0%
4	Asset	Electricity (PV or Generator)	0	0.0%	5	100.0%
5	Service	Access to Clean, Drinking Water	1	20.0%	4	80.0%
6	Service	Access to Health Clinic	0	0.0%	5	100.0%
7A	Asset	Boat	0	0.0%	5	100.0%
7B	Asset	Engine for Boat	0	0.0%	5	100.0%
8	Asset	Machete	0	0.0%	5	100.0%
9	Asset	Planting Tool	0	0.0%	5	100.0%
10	Asset	Chain Saw	0	0.0%	5	100.0%
11	Asset	Diesel or Gasoline	0	0.0%	5	100.0%
12	Asset	Television	1	20.0%	4	80.0%
13	Asset	Refrigerator	1	20.0%	4	80.0%
14	Asset	Radio	0	0.0%	5	100.0%
15	Asset	Fishing Pole	0	0.0%	5	100.0%
16	Asset	Fishing Net	0	0.0%	5	100.0%
17	Asset	Chicken Coop	0	0.0%	5	100.0%
18	Asset	House for Pigs	0	0.0%	5	100.0%
19	Service	Access to Medicine	0	0.0%	5	100.0%
20	Asset	Cooking Stove	0	0.0%	5	100.0%
21	Asset	Clothes	0	0.0%	5	100.0%
22	Asset	Hammock	0	0.0%	5	100.0%
23	Asset	Furniture (Table, Chairs, Bench)	2	40.0%	3	60.0%
24	Asset	Bed	0	0.0%	5	100.0%
25A	Asset	Telephone	1	20.0%	4	80.0%
25B	Asset	Tower for Telephone	2	40.0%	3	60.0%

Figure 7.8: Aggregated Results of 2016 Basic Necessity Survey (Credit: Brian McFarland)

Top 21 Basic Necessities						
	Asset or Service	Item	Are Basic Necessities? (Total Number of Yes Responses)	Are Basic Necessities? (Total Percentage of Yes Responses)	Have Basic Necessities? (Total Number of Yes)	Have Basic Necessities? (Total Percentage of Yes)
1	Service	Access to Enough Food	5	100.0%	5	100.00%
2	Asset	House	5	100.0%	5	100.00%
3	Service	Access to School	5	100.0%	5	100.00%
4	Asset	Electricity (PV or Generator)	5	100.0%	2	40.00%
5	Service	Access to Health Clinic	5	100.0%	5	100.00%
6	Asset	Boat	5	100.0%	4	80.00%
7	Asset	Engine for Boat	5	100.0%	4	80.00%
8	Asset	Machete	5	100.0%	5	100.00%
9	Asset	Planting Tool	5	100.0%	4	80.00%
10	Asset	Chain Saw	5	100.0%	5	100.00%
11	Asset	Diesel or Gasoline	5	100.0%	3	60.00%
12	Asset	Radio	5	100.0%	5	100.00%
13	Asset	Fishing Pole	5	100.0%	5	100.00%
14	Asset	Fishing Net	5	100.0%	4	80.00%
15	Asset	Chicken Coop	5	100.0%	3	60.00%
16	Asset	House for Pigs	5	100.0%	2	40.00%
17	Service	Access to Medicine	5	100.0%	3	60.00%
18	Asset	Cooking Stove	5	100.0%	5	100.00%
19	Asset	Clothes	5	100.0%	5	100.00%
20	Asset	Hammock	5	100.0%	5	100.00%
21	Asset	Bed	5	100.0%	5	100.00%

Figure 7.9: Top 21 Basic Necessities in 2016 (Credit: Brian McFarland)

A simple t-test was performed by James Eaton of TerraCarbon to compare the means for the communities inside the Purus Project in 2014 versus communities inside the Purus Project in 2016. There was no significant difference in the means for either “Total Owned Assets” or “Total Per Capita Assets” using a t-test assuming unequal variances.

Summary Statistics for Inside Project			Summary Statistics for Inside Project	
Highest Total Value of Owned Assets	22,501.00		Highest Total Value of Owned Assets Per Capita	4,261.00
Lowest Total Value of Owned Assets	8,522.00		Lowest Total Value of Owned Assets Per Capita	2,642.62
Total Value of Owned Assets Range	13,979.00		Total Value of Owned Assets Per Capita Range	1,618.38
Average Total Value of Owned Assets	15,626.23		Average Total Value of Owned Assets Per Capita	3,551.26
% Above Total Value of Owned Assets Ave.	66.67%		% Above Total Vale of Assets Per Capita Ave.	66.67%
% Below Total Value of Owned Assets Ave.	33.33%		% Below Total Value of Assets Per Capita Ave.	33.33%

Figure 7.10: Summary Statistics of the 2016 Basic Necessities Survey (Credit: Brian McFarland)

Theory of Change

The PRA and BNS helped to shape the Project Proponent's Theory of Change. As noted in the Social Impact Assessment Toolbox, in simple terms, {the Theory of Change} is a roadmap drawn up by the Project Proponents and stakeholders of how the project plans to get from Point A (project strategy and activities) to Point Z (project impacts)."[73] Likewise, the Purus Project strategies and activities will lead to outputs, followed by outcomes, and ultimately by net positive climate, community and biodiversity impacts.[74]

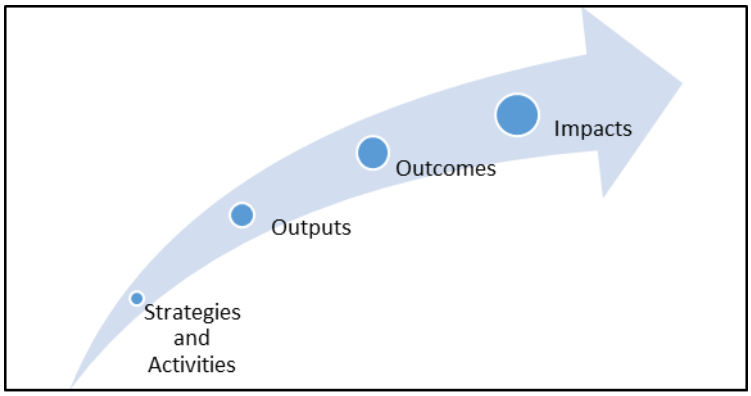


Figure 7.11: Progression from Project Strategies and Activities through Community Impacts

To clearly define activities, outputs, outcomes and impacts, the following definitions were utilized:

Project activities are the physical or implemented activities of the projects.

Project outputs are the tangible short-term results of project activities and normally take the form of products or services provided during the project lifetime and as a direct result of project funding.

[73] Richards, M. and Panfil, S.N. 2011. Social and Biodiversity Impact Assessment (SBIA) Manual for REDD+ Projects: Part 1 – Core Guidance for Project Proponents. Climate, Community & Biodiversity Alliance, Forest Trends, Fauna & Flora International, and Rainforest Alliance. Washington, DC., Page 13.
[74] The linkages between the Purus Project's Strategies and Activities, Outputs, Outcomes, and Impacts were conceptualized with assistance from Brigitta Jozan, Independent Advisor

Project outcomes are the direct intended results stemming from the outputs. They are short- and medium term changes experienced by project stakeholders and/or by the physical environment, and are less tangible and easy to measure than outputs.

Project impacts are the end results sought by the project, especially as regards net social changes. They may occur as a direct or indirect result of project outcomes.[75]

The following causal analysis has been conducted to demonstrate net positive community impacts from the Purus Project.[76]

Carbon Finance

The following Theory of Change is for Carbon Finance.

[75] Sources: Based on GEF Evaluation Office and Conservation Development Centre 2009; Schreckenberg et al. 2010.
[76] Richards, M. and Panfil, S.N. 2011. Social and Biodiversity Impact Assessment (SBIA) Manual for REDD+ Projects: Part 1 – Core Guidance for Project Proponents. Climate, Community & Biodiversity Alliance, Forest Trends, Fauna & Flora International, and Rainforest Alliance. Washington, DC., Page 32.

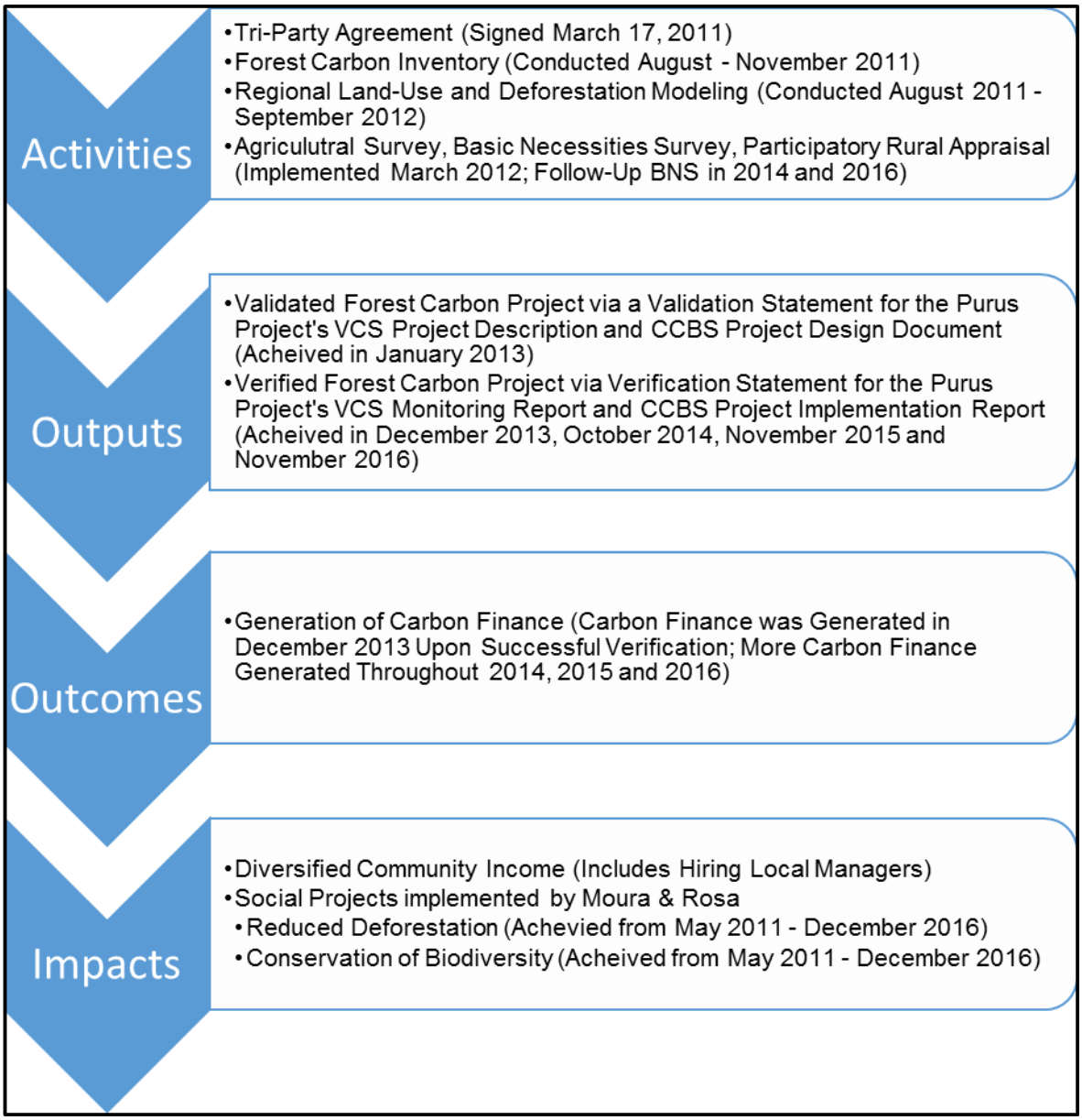


Figure 7.12: Activities, Outputs, Outcomes and Impacts of Carbon Finance

IF, THEN Statements

With a Tri-Party Agreement, forest carbon inventory, regional land-use and deforestation modeling, along with the Agricultural Survey, Basic Necessities Survey and Participatory Rural Appraisal activities successfully accomplished, the output was a certified forest carbon project with a VCS and CCBS validation statement. With validation and verification statements received, carbon finance is now being generated. With carbon finance generated, the communities will diversify incomes and Moura & Rosa is able to implement more social projects and programs. If communities diversify incomes and Moura & Rosa continue to implement social projects (e.g., health clinic, granting land tenure, etc.) and programs, then deforestation will be continuously reduced and biodiversity will be conserved.

Agricultural Surveys

The following Theory of Change is for Agricultural Surveys.

Figure 7.13: Activities, Outputs, Outcomes and Impacts of Agricultural Survey

IF, THEN Statements

With the agricultural surveys designed and communities asked about the most interesting agricultural courses, the Project Proponents identified the top-10 courses, the courses were purchased and the initial agricultural courses were taught to the communities. If the most interesting courses are taught to the communities, then the communities will gain new knowledge, learn new practices and learn new skills about sustainable forms of agriculture and rotational cattle pastures. If the communities gain new knowledge, practices and skills, then the communities will intensify agricultural practices, diversify crops, and increase income generation. If communities intensify agricultural practices, diversify crops, and increase income generation, then deforestation will be continuously reduced and biodiversity will be conserved.

Basic Necessities Survey

The following Theory of Change is for the Basic Necessities Survey (BNS).

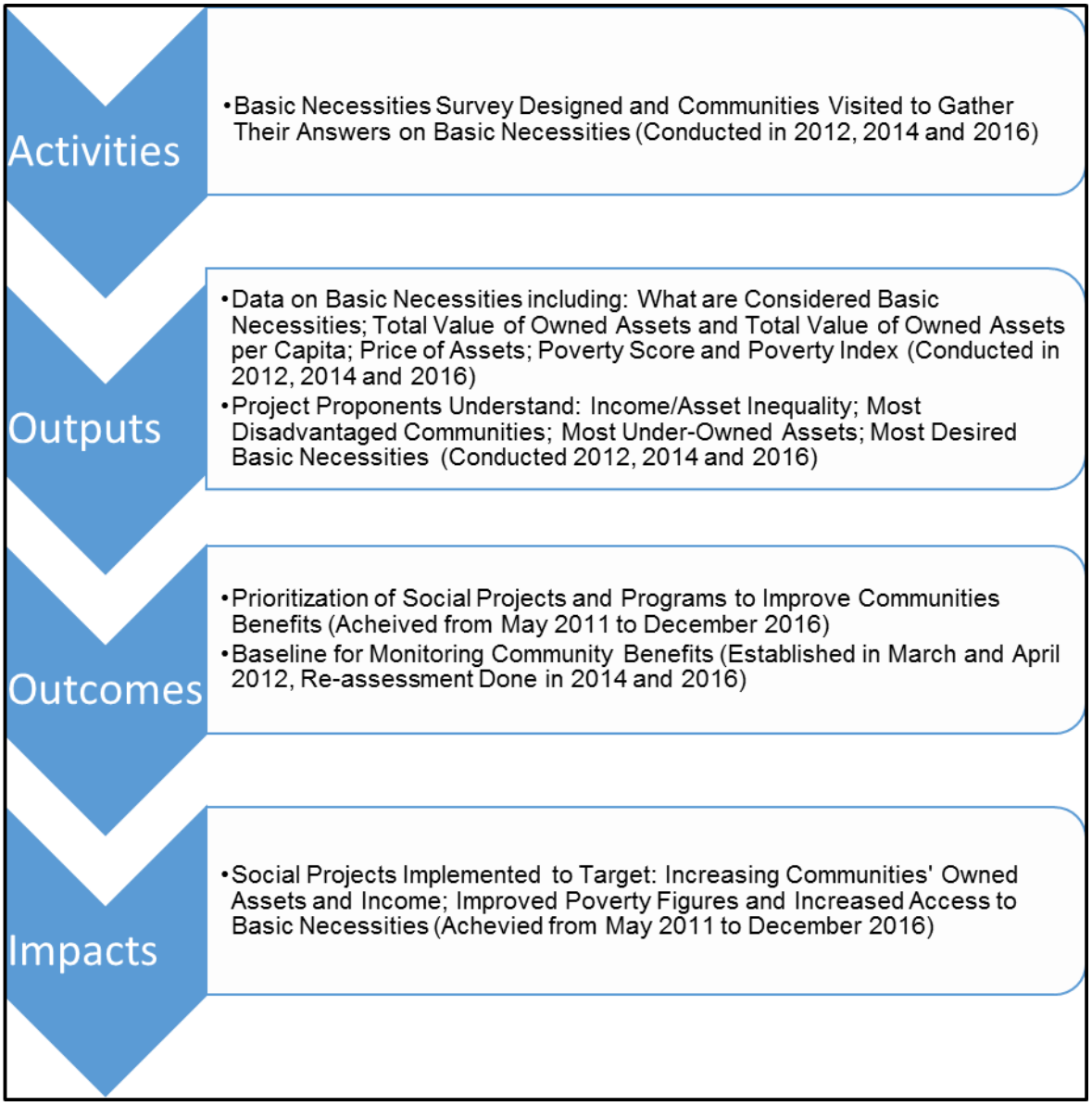


Figure 7.14: Activities, Outputs, Outcomes and Impacts of Basic Necessities Survey

IF, THEN Statements

With the BNS designed and communities surveyed, the Project Proponents generated data on basic necessities, community assets and poverty which enabled the Project Proponents to understand asset inequality, which communities are most disadvantaged, along with which are the most under-owned assets and which are the most desired basic necessities. With this data collected and understood by the Project Proponents, social projects and programs were prioritized for improving community benefits and a baseline for monitoring benefits was established. With social projects and programs prioritized, social

projects are being implemented which specifically target increasing communities owned assets and income, along with to improve poverty figures and access to basic necessities.

Participatory Rural Appraisals

The following Theory of Change is for Participatory Rural Appraisals (PRAs).

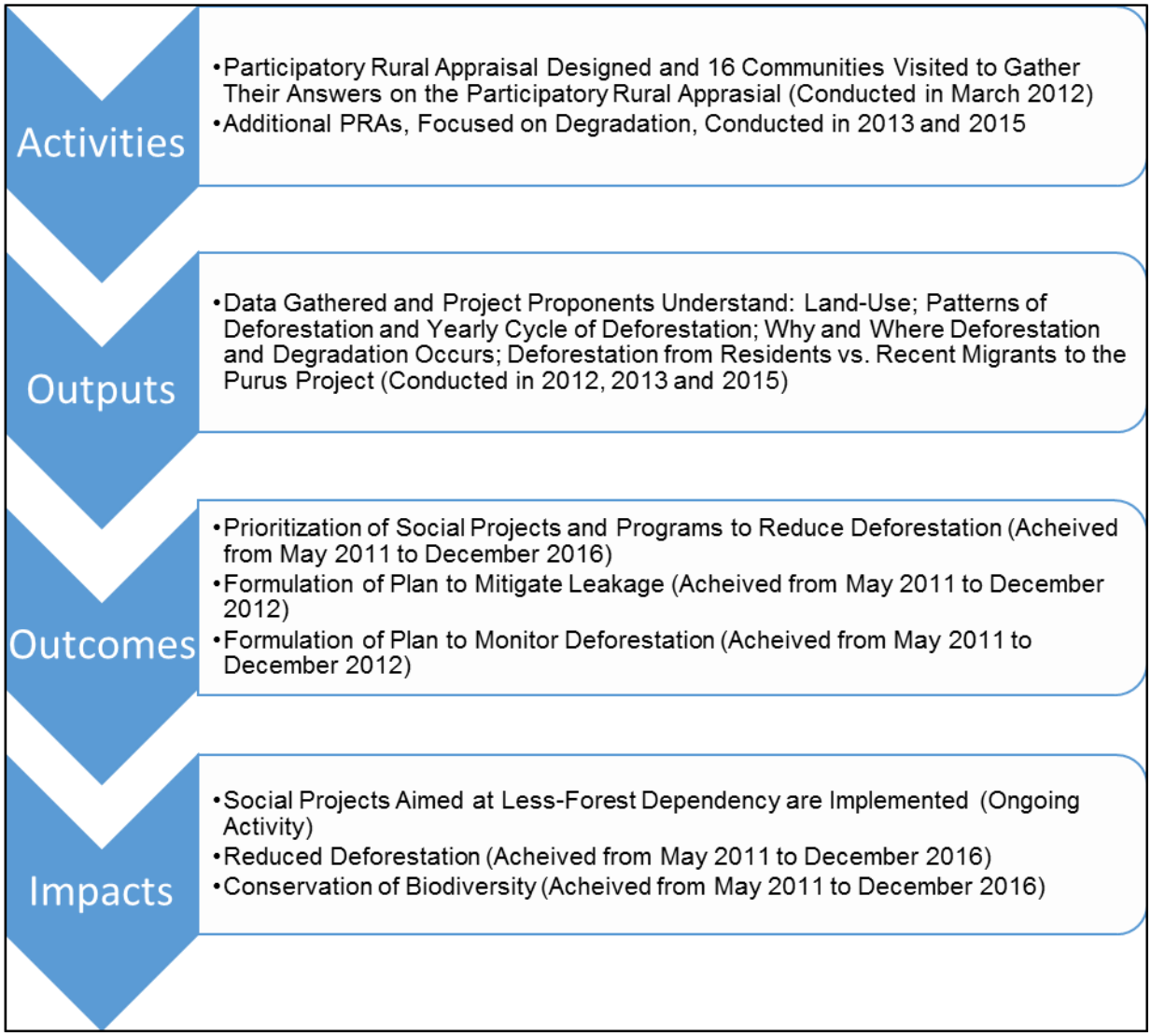


Figure 7.15: Activities, Outputs, Outcomes and Impacts of Participatory Rural Appraisal

IF, THEN Statements

With PRAs designed and communities surveyed, data was gathered and the Project Proponents now understand: Land-Use; Patterns of Deforestation and Yearly Cycle of Deforestation; Why and Where Deforestation Occurs; Deforestation from Residents vs. Recent Migrants to the Purus Project. With this data collected and deforestation patterns now understood by the Project Proponents, social projects and programs aimed at reducing deforestation were prioritized and plans for mitigating leakage and

monitoring deforestation were formulated. If social projects and programs are prioritized, then deforestation will be continuously reduced and biodiversity will be conserved.

Comparison of 'With Project' Scenario and 'Without Project' Scenario

A comparison between community benefits in the 'with project' scenario and in the 'without project' scenarios resulted in net positive community benefits in the 'with project' scenario from January 2016 to December 2016. As demonstrated, the estimated impacts on all communities from the Purus Project are expected to be positive throughout the Project Lifetime and such positive benefits include socio-economic well-being and benefits for ecosystem services.

The 'without project' scenario is the continuation of unplanned, frontier deforestation. While it is believed that the communities would continue to practice subsistence agriculture and cattle-ranching and receive the associated benefits from these activities, the amount of land deforested would increase. Such increased deforestation would result in negative impacts on ecosystem services. This includes increased erosion, increased flooding due to fewer trees storing water, increased GHG emissions, and less habitat area for both wildlife and for the game which communities hunt.

The Purus Project, which seeks to provide alternative economic opportunities to communities and mitigate deforestation, provided net positive socio-economic benefits for communities in the 'with project' scenario from May 2011 to December 2012 by: enabling communities to identify the most desired agriculture and rotational cattle pasture techniques to be taught; the purchase of these agriculture and rotational cattle pasture courses; increased local incomes (i.e., two local project managers hired from community, along with several local contractors and local project manager from Rio Branco); acquisition of a school bus boat for the local school at the Purus Project; diversified incomes (i.e., through learning and gaining access to new crops, along with employment through Moura & Rosa); purchase of two boats (one fast boat for access to the Project and one larger boat to increase market access for the communities' crops); initiation of the eventual removal of trees from the Purus River; and via the establishment of the Project headquarters. These activities would not have resulted in the 'without project' scenario.

In the 'with project' scenario from January 2013 to December 2013, net positive socio-economic benefits for communities were provided by: continuing to reduction of deforestation in the Project Area; ongoing preservation of biologically diverse habitats and the availability of game; offering agricultural extension courses to local communities; providing social assistance such as donating food and gasoline, building stairs and painting community houses; and continuing progress towards legalization of local communities' land tenure.

In the 'with project' scenario from January 2014 to December 2014, net positive socio-economic benefits for communities were provided by: a reduction in the Project Area's deforestation; preservation of biologically diverse habitats; completion of the biodiversity study using motion-sensitive wildlife camera traps; installation of a permanent phone at the Project headquarters; medical assistance provided to local communities; and initiation of granting official land title to several local communities.

In the 'with project' scenario from January 2015 to December 2015, net positive socio-economic benefits for communities were provided by: a reduction in the Project Area's deforestation; ongoing preservation of biologically diverse habitats; construction of an onsite health clinic; acquisition of a boat to provide free transport for the communities; installation of potable water system at the Project's headquarters; and completion of land titling to first few community members.

In the 'with project' scenario from January 2016 to December 2016, net positive socio-economic benefits for communities were provided by: a reduction in the Project Area's deforestation; ongoing preservation of biologically diverse habitats; completion of an onsite health clinic with dentist and nurse visits; ongoing use of the boat to provide free transport for the communities; and engagement with UFAC to provide medicinal and agricultural assistance in 2017.

Impact on High Conservation Values

The communities place high conservation values on the Purus Project due to food, fuel and fodder, medicines, building materials, and traditional cultural significance.

Food

With respect to food, the community places a high conservation value especially on fishing and hunting. The Project did not disrupt the communities' access to fishing and by maintaining the Purus Project's primary forests, the Project shall also assist with maintaining a healthy population of game.

Fuel and Fodder

Although the Project seeks to eliminate deforestation – which might negatively impact the communities' access to fuelwood and charcoal – there will be sustainable woodlots established. Furthermore, many of the communities collect fuelwood or make charcoal out of deadwood and thus, do not require the cutting down of primary forests. It is important to note that the PRAs that are regularly conducted at the Purus Project demonstrate this collection of fuel and fodder does not lead to significant degradation of the primary forests.

Medicines

Being a forest conservation project, the Project shall continue to preserve the primary forest's medicinal plants. In addition, Moura & Rosa will also establish a health clinic at the Purus Project. This health center will provide both medicines and medicinal plants.

Building Materials

Although the Project seeks to eliminate deforestation – which might negatively impact the communities' access to building materials – the recent trend has been for the communities to acquire building materials (e.g., bricks) from the city as opposed to the forest.

Traditional Cultural Significance

The with-project scenario will not involuntarily relocate communities and thus, the Project shall help maintain the traditional cultural significance of the Purus property.

7.2 Negative Offsite Stakeholder Impacts (CM2)

The Purus Project Proponents undertook an extensive stakeholder identification and consultation, including with offsite stakeholders from May 2011 through December 2012. This stakeholder consultation continued throughout 2013, 2014, 2015 and 2016.

The following is a list of the adjacent communities and landowners to the Purus Project:

- Manuel Pedro Neto - Seringal Victoria;
- Reserva Agroextrativista Cazumba-Iracema INCRA Settlement;
- Seringal Mamueiro – INCRA;
- Seringal Veneza - Privately Owned;
- Seringal Escondido;
- Seringal Samauma Velha;
- Settlement Project Alegria – INCRA;
- Settlement Project Liberdade – INCRA;
- Raimundo Silva Araujo;
- Antonio Marazona Dias do Nacimento; and
- Osmir da Silva e Silva.

More specifically in 2016, the Project Proponents met with numerous offsite stakeholders including the Climate Change Institute, along with the communities living at the end of the Ramal approaching the Project Zone.

For instance, in 2016, Moura & Rosa met with the communities located upstream from the Purus Project at the community of Mr. Ribamar to discuss how to organize themselves into an association in order to obtain resources from INCRA and/or Banco da Amazônia to finance their plantations. Whether it be bananas, cassava, cacao, or coffee, it was recommended that at least three people should plant the same crop in order to obtain a commercially viable production volume.

Community Meeting with Mr. Ribamar (Photo Credit: Wanderley Rosa)

Potential Negative Offsite Stakeholder Impacts

Although no negative offsite stakeholder impacts took place since May 23, 2011 and particularly between January 2016 and December 2016, the Project Proponents identified the following potential future negative offsite stakeholder impacts:

- Increased cost of land; for example, if forest carbon projects increase property values for future land purchases;
- Decreased value of land; for example, if Purus Project prevents adjacent properties from accessing markets;
- In-migration to areas adjacent to the Project Zone;
- If communities migrate out of the Project Zone (i.e., due to forced relocation or lack of Project success) and into primary forests adjacent to the Project Zone;
- If the Project Proponents are unable to eliminate deforestation and the community continues to expand into the forest, including forests outside the Project Zone;
- Wealth in Project Zone creates conflict in surrounding areas due to jealousy, a rise in illicit activities, alcoholism, elite capture, etc.

Mitigation Plans

It is important to note that the communities in and near the Purus Project have good relationships and no conflicts with main stakeholders living outside the Project Zone were identified through stakeholder consultations between January 2016 and December 2016. Furthermore, none of the aforementioned potential negative offsite stakeholder impacts were discovered to have occurred during the monitoring period of January 1, 2016 to December 31, 2016.

Regarding the increased cost of land, the Purus Project did not have a noticeable impact on rising costs of land, especially if compared to the completion of BR-364's paving. In contrast, the Purus Project might decrease the value of surrounding land. The Purus Project is a conservation project and might prevent surrounding properties from having access to markets because the Project will not allow road construction through the property. Nevertheless, Moura & Rosa will continue to discuss the Purus Project with adjacent landowners to offer expanding forest conservation projects beyond the boundaries of the Purus Project. Maintaining forest cover, at the expense of road construction or the establishment of large-scale cattle-ranches, has positive climate, community and biodiversity benefits.

In-migration to areas adjacent to the Project Zone could occur, but was not identified as a result of the Purus Project between January 2016 and December 2016. Acre's State System of Incentive for Environmental Services (SISA) seeks to improve rural livelihoods which should continue to reduce in-migration into the both the Project Zone and areas adjacent to the Project Zone. Furthermore, the Project Proponents monitored deforestation throughout the Project Zone and will seek to minimize deforestation within the Project Zone. Similarly, there is a possibility of out-migration from the Purus Project and into the surrounding non-Purus Project property forests. To mitigate out-migration, the Project Proponents have held numerous community meetings and seek to implement a variety of social projects and programs.

With respect to increased conflict, illicit activities, alcoholism, and elite capture, the Project Proponents will continue to monitor community benefits throughout the Project Zone. Children from surrounding communities are allowed to attend school in the Purus Project, while surrounding communities are allowed to visit the dental and health clinic which was established at the Purus Project.

Net Effect of Project on Stakeholders

The Purus Project had a net positive impact from January 1, 2016 to December 31, 2016 on the well-being of stakeholders including the Project Proponents, local communities, offsite stakeholders, and the Acre State Government. Furthermore, ongoing consultations will take place to assure the Project does not result in a net negative impact.

Such positive offsite stakeholder impacts include:

- Increased learning curve for future REDD+ projects amongst private landowners in Acre. This includes the initiation of three additional REDD+ projects in Acre by Carbon Securities and CarbonCo known as the Russas Project (see here), the Valparaiso Project (see here), and the Envira Amazonia Project (see here).

- Sharing of knowledge, best practices, and lessons learned with stakeholders including the State of Acre. This included numerous meetings between January 2013 and December 2016 with the Mayor of Manoel Urbano, STR-Manoel Urbano, and the Climate Change Institute.

7.3 Exceptional Community Benefits (GL2)

This section is not applicable to the Purus Project.

8 BIODIVERSITY

8.1 Net Positive Biodiversity Impacts (B1)

The Purus Project generated net positive biodiversity impacts while maintaining high conservation values since May 23, 2011 and particularly from January 2016 to December 2016. In order to contribute to net positive biodiversity impacts, the Project did not use invasive species nor genetically modified organisms (GMOs).

Biodiversity Impacts

The Project Proponents used the Avoided Deforestation Partners VCS REDD Methodology, entitled, "VM0007: REDD Methodology Modules (REDD-MF), v1.3." and the VCS Monitoring Plan to estimate the changes in forest cover.

In conjunction with the VCS VM0007 methodology to monitor changes in forest cover, the Project Proponents utilized the island biogeography methodology to estimate changes in biodiversity as a result of the project. The biodiversity concept of island biogeography was originally developed by Robert MacArthur and E.O. Wilson and was extrapolated to theorize that habitat area is related to species diversity and species abundance.

Island biogeography in the Brazilian Amazon was demonstrated by the "Biological Dynamics of Forest Fragments Project (BDFFP, also known as the Minimum Critical Size of Ecosystems Project) {… which concluded that} censuses of beetles, birds, and primates in 1-, 10-, and 100- hectare reserves indicate that the number of species, and in some cases population sizes, in these groups varies with the size of the reserve."[77]

The 'without project' scenario involved the continued, unplanned frontier deforestation which would result in less forest cover, less habitat availability, and most likely a reduction in both species diversity and species abundance. In contrast the 'with project' scenario, which is a tropical forest conservation project, had positive biodiversity impacts such as:

- Maintaining forest cover and reforesting degraded areas, thus expanding forest cover;
- Maintaining water cycling, filtration and storage;

[77] Richard O. Bierregaard Jr. et. al., "The Biological Dynamics of Tropical Rainforest Fragments," pages 859-866.

- Maintaining nutrient recycling and soil quality enhancement;
- Providing foodstuffs for both local communities and wildlife; and
- Providing habitat for an extraordinary diversity of flora and fauna.

With no negative biodiversity impacts estimated as a result of the Purus Project, these aforementioned positive biodiversity impacts result in a net positive impact on biodiversity in the 'with project' scenario throughout the Project Zone and Project Lifetime.

Impact on High Conservation Values

In August 2014, it was discovered by the Project Proponents that a local family killed a jaguar which is a threatened species (i.e., a High Conservation Value). The local family has three young children that regularly play in the nearby pasture and the family was concerned about their children's safety due to the jaguar's regular appearance. The killing of jaguars, and other threatened species, is not a regular occurrence at the Purus Project. No other such killings have been observed and no wildlife trafficking or bush meat trade has been identified.

No other high conservation values – whether with respect to communities or biodiversity – were negatively affected by the Purus Project from January 2016 to December 2016. Regarding the biodiversity high conservation values (HCVs), the Purus Project has several qualifying attributes and this includes threatened species, threatened or rare ecosystems, and critical ecosystem services.

To demonstrate that such HCVs were not negatively affected by the Project, one can observe via satellite imagery or firsthand observations that the Purus Project's tropical rainforest (i.e. a threatened or rare ecosystem), and its associated ecosystem services, were maintained as intact forest cover. In addition, the Purus Project's full biodiversity impact monitoring plan, which shall monitor medium-to-large mammals including any threatened species, was publicly posted to the CCBS on May 15, 2013.

In addition, the Project's Participatory Rural Assessment and Basic Necessities Survey were designed to measure the communities' high conservation values and the Project Proponents will continue to monitor these HCVs to ensure they are not negatively affected by the Purus Project.

Identify All Species to be used by the Project

While the Purus Project is mainly a payment for ecosystem services conservation project, in the future there will be some reforestation activities within degraded areas of the Purus Project which shall not include any invasive species. Such locally-appropriate species include:

- Cedro;
- Copaíba;
- Cumaru Citim;
- Cumaru Ferro (*Dipteryx micrantha Harms*);
- Ipê (*Eperua bijuga Benth*.);

- Jatobá;
- Samaúma; and
- Seringueira.

In addition, several agroforestry crops including bananas and coconuts were planted in 2014 and 2015 around the Purus Project's headquarters. It is also important to note that the carbon sequestration associated with these reforestation activities will not be included in the GHG quantifications.

Possible Adverse Effects of Non-Native Species

N/A – There will only be locally-appropriate, native species used in the Purus Project.

Non-Use of GMOs

The Project Proponents guarantee that no genetically-modified organisms (GMOs) will be used in the Purus Project to generate GHG emissions reductions or removals and no GMOs were used since May 23, 2011 and particularly none between January 2016 and December 2016.

8.2 Negative Offsite Biodiversity Impacts (B2)

The Project Proponents have evaluated and will mitigate the potential negative offsite biodiversity impacts which result from the Purus Project.

Potential Negative Offsite Biodiversity Impacts

Due to the fact that the Purus Project is a payment for ecosystem services forest conservation project, there is unlikely to be any negative offsite biodiversity impacts that the Project is likely to cause. The major negative offsite biodiversity impacts would be a result of leakage. For example, this activity shifting leakage could include deforestation agents such as the communities and/or deforestation drivers such as cattle-ranching and road construction shifting from within the Project Zone to outside the Project Zone.[78] This activity shifting leakage would result in an increase in deforestation, increase in GHG emissions, reduction of habitat availability and more forest fragmentation – all of which would have a negative impact on offsite biodiversity. The Project Proponents are committed to monitoring deforestation within the Project Zone and there are activities planned to reduce leakage effects.

Mitigation Plans

The Purus Project has leakage mitigation plans to minimize the likelihood of communities moving from within the Project Zone to outside the Project Zone which would result in negative offsite biodiversity impacts. In addition, the Project Proponents shall practice adaptive management and will collectively address any additional negative offsite biodiversity impacts that are later identified.

[78] Pitman, N. 2011. Social and Biodiversity Impact Assessment Manual for REDD+ Projects: Part 3 – Biodiversity Impact Assessment Toolbox. Forest Trends, Climate, Community & Biodiversity Alliance, Rainforest Alliance and Fauna & Flora International. Washington, DC., Page 9

As previously mentioned, there were a variety of leakage mitigation activities designed and implemented since May 23, 2011 and particularly between January 2016 and December 2016. This includes:

- Continuing alignment with the State of Acre's Payment for Ecosystem Services Scheme;
- Landowners monitored the leakage belt and will report illegal deforestation to the authorities, if identified.

From January 2016 to December 2016, the Project Proponents monitored the leakage belt via a drone and via boat. To mitigate the leakage attributed to communities moving from within the Project Zone to outside the Project Zone, the Project Proponents consulted communities throughout the Project Zone and continued to extend project activities (such as agricultural extension training courses and health services) to communities throughout the Project Zone and not just to those living within Moura & Rosa's property. Furthermore, satellite imagery was also used to quantify the amount of deforestation that took place as a result of leakage from January 2016 to December 2016. Deforestation during this time period was reduced beyond the "without project" scenario and thus, more forest cover and habitat availability were conserved due to the Purus Project.

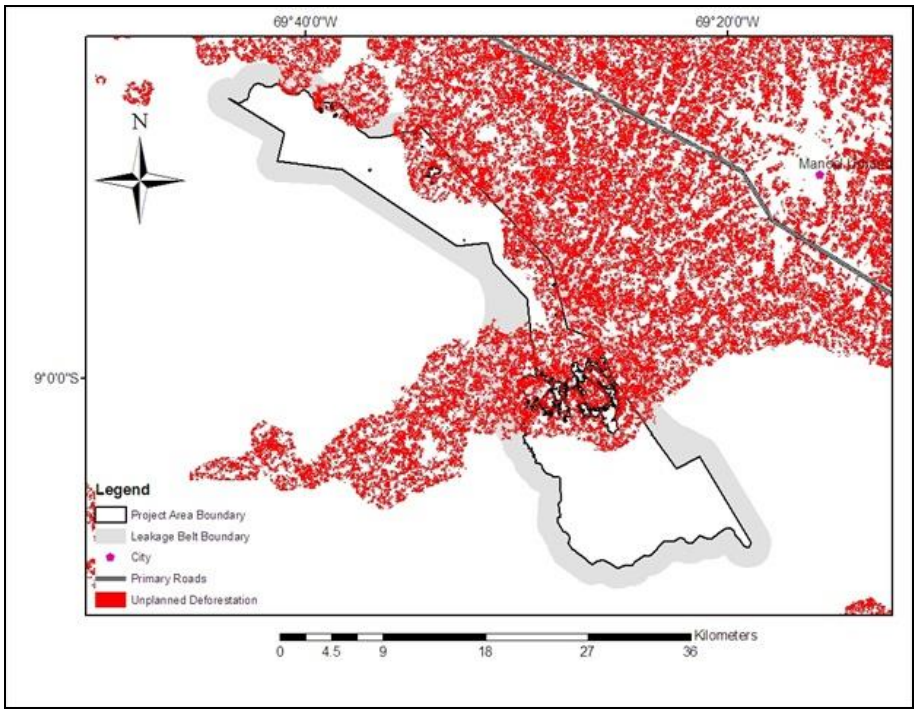
In addition, the State of Acre's Payment for Ecosystem Services Scheme (known as Sistema de Incentivo a Serviços Ambientais or "SISA" in Portuguese) is also relevant to the mitigation of leakage; particularly the leakage attributed to communities moving from outside the Project Zone to within the Project Zone. This is because the SISA is focusing on improving rural livelihoods through a Certification Program of Rural Production Units which shall "provide for the gradual abandonment of burning; priority access to labor-saving technologies; access to incentives and financing; and inclusion in sustainable production chains to encourage the production and protection of environmental services."[79] Thus by improving rural livelihoods, communities will have less incentive to migrate, which shall reduce deforestation in the leakage belt while maintaining forest cover and habitat availability.

Net Effect of Project on Biodiversity

The overall effect of the Purus Project on both offsite and onsite (i.e., within the Purus Project Zone and outside the Project Zone) biodiversity between January 2016 and December 2016 was overwhelmingly positive.

The 'with-project' scenario is a forest conservation project which will mitigate the deforestation of an estimated 6,037 hectares within the Project Area that would have occurred in the 'without-project' scenario from 2011 - 2020:

[79] Environmental Defense Fund, "Ready for REDD: Acre's State Programs for Sustainable Development and Deforestation Control," Page 8.



Map 4: Map of the Predicted Deforestation in the Baseline Period, 2011-2020
(Credit: TerraCarbon and Professor Antonio Flores)

This mitigation of deforestation and preservation of forest cover will have a significantly positive effect on biodiversity.

In contrast, the estimated amount of carbon dioxide equivalent emissions (CO_2e) predicted to occur outside of the Project Zone in the 'with-project' scenario is an estimated 52,019 metric tonnes of CO_2e. Using the weighted average of aboveground biomass in Amazonia forests of approximately 372.3 metric tonnes of CO_2e per hectare,[80] this results in an estimated 139.7 hectares deforested (i.e., 52,019 metric tonnes of CO_2e divided by 372.3 metric tonnes of CO_2e per hectare) outside of the Project Zone as a result of the Purus Project. See the validated VCS Project Description section 3.3 Leakage.

Thus, the overall effect of the Purus Project on biodiversity was overwhelmingly positive because much more forest cover was preserved as opposed to deforested as a result of the project activities.

Furthermore, numerous medium-to-large mammals were photographed at the Purus Project. Some of these mammals are considered threatened or vulnerable according to the IUCN Red List and jaguars, which were also photographed, are considered both a keystone species and an apex predator. Overall, these mammals indicate a healthy, intact, biologically diverse habitat.

[80] FAO, "Global Forest Resources Assessment 2010, Brazil Country Report," Available: http://www.fao.org/forestry/20288-0f6ee8584eea8bff0d20ad5cebcb071cf.pdf.

8.3 Exceptional Biodiversity Benefits (GL3)

The Purus Project not only demonstrated net positive biodiversity impacts on biodiversity within the Project Zone, but also has sites of global significance for biodiversity conservation. This global significance for biodiversity conservation was determined based off the Key Biodiversity Area (KBA) framework of vulnerability.

Project Zone's High Biodiversity Conservation Priority

A rapid assessment of the Purus Project's flora and fauna diversity was conducted by Maria José Miranda de Souza Noquelli of Tenóryo Dias and Alternativa Ambiental from August to September 2009. There were at least two endangered flora species identified at the Purus Project as classified on the International Union for Conservation of Nature (IUCN) Red List. These endangered flora species are Car-cara (common name in French, Portuguese name is Canela rosa, English translation is Cinnamon Rose, scientific name is *Aniba rosaeodora*)[81] and Baboonwood (Portuguese name is Virola Branca/Ucuuba Branca, scientific name is *Virola surinamensis*)[82].[83]

Although yet to be identified within the Purus Project Zone, the International Union for the Conservation of Nature's (IUCN) Red List of Threatened Species classifies the following seven species found in the State of Acre as either endangered or critically endangered:

- Black-faced, Black Spider Money (*Ateles chamek*);
- *Couratari prance;*
- Renaquinho (*Ficus ramiflora*) and Coajinguba (*Ficus ursine*);
- Geoffroy's Woolly Monkey (Lagothrix cana);
- Rollinia calcarata; and
- Trichilia elsae[84]

Furthermore, the wildlife camera traps photographed a short-eared dog (considered near threatened by the IUCN Red List),[85] a jaguar (considered near threatened by the IUCN List),[86] a giant anteater (considered vulnerable by the IUCN Red List),[87] and a lowland tapir (considered vulnerable by the IUCN Red List).[88]

Thus, the KBA framework of vulnerability applies to the Purus Project and the Purus Project was validated to the CCBS with Gold Distinction in January 2013.

[81] IUCN, "Aniba rosaeodora," Available: http://www.iucnredlist.org/details/33958/0
[82] IUCN, "Virola surinamensis," Available: http://www.iucnredlist.org/details/33959/0
[83] Maria José Miranda de Souza Noquelli, "Diagnóstico Ecológico Rápido da Vegetação dos Seringais Porto Central e Itatinga, no Município Manuel Urbano – AC.," May 2012.
[84] IUCN 2012. IUCN Red List of Threatened Species. Version 2012.1. <www.iucnredlist.org>. Downloaded on 11 October 2012.
[85] IUCN, "Atelocynus microtis," Available: http://www.iucnredlist.org/details/6924/0
[86] IUCN, "Panthera onca," Available: http://www.iucnredlist.org/details/15953/0
[87] IUCN, "Myrmecophaga tridactyla," Available: http://www.iucnredlist.org/details/14224/0
[88] IUCN, "Tapirus terrestris," Available: http://www.iucnredlist.org/details/21474/0