MONITORING MANOA REDD+ PROJECT

Document Prepared by Biofílica Ambipar Environment Investments S.A.

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Prepared By	Biofílica Ambipar Environment Investments S.A.
Contact	Rua Vieira de Morais, 420 - Cj. 43/44 — Campo Belo ZIP 04617-000, Sao Paulo/SP - Brazil www.biofilica.com.br/+55 (11) 3073-0430 Plínio Ribeiro — Executive Director — plinio@biofilica.com.br Caio Gallego — Project Coordinator — caio@biofilica.com.br

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1 PROJECT DETAILS

1.1 Summary Description of the Implementation Status of the Project

The Manoa REDD+ Project is a partnership between Biofílica and Grupo Triângulo, located at Manoa Farm, municipality of Cujubim, Rondônia state. Over its nearly 30 years of history, Manoa has improved its management techniques by becoming a world reference model for forest exploration combined with nature conservation.

In this context, the activities of the project are under the responsibility of Biofílica Ambipar Environment Investments and Grupo Triângulo, the activities foreseen by the Project are characterized by their continuous implementation, part of which was initiated during this monitoring period, focusing mainly on the generation of climate benefits, given the great pressure of deforestation that has been occurring in the project region. Among the main activities implemented during the monitoring period, we highlight 1. Monitoring deforestation through satellite images; 2. Asset surveillance carried out by the security team to prevent deforestation and invasions in the area; 3. The implementation of FSC certified low-impact forest management; 4. The Technical training in low-impact forest management and the Environmental Education actions offered by Manoa Sustentável, Exploração e Serviços Florestais. For more details on the implementation status of each project activity, see sections 3.1.1 and 3.1.2.

Actions were taken to prevent events that could impact GHG emission reductions, resulting in non-permanence of emission reductions. These actions include patrimonial surveillance throughout the Project Area, low-impact Forest Management, communication procedures with stakeholders, and the social performance of project proponents with the surrounding population. These actions aim to establish a broad and transparent management of the territory, preventing the occurrence of invasions, disputes and illegal practices, reducing social tensions.

The Project has more than 72,000 hectares of forest, demonstrating the pioneering in the low-impact forest management activity, Manoa Farm has been sustainably managed since 1999, according to the Sustainable Forest Management Plan of the company. Management activities maintain forest cover and the ecological balance of the forest, collaborate with environmental benefits, reinforce good governance of the area, in addition to bringing benefits to the climate, by adopting low-impact harvesting techniques, complying with all current legislation and principles of FSC forest certification.

The Manoa REDD+ Project works with the objective of promoting the development of activities aimed at mitigating climate change, reducing GHG emissions caused by deforestation and forest degradation, promoting social well-being and conserving biodiversity in the municipality of Cujubim. As a result, the total GHG emission reductions generated during this monitoring period (01/Jan/2017 to 07/Aug/2020) were 1,046,092 tCO2eq.

1.2 Sectoral Scope and Project Type

Sector Scope: 14 - Agriculture, Forest and Other Land Use (AFOLU)

Project Category: Reducing Emissions from Deforestation and Forest Degradation (REDD)

Type of Activity: Avoided Unplanned Deforestation (AUD)

Grouped Project: Nope

1.3 Project Proponent

Organization name	Biofilica Ambipar Environment Investments S.A
Contact person	Plínio Ribeiro
Title	Executive Director
Address	Rua Vieira de Morais, 420 - Cj. 93 - Campo Belo ZIP 04617-000, Sao Paulo/SP — Brazil
Telephone	+55 11 3073-0430
E-mail	plinio@biofilica.com.br

Organization name	Manoa Sustentável, Exploração e Serviços Florestais Ltda
Contact person	Murilo Granemann de Souza
Title	Executive Director
Address	Av. Cujubim, nº 3653 – Bairro Setor 06 –Cujubim/RO - Brasil
Telephone	(69) 3582-2012
E-mail	triangulo@triangulo.com.br, floresta@manoa.ind.br

1.4 Other Entities Involved

Organization name	UNIR — Federal University of Rondônia Foundation
Role in the Project	An important partnership established during the period was the agreement with researchers Fernando Henrique Ribas Motta and Dra. Mariluce Rezende Messias linked to the Federal University of Rondônia Foundation (UNIR) for monitoring biodiversity.
Contact person	Mariluce Rezende Messiah
Title	Coordinator of the Mastozoology and Terrestrial Vertebrates Laboratory, and supervisor of the research project entitled “Evaluation of the regeneration phase of an area under low-impact forest management in

	two focal groups of vertebrates through the photographic trapping method at Manoa Farm, Cujubim/RO"
Address	Av. Presidente Dutra, 2965 - Centro, Porto Velho/RO - Brazil
Telephone	(69) 2182-2000
E-mail	floresta@manoa.ind.br

1.5 Project Start Date

The Manoa REDD+ Project began on January 1st, 2013. This date represents a milestone of the first Biofílica studies that took place to evaluate the structure of the REDD+ project. More information about the start date can be found in the Project Description Document (PDD).

1.6 Project Crediting Period

The project's crediting period is January 1st, 2013 to December 31, 2042, resulting in a 30-year period.

1.7 Project Location

The Manoa REDD+ Project is located on the edge of Manoa Farm, and has an area of 72,843 hectares, located in Brazil, in the state of Rondônia, in the municipalities of Cujubim, Itapoã do Oeste and Porto Velho. The access to the area is through the BR-364, Porto Velho-Ariquemes, covering about 140 km up to RO-205 highway, which connects to the municipality of Cujubim through 50 km of the dirt road. The vertices of the project area are in Table 1 and the location of the area in Figure 1.

Table 1. Geographic coordinates of Manoa Farm vertices.

Vertex	Coordinate X	Y Coordinate
V 01	62°31'59,243"W	8°59'45,312"S
V 02	62°51'4.501"W	9°0'0,117"S
V 03	62°51'4.595"W	8°0'10,852"S
V 04	62°50'5.834"W	8°0'38,506"S
V 05	62°31'19,203"W	8°0'26,109"S
V 06	62°47'35,825"W	8°0'15,333"S

V 07	62°31'50,68"W	8°0'41,41"S
V 08	62°47'12,746"W	8°0'33,748"S
V 09	62°31'58,219"W	8°0'39,696"S
V 10	62°47'38,687"W	8°0'54,938"S

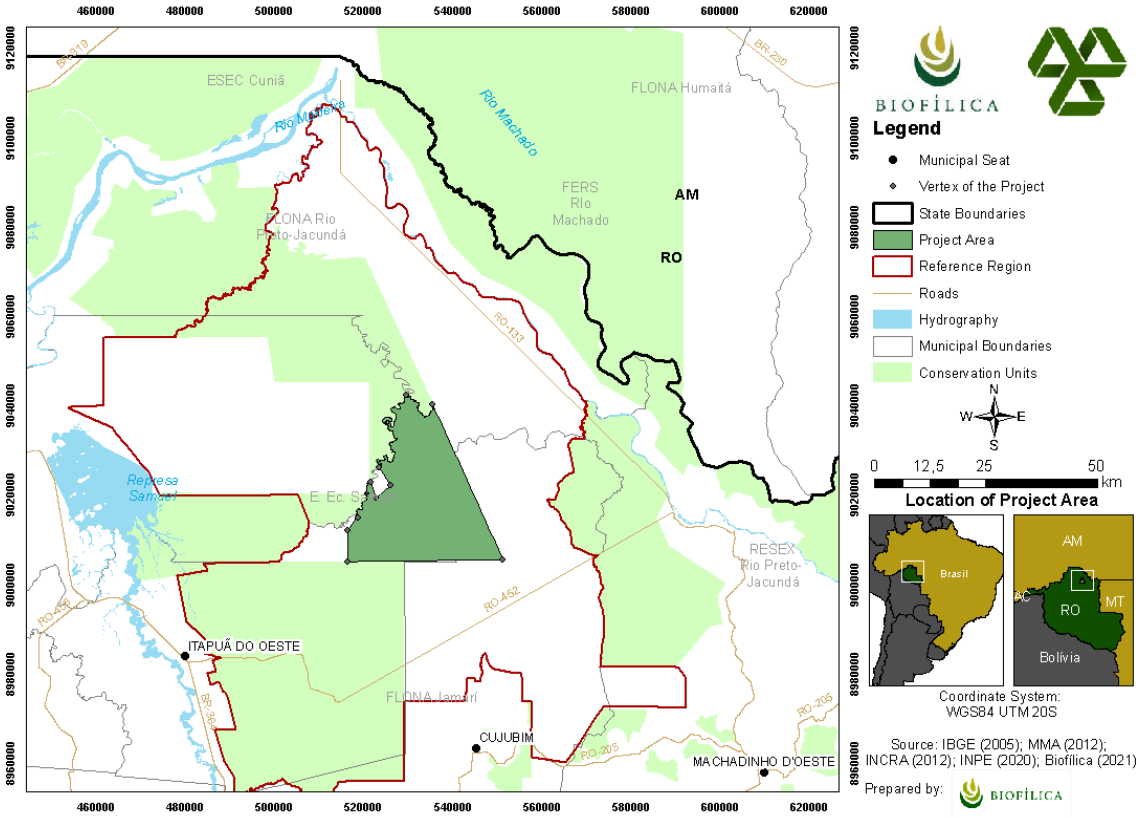


Figure 1 - Project Boundaries Location

1.8 Title and Reference of Methodology

For this monitoring report, the VCS (Verified Carbon Standad) version 4.0 was used. The methodology used in the project is the Methodology for Avoided Unplanned Deforestation (AUD), VM0015 version 1.1, dated December 3, 2012.

Project additionality was analyzed according to the tool approved by the VCS "VT0001 — Tool for the Demonstration and Assessment of Additionality in VCS Agriculture, Forestry and Other Land Use (AFOLU) Project Activities", version 3.0, dated February 1, 2012.

The risks to climate benefits, both natural and human-induced, were measured using the Non-Permanence Risk tool AFOLU, version 4.0

1.9 Participation under other GHG Programs

The Manoa REDD+ Project has not been registered and does not wish registration in any other GHG program other than the VCS Program.

1.10 Other Forms of Credit

It does not apply, as the Manoa REDD+ Project does not have or wishes to reduce GHG emissions from activities that are included in an emissions trading program or other mechanism that include GHG allowance trading. Furthermore, the project does not have or intends to link another form of environmental credit related to GHG.

Thus, as pointed out in response to OBS 5 of the validation audit, the project proponents reiterate their position of non-adherence to other programs that manage any other type of credits linked to other environmental services.

1.11 Sustainable Development

The Manoa REDD+ Project, despite being in a region of great deforestation pressures and a considerable history of degradation, managed to contain all deforestation in the Project Area during the monitored period. The results were guaranteed mainly due to the good governance applied in the area and to asset surveillance activities. Consequently, the project was able to maintain the ecosystem services generated by the permanence of forest vegetation, as well as aspects associated with biodiversity.

The contribution of the permanence of forest conservation benefits is also made thanks to the low-impact forest management carried out by *Manoa Sustentável, Exploração e Serviços Florestais* forest management uses a set of techniques to harvest part of large commercial trees in the forest, in a system of rotating areas, in order to avoid damage to the species that must be preserved and not harm smaller trees, so that they can grow, ensuring the conservation of the forest and the sustainability of production. Due to the positive results, the sustainable management model proposed by the company was already disseminated in 2010 as an example to be followed worldwide by the UN in the publication “Exemplary Cases of Sustainable Management”.

Other complementary benefits were ensured through environmental education training and low-impact management techniques. The development of these activities allowed the dissemination of knowledge among young people and adults about the importance of sustainable management practices and forest conservation, thus generating the consolidation of the culture of sustainable development.

Thus, in a global context, the project is mainly aligned with four UN Sustainable Development Goals (SDGs). The conclusion about this alignment was reached by analyzing the targets set for each goal, in relation to the project activities carried out in the monitored period and the impacts generated.

The same analysis was performed for the national context, since Brazil is one of the few countries in the world that has an instrument for the territorialization of the SDGs, so that it maintains the scope and ambition originally proposed by the United Nations (SILVA; PELIANO; CHAVES, 2018) [1]. Then, when relating the impacts of the project to the SDGs, and their respective global targets, the alignment of the project with the national sustainable development goals pointed out by Ipea (SILVA; PELIANO; CHAVES, 2018) was also pointed out. The results of this evaluation, with the project's contributions to global and national goals, are described below.

Goal 4. Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all

United Nations (UN) Targets: 4.4 By 2030, substantially increase the number of youth and adults who have relevant skills, including technical and vocational skills, for employment, decent jobs and entrepreneurship.

4.7 By 2030, ensure that all learners acquire the knowledge and skills needed to promote sustainable development, including, among others, through education for sustainable development and sustainable lifestyles, human rights, gender equality, promotion of a culture of peace and non-violence, global citizenship and appreciation of cultural diversity and of culture's contribution to sustainable development.

National Targets (Brazil): 4.4 By 2030, substantially increase the number of youth and adults who have the necessary skills, especially technical and professional skills, for employment, decent work and entrepreneurship.

4.7 Target kept without change, in relation to the official wording of target 4.7, due to the fact that it is very comprehensive and thus contemplates the specificities of the Brazilian reality.

Project application justification: The project provides access to and encourages education through training in low-impact management techniques, enabling an increase in the number of young people and adults technically and professionally trained in practices that collaborate with sustainable development. Training in low-impact management techniques involved an average of 30 workers a year, and about 24 college students. In addition, the project carries out activities related to environmental education, which involved in the recent 4 years of the monitoring period around 155 young students (section 3.1), contributing to the dissemination of knowledge about the importance of sustainable management practices and forest conservation, generating, consequently, the consolidation of the culture of sustainable development. The project also supports and collaborates with the scientific/educational environment in that, during the monitored period, an important partnership was established with the Fundação Universidade Federal de Rondônia [*Federal*

[1] SILVA, Enid Rocha Andrade da; PELIANO, Anna Maria; CHAVES, José Valente. AGENDA 2030 – ODS. Metas Nacionais dos Objetivos de Desenvolvimento Sustentável. 2018. Elaborado por Ipea (Instituto de Pesquisa Econômica Aplicada). Disponível em: https://www.ipea.gov.br/portal/index.php?option=com_content&view=article&id=33895&Itemid=433 . Acesso em: 02 jun. 2022.

University of Rondônia Foundation] (UNIR) to monitor biodiversity through a postgraduate research project, master level.

Goal 12. Ensure sustainable consumption and production patterns

United Nations (UN) Targets: 12.2 By 2030, achieve the sustainable management and efficient use of natural resources.

12.8 By 2030, ensure that people everywhere have the relevant information and awareness for sustainable development and lifestyles in harmony with nature.

National Targets (Brazil): 12.2 Target kept unchanged from the official wording of the global target 12.2.

12.8 By 2030, ensure that people everywhere have relevant information and awareness about sustainable development and lifestyles in harmony with nature, in line with the National Environmental Education Program (PRONEA).

Project application justification: Through actions that encourage low-impact forest management, the project helps support some 22 industries in the municipality of Cujubim, which use sustainable raw materials, integrating them into value and market chains, promoting the conservation of natural resources, combined with socioeconomic development (section 3.1.1). Manoa also has an FSC certification for management operations, ensuringthe quality and responsibility of production. Also, some of the main components of the Project relate to the dissemination of knowledge focused on the efficient use of natural resources, seeking greater integration between the parties involved and focusing on sustainable business chains, generating income and raising awareness among the population for the sustainable use of available natural resources.

Goal 13. Take urgent action to combat climate change and its impacts

United Nations (UN) Targets: 13.2 Integrate climate change measures into national policies, strategies and planning

13.3 Improve education, awareness-raising and human and institutional capacity on climate change mitigation, adaptation, impact reduction and early warning

13.b Promote mechanisms for raising capacity for effective climate change-related planning and management in least developed countries and small island developing States, including focusing on women, youth and local and marginalized communities

National Targets (Brazil): 13.2 Integrate the National Policy on Climate Change (PNMC) into national policies, strategies and planning.

13.3 Improve education, increase awareness and human and institutional capacity on climate change, its risks, mitigation, adaptation, impacts, and early warning.

13.b. Encourage expanded international cooperation in its technological and educational dimensions aimed at strengthening capacities for climate change planning and effective management in least developed countries, including focusing on women, youth, local and marginalized communities.

Project application justification: All activities developed by the project aim to combat climate change and its impacts by reducing deforestation in the project area and, consequently, greenhouse gas (GHG) emissions. As a result, the project collaborates directly with the Brazilian goal of reducing emissions, with a potential to reduce greenhouse gas emissions of 8,378,697 tCO2e over a 30-year period (as described on the Project Description). In this monitoring period (01/01/2017 to 07/08/2020), the total GHG emission reductions generated were 1,046,092 tCO2e (section 5.4).

Goal 15. Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss

United Nations (UN) Targets: 15.1 By 2020, ensure the conservation, restoration and sustainable use of terrestrial and inland freshwater ecosystems and their services, in particular forests, wetlands, mountains and drylands, in line with obligations under international agreements

15.2 By 2020, promote the implementation of sustainable management of all types of forests, halt deforestation, restore degraded forests and substantially increase afforestation and reforestation globally

15.5 Take urgent and significant action to reduce the degradation of natural habitats, halt the loss of biodiversity and, by 2020, protect and prevent the extinction of threatened species

15.a Mobilize and significantly increase financial resources from all sources to conserve and sustainably use biodiversity and ecosystems

15.b Mobilize significant resources from all sources and at all levels to finance sustainable forest management and provide adequate incentives to developing countries to advance such management, including for conservation and reforestation

National Targets (Brazil): 15.1. 1br By 2020, at least 30% of the Amazon will be conserved, by means of conservation unit systems provided for in the National System of Conservation Units Law (SNUC), and other categories of officially protected areas such as Permanent Preservation Areas (PPAs), Legal Reserves (LRs) and indigenous lands with native vegetation, 17% of each of the other terrestrial biomes and 10% of marine and coastal areas, mainly areas of special importance for biodiversity and ecosystem services, ensuring and respecting the demarcation, regularization and effective and equitable management, aiming to guarantee the interlinking, integration and ecological representation in larger terrestrial and marine landscapes.

15.2. By 2030, zero illegal deforestation in all Brazilian biomes, expand the area of forests under sustainable environmental management and recover 12 million hectares of forests and other forms of

degraded native vegetation, in all biomes and preferably in Permanent Preservation Areas (PPAs) and Legal Reserves (LRs) and, in areas of alternative land use, expand by 1.4 million hectares the area of planted forests.

15.5.1br By 2020, the rate of natural habitat loss will be reduced by 50% (relative to 2009 rates) and degradation and fragmentation in all biomes will be significantly reduced.

15.5.2br By 2020, the extinction risk of endangered species will have been significantly reduced, tending towards zero, and their conservation status, especially of those suffering the greatest decline, will have been improved.

15.5.3br By 2020, the genetic diversity of microorganisms, cultivated plants, farmed and domesticated animals, and wild varieties, including species of socioeconomic and/or cultural value, will have been maintained and strategies will have been developed and implemented to minimize the loss of genetic variability.

15. a. Mobilize and significantly increase, from all sources, financial resources for the conservation and sustainable use of biodiversity and ecosystems, to enable the implementation of national and international commitments related to biodiversity.

15.b. Mobilize significantly resources from all sources and at all levels to finance and provide adequate incentives for sustainable forest management, including for conservation and reforestation.

Project application justification: Together with the fight against climate change, the project's activities promote the conservation of local biodiversity and the maintenance of ecosystem services. In addition, through the practice of low-impact forest management certified by the FSC seal (section 3.1.2), the project contributes to the sustainable use of terrestrial ecosystems, as well as promoting the dissemination of knowledge about local biodiversity with the monitoring of fauna, referring to the partnership with UNIR, and flora, with the sustainable harvesting activities that take place on the farm. Through the sustainable forest management activities, the project also contributes to the protection of High Conservation Value Areas (HCVA), promoting the conservation of the habitat of vulnerable species and rare ecosystems such as the “salt shaker”, thus, the area acts as a natural refuge for several species, in view of the great degradation of the surrounding area.

2 SAFEGUARDS

2.1 No Net Harm

Although the project's actions are aimed at promoting positive impacts for social actors in the project area, some negative impacts may occur. Thus, as a measure to mitigate negative impacts, some points were addressed during the period verified.

Among the activities included in the project, low-impact forest management is the most likely activity to generate negative impacts. Thus, contemplating the objective of preventing the occurrence of negative impacts, *Manoa Sustentável, Exploração e Serviços Florestais Ltda*, a company that carries out the management, developed and registered in the Sustainable Forest Management Plan, in the Manual of General Procedures and in the Annual Operational Plan (POA, in Portuguese) of each UPA (Annual Unit Production, in English) a series of operating procedures focused on impact reduction strategies that are strictly monitored by the company.

Mitigation of impacts related to social aspects

In relation to social aspects, each year before the beginning of each harvest, workplace health and safety training was carried out with workers, as pointed out in the section 2.3, in addition to monitoring the use of PPE (Personal Protection Equipment) by employees in order to mitigate risks and accidents at work.

Considering the possible negative impacts, such as disbelief and lack of engagement, which can be triggered by failures in the communication process between different actors, as pointed out in section 6.2 of the PDD, we sought to apply the strengthening of communication procedures through two main paths: ombudsman channel and suggestion box. These two points have been described in the section 2.2.

Mitigation of impacts related to biodiversity

Regarding the possible impacts on biodiversity, two fronts were worked on in management as a form of mitigation: one linked to the training of employees who would be carrying out management activities and the other linked to the procedures of the operation itself.

All functions involved in forest management have specific work procedures and the employees responsible for each of them receive annual training at the beginning of each crop. During these trainings, the company seeks to keep its employees (own and third parties) up to date with the best techniques for managing reduced impact, in order to mitigate impacts on the forest.

Among the measures that mitigate the negative impacts on the flora, we highlight the maintenance of 100% of future-cut trees, lower class trees (considering individuals with a diameter at chest height of less than 50 cm) and seed carrier trees, of the primary floristic composition in the areas of permanent preservation, as well as the absolute conservation of rare, endemic and legally protected species (Castanheira and Seringueira), thus contemplating the maintenance of HCV (High Conservation Value) attributes, specifically HCV1 — areas containing significant concentrations of biodiversity values, either globally, regionally or nationally (e.g., endemism, endangered species, refuge).

In line, the protection of individuals bearing seeds, of low-intensity species, of rare species, of species protected by law and of the remaining trees, some preventive measures are taken, such as the planning of roads and courtyards in the countryside, considering the presence of these trees, making deviations from the beds of the roads and adjustments in the location of the yards, use of culling techniques with the direction of falling trees in forestry, in order to avoid mechanical damage to all remaining trees and the practices of cutting the vines in order to prevent the felling of the desired individual to be cut from affecting the nearby trees. In order to assist this planning, all trees inventoried of the species Castanheira and Seringueira are marked on the field records as "Forbidden Cut" and identified with a specific symbol on the forest maps, regardless of their diameter.

Considering the permanent preservation areas and riparian forests, no tree is extracted located at a distance of up to 30.00 m from the banks of creeks up to 10.0 m wide and 50.00 m from the banks of streams up to 50.0 m wide and 50 m from the springs and in areas with a slope greater than 45°. Other protective measures are taken, such as the adoption of special procedures in the extraction phase, seeking to direct the fall of trees to be felled so that they do not damage the vegetation present in these protected areas, not building camps in permanent preservation areas, avoiding opening roads crossing rivers or streams and other protected areas, and when there is no other alternative, construct pointers and not manhole in order to avoid flooding or damming them, among other more preventive measures.

The protection of these species and the preservation of these areas end up acting as measures to mitigate the negative impacts on fauna, since they allow the maintenance of fruit trees, ensuring the feeding of the fauna, as well as they act as temporary shelters until the animals' reflux to the explored areas. In addition, forest exploration in an UPA starts close to the most altered areas, enabling the escape to interior areas of natural forest.

Other mitigation measures that are adopted for fauna include the non-felling of nest trees and the planning of roads, dragging branches, esplanades and felling of trees in order to maintain the integrity of the nests, and implantation of plates on boundary bites with the words "Prohibited Hunting". In addition, all visitors who enter the boundaries of the Project Area, with prior authorization from the property manager, undergo an identification and registration process and receive guidance on the prohibition of hunting and overfishing, capture and harassment of wild animals. Any suspicious action in this regard is immediately communicated to IBAMA [*Instituto Brasileiro do Meio Ambiente e dos Recursos Naturais Renováveis* - Brazilian Environment and Natural Resources Institute] and SEDAM [*Secretaria de Estado do Desenvolvimento Ambiental* - State Secretariat of the Environment].

An important measure to mitigate the negative impacts that encompass both fauna and flora is the frequent surveillance that is carried out across the boundaries of the property, acting against possible actions by invaders that could negatively impact the natural resources and biodiversity of the project area. More details are described in the section 3.1.2.

During the monitored period, through satellite images, it was possible to identify an increase in pressure for deforestation, invasions and other illegal activities in the surrounding areas (leakage belt and reference region). Through monitoring by satellite images and the generation of annual

bulletins, it was possible to assist in asset surveillance activities, where the coordinate points for field checking are passed on by the surveillance team.

Regarding the salt shaker, which consists of another HCV present in the project area, access to the area is restricted to employees and researchers in order to promote the maintenance of the area and avoid negative impacts on it and the species that inhabit it. Although the UPA 13, where HCV is present, has not yet been explored, the salt shaker area presents the same procedures regarding the care of management activities, both in planning and operation. Therefore, the existence and location of this area will be taken into account in the planning of roads, dragging extensions, esplanades and tree felling in order to maintain the integrity of this HCV.

2.2 Local Stakeholder Consultation

Communication channels

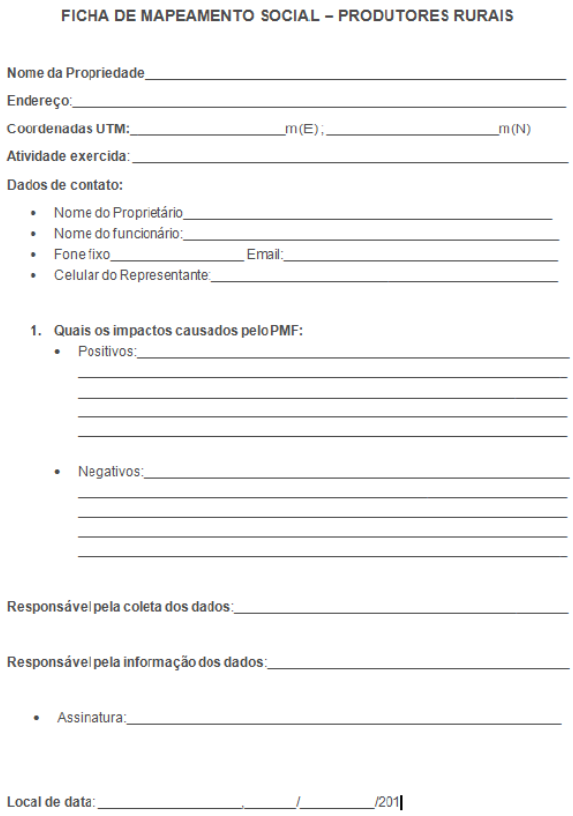
Manoa Sustentável, Exploração e Serviços Florestais has in its general procedures manual guidelines on how to establish the relationship with the actors present around the farm area. Consultation and communication with these actors, enabling discussion about the progress of activities carried out on the property, both in the form of complaint and suggestion, occurs through three fronts: application of a questionnaire to survey positive and negative impacts, availability of the channel of ombudsman and development of the suggestion box. Through these mechanisms, it was possible for stakeholders to influence the implementation of project activities, adopting, where relevant, some suggestion of improvement or innovation, and some corrective or compensation measure in the event of claims and damages.

Manoa Farm employees are also communicated about REDD+ project activities since they are actively involved and participate in the activities. In this way, as one of the stakeholders of the Project, the employees receive directions and are communicated about all the processes, including the current verification.

The application of a questionnaire to survey positive and negative impacts is consistent with the monitoring measures established for social aspects that could be impacted by forest management activities. The questionnaire is applied to rural properties, with headquarters and employees residing on site and which are neighbors of the Forest Management Area. Thus, between July and October, the company visits properties located in a 10 km buffer of the farm, applying questionnaires to farmers, associations and schools that are present in the area of influence of the area (Figure 2). Where relevant, it performs impact compensation guided by the loss and damage policy.

The social questionnaires were applied in the mentioned properties. However, the questionnaires referring to the years 2017 and 2018 were lost due to technical problems with the computers on which they were saved. In 2019, 6 questionnaires were collected, where 4 answered that they had nothing to declare, 1 (Sítio Nossa Senhora Aparecida) thanked Manoa for the maintenance of the road, and there was only one observation from Fazenda Paiva referring to the amount of dust due to the fact that their house is very close to the road. In this sense, Manoa gives the directions for the resolution of the

dissatisfaction and when it was within its reach, the Farm took care of providing the resolution to the requests. The monitoring forms for the year 2019 were delivered to VVB.



FICHA DE MAPEAMENTO SOCIAL – PRODUTORES RURAIS

Nome da Propriedade_____

Endereço:_____

Coordenadas UTM:_____m(E); _____m(N)

Atividade exercida:_____

Dados de contato:

- Nome do Proprietário_____
- Nome do funcionário:_____
- Fone fixo_____ Email:_____
- Celular do Representante:_____

1. **Quais os impactos causados pelo PMF:**
   - Positivos:_____
   - Negativos:_____

Responsável pela coleta dos dados:_____

Responsável pela informação dos dados:_____

- Assinatura:_____

Local de data:_____, _____/_____/201

Figure 2 - Model of the questionnaire applied to rural producers to monitor impacts.

Linked to the loss and damage policy, the procedures necessary to identify, prevent and resolve possible conflicts related to losses and damages that affect the legal and traditional rights, property, resources or livelihoods of the local population are defined. Thus, to promote the effective communication with the surrounding actors in cases of compensation for possible damages or negative impacts arising from the activities, the company provides a public ombudsman channel. Through the ombudsman's office, it is possible to communicate any origin, such as complaints, dissatisfaction or even suggestions. The third front of consultation and communication constituted by the suggestion box was designed to meet possible suggestions, demands or complaints by employees of the farm Manoa (Figure 3). Without a defined procedure, the box was opened by the responsible technicians, removing the records made on paper and evaluating one by one to apply the necessary actions considering each demand.

Figure 3 - Suggestion box located in the Manoa Farm cafeteria.

In addition to the three main consultation and communication fronts established by *Manoa Sustentável, Exploração e Serviços Florestais*, the dialogue was also established by other means such as e-mail exchange, meetings and other informal chats. This path, for example, was contemplated by schools that received training in environmental education and low-impact management techniques in the project area to send letters of thanks with feedback on the action taken.

One of the results obtained from the suggestion of the *Faculdade de Rondônia* [Faculty of Rondônia] (FARO), whose relationship was established through training in low-impact management techniques for Forest Engineering students, was a cooperation agreement to establish an annual training course in low-impact management techniques impact on the Manoa farm. The agreement was unable to be concluded and formalized within the verified period because, due to the Covid-19 pandemic, the face-to-face course was unable to take place at a time marked by restriction on gatherings. In addition, the death of Professor Eugenio, whose role was to coordinate the agreement on the part of FARO, corroborated to temporarily pause communication. The conversations are being reestablished with the normalization of the current state situation and with the new coordination on the part of FARO.

During the evaluation of the project by the proponents, they understood that there was a need to strengthen communication channels. Thus, it is currently being discussed what adaptations are necessary to establish a more robust consultation and communication process among stakeholders, mainly adapting the form of registration.

In addition to the opportunity to improve the form of registration of the consultations and communications established, an opportunity for improvement in the process of dissemination of the ombudsman channel was also evaluated. Thus, among the necessary adaptations that are being discussed for implementation is the formalization and follow-up of the processes, such as recording the

suggestions and criticisms received in a spreadsheet and presentation of the ombudsman channel during the visit with interested parties.

During the monitored period, only one observation was registered, as described above, collected from the social questionnaires. In relation to this, Manoa provided the necessary directions for resolution. Besides, no other type of dissatisfaction, observations or similar elements related to the project or any other Manoa activity were registered.

Stakeholder access to project documents

To comply with the reference in section 4.5 of the VCS Registration and Issuance document, the documents related to the validation and the first VCS verification of the Manoa REDD+ Project were made available through virtual means on the Verra registry platform for stakeholder consultation.

The documents related to the current monitoring period (second VCS verification – 2017 to 2020), will subsequently be made available on the Verra registration platform at the end of the current verification process, once the documents are feasible for publication in line with section 4.5 of the VCS Registration ans Issuance.

News and updates about the project were published in the Biofílica Newsletter through social media Facebook, Instagram and LinkedIn. In the same sense, the results obtained for the monitored period will be made available on these platforms for stakeholders, after completion of the audit process.

In addition, a catalog (Figure 4) with information about the REDD+ Manoa Project was distributed to participants who visited the Manoa farm for training (Figure 5). The catalog was made available to the VVB team, in both Portuguese and English versions.

Figure 4 - Cover of the catalog containing the information of the REDD+ Manoa Project.

Figure 5 - Children who were trained in environmental education at Manoa farm receiving the catalog with information from the REDD+ Manoa Project.

In addition, during the monitored period, there were no changes in risks, costs, and benefits related to local stakeholders. As well as there were no changes in laws and regulations covering workers' rights in the host country.

2.3 AFOLU-specific Safeguards

Risk mitigation

Risk assessment was performed through the application of the VCS approved tool "*AFLOU Non-Permanence Risk Tool, v. 4.0*". The result of the risk tool was presented as an attachment to the MR in this monitored period and will be reported to VVB through the Risk Report and the Risk Calculation Tool. With the new assessment, the risk of the project did not change, remaining at 10%. In addition, other risks to the benefits of the project were identified, as well as their respective mitigating measures. These risks are listed below:

Risk: Illegal activities, such as invasions and theft of wood, occurring unbridled around the project area, causing degradation and loss of forest cover.

Mitigation: The mitigation of this risk is linked to the involvement of project proponents and efforts to contain deforestation. During the entire monitoring period, annual deforestation bulletins (PRODES) were prepared with satellite images. Through the analysis of the bulletins, it was possible to perceive the dynamics of deforestation, especially in the surroundings of the project, in addition to the change in this dynamic. As a strong activity present in the project area, the patrimonial surveillance of

Fazenda Manoa, which is constantly carried out, was successful in its activities, since no record of invasions and loss of forest cover occurred during the monitored period. Also, as a way of engaging the population on the subject of environmental education, courses, training and technical visits were offered.

Risk: Problems in the trading of carbon credits, due to variations in the price of credits and the absence of a regulated market, and consequent lack of resources to finance the proposed activities.

Mitigating measures: Biofílica, proponent of the project, has a commercial sector exclusively responsible for developing project dissemination materials, participating in national and international events related to REDD+ and carbon credits in order to publicize, establish and expand the network of commercial contacts with possible interested in the purchase of carbon credits. In addition, Biofílica is always looking for financing alternatives, such as donations and partnerships for the direct implementation of the project's activities (not necessarily linked to the sale of credits).

Risk: Forest management activities may cause negative impacts on the project.

Mitigating measures: The Forest Management carried out at Manoa Farm follows the assumptions and guidelines of the FSC certification, which guarantees quality and mitigation of impacts. In addition, Grupo Triângulo has a procedure manual and a well-defined Forest Management Plan, where all activities related to management are guided by these documents. In addition, training was offered to management workers on this topic (described below in the item “impact mitigation activities”).

Recognition of property rights

The activities of the Manoa REDD+ Project will be developed according to the property rights and use of Manoa Sustentável Extação e Serviços Florestais Ltda. The right to possession and use are demonstrated through the following documents, made available to the VVB team:

- Definitive title of land of 73,079 hectares in the municipality of Cujubim, state of Rondônia;
- Whole Content Certificate;
- Vintenary Certificat;
- Domain Recognition Title;
- Rural Environmental Registry (CAR);
- Environmental License in Rural Property;

Further documentary research conducted concluded that there is regularity of the property, and there is no burden, encumbrance or limitation to the full use of it, nor is there any obstacle to the

realization of the Manoa REDD+ Project, such as blockages, liens, mortgages, arrests or land disputes. The proof of this legitimacy can also be evidenced by obtaining the FSC and Cerflor certification labels, which attest to the legality of the project.

The Manoa REDD+ Project has not carried out any activities on private property or belonging to indigenous and traditional communities or to the government, only on properties belonging to Manoa Sustentável Extração e Serviços Florestais Ltda. In addition, it is important to highlight that there are no traditional peoples and communities in the project area, as presented in section 2.7 of the PDD.

The property where the project is located has a larger area than the area used for the project activities and, thus, there was no interference with neighboring properties. Therefore, it was not necessary to request free, prior and informed consent on the property rights of any interested party. In addition, the entire consultation and communication process with these actors took place through the established communication channels, described in the section 2.2.

Impact mitigation activities

Among the actions implemented by the Manoa REDD+ Project, low-impact forest management is the most likely activity in generating risks with local actors, in this case management employees. Considering the risks, *Manoa Sustentável, Exploração e Serviços Florestais Ltda* addresses health and safety at work as a fundamental aspect of the company's daily activities, thus complying with the [*Programa de Controle Médico de Saúde Ocupacional*] Occupational Health Medical Control Program — PCMSO and the *o Programa de Prevenção de Riscos Ambientais* [Environmental Risk Prevention Program] — PPRA.

The PCMSO has the character of prevention, screening and early diagnosis of work-related health problems. In line with the program, the company conducts medical assessments of each employee at the time of admission, annually, upon return of the employee to work on leave for more than 30 days, and when dismissal occurs. On the other hand, the PPRA works to preserve the health and integrity of all employees of the company, through the anticipation, recognition, assessment and control of environmental risks existing or that may exist in the workplace. Thus, applying the PPRA, the company monitors and proposes measures to reduce the risks arising from each labor activity.

Through lectures and training, occupational preventive actions related to PCMSO and PPRA are carried out, such as forest fire brigade, chainsaw training (Figure 6), regulatory standard 06 (personal protective equipment), regulatory standard 12 (safety in machinery and equipment), the importance of teamwork and forms of communication for interpersonal relationships, basic notions of recognition of venomous animals most common of accidents, quality of life in the workplace emphasizing the organization of the place of conduct with company assets, equipment and accommodation, adult vaccination calendar and the importance of keeping it up to date, basics of pre-hospital care, more frequent worms in adults, basic hand washing and personal hygiene, and sexually transmitted infections (HIV, syphilis, and hepatitis B and C). The records of these activities were made by monitoring reports of the management area of each PSU, by photographs — some presented below — and attendance lists, made available to VVB.

Figure 6 - Chainsaw Training Applied Together with Management Workers in 2019

In addition, in order to ensure worker health and safety in management activities, the company has a manual of general procedures for forest management in 2012, updated in 2020, which must be obeyed by all employees. The manual was made available to the VVB team.

The manual describes the mandatory safety equipment for each function, procedures for proper and safe execution of each activity, instructions on proper disposal of organic and inorganic waste, hygiene measures, and others. The manual also describes the health and safety monitoring plan at work, which consists of a biannual internal audit regarding the working conditions of the own and outsourced teams and the conditions of use of PPE for the contracted activities. The monitoring report lists all non-conformities along with the respective deadlines for complying with the corrective actions. Secondly, the status and closure of corrective actions is checked in the field.

Among the audited items are food, quality of water available, living conditions in camps, occupational health programs, ergonomic conditions of activities, existence of an environmental risk prevention program, training, transportation of workers, transportation of fuel, areas risk, communication system, condition of machinery and equipment, rest period between work hours and use, and conservation status of PPE. Furthermore, in order to control the use of PPE and its removal by each employee, Manoa has a control form (Figure 7).

FICHA DE MONITORAMENTO DE SAUDE E SEGURANÇA NO TRABALHO - USO E ESTADO DE CONSERVAÇÃO DE EPI's					
EMPRESA:					
DATA:	RESPONSÁVEL PELA AVALIAÇÃO:				
EPI	NÃO APLICA	USO	ESTADO DE CONSERVAÇÃO	AÇÃO CORRETIVA	PRAZO
NOME:					
FUNÇÃO:					
Camisa de manga longa					
Calça de nylon almofadada					
Bota com bico de aço					
Capacete					
Viseira					
Protetor auricular					
Luva					
Bota					
Caneleira					
Camisa de cor clara					
ONDE:					
USO = SIM OU NÃO					
ESTADO DE CONSERVAÇÃO: BOM, REGULAR OU RUIM. EM CASO DE RUIM DESCREVER A SITUAÇÃO DO EPI.					

Figure 7 - Form for monitoring the use and conservation status of PPE.

All documents pertaining to impact mitigation activities were made available to the VVB team.

Relationship and communication with the surroundings and other stakeholders

The communication with the surroundings and other stakeholders, which enables both the discussion about the progress of the project, as well as complaints and suggestions, is carried out in three ways: application of a questionnaire to survey the positive and negative impacts, the availability of the ombudsman channel, and development from the suggestion box. More details have been described in the section 2.2.

Furthermore, as part of the monitoring of UPAs in post-exploratory activities, social aspects in the forest management area (MFA – *Forest Management Area*) were monitored. Thus, we identified in the region, 1 Association of Rural Producers (*Associação dos Produtores rurais da comunidade São José* [Association of Rural Producers of the São José community] - ASPROJ), 1 municipal school (Municipal School 22 de Março) on the route from the urban area of the municipality of Cujubim-RO to Fazenda Manoa, 8 rural properties, with headquarters and employees local residents and who are neighbors of the MFA (Figure 8). A copy of the public summary of the management plan was formalized, as well as a contact phone number and digital address of Manoa Sustentável Extração e Serviços Florestais Ltda company's ombudsman to maintain a communication channel with the association and the school. The social monitoring is best described in section 2.2.

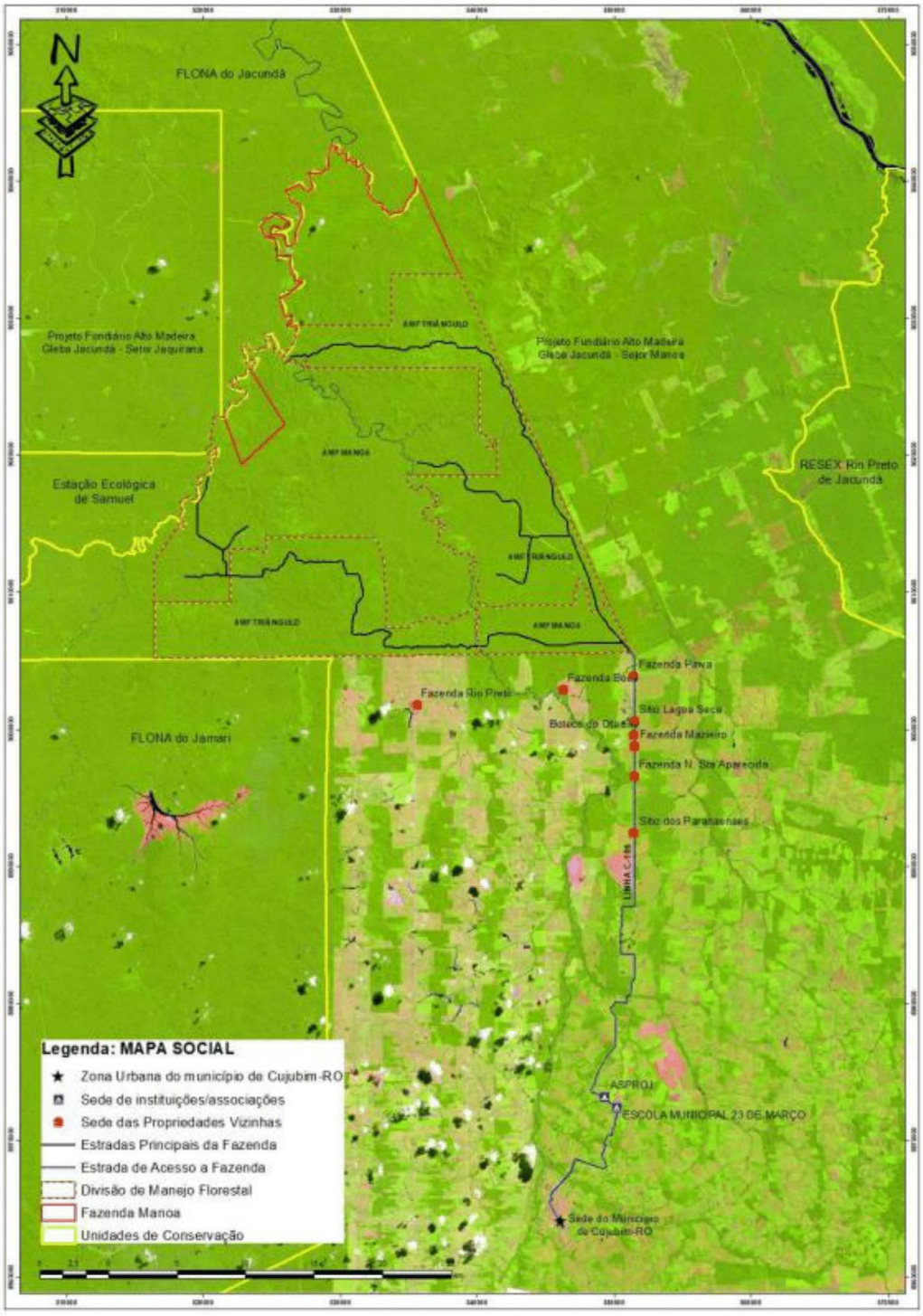


Figure 8 - Social map present in the monitoring report of the forest management area (MFA).

3 IMPLEMENTATION STATUS

3.1 Implementation Status of the Project Activity

The activities of the REDD+ component implemented during the second monitoring period (January 1, 2017 to August 7, 2020) are demonstrated in Table 2.

Table 2. Summary of the main activities of the REDD+ Manoa Project during the monitoring period

Activity	Description	Status, applicable procedure, and additional information related to registry formats
Validation/Verification VCS		
Selection and Contracting of the Validation and Verification Body (VVB)	Prospecting and contact with validating bodies and verifiers accredited by the VCS standard. Negotiation and choice of the most appropriate VVB (obeying the rules of the standard) for verification in question.	From February to April 2021
Audit process tracking	Collaboration with the audit process to be conducted by VVB.	Conducted during the second verification in question
Project Registering/Updating	Project registering or updating on Register Platform, as well as verified credits generation (VCUs).	Performed periodically
Financial Management of the Project		
Project Budget Tracking	The project budget means that financial plans are made for the activities to be carried out and in progress	Started in 2012, carried out continuously throughout the duration of the project
Prospecting for potential VCUs buyers	Prospecting for potential buyers of verified credits (VCUs) generated by Project Verification	Started in 2014, carried out continuously throughout the duration of the project
First sale of carbon credits	First sale of carbon credits generated by Project activities	June 2018
Technical Activities		

Environmental Education Actions	The main objective of the environmental education actions carried out in the municipality of Cujubim, was to provide the population with information and instructions on the importance of forests, the benefits they generate for humans and basic knowledge to protect these forests, linked to the REDD+ theme, its processes and importance for the conservation of forest ecosystems.	• 2017: Escola Municipal Pequeno Príncipe e a Guarda Mirim – Document: "2017-relatoiro-de-atividades-visitas" • 2018: Escola Municipal Teotônio Brandão Villella – Document: "2019-relatorio-monitoramento-AMF-UPA-27e01-2017-2018" • 2019: Escola Municipal Aloísio Becker e a Escola Antônio Franciso Lisboa – Documents: "201907-programacao-visita-ceflom-escola-emef-aluisio-becker"; "201909-cronograma-visita-escola-antonio-francisco-lisboa"
Low-Impact Forest Management Technical Training	As a way of disseminating sustainable forest exploration techniques among local actors such as sector workers and public agents, 2 trainings were carried out within this scope.	• 2017: technicians from the *coordenadoria de desenvolvimento florestal* [Forest

		Development Coordination] (CODEF) of SEDAM – Document: "2017-relatoiro-de-atividades-visitas" • 2019: Forest Engineering Students Faculty of Rondônia (FARO) – Document: "201912-carta-agradecimento"
Annual assessment of social activities	With the objective of refining data collection methods, all activities started to be better recorded and to structure a communication channel	Started in 2019 "2019-oficio-e-recibo-paroquia-sao-joao-batista"; "20190709-lista-presenca-ceflom-palestra-redd"; "201909-lista-presenca-ceflom"; "ATA DE REGISTRO_ESTANDE MANOA"; "202010-oficio-raio-de-luz-dia-das-criancas"; "foto-caixinha-de-sugestoes".
Management and Monitoring		
Vegetation Cover Monitoring	The monitoring of the vegetation cover of the Project Area and of the areas delimited as the Leakage Belt was carried out by the evaluation of satellite images, carried out by Biofílica. The areas detected as "deforestation" by PRODES images and	The monitoring is carried out annually, with the consequent generation of the

	data were identified by coordinates and passed on to the manager of Manoa Farm through the Monitoring Bulletin. The surveillance team checked the fields of the points identified as deforestation (through the coordinates of each point that were also sent in the Bulletin).	Monitoring Bulletin. View documents: "Boletim de Monitoramento – Manoa 2017"; "Boletim de Monitoramento – Manoa 2018/2019"; "Boletim de Monitoramento – Manoa 2019".
Patrimonial surveillance	The surveillance activity is carried out by the employees of the Manoa farm, adopting a strategy to have the "surprise effect", that is, there is no frequency and schedule of defined rounds going through the farm. The procedure adopted by employees, in case of detection of wood theft or invasion, is to immediately report the occurrence to the forest manager, who will call on SEDAM and IBAMA to take legal action. In 2020, there was a need to register the information of the rounds. In a complementary way, it is recorded through a presence book, all the entrances and exits of the Manoa Farm.	Conducted continuously, whenever there are allegations or suspected illegal actions "20200706-08-ronda-vigia"; "controle-entrada-fazenda-1"; "controle-entrada-fazenda-2"; "20200727-30-ronda-vigia"; "20200803-06-ronda-vigia"

3.1.1 Contributions with surrounding communities

In addition, it is important to highlight that there are no traditional peoples and communities in the project area, (as presented in section 2.7 of the PDD). Three main activities were carried out with the parties involved in the Project, aiming to promote positive impacts for social actors in the project area, in which it can be highlighted: job and income generation, training of skilled labor, mainly for action in the forest management chain of low impact, training and dissemination of low-impact forest exploration techniques, training through courses and training covering the theme environmental education and social actions by donations benefiting the general population.

Also, the socioeconomic impacts of the actors that were indirectly contemplated by the Manoa REDD+ Project through the actions carried out are positive when comparing a scenario without the

project. Direct positive impacts can be highlighted, such as: support of 30 industries benefited from the raw material of low-impact forest management, favoring the general population through social actions, road maintenance, benefiting rural and forest producers, maintenance of government resources due to tax collection and taxes paid to the union, state and municipality. The main social activities are detailed below:

Environmental education actions in the municipality of Cujubim

Environmental education actions were carried out that aimed to provide necessary information and instructions to the local population on the importance of forests, the benefits they generate for humans and basic knowledge to protect these forests. The training sessions took place at CEFLOM (*Centro de Educação Florestal Manoa* [Manoa Forest Education Center]). In 2017, two activities were carried out, one with the *Escola Municipal Pequeno Príncipe* [Municipal School Pequeno Príncipe], where they were discussed the importance of low-impact forest management for the continuity of forest production, as well as biodiversity conservation, covering 33 people. The other activity, with Guarda Mirim,30 people, more in-depth concepts about low-impact forest management were discussed, as well as the activities developed and how they are developed, so that it was clear the importance of forest conservation, also, at the opportunity, the members of the *Guarda Mirim* [Kid Guard] knew in practice the exploration activities forestry.

In 2018, there was an activity with the same theme of environmental education and practice on low-impact forest management, together with the *Escola Municipal Teotônio Brandão Villella* [Teotônio Brandão Villella Municipal School], with the participation of 29 people. And in 2019, two activities take place, one with the *Escola Municipal Aloísio Becker* [Aloísio Becker Municipal School], with the participation of 30 people, where, in addition to the presentation on the theme of environmental education and forest management with reduced impact, the students were presented with the concepts, assumptions and benefits of REDD+ Projects. Another activity in 2019 was held with the *Escola Antônio Franciso Lisboa* [Antônio Franciso Lisboa School], with the participation of 33 people, where content on environmental education and forest management with reduced impact was also treated (Figure 9). As of 2020, due to the pandemic caused by Covid-19, environmental education actions were temporarily interrupted in order to ensure the health and safety of all.

Figure 9 - Training of EMEF Aluísio Becker students on environmental education with the support of Biofílica.

Environmental education activities empower society on issues related to the environment, also disseminating knowledge on the subject. From perspectives related to the importance of conservation and maintenance of forest cover, these activities help to contain unplanned deforestation.

The environmental education activities were monitored by the monitoring reports of the forest management areas made available to the VVB team, as well as other documents related to the theme.

Low-Impact Forest Management Technical Training

The main objective of low-impact management technical training is the dissemination of sustainable forest exploration techniques among local actors, such as sector workers and public agents, expanding knowledge to all involved, and, consequently, conserving forest remnants. and maintaining forest cover, avoiding unplanned deforestation and degradation. In 2017, a 4-day training took place, assisting the technicians of the SEDAM Forest Development Coordination (CODEF), evaluating all phases of low-impact forest exploration, reaching around 22 people. Various topics were addressed, such as forest certification, forest inventory, planning of the stages of exploration of annual production units (UPA's - *Unidades de Produções Anuais*), low-impact forest exploration, internal audits in management, monitoring of damage in the exploration, chain of custody, internal volume control/ species explored in UPA's, in addition to monitoring some stages of forest exploration, such as opening trails, storage yard, felling and sectioning of trees, dragging and at the end the issuance of tax documents (DOF and Nota). Also, as a technical visit, Forest Engineering students from the College of Rondônia (FARO) participated in the training.

In 2019, there was a training with forest engineering students Faculty of Rondônia (FARO), involving a total of 24 people in two days of visiting the Farm (Figure 10), with the main objective of getting

to know the Farm and acquiring experience in the area of forest operation, with the premise of management activities performed by the Triangle Group. The experience between the two institutions was very positive, whereas a cooperation agreement was suggested to establish annually courses related to forest management and conservation at Manoa Farm. The start of activities was scheduled for 2020, however, due to the pandemic caused by Covid-19, activities had to be postponed and, due to the permanence of restrictions, no action could be initiated, which are dependent on the resumption of collective activities. In addition, the death of Professor Eugenio, whose role was to coordinate the agreement on the part of FARO, corroborated to temporarily pause communication. Talks are being reestablished with the normalization of the current state situation regarding the pandemic and with the new coordination by FARO.

Figure 10 - FARO students during field training on sustainable forest management.

In addition to the training, there were visits by other actors such as entrepreneurs from the timber industry, the judge of the Court of Auditors of the State Benedito, the Mayor of Cujubim and the Mayor of Cujubim to learn about the project and techniques of sustainable forest management.

Annual assessment of the social activities developed by the project

Based on the activities that took place, the initial focus of the project consisted of actions aimed at disseminating knowledge regarding environmental education and sustainable forest management practices. From the conclusion of the first activities carried out in the social sphere in 2017 and 2018, it was realized that there was a possibility to refine the data collection methods because neither the participants' signatures nor photos were collected during the activities. Thus, as an improvement in the monitoring process, attendance lists were formulated, and in 2019, all activities started to be better recorded, with attendance lists and photos of participants.

Another point he judged to be important for improvement was the feedback process with stakeholders. It was understood that the structuring of a communication channel would be relevant to improve future activities that would be implemented in the theme of environmental education and training in sustainable forest management based on feedback provided by participants, such as employees trained by the forest management. In addition, it was assessed that the communication channel is an important tool to open up suggestions for other activities that could be implemented by the project.

From the moment the activities developed were successful and a consolidation on the understanding of the way in which these activities should be structured and implemented, the proponents sought to expand their actions of socioeconomic scope, diversifying the activities with the employees of the farm that they own rural properties. These activities will aim to increase income generation and contribute to the formation of economic independence of these actors.

Thus, in 2020, to understand and define the strategies to be implemented, a diagnosis was made with the employees of the farm through the application of a questionnaire addressing topics about activities developed in rural property, types of funding, among others. Based on the results obtained with the questionnaire, it was not possible to have a full understanding of the employees' work context outside the management period to support the formulation of technical assistance actions. Therefore, the proponents intend to reformulate the questionnaire to give a more assertive direction regarding the expected results for the diagnosis.

Commercial relationship with the municipality

Currently there is a great demand from industries outside the municipality of Cujubim (RO) for the raw material produced by Manoa. The high demand is mainly due to the fact that Manoa is a company with a good reputation, reducing the risks related to the purchase of wood, in addition to the high quality of the product, an outstanding context in the Amazon situation.

Nevertheless, as an internal policy established by the company, Manoa supplies raw material for sale only to industries in the municipality of Cujubim (RO), in order to contribute with the increase of municipal tax generation, jobs and the circulation of local income. The main justification for this action is to demonstrate to the population and local authorities the importance of its activities, consequently maintaining a good relationship with the surroundings and the support of the community to maintain its operations.

With this, the focus of Manoa's wood production is currently 100% in Cujubim, with the product being sent to Triângulo (Curitiba), processed in Cujubim. The process works as follows: the sawmill that buys wood from Manoa, processes this wood and sells it to Triângulo. Manoa accompanies the entire wood processing process, as a way to maintain the quality of the product required by Triângulo. Additionally, the wood is only sold to sawmill in other municipalities if there is raw material left over. The document related to the local industries that buy the raw material from Manoa, was delivered to the VVB.

Other complementary actions

In addition to the planned activities, there were other social actions carried out by the company Manoa, such as donations of materials for the renovation of the Cujubim hospital (Figure 11), cost assistance for the *3ª Feira do Agricultor de Cujubim* [3rd Cujubim Farmer's Fair] held by the charitable association Anjos da Paz, donations of uniforms to students. participate in the *XI Festival Nossa Arte Estadual em Ariquemes* [11th Nossa Arte Estadual Festival in Ariquemes], donations for the *Festa Junina da E.M. Teotônio Brandão Vilella* [June Festival of E.M. Teotônio Brandão Vilella], donations of toys and chocolates to E.M.E.I [*Escola Municipal de Educação Infantil*] Raio de Luz [Municipal School of Infant Education Ray of Light], donations of chocolates to the *Pastoral da Criança da Igreja Católica* [Pastoral of the Child of the Catholic Church], donations of non-invasive ventilation masks to the Covid-19 Service Center of the Municipality of Cujubim, among other actions, benefiting the general population, from children to adults.

Figure 11 - Cujubim Hospital that benefited from donations of materials for its renovation.

The good relationship with the neighborhood helps to contain invasions and illegal activities in the project area. As a result, it is observed, through the results of monitoring by satellite images (section 3.1.2), that the project area has no record of illegal deforestation during the monitored period. Documents related to complementary activities can be found in the MFA monitoring reports, as well as in other documents made available to the VVB team.

Relationship of social activities and their impact on GHG emission reductions

During the monitoring period, the Manoa REDD+ Project carried out several activities regarding the work with different regional social groups, since inside the farm property there are no community

groups established, causing a direct and indirect impact not only at the municipal level, but also at the state level, mainly through the capacity building work of the state environmental agencies.

To demonstrate the clear relationship of the result of this work with its contribution to the reduction of GHG emissions directly and indirectly, in the short and long term, the proponents prepared Table 3 below where the main activities carried out in the years monitored are described with their expected impacts on the climate.

All the evidence of these actions performed, are better detailed in the items above and were made available to the VVB for analysis and verification. Additionally, the relation of the impact for the reduction of GHG emissions caused by the social activities carried out are the result of an analysis of the proponents, based on the local context, where Manoa is a reference in the Cujubim region and in the state of Rondônia, regarding the union of good forest management practices and forest conservation, which directly reflected in the zero deforestation rates in the Project Area.

Table 3. Relationship of the social activities of the monitored period with the reduction of GHG emissions

Social activities conducted per year			Impact for GHG emission reductions
Environmental education actions in the municipality of Cujubim	2017	With the Escola Municipal Pequeno Príncipe [Municipal School Pequeno Príncipe], where they were discussed the importance of low-impact forest management for the continuity of forest production, as well as biodiversity conservation, covering 33 people	The environmental education activities empower the society about themes related to the environment, disseminating knowledge about the theme. From the standpoint of the importance of conservation and maintenance of forest cover, and consequently, the reductions and removals of GHG emissions, these activities act in a preventive way to curb unplanned deforestation, since the groups addressed in these activities are mainly young people. The effective impact of these activities can be seen in the future, through the empowerment of the youth on the theme and in the development of their effective environmental awareness that will culminate in the preservation of the forest areas.
		With Guarda Mirim,30 people, more in-depth concepts about low-impact forest management were discussed, as well as the activities developed and how they are developed, so that it was clear the importance of forest conservation, also, at the opportunity, the members of the Guarda Mirim [Kid Guard] knew in practice the exploration activities forestry.	
	2018	With the Escola Municipal Teotônio Brandão Villella [Teotônio Brandão Villella Municipal School], with the participation of 29 people, was developed the theme of environmental education and practice on low-impact forest management.	

	2019	With the Escola Municipal Aloísio Becker [Aloísio Becker Municipal School], with the participation of 30 people, where, in addition to the presentation on the theme of environmental education and forest management with reduced impact, the students were presented with the concepts, assumptions and benefits of REDD+ Projects.	
		With the Escola Antônio Franciso Lisboa [Antônio Franciso Lisboa School], with the participation of 33 people, where content on environmental education and forest management with reduced impact was also treated.	
Low-Impact Forest Management Technical Training	2017	A 4-day training took place, assisting the technicians of the SEDAM Forest Development Coordination (CODEF), evaluating all phases of low-impact forest exploration, reaching around 22 people	The main objective of the technical training courses on low impact management is the dissemination of sustainable forest exploitation techniques among local players, such as sector workers and public agents, expanding the knowledge to all those involved. The main consequence of this activity is to help maintain forest remnants, forest cover and carbon stocks, avoiding unplanned deforestation and degradation, carrying out forest management activities that are based on good practices that cause the least impact to the forest, beyond the limits of the project area.
	2019	A training with forest engineering students Faculty of Rondônia (FARO), involving a total of 24 people in two days of visiting the Farm, with the main objective of getting to know the Farm and acquiring experience in the area of forest operation, with the premise of management activities performed by the Triangle Group.	
Relations with the municipality of Cujubim		As an internal policy established by the company, Manoa supplies raw material for sale only to industries in the municipality of Cujubim (RO), in order to contribute with the increase of municipal tax generation, jobs and the circulation of local income.	The main justification for this action is to demonstrate to the population and local authorities the importance of maintaining Manoa's activities for the region, consequently maintaining the good relationship with the surroundings and receiving

	In addition to the planned activities, there were other social actions carried out by the company Manoa, such as donations of materials for the renovation of the Cujubim hospital, cost assistance for the 3ª Feira do Agricultor de Cujubim [3rd Cujubim Farmer's Fair] held by the charitable association Anjos da Paz, donations of uniforms to students participate in the XI Festival Nossa Arte Estadual em Ariquemes [11th Nossa Arte Estadual Festival in Ariquemes], donations for the Festa Junina da E.M. Teotônio Brandão Vilella [June Festival of E.M. Teotônio Brandão Vilella], donations of toys and chocolates to E.M.E.I [Escola Municipal de Educação Infantil] Raio de Luz [Municipal School of Infant Education Ray of Light], donations of chocolates to the Pastoral da Criança da Igreja Católica [Pastoral of the Child of the Catholic Church], donations of non-invasive ventilation masks to the Covid-19 Service Center of the Municipality of Cujubim, among other actions, benefiting the general population, from children to adults.	the community's support to maintain its operations. The good relationship with the neighborhood helps to contain invasions and illegal activities in the project area, strengthening the farm's image and governance in the region. As a consequence, it is observed through the results of the satellite image monitoring that the project area was totally preserved during the monitored period, causing the minimum of emissions that refer to the activities carried out.

3.1.2 Analysis of soil use and land coverage changes during the monitoring period

For the analysis of land use and cover changes, the activities of the Manoa REDD+ Project are mainly aimed at preventing deforestation and forest degradation and GHG emissions into the atmosphere. There are three main activities that address these objectives: monitoring deforestation through satellite images and generation of annual bulletins, asset surveillance and low-impact forest management (FSC Certificate). The activities are described below.

The implementation of these activities was monitored from annual bulletins, land use and land cover maps, entry and exit list of the project area, and documents related to exploration (POA and post-exploratory reports). All documents were handed over to VVB.

<u>Monitoring of deforestation by satellite images and generation of annual bulletins</u>

For the analysis of land use and land cover changes during the monitoring period, the methodologies mentioned in item 4.5 of the Project Description Document were used, through the

PRODES data, available in vector format (shapefile) and matrix (raster) and with spatial resolution of 30 meters. According to the PRODES methodology (CÂMARA et al. 2006), images undergo geometric correction with a displacement error of less than 1 pixel (30 x 30 m). These images cover the monitoring period (2017 to 2020) and can be located through the Orbit/Point on the Landsat scene 231/66 and 232/66. The main activities carried out by the PRODES system to monitor forest cover in the Brazilian Amazon are detailed below. The satellite image monitoring activity aims to understand the context of deforestation and invasions, and consequently improve the agility and assertiveness of field patrols, for the maintenance of forest cover.

Pre-processing

The image pre-processing procedures performed by the PRODES Project consist of the following steps (CÂMARA et. al., 2006):

1) Selection of images with lower cloud cover and acquisition date closer to the dry season in the Amazon and with adequate radiometric quality;

2) Georeferencing of images with spatial resolution of 30 meters in 1:100 .000 scale topographic charts and NASA orthorectified MRSID format images.

Interpretation and Rating

The satellite image classification method used by PRODES follows four main steps. First, a spectral mixture model is generated, identifying in the images the components of vegetation, soil, and shadow. This technique is known as the linear spectral mixture model (MLME [*Modelo Linear de Mistura Espectral*]), which aims to estimate the percentage of vegetation, soil, and shadow components for each cell (pixel) of the satellite image. The second stage is the application of the segmentation technique, which identifies in the satellite image spatially adjacent regions (segments) with similar spectral characteristics. After segmentation, there is an individual classification of the segments, in order to identify the classes of forest, non-forest vegetation, hydrography and deforestation (anthropic vegetation). Finally, the result of classified segmentation is submitted to the process of editing or auditing the classification, carried out by a specialist, and finalized with the creation of state mosaics.

Map Accuracy Assessment

During the period covered by this monitoring, no records of forest cover conversion in the Project Area were identified. However, regardless of this analysis, the accuracy of the PRODES data was evaluated based on the visual evaluation of the predominant class (Forest and Deforestation) in the Sentinel-2 images, with 10 meters of spatial resolution in the composition of bands 4-3-2. The accuracy value of the monitoring process of land use classes in the monitored area was 90%, higher than the 80% established by VM0015. Figure 12 demonstrates the methodology adopted to perform the PRODES mapping accuracy evaluation.

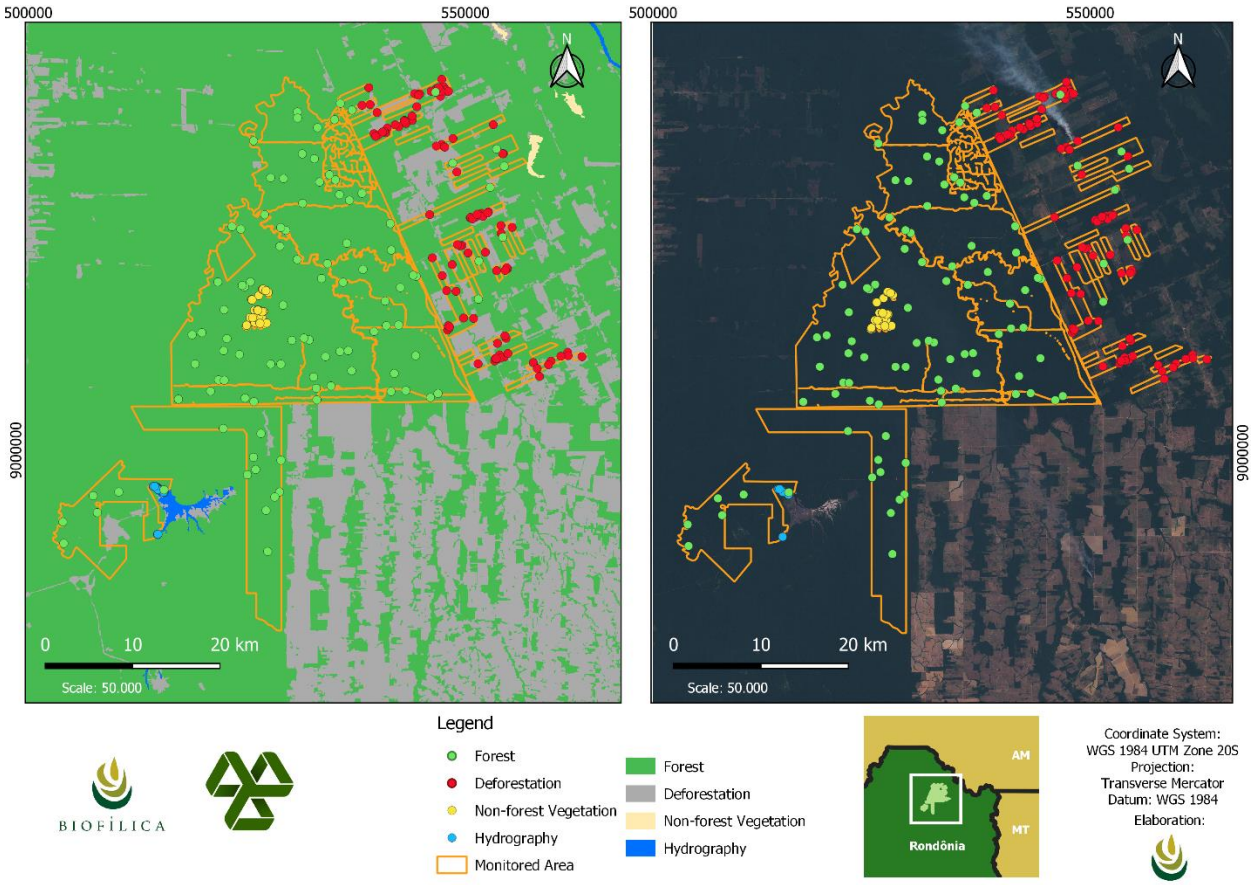


Figure 12 - Map of evaluation of accuracy points. Source: Biofílica (2021).

A total of 300 points were randomly distributed in the monitored areas (Project Area and Leakage Belt). For each point, a visual interpretation was made of the predominant class (classes: Forest, Deforestation, Non-forest and Hydrography). With the reference points and the land use and land cover map of the monitored period, it was possible to evaluate the performance of the monitoring process through the analysis of the confusion matrix (Table 4), as established by Congalton and Green (2008). The accuracy result was 90%, higher than that established by VM0015.

The confusion matrix was made from the random allocation of points in the different strata determined, which are precisely the classes of land use and land cover. We used 300 points in the accuracy evaluation, a value higher than the one suggested in the Project Description document, which was 93 points. Of the 300 points, 93 were randomly distributed in the "Forest" class, 90 in the "Deforestation" class, 48 points in the "Non-forest" class and the remaining 38 points were distributed in the "Hydrography" class.

Table 4. Confusion matrix generated by evaluating PRODES data in the monitored period (2017 to 2019).

		PRODES x SENTINEL-2						
		Reference				Total	User accuracy	Ommission Error
		Forest	Deforestation	Non-Forest	Hydrography			
Classified	Forest	**93**	2	4	1	100	93%	7%
	Deforestation	2	**90**	8	0	100	90%	10%
	Non-Forest	2	0	**48**	**0**	50	96%	4%
	Hydrography	12	0	**0**	**38**	50	76%	24%
Total		109	92	60	39	**300**		
Producer accuracy		85%	98%	80%	97%			
Omission Error		15%	2%	20%	3%			
Map Accurancy								90%

During the monitoring period, Biofílica generated annual monitoring bulletins, which include the coordinates of the deforested areas during the analyzed year, thus assisting in asset surveillance activities. The 2017, 2018, 2019, and 2020 monitoring bulletins were produced respectively in 2018, 2019, 2020 and 2021. The deficit in time occurs mainly because of the PRODES data it takes about a year to be published for the retroactive year.

Physical patrol of the area

During the monitoring period, in linel with the collection of data and images from the PRODES Project, and the annual submission of the Biofílica Monitoring Bulletin, the Manoa Farm's patrols team conducted its patrol activities within the farm's perimeter. The bulletins provided the necessary support for the field team, since through the annual data it was possible to identify the areas at risk and with the highest concentration of deforestation, in addition to understanding the context of the region where Manoa Farm is located, more specifically the context of the leakage belt. thus, it is possible to take more assertive actions to contain deforestation near the most affected boundaries. Asset surveillance is directly linked to actions to monitor unplanned deforestation. It aims to maintain the integrity of the Project Area by removing potential deforestation agents, also due to the good relationship of Manoa Farm with the neighborhood, preventing the entry of invaders, but also adds to the actions of monitoring deforestation not planned when it was not possible to prevent these illegal activities. The activity is carried out by employees of the Manoa farm adopting a strategy to have the “surprise effect”, that is, there is no frequency and schedule of defined rounds going through the farm so that the invaders do not identify a pattern in the inspection action. In case of detection of wood theft or invasion, employees are trained to immediately report the occurrence to the forest manager, who will call the public entities responsible to take legal action.

As a process of improvement and control arising from REDD+ activities in the project, as of July 2020 the patrols began to be recorded using standardized forms. Thus, surveillance patrols take place with a team of 2 to 3 people (ideally 3) and priority is given to areas with the highest deforestation pressure. In the field, the team registers the activity with photos, GPS points (tracking) and all possible information about any illegal activities, always adopting the "good neighbor policy". Manoa's good

relationship with the surroundings and the surveillance team, always present in the areas of greatest pressure, helps to contain the entry of invaders in the area. In some cases, the invaders themselves act in the "maintenance" of the property, when they identify and stop, among themselves, the action of other potential agents of deforestation, aiming to maintain the good relationship with Manoa Farm. After finishing the field activity, the forest manager writes the form with the description of what was done, and, afterwards, it is signed by the team that did the activity, confirming the information. Finally, the data is sent to Biofílica (São Paulo).

Linked to the activity, on the Manoa farm there are two strategic points that consist of the Casa Rio Preto and Casa Curica, where there is surveillance by farm employees who live in these locations (Figure 13), part of the investments made by the project are aimed at maintaining these crucial points for this activity. From the beginning of the records until the end of the monitored period (August 07, 2020) there were 3 records of patrols in the project area.

The first registered round took place between July 6 and 8, 2020, where a structure was found, however, no traces of people or materials were found at the site. The second round took place between July 27 and 30, 2020, where the cleaning of the access areas to the Casa Curica surveillance point was carried out, and no trace of trespassers or illegal activity was found. The third round recorded in the monitored period, took place between August 03 and 06, 2020, where cleaning of the access areas to the surveillance point Casa Rio Preto was also carried out and no trace of illegal activity was found. All forms, as well as information regarding the patrols, were made available to the VVB.

Even though during the monitoring period the registration of patrols began, the proponents evaluate the need to improve the tool initially used, as well as its elaboration process and the use of more frequent remote sensing data for monitoring the areas. In this way, it is expected that the relationship between the data collected in the remote monitoring and the actions of the surveillance team will be clearer, in other words, when the surveillance team is carrying out its rounds, the form will clarify if the surveillance strategy originated from the PRODES Bulletin data, from other monitoring sources originating from the REDD+ Project or from other internal actions on the Manoa farm. With this, it is expected to improve the production of the form, making the process of organizing the information generated in the field easier and faster for those responsible. For this, the proponents will direct as a priority in the future monitoring plan the joint updating of this tool, with this information being available in detail in the next audits.

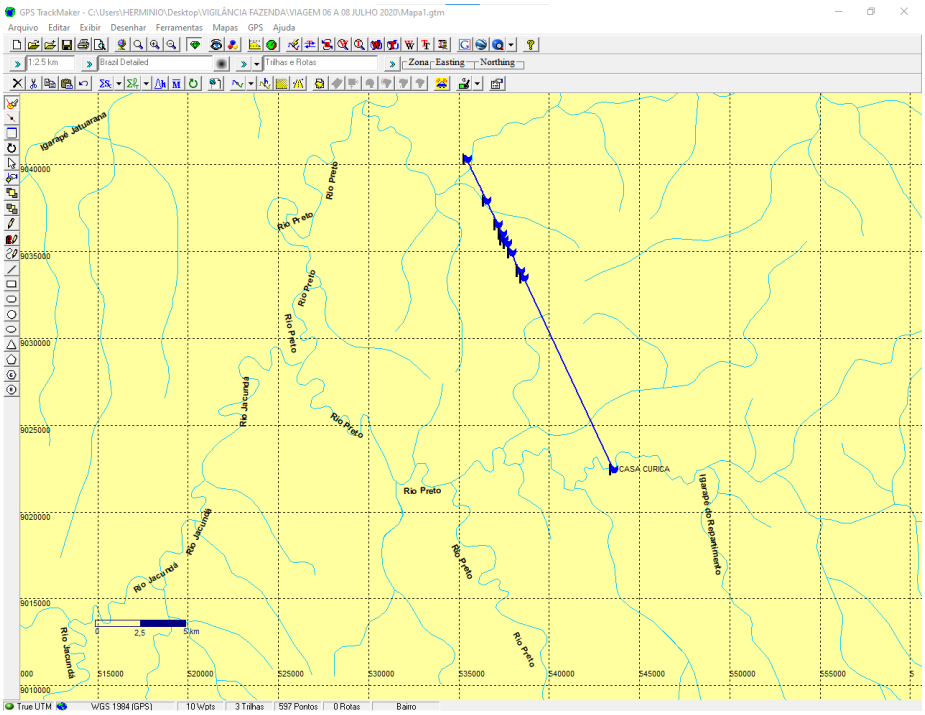


Figure 13 - Location of "Casa Curica".

In addition to the patrimonial surveillance actions, *Manoa Sustentável, Exploração e Serviços Florestais*, records all persons entering the farm's property in a book present at the main entrance, where they are reported, in addition to the visitor's name, date and time of entry and departure, agency or responsible institution, as well as the license plate of the vehicle.

Low-impact forest management (FSC Certified)

Manoa's Sustainable Forest Management Plan (PMFS - *Plano de Manejo Florestal Sustentável*) was prepared in 2002, when Triângulo Pisos e Panelos Ltda started the production of geared floors. In 2018, Manoa's PMFS was reformulated, which, until then, had been approved on behalf of the owners of the Triângulo group (sic) (individuals), in the reformulation, the company *Manoa Sustentável, Exploração e Serviços Florestais Ltda* becomes the owner of the PMFS, as explained in section 3.2.2.

The objective of the PMFS is to use the natural forest resources of the management area for timber production purposes, complying with current environmental legislation and the commitment to maintaining environmental quality, economic sustainability and social responsibility. In this sense, the plan has a series of guidelines that govern all stages of exploration, from the planning stage to the harvest and post-harvest phases. In 2005, the company *Manoa Sustentável, Exploração e Serviços Florestais Ltda* won the FSC (Forest Stewardship Council) certification, for this reason, the exploitation of forest resources must be from the perspective of reduced impact and principles and criteria of FSC certification.

Since 2005, FSC certification has been validated with annual audits. During the second monitoring period (2017-2020), 4 FSC audits were carried out, ensuring that the forest was exploited

using sustainable practices and the physical presence of the proponent in the area, as well as reinforcing the performance of sustainable forest management activities aligned with REDD+ activities and the sustainable use of natural resources.

Thus, the operations carried out comply with all current legislation (at the federal, state and municipal levels) and with the principles of international forest certification. Throughout the monitored period, the forestry operations were carried out strategically, combined with the inputs prepared by the REDD+ project, with the objective of maintaining the forest cover, ensuring the protection of natural habitats and attributes of high conservation value.

The forest exploration is guided by the PMFS and, each Annual Production Unit (UPA) explored, Annual Operations Plans [*Planos de Operações Anuais*] (POAs) are made where specificities of information and procedures of each UPA to be explored are provided. In this sense, during the monitored period, the UPAs 01, 10 and 27 were explored, and UPA 15 began its activities during the monitored period, however, the effective exploration was finished outside the period.

Currently, forest management is the main tactic used to contain invasions on the farm; this occurs because of the physical presence in the area while the operations are being carried out. The existence of workers throughout the year in the locations where logging occurs, directly reinforces the governance of the property, discouraging the action of invaders and, consequently, the carrying out of illegal activities. For this to occur in synchrony with the data generated by the REDD+ project, the information generated by the monitoring bulletins is used to help define the areas that will be explored on the farm.The Manoa farm is divided into 27 UAPs identified with their respective numbers, however, its exploration does not occur in a numerically guided manner (first UAP 1, followed by UAP 2, et al), the definition of the areas that will be explored goes according to the regions of greatest pressure and risk of deforestation. Manoa, which is responsible for carrying out the activity, knows that the limits ("borders") of the farm are areas of greatest risk. In addition to this, the information generated in the monitoring bulletins shows the development of deforestation outside the farm and the consequent increase in pressure in specific regions. The union of this knowledge helps in the subsequent process of defining the areas that will be explored.

Since 2017, when the development of deforestation pressure in the eastern part of the Farm (region of the Leakage Belt, known as "Soldados da borracha") was noted through the geographic data survey, the forest management operation was directed to occur in the proximity of these areas, in order to reaffirm the presence and governance of the area. This relationship is very clear in the exploitation map below (Figure 14), the UPA 27, was exploited in 2017, the year that deforestation increased in the eastern region, and the UPA 15 was exploited in 2020, the year that the area returned to the region suffered great pressure. This strategy is joined to the fact that Manoa has as principle to carry out the exploration "from outside to inside" in the limits of the farm, that is, the UPAS initially explored are those located more to the edges of the farm and, later, the activity will migrate to the center of the property.

In addition to the physical presence in the area, forest management is essential for the installation of infrastructure that helps with surveillance and fire containment activities, reinforcing the security of the property. This situation is illustrated in Figure 14, where UPA 10 and UPA01 were explored in areas that had not previously been accessed on the farm. The infrastructures set up for management operations (roads, bridges, and branches) have a high cost, in this sense, the opening of the areas for

exploration manages to dissolve this value, since the infrastructures are also used for patrimonial vigilance activities, besides facilitating access to previously inaccessible points. Due to the high cost of implementing this infrastructure and combined with the objective of reinforcing the physical presence in the areas, the region where the UPAs to be explored are defined is explored for at least 2 years. The roads built also help fight fires, acting as access routes and firebreaks, being very important in the monitored period, especially given the context of the farm's surroundings, where the presence of fire is increasingly constant. In this way, the management activities linked to the REDD+ scope meet the objectives of the VM0015 methodology to avoid unplanned deforestation.

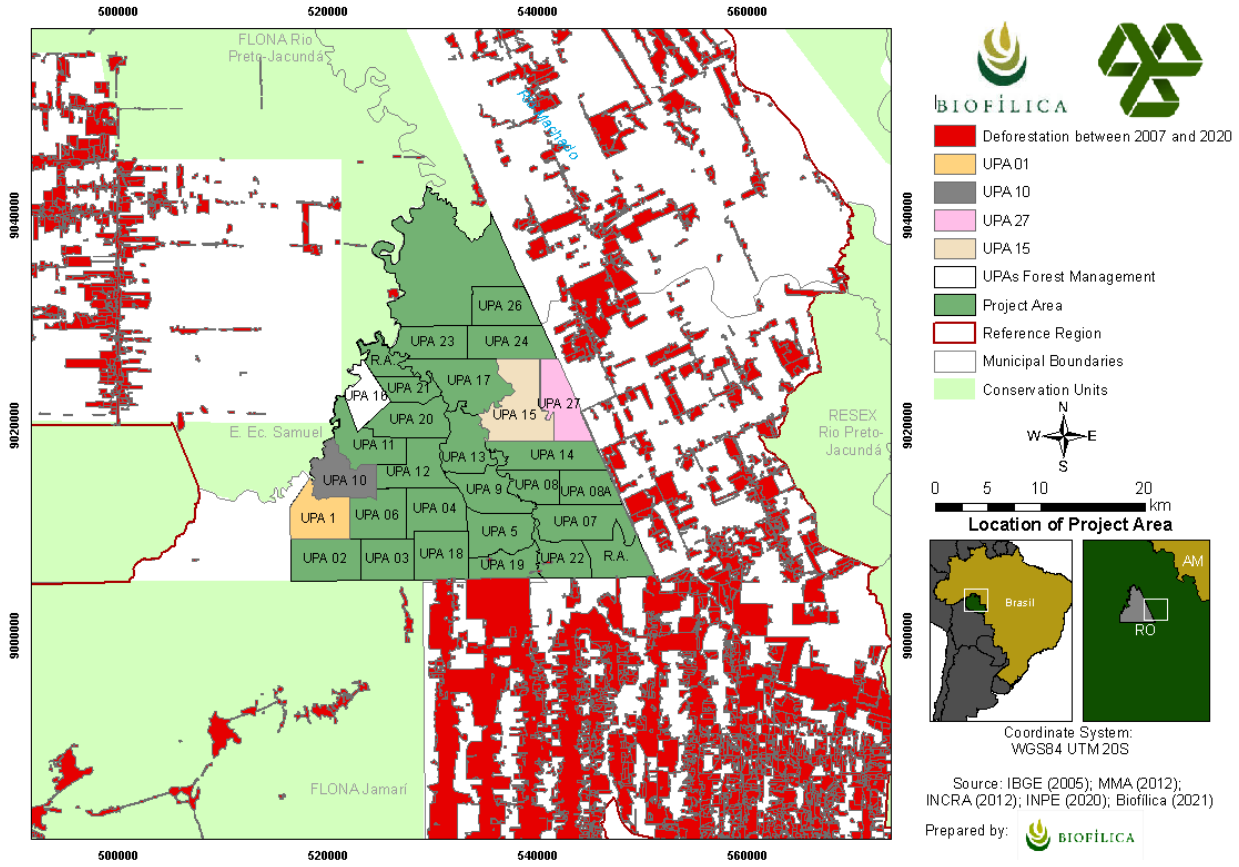


Figure 14 - Map with location of UPAs exploited in the monitored period and deforestation in the region

3.1.3 Leakage monitoring and non-permanence risk factors management

For leakage monitoring, the same assumptions were used as for deforestation monitoring in the project area (section 3.1.2). In this sense, as described in section 3.1.2, through satellite images and the consequent generation of annual monitoring bulletins, it was possible to map the forest cover and land cover change in the Leakage Belt. With the generation of bulletins, it was possible to identify the regions of greatest risk for the project area and understand the context of the Leakage Belt region. Through this

understanding, despite the limitation of Fazenda Manoa's activities only in the project area, as described below, it is possible to identify the areas with greatest deforestation pressure, directly assisting in carrying out surveillance activities and low-impact forest management more effectively..

Risk assessment was performed through the application of the VCS approved tool "*AFLOU Non-Permanence Risk Tool, v. 4.0*". The result of the risk tool was presented as an attachment to the MR in this monitored period and will be reported to VVB through the Risk Report and the Risk Calculation Tool. In addition, the risk of deforestation in the surroundings presented itself as one of the greatest risks of non-permanence of the project, being described below:

Deforestation in the surroundings and emissions from leakage

During the monitored period, it was possible to detect deforested areas in the Leakage Belt, starting in 2017 with approximately 280 ha, reaching 576 ha in 2019, being the year with the largest area deforested, being above what was predicted by the baseline. The areas to the southeast of Fazenda Manoa showed the highest rates of deforestation within this period, being responsible, therefore, for the increase in the deforestation rate within the Leakage Belt.

In order to understand how uncontrolled deforestation took place, an analysis of deforestation within a 10 km radius of the Manoa farm, called “Surrounding Area”, was carried out. Thus, the years 2018 and 2019 were compared, noticing an increase of 235% (from 1.705ha, in 2018, and 4.003 ha, in 2019) in the Surrounding Area. Also, there was an increase in the number of deforestation polygons; from 45 polygons (2018) to 87 polygons (2019), having also increased the number of polygons greater than 10ha, indicating greater aggressiveness in the behavior of deforestation agents in the region in 2019.

According to a survey conducted by the proponents, which culminated in the preparation of a dossier that was made available to the VBB on a confidential basis, this increase is unrelated to the activities carried out by the project during the monitored period, but rather occurred because of changes in the local context. In the dossier prepared, strong evidence was organized based on bibliographic references and data obtained from a field survey conducted by the proponents, where it was demonstrated that the action of the new agents of deforestation in the leakage belt was supported by the whole context of development of the region, which was not expected in the baseline, changing the whole context of the action and evolution of the agents previously identified by the project.

Moreover, because of all this context, Manoa Farm was not able, during the monitored period, to act in the control for these areas not to be impacted, being its power of influence restricted only to the property itself, mainly because of its well-defined land situation, besides its good relationship with the neighborhood, since the activities of the Low Impact Forest Management allied with the REDD+ activities of the Project are widely known by local agencies and institutions, which reinforces the governance of the property and consequently increases the protection of the Project Area. Given this, the proponents understand that it is appropriate not to account for the leakage identified in the monitored period as a measure not to jeopardize the project, following mainly the guidelines found in VM0015, part 3, task 1,

section 1.2.2 (p. 115) and by the Project Developer's Guidebook to VCS REDD Methodologies, from Conservation International.

Forest fires

Another existing risk is fire. As presented in the Monitoring Bulletins, the Project Area (as well as the entire property) is under pressure from deforestation and heat outbreaks, mainly from surrounding deforested areas.

This risk is mitigated both by the action of asset surveillance on the property and in the sustainable forest management plan, where there is a description of forest protection against fires in the area of the management plan, which involves both educational and informative internal campaigns, in the management area and in the areas surrounding the AMF, as for prevention for immediate Relief Request, where all camps are equipped with a communication system (rural telephony, global cellular, internet, radio transmitters, etc.), which allows the transmission and receipt of information in the event of a fire. In addition, the Fire Brigade training (Figure 15 and Figure 16) in compliance with NR-23 to comply with the planning of activities of the PCMSO and PPRA (section 2.3), offered to all workers of the own and outsourced teams of Manoa (sic) Sustentável, Exploração e Serviços Florestais,which is linked to the low-impact forest management activities.


CERTIFICADO

Sistema FIERO SESI

O Departamento Regional **SESI/RO** confere o presente certificado a **EDEVALDO C. CASSIMIRO** pela participação no treinamento de **BRIGADA DE INCÊNDIO** em conformidade com a **NR-23**, realizado em **CUJUBIM – RO**, no Data de **10/04/2019** com carga horária de **08** horas.

Ariquemes, 10 de abril de 2019.

SESI /RO

SESI - Treinamento Segurança Brigada de Incêndio NR-23

Figure 15 - Certificate model offered to participants of the Fire Brigade course (front).

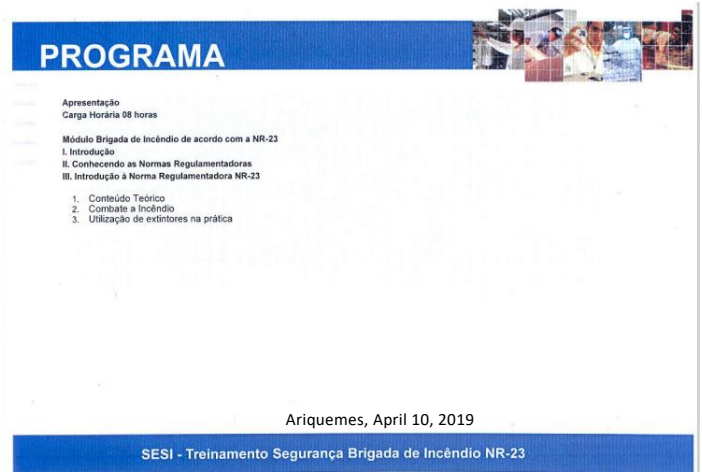


Figure 16 - Certificate model offered to participants of the Fire Brigade course (back).

3.2 Deviations

3.2.1 Methodology Deviations

This section does not apply because, considering the period monitored, there was no methodological deviation in the project.

3.2.2 Project Description Deviations

Project Proponent – Change of land title

In 2019, the Manoa Farm was incorporated into the capital of the company Manoa Sustentável Extração e Serviços Florestais Ltda, in order to facilitate the bureaucratic procedures in the public agencies that carry out the release and inspection of the Forest Management Plan. Before the owner was Triângulo Pisos e Painéis Ltda, project proponent indicated in the PDD of the project. This action was necessary because the responsible public agencies always had difficulties in understanding why the owner of the area was not the company Manoa Sustentável Extração e Serviços Florestais Ltda, since it is responsible for the exploration of the forest management plan.

The change in the land title merely facilitated the bureaucracies of the responsible public agencies, and the capitalization of Manoa Farm did not generate costs, only the documentary regularization of the property. All the information regarding this process (clarification by the Trinângulo group) and the farm's updated land documents were made available to VVB on a confidential basis.

Since Manoa is a company that is part of the "Triângulo Group", as well as Triângulo Pisos e Painéis Ltda, the Triângulo Group, together with Biofílica, defined as a result of the real estate payment and property

transfer, that Manoa will become the proponent of the Project together with Biofílica, and therefore the holder of the carbon credit rights, instead of Triângulo Pisos e Painéis Ltda. Thus, Triângulo Pisos e Painéis Ltda (Released Representor), previously a Project proponent together with Biofílica Ambipar Environmental Investments S.A., opted to no longer be a proponent, giving way to Manoa Sustentável Extração e Serviços Florestais Ltda (Accending Representor). This change refers to sections 1.4 (G4), 2.2 (G3), 2.6.2, 3.2 (G5), 8.1 (CL3, CM3 & B3) of the PDD. This change does not interfere in any way in the management and governance process of the Project, and it only aims to reflect and formalize the process that has already been implemented in practice, since Manoa has already been assuming more responsibilities in the last few years, because, besides carrying out the low-impact forest management in the project area, it has also been responsible for providing infrastructure support to the project activities, as well as being responsible for land security and patrimonial vigilance and, finally, as the owner of the land.

The change of proponents of the project, with the departure of Triângulo and the rise of Manoa, did not affect the additionality or applicability of the project, especially since the companies belong to the same group (Triângulo Group) and, therefore, the guidelines and responsibilities previously established remain the same. This change was only aimed at improving the management and governance procedures, i.e., this change did not impact any of the definitions established in the PD regarding the governance responsibilities of the Triangle Group or Biofílica.

The formalization of the process of change of Proponents before the Registry will be completed after the completion of the verification analysis by the VVB, so that the sending of the documents for ascension and release will be done in conjunction with the monitoring and verification report to Verra, since it is only a registration process. In any case, in the course of the MR, the role of the above mentioned Proponents becomes clear. The update of the previously established contract was carried out through the preparation of an addendum, which was signed by the legal heads of the institutions and was made available to the VVB on a confidential basis.

Project Proponent – New Investing Partner

In July 2021, Ambipar Participações e Empreendimentos S.A. completed the acquisition of 53.6% of the capital stock of Biofílica Investimentos Ambientais S.A. The main objective of this transaction was to accelerate the company's growth, leveraged by the Ambipar Group, and as a result expand its portfolio of environmental services provided.

As a consequence of this acquisition, the company underwent a nominal change, decided in an extraordinary general meeting, and is now called Biofílica Ambipar Environment Investments S.A. The entry of the partner (Ambipar) in Biofílica did not change the company's corporate purpose, which is still strongly related to the promotion and financing of activities related to the environment and environmental conservation. The entry of a new partner will have a positive effect in that the contribution of resources, expertise, and gains in scale will allow Biofilica to advance more consistently and rapidly in its activities related to the environment and environmental conservation.

Additionally, there are no contractual or other legal implications to the Manoa REDD+ Project contract, or any other project implemented by Biofílica prior to this transaction, as a result of a new

partner joining Biofílica. The main investment objectives of this transaction are the development of technology and expertise regarding Nature Based Solutions techniques.

Monitoring Indicators

Considering the monitoring period there were deviations from two proposed indicators: “Harvest damage assessment” and “Frequency of surveillance and patrol operations”. However, the deviations that occurred did not compromise the monitoring of the project, as can be analyzed in the descriptions below.

The indicator “Assessment of damage of forest management activity” was proposed to assess the damage occurring in management operations by comparing the previous and subsequent situation of individuals present in the installed plots. The indicator was designed to be monitored with the m^3/ha unit, however, the process of recording post-exploratory damage raises the number of damaged and killed individuals in an analyzed area without considering the volume of each individual. Thus, the indicator was analyzed and reported in the individual/ha unit.

The indicator “Frequency of surveillance and patrol operations” was initially proposed to assess the functioning of patrimonial surveillance actions. This activity aims to promote mitigation actions against the invasion in the Project Area and, consequently, to act to combat deforestation and illegal and unplanned forest degradation. Surveillance actions have taken place continuously throughout the project since 1997, presenting specific tactics as described in the section 3.1.2. Based on the costs associated with maintaining surveillance infrastructures (Casa Curica e Casa Rio Preto), it is possible to prove their use and, consequently, the continuity of surveillance operations, as can be seen in the recents patrol reports and Manoa’s Farm expenses reports made available to VVB. However, the registration of activities started to be initialized only in 2020. Thus, the monitoring of actions as well as the completion of the aforementioned indicator was compromised given the lack of records that could quantitatively prove the actions. Despite this gap, it was possible to indirectly identify the effect of surveillance actions in the Project Area because there was no unplanned illegal deforestation action in the area during the period. This proves that the patrimonial surveillance actions were carried out.

3.3 Grouped Projects

It doesn't apply because this is not a grouped project.

4 DATA AND PARAMETERS

4.1 Data and Parameters Available at Validation

Data/ Parameter	Deforestation
Data unit	Hectare (ha)
Description	Maps of forest cover areas converted to non-forest cover areas
Source of data	Measured through data from the PRODES/INPE project [*Projeto de Monitoramento do Desmatamento na Amazônia/Instituto Nacional de Pesquisas Espaciais* - Amazon Rainforest Deforestation Monitoring Project National Institute for Space Research]
Value applied	0.79% /year on average (2000-2012)
Justification of choice of data or description of measurement methods and procedures applied	Data from the program PRODES Digital (Satellite of the official mapping of deforestation in the Brazilian Amazon) were used to map deforestation and production of the Forest Cover Mark of Excellence Map. A total of 48 Landsat images were used during the analyzed period. The ISOSEG non-supervised classification method was used to classify images to map the classes of forest, non-forest vegetation, hydrography, and deforestation
Purpose of Data	• Determining the baseline scenario • Calculation of baseline emissions • Calculation of project emissions • Calculation of the leakage
Comments	View documents: • Chamber et al. 2006: Methodology for calculating the annual rate of deforestation in the Legal Amazon • Determination of the Baseline and Deforestation Dynamics for the Manoa project • http://www.obt.inpe.br/

Data/ Parameter	Ctot
Data unit	tCO2 and ha-1
Description	Average carbon stock per hectare across all carbon reservoirs in the forest class used in the baseline scenario
Source of data	Calculated by allometric equations and field measured data
Value applied	513 tCO2 and ha-1

Justification of choice of data or description of measurement methods and procedures applied	*Estimativas de biomassa acima e abaixo do solo foram realizadas por meio de dados de inventário florestal, equações alométricas desenvolvidas em áreas similares a área do projeto* [Above and below ground biomass estimates were performed using forest inventory data, allometric equations developed in areas similar to the project area] (SILVA, 2007). *O reservatório de madeira morta foi estimado com base em dados do inventário florestal e equações de Silva* [The deadwood reservoir was estimated based on data from Silva's forest inventory and equations] (2007).
Purpose of Data	• Determining the baseline scenario • Calculation of baseline emissions • Calculation of project emissions • Calculation of the leakage
Comments	View documents: • Estimation of the Forest Carbon Stock for the REDD+ Manoa project • Section 5.3 of the "Project Description — Baseline Issue"

Data / Parameter	DBH
Data unit	cm
Description	Diameter at Breast Height (130 cm) for each tree with DBH equal to or greater than 15 cm in each plot of the forest inventory
Source of data	Field Measured by Florestal Paisagismo
Value applied	View spreadsheet with field data
Justification of choice of data or description of measurement methods and procedures applied	VCS VM0015 Methodology Requirement. Forest inventory data collected less than 10 years ago on multiple plots located in large spatial distribution
Purpose of Data	• Determining the baseline scenario • Calculation of baseline emissions • Calculation of project emissions • Calculation of the leakage
Comments	Key Variable for Estimating Carbon Stock

Data / Parameter	$BGBfw = 0{,}0469 \times DAP 2{,}4754 \times fc1$ $AGBfw = EXP(-1{,}716 + 2{,}413 \times ln(\mathrm{DAP}))$
Data unit	Kg (fresh weight of biomass)
Description	Equation for converting DBH to fresh biomass

Source of data	1: SILVA, 2007 2: NOGUEIRA, 2008
Value applied	1. $\boldsymbol{BGBfw = 0{,}0469 \text{x} DAP 2{,}4754 \text{ x} fc1}$ 2. $\boldsymbol{AGBfw = EXP(-1{,}716 + 2{,}413 \text{x} ln(\text{DAP}))}$
Justification of choice of data or description of measurement methods and procedures applied	Equation developed for forests with similar characteristics to forests in the reference region
Purpose of Data	• Determining the baseline scenario • Calculation of baseline emissions • Calculation of project emissions • Calculation of the leakage
Comments	-

Data / Parameter	CF
Data unit	t
Description	Carbon content in dry biomass
Source of data	Nogueira, E.; Fearnside, P.; Nelson, B., et al., 2008. *Estimativas de biomassa florestal na Amazônia Brasileira: Novas equações alométricas e ajustes da biomassa dos inventários de volume de madeira.* [Forest biomass estimates in the Brazilian Amazon: New allometric equations and biomass adjustments from wood volume inventories]. Forest Ecology and Management, 256 (11), pp.1853-1867
Value applied	0,485
Justification of choice of data or description of measurement methods and procedures applied	Value found in scientific literature
Purpose of Data	• Determining the baseline scenario • Calculation of baseline emissions • Calculation of project emissions • Calculation of the leakage
Comments	-

Data / Parameter	44/12
Data unit	tCO2e

Description	Carbon mass to CO2e mass conversion factor
Source of data	From the scientific literature: 2006 IPCC Guidelines for National Greenhouse Gas Inventories Volume 4 - AFOLU
Value applied	44/12
Justification of choice of data or description of measurement methods and procedures applied	IPCC Default Value
Purpose of Data	• Determining the baseline scenario • Calculation of baseline emissions • Calculation of project emissions • Calculation of the leakage
Comments	-

Data / Parameter	Opening of area for management infrastructure
Data unit	Percent
Description	Open area for the construction of infrastructure necessary for sustainable forest management activities, such as yards, primary and secondary roads
Source of data	Post-Exploratory Report and Expert Opinion
Value applied	1.6%
Justification of choice of data or description of measurement methods and procedures applied	Data are collected in field after harvesting activity. Post-exploratory reports
Purpose of Data	• Determining the baseline scenario • Calculation of baseline emissions • Calculation of project emissions • Calculation of the leakage
Comments	-

4.2 Data and Parameters Monitored

Data / Parameter	Deforestation of project area and leakage belt
Data unit	Hectare (ha)
Description	Forest cover areas converted into non-forest cover areas within the project area and leakage belt of the Manoa REDD+ Project

<table>
<tr><td>Source of data</td><td>Landsat8 remote sensing satellite images used by the PRODES project corresponding to orbit/point 231/66 and 232/66.</td></tr>
<tr><td>Description of measurement methods and procedures to be applied</td><td>The monitoring of forest cover in the monitored area was carried out by overlapping the PRODES vector data with the limits of the project area and leakage belt of the Manoa REDD+ Project. Polygons mapped as deforestation in the years 2017 to 2020 were selected for quantification of the deforested area and subsequent field verification activities.</td></tr>
<tr><td>Frequency of monitoring/recording</td><td>Yearly</td></tr>
<tr><td>Monitored Value</td><td><table><tr><td></td><td>$ABALPA_{icl,}$ (ha)</td><td>$ABSLK_{icl,}$ (ha)</td></tr><tr><td>2017</td><td>0</td><td>0</td></tr><tr><td>2018</td><td>0</td><td>0</td></tr><tr><td>2019</td><td>0</td><td>0</td></tr><tr><td>2020</td><td>0</td><td>0</td></tr></table></td></tr>
<tr><td>Monitoring equipment</td><td>Digital processing program remote sensing images, geographic information systems, and navigational GPS</td></tr>
<tr><td>QA/QC procedures to be applied</td><td>Images with a special resolution of 30 meters or more were used in the mapping and the minimum mapping unit was 1 ha. The methodology for assessing data accuracy is described in Section 3.1.2. The accuracy of the land use and land cover classification is 93%.

This information served as a source for the preparation of monitoring bulletins (available to VVB), which were sent to the asset surveillance team, to perform field identification of deforestation points with GPS data. This step is also described in Section 3.1.2.</td></tr>
<tr><td>Purpose of the data</td><td>• Calculation of project emissions

• Calculation of the leakage</td></tr>
<tr><td>Calculation method</td><td>In the event that unplanned deforestation areas are detected, the Forest Cover Excellence Mark Map will be updated by map algebra.</td></tr>
<tr><td>Comments</td><td>• PRODES Digital Project: http://www.dpi.inpe.br/prodesdigital/prodes.php

More information on quality control and assurance available at:</td></tr>
</table>

	• (CÂMARA et al., 2006). *Metodologia para o cálculo da taxa anual de desmatamento na Amazônia Legal* [Methodology for calculating the annual rate of deforestation in the Legal Amazon]

Data / Parameter	Ctot
Data unit	tCo_{2e} ha^{-1}
Description	Average carbon stock per hectare across all carbon reservoirs in the forest class used in the baseline scenario
Source of data	Calculated by allometric equations, expansion factors of scientific literature, and data measured in the field by Florestal
Description of measurement methods and procedures to be applied	Above and below ground biomass estimates were performed using forest inventory data, allometric equations developed in areas similar to the project area (SILVA, 2007).
Frequency of monitoring/recording	Forest inventory data collected over periods of up to 10 years on multiple plots
Monitored Value	513 tCo_{2e} ha^{-1}
Monitoring equipment	N/A
QA/QC procedures to be applied	Carbon Stock Monitoring Plan — Manoa REDD+ Project
Purpose of the data	• Calculation of project emissions • Calculation of the leakage
Calculation method	Comparisons between the average total carbon stock value contained in the forest class used in the baseline scenario, according to the Forest Carbon Stock Estimate of the Manoa REDD+ Project
Comments	According to VM0015 (p. 107), in forest management areas, the monitoring of carbon stocks is mandatory if the areas are subject to a significant reduction in the carbon stock in the project scenario, in relation to ex ante evaluation. As the management carried out is of low impact, not causing the opening of the forest canopy, the impact caused by logging was not relevant, because of this, this parameter was not renewed,

	maintaining the value used at the beginning of the project and in previous checks.

Data / Parameter	DBH
Data unit	cm
Description	Diameter at Breast Height (130 cm) for each tree with DBH equal to or greater than 10 cm in each plot of the forest inventory
Source of data	Calculated from the chest circumference measured in the field
Description of measurement methods and procedures to be applied	DAP is calculated from chest height circumference (NAC) data of each monitored tree measured in the field
Frequency of monitoring/recording	Forest inventory data collected over periods of up to 10 years on multiple plots
Monitored Value	View documents: Field Measure Sheet
Monitoring equipment	Calculated from the circumference at breast height (CBH) of data measured in the field using tape measure.
QA/QC procedures to be applied	All individuals of live plants with DBH equal to or greater than 10 cm (or CBH - circumference at breast height - equal to or greater than 31 cm) were measured in each subplot of the chosen cluster, both individuals who had already been measured in 2014, and young individuals who reached the minimum desirable diameter. The exact point of the measurement was identified with ink, thus allowing them to be screened and audited. All individuals measured were platelet with information regarding cluster number, subplot number, individual number and, in the case of bifurcated trees, bifurcated tree number. Individuals who had already been measured previously continued with the same numbering and the new ones received sequential numbering taking into account the first inventory.
Purpose of the data	• Calculation of baseline emissions • Calculation of project emissions

	• Calculation of the leakage
Calculation method	DBH is calculated from circumference at breast height (CBH) data of each monitored tree measured in the field.
Comments	To assess the growth of the forest and its carbon sequestration capacity, the company Manoa carried out the remeasurement of some plots deployed in 2014. Parcels of clusters 10, 13,23,28,35 of the respective UPAs, 4, 4, 14, 22 and the last in the absolute reserve were remeasured. The same methodology was applied to measure the plots.

Data / Parameter	Deforestation planned for forest management infrastructure
Data unit	Hectare (ha)
Description	Forest cover areas converted into non-forest cover areas due to the construction of forest roads, trails and yards necessary for forest management
Source of data	Post-exploratory reports, remote sensing images, technical maps, and specific field charts to monitor the construction of forest management roads, trails, and forest yards
Description of measurement methods and procedures to be applied	The monitoring of forest cover areas was carried out through post-exploratory reports, road construction maps, trails and yards for forest management, and field checks. The Forest Cover Mark of Excellence Map was updated through the algebraic map. The reduction in carbon stock in the project area was reported during the verification processes.
Frequency of monitoring/recording	During the management year of each UPA (Annual Production Unit)
Monitored Value	
Monitoring equipment	Field sheets and geographic information system

	$APDPA_{icl}$, (ha)
2017	30
2018	28
2019	27
2020	45

QA/QC procedures to be applied	The mapping of deforestation areas planned for the implementation of Forest Management infrastructures will be carried out through high-resolution images and field checks
Purpose of the data	• Calculation of project emissions
Calculation method	For the identified planned deforestation areas, the Forest Cover Excellence Mark Map will be updated through the algebraic map.
Comments	-

Data / Parameter	ΔCABBS LLKT
Data unit	tCo_{2e}
Description	Changes in Total Carbon Stock in the Leakage Belt Area
Source of data	Calculated
Description of measurement methods and procedures to be applied	• Leakage prevention activities will be listed; • A map showing the areas of intervention and the type of intervention will be prepared; • Areas where leakage prevention activities impact carbon stock will be identified; • Existing non-forest classes within these areas in the case of the baseline will be identified; • Carbon stocks will be measured in the identified classes or conservative estimates from the literature will be used; • Changes in carbon stock in leakage management areas under the project scenario will be reported using Table 30b of VM0015; • Changes in the net carbon stock caused by prevention measures during a fixed period of the baseline and, optionally, in the project credit period will be calculated; Calculation results will be reported in Table 30.c of VM0015
Frequency of monitoring/recording	To be determined depending on activity
Monitored Value	

	ΔCabbsLLK (TCo_{2}-e)
2017	0
2018	0

	2019: 0 2020: 0
Monitoring equipment	Digital processing program remote sensing images, geographic information systems, and calculation tables
QA/QC procedures to be applied	Images with a special resolution of 30 meters or more were used in the mapping and the minimum mapping unit was 1 ha. The methodology for assessing data accuracy is described in Section 3.1.2. The minimum accuracy of the land use and land cover classification is 80%
Purpose of the data	• Calculation of the leakage
Calculation method	Evaluation of ex post estimates in the Leakage Belt in relation to the ex ante estimate of the project (Table 35 of VM0015).
Comments	-

Data / Parameter	Assessment of damage to forest management activity
Date unit	individual. ha^{-1}
Description	Evaluation of exploratory damage performed by sampling in the UPAs comparing the previous and subsequent situation of individuals present in the installed plots
Source of data	Post-exploratory reports
Description of measurement methods and procedures to be applied	After the end of the exploration, the plots were remeasured to assess the damage to the remaining trees with DBH greater than 10cm. In data collection, damage to the canopy and trunk are considered, encompassing three levels of classification: small, moderate, and severe. In the UPA 27, 01 and 10, damaged and killed individuals were analyzed in 15, 10 and 10 plots, respectively.
Frequency of monitoring/recording	Annual, after the end of the harvesting operations of each UPA
Monitored Value	UPA 27 - explored in 2017 - 11.33 ± 3.57 individuals damaged per hectare - 64.67 ± 20.53 individuals killed per hectare

	UPA 01 - explored in 2018 - 16.2 ± 6.69 individuals damaged per hectare - 59.9 ± 17.57 individuals killed per hectare UPA 10 - explored in 2019 - 7.50 ± 3.92 individuals damaged per hectare - 58.5 ± 18.6 individuals killed per hectare
Monitoring equipment	View documents: 2019-relatorio-monitoramento-AMF-UPA-27e01-2017-2018 2020-relatorio-monitoramento-AMF-UPA-10-2019 201804-relatorio-final-UPA-27-e-protocolo; 201904-relatorio-final-UPA-01; 201912-relatorio-final-UPA-10.
QA/QC procedures to be applied	On a quarterly basis, the exploration coordinator randomly traverses the areas that received damage monitoring to assess whether data collection was effective by taking appropriate action, if appropriate.
Purpose of the data	Assessment of the damage caused by the exploitation to the remaining trees.
Calculation method	Analysis of the trees inserted in the plots in a condition after the exploration, raising the damage to the crown and trunk.
Comments	The indicator was planned because it was reported in the m^3/ha unit, however, the form of registration was performed in individual/ha. The description of the deviation can be found in the 3.2

Data / Parameter	Frequency of surveillance and patrol operations
Data unit	Number of operations per year
Description	Record of the number of surveillance operations performed on the farm during the monitoring period
Source of data	Patrimonial Surveillance Reports

Description of measurement methods and procedures to be applied	The monitoring of surveillance actions took place through the analysis of the rounds that were recorded during the monitoring period.
Frequency of monitoring/recording	Monthly
Monitored Value	Although the actions occurred throughout the monitored period, their recording became effective as of June 2020, therefore, not all of them were recorded. This way, it was only possible to account for the rounds that were recorded. 2017: no records were made 2018: no records were made 2019: no records were made 2020: 1
Monitoring equipment	Does not apply
QA/QC procedures to be applied	The activity is carried out by Manoa farm employees adopting a strategy to have the "surprise effect". In case of detection of wood theft or invasion, employees are trained to immediately report the occurrence to the forest manager.
Purpose of the data	- Assessment of patrimonial surveillance actions
Calculation method	Does not apply
Comments	Asset surveillance actions have taken place since 1997, and continued throughout the project. More details about the activity can be found in the section 3.1.2 . However, the registration process for rounds held only began to be formalized as of 2020. Therefore, the monitoring failed to adequately represent the surveillance actions that occurred throughout the period verified. The description of the deviation can be found in the section 3.2

4.3 Monitoring Plan

4.3.1. Organizational structure, responsibilities, and competencies

The monitoring plan for the Manoa REDD+ Project is a combination of three components: climate, community and biodiversity.

Biofílica is responsible for coordinating monitoring processes during the project life cycle. In addition, he was also responsible for monitoring climate aspects, with the support of Grupo Triângulo.

The monitoring of community attributes was carried out mainly by Grupo Triângulo, and indicators related to Sustainable Forest Management were worked out by the company responsible for Management operations, called *Manoa Sustentável, Exploração e Serviços Florestais*. The monitoring of biodiversity,

in turn, was carried out by different actors. The monitoring of forest cover and attributes of high value for conservation were also carried out by *Manoa Sustentável, Exploração e Serviços Florestais*. The monitoring of avifauna and mastofauna was carried out by UNIR through the creation of a partnership with the o *Laboratório de Mastozoologia e Vertebrados Terrestres* [Laboratory of Mastozoology and Terrestrial Vertebrates] (LABMASTO). The results regarding biodiversity monitoring will be reported in the next CCB check.

Project Competencies and Responsibilities

Biofílica is a Brazilian company focused on the management and conservation of forest areas in the Amazon biome. It was created in 2008 with the aim of creating pioneering alternatives to make environmental conservation an economically interesting activity for forest owners, communities and investors. In line with these objectives, its mission is to reduce deforestation and carbon emissions in the atmosphere, conserve biodiversity and water resources, and promote social inclusion and development of communities living in the Amazon biome through the commercialization of credits for environmental services, encouragement and financing of scientific research activities and development of sustainable business chains.

Responsibilities: general coordination of socioeconomic and environmental diagnosis [*Diagnóstico Socioeconômico e Ambiental*] (DSEA) and carbon stock and baseline studies; development and financing of the PDD (Project Design Document); remote monitoring of forest cover and implementation/coordination of additional actions aiming to reduce/mitigate greenhouse gas (GHG) emissions; validation/verification and commercialization of credits; co-management of the Project for its entire duration.

Manoa Sustentável, Exploração e Serviços Florestais consists of one of the companies of the Triângulo Group. It began in 1983, when Triângulo Pisos e Painéis acquired 74,000 hectares of forests in Cujubim, Rondônia. In 1994, the company's Sustainable Forest Management Plan was approved, including innovative practices to reduce the environmental impact from sustainable forest management and, in 1997, began the company's forestry activities. The company is certified by the Forest Stewardship Council (FSC) and has already been recognized by FAO (UN) as a successful model for a sustainable forest management plan. The company's voluntary initiative to adopt sustainable practices has proven that it is possible to combine economic development with environmental and social sustainability, encouraging other companies to follow the same path.

Responsibilities: r Current owner of the land where the project is developed, representing the Triângulo Group, responsible for carrying out the low-impact forest management, for providing infrastructure and logistical support to Biofílica and other professionals involved in the project, responsible for social monitoring and for land security and patrimonial vigilance.

4.3.2. Internal audit performed

Biofílica Ambipar Environment Investments supports annual financial audit processes, ensuring that its resources are allocated responsibly and free from corruption. The financial statements and minutes of meetings related to the company are published on the website of JusBrasil, the largest open legal community in Latin America.

Manoa Farm has an ombudsman email address that is available to receive complaints, doubts and suggestions (ouvidoria@manoa.ind.br).

The Manoa REDD+ project does not undergo any type of internal audit, besides the one applied in the verification processes of the VCUs. The project proponents follow up on the development of the project through alignments and exchange of information regarding the activities carried out and apply the monitoring processes of the activities and indicators as described in the project design document.

Additionally, among the proponents, Biofílica Ambipar Environment Investments only performs annual financial audit processes, ensuring that its resources are allocated responsibly and free of corruption, and no other types of internal audits are performed. As for Manoa, FSC certification audits are performed annually for the forest management activities of the property. This audit is structured as follows:

1. Analysis of documents from the Organization responsible for forest management, in this case Manoa;

2. The sites that are visited in the on-site visit to the area are selected;

3. Team meetings are held, in person or by telephone, to analyze the data observed, review documentation (forest management procedures, policies, management plan, etc.), and define the next day's activities;

4. After a team meeting to consolidate the main findings of the evaluation, a summary of the positive and negative points observed are presented to the company's management and included in the evaluation report;

5. Interviews are conducted with forest workers and other affected/interested parties to verify the working conditions within the Organization responsible for forest management, in this case Manoa.

The entire process is described in a report that includes a description of the audit process, the evidence collected, and the audit conclusions. The reports issued for the maintenance of Fazenda Manoa's FSC certification were made available to VVB.

4.3.3. Monitoring Plan for Climate Impact

The Monitoring Plan for Climate Impact contains the essential aspects for demonstrating the reduction of emissions from deforestation and degradation due to avoided unplanned deforestation (according to the applied methodology VM0015). Thus, it allows you to monitor changes in carbon stock over the lifetime of the project due to changes in land use within the project area and in the casting belt.

In relation to the project's activities, actions related to monitoring deforestation through satellite images and generation of annual bulletins, asset surveillance and low-impact forest management are the main actions contemplated for the "climate" component. The first two are essential for maintaining and increasing carbon stocks by reducing emissions from deforestation and forest degradation. Low-impact forest management, on the other hand, aims to ensure that there is a source of revenue from forest exploration with sustainable practices, thus contributing to reducing impacts and maintaining forest cover and attributes of high value for conservation.

The Project's Monitoring Plan for Climate Impact covers two tasks: 1) Monitoring changes in carbon stock and GHG emissions for periodic checks; and 2) Revisiting baseline projections related to future fixed baseline periods. During this monitoring period, only Task 1 was performed.

TASK 1: MONITORING CARBON STOCK CHANGES AND GHG EMISSIONS FOR PERIODIC CHECKS

1. Monitoring current changes in carbon stocks and GHG emissions in the Project Area

a) Technical description of monitoring tasks

The monitoring of carbon stock changes and GHG emissions was carried out through the analysis of unplanned, avoided and planned deforestation.

Biofílica operates in the management of monitoring actions for REDD+ activities, which aim to avoid unplanned deforestation, and thus performs the verification of forest cover areas by satellite images. The field check of deforestation polygons, if detected by analysis of satellite images, would be carried out by the *Manoa Sustentável, Exploração e Serviços Florestais* asset surveillance team.

b) Data to Collect

Table 5. Data collected to monitor changes in carbon stock and GHG emissions for periodic checks in the Project Area.

Parameter	Description	Unit	Fountain	turnout
$Cott_{icl}$	Average carbon stock for all carbon reservoirs in the *icl*forest class	Ton of carbon dioxide	Calculated by allometric equations and field measured data	Collected in periods of up to 10 years

		equivalent ($TCo_2e.ha^{-1}$)		
$APDPA_{iclt,}$	Areas of planned deforestation in forest class icl in year t in the Project Area	Hectare (ha)	Calculated through remote sensing images, technical maps and data, field and post-exploratory management information	Yearly
$\Delta CpLdPa_t$	Total decrease in carbon stocks due to planned harvesting activities in year t in the Project Area	ton of carbon dioxide equivalent (tCo_2-e)	Calculated	Yearly
$CAP_{iclt,}$	Annual area within the Project Area affected by catastrophic events in the icl class in year t	Hectare (ha)	Calculated through remote sensing images	Each time a catastrophic event occurs
$\Delta CUCDPA_t$	Total decrease in carbon stock due to catastrophic events in year *t* in the Project area	ton of carbon dioxide equivalent (tCo_2-e)	Calculated	Each time a catastrophic event occurs
$AUFPA_{iclt,}$	Areas affected by forest fires in the *icl* forest class where carbon stock recovery occurs in year *t*	Hectare (ha)	Calculated through remote sensing images	Each time a forest fire event occurs
$\Delta CUFdPA_t$	Total decrease in carbon stock due to unplanned forest fires in year *t* in the Project area	ton of carbon dioxide equivalent (tCo_2-e)	Calculated	Each time a forest fire event occurs
$\Delta CUDdPA_t$	Total current change in carbon stock due to unavoided planned	ton of carbon dioxide	Calculated	Yearly

	deforestation in year *t* in the Project area	equivalent (tCo_{2}-e)		
$\Delta CPSPA_t$	Total change in inventory in the Project area in year *t*	ton of carbon dioxide equivalent (tCo_{2}-e)	Calculated	Yearly

c) Brief description of data collection procedures

Monitoring land use and cover changes

The monitoring of unplanned deforestation in the Project Area was based on data processed by the PRODES project, identifying land use conversion areas. The procedures performed for data collection and processing were described in the Section 3.1.2 of this document.

The monitoring of planned deforestation caused by forest management activities used information contained in maps and shapefiles of road and extension planning, post-exploratory monitoring reports of managed areas, as well as yard planning information (quantity and average size) installed by UPA, of their respective monitored years.

Monitoring Carbon Stocks and Non-CO2 Emission

The monitoring of changes (reductions) in carbon stock is carried out through forest inventory, measurement of diameter at chest height (DAP = 130 cm), for each tree with DAP greater than or equal to 15 centimeters within the forest inventory plots. DAP is the main variable used to estimate carbon stock and changes in carbon stock in the REDD+ Manoa project.

Monitoring of non-CO2 emissions from forest fire is carried out through satellite imagery mapping, identifying the affected area, and calculations described in VM0015 (Section 6.2 — Baseline Non-CO2 emissions from forest fires).

d) Quality control and quality assurance procedures

Monitoring Change in Land Use and Cover

In order to validate the information obtained from the PRODES mapping, the mapped information on the occurrence of deforestation was checked through high-resolution images of the Sentinel-2

satellite, with 10m of spatial resolution, and data collected in the field with a GPS navigation when necessary. The minimum accuracy in land use and cover classification is 80%. SAR sensor images, such as RADRSAT-2, Cosmo SkyMed or Terrasar-X, are used for cloud-covered areas.

The original (raster) and processed (vector) digital data from satellite images, coordinates, technical maps, photos and field sheets are stored by Biophílica throughout the project. Maps with installed infrastructure, satellite images, and deforestation reports are made available to the verification body at each verification event.

Monitoring carbon stocks and non-CO2 emissions

The procedure for controlling and guaranteeing the quality of forest management is conducted by *Manoa Sustentável, Exploração e Serviços Florestais* in the pre-harvest inventory phases, during and after harvest. The original field reports and records are accessed by Biofílica, which seeks to maintain a copy of these documents throughout the project life cycle. Inventory and monitoring spreadsheets and reports of permanent parcels are made available to the verification body at each verification event.

e) Data Archiving

Biofílica keeps all data and reports from Manoa REDD+ Project stored in digital files for the entire duration of the Project. The original reports and field records collected produced by the forest management activity are stored by *Manoa Sustentável, Exploração e Serviços Florestais*. Throughout the project, Biofílica maintains a copy of these documents in digital format.

All documents related to the monitoring of the Manoa REDD+ Project are compiled into paper and/or digital files and made available to verifiers at each verification event.

1.1. Project Implementation Monitoring

The main actions contemplated for the “climate” component of the Manoa REDD+ Project are actions to monitor deforestation through satellite images and generation of annual bulletins, asset surveillance and low-impact forest management. The first two are essential for maintaining and increasing carbon stocks by reducing emissions from deforestation and forest degradation. Low-impact forest management, on the other hand, aims to ensure that there is a source of revenue from forest exploration with sustainable practices, thus contributing to reducing impacts and maintaining forest cover and attributes of high value for conservation.

The implementation of project activities is monitored through physical-financial schedules, performance and quality monitoring reports, such as post-exploratory reports from each UPA and

monitoring reports of the forest management area, forest cover maps, meeting reports, surveillance rounds reports, as well as other possible relevant documents.

1.2.Monitoring land use and land cover changes within the Project Area

The monitoring of unplanned deforestation was developed by mapping the forest cover of the Project area through the data provided annually by PRODES. Subsequently, the mapping was validated based on the evaluation of accuracy with good visualization images and low cloud coverage of the Sentinel-2 satellite and, when necessary, with support of LandSat-8 images. Once the monitoring of the areas is completed, the annual deforestation report is produced by Biofílica with the objective of assisting *Manoa Sustentável, Exploração e Serviços Florestais* in its field actions with the inspection of the identified areas. Regarding the monitoring of planned deforestation caused by forest management activities, this was carried out through maps and shapefiles, pre-exploratory documents for planning roads and extensions, post-exploratory monitoring reports of the areas managed for the respective years monitored.

The monitoring of land use and land cover changes within the Project Area was also supported by two other important activities: patrimonial surveillance and low-impact forest management.

Asset surveillance is directly linked to actions to monitor unplanned deforestation, as it aims to maintain the integrity of the Project Area by removing potential deforestation agents. The activity is carried out by employees of the Manoa farm adopting a strategy to have the “surprise effect”, that is, there is no frequency and schedule of defined rounds going through the farm so that the invaders do not identify a pattern in the inspection action. In case of detection of wood theft or invasion, employees are trained to immediately report the occurrence to the forest manager, who will call on SEDAM and IBAMA to take legal action.

Surveillance rounds started to be registered starting in 2020 through standardized forms. These forms record all possible information about the attackers (name, place of entry, coordinates of the theft or invasion point, equipment or machinery used, access route, among other information. The indicator that is directly related to this activity corresponds to the indicator “Frequency of surveillance and patrol operations”, presented in the section 4.2, and with more information presented in the section 3.2. Linked to the activity, at Manoa farm there are two strategic points that consist of Casa Rio Preto and Casa Curica, where there is inspection by farm employees who live in these places.

In addition to the patrimonial surveillance actions, *Manoa Sustentável, Exploração e Serviços Florestais* records all persons entering the farm's property in a book present at the main entrance, collecting information about the person's name, time and date of entry and departure, from in order to have control over all visitors. Until the period of 2020, the company's policy and culture did not imply the storage of these records. However, as of 2021, the importance of storing these documents was understood given the need to check these records in a future year.

The low-impact forest management activity is carried out by *Manoa Sustentável, Exploração e Serviços Florestais* following rigorously monitored standards, laws and operating procedures, in order to

cause the least possible impact during logging activities to social and environmental welfare. To monitor the activity and related indicators “Planned Deforestation for Forest Management Infrastructure” and “Harvest Damage Assessment”, presented in the section 4.2, the annual operational plans of each UPA explored during the period verified were analyzed, the post-exploratory reports and forest management area monitoring reports, maps and satellite images containing information about forest cover areas converted to non-forest class.

1.3.Monitoring changes in carbon stock

Within the Project Area

It is expected that the ex ante estimate of carbon stock by forest class will not change during the baseline period. However, the VCS VM0015 Methodology requires the monitoring of carbon stock in the project area subject to significant loss of carbon stock in the scenario with the project according to the ex ante assessment due to controlled deforestation and planned management activities, or areas subject to non-reduction planned and significant in the carbon stock in the baseline scenario.

The total change in carbon stock due to unplanned unavoided deforestation within the project area is calculated as follows:

$$\Delta \mathrm{CUDdPA}_t = \sum_{y=1}^{t} \left(\sum_{icl=1}^{icl} AUDPA_{icl,y} * \Delta Ctot_{icl,t-y} - \sum_{fcl=1}^{fcl} AUDPA_{fcl,y} * \Delta Ctot_{fcl,t-y} \right) \quad (1)$$

Where:

ΔCUDdPAt: Total carbon stock changes due to unavoidable unplanned deforestation in the Project Area in year t.

AUDPAicly,: Unplanned deforested area in the initial forest class *icl* in year *t* within the Project Area in the Project scenario.

ΔCtoticl,Ac: Loss of carbon stock in the initial forest class *icl* at the age of change Ac (number of years after the change of use and soil cover)

AUDPAfcl, y: Post deforestation non-forest class area fcl in year t in the Project Area after unplanned deforestation in the Project scenario.

ΔCtotfcl, Ac: Gain in carbon stock in the final post deforestation non-forest class fcl at the age of change Ac (number of years after change of use and soil cover).

If there is a significant reduction in carbon stock due to sustainable forest management activities, this reduction will be reported in the verification processes through table 29 of the VCS VM0015 Methodology version 1.1.

Within the Leakage Management Areas

In the Project scenario, no area is subject to the planned reduction of carbon stock within the Leakage Management Areas.

Ex-post estimate of non-CO2 emissions due to forest fires

Emissions due to biomass burning are not counted in this project. According to the VM0015 Methodology, non-CO2 emissions can be omitted conservatively, since, as demonstrated by scientific research, the occurrence of natural fires in the Amazon region is rare, with a predominance of anthropogenic fires related to human occupation (SCHROEDER et al, 2009). Furthermore, in addition to the project not including or stimulate activities associated with fire, it promotes actions to mitigate deforestation caused by these agents, both by strengthening patrimonial surveillance and by monitoring the farm areas. Another mitigation measure is based on fire brigade training with forest management employees. Thus, it is conservative to exclude these emissions from monitoring.

Monitoring impacts of natural disturbances and other catastrophic events

Losses in carbon stock and increase in GHG emissions due to natural disturbances or catastrophic events, if any, would be controlled through monitoring of forest cover by satellite using the same methods applied for monitoring forest cover in the Project Area.

The main activities to be developed for data collection and processing are:

- Selection of optical satellite images with lower cloud coverage, taken in seasons close to the Amazon dry season and with adequate radiometric quality;

- Georeferencing of satellite images with topographic graphics on a scale of 1:100 ,000 or NASA images in MrSID in orthorectified format;

- Mapping affected forest cover areas.

During this monitoring period, no significant reduction in carbon stock was identified due to natural disturbances or catastrophic events. If there were, emissions derived from natural disturbances or catastrophic events would be estimated by multiplying the forest loss area mapped by the average forest carbon stock.

2. Leakage Monitoring

a) Technical description of monitoring tasks

The Manoa REDD+ Project involves two leakage source monitoring activities:

i. Monitoring the reduction in carbon stocks and/or the increase in GHG emissions associated with leakage prevention measures if project proponents implement activities such as tree planting, agricultural intensification, fertilization, forage production and/or other improvement measures in areas agricultural and cattle breeding.

When these activities cause a reduction in carbon stocks and/or an increase in GHG emissions in Leakage Management Areas, these changes in carbon stock and/or GHG emissions are estimated by Biofílica.

During the monitored period, the project proponents did not carry out any of the mentioned interventions. Therefore, changes in carbon stock and GHG emissions associated with leakage prevention activities were not accounted for during this monitoring period.

ii. Monitoring of forest cover in the Leakage Belt through PRODES data and satellite images, carried out by Biofílica.

Biofílica monitored the forest cover in the Leakage Belt through PRODES data and satellite images to account for the reduction of carbon stock and the increase in GHG emissions due to the displacement of leakages.

b) Data to Collect

Table 6. Data collected for the monitoring of the REDD+ Manoa Project leakages

Data/Parameter	Description	Unit	Fountain	turnout
$\Delta CLPMLK_t$	Decrease in carbon stock due to leakage prevention measures	ton of carbon dioxide equivalent (tCO2-e)	Calculated	Yearly
EgLKt	Emissions from grazing animals in the management area in year t	ton of carbon dioxide equivalent (tCO2-e)	Calculated	Yearly
$ELPMLK_t$	Total annual increase in GHG emissions due to leakage prevention measures in year t	ton of carbon dioxide equivalent (tCO2-e)	Calculated	Yearly
$\Delta CabBSLLK_t$	Total carbon stock change in the leakage belt area	ton of carbon dioxide equivalent (tCO2-e)	Calculated	Yearly

c) Brief description of data collection procedures

Monitoring changes in carbon stock and GHG emissions associated with leakage prevention activities

There was no reduction in carbon stock due to activities developed in the Leakage Management Areas, since no activity to improve cultivation or pasture management that could change carbon stocks and increase GHG emissions, in relation to the baseline scenario, were implemented or stimulated during the monitored period.

However, if it was decided that these activities were necessary, ex-ante changes in carbon stock and associated GHG emissions would be estimated through step 8 of the VM0015 methodology. Sequentially, if significant, emissions would be monitored and data provided to the verification body in each verification event through tables 30b, 30c, 31, 32 and 33 of the VM0015 methodology, version 1.1.

If leakage prevention activities were implemented in the Leakage Management Area, some key activities would be performed to collect and process data to monitor changes in carbon stock:

- List of leakage prevention activities;
- Preparation of a map showing the areas and type of intervention;
- Identification of areas where leakage prevention activities impact carbon stock;
- Identification of existing non-forest classes within those areas in the case of baseline;
- Measurement of carbon stocks for identified classes or use estimates from conservative literature;
- Report of changes in carbon stock in leakage management areas under the project scenario using VM0015 table 30b;
- Calculation of changes in net carbon stock that leakage prevention measures cause during the fixed baseline period and project accreditation period;
- Report of the calculation results in table 30.c of VM0015.

To monitor the emissions of Methane (CH4) and nitrous oxide (N2O) from cattle, the following main activities would be carried out:

- Specification of annual pasture areas within the Leakage Management Area;
- Brief description of animal types, forage and manure management, and reporting of the key parameters required to calculate GHG emissions through Table 31 of VM0015;
- Determination of the number of animals in the base case and under the project scenario based on total pasture and forage areas. Consideration of the difference for calculating GHG emissions;

- Use of the methods described in Appendix 4 to VM0015 to estimate emissions from enteric fermentation and manure management. Final calculation using Equation 18 of VM0015 and, if significant, use of Table 32 of VM0015 to report the results.

Monitoring the reduction of carbon stock and increase in GHG emissions due to leakage displacement

Activity data for the Leakage Belt area were determined using the same methods applied to monitoring deforestation in the Project Area (item 1.2). If during the monitoring process a deforestation event higher than expected for the baseline scenario is identified in the leakage belt and such deforestation is attributed to Project Area deforestation agents, losses in carbon stock will be accounted for and reported using Tables 22c and 21d of the approved methodology VM0015, version 1.1.

d) Quality control and quality assuarance Procedures

Monitoring changes in carbon stock and GHG emissions associated with leakage prevention activities

It would be determined according to the activity if implemented, however no leakage prevention activity was implemented during this monitoring period.

Monitoring the reduction of carbon stock and increase in GHG emissions due to leakage displacement

The control and quality assurance procedures were the same applied to the monitoring of deforestation in the Project Area (item 1).

e) Data Archiving

Original reports and field records are stored by *Manoa Sustentável, Exploração e Serviços Florestais*. Biofílica maintains a copy of these documents in digital format throughout the lifetime of the project. The original (raster) and processed (vector) digital data from satellite images, coordinates, technical maps, field photos, and tokens are stored by the Biofílica for the lifetime of the project. Annual map of deforestation areas, satellite images and reports are made available to the verification body at each verification event.

2.1.Monitoring changes in carbon stock and GHG emissions associated with leakage prevention activities

There was no reduction in the carbon stock associated with activities developed in the Leakage Management Areas, since no activity to improve agricultural techniques, or the management of pasture areas, which could alter carbon stocks and increase GHG emissions compared to the scenario of baseline, were implemented during this monitoring period.

However, if it was decided that these activities were necessary, the ex-ante changes in carbon stock and GHG emissions associated with these activities would be estimated through Step 8 of the VM0015 methodology. Being significant, associated activities and emissions will be monitored and data will be made available to verifiers through tables 30b, 30c, 31, 32 and 33 of VM0015, version 1.1.

The following activities that could lead to a reduction in carbon stock or increase in GHG emissions in Leakage Management Areas are:

- Changes in carbon stock due to activities implemented in the Leakage Management Areas;

- Methane (CH4) and nitrous oxide (N2O) emissions derived from the intensification of the herd (involving changes in animal diet and/or number of animals).

Nitrous oxide (N2O) emissions from nitrogen fertilization are always considered insignificant, according to the latest version of the VCS standard — VM0015. Fossil fuel consumption is always considered negligible in the AUD of the project activities and should not be considered.

2.2 Monitoring the reduction of carbon stock and increase in GHG emissions due to leakage displacement

Activity data for the Leakage Belt area were determined by the same methods applied to monitoring deforestation in the Project Area (item 1).

No higher-than-expected deforestation events for the baseline scenario were identified within the Leakage Belt. However, if during the monitoring process a greater than expected deforestation event in the baseline scenario is identified in the Leakage Belt, and such deforestation is attributed to deforestation agents in the project area, losses in carbon stock are accounted for and reported using Use Tables 22c and 21c of the Approved Methodology VM0015. This situation was not identified in the Leakage Belt during the monitored period.

The total change in carbon stock due to unplanned and unavoided deforestation within the Leakage Belt area was calculated as follows:

$$\Delta CBSLLK_t = \sum_{y=1}^{t}\left(\sum_{icl=1}^{icl} AUDLK_{icl,y} * \Delta Ctot_{icl,t-y} - \sum_{fcl=1}^{fcl} AUDLK_{fcl,y} * \Delta Ctot_{fcl,t-y}\right) \quad (2)$$

Where:

ΔCBSLLKt Total change in carbon stock due to unplanned and unavoided deforestation within the Leakage Belt area in year t.

AUDLKicl,y Unplanned deforestation area in the icl forest class in year t within the Leakage Belt area in the scenario with the project.

ΔCtoticl, Ac Loss in carbon stock in the initial forest class icl at the time of change Ac (number of years after the change in land use and cover (LU/LC)).

AUDLKfcl,y Non-forest class area fcl at time t within the Unplanned Post-Deforestation Leakage Management Belt area in the project scenario.

ΔCtotfcl,Ac Gain in carbon stock in the final non-forest class fcl post-deforestation in the period of change Ac (number of years after the change in land use and cover (LU/LC)).

2.2.Estimated total leakage ex post

The results were presented to the verification body through Table 35 of the VM0015 Methodology, version 1.1.

3. Net ex-post GHG reductions

a) Technical description of monitoring tasks

In the verification processes, the results were presented using Table 36 of the approved methodology VM0015 version 1.1, together with spatial data (deforestation maps).

b) Collected data

Table 7. Data collected for monitoring ex-post GHG net reductions for the REDD+ Manoa Project.

Parameter	Description	Unit	Fountain	turnout
$\Delta REDD_{,t}$	Net anthropogenic greenhouse gas emission reduction attributable to the AUD project activity at year t	ton of carbon dioxide equivalent (tCo_2-e)	Calculated	Yearly
$VCU_{,t}$	Number of Verified Carbon Units (VCUs) to be made available for trade in year *t*	ton of carbon dioxide equivalent (tCo_2-e)	Calculated	Yearly

c) Brief description of data collection procedures

The calculation of the amount of Verified Carbon Units (VCUs) that were produced by the activities of the Manoa REDD+ Project in the years 2017, 2018 and 2019 was made using equations 19 and 20 of the VM0015 Methodology version 1.1.

d) Quality Control and Quality assurance Procedures

All tasks and tools indicated in Part 2 of the Approved Methodology VM0015 have been used to ensure that the data is adequate for the verification process and the number of Carbon Verified Units is reliable.

e) Data Archiving

All data and reports from Manoa REDD+ Project are stored by Biofílica in digital files throughout the project. All documents relating to project monitoring are compiled and made available to the verification body at each verification event.

5 QUANTIFICATION OF GHG EMISSION REDUCTIONS AND REMOVALS

5.1 Baseline Emissions

The estimation of unplanned deforestation in the project area in the without-project scenario was implemented by applying the following steps:

- Analysis of historical land use and land cover change between 2000 and 2012 in the Reference Region of the Manoa REDD+ Project area;

- Analysis of agents, drivers and underlying causes of deforestation and its future development for the Manoa REDD+ Project Reference Region;

- Annual baseline estimation of the areas of unplanned deforestation in the Reference Region (RR), Project Area (PA) and the Leakage Belt (LB).

The entire detailed process is described in the Manoa REDD+ Project Design Document. To determine the reduced emissions, the stock estimated in the primary forest inventory, conducted in the year 2015 and previously described in the project design document, was multiplied by 3.6667 (44/12), because 1 kg of C equals 3.66667 kg of CO2 (mass of CO2 = 44 and the mass of C = 12; 44/12 = 3.66667).

Thus, the carbon estimate calculated for the above and below ground stocks considering the means of the calculated values for managed forest and primary forest was 119.01 tC/ha (± 9.95 tC/ha) for the above-ground reservoir and 20.89 tC/ha (± 1.79 tC/ha) for the reservoir below ground. Further information can be obtained in the document Final Carbon Stock Report (*Florestal-Planejamento, Paisagismo e Consultoria Ltda* [Forest-Planning, Landscaping and Consulting Ltda], 2015).

The Table 8 presents the average carbon values per hectare for each initial class of land use and cover considered for the baseline scenario present in the project area and leakage belt.

Table 8. Carbon stocks per hectare for the initial class icl existing in the Project Area and in the Leakage Belt

Initial forest class (*icl*)			$Ctot_{icl}$
Name:	Forest		
$_{icl}$ID	1		
Average carbon stock per hectare + 90% CI			

Cab_{icl}		Cbb_{icl}		Cdw_{icl}			
C stock	± 95% CI	C stock	± 95% CI	C stock	± 95% CI	C stock	± 95% CI
tCO2e ha-1	tCO2e ha-1	tCO2e ha-1	tCO2e ha-1	tCO2e ha-1	tCO2e ha-1	tCO2e ha-1	tCO2e ha-1
436.4	10.0	76.6	1.8	-	-	513.0	11.7

Cabicl = Average equivalent carbon stock per hectare for the above-ground biomass reservoir for the initial forest class (tCO2e/ha);

Cbbicl = Average equivalent carbon stock per hectare for the biomass reservoir below-ground for the initial forest class (tCO2e/ha);

Cdwicl = Average equivalent carbon stock per hectare for the dead biomass reservoir for the initial forest class (tCO2e/ha);

Ctoticl = Average equivalent carbon stock per hectare for the total biomass reservoir for the initial forest class (tCO2e/ha).

To calculate the baseline, the number of hectares of each forest class that could be deforested in the absence of the project were extracted from the land use and cover maps. The results of the baseline projections show a deforestation, between 2017 and 2019, of 1,884 hectares in the Project Area (Table 9) and 173 hectares in the Leakage Belt (Table 10).

Table 9. Annual baseline unplanned deforestation areas in the Project Area for the 2017-2019 monitored period

Area established after Zone deforestation within the Project Area		Total Baseline Deforestation in the Project Area	
IDZ>	1		
Name>	Zone 1	$ABALPA_t$	ABALPA
Project Year *t*	ha	ha	ha
2017	674	674	674
2018	497	497	1,171
2019	713	713	1,884
2020	634	634	2,518

Table 10. Annual Unplanned Deforestation Areas of Baseline in the Leakage Belt for the 2017-2019 Monitored Period

Area established after Zone deforestation per zone within the Leakage Belt		Total Baseline Deforestation in the Leakage Belt	
IDZ>	1		
Name>	Zone 1	*ABSLLK and*	ABSLOK
Project Year *t*	ha	ha	ha
2017	28	28	28
2018	47	47	75
2019	98	98	173
2020	88	88	261

To calculate the changes in the carbon stock in the baseline in the Project Area and in the Leakage Belt for year t, method 1 of VM0015, version 1.1, was used through equation 10 - contained on page 72 of this VM0015, presented below:

$$\Delta CBSLPA_t = \sum_{p=1}^{P}\left(\sum_{icl=1}^{Icl} ABSLPA_{icl,t} * \Delta Cp_{icl,t=t*} - \sum_{z=1}^{Z} ABSLPA_{z,t} * \Delta Cp_{z,t=t*} + \sum_{icl=1}^{Icl} ABSLPA_{icl,t-1} * \Delta Cp_{icl,t=t*+1} - \sum_{z=1}^{Z} ABSLPA_{z,t-1} * \Delta Cp_{z,t=t*+1} + \sum_{icl=1}^{Icl} ABSLPA_{icl,t-2} * \Delta Cp_{icl,t=t*+2} - \sum_{z=1}^{Z} ABSLPA_{z,t-2} * \Delta Cp_{z,t=t*+2} + \cdots + \sum_{icl=1}^{Icl} ABSLPA_{icl,t-19} * \Delta Cp_{icl,t=t*+19} - \sum_{z=1}^{Z} ABSLPA_{z,t-19} * \Delta Cp_{z,t=t*+19}\right) \quad (3)$$

ΔCBSLPAt Total baseline carbon stock change within the project area at year t; tCO2-e

ABSLPAicl,t Area of initial forest class icl deforested at time t within the project area in the baseline case; ha

ABSLPAicl,t-1 Area of initial forest class icl deforested at time t-1 within the project area in the baseline case; ha

ABSLPAicl,t=t-19 Area of initial forest class icl deforested at time t-19 within the project area in the baseline case; ha

ΔCpicl,t=t* Average carbon stock change factor for carbon pool p in the initial forest class icl applicable at time t (as per Table 20.a); tCO2-e ha-1

ΔCpicl,t=t*+1 Average carbon stock change factor for carbon pool p in the initial forest class icl applicable at time t=t*+1 (= 2nd year after deforestation, as per Table 20.a); tCO2-e ha-1

ΔCpicl,t=t*+19 Average carbon stock change factor for carbon pool p in the initial forest class icl applicable at time t=t*+19 (20th year after deforestation, (as per Table 20.a); tCO2-e ha-1

ABSLPAz,t Area of the zone z "deforested" at time t within the project area in the baseline case; ha

ABSLPAz,t-1 Area of the zone z "deforested" at time t-1 within the project area in the baseline case; ha

ABSLPAz,t-19 Area of the zone z "deforested" at time t -19 within the project area in the baseline case; ha

ΔCpz,t=t* Average carbon stock change factor for carbon pool p in zone z applicable at time t = t* (as per Table 20.b); tCO2-e ha-1

ΔCpz,t=t*+1 Average carbon stock change factor for carbon pool p in zone z applicable at time t = t*+1 ((= 2nd year after deforestation, as per Table 20.b); tCO2-e ha-1

ΔCpz,t=t*+19 Average carbon stock change factor for carbon pool p in zone z applicable at time t = t*+19 ((= 20th year after deforestation, as per Table 20.b); tCO2-e ha-1

The total emissions in the Project Area baseline scenario for the years 2017, 2018, 2019 and 2020 were 296,657.1 tCO2e; 220,014.8 tCO2e; 315,124.6 tCO2e and 281,411 tCO2e, respectively, as presented in Table 11. The total emissions in the Leakage Belt baseline scenario for the years 2017, 2018, 2019 and 2020 were 12,480.6 tCO2e; 20,828.0 tCO2e; 43,200.2 tCO2e and 38,942 tCO2e, respectively, as presented in Table 12.

Table 11. Total changes in the carbon stock of the Project Area baseline scenario (table 21.b. VM0015)

Changes in carbon stock by initial forest class (icl)		Total change in the carbon stock of the initial forest class of the Project Area		Changes in post-deforestation carbon stock by z-zone		Total changes in post-deforestation carbon stock by zone in the Project Area		Total changes in carbon stock in the Project Area	
$_{icl}$ID >	1	$\Delta CBSPLA_{icl,t,}$	$\Delta CBSPA_{icl}$	ID_{says}>	1	$\Delta CBSPA_{z,\ t}$	$\Delta CBELPA_{z}$	$\Delta CBSLPA_{t}$	$\Delta CBSLPA$
Name>	Forest	annual	cumulative	Name>	Zone 1	annual	cumulative	annual	cumulative
Project Year *t*	tCO_2e	tCO_2e	tCO_2e	Project Year *t*	tCO_2e	tCO_2e	tCO_2e	tCO_2e	tCO_2e
2017	310,382.5	310,382.5	310,382.5	2017	13,725.4	13,725.4	13,725.4	29,6657.1	296,657.1
2018	236,951.9	236,951.9	547,334.4	2018	16,937.1	16,937.1	30,662.5	22,0014.8	516,671.9
2019	336,669.1	336,669.1	884,003.5	2019	21,544.5	21,544.5	52,207.0	315,124.6	831,796.5
2020	307,052	307,052	1,191,056	2020	25,641	25,641	77,848	281,411	1,113,207

Table 12. Total changes in the carbon stock of the Leakage Belt baseline scenario (Table 21.c. VM0015)

Changes in carbon stock by initial forest class (icl)		Full change in carbon stock of the initial forest class of the Leakage Belt		Changes in post-deforestation carbon stock by zone z		Total post-deforestation carbon stock changes by zone in the Leakage Belt		Total Carbon Stock Changes in the Leakage Belt	
$_{icl}$ID >	1	$\Delta CBSLK_{iclt,\ t}$	$\Delta CBSLK_{icl}$	ID_{says}>	1	$\Delta CBSLK_{z,\ t}$	$\Delta CBSLK_{z}$	$\Delta CBSLK_{t}$	$\Delta CBSLK$
Name>	Forest	annual	cumulative	Name>	Zone 1	annual	cumulative	annual	cumulative
Project Year *t*	tCO_2e	tCO_2e	tCO_2e	Project Year *t*	tCO_2e	tCO_2e	tCO_2e	tCO_2e	tCO_2e
2017	13,895.8	13,895.8	13,895.8	2017	1,415.2	1415.2	1415.2	12,480.6	12,480.6
2018	22,546.9	22,546.9	36,442.7	2018	1,718.9	1718.9	3134.1	20,828.0	33,308.6
2019	45,552.4	45,552.4	81,995.1	2019	2,352.2	2352.2	5486.3	43,200.2	76,508.8
2020	41,863	41,863	123,858	2020	2,921	2,921	8,407	38,942	115,451

After this analysis, the ex-post evaluation of the monitored period (2017 - 2020) was conducted, and the results of the monitoring period are presented in the tables on the following pages.

5.2 Project Emissions

5.2.1 Emissions due to planned deforestation

Emissions associated with planned deforestation occurred in the Project Area from 2014 to 2018. Total emissions related to planned deforestation were 215,200 tCO2e. This value was estimated based on the former Forest Management Plan in place in the area during the validation period.

Table 13 shows the decrease in carbon stock due to planned deforestation in the Project Area. These values were obtained by multiplying the average of the areas of infrastructure annually opened for roads, tracks, and storage yards (necessary for the management of each Annual Production Unit (APU)), by the average variation in carbon stock, as shown in the equation below:

$$\Delta CPDdPA_t = (APDPA_{icl,t} \times Ctot_{icl,t}) \quad (4)$$

Where:

ΔCPDdPAt: Total decrease in carbon stock due to planned deforestation at year t in the project area;

APDPAicl,t: Areas of planned deforestation in forest class icl at year t in the project area;

Ctoticl,t: Average carbon stock of all accounted carbon pools in forest class icl at time t.

Table 13. Carbon stock decrease due to planned deforestation in the Project Area (Table 25.a. VM0015).

Project Year *t*	Areas of planned deforestation x	

	Carbon stock change (decrease) in the project area		Total carbon stock decrease due to planned deforestation	
	IDcl =	1	annual	cummulative
	APDPAicl,t	Ctoticl,t	ΔCPDdPAt	ΔCPDdPA
	ha	tCO2e ha-1	tCO2e	tCO2e
2017	30	513	15,454	15,454
2018	28	513	14,361	29,815
2019	27	513	14,086	43,901
2020	45	513	23,213	67,114

5.2.2 Emissions due to planned logging activities

As established in the project PDD, a significance analysis was performed based on the tool "Tool for testing significance of GHG emissions in A/R CDM project activities" in order to assess the impact of emissions from logging activity on project emissions.

For the calculation we used data provided by the Manoa farm regarding the annual intensity of forest exploitation in the monitored period and the amount of carbon extracted, the average annual volume of carbon extracted calculated for the Manoa farm forest management was 130,874.54 tCO2e. The potential for carbon increment in the managed forest was also considered, and according to West et al. (2013), an area managed in the reduced impact system regenerates about 2.8 tons of above-ground Biomass per hectare per year (4.98 tCO2e/ha.year), the average value found was 123,240.54 tCO2e. Thus, the total calculated balance of carbon stock changes due to logging activity was 30,535.99 tCO2e.

For the significance evaluation, the relationship between the balance of changes in carbon stock due to logging and the total ex-post emissions calculated for the project was applied. The results showed a relative contribution (RC%) of 3% in relation to the logging activity, being below the 5% threshold of significance required by the methodology, and therefore can be disregarded from the scope of emissions of the project. As such, emissions associated with planned logging activities in the Project Area from 2019 to 2020 were not accounted for. All calculations related to the significance testing were shared with the audit team.

Additionally, the timber harvest from Sustainable Forest Management was targeted to obtain long-lived timber products and based on the fact that VM0015 considers it conservative to disregard these products from calculations, all harvest activities have been excluded.

Table 14. Carbon stock decrease due to planned logging activities in the project area (Table 25.b. VM0015).

Project Year t	Areas of planned logging activities x Carbon stock change (decrease) in the project area		Total carbon stock decrease due to planned logging activities	
	IDcl =	1	annual	cummulative
	APLPAicl,t	Ctoticl,t	ΔCPLdPAt	ΔCPLdPA
	ha	tCO2e ha-1	tCO2e	tCO2e
2017	0	0.0	0.0	0.0
2018	0	0.0	0.0	0.0
2019	0	0.0	0.0	0.0
2020	0	0.0	0.0	0.0

5.2.3 Emissions due to fuel-wood and charcoal activities

No emissions associated to planned fuel-wood and charcoal activities were developed in the Project Area.

Table 15. Carbon stock decrease due to planned fuel-wood collection and charcoal production in the Project Area (Table 25.c. VM0015).

Project Year t	Areas of planned fuel-wood & charcoal activities x Carbon stock change (decrease) in the project area		Total carbon stock decrease due to planned fuel-wood and charcoal activities	
	IDcl =	1	annual	cummulative
	APFPAicl,t	Ctoticl,t	ΔCPFdPAt	ΔCPFdPA
	ha	tCO2e ha-1	tCO2e	tCO2e
2017	0	0.0	0.0	0.0
2018	0	0.0	0.0	0.0
2019	0	0.0	0.0	0.0
2020	0	0.0	0.0	0.0

5.2.4 Removals due to carbon stock increase of planned activities

Carbon stock increase due to planned activities in areas that would be deforested in the baseline case was omitted.

Table 16. Total ex post carbon stock decreases due to planned activities in the Project Area (Table 25.d. VM0015).

Project Year t	Total carbon stock decrease due to planned deforestation		Total carbon stock decrease due to planned logging activities		Total carbon stock decrease due to planned fuel-wood and charcoal activities		Total carbon stock decrease due to planned activities	
	annual	cumulative	annual	cumulative	annual	cumulative	annual	cumulative
	$\Delta CPDdPA_t$	$\Delta CPDdPA$	$\Delta CPLdPA_t$	$\Delta CPLdPA$	$\Delta CPFdPA_t$	$\Delta CPFdPA$	$\Delta CPAdPA_t$	$\Delta CPAdPA$
	tCO_2e	tCO_2e	tCO_2e	tCO_2e	tCO_2e	tCO_2e	tCO_2e	tCO_2e
2017	15,454	15,454	0	0	0	0	15,454	15,454
2018	14,361	29,815	0	0	0	0	14,361	29,815
2019	14,086	43,901	0	0	0	0	14,086	43,901
2020	23,213	67,114	0	0	0	0	23,213	67,114

5.2.5 Total ex-post carbon stock decrease in the Project Area

No carbon stock decrease associated to Project activities has occurred in the Project Area in the monitored period.

Table 17. Total Ex post estimated net carbon stock decrease in the Project Area (Table 27 VM0015).

Project Year t	Total carbon stock decrease due to planned activities		Total carbon stock increase due to planned activities		Total carbon stock decrease due to unavoided unplanned deforestation		Total carbon stock change in the project case	
	annual	cumulative	annual	cumulative	annual	cumulative	annual	cumulative
	$\Delta CPAdPA_t$	$\Delta CPAdPA$	$\Delta CPAiPA_t$	$\Delta CPAiPA$	$\Delta CUDdPA_t$	$\Delta CUDdPA$	$\Delta CPSPA_t$	$\Delta CPSPA$
	tCO_2e	tCO_2e	tCO_2e	tCO_2e	tCO_2e	tCO_2e	tCO_2e	tCO_2e
2017	15,454	15,454	0	0	0	0	15,454	15,454
2018	14,361	29,815	0	0	0	0	14,361	29,815
2019	14,086	43,901	0	0	0	0	14,086	43,901
2020	23,213	67,114	0	0	0	0	23,213	67,114

5.2.6 Emissions due to unplanned and unavoided deforestation

Total unplanned deforestation in the Project Area during this monitoring period is 0.0 hectares, according to data from PRODES (2020). The accuracy of the PRODES (2018) data for land use and land cover classes in the monitored area was 90%, a value higher than the 80% established by VM0015. The methodology and results of this analysis are described in Section 3.1. Data for the years 2017, 2018, 2019 and 2020 are presented in Table 18.

Table 18. Deforested areas observed annually in each zone within the Project Area (Table 13.b. VM0015).

Area estabiliseh after deforestation per zone within the project area		Total monitored deforestation in the project area		Baseline
IDz>	1			
Name>	Zone 1	Annual	Cumulative	Annual
Project yeart	ha	ha	ha	ha
2017	0	0	0	674
2018	0	0	0	497
2019	0	0	0	713
2020	0	0	0	634

5.2.7 Emissions due to forest fires and catastrophic events

During the monitored period, there were no significant emissions from forest fires and catastrophic events in the Project Area (Table 19 and Table 20).

Table 19. Ex-post actual carbon stock decrease due to forest fires in the project area (Table 25.e. VM0015)

Project Year *t*	Areas affected by forest fires x Carbon stock change (decrease)		Total carbon stock decrease due to forest fires	
	ID_{cl} =	1	annual	cummulative
	$AUFPA_{icl,t}$	$Ctot_{icl,t}$	$\Delta CUFdPA_t$	$\Delta CUFdPA$
	ha	$tCO_2e\ ha^{-1}$	tCO_2e	tCO_2e
2017	0	513	0,0	0,0
2018	0	513	0,0	0,0
2019	0	513	0,0	0,0

2020	0	513	0,0	0,0

Table 20. Carbon Stock decrease due to catastrophic events in the Project Area (Table 25.f. VM0015).

Project Year *t*	Areas affected by catastrophic events x Carbon stock change (decrease)		Total carbon stock decrease due to catastrophic events	
	ID_{cl} =	1	annual	cummulative
	$ACPA_{icl,t}$	$Ctot_{icl,t}$	$\Delta CUCdPA_t$	$\Delta CUCdPA$
	ha	$tCO_2e\ ha^{-1}$	tCO_2e	tCO_2e
2017	0	513,0	0,0	0,0
2018	0	513,0	0,0	0,0
2019	0	513,0	0,0	0,0
2020	0	513,0	0,0	0,0

5.2.8 Total ex-post carbon stock decrease in the Project Area

The calculation of the total change in carbon stock (ex-post) in the Project Area used the same methods described in items 6.1.2 and 6.1.3 of the approved VCS methodology VM0015, considering the changes observed in the monitoring period.

The total change in carbon stock due to unplanned and avoided deforestation in the Project Area was calculated following the equation below. The ex-post carbon stock change in the Project Area is presented in Table 21 and the total ex-post carbon stock change of the Project Area under the project scenario in this monitoring period is presented in Table 22.

$$\Delta\,\mathrm{CUDdPA}_t = \sum_{y=1}^{t}\left(\sum_{icl=1}^{icl} AUDPA_{icl,y} * \Delta Ctot_{icl,t-y} - \sum_{fcl=1}^{fcl} AUDPA_{fcl,y} * \Delta Ctot_{fcl,t-y}\right)$$

(1 – section 4.3.3)

Where:

ΔCUDdPAt: Total carbon stock changes due to unavoidable unplanned deforestation in the Project Area in year t.

AUDPAicly,: Unplanned deforested area in the initial forest class *icl* in year *t* within the Project Area in the Project scenario.

ΔCtoticl,Ac: Loss of carbon stock in the initial forest class *icl* at the age of change Ac (number of years after the change of use and soil cover)

AUDPAfcl, y: Post deforestation non-forest class area fcl in year t in the Project Area after unplanned deforestation in the Project scenario.

ΔCtotfcl, Ac: Gain in carbon stock in the final post deforestation non-forest class fcl at the age of change Ac (number of years after change of use and soil cover).

Table 21. Change in ex-post carbon stock in the Project Area (Table 21.b.2. VM0015)

Carbon stock changes per initial forest class icl		Total carbon stock change of initial forest class in the project area		Carbon stock changes per post-deforestation zone z		Total carbon stock change of post-deforestation zones in the project area		Total net carbon stock change of the project area	
IDicl>	1	ΔCBSLPAicl,t	ΔCBSLPAicl	IDiz>	1	ΔCBSLPAz,t	ΔCBSLPAz	ΔCBSLPAt	ΔCBSLPA
Name>	Forest	annual	cumulative	Name>	Zone 1	annual	cumulative	annual	cumulative
Project Year t	tCO2-e	tCO2-e	tCO2-e	Project Year t	tCO2-e	tCO2-e	tCO2-e	tCO2-e	tCO2-e
2017	0	0	0	2017	0	0	0	0	0
2018	0	0	0	2018	0	0	0	0	0
2019	0	0	0	2019	0	0	0	0	0
2020	0	0	0	2020	0	0	0	0	0

Table 22. Total carbon stock changes in the Project Area under the project scenario (Table 27 VM0015)

Project Year t	Total carbon stock decrease due to planned activities		Total carbon stock increase due to planned activities		Total carbon stock decrease due to fires and catastrophic events		Total carbon stock increase due to fires and catastrophic events		Total carbon stock change in the project case	
	annual	cumulative	annual	cumulative	annual	cumulative	annual	cumulative	annual	cumulative
	ΔCPAdPAt	ΔCPAdPA	ΔCPAiPAt	ΔCPAiPA	ΔCFCdPAt	ΔCFCdPA	ΔCFCiPAt	ΔCFCiPA	ΔCPSPAt	ΔCPSPA
	tCO2e	tCO2e	tCO2e	tCO2e	tCO2e	tCO2e	tCO2e	tCO2e	tCO2e	tCO2e
2017	15,454	15,454	0	0.0	0.0	0.0	0.0	0.0	15,454	15,454
2018	14,361	29,815	0	0.0	0.0	0.0	0.0	0.0	14,361	29,815
2019	14,086	43,901	0	0.0	0.0	0.0	0.0	0.0	14,086	43,901
2020	23,213	67,114	0	0.0	0.0	0.0	0.0	0.0	23,213	67,114

5.2.9 Non-CO2 emissions from forest fires

Following the guidelines in VM0015, item 6.2 (p. 81), Non-CO2 emissions from fires used to clear forests in the baseline were omitted, being monitored in the ex-post scenario only when significant. During the monitoring period, the monitored area did not experience any significant and unplanned reduction in carbon stock, for example due to uncontrolled forest fires and other catastrophic events. And according to VM0015 v 1.1.4 (page 112) these events are subject to monitoring and should be accounted for in the project scenario when significant. Therefore, as no significant events occurred during the monitoring period, this information was considered irrelevant and was not monitored.

Table 23. Total (ex-post) carbon stock changes and non-CO2 emissions in the Project Area (Table 29 VM0015)

Project Year t	Total ex post carbon stock decrease due to planned activities		Total ex post carbon stock increase due to planned activities		Total ex post carbon stock decrease due to unavoided unplanned deforestation		Total ex post net carbon stock change		Total ex ante estimated actual non-CO2 emissions from forest fires in the project area	
	annual	cumulative	annual	cumulative	annual	cumulative	annual	cumulative	annual	cumulative
	ΔCPAdPAt	ΔCPAdPA	ΔCPAiPAt	ΔCPAiPA	ΔCUDdPAt	ΔCUDdPA	ΔCPSPAt	ΔCPSPA	EBBBSLPAt	EBBPSPA
	tCO2e	tCO2e	tCO2e	tCO2e	tCO2e	tCO2e	tCO2e	tCO2e	tCO2-e	tCO2-e
2017	15,454	15,454	0	0	0	0	15,454	15,454	0	0
2018	14,361	29,815	0	0	0	0	14,361	29,815	0	0
2019	14,086	43,901	0	0	0	0	14,086	43,901	0	0
2020	23,213	67,114	0	0	0	0	23,213	67,114	0	0

5.3 Leakage

One source of leakage was monitored: leakage due to displacement activity. Leakage due to displacement activity was monitored by mapping forest cover change in the Leakage Belt. As defined in the VCS VM0015 methodology, deforestation detected above the baseline in the Leakage Belt area was considered leakage by displacement. Activity data for the Leakage Belt area were determined using the same methods applied in mapping deforestation in the Project Area.

5.3.1 Total decrease in carbon stock (ex-post) in the Leakage Belt

As mentioned for the Project Area, the PRODES data used in monitoring the Leakage Belt also had its accuracy analyzed, being like what was found for the Project Area.

As mentioned in section 3.1.3, and in line with the information provided in the dossier prepared by the proponents, it was considered appropriate not to account for the leakage identified in the

monitored period as a measure not to jeopardize the project, following mainly the guidelines found in VM0015, part 3, task 1, section 1.2.2 (p. 115) and by the Project Developer's Guidebook to VCS REDD Methodologies, from Conservation International.

Table 24. Areas deforested annually in each zone within the monitored Leakage Belt (Table 13.c. VM0015)

Area establiseh after deforestation per zone within the leakage belt		Total monitored deforestation in the leakage belt		Baseline
IDz>	1			
Name>	Zone 1	Annual	Cumulative	Annual
Project yeart	ha	ha	ha	ha
2017	0	0	0	28
2018	0	0	0	47
2019	0	0	0	98
2020	0	0	0	88

The total change in carbon stock due to unplanned and unavoided deforestation in the Leakage Belt in this monitoring period is presented in Table 25:

Table 25. Change in ex-post carbon stock in the Leakage Belt area (table 21.c.2. VCS VM0015).

Carbon stock changes per initial forest class icl		Total carbon stock change of initial forest class in the leakage belt area		Carbon stock changes per post-deforestation zone z		Total carbon stock change of post-deforestation zones in leakage belt area		Total net carbon stock change of the leakage belt area	
IDicl>	1	ΔCBSLLKicl,t	ΔCBSLLKicl	IDiz>	1	ΔCBSLLKz,t	ΔCBSLLKz	ΔCBSLLKt	ΔCBSLLK
Name>	Forest	annual	cumulative	Name>	Zone 1	annual	cumulative	annual	cumulative
Project Year t	tCO2-e	tCO2-e	tCO2-e	Project Year t	tCO2-e	tCO2-e	tCO2-e	tCO2-e	tCO2-e
2017	1,389	1,389	1,389	2017	1,172	1,172	1,172	217	217
2018	1,389	1,389	2,777	2018	1,172	1,172	2,434	217	434
2019	1,389	1,389	4,166	2019	1,172	1,172	3,515	217	651
2020	1,389	1,389	5,555	2020	1,172	1,172	4,686	217	869

5.3.2 Estimated total ex-post leakage

Total ex post carbon stock changes in the Leakage Belt due to displacement activities in this monitored period are presented in Table 26. Leakage was calculated as the difference between ex post and ex ante analyses.

In this case, as a result, the value of carbon stock changes in the monitoring period for the years 2017 and 2020 were less than zero (<0). Thus, ex post leakage was defined as zero in these monitored years, as recommended by item 1.2 – Leakage Monitoring, of VCS VM0015.

Table 26. Total ex-ante and ex-post carbon stock changes from baseline in the Leakage Belt.

Total ex ante net carbon stock change of the leakage belt area			Total ex post net carbon stock change of the leakage belt area		Total ex-post Leakage	
IDiz>	ΔCBSLLKt	ΔCBSLLK	ΔCBSLLKt	ΔCBSLLK	ΔCBSLLKt	ΔCBSLLK
Name>	annual	cumulative	annual	cumulative	annual	cumulative
Project Year t	tCO2-e	tCO2-e	tCO2-e	tCO2-e	tCO2-e	tCO2-e
2017	12,480.6	12,481	217	217	0	47,441
2018	20,828.0	33,309	217	434	0	47,441
2019	43,200.2	76,509	217	651	0	47,441
2020	38,941.9	115,451	217	869	0	47,441

5.4 Net GHG Emission Reductions and Removals

The reduction of anthropogenic GHG emissions were calculated according to equations 19, 20 and 21 of the VCS VM0015 version 1.1 methodology. The risk factor was estimated using the Non-Permanence Risk Report, resulting in a VCS Credit Buffer (VBC) of 10%. The calculated ex-post GHG emission reductions[2] are presented in Table 27.

$$\Delta REDD_t = (\Delta CBSLPA_t + EBBBSLPA_t) - (\Delta CPSPA_t + EBBPSPA_t) - (\Delta CLK_t + ELK_t) \quad (5)$$

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

ΔCBSLPAt Sum of baseline carbon stock changes in the project area at year t; tCO2e

[2] The values presented in Table 27 adopt a conservative practice of rounding down from the final calculation performed using equations 19, 20 and 21. Thus, a difference of 2.0 is presented between the values.

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

CPSPAt Sum of ex ante estimated actual carbon stock changes in the project area at year t; tCO2e

EBBPSPAt Sum of (ex ante estimated) actual emissions from biomass burning in the project area at year t; tCO2e

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

ELKt Sum of ex ante estimated leakage emissions at year t; tCO2e

$$VCU_t = \Delta REDD_t - VBC_t \quad (6)$$

$$VBC_t = (\Delta CBSLPA_t - \Delta CPSPA_t) * RF_t \quad (7)$$

VCUt Number of Verified Carbon Units that can be traded at time t; t CO2-e

ΔREDDt Ex ante estimated net anthropogenic greenhouse gas emission reduction attributable to the AUD project activity at year t; tCO2-e ha-1

VBCt Number of Buffer Credits deposited in the VCS Buffer at time t; t CO2-e

ΔCBSLPAt Sum of baseline carbon stock changes in the project area at year t; tCO2e

ΔCPSPAt Sum of ex ante estimated actual carbon stock changes in the project area at year t; tCO2-e ha-1

RFt Risk factor used to calculate VCS buffer credits; %

Table 27. Ex-post reduction of anthropogenic GHG emissions (ΔREDDt) and Verified Carbon Units (VCUt) (Table 36 VM0015).

Project Year t	Baseline carbon stock changes		Ex post project carbon stock changes		Ex post leakage carbon stock changes		Ex post net anthropogenic GHG emission reductions		Ex post VCUs tradable		Ex post buffer credits	
	annual	cumulative	annual	cumulative	annual	cumulative	annual	cumulative	annual	cumulative	annual	cumulative
	ΔCBSLPAt	ΔCBSLPA	ΔCPSPAt	ΔCPSPA	ΔCLKt	ΔCLK	ΔREDDt	ΔREDD	VCUt	VCU	VCBt	VCB
	tCO2-e	tCO2-e	tCO2e	tCO2e	tCO2e	tCO2e	tCO2e	tCO2e	tCO2e	tCO2e	tCO2e	tCO2e
01/Jan/2017 - 31/Dez/2017	296,657	296,657	15,454	15,454	0	0	281,203	281,203	253,083	253,083	28,120	28,120
01/Jan/2018 - 31/Dez/2018	220,015	516,672	14,361	29,815	0	0	205,653	486,856	185,088	438,171	20,565	48,685
01/Jan/2019 - 31/Dez/2019	315,125	831,797	14,086	43,901	0	0	301,038	787,894	270,935	709,106	30,103	78,788
01/Jan/2020 - 07/Ago/2020	281,411	1,113,207	23,213	67,114	0	0	258,198	1,046,092	232,379	941,485	25,819	104,607

APPENDIX 1: FREL AMAZÔNIA

The Forest Emission Reference Level, or FREL, aims to technically evaluate the payment for REDD+ activities. To this end, emission levels were measured at the national scope for the Amazon biome (FREL Amazon), allowing the evaluation of the real effects of policies and measures to reduce greenhouse gas emissions. The FREL is a requirement for developing countries that wish to obtain recognition by the UNFCCC of their national forest mitigation efforts for the purpose of payments for results from REDD+ activities.

The reference level was taken from the document "Brazil's submission of a Forest Reference Emission Level (FREL) for reducing emissions from deforestation in the Amazon biome for REDD+ results-based payments under the UNDCCC"[3]. which was submitted by Brazil to and approved by the UNFCCC in 2014.

As an enhancement to the emission analysis, as well as the project's reductions data, a comparison was made with the values reported by the Amazon FREL. Firstly, the methodological context and assumptions used by the FREL were intensively analyzed, with the objective of understanding the insertion of the project at a national level, as well as an exercise to track governmental updates to emissions levels and whether the project was following these updates.

The values taken from the FREL have as average annual deforestation 1,702,277.6 ha of area in the Legal Amazon, which refers to 907,959,466.3 tCO2 emitted annually. On the other hand, in the monitored period, the project figures show that an average of 16,778.5 tCO2 was emitted annually, referring to the average deforested area in the project area of 32.5 ha. It is important to emphasize that the areas and emissions from planned deforestation in the project area were considered, since no values for unplanned deforestation were recorded (Table 13). A simple rule of three was made taking into account the annual deforestation of the project and extrapolating to the reference level values, the project should emit annually the equivalent of 17,334.8 tCO2.

The total percentage of project emissions was also checked against the reference level to understand the representativeness of project emissions with the total FREL value (907,959+466.3 tCO2). It was identified that the project emissions in the monitored period represented only 0.000001% of the total emissions of the Legal Amazon.

Making a methodological comparison between the FREL and the Manoa REDD+ Project, it is possible to notice a difference. The reference level is based on an extremely robust and reliable methodology, for this reason, some notes should be taken into consideration to explain this difference.

[3] BRASIL. Ministério do Meio Ambiente. Ministério da Ciência, Tecnologia e Inovação. **Brazil's submission of a Forest Reference Emission Level (FREL) for reducing emissions from deforestation in the Amazonia biome for REDD+ results-based payments under the UNFCCC**.Brasília, DF: MMA, Set. 2014.

First, the national reference level considered the years 1996 to 2010 in its calculations, consisting of a different period than the one monitored by the project (2017 to 2020). In addition, the methodology associated with FREL integrated burlap into its carbon stock calculations and, consequently, the final emissions values took burlap into account as well. There was also a differentiation of forest physiognomies and their emission factors.

Another important point is the fact that the Manoa REDD+ Project was developed in a very local context, different from the FREL, where an analysis of the Legal Amazon as a whole was done. In this sense, the methodological differences approached cause the final results of emissions to be different from each other.

Finally, it is important to highlight the importance of the FREL as a national initiative to monitor emissions at a broader level, in addition to strengthening the national strategies of the REDD+ scope. The Manoa REDD+ Project will follow the updates at the national level in order to contribute to the progress and improvement of REDD+ projects in the national territory.

APPENDIX 2: LOW-IMPACT FOREST MANAGEMENT RESULTS

As a way to demonstrate the low impact of forest management operations, the compiled results of the post-exploitation reports of the logged UPAs in the monitored period (2017 - 2020) were brought in.

Between April and December 2017, UPA 27 was explored. In the POA, it is possible to identify that the effective management area of the UPA 27 (1,940.68 ha) corresponds to 81.96% of the total area of the UPA (2,367.71 ha). In the pre-exploratory inventory, 43,046 trees were inventoried, which together had a total volume of 204,878 m^3, corresponding to 22.18 tree/ha, of which 48,517 m^3 were authorized to exploit (as described in AUTEX of UPA 27), corresponding to 25m3/ha of intensity of exploration. However, 37,596.65 m3 were explored, which corresponds to 77.49% of the total authorized. As of the survey carried out by SEDAM in March 2018, the exploration activities of UPA 27 were considered closed, with the technical opinion that the information collected in the field is in accordance with the methodology described in the Census Inventory filed by the environmental agency.

UPA 01 was explored between May and December 2018. The total area of the UPA is 2,359.65 ha, with an effective management area equivalent to 2,174.69 ha, which represents 92.16% of the total. In the UPA 01 exploration authorization, 54,367.22 m3 were authorized, and a total of 52,102.53 m3 was effectively exploited, which is equivalent to 95.83% of the total authorized. The volume explored represents a total of 8,618 trees. Thus, according to the technical survey carried out by SEDAM, in March 2019, the exploration activities of UPA 01 were closed, with the opinion that the information collected in the field was in accordance with the methodology described in the PMFS/POA Census Inventory of the PMFS/POA of the UPA in question.

The UPA 10 Annual Operation Plan was prepared in November 2018, with its exploration authorization validated as of April 26, 2019 and exploration activities were started in May 2019 and finalized in December 2019. The total area of the UPA is 2,343.95 ha, and the effective management area is equivalent to 89.05% of the total, that is, 2,066.05 ha. The exploitation of a maximum volume of 51,630.74 $m^3$was authorized, and the equivalent of 51,354.56m3 was explored, representing 8,234 individuals. Thus, according to the SEDAM survey, carried out in November 2020, the exploration activities of UPA 10 were considered closed.

The Annual Operation Plan for UPA 15 was prepared in January 2020 and its exploration activities were initiated in April 2020 and finalized in December 2020, not contemplating the monitoring period. For this reason, the exploration results will be reported in the next monitoring report.

Also, annual post-exploratory monitoring of the explored UPAs is carried out. Thus, the assessment of damage to remaining trees, evaluation of impacts on the construction of infrastructures (roads, yards, branches and clearings) and tree dragging, monitoring of fauna and attributes of high conservation value and monitoring of social aspects in the management area were carried out. evaluated forestry. All documents regarding the operation of the UPAs were submitted to VVB.