Social and Environmental Impact Assessment (ESIA)

Forestal del Caribe

May 2022

Sustainable Strategies
For Visionary Companies

Realised by Sustainable Strategies

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This Environmental and Social Impact Assessment (ESIA) for the "Forestal del Caribe Project" has been prepared by Sustainable Strategies (Estrategias Sostenibles, S.A.) Guatemala with all due knowledge, care and diligence as agreed with the client, Arbaro Fund. We disclaim any liability to the client and others with respect to any matter outside the scope of the foregoing.

The environmental and social advisors involved have developed their inputs in accordance with environmental and social consultancy practices, based on their professional capacities within the scope of their appointments. This process involved: desk research, a field visit with interviews, analysis, drafting and validation with Arbaro Fund. The report is presented in this document.

This ESIA is confidential to the client and we accept no liability in the event of third parties copying or making public part or parts of it.

Index of Tables

Index of Figures

Executive summary

Sustainable Strategies (SS) has been contracted by Arbaro Fund to conduct a strategic level Environmental and Social Impact Assessment (ESIA) to identify, in an independent process, potential environmental and social risks and impacts of the "Forestal del Caribe Project" which Arbaro is evaluating for development in Izabal, Guatemala. This ESIA is a tool to assist in the investment decision making process and is not an instrument to obtain an environmental license before the Guatemalan authorities or legislation.

Table 1. General data of the project.

Project	Forestal del Caribe
Developer	Arbaro Fund
Operational partners	Interforest S.A. Forestal Rio Blanco S.A.
Type of financing	Foreign investment Arbaro Fund
Project phase	Evaluation
Environmental and social risk rating	B *initial

Arbaro Fund is a Luxembourg private equity fund that invests in sustainable forestry projects in: Latin America, the Caribbean and Africa, countries where biophysical growing conditions are ideal for its interests. The fund currently has project in Africa and Paraguay.

Arbaro Fund is evaluating investing in a melina (*Gmelina arborea*) production forestry project for the development of wood pallets in Guatemala in two stages. For the first stage, it is evaluating the purchase of two properties, both considered the Area of Direct Influence -AID- of the Project: the farm "Rio Frio", for planting and forest production on approximately 1,000 ha, and the farm "Agroman", also known as "Buenos Aires", for the construction of a sawmill and a nursery for the production of seedlings in the future.

For the first stage, the purchase of the "Rio Frio" farm involves the purchase of an extension of six out of seven properties[1] totalling 2,275 ha. After the initial purchase of properties, Arbaro Fund will proceed with the splitting of three portions of land that coincide with the Protected Area to be dedicated to forest conservation. The melina project will be carried out on farms that do not overlap with protected areas.

The second stage proposes to expand forestry operations with the objective of achieving agricultural forestry production of 2,000 to 5,000 hectares, or known as the Area of Influence of the Project - AIP - the expansion of the project is contemplated through the purchase or lease of other land located in a previously defined geographical area. The AIP includes more than 62,000 ha under evaluation for future planting expansion.

[1] One of the properties in “Río Frío”, with 354.51 ha, will be bought directly by Fundaeco from the Seller

This strategic level ESIA of the "Forestal del Caribe Project" is the final deliverable of the environmental and social impact assessment process carried out by the Sustainable Strategies team to support Arbaro Fund in the investment decision process.

The ESIA did not identify any major impacts that are unmanageable or irreversible. The three main potential impacts are:

- Planting and harvesting in areas of natural and modified habitats with biotic sensitivity.
- Planting and harvesting in areas with possible Mayan archaeological remains, i.e. archaeological heritage.
- Planting and harvesting close to indigenous and vulnerable populations.

It is concluded that the identified adverse impacts are manageable. Many of these impacts are already fully or partially addressed under current and/or planned management by the forest operator, Interforest, as indicated verbally by them. Other impacts will require the development of management elements that have been detailed in the Environmental and Social Management System section as mitigation measures to further reduce impacts.

It is noted that the project has the potential to have a positive impact, identifying mainly the impacts of:

- Generating employment in areas with a high need for fixed income.
- Sequestering carbon, which can be also marketed to generate complementary income to that of the forest plantation.
- Restoring forest habitats for flora and fauna species in the region.
- Providing raw material for wooden pallets in an industry where the sustainability debate has not yet matured.

The Management Plan and the important components to be developed by the Project and/or its managers to ensure that the impacts of the Project are managed are presented.

Annex 17 details some complementary studies to be carried out to deepen on some of the issues and/or impacts identified in this process, corresponding to land use, study on the archaeological site in the AID of the Project, integrate more information on indigenous populations in the AIP and to update the biodiversity baseline.

List of acronyms

- Agexport: Exporters' association promoting export growth in Guatemala
- AID: Area of Direct Influence
- AII: Area of Indirect Influence
- AIP: Area of Influence of the Project
- AMASURLI: Authority for the sustainable management of the hydrographic basin of Lake Izabal and Río Dulce.
- COCODE: Consejos Comunitarios e Desarrollo Urbano y Rural de Guatemala (Community Urban and Rural Development Councils of Guatemala)
- CONAP: Consejo Nacional de Áreas Protegidas (National Council of Protected Areas)
- COVID 19: Infectious disease caused by coronaviruses
- DDAS: Environmental and Social Due Diligence
- DEMOPRE: Department of Pre-Hispanic and Colonial Monuments
- DIGARN: Directorate of Environmental and Natural Resources Management
- EIA: Environmental Impact Assessment
- ESIA: Environmental and Social Impact Assessment
- ESG: Environmental, Social, and Governance principles (Arbaro Fund)
- ESMP: Environmental and Social Management Plan
- ESMS: Environmental and Social Management System (Arbaro Fund)
- ETAR: Wastewater Technical Study
- FSC: Forest Stewardship Council
- GCF: Green Climate Fund
- GHGs: Greenhouse Gases
- Ha: Hectares
- IFC: International Finance Corporation
- ILO: International Labour Organisation
- INAB: National Forest Institute
- INE: National Institute of Statistics of Guatemala.
- INSIVUMEH: National Institute of Seismology, Volcanology, Metrology and Hydrology of Guatemala.
- MAGA: Ministry of Agriculture, Livestock and Food.
- MARN: Ministry of Environment and Natural Resources
- MQRS: Complaints, claims and suggestions mechanisms
- NGO: Non-Governmental Organisation
- PINFOR: Forestry Incentive Programme
- PS: IFC Performance Standard
- RA: Rainforest Alliance
- SEGEPLAN: Presidential Secretariat for Planning and Programming.
- SS: Sustainable Strategies
- WHO: World Health Organisation

1. Introduction

1.1 General considerations

Arbaro Fund is a Luxembourg private equity fund. It invests in sustainable forestry projects in: Latin America, the Caribbean and Africa, countries where biophysical growing conditions are ideal for its interests.

Arbaro is currently evaluating investing in a forestry project for the production of melina (*Gmelina arborea*) that would be used as a raw material in the production of pallets in Guatemala. Arbaro is requesting a strategic level Environmental and Social Impact Assessment (ESIA) to identify potential environmental and social risks and impacts associated with the development of the project. This ESIA will be publicly disclosed on its website (https://www.arbaro-advisors.com/arbaro-fund/) prior to making the corresponding investment.

It is for the above reasons that the ESIA is directed towards investment decision making, therefore, the scope and depth of the analysis is limited to that agreed with Arbaro. Furthermore, it focuses on the risks identified for the physical, biotic and socio-cultural components that may represent a threat or incompatibility with the project and its socio-environmental management. This ESIA is not an instrument for obtaining an environmental licence before the Guatemalan authorities or legislation.

1.2 Objectives

The objective of this study is to carry out an independent strategic level ESIA for the "Forestal del Caribe" project to be developed in northeastern Guatemala, identifying the environmental and social impacts for the more than 62,000 ha defined as part of the Area of Influence of the Project (AIP) and in greater detail for the first phase of the project which contemplates the purchase and development of two farms, planting and forest development in 1,000 ha in the farm "Rio Frio" and purchase of the farm "Agroman"" where the sawmill for the raw material generated by the project would be established.

Specifically, the objectives of this strategic level ESIA would be:

- Develop the strategic level ESIA aimed at assisting in the decision making by Arbaro Fund on whether or not to implement the project.
- Adhere the processes of the ESIA at the strategic level to Guatemalan regulations, as well as to the IFC Performance Standards and the 10 Principles of the Forest Stewardship Council (FSC), as well as other international standards as subsequently defined.
- Identify and evaluate regional and strategic studies affecting the Project.
- Identify the main impacts and propose a management plan to mitigate them.

1.3 Methodology

For the preparation of this ESIA, the hybrid assessment methodology was applied by means of virtual phone calls and a three-day field visit. This assessment process took place over a period of two months, March and April 2022. The methodology consisted of the following processes:

1) **Review meetings with the Arbaro and Interforest team:** During March and April, multiple calls were held with internal and external stakeholders of the project to learn about the project, the AIP and the AID, refine the approach, scope and detail of activities to be carried out to develop the project.
2) **Field visit:** In March 2022 a field visit was made to the farms "Rio Frio", "Agroman" and "Las Guitarras" by 4 consultants of the SS team. The visit included a vehicle tour on the main road through this area and a short tour of the farm "Las Guitarras" which is in the process of evaluation for phase 2 of the Project. For the AID that includes the "Rio Frio" and "Agroman" farms, a field visit was made to see the facilities and the communities of the AID of these farms. We focused on the current status of the project and assessed the main environmental and social impacts, both current and projected for the development of the project. The agenda of the visit can be found in **Annex 12**. The people interviewed during the process can be identified in **Annex 14**.
3) **Documentary review:** analysis of information submitted by the seller of the properties, the forest operator and other complementary studies and reports. The desk review covered relevant elements of the AIP. See the list of documents reviewed in **Annex 13**.
4) **Drafting of the preliminary report:** the SS team drafted a preliminary report for Arbaro Fund.
5) **Preparation of the report:** the Sustainable Strategies team, compiling the results of the documentation analysed, drafted this ESIA during the month of April 2022. Subsequently, in May, it integrated the comments and adjustments as recommended by Arbaro Fund and Interforest, the forest operator.

1.4 Limitations of the Process

The main constraints to conducting this study can be summarised in four.

- The timeframe designated for this ESIA was a major constraint in developing and implementing the study methodology.
- The AIP and AID assessment model of the two project phases under different scopes of analysis with heterogeneous secondary information available for environmental and social areas available has imposed complexities that have been highlighted in the subsequent sections where relevant.
- The lack of preliminary information, baselines, previous forest management plans, among others, from the seller of the property limited the historical analysis of impacts on the "Rio Frio" and "Agroman" farms. The time limitation mentioned in the first point made it impossible to fill these gaps with primary studies and information.

- The biotic baseline was developed using field data and information collected during site visits in 2009 as part of the process of developing a High Conservation Values study for the Western Group, and although these are robust, a margin of error is allowed for due to the time that has elapsed since then. In addition, the data does not include range limitations. The same comment as above is made.

2. Legal framework

The legal framework applicable to the project is presented below in four sections.

- First, the international regulatory framework required by Arbaro Fund for the development of this ESIA and which the forest operator will be required to comply with in the development and operation of the Project is presented.

- The second section includes the laws and regulations of Guatemala mainly applicable to the Project. The second section is complemented by **Annex 2**, which has a general list of the laws and regulations of the country applicable to the Project with **Annex 1** which includes a matrix of the main permits and licenses required for the project, including a detail of the estimated time required to manage these procedures.

- The third section identifies future legislation that may apply to the project.

- The fourth section makes an analysis of existing environmental permits for the farms "Rio Frio" and "Agroman".

2.1. International Standards

The applicable international standards for the development of the ESIA at the request of Arbaro Fund are:

- Arbaro Fund's Environmental and Social Management System,
- ILO Conventions signed by Guatemala,
- IFC Performance Standards on Environmental and Social Sustainability,
- International Finance Corporation Guidance Notes: Performance Standards on Environmental and Social Sustainability, IFC,
- IFC Environmental, Health and Safety Guidelines for Logging, Sawmilling and Wood Products Manufacturing Operations,
- Principles and criteria for Forest Stewardship Council (FSC) certification
- Guiding Principles on Business and Human Rights, United Nations,
- Indigenous Peoples Policy, Green Climate Fund.

It is identified that the investment will have impacts and should consciously manage the eight IFC Performance Standards. A summary of the application of each standard is shown in Table 2.

Table 2. IFC Performance Standards applicable to the Caribbean Forest Project.

Performance Standard	Applies	Detail
PS1: Social and Environmental Management and Assessment System	X	The Project shall adequately identify, assess, manage and mitigate social and environmental risks and impacts in its management system, including monitoring and control of its contractors.

PS2: Employment and working conditions	X	The Project shall comply with on-site contracting and occupational health and safety laws and standards and best practices in relation to human rights.
Ps3: Pollution prevention and reduction	X	The Project shall make appropriate use of resources by preventing and reducing pollution and ensuring that it reduces its impact on climate change and carbon generation.
PS4: Community health and safety	X	The Project shall avoid and manage impacts on the health and safety of neighbouring communities.
PS5: Land acquisition and involuntary resettlement	X	No communities will be resettled in the development of the project. However, the purchase and development of each farm can be reviewed on a case-by-case basis if there is economic displacement of families and/or persons living on the farms.
PS6: Biodiversity conservation and sustainable management of living natural resources	X	The Project is developed over modified and natural habitats bordering protected areas. Several vulnerable species are identified in the Project's area of influence.
PS7: Indigenous Peoples	X	The Project is being developed in an area where there is a high percentage (28.21% according to the 2018 census in the department of Izabal) of Q'eqchi' indigenous peoples.
PS8: Cultural Heritage	X	Archaeological sites are identified in the AIP and one site in the AID to be surveyed and mapped prior to interventions in the area.

2.2. National legislation

In order to start the implementation of a melina tree planting project (the "Project") Arbaro Fund and/or its Forest Operator shall comply with a number of legal requirements as outlined in this section, see table in **Annex 1.**

2.2.1. Legal requirements prior to the start of the project.

Prior to obtaining the environmental licenses and permits for the first stage of the project on the "Río Frío" farm and the "Agroman" farm, a series of legal processes must be fulfilled. Similarly, future farms that are linked to the second stage of the project that are intended to be purchased or leased, will require the review of the process indicated below in order to legalise and comply with the legislation and regulations required for the Project.

In order to apply for the environmental permits applicable to this project, it is necessary to have the following:

A. Legal personality to act before the authorities.

a) In the case of an Individual Person, he/she should only have his/her Personal Identification Document (DPI) issued by the National Registry of Persons (RENAP), if national, or a Passport issued by the corresponding authority of the country of origin, if foreign. We understand that this would not apply to the project.
b) In the case of a legal entity, which will be the case for the "Forestal del Caribe" project, it must be a company constituted according to the rules established in the Commercial Code of Guatemala,[2] and be duly registered in the General Commercial Registry of the Republic, have the corresponding company and business patents, and have a duly registered and valid legal representative. In this case, it is not important who the shareholders are, as the company is an

[2] Decree 2-70 of the Congress of the Republic

independent legal entity that can apply for the corresponding forestry authorisations.

B. **Unified Tax Registry (RTU).** It is necessary that the owner of the project is registered with the Superintendencia de Administración Tributaria (SAT) and is up to date with its corresponding tax obligations. This procedure is typically carried out by an accountant.

C. **Tenure over the property.** It is also necessary that the project proponent has legal tenure over the property where the corresponding project will be developed. This legal tenure must consist of the ownership of the property, i.e. it must be duly registered in favour of the project proponent in the General Property Registry.

When the property is leased, the lease title is sufficient to process the approval of environmental instruments. However, it will not be acceptable for forestry permits, as described below, because the applicable legislation requires ownership to obtain the respective authorisations. Therefore, in the case of forestry permits to be processed on leased forest land, such permits must be obtained through the current owner of the property, if ownership is not transferred to the Project developer.

2.2.2. Environmental Instruments

Under Article 8 of the Law for the Protection and Improvement of the Environment, decree 68-86 and the Regulation of Environmental Evaluation and Control and Monitoring, Governmental Agreement 137-2016, in order to initiate the development of the Project, being projects that can produce environmental deterioration and that introduce harmful or notorious modifications to the landscape and cultural resources of the national heritage, it is necessary to obtain prior approval of an Environmental Instrument (or what is typically known internationally as the Environmental Impact Assessment -EIA-), carried out by professionals in the field and approved by the Ministry of Environment and Natural Resources (MARN).[3]

It is stressed that an EIA must be obtained for each farm to be acquired and/or leased. In the case of the "Rio Frio" farm, this is considered as a single project under one owner.

Starting operations without a prior EIA entails fines of between Q5,000 and 100,000.

EIAs are technical documents containing the necessary information for an orderly identification and assessment of the environmental impacts or risks of a project from the planning phase, with a preventive character, to the execution, operation and abandonment phases, with a corrective character, and which allow the formulation of the respective mitigation measures.

In accordance with Guatemalan regulations, projects, works, industries or activities are categorised in a list (Lista Taxativo)[4] , according to their impact and effects on the

[3] Art. 8 of the Law for the Protection and Improvement of the Environment (Decree 68-86).
[4] Taxable List (GA 204-2019 and its amendments)

environment. Although this list classifies the different projects, the MARN may vary its classification depending on the specific factors of the activity.

Projects are classified into three different basic categories A, B, and C taking into account factors or conditions that are relevant to their characteristics, nature, potential environmental impacts or environmental risk.

- **Category A:** projects with the highest potential environmental impact or environmental risk.
- **Category B:** projects with moderate potential environmental impact or environmental risk; which is subdivided into two:
  - **SubcategoryB1:** activities that are considered to have a moderate to high environmental impact; and
  - **Sub-category B2:** activities considered to have a moderate to low impact.
- **Category C:** projects considered to have a low environmental impact. [5]

Since the Taxonomy List does not specifically establish the planting of melina, in order to carry out the project, it is recommended that the Directorate of Environmental Management and Natural Resources (DIGARN) be asked for the taxonomy list to review the category that would apply to the project. [6]

As the project is of a specific nature, being a non-taxatively regulated project, but located on a property with similar activities that are regulated, it is expected that the category assigned to the project will be **Subcategory C with Environmental Management Plan (EMP)**. However, there is a high likelihood that the project will be classified as a **Subcategory B2** as it is a farm that will operate near and/or adjacent to protected areas.

Likewise, for the farm "Agroman"" where a sawmill and forest nursery will be installed, an EIA should be obtained, including both planting and other operations. In this case, the project could be obliged under the following categories of the Tax Schedule:

- If the sawmill production will be less than 50,000 board feet, the issuance of an environmental instrument C with AMP can be considered.
- If the production is between 50,000 and 180,000 board feet, the corresponding instrument will be a B2.
- If the production exceeds 180,000 board feet, the corresponding instrument will be classified as a B1.

In this regard, it is important to note that, by combining the sawmill, the nursery and the respective plantation, it will be necessary to submit **a single environmental instrument** for the "Agroman" farm and another one for the "Rio Frio" farm ; furthermore, the MARN could decide to establish a specific category applicable to the overall project.

It is our recommendation that the successful bidder apply for the environmental authorisation as soon as possible after acquiring the project, in order to avoid any delay

[5] Art. 28 of the Regulation on Environmental Assessment, Control and Monitoring (AG 431-2007)
[6] Art. 2 of the Tax Schedule

in the start of the preparation and planting of the crop. This is because, in order to obtain any other permit, licence or authorisation related to the project, it will be necessary to present as part of the requirements the resolution approving the EIA and the corresponding Environmental Licence.

2.2.2.1. Preparation and Approval of the Environmental Instrument

The EIA Study is the technical document issued for Category B projects, and the Initial Environmental Study is issued for Category C projects. These allow the identification and prediction, with a more in-depth analysis, of the effects on the environment that a project, work, industry or activity will have on the environment, which due to its characteristics has been considered as having a moderate or high potential environmental impact or environmental risk according to the Taxation List.[7]

Table 3. Comparison of processes and requirements environmental instruments.

	C	C with EMP	B2	B1	A
Documentary requirements[8]	Form provided by MARN	Form provided by MARN and PGA elaborated by Consultant	Environmental Instrument based on MARN requirements	Environmental Instrument based on MARN requirements	Environmental Instrument based on MARN requirements
Environmental Consultant[9]	No	Yes Individual or Consulting Firm	Yes Individual or Consulting Firm	Yes Individual or Consulting Firm	Yes Consulting Company
Place of Presentation[10]	DIGARN Departmental Delegation	DIGARN Departmental Delegation	DIGARN Departmental Delegation	DIGARN Departmental Delegation	DIGARN
Inspection [11]	No	No	No	Yes	Yes
Public Participation[12]	No	No	No	Yes	Yes
Deadline [13]	5 working days	5 working days	15 working days	2 months	4 months
Environmental Licensing[14]	No	No	Yes	Yes	Yes

The approval of each EIA is requested from the DIGARN of the MARN. It can also be requested from the Departmental Delegation of the Department where the project is

[7] Art. 3 of GA 137-2016
[8] This refers to what type of document should be prepared. The specific requirements will be provided by the Environmental Consultant once the classification of the project is determined.
[9] This refers to the need or not to have an Environmental Consultant for the elaboration of the environmental instrument to be submitted. Individual Consultant implies that it can be a private person who prepares the instrument. Whereas a Consulting Company refers to a company with a minimum of three individual consultants preparing the instrument.
[10] This refers to the fact that, based on the location of the project, it must be submitted to the MARN Delegation located in the department where the project is located. DIGARN means the Directorate of Environmental Management in the central MARN.
[11] It refers to whether there will be a visit by MARN during the approval process of the environmental instrument.
[12] It refers to the need for a public participation process.
[13] The deadline is established on the basis of the deadlines set out in the legislation. However, these deadlines are longer due to MARN's workload. The deadlines are counted from the date on which MARN has received all the documentation required in the initial application and in subsequent requests.
[14] This refers to whether the need for an Environmental Licence is mandatory, or whether a resolution approving the project is sufficient.

located. This request is made by presenting the corresponding environmental instrument, whose format and requirements are provided by the MARN. [15]

During its evaluation, DIGARN shall carry out all inspections deemed relevant to issue its resolution. Likewise, DIGARN and MARN Delegations may request opinions from other public entities,[16] including the National Forest Institute (INAB), the National Council of Protected Areas (CONAP) and the Authority for the Sustainable Management of the Lake Izabal and Río Dulce Basin (AMASURLI). These entities will have a maximum of 15 working days (20 calendar days) to issue their opinion, and in case they do not present it, DIGARN will have to issue its opinion with or without it, CONAP has a period of 6 months to issue an opinion.

It is important to be clear that consultation with CONAP is obligatory only in the case that the Project is located in protected areas,[17] and without it the resolution approving the EIA cannot be issued. Due to the need for these opinions, and in order to speed up the EIA approval process and ensure that deadlines are respected, it is necessary to approach the respective authorities during the approval process.

The successful bidder shall involve, at the earliest possible stage of the process, the population located in the area of influence of the project. To this end, the successful bidder shall draw up a public participation plan for the entire life cycle of the project, which shall be agreed by the MARN. This plan must include the identification of related populations, the creation of mechanisms for community participation, and strategies for the resolution of potential conflicts.

The deadline for the review and approval of EIAs, according to current regulations, is 15 working days for Category B, and 5 working days for Category C with EMP from their submission.[18] Notwithstanding the above, the deadline may be extended due to the fact that MARN is having difficulty in meeting the deadlines due to its current workload.

The successful bidder may not start the activity subject to this procedure until it has with the positive resolution of the EIA. The project's Approval Resolution licence will contain environmental commitments to be fulfilled related to the Management Plan indicated in the environmental instrument, water measurements, among others.

2.2.2.2. Environmental Licensing

Once the environmental instrument has been approved, and within 15 days of its notification, the proponent must apply to DIGARN for the issuance of the Environmental Licence.[19] The term of the Environmental Licence would be between one and five years, based on the specific request of the project proponent.

[15] www.marn.gob.gt
[16] Art. 41 of GA 431-2007
[17] Art. 29 of GA 137-2016
[18] Arts. 25 and 26 of GA 137-2016
[19] Art. 60 and 61 of GA 137-2016 and its amendments

2.2.2.2.3. Deadline

The total time for obtaining the Resolution of Approval of the Environmental Instrument may last:

- Approximately 6 months in the case of an environmental licence that is managed before the MARN and that does NOT deal with planting in protected areas.
- Approximately 12 months, in the case of an environmental licence that includes planting in protected areas, as an opinion from CONAP is required. See section on project alternatives.

2.2.2.4. Penalties

The sanction for initiating any project without a prior EIA is a fine of between approximately US$650.00 and US$12,500.00[20] , depending on the Category of the Project. The sanction will be imposed by the Legal Compliance Directorate (DCL) of MARN, after an administrative process has been carried out. If the fine is not paid within six months of being sanctioned, the business will be closed until payment is made.

2.2.3. Wastewater Treatment

For sawmill operations, if there is a discharge of wastewater from the toilets and kitchen of the administrative offices, it will be important to prepare a Technical Wastewater Study (ETAR),[21] including the mechanisms considered appropriate for wastewater treatment and compliance with the maximum permissible parameters for wastewater discharges.

In this regard, it will be important to determine whether the location of the wastewater discharges will be a receiving body[22] or the public sewer. This is in order to establish the necessary measures to be taken to treat the discharges in order to comply with the maximum permissible parameters. Wastewater treatment may be by physical, chemical or biological means, as recommended in the ETAR. In addition, it will be necessary to take two samples per year of the wastewater discharged to check compliance with the legal parameters, or to make the necessary adjustments.

The ETAR must be updated every 5 years and integrate those measures that enable the project to meet the necessary requirements.

The deadline for obtaining this authorisation does not depend on any governmental authority, since the ETAR does not require such authorisation to enter into force. Therefore, its issuance period will depend exclusively on the Technician in charge.

2.2.4. Authorisation of activities in Protected Areas

Protected Areas in Guatemala are regulated by the Protected Areas Law (Decree 4-89). Protected Areas are defined as those areas whose purpose is the conservation, rational

[20] The fine is established in Quetzales between Q.5,000.00 and Q.100,000.00, at the exchange rate on the date the sanction was imposed.
[21] Wastewater Disposal and Reuse and Sludge Disposal Regulations (AG 236-2006)
[22] Natural body of water into which wastewater discharges can be made.

management and restoration of wild flora and fauna, related resources and their natural and cultural interactions. The law divides protected areas into six management categories[23] , and in each of them establishes different management obligations.

For a Protected Area to be considered as such, it must be declared by a Decree issued by the Legislative Body. Legally declared protected areas can be located on both public and private land.

In the event that the farms to be worked coincide with protected areas, which will not be the case for the "Forestal del Caribe" project after obtaining approval of the EIA,[24] an environmental commitments contract must be signed with CONAP only in the case of planting in protected areas. The Environmental Commitments Contract establishes the terms, conditions and operating rules for the implementation of the project that tend to protect the Protected Area, its flora and fauna.

CONAP will sign the contract when: (a) the Management Plan of the Protected Area allows for the activity in question; (b) it is not located in a Protected Area classified as Category I[25] or within the core zones; and (c) the Master and Operational Plan so permits. There is no specific deadline in the law for its subscription, but it must be signed prior to the start of the corresponding operation.

In case of initiating any activity without the Environmental Commitments Contract, it will be considered an administrative offence or a crime. This omission may be classified as a crime of Usurpation of Protected Areas, punishable with 4 to 8 years imprisonment and a fine between US$360.00 and US$700.00.[26] CONAP or any person may file a complaint with the MARN and the Public Prosecutor's Office, so that the corresponding administrative and criminal proceedings may be initiated.

It also acts as complementary legislation:

- Master Plan 2008-2012 of the Cerro San Gil Springs Protected Reserve, CONAP resolution.
- Rio Dulce National Park Master Plan 2005-2010,

[23] The Management Categories are detailed in the Protected Areas Law (Decree 4-89), which are as follows: Category Type I: National Park and Biological Reserve; Category Type II: Protected Biotope, Natural Monument, Cultural Monument and Historical Park; Category Type III: Multiple Use Area, Spring, Forest Reserve and Wildlife Refuge; Category Type IV: Natural Recreational Area, Regional Park, Routes and Scenic Routes; Category Type V: Private Nature Reserve; Category Type VI: Biosphere Reserve; Category Type V: Private Nature Reserve; Category Type VI: Natural Reserve; and Category VI: Biosphere Reserve.

[24] Art. 20 of the Law on Protected Areas (Decree 4-89) "Activities within Protected Areas. Public or private companies that currently have, or in the future will develop commercial, industrial, tourist, fishing, forestry, agricultural, livestock, experimental or transport facilities or activities within the perimeter of the protected areas, will enter into a contract with CONAP, by mutual agreement, establishing the conditions and rules of operation, determined by an environmental impact study, presented by the interested party to the National Council of Protected Areas, which, with its opinion, will forward it to the National Environmental Commission for its evaluation, as long as its activity is compatible with the uses foreseen in the master plan of the conservation unit in question."

[25] This category includes national parks and biological reserves, as they aim to perpetuate the natural state of the region.

[26] Art. 82bis LAP. The value in Quetzales is between Q3,000.00 and Q.6,000.00.

- Other protected area master plans in case of planting on protected area.

In relation to easements, if an electricity transmission line passes through a property, planting is not allowed within the area of the easement, unless it does not affect the electrical clearances and technical specifications. In [27]addition, according to the farm contract with the pipeline, 15 metres must be respected around the passage of the pipeline.

2.2.5. Change of Land Use / Tree Felling Authorization

If it becomes necessary to fell trees in areas containing natural forests, it is necessary to apply for a tree felling licence prior to the implementation of the project. The change in land use is not part of the Project.

The tree felling licence is independent of the approval of the EIA and any other authorisations that need to be obtained. The licence shall be applied for:

- To the **municipality** when the felling is located within the urban perimeter and the volume is less than 10 cubic metres.[28]

- To the **National Forest Institute**, for volumes greater than 10 cubic metres or in rural areas. Felled forest products may be used or marketed by the user. The interested party, at its choice, will pay the Private Forestry Fund[29] or reforest an area equal to the transformed area.[30]

Exceptions to obtaining the licence are established as follows:

a) Shading, pruning, felling and thinning in the cultivation of coffee, cardamom, cocoa and other similar agricultural crops;
b) Felling, pruning and thinning of voluntary plantations registered with INAB;
c) Felling and thinning of fruit tree plantations;
d) Pruning and thinning of compulsory plantations;
e) The pruning and thinning of agroforestry systems and
f) Household Consumption[31] when felling does not exceed 15 cubic metres per year.

The legislation establishes a deadline of 60 working days for the issuance of the corresponding authorisation, but this is not a deadline that is met, so it is necessary for the Proponent to be in constant contact with INAB in the process prior to applying for the licence, as well as during the approval process, with the aim of speeding up the process.

[27] Art. 32 of the General Electricity Law (Decree 93-96)
[28] Art. 54 of the Forestry Law (Decree 101-96)
[29] The amount shall be equivalent to the cost of reforestation of the area subject to change of cover, the amount to be established by INAB.
[30] Art 46 of LF
[31] Household Consumption is understood as the felling of trees for non-profit purposes to satisfy domestic needs, such as fuel, fence posts and constructions, in which the harvester uses the trees exclusively for his own consumption and that of his family.

In the case of requiring the felling of protected tree species, the corresponding authority must send the file to CONAP for authorisation. The legislation does not establish a time limit for these authorisations.

In case of felling of trees without the respective licence, it will be considered an illegal act or offence. Consequently, criminal proceedings will be initiated against the offender, who will be punished for one or more of the following actions[32] :

1) Felling or removing trees without the corresponding licence. If the volume is less than 5 m^3 , it will be considered a misdemeanour and a warning will be issued. If the volume is between 5.1 and 100 m^3 , with a fine equivalent to the value of the wood according to the appraisal carried out by INAB. If it is greater than this volume, with imprisonment of 1 to 5 years.[33]

2) For changing the use of land in areas covered by forest and registered as beneficiaries of the forestry incentive without authorisation, with imprisonment of 2 to 6 years and a fine equivalent to the value of the timber according to the appraisal carried out by INAB.[34]

2.2.6. Registration of the Voluntary Plantation

Voluntary planting is registered with INAB through the submission of the Forest Management Plan as a stand of trees established by direct or indirect planting of forest species. Established without prior commitment to the competent forestry authority for harvesting or for forestry incentives for reforestation. The advantage of having a voluntary plantation is that it is not necessary to have prior authorisation for the felling of the corresponding trees, as indicated above.

Voluntary planting allows the right to cut trees without the need for a licence. The trees become property and can be disposed of freely, without the need for authorisation from INAB. In this case, if the Voluntary Plantation is also registered with Probosque, Probosque's obligations prevail, but the Voluntary Plantation can be used for subsequent actions.

The registration of the voluntary plantation does not have to be done prior to the start of the project and can be submitted afterwards.

INAB has 60 working days from the submission of the complete authorisation application, including the approved EIA to submit its approval for the registration of the Voluntary Plantation.

[32] These offences are in principle commutable, depending on the lesser extent of the damage caused.
[33] Arts. 92 and 103 of LF
[34] Art. 98 of LF

2.2.7. Obtaining Probosque Incentives

The Probosque programme[35] aims to promote and encourage the country's forestry development through sustainable forest management, reduce deforestation of forested land, promote reforestation of forest areas currently without forest, and increase their productivity.

The modality applicable to this project is the establishment and maintenance of forest plantations for industrial purposes, whose main objective is to produce saw timber or to supply the forestry industry. To this end, persons applying for the project will receive monetary incentives based on the size and type of plantation, which they may use for the development of their projects. To be eligible for the incentives, the interested party must submit to INAB the management plan for the projects to be incentivised, and must maintain the forests standing for a minimum period of time to be established in the resolution authorising participation in the programme.

The Forest Management Plan should include at least those elements required by INAB, but can be expanded, for example, to meet the requirements of international institutions such as the International Finance Corporation (IFC), as long as it does not contradict the Forestry Law and its regulations.

In the present case, the property has already benefited from the incentives contained in the Forestry Law (Decree 101-96) under the Forestry Incentives Programme (PINFOR), which was replaced by the Probosque Programme, currently in force. In this context, we believe that there is a possibility that INAB will grant the corresponding authorisations.

INAB has 30 working days from the submission of the complete authorisation application, including the approved EIA, to submit its approval for entry into the Probosque Programme.

2.2.8. Registration as a Sawmill

For the sawmill to be located on the farm "Agroman", it will be necessary to register with the National Forestry Registry of INAB.[36] This registration is carried out by means of the form provided by this institution. Likewise, half-yearly reports must be submitted, stating the type and quantity of raw material processed in the previous quarter and the quantity of product processed and marketed.

INAB has 60 working days from the submission of the complete application for authorisation, including the approved EIA to submit its approval for registration as a sawmill.

[35] Decree 2-2015
[36] Art. 61 of the Forestry Law Regulation. Resolution 02.43.2005

2.2.9. Chainsaw registration

Persons wishing to use chainsaws must request authorisation from INAB at the time of submitting the management plans for forest harvesting or registration of the voluntary plantation.[37] The deadline for the issuance of the corresponding application will be a maximum of 60 working days from the submission of the complete authorisation application.

2.2.10. Building Licence

Municipalities are responsible for issuing building permits for construction within their jurisdiction. In order to begin construction of the sawmill, it will be necessary to request the issuance of a construction licence from the municipality of Livingston, where the project is located. The application will be made based on the Building Regulations for the Municipality of Livingston in the Department of Izabal, which is registered in act number 038-2005, dated 18 November 2005.

Among the most common requirements to be able to apply for a building permit are:

1. Documents proving the existence of the legal entity and legal representation;
2. Document proving the ownership or possession of the property;
3. Description of the work to be carried out, including budget, materials, deadlines, construction system, etc.
4. Duly approved Environmental Impact Study,
5. Plans of the construction and the location of the property;
6. Payment of the Licence Fee: which generally consists of a percentage of the value of the construction.

Each municipality will have its own response times according to its local capacity. It is recommended to approach the Municipality of Izabal to start looking for a speedy response.

In the case of needing to create streets or public roads on the farm, an authorisation from the Guatemalan Ministry of Communications may be required.

On “Rio Frio“ and "Agroman" farms this will not be necessary.

2.2.11. Hydrocarbon Storage Licence

In the event that all or part of the energy with which the sawmill will be operated is derived from petroleum or its derivatives, and there is storage within the project, it will be necessary to have a Storage Depot Operation Licence for Own Consumption from the Ministry of Energy and Mines (MEM). [38]MEM has a period of 30 working days from the submission of the complete authorisation application, including the approved EIA, to issue the Hydrocarbon Storage Licence.

[37] Art. 4 of the Law regulating the registration, authorisation and use of chainsaws. Decree 122-96
[38] Art. 17 of the Law on the Commercialisation of Hydrocarbons (Decree 109-97)

There is no corresponding legislation for the control of atmospheric gas emissions for any type of project. To this effect, the environmental parameters and measures established for the control of atmospheric emissions in the environmental instrument will be considered as law for the project proponent, and will be mandatory.

2.2.12. Solid Waste Disposal

The MARN issued the Acuerdo Gubernativo 164-2021: Reglamento para la gestión integral de los residuos y desechos sólidos comunes , as a tool that addresses the origin of waste production, and regulates the collection, transfer, treatment and final disposal of waste and solid waste.

2.2.13. Use of Pesticides, Fertilisers and Fertilisers

The use of pesticides, manures and fertilisers is not regulated in the country. However, if the project owner is interested in importing, exporting, formulating, repackaging, storing and marketing fertilisers and fertilisers for his project, he is obliged to obtain a registration from the Ministry of Agriculture, Livestock and Food (MAGA).[39]

2.2.14. Occupational Health and Safety Regulation

The Occupational Health and Safety Regulation[40] arises from the obligations that the Labour Code[41] and the Health Code[42] impose on employers in relation to the protection of their workers.

This regulation establishes the obligations of employers to ensure the physical, mental and social well-being of their workers, and thus their efficiency at work, by controlling those risks that may cause accidents or occupational diseases. To this end, it is necessary to have an Occupational Health and Safety Plan, which is submitted to the Ministry of Labour for approval.

Related to this regulation, and to be included in the Occupational Health and Safety Plan, the following regulations also establish protection obligations for workers in their workplace, which must be taken into consideration: a) Complementary Norms to the Occupational Health and Safety Regulation, for the Prevention and Control of SARS VOC-2 Outbreaks in Workplaces;[43] and b) Manual for the Constitution, Organisation and Functioning of the Bipartite Committees for Occupational Health and Safety in Guatemala.[44] In addition, it is important to take into consideration the Regulation on Registration, Commercialisation, Use and Control of Agricultural Pesticides and Related

[39] Decree 43-74 and Governmental Agreement No. 746-93
[40] Governmental Agreement 229-2014
[41] Decree 1441 of the Congress of the Republic
[42] Decree 90-97 of the Congress of the Republic
[43] Governmental Agreement 79-2020
[44] Ministerial Agreement 23-2017

Substances[45] which establishes obligations for the use of personal protective equipment when applying agricultural pesticides.

Likewise, it is necessary to prepare an Emergency Response Plan, which establishes the guidelines and directives to act in the face of the different emergency situations that may arise, such as fires, earthquakes, floods, etc.[46]

6.1.15 Labour Regulation

The Labour Code establishes certain mandatory obligations for employers when hiring employees:

- *Employment contract*: An employment contract must be drawn up for each employee, and a copy submitted to the Ministry of Labour within 15 days of signature.
- *Salary*: All employees must receive at least the Minimum Wage established annually[47] , as well as the payment of the incentive bonus[48] . Likewise, the payment of the Aguinaldo[49] and the Bono 14[50] is mandatory.
- *Working day*: must comply with the Ordinary working day (between 6 and 18 hours on the same day; cannot be more than 8 hours a day or 44 hours a week); Night working day (between 18 hours on one day and 6 hours on the following day; cannot be more than 6 hours a day or 36 hours a week); and Mixed working day (covers part of the day and part of the night, and cannot be more than 7 hours a day or 42 hours a week).
- *Holidays*: Every worker, without exception, is entitled to a period of paid holidays after each year of continuous work in the service of the same employer, the minimum duration of which is fifteen working days. In order for the worker to be able to enjoy the holidays, he/she must have worked a minimum of 150 days in the year. Holidays cannot be accumulated or compensated in money.
- *Weekly Rest*: Every worker is entitled to one paid rest day after each working week.
- *Wage book*: In which the payment of wages and other emoluments to workers is documented, as well as statutory deductions arising from the payment of taxes and occupational health and safety.
- *Internal Working Regulations*: Where there are 10 or more workers, Internal Working Regulations must be drawn up and approved by the Ministry of Labour.

[45] Governmental Agreement No. 377-90

[46] Art. 141 of GA 229-2014

[47] The Minimum Wage for the year 2022 is established as follows: For agricultural activities Q.2,872.55 and for non-agricultural activities Q.2,959.24.

[48] The amount of the incentive bonus is Q.250.00.

[49] It is equivalent to 100% of the average salary of the last 6 months and is paid annually on 15 December of each year.

[50] It is equivalent to 100% of the average salary of the last 6 months, and is paid annually on 15 July of each year.

- *Registration with the IGSS*: When there are 3 or more workers, the employer must register with the Guatemalan Social Security Institute (IGSS), and pay the employer's contribution (10.67%), and deduct the worker's contribution (4.83%) from the salary.
- *Annual Report*: Send in the first two months of each year to the Ministry of Labour a report indicating total expenditures for salaries or any other economic benefits during the previous year, as well as information on workers.

2.2.15. Watershed Protection and Conservation

Since the project is located within the Río Dulce Basin, the owner will have the right to participate in the Technical Committee of the Basin, as a user of the water resource. As a member of this technical committee, the owner will be able to promote and encourage those actions that he considers appropriate for the protection of the corresponding basin and its natural resources. This can be done through the contribution of experience and knowledge for the elaboration of the respective strategies. Participation in the technical roundtable is voluntary, and must be requested from the MARN, which has the right to authorise or not the participation of the landowner.[51]

2.2.16. Protection of the Nation's Cultural Heritage

Decree No. 26-97 definitively contains the Law for the Protection of the Cultural Heritage of the Nation and its reforms by Decree 81-89. The purpose of the law is to establish regulations to legally promote the rescue, investigation, salvage, recovery, conservation and valorisation of the goods that make up the Cultural Heritage, including archaeological sites.

To this end, the dissemination of cultural goods and the precise definition of those concepts which, being such a specialised subject, need to be correctly interpreted in order to have a properly established nomenclature.

It also includes sanctions for the crime of spoliation, in order to prevent property owners from destroying an asset that is part of the National Cultural Heritage, and to create an inter-institutional commission at the highest level to resolve cases of impact where National Cultural Heritage assets are at risk.

2.2.17. Project consultation and social participation

Guatemalan law provides various spaces for communities and interest groups to give their opinion on the development of the project according to its level of impact and importance, and the spaces legally created for consultation and social participation around the project are presented below.

[51] Governmental Agreement 19-2021

2.2.17.1. Public Participation in the process of approving the Environmental Instrument[52]

For Projects categorised as A (High Impact) or B1 (Medium to High Impact) you will need to undertake the public participation process. The public participation process does not apply for projects in Categories B2 or C.

The following mechanisms should be included in the public participation process if necessary:

a) **Publication of edicts**. The proponent shall publish the edict in a newspaper of major national circulation, and in the newspaper of major regional circulation in the AIP in order to inform that an environmental instrument will be submitted to the MARN, which shall place on its website a digital copy of the edicts presented in the Environmental Instrument. The edict shall be published in Spanish and in the language prevailing in the area where the project is located.

b) **Observations and Opposition.** Individuals or legal entities with an interest may present their observations or objections within a period of 20 days from the third day of the publication of the edict. Oppositions presented within the period foreseen in the present article will be made known to the proponent so that he/she may strengthen the instrument and eliminate any deficiencies, whether technical or documentary.

   In the final resolution of the environmental instrument, the MARN will resolve on the observations, opinions or oppositions that have been presented within 20 days of the public hearing, by individuals or legal entities with an interest, as long as they have a technical, scientific or legal basis to support their opinion or criterion, and will be notified of the results in order to determine the solution or resolution of the same.

c) **Documentation of participatory methodology.** For Category A Projects, the proposer must submit interviews, surveys, workshops, assemblies and/or working meetings, considering the linguistic community and cultural relevance of the AIP.

d) **Public participation guide.** It should at least develop: how public communication was encouraged during the elaboration of the environmental instrument, how potential conflicts were resolved and detail all activities that will be carried out to involve and/or consult the population during the different phases of the project's development. The proponent must develop and implement public participation mechanisms before, during and after completion of the environmental assessment, control and monitoring process, as appropriate.

[52] Arts. 43 to 47 of GA 137-2016

2.2.17.2. Consultation with indigenous peoples

Guatemala became a signatory to the International Labour Organisation (ILO) Convention 169 concerning Indigenous and Tribal Peoples in Independent Countries (ILO Convention 169) in March 1996 by means of Decree 9-96 of the Congress of the Republic. Even though Convention 169 is an international instrument, it is included as national legislation in this report, because it is the applicable norm in the country, as there is still no national regulation that establishes the mechanisms for implementing consultation.

The purpose of this convention is to guarantee workers of indigenous and tribal peoples effective protection in terms of hiring and employment conditions, avoiding any type of discrimination. In its articles 6 and 7, it establishes the State's obligation to carry out good faith consultation processes with indigenous peoples, as a fundamental collective right aimed at gathering the free and informed opinion of these communities, when considering possible government actions that could directly affect them, in order to establish agreements or measures that are meritorious. In these cases, the public participation of the communities located in the area of influence of the projects is necessary.

The Ministry of Labour is currently developing implementing regulations for the convention, but it is not publicly known when these will be available. Until this regulation is enacted, the lack of implementation procedures for the Convention creates socio-environmental risks for Guatemala, specifically for companies operating in areas of mostly indigenous influence.

In the absence of regulations for the implementation of consultation processes with indigenous peoples in Guatemala, the applicable legislation is based on international frameworks and case law on the implementation of previous consultation processes in the country. In this regard, some points to take into consideration are summarised below:

- Consultation processes with indigenous peoples in Guatemala have been required by the Constitutional Court following appeals filed by civil society against projects.

- Consultation processes with indigenous peoples in the country have been required for mining and hydroelectric projects. There is no precedent for requiring consultation for agricultural or forestry projects.

- The governmental body that has carried out these consultation processes in previous processes has been the Ministry of Energy and Mines for mining and hydroelectric projects. In the event that a consultation process is required for a forestry project, INAB should be the authority in charge of the process.

- According to the interpretation of the Constitutional Court (CC), in the judgment issued in case number 3878-2007 dated 21 December 2009, States must observe the right of consultation that indigenous peoples have within their national boundaries, that is, in the place where they live. However, consultation is not equivalent to a veto prerogative, which is recognised for indigenous peoples. The

right to Consultation is a sign of the need for constructive dialogue between the people of the communities and the other parties involved, and can also demonstrate whether, in the particular case, certain agreements are required in order to achieve the greatest benefit for both parties.

- The consultation process may be required prior to the development of a project and/or when the project is already in operation. In case the project is already in operation, the impact is that a provisional suspension of the projects may be required due to lawsuits in Amparo proceedings for not having carried out the consultation process prior to granting the corresponding licences.

2.2.17.3. Neighbourhood consultation

Based on articles 63 to 66 of the Municipal Code (Decree 12-2002) a Neighbourhood Consultation can be promoted in order to seek the opinion of the neighbours on issues of special importance and which fall within the competence of the municipalities.

The Neighbourhood Consultation Call can be made in one of the following cases:

- That the Municipal Council, with 2/3 of its members, deems it appropriate;
- It must be requested by at least 10% of the registered residents;
- At the request of the communities, through the COCODES Coordinating Body or the indigenous authorities[53] , on issues of interest to them.

The Neighbourhood Consultation is the only legal means established by law so that either communities or neighbours can participate in decisions that are of interest to them or that may affect them. This consultation would be convened by the Municipal Council. The modalities of the consultations may be carried out as follows:

a) Consultation in a ballot technically and specifically designed for the case, stating in the call the issue to be addressed, the date and the places where the consultation will take place.
b) Application of criteria of the legal system specific to the communities concerned.

The results will be binding if at least 50% of the registered residents participate in the consultation and the majority vote in favour of the matter consulted.

2.2.17.4. Municipal opposition

A municipality that opposes the project for governmental reasons may take de facto measures either by convening a Neighbourhood Consultation or by denying any of the

[53] Guatemala is party to Convention 169 on indigenous and tribal peoples, which was approved by Decree 6-96 of the Congress of the Republic, which establishes in Article 6:
"(a) consult the peoples concerned, through appropriate procedures and in particular through their representative institutions, whenever consideration is being given to legislative or administrative measures which may affect them directly; (b) establish means by which the peoples concerned can freely participate, to at least the same extent as other sectors of the population, and at all levels of decision-making in elective institutions and administrative and other bodies responsible for policies and programmes which concern them; (c) establish means for the full development of these peoples' institutions and initiatives, and in appropriate cases provide the necessary resources for this purpose.

permits it is required to grant. In the event that a permit is denied without just cause, in order to reverse the decision of the municipality, action must be taken in accordance with the Administrative Remedies and the Contentious Administrative Process established in the Law on Contentious Administrative Matters (Decree 119-96).

2.2.18. Private Nature Reserve

Private Nature Reserves are areas belonging to individuals or legal entities, which the owners VOLUNTARILY and FOR AS LONG AS THEY DEEM APPROPRIATE, for the conservation and protection of flora and fauna habitats, as well as biotic communities or features of the environment.

They ensure the preservation, stability or survival of certain species of plants and animals, through the protection of critical habitats, breeding populations and feeding or breeding areas.

These reserves have the full backing and recognition of the State for the protection of the integrity of the land and its resources and are managed at CONAP by means of a request document following the instructions of the Regulation.

2.3. Identification of future legislation that may have an impact on project operation

The following bills are currently under discussion in Guatemala that may have an effect on the environment:

- **Water Law:** This is a constitutional mandate, yet to be fulfilled. To date, more than 16 bills have been submitted to Congress, and MARN and other private institutions have drafted their own bills, which are awaiting approval by Congress. Due to the forestry nature of the project, it is very likely that the regulation that is finally approved will contain some regulation that obliges the company to comply with certain obligations. Among the duties that may be imposed on the project proponent are payments for environmental services, the imposition of a minimum ecological flow different from that agreed, or mandatory measurements.

- **Initiative providing for the adoption of reforms to the nation's natural and cultural heritage legislation:** This initiative includes regulations that tighten obligations with respect to logging, care of protected areas and natural and cultural heritage. Initiative No. 5192, which was heard in first reading on 17 November 2016.

Annex 1 contains a list of the main legislation applicable to the project in different legal branches and Guatemalan instruments that should be considered in future stages for the procedures to be carried out by the project.

2.4. Analysis of existing environmental permits

The following is an analysis of the existing environmental permits that were shared by Interforest and the Forestry Regent of Grupo Occidente's[54] "Rio Frio" and "Agroman" farms.

It is not known if there are any other environmental permits.

2.4.1. Prior EIA approval

File D-028-12, for the AGROFORESTAL RÍO FRÍO Project, approved by resolution 516-2013/DIGARN/UCA/ODGR/caml of 4 February 2013. Project consisting of the plantation of *Hevea brasiliensis*, managed under principles of sustainability, owned by the entity Agropalmeras, Sociedad Anónima. Modified by resolution 514-2013/DIGARN/LTCT/arg dated 7 June 2013.

- The project has a Surety Insurance issued by Grupo Financiero de Occidente identified with the number C-6 201300485 with validity from March 8, 2016 to March 7, 2018.
- It also has an Environmental Licence No. 03991-2016/DIGARN, valid from 8 March 2016 to 7 March 2018.

In order to carry out the operation of the melina project, it will be necessary to request the CLOSURE OF THE RÍO FRÍO AGROFORESTAL PROJECT, and for it to be cancelled before the MARN, as its objective differs from the purpose of the new Project.

It is noted that it is not possible to have two environmental licences for the same piece of land. Therefore, given the urgency of developing the environmental licence for the melina project, the PINFOR licence for the eucalyptus forestry project should be closed.

NOTE: The cancellation of PINFOR may entail the return of all incentives received by the owner from Agroman, so this payment must be contemplated to INAB, who administers PINFOR, at the time of cancellation of such authorisation.

Subsequently, the environmental licence for the eucalyptus must be closed prior to the sale and purchase process and the forest management plan of the harvesting licence must be closed.

Subsequently, in order to remove the eucalyptus from the farm, Arbaro can proceed by two ways, 1. Register this voluntary plantation with INAB in its name, which may take 2 months, and then proceed to cut it down. Another way is to apply for a Land Use Change Licence, which indicates the number of trees and their species to be felled. This licence is requested from INAB, even if you have an EIA.

[54] The Grupo Occidente is the current owner of the properties. This refers to the forest manager of the current farms owner.

In the case of the rubber planted on the farm, it does not have an environmental licence. It is recommended that Arbaro register this voluntary plantation with INAB in his name, which may take 2 months, and then proceed to cut it down.

A single voluntary plantation may be registered with INAB for both crops by making an inventory of trees and then proceeding with felling.

2.4.2. Approval of the Forestry Management Plan PINFOR

Approval Nº 3-1-1802-58-2.1-2014, the farm "Río Frío", through its owner, Agropalmeras S.A. has the approval of a Forestry Management Plan for the plantation of several species of eucalyptus. The term of the approved project is from 26 September 2014 to 31 December 2023.

Since this approval is not compatible with the purposes of the "Forestal del Caribe Project", Agropalmeras S.A. will have to request the closure of the project under its name (PINFOR), and the proponent of the new project will have to make its own application to INAB in order to benefit from the incentives granted by Probosque.

2.4.3. Application to CONAP

Based on Opinion DAGeos-111-2018/LL/RAAP/cc dated 8 March 2018, CONAP issued a resolution indicating that the "Río Frío" farm intersects with the Río Dulce National Park Protected Area, in the Special Use Zone, and with the Cerro San Gil Springs Protected Area, especially in the Buffer Zone.

This resolution establishes that for any authorisation to be obtained in relation to the Project, it will be necessary to have a favourable opinion from CONAP in the event that the property coincides with these protected areas.

Prior to requiring environmental licences, it will be important to split the portions of the farms that coincide with protected areas, so that these do not form part of the Project. After such splitting, a location must be requested from CONAP indicating that the properties do not coincide with protected areas.

2.4.4. Mining Licence

A mining licence authorisation to mine white pumice sand, grey pumice sand, yellow pumice sand, gravels, boulders, conglomerates, tuffs, serpentinites and limestones is submitted on behalf of Agropalmeras S.A. Contained in Resolution 1039 dated 21 March 2012.

Upon acquisition of the farm where the project will be developed, it will be necessary for Agropalmeras, S.A. to submit the application for the cancellation of said Licence and to carry out all those activities necessary to comply with the closure requirements, including the restoration of the site if necessary.

3. The project

In this section, the general information on the project is presented, considering its justification for its development, the objectives of this strategic level ESIA, as well as the location and areas of influence of the Project "Forestal del Caribe" to be developed by Arbaro Fund and managed by Interforest S.A.

3.1. Project description

Arbaro seeks to develop a forestry project to plant melina (*Gmelina arborea*) in a controlled manner. The purpose of the wood produced will be its use as raw material for the production of pallets. The project will be implemented in two stages:

- The first stage would begin with the purchase of two farms. One of them for the sowing and cultivation of melina in approximately 1,000 ha, the farm "Rio Frio" for the sowing of melina, currently owned by Agropalmeras S.A. which belongs to Grupo Occidente S.A., and the other for the construction of a sawmill for the sawing of melina boards and an eventual nursery, the farm "Agroman" located in the vicinity of the community of Buenos Aires, about 40 minutes from the farm "Rio Frio" which belongs to the same group, for this report AID or Area of Direct Influence, see map below.

- The second stage of the Project considers the purchase and/or lease of additional farms located in the Area of Influence of the Project (AIP) which was previously defined by Arbaro and which includes both sides of the La Ruidosa to Petén highway, approximately from the community of Buenos Aires to the community of Las Guitarras and which covers 62,802.70 ha according to the map below. In this area, 2,000 to 5,000 ha of melina are expected to be planted in total, and more than 20 farms are currently being evaluated for this purpose. The sawmill at the farm "Agroman" will be the facility that will process the raw material from the project in both phases, see maps below.

The project envisages the establishment of two operational alliances with Guatemalan companies. First, Interforest, S.A., a private company, will manage the plantation in Guatemala thanks to its experience in consultancy, technical studies, administration, management, handling and marketing of forest assets and timber harvesting under socio-environmental responsibility standards in the various communities in which it operates.

Secondly, Forestal Rio Blanco, S.A. a private company, which will transform the melina boards into wooden pallets or pallets for the export of fruit and vegetables. Its industrial operation produces sawn timber, kiln-dried and manufactured products for construction, furniture and multiple uses required by its customers. It is also internationally certified (IPPC) for packaging and pallets.

The dimensioned melina lumber produced at the sawmill will be sent to Forestal Rio Blanco's sawmills where pallets of lumber will mainly be developed. Forestal Rio Blanco has two mills in El Rancho, El Progreso and two sawmilling and assembly plants in Puerto

Barrios. This company is considered one of the main producers of pallets in the country and has an assembly plant for the manufacture of pallets and packaging.

At present, the area in which the project is planned to be developed is mostly agro-industrial, with several commercial forestry plantations and other agricultural crops such as pineapple, as well as livestock.

The plantation will have social and environmental management systems in place, following Arbaro Fund requirements based on environmental, social and public policies that align with all Forest Stewardship Council (FSC) and IFC Environmental and Social Sustainability PS principles and certification criteria.

In addition, all melina planting, both in the first and second phases, is planned to be carried out on deforested land or land with human-modified land use. No activities will be carried out in protected areas. Planting, management and harvesting activities will be mechanised.

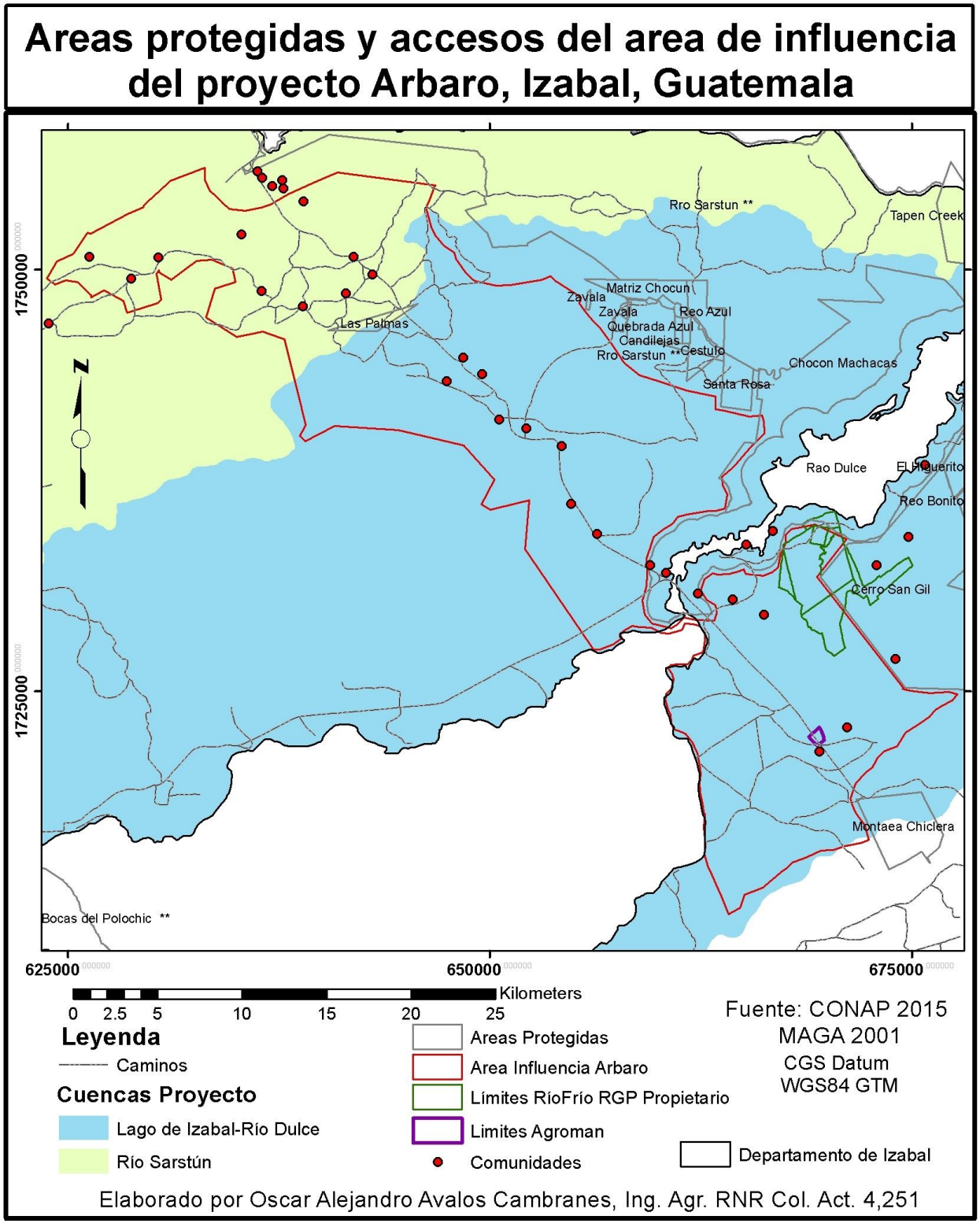

Figure 1. General Map of the Project. Source: Interforest, 2022.

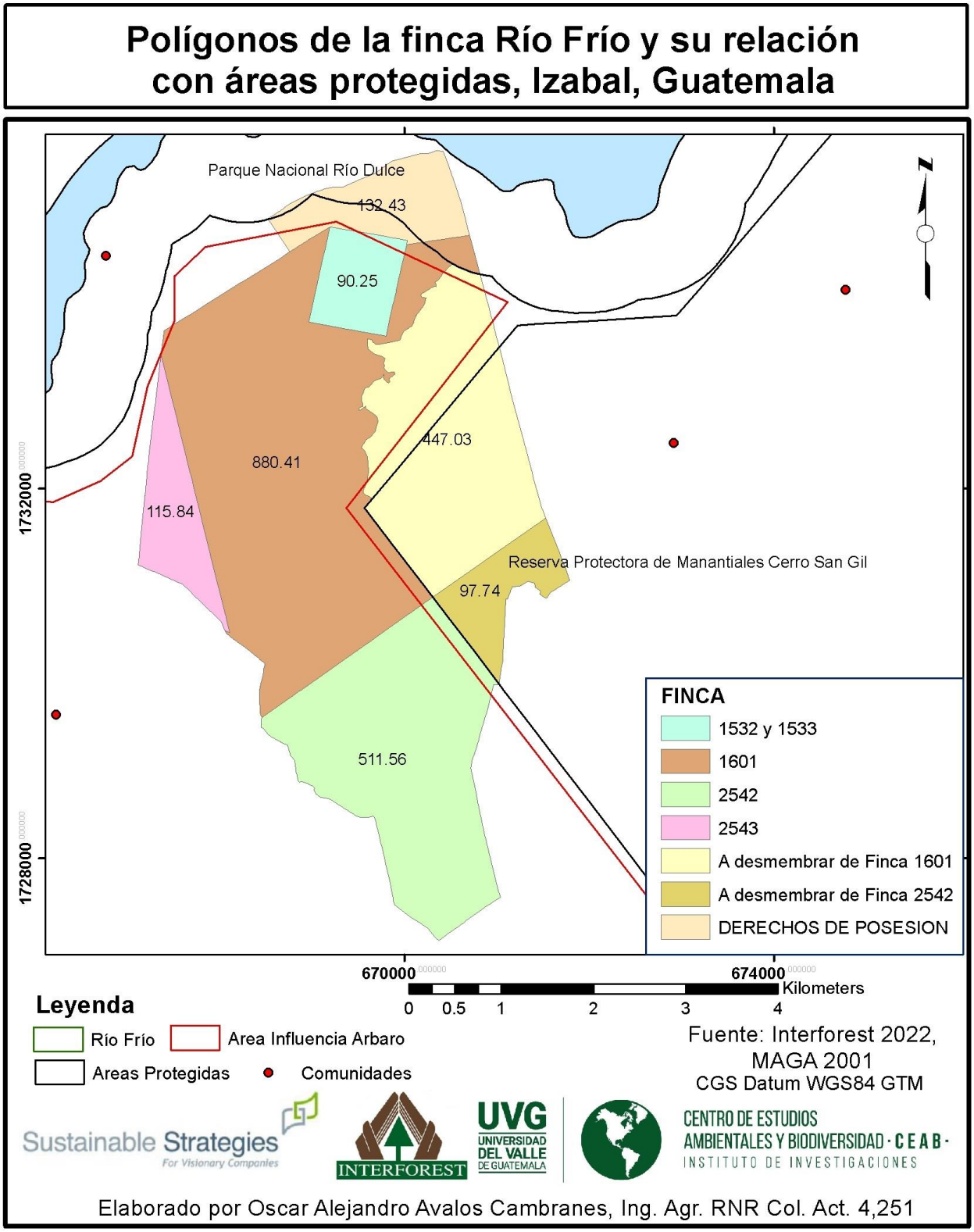

Figure 2. Polygon map of the farm "Rio Frio". The property that will be bought directly by Fundaeco from the seller is not included in this Figure

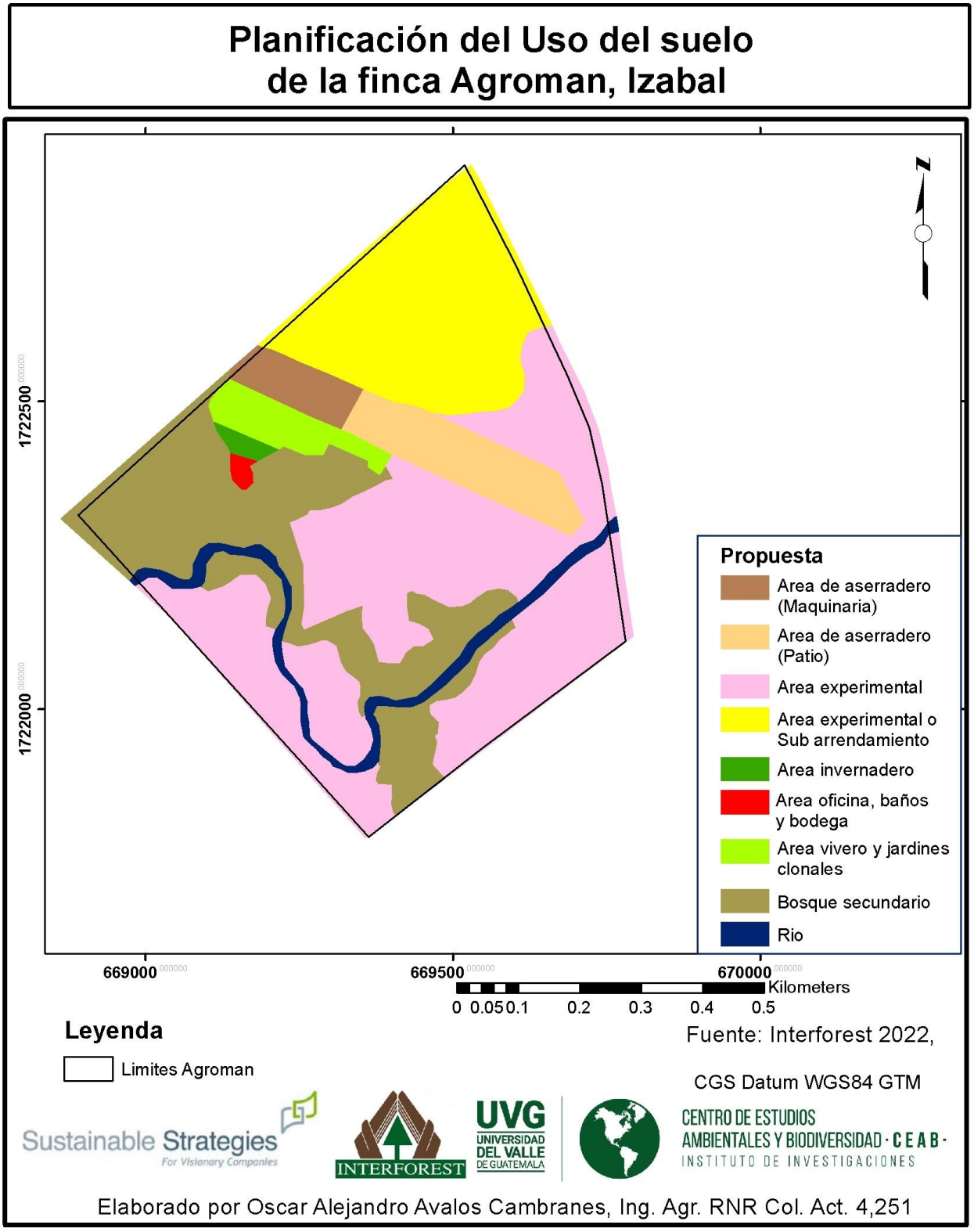

Figure 3. Map of the farm "Agroman".

3.2. Objectives of the Forestal del Caribe Project

- Establish a forest plantation on the "Río Frio" farm, where 1,000 ha of melina can be planted and used for the production of wood for pallets.
- Expand melina plantations in the defined AIP by selecting farms with human-modified land uses to between 2,000 and 5,000 ha, either by leasing or purchasing real estate.
- To have a primary sawmill for the sawmilling of wood from the project's plantations, which will later be transformed into wooden pallets for the export of fruit and vegetables.
- Produce timber sustainably for the pallet industry, meeting international standards for the forest industry, as well as the IFC Performance Standards and carbon sequestration, contributing to climate change mitigation.
- Promote the socio-economic development of the area and neighbouring communities in line with the sustainable development of the project.

3.3. Justification

Internationally there is a demand for more and better quality wooden pallets to move products in global trade. The supply of pallets has become scarce and there are commercial opportunities to supply pallets sustainably.

At the national level, the economic importance of forests lies in the supply of timber goods, covering domestic demand (approximately 800,000 m^3 /year) and demand for firewood as an energy source (1 m3/year per capita, mainly in rural areas). It also adds value to the environmental services linked to the country's forests.

The department of Izabal has the largest forestry industry in the country. There are plantations of rubber, eucalyptus, Caribbean pine, teak and melina, among others. In the 1990s, the American company Simpson carried out a plantation of 10,000 ha of melina, successfully demonstrating the plantation and introduction to the country of this commercial species, which is authorised by the Guatemalan entities that promote sustainable forestry development, such as INAB and CONAP, as described above: INAB and CONAP described above in the legal section.

The forestry sector, to which the project would belong, is recognised for its competitiveness, unity and leadership in solving common problems in the sector. This sector is considered one of the main contributors to the growth of the Gross Domestic Product in Guatemala. In addition, it has a positive contribution to the country's development, social and environmental issues.

The farms identified for the development of the project present the opportunity to develop pallet melina in a sustainable way and generate positive impacts on the environment and the communities around the project.

3.4. Project location

The project "Forestal del Caribe" is located in the north-east of Guatemala, in the department of Izabal, Guatemala, in the vicinity of the river Dulce and close to Lake Izabal. The total area of influence of the project covers more than 62,000 ha on both sides of the road from La Ruidosa to Peten, approaching between the communities of Buenos Aires and the community of Las Guitarras.

Finca "Río Frío" is located in the northeast of Guatemala, near the banks of the Río Dulce and the banks of the Golfete del Río Dulce, approximately 5 hours from the capital of the country. It is located in the jurisdiction of the municipality of Livingston, department of Izabal, Guatemala. To get to the farm, you must drive along Km 265 on the CA-13 highway and then continue for approximately 30 minutes on dirt roads between farms to get to the entrance of the farm.

Finca "Agroman", where the sawmill will be located, is located on the CA-13 road at approximately km 260, about 15 minutes before reaching Rio Dulce and about 40 minutes from the farm "Rio Frio".

3.5. Areas of Influence

In order to standardise concepts and to better understand the references to different geographical areas of the project, the following describes the area of influence and how it is composed.

- Area of Project Influence (AIP) or possible area of expansion: refers to the geographical area in which the interrelation of the project with the identified physical, socio-economic and biotic elements is framed, on which it can have an impact to varying degrees or intensities. For the "Forestal del Caribe" project, this area was previously defined by Arbaro Fund and comprises, according to the map above, 62,802.70 ha located on both sides of the road from La Ruidosa to Petén, approximately from Buenos Aires to Guitarras, intersection of the northern transversal highway (area delimited in red in Figure 2). The AIP evaluates the possible expansion of phase two and the development of phase one. Within the AIP is the Area of Direct Influence and the Area of Indirect Influence.

- Area of Indirect Influence (AII): These are areas that, despite being far from the project as such, may receive part of the socioeconomic, physical or biotic impacts generated by the project, but at a lower intensity. For the purposes of the "Forestal del Caribe" project, these would be the areas outside the boundaries of the "Río Frío" and "Agroman" farms. In later stages of the work in relation to the possible expansion, it will be analysed if even the AII could extend beyond the area previously defined by Arbaro as AIP.

- Area of Direct Influence (AID): This is the area where the project will start with the first phase. It is directly linked to the activities to be developed by Arbaro with the planting of melina and the facilities it will build (including the sawmill) and is the area

that will directly receive the potential impacts during the construction and operation of the project. In this case, it is clearly delimited to two specific farms and the interconnections to be used.

- Associated infrastructure, as defined by the OECD, could include the pallet assembly facility and access roads to farms (particularly if these have to be widened to allow truck access).
- Finca "Agroman" has approximately 53 ha for the location of the sawmill and nursery.
- Finca "Río Frío": The project consists of a total of 2,275 ha within six properties to be acquired.
    - Of this total area, 462 ha coincide with protected areas and will not form part of the Project.
    - Of the 462 ha that coincide with protected areas, the Rio Dulce National Park and the Cerro San Gil Spring Reserve are addressed.
    - All portions of land including protected area to be split will be sold to Fundaeco, a conservation NGO.
    - Of the 1,813 ha of available area, 1,000 ha will be used for the melina project. Within the total available area, some sections will be left for native forest protection and conservation, according to the Guatemala's law and the best forest practices.
- One of the properties that belongs to Finca "Río Frío" will be bought directly by Fundaeco from the seller.

See details of areas in the table below.

Table 4. Farms that make up "Rio Frio", their size and the areas to be split.

No.	Property	Buyer	Area Total	Area Ap	Area Disponible
1	Posession rights	Arbaro	132.43	84.59	47.84
2	Possession rights to be split	Fundaeco	85.40	85.40	0.00
3	1601	Arbaro	1327.44	280.53	1046.91
4	1601 to be split	Fundaeco	278.50	278.50	0.00
5	2542	Arbaro	609.3	97.74	511.56
6	2542 to be split	Fundaeco	97.70	97.70	0.00
7	1532 y 1533	Arbaro	90.25	0	90.25
8	2543	Arbaro	115.84	0	115.84
9	Property that Fundaeco will buy directly*	Fundaeco	354.51	354.51	0.00
		Total	**2,275.26**	**462.86**	**1,812.40**

**This property is not part of the project nor part of the total*

3.6. Forestry Operations

The melina forest plantation has an expected felling or harvesting cycle of 6 years. The following six activities are projected for the forestry cycle, which are described below.

Note that for the "Rio Frio" farm it is expected that approximately 500 ha will be planted in the first year and then 500 ha in the second year.

3.6.1 Site and soil preparation

As the plantations are established in grasslands, guamiles, shrubs, bushes, thickets and areas previously used for forest plantations (rubber and eucalyptus), the sites will have to be cleared using the ruma process (mechanised clearing).

Soil preparation will be carried out throughout the planting area, as most of the sites suffer from soil compaction due to previous intensive use (specifically livestock activities with sown pastures). In addition, sites previously used for livestock are degraded and require improvement. Soil preparation includes ploughing and tillage, using a tractor, as well as subsoiling and lime application in rows whenever necessary.

Some additional considerations for soil preparation will be:

- Consider leaving the organic material of the ruma positioned in the layout so as not to encourage slagging and erosion.
- Consider firebreak areas in the layout.
- Smoothing of slopes for road access for the passage of tractors and harrows.
- Drainage management plan for flooded areas or areas at risk of flooding.

The following inputs are required at this stage:

- Application of agrochemicals for improvements due to the nature of the soil.
- Weed control through manual labour and herbicides.
- Ant or zompopo control (application of insecticides).

3.6.2 Species selection

The project will use cloned plants of the species *Gmelina arborea* (transferred from Costa Rica and/or from nurseries on the south coast of Guatemala).

3.6.3 Plantation

All planting will be done on land that was deforested in the 1990s. No work will be done in protected areas.

It is planned to plant in the rainy season and to have a planting distance of 2.5 m between plants x 5.0 metres between rows, which represents a density of 800 trees per hectare.

3.6.4 Maintenance

For the first year of maintenance, reseeding should be considered in order to complete the density of the individuals that do not survive; in addition, a couple of cleanings (manual, chemical and/or mechanical weed control) should be considered.

For the second year, again at least two cleanings have to be carried out.

For the fourth year, the initial density is reduced to 50% to increase the sunlight input. This may cause an increase in weeds, so weeding will have to be maintained at this stage and year.

Authorised herbicides and agrochemicals will be used under consideration of FSC certification.

3.6.5 Pruning

It is necessary to carry out the respective pruning annually or in 4 to 5 years of the 6-year cycle, which favours a better conformation of the trunk (stem). This must be carried out carefully so as not to cause damage to the bark and favour infection by pathogenic agents. The first pruning will be carried out with machete, later with scissors, foxtail, possibly machete and ladder and finally with ladder and motorised equipment, having a phytosanitary programme so as not to affect the cuts.

If the species has among its characteristics self-pruning, it will favour the implementation of this activity, so it is necessary to know the characteristics of the clones of this species; the materials obtained from pruning should be distributed or accumulated within the sites, so that they decompose and are incorporated into the soil, also this management of pruning residues are flammable materials that it is necessary to have a control to prevent and reduce the risk of forest fires.

3.6.6 Thinning and final felling

At the end of the fourth year, thinning will be carried out at an intensity of 50% (extraction of 400 individuals), the selection of these for felling, extraction and harvesting can be those with unsuitable characteristics such as: suppressed, twisted, forked or badly shaped trees; if the individuals have the desirable characteristics, one out of every two individuals must always be eliminated.

The final felling will mainly take place in year 6, however, with the knowledge of the species in the region for more than 2 decades and the characteristics of the clones that will be used, it will be possible to extend the final felling. This will be defined according to the objectives of the plantations and mainly by those in charge and responsible for the project, as well as seeing the results of the first reforestations and making decisions later, to obtain better results in the short term.

Harvesting will be carried out mechanised, using harrows to transport the material to the sawmill.

No timber shall be transported by water.

“Rio Frio" farm: forestry operations are planned to be carried out starting in 2022 with the planting of 500 ha and then planting another 500 ha in 2023 for a total of 1,000 ha to be planted.

As complementary infrastructure to be built on the farm, the following are planned:

- Tractor galleys
- Agrochemical warehouse
- Fuel storage (if necessary)
- Guardianship
- Health services
- Septic tanks
- Office
- Improvements to access roads
- Firewall areas
- Fence improvements
- Drainage improvements

"Agroman”: The land to be acquired is 52.67 ha.

The project will be developed on 4 to 10 ha for the construction of the sawmill and associated infrastructure, see previous map of the "Agroman" farm.

As complementary infrastructure to be built on the farm, the following are planned:

- Sawmill
- Collection yard
- Drying yards
- Guardianship
- Fence improvements
- Office
- Greenhouse for pylons
- Drainage improvements
- Workshops
- Health services
- Septic tank
- General storage
- Agrochemical warehouse
- Fuel storage
- Parking galleys
- Drying oven

For the other farms under evaluation for expansion of operations, no timeline or forestry development expectations have been projected.

3.7. Project Classification

Sustainable Strategies recommends that the project be classified as **Category "B"** according to the methodology recommended by the IFC Performance Standards, assuming the provisions set out below.

The total estimated footprint of the project is about 1,000 ha in its initial phase with an eventual expansion to between 2,000 to 5,000 ha. The project will be carried out on land previously mostly in agroforestry use, reducing impacts from land use changes. The Project's Area of Influence is primarily "modified" habitat and portions of "natural" habitat. According to our review, no "critical" habitat was identified, see map below.

The Project Influence Area borders several protected areas. The classification of the Project as category B considers the commitment of the investor and developer not to carry out operations over protected areas, see map below defining project area bordering protected areas.

In this context, the impact assessment indicates that the Project is expected to be undertaken with limited adverse environmental and social risks and impacts, impacts that are few in number, generally site-specific, largely reversible and addressable through mitigation, control and monitoring measures.

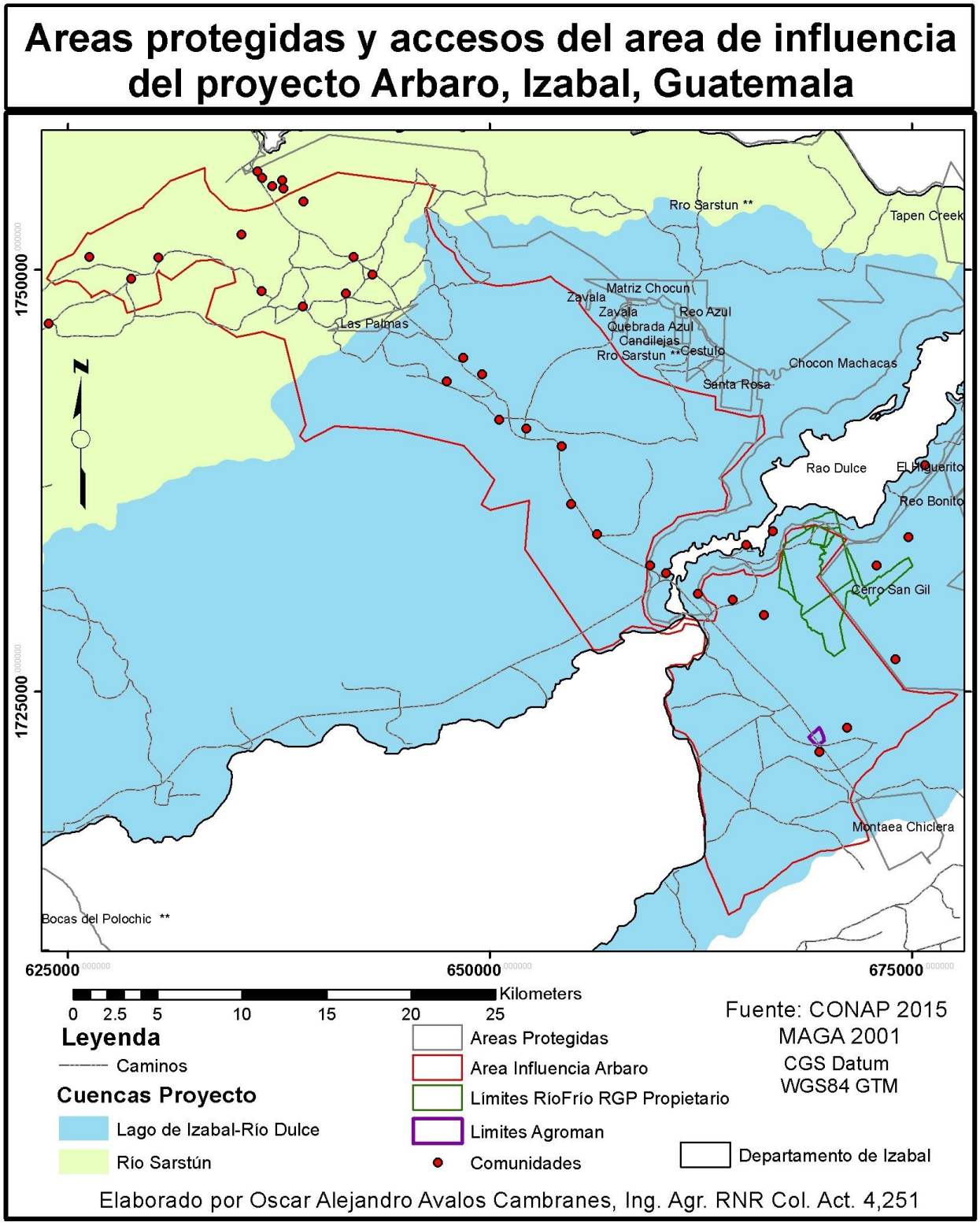

Figure 4. *Map of the AIP and protected areas.*

4. Baseline

This section presents the baseline developed for the strategic level ESIA for the physical, biotic and socio-cultural components.

In order to meet the requested scope, the data mentioned for the AIP are generic and will need to be expanded in future work and studies to be carried out for the AID.

In general terms, each of the sections is addressed:

- AIP: generally including information from third party sources.
- AID: in greater detail and breakdown, addressing both information from third party sources and own observations.
- AII: in a limited way giving a general detail of current status, when there is relevant data to mention.

It is noted that there is no information on sunlight, noise or air quality and therefore this data is not included in the ESIA.

4.1. Physical component

4.1.1. Climate

The department of Izabal, according to the 32-year record of the Las Vegas weather station of INSIVUMEH (National Institute of Seismology, Volcanology, Metrology and Hydrology of Guatemala), the average annual temperature in the area is 27.8ºC. The average maximum temperature is 32.2ºC and the minimum temperature is 21.9ºC.

The department of Izabal has a flood threat according to SEGEPLAN (Secretariat of Planning and Programming of the Presidency) and according to CONRED 2015 in 30% of its total extension, equivalent to 223,947 ha; in particular, Livingston presents a high vulnerability to tropical storms, hurricanes, landslides and mudslides. It also presents a low vulnerability to flooding, mainly during the winter season and in places close to rivers and the Atlantic Ocean (i.e. in an area of 26,309 km^2 or 1.35% of the municipality's territory), with a weighted flood hazard index of 0.459% (www.inforpressca.com).

The most recent hurricanes and natural disasters in the region have been hurricanes Eta and Iota, both of which occurred in 2020.

Known climate models project that extreme weather events will increase, so it is important that AIP communities manage to survive on the surrounding natural resources without government intervention for at least several weeks.

As far as the AIP is concerned, and more specifically the AID, according to INSIVUMEH records, the nearest meteorological station (Las Vegas) records an overall average annual rainfall of 1,958.2 mm. Analysing the data by decade, the average annual

rainfall values from 1991 to 2000 register 1,920.4 mm/year. For the decade from 2001 to 2010, the annual average was 1,967.4 mm. Finally, the decade from 2011 to 2020 recorded an annual average of 1,964.5 mm. The averages per decade do not show considerable variations.

In **Annex 10**, the monthly and annual precipitation records in millimetres for the Las Vegas station can be observed. According to the statistical analysis of the records, the meteorological drought is below 1,558 mm/year (10th percentile); this occurred in 2009, 2018 and 2019. The years with excess rainfall greater than 2,320.6 mm/year (90th percentile) have been 1991, 2006 and 2020.

The month with the lowest annual monthly average rainfall is April, with a record of 64.3 mm, and the month with the highest rainfall is November, with a record of 270.7 mm. These annual average values for November are not normal, since October is the end of the rainy season. The increase in records was due to hurricanes Eta and Iota, both of which occurred in November 2020.

However, it should be noted that the precipitation recorded at Las Vegas is influenced by an orographic effect on the San Gil hill, as the clouds discharge to the north side of the Las Vegas farm. The expected precipitation at the "Rio Frio" farm should be less than this.

For the AIP, the flood hazard for the area of influence of the project (different categories) is 18,007 ha (see detail in table 4 adding areas of very high, high, medium and low hazard).

For the AID, the "Río Frío" farm, the threat of flooding can cover an area of 625 ha or 23% of the farm, as indicated in table 4 (adding areas of very high, high, medium and low threat), considering that this farm has the presence of the San Vicente river in the southern area, in a north-easterly direction the Frio river is located and is close to the Dulce river.

For the farm "Agroman" the threat of flooding occupies 60% of the farm. This risk is due to the fact that it is crossed by the San Marcos river.

Recommendations to reduce this threat to properties include the construction of canals or channels to evacuate excess humidity. For the finca "Río Frío", the location of this infrastructure has already been identified.

Table 5. Flood hazard of the AIP and the Río Frio farm.

No.	Threat Flooding	Area Ha	No.	Threat Flooding	Area Ha
1	Very High	3,231.69	1	Very High	29.00
2	High	5,261.61	2	High	225.96
3	Medium	4,816.88	3	Medium	150.27
4	Low	4,696.59	4	Low	219.31
5	No threat	44,795.7	5	No threat	1,945.09
	Total AIP	**62,802.70**		**Total Finca Rio Frio**	**2,629.63 ha**

No recent flooding has been reported by the farm manager who has been on the property for more than 6 years intermittently within the farm "Río Frío". The area is characterised by flat terrain with slopes of less than 4%, moderately sloping terrain with slopes between 4 and 8% and a small section almost in the centre of the farm with sloping terrain with 16 to 32% slope.

It should be noted that access to the "Río Frio" farm is limited in the event of rainfall by the flooding of the river of the same name, which is fed by tributaries of the Cerro San Gil, and which, when trying to cross it, presents difficulties.

Other natural phenomena such as forest fires, droughts and frosts have not occurred on the farms.

4.1.2. Soils

4.1.2.1. Geology

The AIP contains sections of six geological units, described below:

- Carboniferous Permian Sedimentary Rocks (CPsr): characterised by the Santa Rosa group (shales, sandstones, conglomerates and phyllites), Santa Rosa, Sacapulas, Tactic and Macal formations.
- Cretaceous Sedimentary Rocks (Ksd): characterised by Neocomian - Camapanian carbonates, including the Cobán, Ixcoy, Campur, Sierra Madre and Yojoa groups.
- Cretaceous - Tertiary Sedimentary Rocks (KTs): characterised by Campanian - Eocene Sepur formations, predominantly marine clastic sediments, including the Toledo, Reforma, Cambio and Grupo Verapaz formations.
- Tertiary Igneous and Metamorphic Rocks (Pi): characterised by ultra-basic rocks of unknown age, predominantly Serpentinites of pre-Mestrichtian age.
- Presence of Sedimentary Rocks of the Quaternary Alluvium period (Qa): the term alluvium corresponds to processes related to water resources.
- Upper Tertiary Oligocene - Pliocene Sedimentary Rocks (Tsp): predominantly continental, includes the Cayo, Armas, Herrería, Bacalar and White Marls formations.

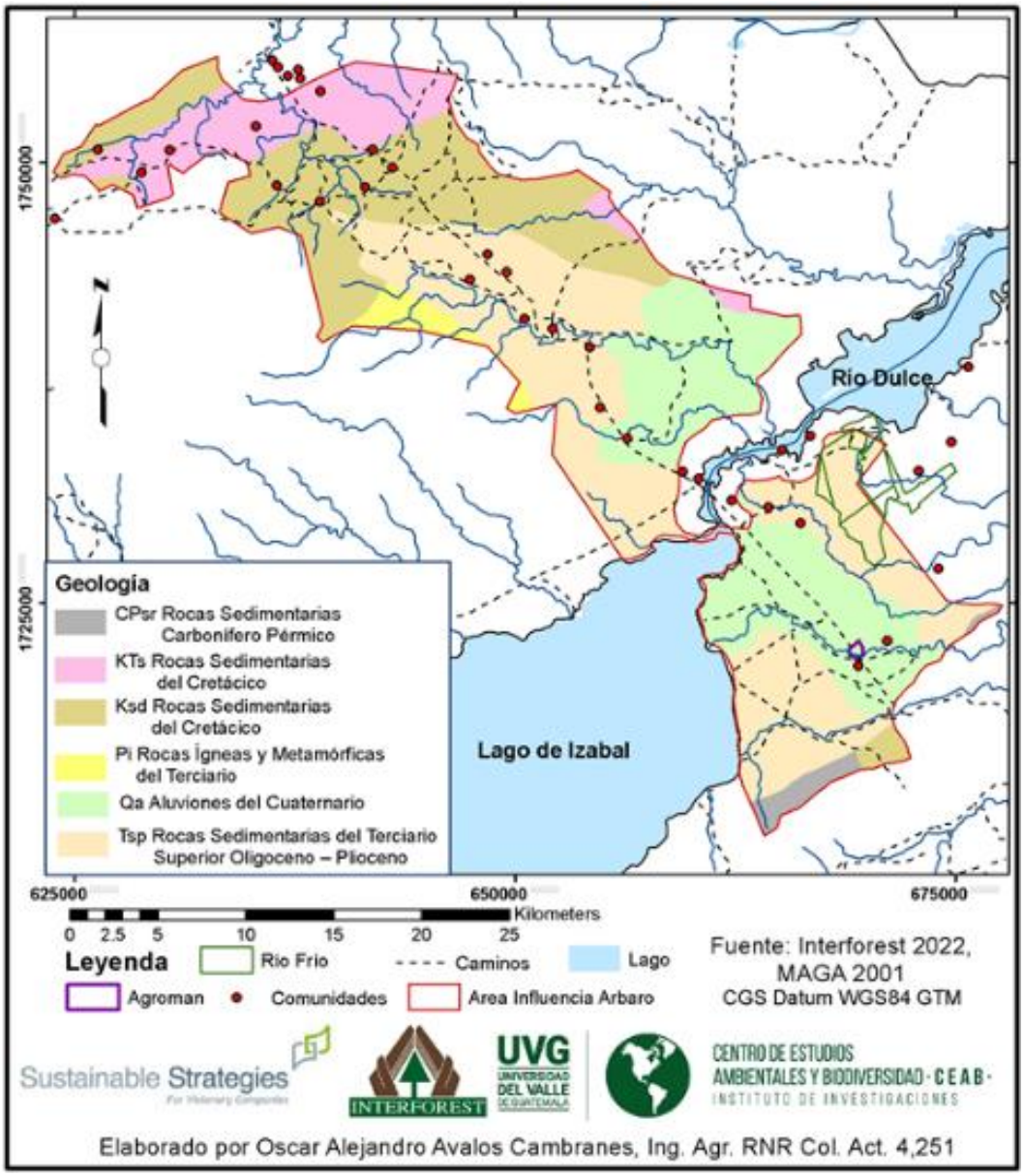

Figure 5. Geology of the AIP of the "Forestal del Caribe" Project.

Table 6. Geological units of the AIP.

No.	Geological units	Area in Ha within the AIP	Area in % within the AIP
1	CPsr	974.71	1.55
2	Ksd	14,658.46	23.32
3	KTs	7,435.89	11.83
4	Pi	1,251.56	1.99
5	Qa	14,705.28	23.39
6	Tsp	23,842.11	37.92
	Total	**62,868.01**	**100.00**

An analysis of the mapping for the AID reveals that the farm "Rio Frio" is located on Upper Tertiary Sedimentary Rocks identified as "Tsp". The farm "Agroman" is located on Quaternary Alluvium identified as Qa (see figure above).

4.1.2.2. Soil taxonomy

According to MAGA 2000 (soil description at a scale of 1:250,000), **the AIP** has six units present, consisting of five suborders, which are described below according to their orders. The list of the six units and suborders is given below, followed by a map illustrating their locations.

a) ***Alfisol order (alf)*** *:* Soils with an internal horizon that has a high clay content in relation to the superficial horizons, in addition to high base saturation (greater than 35%). They are mature soils with an advanced degree of development. They are generally soils with good fertility potential.

- **Suborder Udalfs (Ld)**: Alfisols that are wet inside for 270 days or more most years, therefore have adequate moisture content most of the year, are very productive for agriculture when found on gentle relief surfaces. When found on undulating relief or steeper slopes, they offer very good potential for forestry production and natural resource conservation.

b) ***Order Entisol (ent):*** Soils with minerals derived from both alluvial and residual materials, of moderately coarse to fine texture, with topography varying from flat to steep. According to the relief, these soils are present in very hilly areas (mountain tops and volcanoes) or in flat parts.

- ***Suborder Orthents (Eo)***: Soils of variable depth, most are shallow or very shallow. Generally located in steeply sloping areas, they also exist in areas of moderate to gentle slope, where they have originated from recent thick depositions or colluvium. A large number of Orthents in Guatemala are not suitable for agricultural activities, especially when they are on sloping surfaces. Their limitations include: shallow effective depth, in many cases internal stoniness and rocky outcrops. If they have lost their natural cover, their best uses are for forestry production or agroforestry systems.

c) ***Order Inceptisol (ept)***: Incipient or young soils, without evidence of strong development of their horizons, but more developed than entisols. They are very abundant soils in different climatic conditions and source materials.

- ***Suborder Udepts (Pd)***: Inceptisols that are not dry inside for more than 90 days. They have adequate moisture content most of the year. They generally present good conditions for productive activities, but when found in regions of high rainfall, they require nutrient replenishment to make them productive.

d) ***Order Mollisol (oll)***: Soils with a thick, dark surface horizon, generally with a high organic matter content and a high base saturation (greater than 50%). They are quite

fertile soils, and due to their physical and chemical characteristics, they are generally very good soils for agricultural production. It is common to find them on flat or almost flat reliefs, which favours their mechanisation. However, their use must be planned in order to be sustainable.

- ***Suborder Rendolls (Mr)*****:** Mollisols with an upper horizon between 10 and 50 cm deep, high organic matter content, developed on soft limestone. Although these soils have a good surface horizon, they lie directly on limestone rock, which limits their depth. In addition, they are found in places with steep or strongly undulating relief, so their best uses may be for forest production and/or conservation of natural resources.

e) ***Order Ultisol (ult)***: These are soils that normally present a high alteration of their mineral materials. They have an inner horizon with a high clay content (argillic) which has a low base saturation (less than 35%). Most ultisols are poor soils due to the washing they have undergone. Due to their very low productivity levels, they require non-conventional technologies and extensive management, but not crops or nutrient-demanding productive activities.

- ***Suborder Udult (Ud)***: Soils that are dry within 90 to 180 days of the year. They show moisture deficit. With proper management of their natural fertility and appropriate techniques to control erosion, productive activities can be developed, provided they are of an extensive nature.

Table 77. Soil suborders (units) of the AIP.

No.	Unit	Suborder	Order	Area Ha	Area %
1	Eo Mr Ud	Orthents Rendolls Udult	Entisol Molisol Utisol	1.00	0.002
2	Eo Pd	Orthents Udepts	Entisol Inceptisol	462.28	0.74
3	Ld Pd	Udalfs Udepts	Alfisol Inceptisol	4,083.52	6.52
4	Ld Pd Ud	Udalfs Udepts Udult	Alfisol Inceptisol Ultisol	32,198.42	51.38
5	Mr Ld Pd	Rendolls Udalfs Udepts	Molisol Alfisol Alfisol Inceptisol	1,268.31	2.02
6	You Pd	Udult Udepts	Ultisol Inceptisol	24,654.07	39.34
			Total	**62,667.60**	**100.00**

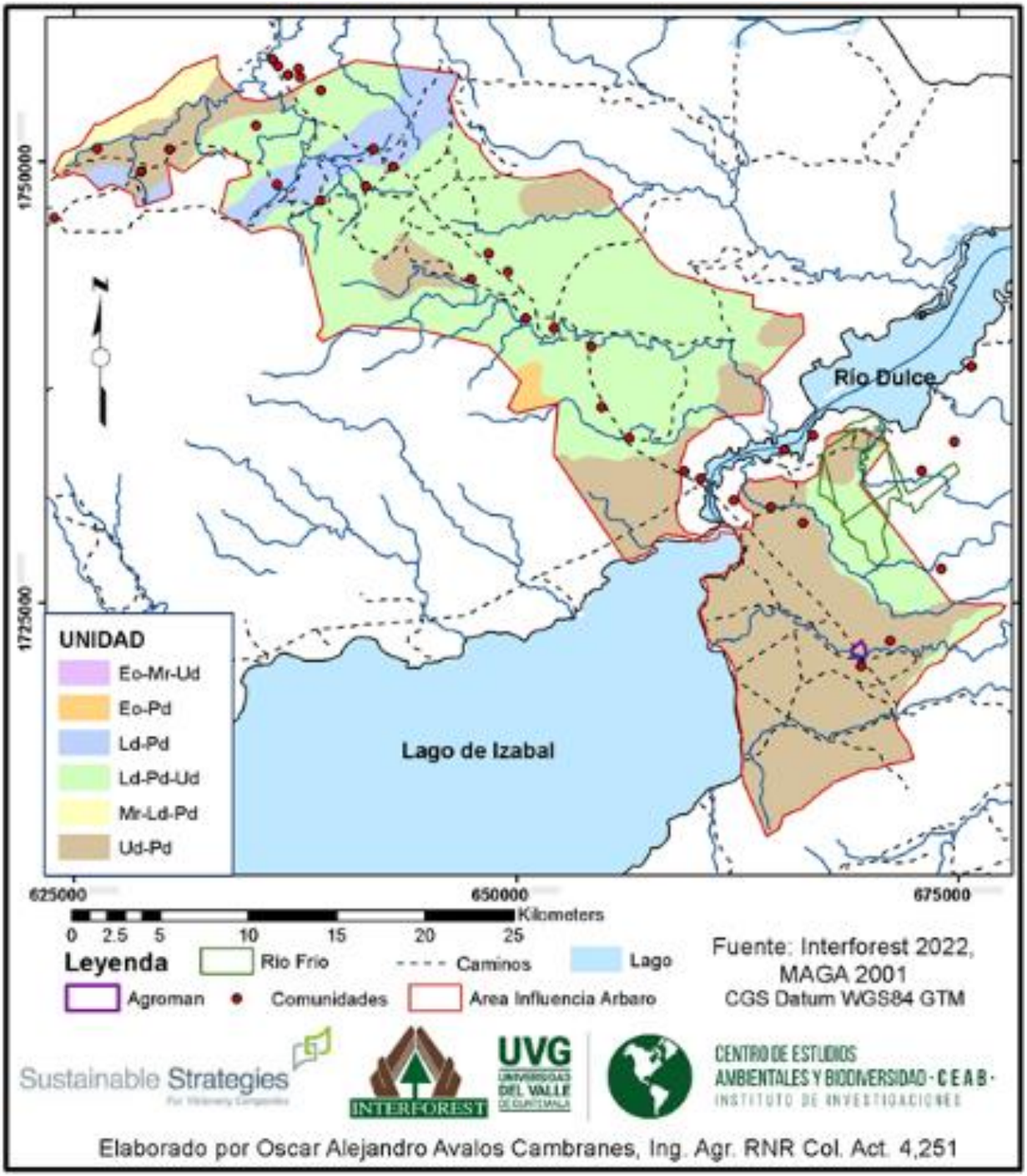

Figure 6. Soil taxonomy at suborder level (units) of the AIP.

For the AID, the "Río Frío" farm has soils of the units Ld, Pd, Ud (larger extension) and Ud, Pd (smaller extension), the latter being the ones that comprise the entire "Agroman" farm.

4.1.2.3 Land use capacity

The AIP presents the seven use capacity categories of INAB 1998, at a scale of 1:250,000. These categories can be summarised as soils for agricultural, agroforestry, silvopastoral and forestry use. The categories are described below.

- **Agriculture without limitations (A):** Areas with suitability for agricultural crops without major limitations of slope, depth, stoniness or drainage. They allow intensive or extensive monoculture or associated farming and require little or no intensive soil conservation practices. They can be mechanised.
- **Improved agriculture (Am):** Areas with moderate use limitations with respect to slope, depth, stoniness and/or drainage. Soil management and conservation practices are required for cultivation, as well as relatively intensive agronomic measures in accordance with the type of crop established.
- **Agroforestry with annual crops (Aa):** Areas with slope and/or effective soil depth limitations, where the planting of agricultural crops associated with trees and/or soil conservation works and agronomic cultivation practices or techniques is allowed.
- **Silvopastoral systems (Ss):** Areas with limitations of slope and/or depth, internal drainage that have permanent or transitory limitations of stoniness and/or drainage. They allow the development of natural or cultivated pastures and/or associated with tree species.
- **Agroforestry with permanent crops (Ap):** Areas with slope and depth limitations, suitable for the establishment of permanent crop systems associated with trees (isolated, in blocks or plantations, either fruit or commercial species and other forest products).
- **Forest land for production (F):** Areas with limitations for agricultural uses; sloping or stony, with preferential suitability for sustainable forest management, both native forest and plantations for harvesting purposes, without this meaning the deterioration of other natural resources. The substitution of forest by other systems would lead to the productive degradation of soils.
- **Forest protection lands (Fp):** Areas with severe limitations in any of the limiting or modifying factors; suitable for exclusive environmental protection or conservation forestry activities. They are marginal lands for intensive agricultural or livestock use. They aim to preserve the natural environment, conserve biodiversity, as well as water sources. These areas allow for scientific research and ecotourism use in certain sites designated for such purposes, without negatively affecting the ecosystem(s) present in them. They also include areas subject to frequent flooding, mangroves and other fragile ecosystems. Mangrove-covered areas are subject to special regulatory regulations that determine their use or protection.

  This category also includes the areas known as gallery forests, which are areas located on the banks of rivers, streams or creeks and at water sources. Their function is to retain sediments coming from the upper reaches, to protect watercourses, water mirrors and to capture rainwater through the aerial part of the existing vegetation.

Gallery forests can be delimited with a 15 to 30 metre wide strip of vegetation cover along the banks of rivers, streams, creeks and springs.

Approximately half of **the AIP** (48%) can be used for agriculture, and the other half (49%) can be used for agroforestry and silvopastoral systems, according to INAB. In addition to the seven categories of land use capacity, it is noted that the AIP is adjacent to protected areas.

For the AIP, only 2% of the total area has the capacity for forestry activities. However, it is important to consider that the lower the intensity of use to which the land units are subjected, the greater the conservation of soil and water. Therefore, the intensity of use of agricultural and livestock land favours its intensity of use when carrying out forestry and reforestation activities.

Table 8. Land use capacity categories of the area of influence of the project, INAB.

No.	Land Use Capacity	Area Ha	Area %
1	Unrestricted agriculture	22,122.26	35.19
2	Improved agriculture	8,364.38	13.3
3	Agroforestry with annual crops	26,102.14	41.52
4	Silvopastoral systems	58.07	0.09
5	Agroforestry with permanent crops	4,448.7	7.08
6	Forest land for production	1,252.39	1.99
7	Forest land for protection	237.32	0.38
8	App Protected areas	282.83	0.45
	Total	62,868.08	100.00

The estimates presented above correspond to data available from INAB, but a more detailed study is needed to define more precisely the categories indicated, as recommended in **Annex 17.**

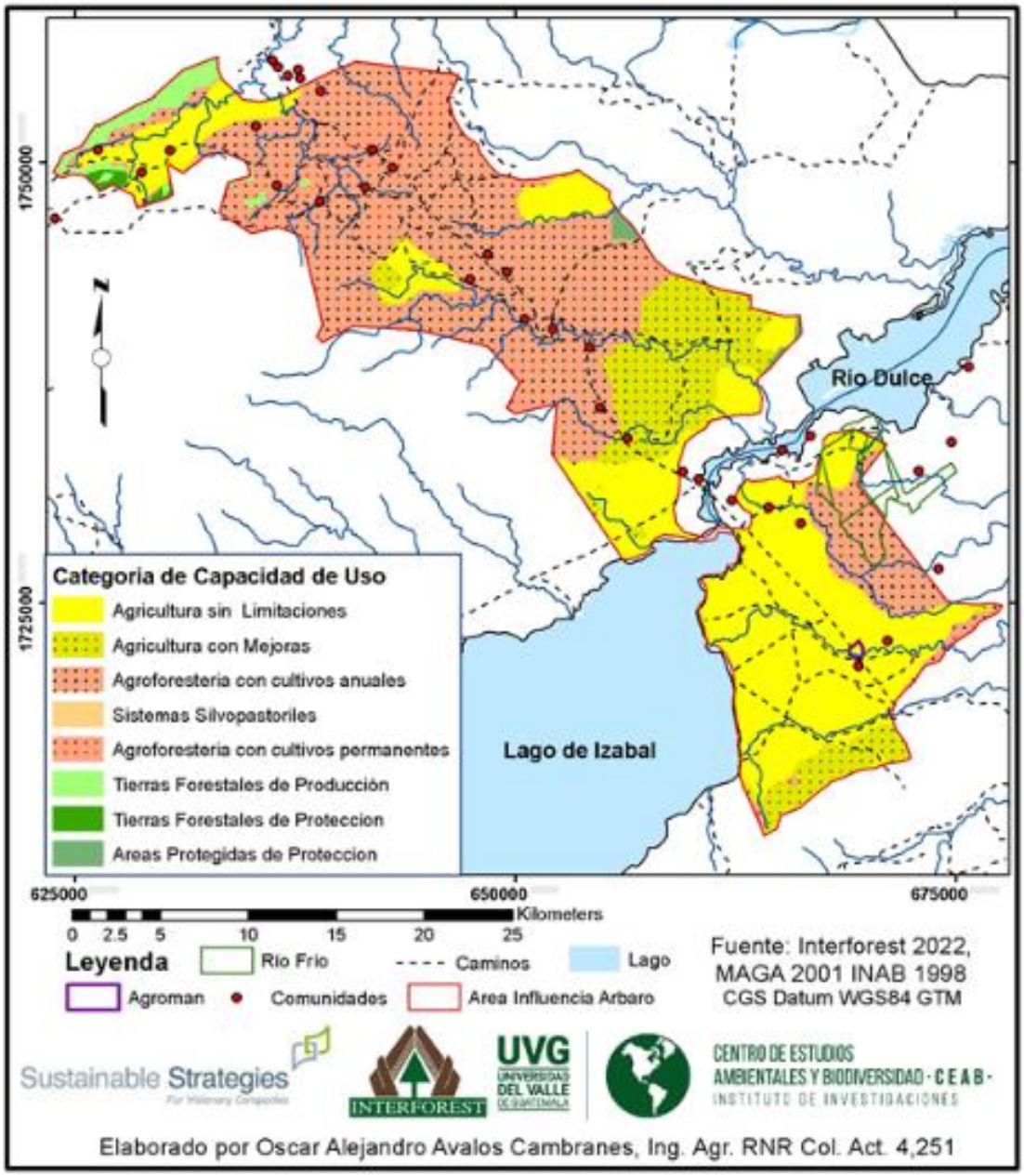

Figure 7. Land use capacity of the AIP.

In the AID, the "Río Frío" farm falls between the categories of unconstrained agriculture (smaller area) and agroforestry with annual crops (larger area).

The AIP lies between the Natural Regions of the Northern High Limestone Highlands (largest extent) and the Northern Floodplain Lands.

The farms "Rio Frio" and "Agroman" are in the first category or Natural Regions of the Northern High Limestone Lands. In case more detailed soil information is required, a physiographic analysis or landforms and bioclimatic regions will be required.

Mapping units are defined with the previous analyses and maps of slopes in the office; with which the variables of terrain slopes, effective soil depth and limiting factors (stoniness and drainage) are verified in the field. These field records are analysed with the matrices of the natural regions, starting with the slope ranges and depths, defining a preliminary use capacity, which the limiting factors are analysed to obtain the final use capacity.

It is recommended to conduct Land Use Capability Studies in more detail or with a better scale of survey, for the AIP and particularly for the AID, see **Annex 17.**

4.1.2.4. Land use and vegetation cover

For the AIP and the AID, there is a land use and vegetation cover map for the year 2020, prepared by MAGA[55] . These maps show that **the AIP** has a land use and vegetation cover of:

- 52% of pastures, these areas can reduce their intensity of use by having reforestations and plantations managed with melina. These pastures have been previously prepared and worked by other people.
- 17% of permanent crops such as rubber.
- 11% of broadleaved forest, which shall not be disturbed. Gallery forests close to water bodies should be conserved.
- 10% low shrub vegetation.
- 3% oil palm cultivation.
- 2% of forest plantations (broadleaved and coniferous)

[55] Land use maps are also available for 2003 and then 2012, allowing the dynamics of land use between the different periods to be observed.

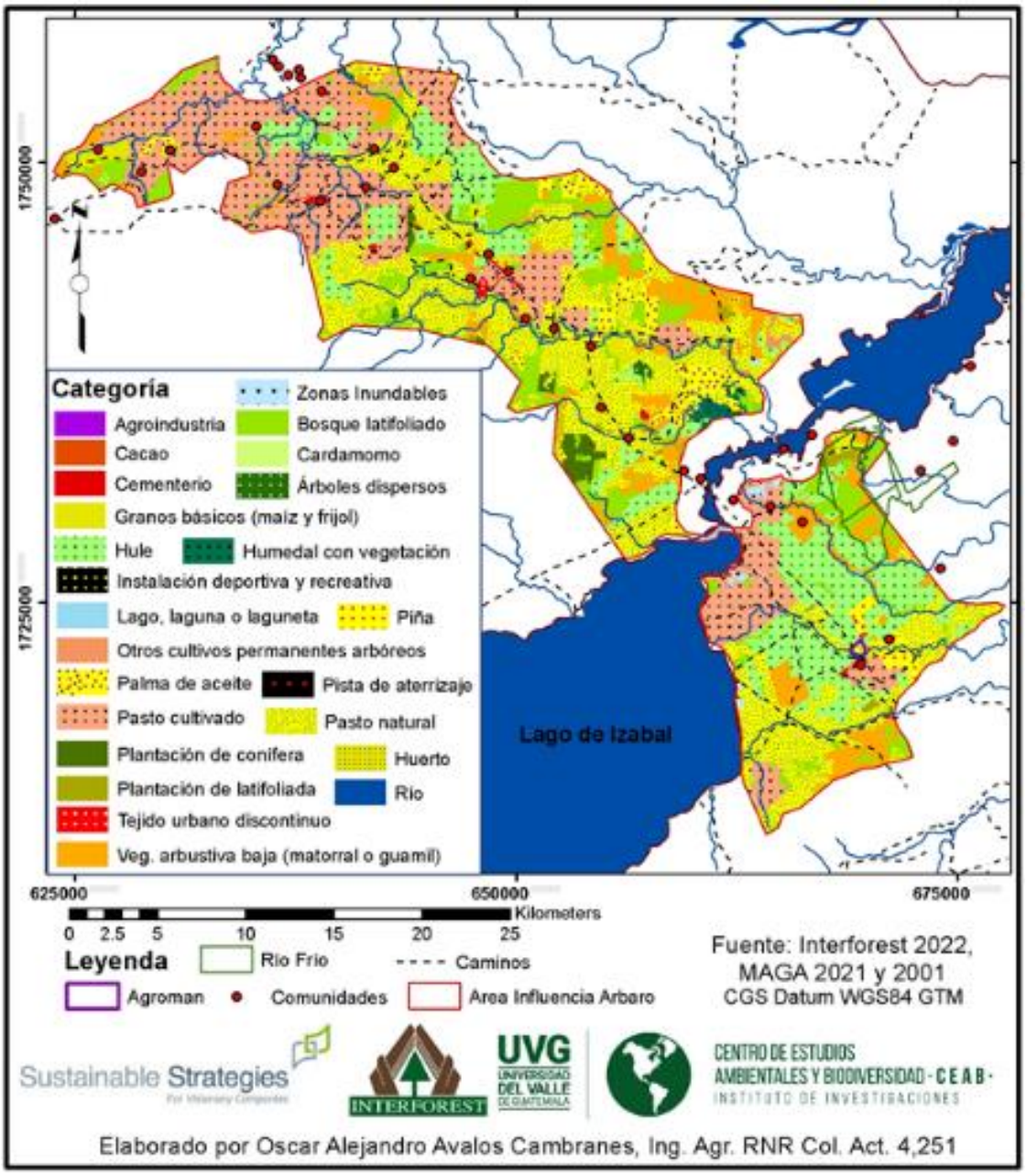

Figure 8. Land use and vegetation cover 2020 of the AIP.

For the AID, the "Río Frío" farm has various uses such as: forest and broadleaf plantation, natural pastures, rubber and bush vegetation. The farm "Agroman" has the categories of rubber and low shrub vegetation.

MAGA categorised the current land use as of 2021, detailed land use distribution in the following table and further details for the land use for the finca "Rio Frio" can be seen illustrated in the current land use map developed by Interforest.

Table 9. Land uses within the AIP.

No.	Category	Area Ha	Area %
1	Agribusiness	5.64	0.01
2	Scattered trees	96.18	0.15
3	Broadleaved forest	6,851.78	10.91
4	Cocoa	2.22	0.00
5	Cardamom	16.01	0.03
6	Cemetery	1.39	0.00
7	Basic grains (maize and beans)	739.17	1.18
8	Orchard	418.57	0.67
9	Rubber	10,685.60	17.02
10	Vegetated wetland	365.95	0.58
11	Sports and recreational facility	12.88	0.02
12	Lake, lagoon or lagoonette	125.61	0.20
13	Other permanent tree crops	126.64	0.20
14	Palm oil	2,149.52	3.42
15	Cultivated grass	14,795.25	23.56
16	Natural grass	17,985.41	28.64
17	Pineapple	610.97	0.97
18	Runway	1.35	0.00
19	Conifer plantation	641.80	1.02
20	Broadleaf plantation	350.39	0.80
21	Discontinuous urban fabric	316.38	0.50
22	Low shrub vegetation (scrub and/or guamil)	6,115.38	9.74
	Total	62,788.36	100.00

According to the 2021 land use map prepared by Interforest (see figure below), the area of the farm "Río Frío" that can be used for reforestation represents an extension of 1,094.39 ha, equivalent to 42% of the total area of the farm. The rest of the area is included in the river, power line and road categories.

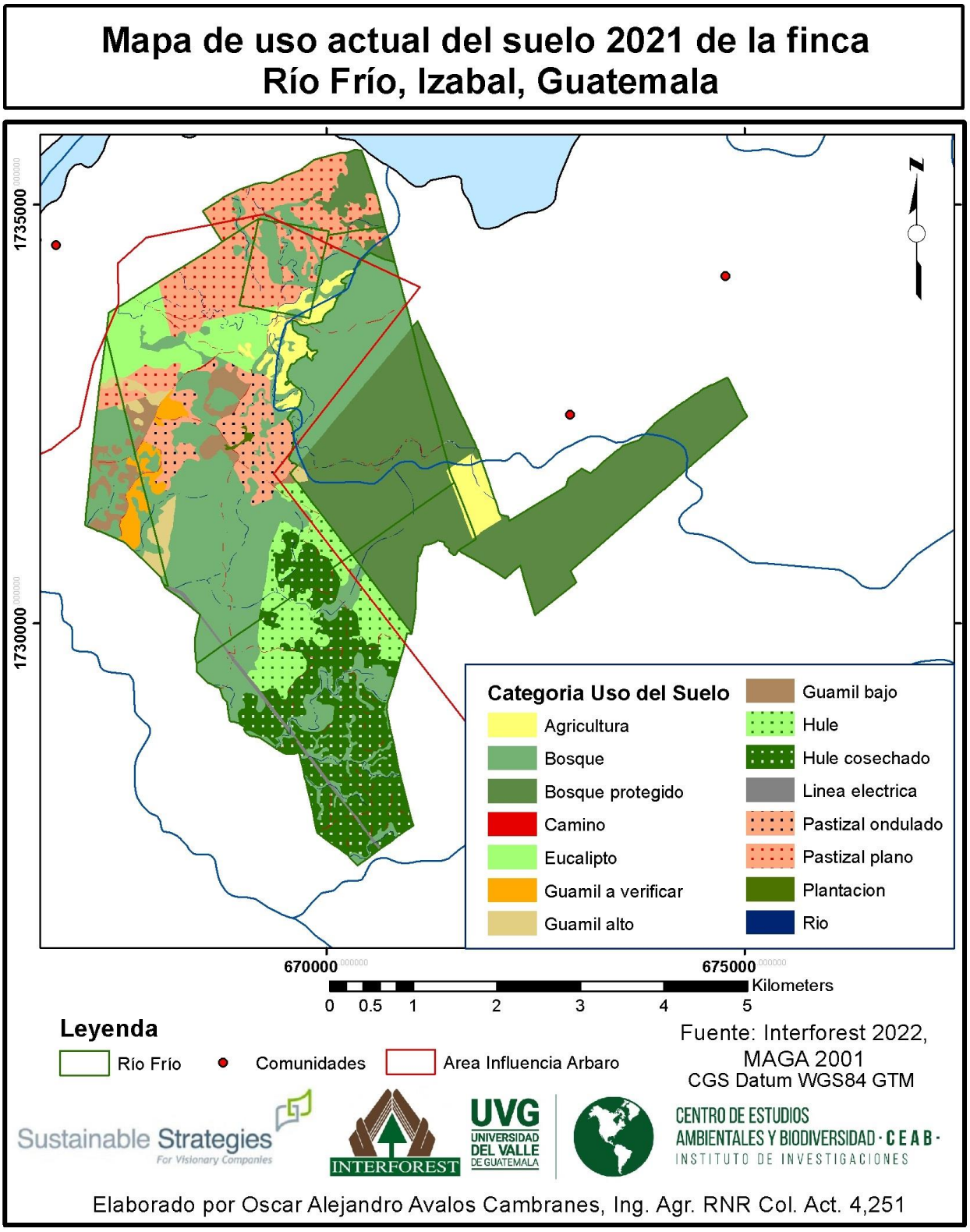

Figure 9. Map of current land use 2021 at finca "Río Frío".

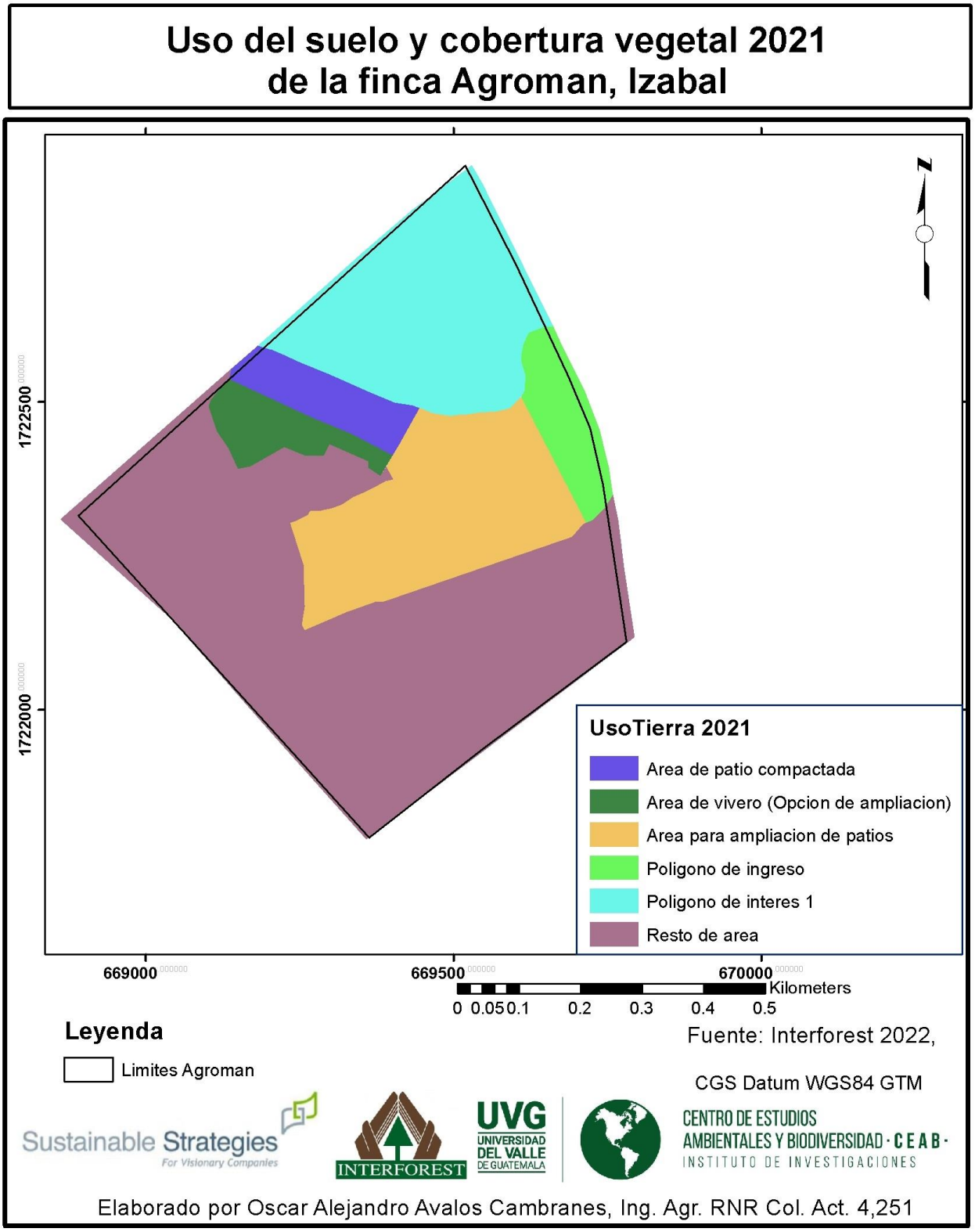

Figure 10. Map of current land use on "Agroman" farm

4.1.3. Water

4.1.3.1. Hydrological location

The location of the AIP is within one of the most important hydrographic basins of the country, the Caribbean slope and specifically in the basins of the rivers Sarstún and Lago de Izabal Río Dulce. The latter has a Decree 10-98 for the "Ley de creación de la autoridad para el manejo sustentable de la cuenta del Lago de Izabal, el Río Dulce y su cuenca".

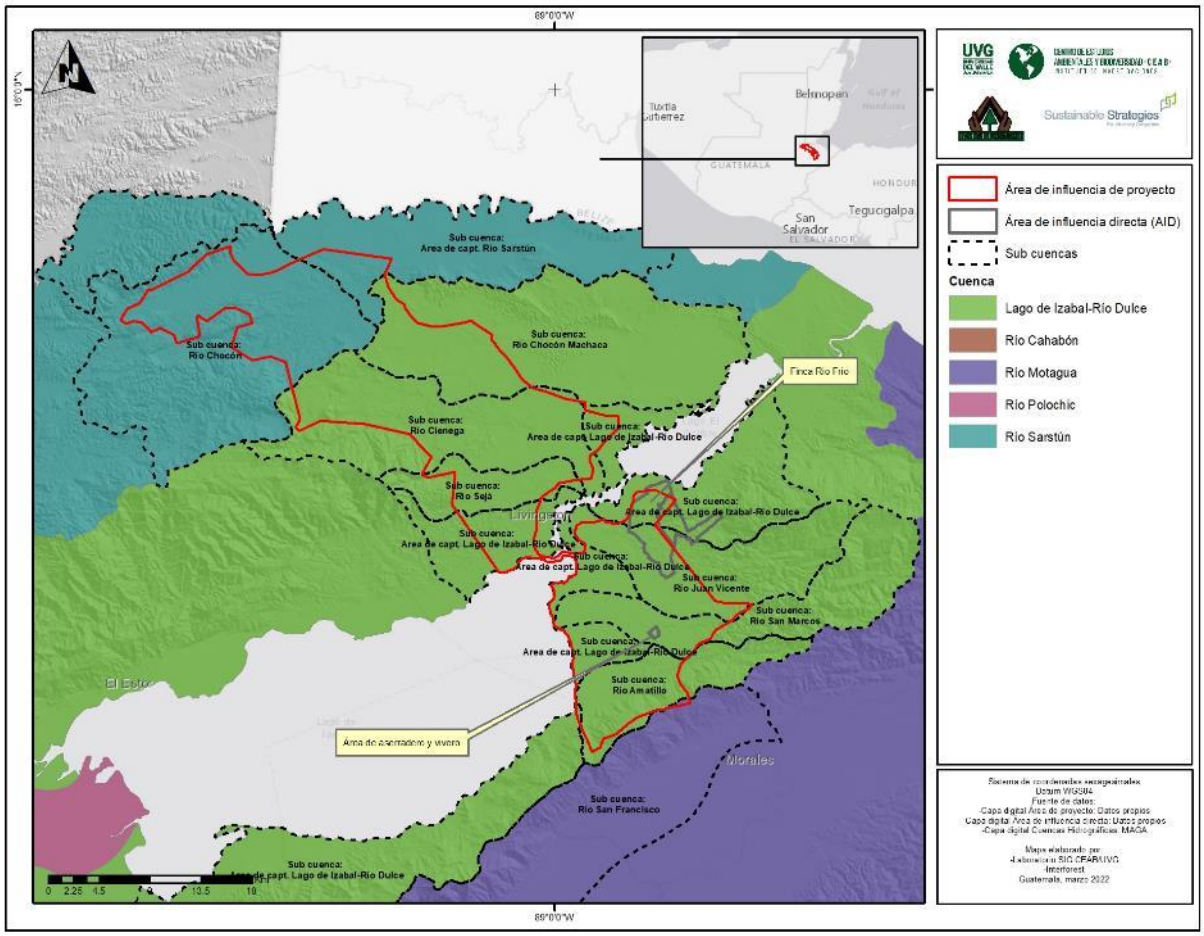

Figure 11. Watershed map of the Caribbean Forest AIP.

The basin of Lake Izabal and Río Dulce has two sub-basins that flow into the lake, the first is the Cahabón river, which flows into the Polochic river and subsequently drains into the lake. Currently, the Governmental Agreement 19-2021 establishes the "Provisions to promote the protection and conservation of hydrographic basins in Guatemala". The relevant part of this agreement is to define the components for the elaboration of the characterisation, diagnosis and plan of hydrographic basins.

Within the area of influence there is no water stress, which means that water is available most of the time, according to the life zones (atmospheric water balance) humid forest and very humid forest, these two zones indicate that there is available humidity, this can be verified with annual rainfall data that does not exceed 2,000 mm.

Within the AID, the "Río Frio" farm has an abundance of water, particularly from the Rio Frio river that crosses the property.

The farm "Agroman" is crossed by the river or San Marcos, which provides abundant water, even in the dry season.

4.1.3.2. Water resources

In the AIP, surface water resources are related to the following hydrological units: Caribbean slope and watersheds of the rivers Lago de Izabal, Río Dulce and Río Sarstún, as indicated in the hydrological location map (Figure 7). In addition, the priority area is located in 13 sub-watersheds and in more detail within 37 micro-watersheds according to MAGA 2009. The project covers 100% of some hydrological units mentioned, others in smaller proportions, see table below.

The surface drainage at scale 1:250,000 (minor detail MAGA 2001) represents for the Río Frio farm the length is 6,894 m and "Agroman" has 500 m of river length. At a scale of 1:50,000 (higher detail MAGA 2009) the total length of all rivers for Rio Frio is 20,803 m. The farm "Agroman" has 1,603 m river length. This information on river length is important for defining riverbank protection zones.

If we define a length of 25 m per side according to the scale we have an extension for river protection purposes of: scale 1:250,000 is 30.60 ha for Rio Frio and 2.5 ha for "Agroman"; at scale 1:50,000 the areas are 104 ha for Rio Frio and 8 ha for "Agroman"; these surfaces can be reduced by analysing the cartography of the area and verification in the field.

Table 10. Hydrological potential of the AIP.

No.	Category	Area Ha	Area %
1	Very High	758.36	1.21
2	High	26,185.84	41.83
3	Medium	31,310.32	50.02
4	Low	4,244.36	6.78
5	Very Low	98.52	0.16
	Total	62,597.4	100.00

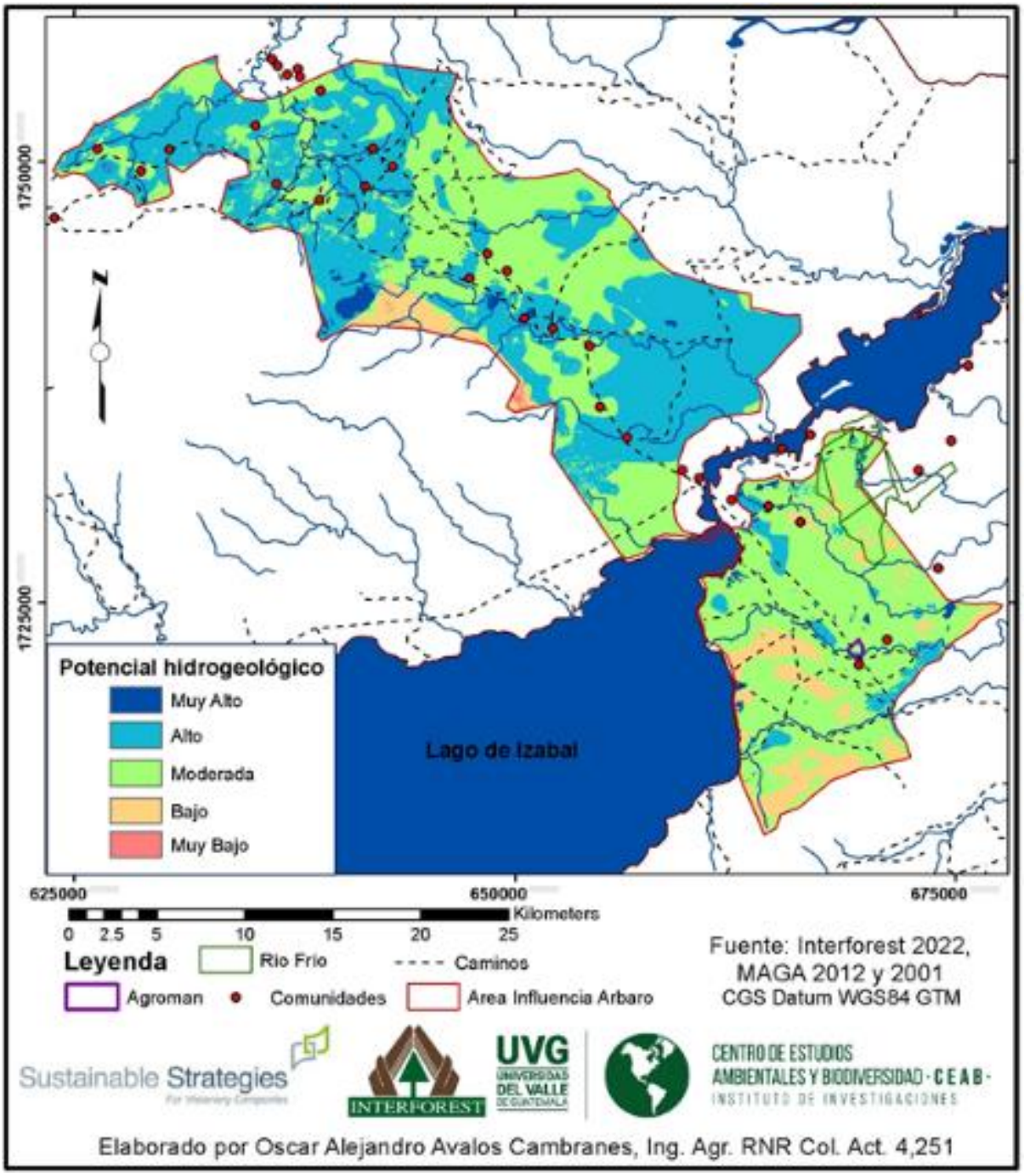

Figure 12. Hydrogeological potential of the AIP.

In 2012, MAGA generated information on the hydrogeological potential for Guatemala, which includes the analysis of nine variables such as: lithology (type of rocks), geomorphology, lineaments (geological structures), rainfall, evapotranspiration, terrain slope, density of fluvial currents, land use and soil types. From this analysis, they are classified into five categories of hydrogeological potential: very low, low, medium, high and very high. The very low and low category does not indicate that there is no lack of

groundwater, it means that the water is very deep and/or the yield of the well is low (less than 100 gal/min). Of the remaining categories (medium, high and very high) the potential may be quite acceptable to implement development projects. This information is related to the groundwater supply according to the average annual rainfall.

4.2. Biotic component

The baseline of the biotic component for the "Forestal del Caribe" project is presented below. The accuracy of the information on aquatic fauna and flora is limited due to the date of the baseline survey in 2009 for the finca "Río Frío".

The baseline for the terrestrial biotic component is bellow.

4.2.1. Description of habitats present

The AIP and the AID of the "Forestal del Caribe" project comprise various types of ecosystems mainly related to tropical lowland rainforests and wetlands. The main ecosystems present in the region are shown below according to different classification systems, see map below.

Table 11. Ecosystems within the region of the Area of Direct Influence (AID) and Area of Project Influence (AIP) of the "Forestal del Caribe" project.

Ecosystem classification system	Ecosystems present	% presence in AID	% presence in AIP
Ecoregions[56]	Rainforests of the Central American Atlantic	100	100
Forest type[57]	Broadleaved forest	90	80
	Broadleaved gallery forest	0	15
	Wetlands	10	5
Life zones[58]	Tropical Rainforest (bh-T)	100	40
	Very humid tropical forest (bmh-T)	0	60

In **Annex 17 it** is recommended to update the land use in order to update the data presented in the table above as contrary data is identified, particularly for the existence of broadleaved gallery forests and wetlands.

4.2.1.1. Ecoregions

The AIP and the AID are entirely within the Central American Atlantic Rainforest ecoregion, which is made up of tropical and subtropical moist broadleaved forests and covers an area of 7,800 km^2 in the country.

It is considered an important centre of biological diversity, due to its location on the Central American isthmus. It contains a mixture of Nearctic and Neotropical plants and animals.

[56] Olson et al. (2001).
[57] INAB-CONAP (2015).
[58] IARNA-URL (2018).

It is home to the so-called Caribbean Flyway, one of the major bird migration routes, both between North and South America and between the montane forests and the lowlands. See **Annexes** with lists of existing fauna in the project.

The diversity of birds and amphibians in the area is very high, with species such as the brown mantled howler monkey (*Aloauatta palliata*), the elegant eagle (*Spizaetus ornatus*) or the O'Donnell's salamander (*Bolitoglossa odonnelli*) standing out. This ecoregion has an extension of 781,567 ha, of which only 34.7% remains with forest cover.

4.2.1.2. Forest type and sub-type

Three forest types are found **in the AIP and the AID**: broadleaved forest, broadleaved gallery forest and wetlands. Broadleaved forests are characterised by a majority of broadleaved evergreen forest species and harbour a high species diversity, both in terms of numbers (species richness) and evenness of densities (abundance of individuals). These forests have an abundance of palms and economically important tree species, which could be explored for sustainable exploitation by the communities.

Broadleaved gallery forests are forests associated with the banks of major rivers and have a very different vegetation composition from the rest of the landscape. Their importance lies in their function as a biological corridor, seasonal food source, water reserve and breeding site.

Rivers and riparian forests are the most diverse and dynamic natural corridors, as well as the most biophysically diverse in composition. They therefore represent the framework for understanding the organisation, diversity and dynamics of biological communities associated with river systems. From a regional point of view, they maintain biological processes and connect populations between various vegetation types, across the altitudinal gradient.

The broadleaf gallery forest is an important element due to the number of species that pass through it and that use this ecosystem as a source of food, refuge or means of accessing the resources of the tropical rainforest, using the riparian vegetation as a refuge from the heat. The gallery forest is also important to prevent sedimentation and eutrophication of the river.

These forests are fundamental for the resilience of many species and ecosystems as they are natural biological corridors that provide structural and functional connectivity to ecosystems, and allow the adequate flow of ecosystem services between the forest and the surrounding matrix. These forests are also very relevant in terms of mitigating the impacts of climate change as they mitigate susceptibility to flooding, regulate the amount of sediment carried by rivers and prevent them from overflowing.

Finally, wetlands are another type of forest present in the project site and its area of influence, which are also of special importance in the regulation of the regional hydrological cycle. These wetland areas are priority breeding sites for many species of migratory birds, as well as providing refuge and breeding sites for fish and amphibians.

The drying up of wetlands drastically alters regional hydrological cycles, making these ecosystems critical for management and conservation.

Based on the above considerations, the three forest types present in the region are considered as priority habitats for management and conservation. Mainly the proper management of gallery forests and wetlands is fundamental to ensure the maintenance of provisioning ecosystem services and the overall flow of ecosystem services in the region, while broadleaved forest is fundamental for the conservation of biodiversity and the maintenance of provisioning ecosystem services.

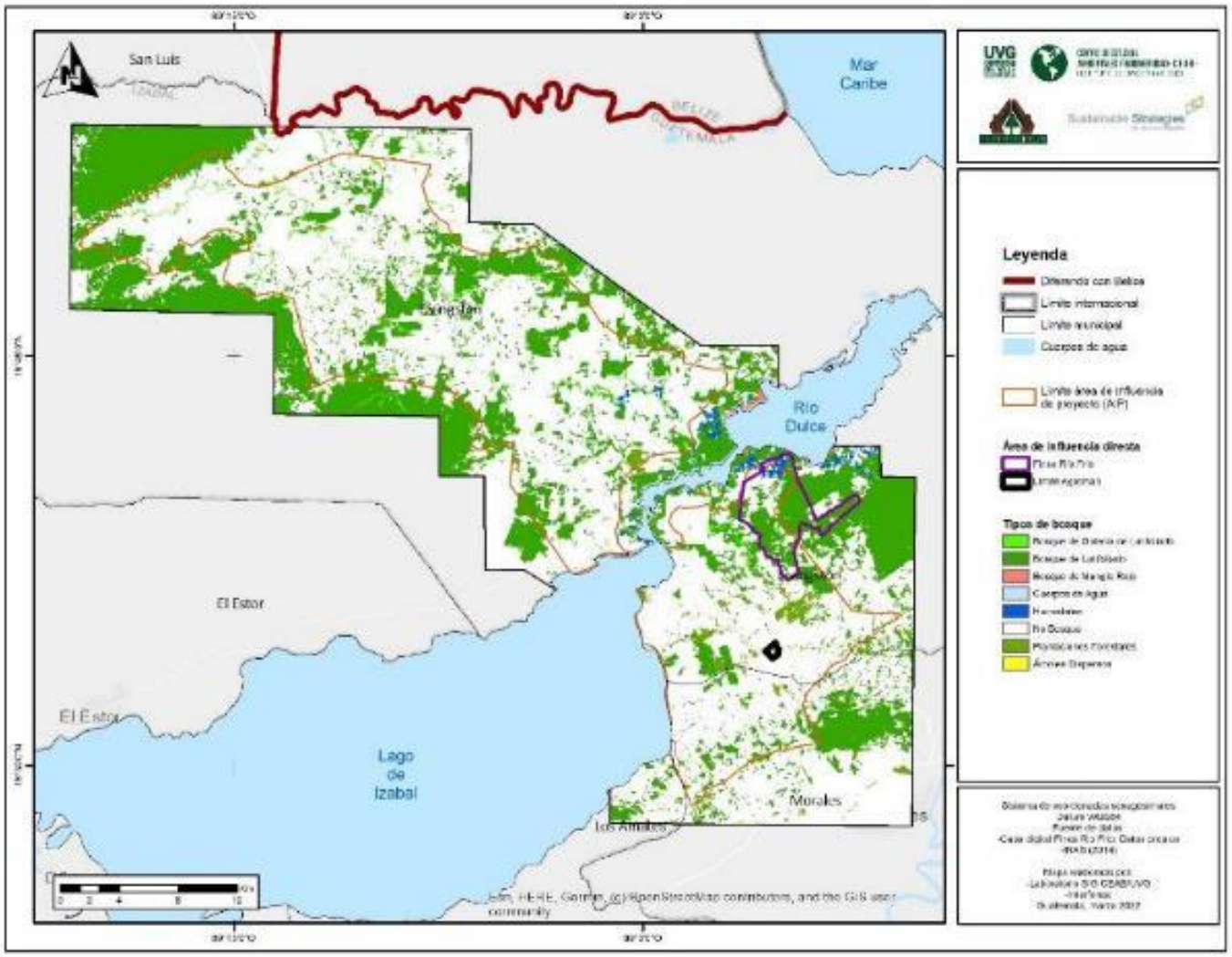

Figure 13. Map of forest types in the AID and AIP regions.

4.2.1.3. Life zones

In the AIP and the AID of the project, two types of life zones are found: Humid Tropical Forest (bh-T) and Very Humid Tropical Forest (bmh-T).

- **Very Humid Tropical Forest (bh-T):** This life zone is located in approximately 59% of the northern fringe of the AIP.

The ratio of potential evapotranspiration to rainfall is 0.42, so this ecosystem is considered to have a high water surplus. The main tree genera present in this life zone are *Alseis, Calophyllum, Cedrela, Dalbergia, Ficus, Ilex, Pachira, Pouteria, Sabal* and *Swietenia*.

- **Tropical Rainforest (bh-T):** The AID lies entirely within the bh-T life zone, which is the largest life zone in the country and is in approximately 41% of the AIP.

The ratio established between potential evapotranspiration and average rainfall volumes for this life zone is 0.69, which means that it is considered a water surplus ecosystem. The main tree genera present in this life zone are *Aspidosperma*, *Brosimum*, *Bursera*, *Calophyllum, Cedrela, Ceiba, Ficus, Pouteria, Tabebuia* and *Swietenia*.

4.2.1.4. Protected areas

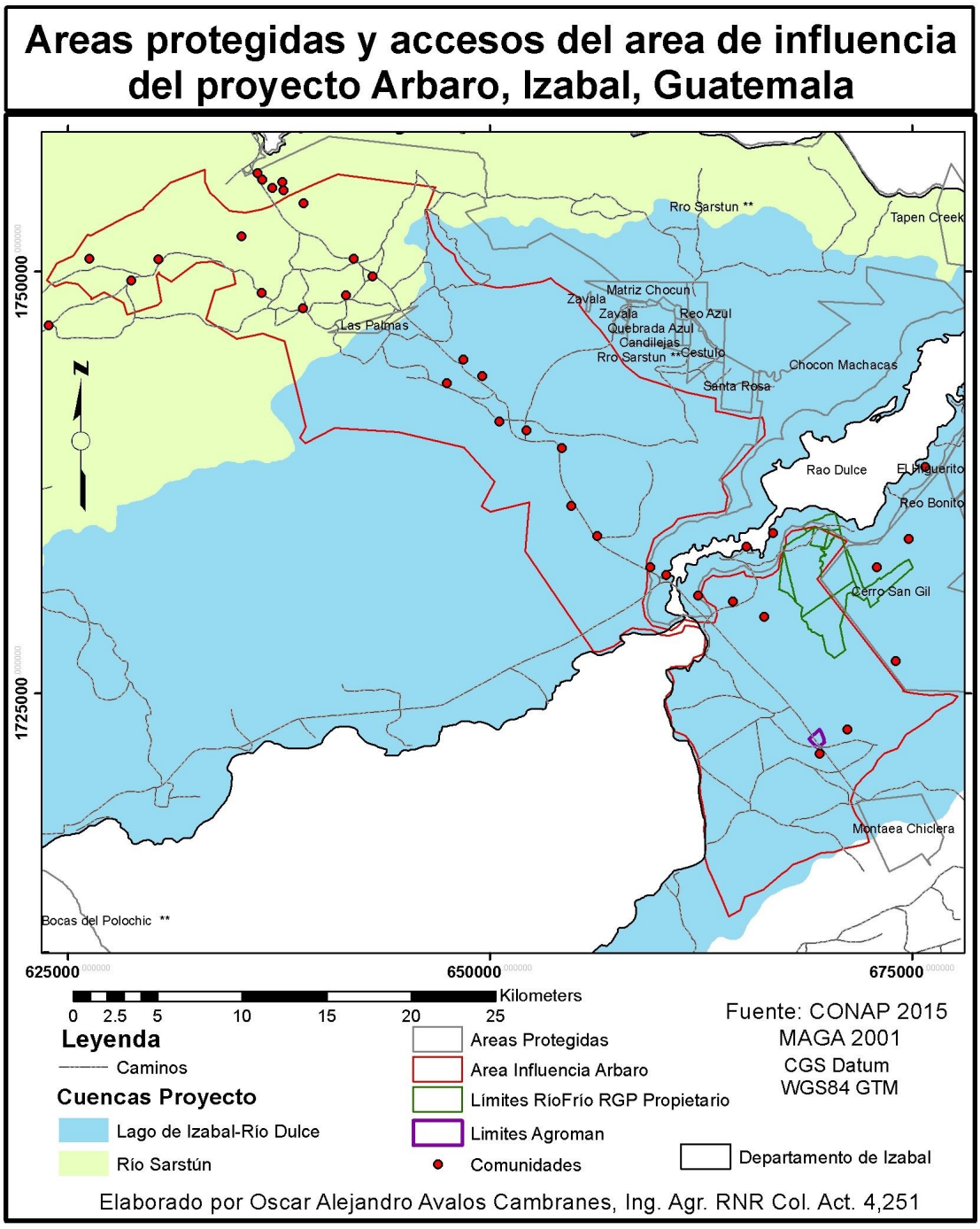

Figure 1414. Map of life zones in the AID and AIP regions of the Caribbean Forest Project.

In the department of Izabal there are a total of 53 protected areas covering an area of 235,358 ha, or 31% of the department.

In the AIP, there are 20 protected areas out of 53 in the whole department, which are characterised in table 11. The AIP borders nine Protected Areas. Additionally, circumscribed by within the AIP is the Las Palmas Private Nature Reserve (RNP).

In the AID, the "Río Frío" farm is located in the middle of two protected areas: the Cerro San Gil Springs Protected Reserve and the Río Dulce National Park.

Table 1212. Protected areas relevant to the AID and AIP of the "Forestal del Caribe" project.

Name	Category CONAP/ extension	Category IUCN	Relationship with the AIP	Conservation values
Rio Dulce	National Park (13,000 ha)	I	Adjacent to the AID	It is the habitat of the manatee (*Trichechus manatus*), a species in danger of extinction, and its mangroves constitute important communal perching areas for aquatic birds. Its location makes it a strategic area for maintaining connectivity between the different protected areas.
Chocón-Machacas	Protected Biotope (6,265 ha)	II	Adjacent to the AIP	It is the habitat of the manatee (*Trichechus manatus*), a species in danger of extinction. It conserves wetlands of regional relevance which are sensitive to alterations in the region's hydrological regime.
San Gil Hill	Manantiales Protected Reserve (47,433 ha)	III	Adjacent to the AIP	It supplies water to at least 50,000 people in the municipalities of Livingston, Morales and Puerto Barrios. Cerro San Gil has also been the focus of research by the Resident Bird Banding and Monitoring Programme. and Migratory Species, which is the most extensive programme in Mesoamerica with 25 uninterrupted years of monitoring.
River Sarstun	Multiple Use Area (35,202 ha)	III	Adjacent to the AIP	The Sarstun River is the border between the countries of Guatemala and Belize, and constitutes one of the most important sites for manatee (*Trichechus manatus*) conservation. Important breeding site for commercially important fish.
Chiclera Mountain	Municipal Regional Park (1,490 ha)	IV	Adjacent to the AIP	Important water reserve, which supplies water to the city of Morales, Izabal.
Las Palmas	Private Nature Reserve (242 ha)	V	Within the AIP	Remnants of tropical broadleaf forest and gallery forest. This reserve has an extension of 241.80 ha. This RNP is registered within the Guatemalan System of Protected Areas (SIGAP) according to Resolution SE-CONAP 09/2002 and its owner is Mr. Alfred Botschi Gander.
Zavala	Private Nature Reserve (659 ha)	V	Adjacent to the AIP	It preserves remnants of tropical broadleaf forest and gallery forest.
Quebrada Azul	Private Nature Reserve (654 ha)	V	Adjacent to the AIP	It preserves remnants of tropical broadleaf forest.
Castulo	Private Nature Reserve (360 ha)	V	Adjacent to the AIP	It preserves remnants of tropical broadleaf forest and gallery forest.
Santa Rosa	Private Nature Reserve (510 ha)	V	Adjacent to the AIP	It preserves remnants of tropical broadleaf forest and gallery forest.

4.2.1.5. Modified habitats and natural habitats

According to IFC Performance Standard 6 (PS6) on biodiversity, modified habitats are defined as areas that may contain a high proportion of non-native plant or animal species, or where human activity has substantially modified the primary ecological functions and species composition of the area.

Separately and contrary to modified habitats, PS6 defines natural habitats as areas composed of a viable assemblage of mostly native plant or animal species, or where human activity has not resulted in any substantial modification of the primary ecological functions or species composition of the area.

An analysis of satellite imagery and remote sensing using the Breaks For Additive Seasonal and Trend (BFAST) algorithm, which analyses the number of abrupt positive or negative changes occurring over a given period or time series, was used to assess trends in cover and permanence of natural and modified habitats.

Three decadal trend maps of forest cover change were produced and analysed for the project area: 1990-2000, 2000-2010 and 2010-2020. Sentinel 2 satellite images were used. Subsequently, the Collect Earth Online (CEO) module was used to generate training points for use in the classification of the image mosaics. Within CEO, 5 categories were generated: forest, non-forest, water, infrastructure and other classes.

After generating the control points, the classification module of the SEPAL platform was used, in which the Sentinel 2 images and the control points were used to obtain a raster map with forest, non-forest and water cover.

Subsequently, to look at land use trends, a time series analysis approach was used, in this case from 1990 to 2020. This analysis uses the BFAST algorithm, which analyses the number of abrupt positive or negative changes occurring in a given period or time series. This analysis was also performed on the SEPAL platform.

In the case of AIP and AID, images from the Landsat 8 satellite, which has a resolution of 30 metres, were used. This satellite was used because at the moment the SEPAL module of BFAST only allows the use of this type of images. To use the BFAST module it is necessary to create a vegetation index series, and for this analysis the Normalised Difference Fraction Index (NDFI) was used. This index makes a positive or negative forest disturbance detection using sub-pixel fractions of green vegetation, non-photosynthetic vegetation, bare soil and shade. The SEPAL platform was again used to create the NDFI time series.

For the AIP it can be seen, based on the information gathered with the BFAST analyses, that the decade with the greatest loss of tree-type vegetation cover was the period 2000-2010, while the decade with the greatest gain in cover was the period 2010-2020.

When analysing trends **within the AID**, it is observed that land use changes in the AID occurred mainly in the decade 1990-2000, and were mainly cover gains either by natural

regeneration of secondary forest and/or forest plantations (e.g., rubber). The 2000-2010 decade shows smaller increases in cover, as does the 2010-2020 decade.

Within the AID, the "Río Frío" farm is notable for the virtual absence of red zones, which indicates that land use conditions in the region have remained practically unchanged over the last 30 years. Within the alterations over the last 30 years, increases in vegetation cover caused by rubber plantations and natural regeneration in the period 1990-2010 are highlighted.

During the last decade, the AID region has remained unchanged, which is evidence that the existing rubber plantations in the region, planted in the 1990s-2000s, have become anthropogenic forest habitats of relevance for the functional and structural connectivity of the fauna in the region.

Therefore, areas of natural broadleaved forest, wetlands and gallery forest existing within the AID as well as in the AIP can be considered as natural habitats, while areas of rubber plantations and guamiles within paddocks can be considered as modified habitats.

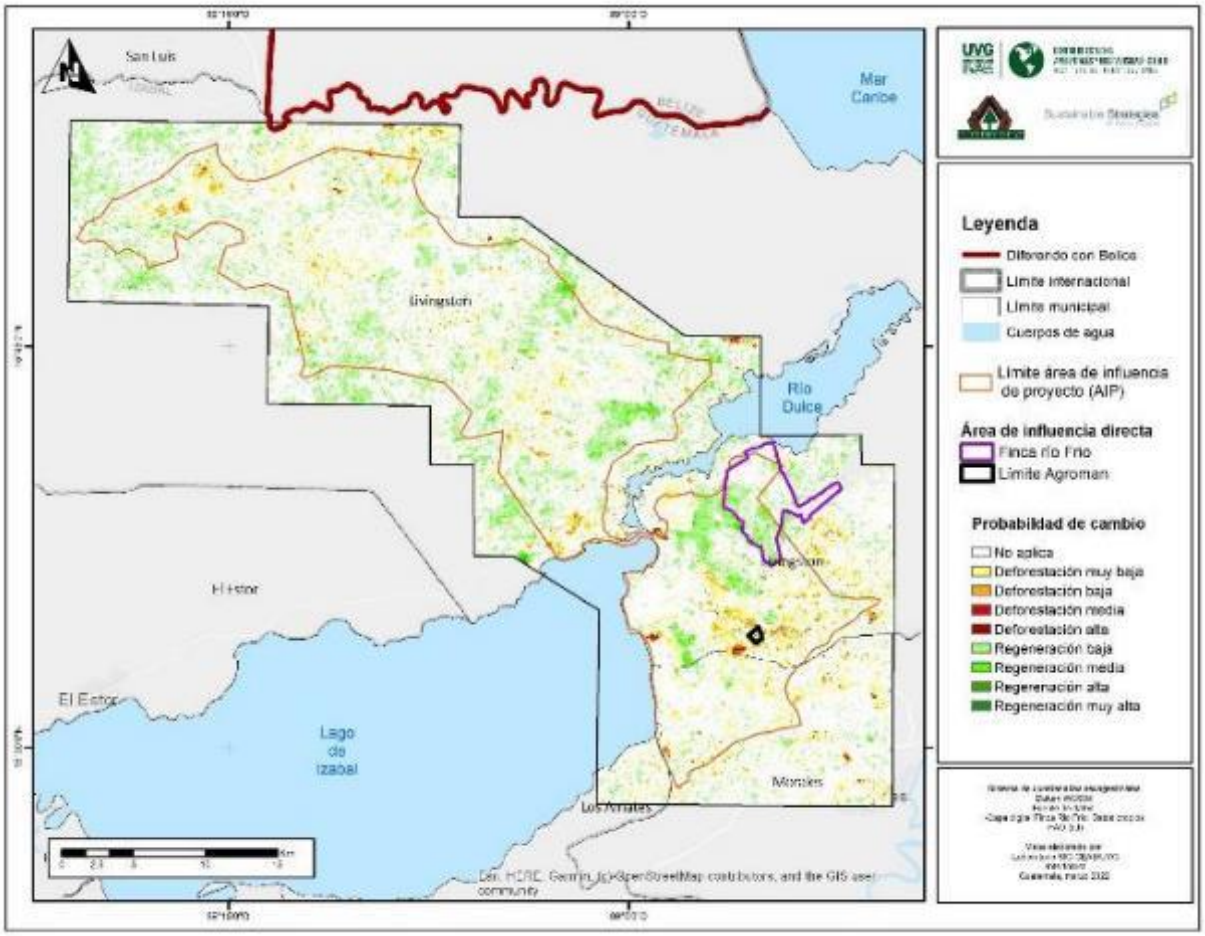

Figure 1515. Map of BFAST vegetation cover change analysis in the Forestal del Caribe project AID and AIP for the decade 1990-2000. Green areas represent vegetation cover gain (natural, regeneration or

planting) and red areas represent vegetation cover loss. Areas without colour represent areas with no discernible change for the period analysed.

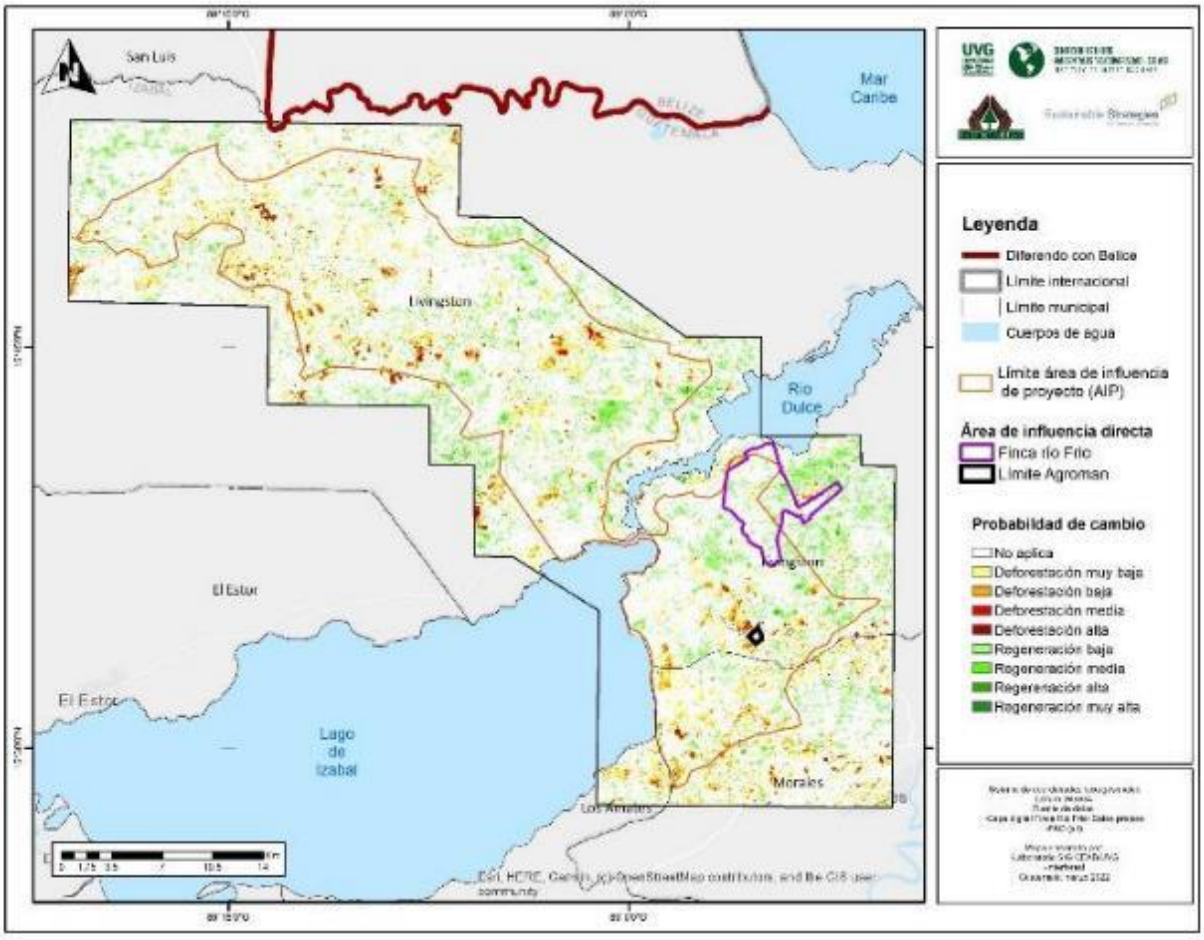

Figure 16. Map of BFAST vegetation cover change analysis in the AID and AIP of the Forestal del Caribe project for the decade 2000-2010. Green areas represent vegetation cover gain (natural, regeneration or planting) and red areas represent vegetation cover loss. Areas without colour represent areas with no discernible change for the period analysed.

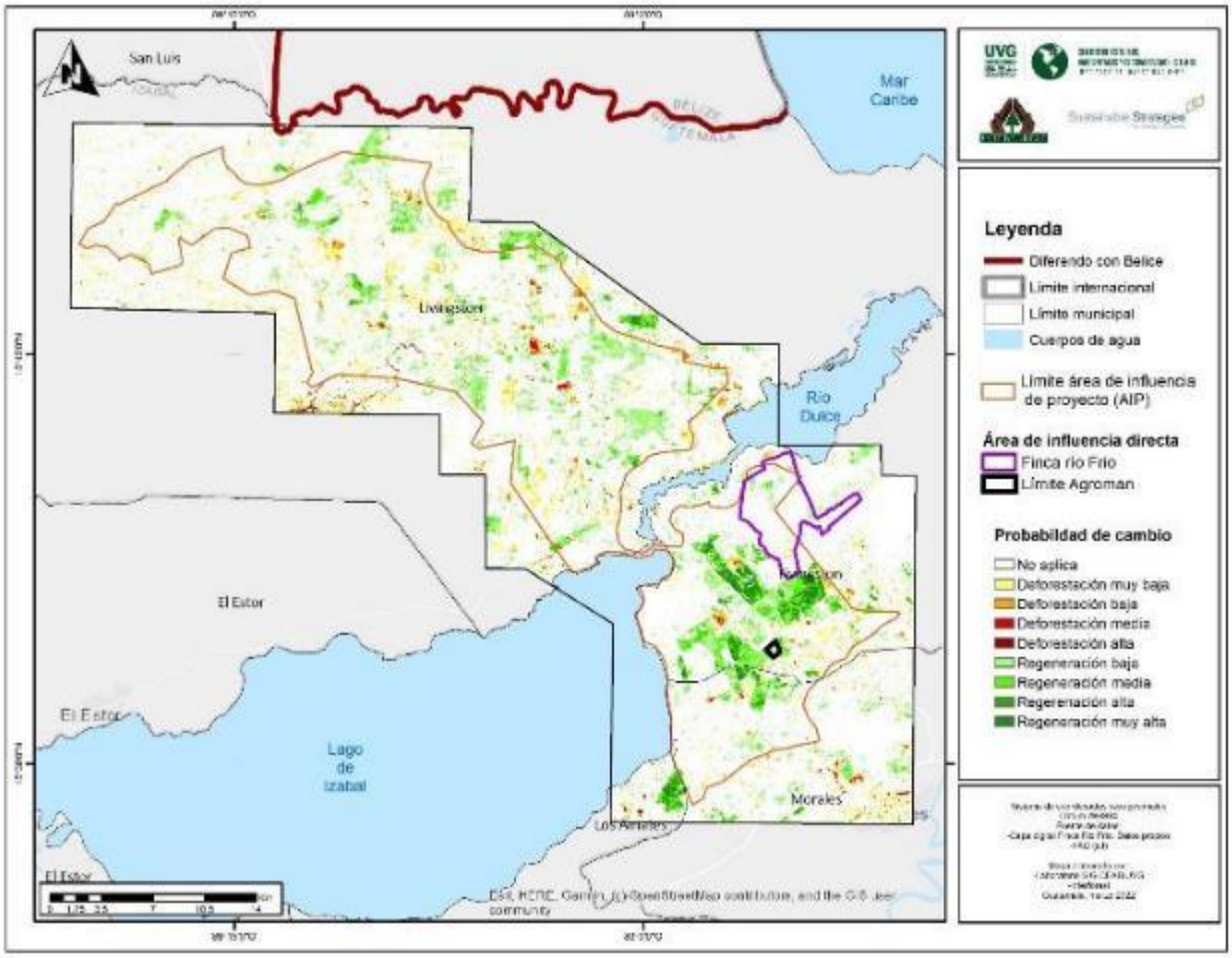

Figure 17. Map of BFAST vegetation cover change analysis in the AID and AIP of the Forestal del Caribe project for the decade 2010-2020. Green areas represent vegetation cover gain (natural, regeneration or planting) and red areas represent vegetation cover loss. Areas without colour represent areas with no discernible change for the period analysed.

4.2.1.6. Habitat Type Analysis.

In accordance with IFC Performance Standard 6, based on information gathered from both primary and secondary sources and field research data previously conducted in the AIP, four habitats have been identified based on the criteria of PS6, these are:

1. **Broadleaved forest (natural habitat):** Present both in the AID in the "Río Frío" farm and in the AIP.
2. **Gallery forest (natural habitat):** Present both in the AID in the "Río Frío" and "Agroman" farms, as well as in the AIP.
3. **Wetlands (natural habitat):** Present both in the AID in the "Río Frío" and "Agroman" farms, as well as in the AIP.
4. **Old rubber plantation (modified habitat):** Present in the AID at the "Río Frío" farm.

Modified habitats: Modified habitats are areas that may contain a large proportion of non-native plant or animal species, or where human activity has substantially modified the primary ecological functions and species composition of the area. Modified habitats include areas managed for agriculture, forest plantations, reclaimed coastal areas and reclaimed wetlands. This Performance Standard will apply to areas of modified habitat that include significant biodiversity value, as determined through the risk and impact identification process required by the Performance Standard. In such cases, the client shall minimise impacts on biodiversity and implement appropriate mitigation measures.

Natural habitats: Natural habitats are areas composed of a viable assemblage of mostly native plant or animal species, or where human activity has not resulted in any substantial modification of the primary ecological functions or species composition of the area.

The client will not significantly modify or deteriorate natural habitats, unless the following can be demonstrated: There are no other viable alternatives within the region for project development within modified habitats. Consultation with stakeholders has determined their views, including those of the Affected Communities, regarding the degree of modification and deterioration; and any modification or deterioration will be mitigated in accordance with the hierarchy of mitigation measures.

In natural habitat areas, where feasible, mitigation measures will be designed to ensure that there is no loss of biodiversity. Appropriate actions include: Prevention of impacts on biodiversity through identification and protection of reserve areas. Implementation of measures to minimise habitat fragmentation, such as biological corridors. Habitat restoration during operations and/or habitat restoration after operation. Implementation of equivalent biodiversity offset measures.

It is therefore important to maintain and conserve the natural forest cover identified as "Forest" existing in the AID, as well as to maintain and restore the gallery forests (riparian), where they exist, and to enrich the forest plantations with forest species that provide food for the fauna, for example fruit trees.

Table 13. Habitats and relevant associated species identified for the AID and AIP of the Forestal del Caribe project.

Habitat Type	Location	Associated species	Category IUCN Red List	Justification
Broadleaved forest (natural)	AID (Rio Frio)	*Faramea standleyana* (shrub)	EN*	Criterion i and ii PS6. Threatened species. Global distribution restricted to IDA and IPA.
		Aiouea guatemalensis (shrub)	VU**	Criterion i and ii PS6. Threatened species. Project area covers a significant part of its global distribution.
		Ateles geoffroyi (spider monkey)	EN	Criterion i PS6. Threatened species.
		Alouatta palliata (brown mantled howler monkey)	VU	Criterion i and ii PS6. Threatened species. Project area covers an important part of its known distribution in Guatemala.
	AIP	*Licania guatemalensis* (tree)	RC	Criterion i and ii PS6. Threatened species. Global distribution restricted to the AIP.
		Pera barbellata (palo prieto tree)	EN	Criterion i and ii PS6. Threatened species. Project area covers a significant part of its global distribution.
		Coussarea imitans (tree)	EN	Criterion i and ii PS6. Threatened species. Project area covers a significant part of its global distribution.
		Eugenia chahalana (tree)	EN	Criterion i and ii PS6. Threatened species. Project area covers a significant part of its global distribution.
		Eugenia izabalana (tree)	EN	Criterion i and ii PS6. Threatened species. Global distribution restricted to the AIP.
		Astrocasia austinii (tree)	EN	Criterion i and ii PS6. Threatened species. Global distribution restricted to the AIP area.
		Faramea standleyana (shrub)	EN	Criterion i and ii PS6. Threatened species. Global distribution restricted to the AIP.
		Aiouea guatemalensis (shrub)	VU	Criterion i and ii PS6. Threatened species. Project area covers a significant part of its global distribution.
		Coussapoa oligocephala (Bojo maja copjo, hemiepiphyte tree)	VU	Criterion i and ii PS6. Threatened species. Project area covers a significant part of its global distribution.
		Palicourea mediocris (tree)	VU	Criterion i and ii PS6. Threatened species. Project area covers a significant part of its global distribution.
		Chaetura pelagica (Chimney Swift)	VU	Criterion i PS6. Threatened species.
		Ateles geoffroyi (spider monkey)	EN	Criterion i PS6. Threatened species.
		Alouatta palliata (brown mantled howler monkey)	VU	Criterion i and ii PS6. Threatened species. Project area covers an important part of its known distribution in Guatemala.
Gallery forest (natural)	AIP	*Chaetura pelagica* (Chimney Swift, bird)	VU	Criterion i PS6. Threatened species.
		Ateles geoffroyi (spider monkey)	EN	Criterion i PS6. Threatened species.

Habitat Type	Location	Associated species	Category IUCN Red List	Justification
	AIP and AID (Rio Frio)	*Alouatta palliata* (brown mantled howler monkey)	VU	Criterion i and ii PS6. Threatened species. Project area covers an important part of its known distribution in Guatemala.
		Chaetura pelagica (Chimney Swift, bird)	VU	Criterion i and iv PS6. Threatened species. Highly threatened ecosystem, wetlands of regional importance for the Río Dulce National Park, which are sensitive to alterations in the hydrological regime of the region.
		Ateles geoffroyi (spider monkey)	EN	Criterion i and ii PS6. Threatened species. Monkeys use the old rubber plantation as a corridor connecting the populations of the Cerro San Gil Springs Protected Reserve with the remaining forest within the AID.

*EN: Endangered
**VU: Vulnerable

4.2.2. Ecosystem services

Ecosystem services are the benefits obtained from ecosystems by humans that contribute to both making human life possible and worth living (Díaz et al. 2006). These services are all those benefits provided by ecosystems to humans, such as protecting land from erosion, maintaining rainfall, and even regulating local, regional and global climate (Rodas and Godínez 2011). Ecosystem services also encompass processes such as sediment assimilation, recycling and nutrient renewal (Chee 2004).

The concept of ecosystem services is context-dependent, i.e. the same ecosystem process may produce an environmental service that is highly valued by one society, but not necessarily valued by other societies or actors in the region (Norberg 1999).

There are broadly three types of ecosystem services directly received by people and one type that supports the functioning of the previous three. Ecosystem services directly received by humans are provisioning services (which contribute to the production of "goods" such as food, energy sources, genetic resources, fibre and timber), regulating services (such as regulation of climate, water quantity and quality, disease, wind strength, pollination) and cultural services (e.g. spiritual, religious or educational). Ecosystem services that support the functioning of the above are called supporting services and are part of large-scale ecological processes, such as net primary productivity, the hydrological cycle, and the biogeochemical cycles of phosphorus, nitrogen and carbon.

In the AIP and AID, there are eight major ecosystem services (two within the provisioning services category and six within the regulating services category) that are the most relevant:

1. Provision of timber (Procurement).
2. Water supply (Provisioning).
3. Regulation of the hydrological cycle (Regulation).
4. Pollination (Regulation).

5. Seed dispersal (Regulation).
6. Pest and disease control (Regulation).
7. Carbon sequestration and storage (Regulation).
8. Providing options for the future in times of climate emergency (Regulation).

A large part of the regional population and economic sectors depend on the goods and services provided by the ecosystems of the IDA and its IPA. Their presence and degree of degradation are determinants of the quality of the ecosystem services provided, while their location and the presence of people who require these services determine their value.

The AIP and AID will be very relevant in the near future on the issue of timber provisioning, as it is in itself the purpose of the project. Water provisioning and regulation services that influence the water available for human, recreational and industrial consumption, agriculture, fisheries, etc., are considered essential for the human communities in the AID and AIP and, at the same time, are very vulnerable to climatic effects. The AID and the AIP of the project are very important areas for the provision and regulation of the hydrological cycle, as they are related to the water recharge of the Rio Frio and Rio Bonito micro-basin, within the Juan Vicente River sub-basin. This water recharge is also fundamental for the wetlands and mangroves of the Río Dulce National Park, adjacent to the AID.

The pollination and seed dispersal services provided by insects, birds, bats and monkeys living in the remaining forests of the AIP and flowing into the AIP are essential. These animals allow the dispersal of seeds necessary for plant restocking, crop pollination and vegetation regeneration.

In addition, the pest and disease control services provided by snakes, insectivorous birds of prey, insectivorous bats and carnivorous mammals are a priority to maintain the health of human communities surrounding the AID and living within the AIP. These groups of fauna allow the population control of potential pest species such as rats, mice, flies and mosquitoes, which affect crops and/or are vectors of diseases relevant to human health.

Carbon sequestration and storage contributes to climate change mitigation and helps regulate the local climate. The provision of forward-looking options in times of climate emergency is key to the AIP. Natural ecosystems in the AID and AIP are key to sustaining human life mainly in the aftermath of natural disasters.

In the event of catastrophic events that cut off local communities in the AIP, the provision of clean water, food and fish flowing from the AID to the AIP is critical to community climate resilience.

Within this context, improving the institutional framework and involving AIP stakeholders in assessing their vulnerability and adaptation options in the face of climate change; establishing and managing biological corridors in the AID between protected areas affected by climate change; changing or adapting the productive system of the AID to more sustainable matrices for the flow of ecosystem services; reaching agreements

between actors living in the same watershed to improve land use and management and reduce sedimentation and pollution of downstream waters are among the best strategies to reduce the vulnerability of the socio-ecological systems of the AID and AIP to climate change.

4.2.3. Species description

To systematise existing biodiversity information for the AIP and the AID, records of fauna and flora collecting localities in the region, found in the online database Global Biodiversity Information Facility -GBIF (www.gbif.org), were compiled and analysed.

Records from the tropical rainforest area of Izabal were also analysed, as well as within the project and its area of influence in the collections of UVAL-Herbarium of the Universidad del Valle de Guatemala, the Biological Collections of the UVG and the Systematic Entomology Laboratory of the UVG. In addition, the lists present in the online databases of Ebird, VertNet and the National Biodiversity Information System of Guatemala (SNIBgt) were also evaluated.

In all cases, an exhaustive bibliographic review was carried out of the research on biodiversity previously carried out in the region by the CEAB-UVG, as well as those deposited in the CONCYT databases, and Bachelor's and Master's degree theses from different universities in the country. The databases of the Red List of Threatened Species of the International Union for Conservation of Nature (IUCN) were reviewed.

A total of 12,657 existing biodiversity records from databases and general published research lists were analysed. Species richness results are shown in the table below, and full lists are identified in the **Annexes**.

Table 1414. Reported species richness of flora and fauna in the AID and AIP regions of the Forestal del Caribe project.

Taxonomic group	Species richness (n)		
	Area of Direct Influence (AID)		Area of influence of the project (AIP)
	Rio Frio	Agroman[59]	
Plants	43	11	642
Insects	46	4	27
Fish	6	2	20
Amphibians	18	2	10
Reptiles	46	2	43
Birds	65	7	187
Mammals	49	6	18
Total	267	32	927

The above table was developed based on geo-referenced flora and fauna sightings. The vast majority of geo-referenced localities and sighting records come from the forest areas

[59] All species in the AID at "Agroman"" are also found in the AID at the "Rio Frio" farm.

of the "Rio Frio" farm, and this study conducted in 2009 includes the portions of the farm that will be sold to Fundaeco as they coincide with the protected area and manifest this higher level of biodiversity richness.

Outside the AID, i.e. in the AIP, sightings and records are scarcer because there is very little natural cover left in the region. The vast majority of conserved natural forest that exists in the region is the central forest block and the block east of the Rio Frio estate in the Cerro San Gil Protected Area.

Hence, species richness is much higher in the AID than in the AIP, because of these remnant forests within the AID. The species richness quantified in the AIP is exclusive to the AIP, not including species that are recorded for the AID. That is, the AIP biodiversity calculations exclude the AID area so as not to inflate richness and to show that the AIP itself is quite degraded (as seen in our forest cover analysis on page 71), but that the AIP has maintained biodiversity-relevant natural forests and that these remnant forests have remained largely intact since 1990, as described in the maps above.

It should be noted that these estimates for the AID should be corrected considering that the "Rio Frio" farm to be planted with melina will be smaller and will not operate on a protected area as it will be dedicated to conservation by Fundaeco and/or by the Arbaro Fund itself.

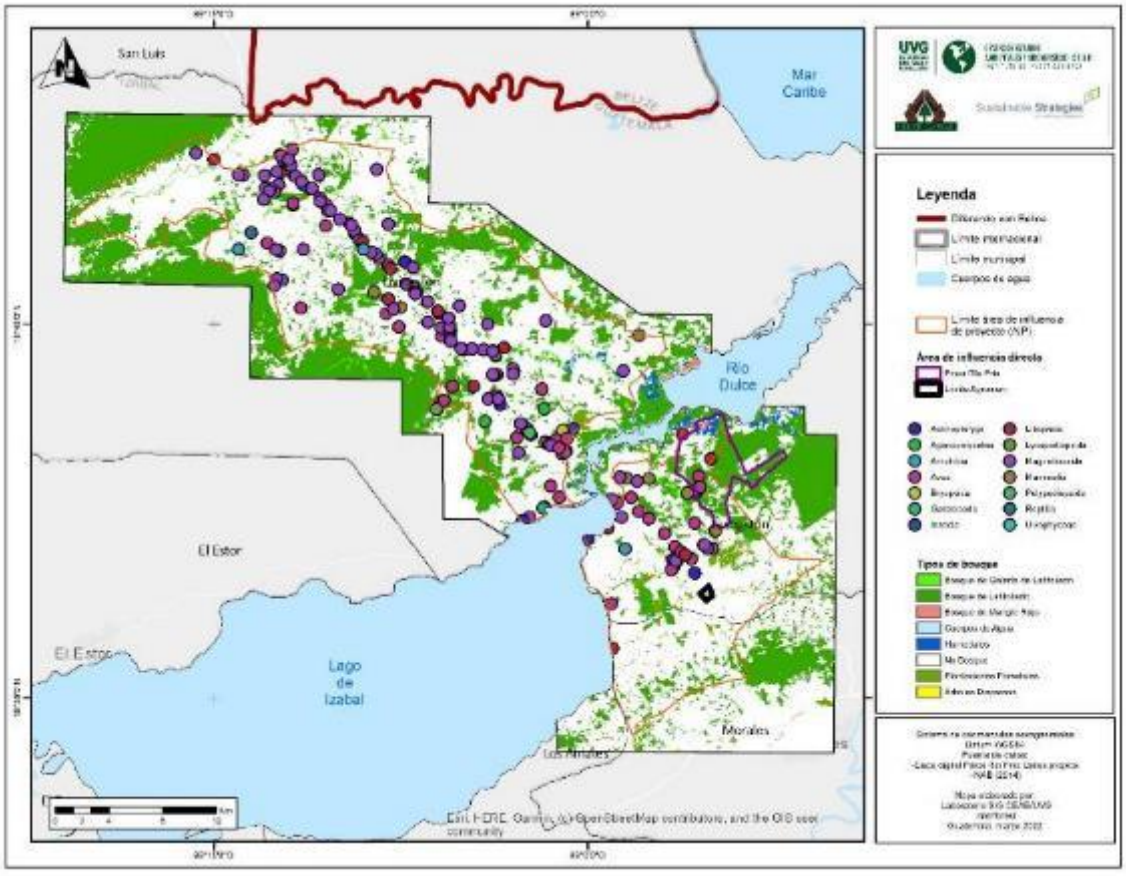

Figure 18. Locations of biodiversity records by major taxonomic group in the AID and AIP regions of the Forestal del Caribe project.

For the AID, practically all the species of insects, amphibians, reptiles and mammals reported for the region are found within the AID in the "Río Frío" farm. As for birds, 65 species have been reported directly within the AID at the "Río Frío" farm, only 7 for the AID at "Agroman" and 187 for the entire AIP.

These data reveal the importance of the AID in the "Río Frío" area in terms of biodiversity. The Annexes show the lists of species reported for plants, insects, amphibians, reptiles, birds and mammals for both the AID and the project's AIP.

From this list of species with *special conservation status*, there are four that were found to be present in the AID. Below, find the IUCN Red List rank of these four and the overlap in the area of the farms to be developed. *Farmamea standleyana* is not identified on the AID. The second, *Aiouea guatemalensis*, is potentially nearby, probably located in a protected area that is outside the scope of the project. However, it is noted that *Aiouea guatemalensis* has a wide growing range in Guatemala, covering Izabal, Peten and Alta Verapaz.

The monkey species, *Ateles geoffrovi* and *Alouatta palliata*, do not present a significant risk as they are located in a wide geographical range of Mesoamerica and are not solely dependent on the AIP. These species will also be considered in the Environmental Management Plan or Biodiversity Management Plan (if required by the investor).

Table 15. Species in threatened categories (VU, EN and CR) of flora and fauna present in the AID and AIP regions of the "Forestal del Caribe" project according to the Red List of Threatened Species of the International Union for Conservation of Nature (IUCN).

Taxonomic group	Species	Category IUCN Red List	Area of Direct Influence (AID)		Project Area of Influence (AIP)
			Rio Frio	Agroman	
Tree	*Licania guatemalensis*	CR*			X
Shrub	*Faramea standleyana*	EN**	X		X
Tree	*Pera barbellata*	EN			X
Tree	*Coussarea imitans*	EN			X
Tree	*Eugenia chahalana*	EN			X
Tree	*Eugenia izabalana*	EN			X
Tree	*Astrocasia austinii*	EN			X
Shrub	*Aiouea guatemalensis*	VU***	X		X
Tree	*Coussapoa oligocephala*	VU			X
Tree	*Palicourea mediocris*	VU			X
Bird	*Chaetura pelagica*	VU			X
Mammal	*Ateles geoffroyi*	EN	X		X
Mammal	*Alouatta palliata*	VU	X		X

*CR: Critically Endangered / **EN: Endangered / ***VU: Vulnerable

Note: Essential in defining that there is no critical habitat.

An analysis of the geographic extent of the habitat of the four IUCN Red List species for the Project's AID shows that all three species have extensive geographic habitat in which they live and breed. See figures below.

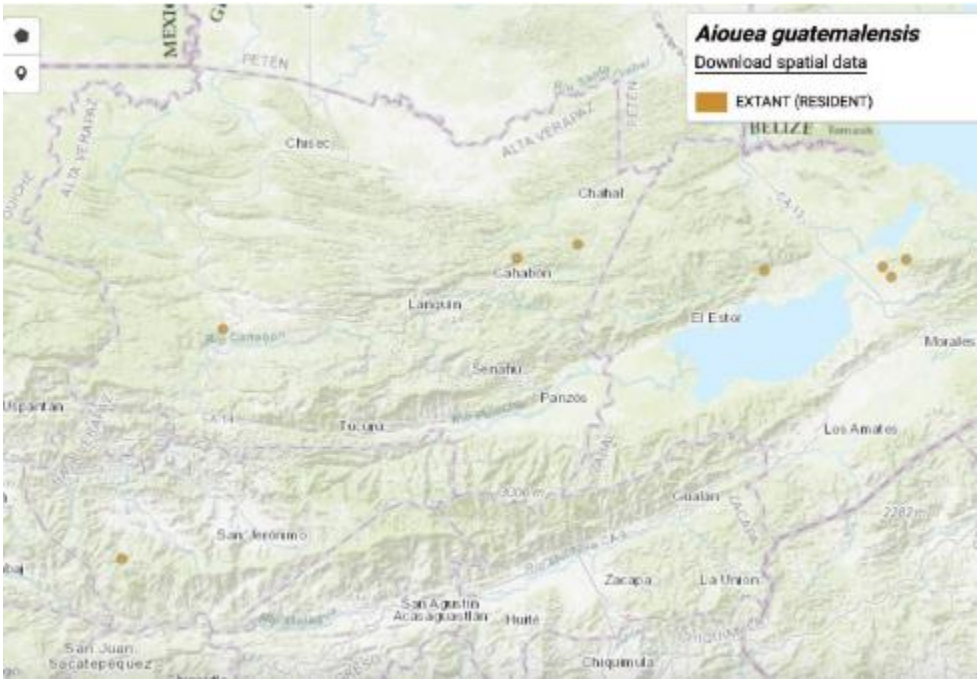

Figure 19. Map of sightings of Aiouea guatemalensis. Source: IUCN Red List.

Figure 20. Habitat map of Ateles geoffroyi (Geoffroy's Spider Monkey / Mono Arana). Source: IUCN Red List.

Figure 21. Habitat map of Alouatta palliata (Mantled Howler Monkey / Mono Ahullador Café). Source: IUCN Red List.

		
Aiouea guatemalensis.	Ateles geoffroyi (Geoffroy's Spider Monkey / Mono Arana)	Alouatta palliata (Mantled Howler Monkey / Mono Ahullador Cafe)

Figure 22. Images of Species of Special Concern in the AID.

Analysing the species of special consideration within the AIP, there are four species on the IUCN red list category for which there is little information on the geographical extent of their habitat and for which further research should be carried out when updating the biotic baselines and generating the Biodiversity Management Plans as required in **Annex 17**: *Faramea standleyana, Licania guatemalensis, Eugenia izabalana and Astrocasia austinii.*
See these four species in the figure below.

			
Faramea standleyana.	*Licania guatemalensis*	*Eugenia izabalana*	*Astrocasia austinii*

Figure 23 . Images of Species of Special Concern in the AIP.

4.3. Socio-cultural component

4.3.1. Socio-economic-political overview of the communities linked to the AII, AIP, and AID of the project

For the department of Izabal, according to data from the National Institute of Statistics (INE) of Guatemala for the year 2019, it indicates that the department of Izabal, in which the AIP is located, has a population of 408,688 inhabitants, of which 28.21% self-identify as Mayan, with an average age of 26.05 years.

The primary sector of the economy of the Department of Izabal consists of mining, agriculture (cardamom, cocoa, rambutan, maize, beans, bananas), forestry (rubber, African palm), cattle, and more recently, pineapple. See above map of land use in the AIP. The secondary sector consists of banana, pineapple and rubber processing plants. Recently, corrugated cardboard production plants have been installed. In Puerto Barrios, Forestry Rio Blanco has installed two sawmills, one of them in association with the company CHEPS.

In the tertiary sector, there are two seaports, a free trade zone, and a fairly robust tourism infrastructure, including hotels, marinas, restaurants, and archaeological parks and nature reserves. In recent years, much expectation has been generated about the impact of the infrastructure project called Franja Transversal del Norte, which connects the Department of Huehuetenango (bordering Mexico) with the ports of Izabal (Segeplán, 2018).

The Q'eqchi' people are the largest Mayan ethno-linguistic group in Guatemala. It is located in the departments of Alta Verapaz, Baja Verapaz, Petén (the largest department in the country) and Izabal, where Q'eqchi' communities have settled throughout the department, engaging in agricultural, commercial and artisanal fishing activities. Currently there are also important Q'eqchi' settlements in Belize (see Figure 16). The socio-cultural dynamics of the department of Izabal have been characterised by the expansion of the Q'eqchi' populations and their interaction with the Garífuna group (located in the coastal area of the department).

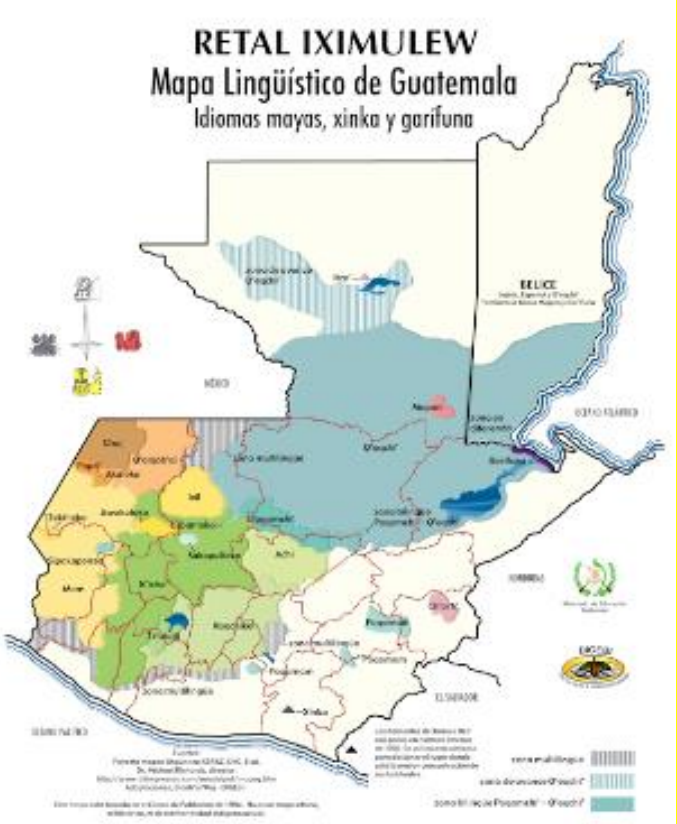

Figure 24. Linguistic map of Guatemala. Source: Ministry of Education, 1994.

The AID largely corresponds to the municipality of Lívingston, one of the five that make up the department of Izabal. INE data indicate that the municipality of Lívingston, where the two farms of the project's AID are located, has 73,492 inhabitants, 75.61% of whom are rural and 55.6% indigenous (including the Mayan and Garifuna populations). The average level of schooling is 4.99 years, which means that literacy levels are low in the area (Census, 2018).

According to the Local Competitiveness Index of the Foundation for the Development of Guatemala (FUNDESA, 2020), the municipality of Lívingston ranks 214th out of 340 in terms of its overall competitiveness, with a GDP per capita of US$ 2,831.68. A selection of important indicators from this index is presented in a table below.

Table 1616. Indicators of local competitiveness in Izabal.

Indicator	Value	Remarks
Recorded Cases of Agrarian Conflict	19	The 19 historically registered cases of agrarian conflict in Lívingston compare with the 68 in the neighbouring municipality of El Estor, and the 154 registered for the municipality of Santa Cruz Barillas, Huehuetenango, in the northwest of the country.
Percentage of Progress of the Municipal Development Plan and the Land Use and Zoning Plan	100	Izabal has a complete Land Use Plan, which is important when initiating any project, as it defines the land use policies of a particular territory.
Percentage of Road Network Gap	39.81	The road network gap refers to the percentage of compliance with the Road Development Plan 2018-2032, which implies a strong need for investment in new roads and improvements to existing roads.
Percentage of Water and Sanitation Coverage	45.3	In socio-economic indicators, more than half of the population does not have adequate water and sanitation services.
Percentage of Population Living in Poverty	75.46	Some 75% of the population lives in poverty.
Percentage of Achievement in Mathematics and Reading Tests	1.93	Regarding education, only 2% of the population achieved the required results in official tests in mathematics and reading.
Remittances as a Percentage of GDP	34.04	The impact of migration in the municipality is seen in the percentage of GDP represented by remittances, which exceeds 34% (nationally it is 11.92%).

Source: FUNDESA, 2020.

The municipality is divided into 15 micro-regions, with a total of 219 communities. The project's AIP covers a large part of 6 of the micro-regions, which consist of a total of 99 communities, of which 42 are within the AIP and 8 within the AID. These 8 communities can be characterised as follows: poor access to sanitation and drinking water, unequal access to electricity (some communities are supplied by home solar panels), difficulty of mobilisation (dirt roads and dependence on waterways in some cases), and households with significant gaps (71% of households with dirt floors, for example). Primary education coverage is 60%, secondary 27%, and diversified 12% (Interforest, 2021).

The municipal authority maintains good communication and collaboration with the Community Development Councils (COCODE), which are the main form of social organisation and authority at the local level. The leaders are fully identified in each community and are quite open to collaborate in projects of interest to the communities (Interforest, 2021).

Community Development Councils (COCODES) are a participatory governance structure, complementary to the institutional framework of the State, and corresponding to a broader system, the National System of Development Councils. COCODES consist of an assembly (in which all residents of a community can participate) and a coordinating body, usually known as the Board of Directors.

The main function of the COCODES is to promote community participation in decision-making on local development processes. These committees can propose projects to the municipal authorities, as well as manage their own funds through donations and other sources. Each COCODE elects representatives to the Municipal Development Councils

(COMUDES), where budgetary investment decisions are made at the municipal level. There are other levels of the development system (departmental and national), but it is the COCODES and COMUDES that exert the greatest influence on the daily life of the communities.

The national council system is a product of the Peace Accords (1996), and is based on the so-called "trilogy of decentralisation laws" enacted in the early 2000s. These laws are: Decentralisation Law, Development Councils Law, and Municipal Code. From a political science perspective, the system and its laws can be encompassed within the broader concept of decentralisation, which seeks the devolution of competencies and budgetary decisions to the more local levels of government.

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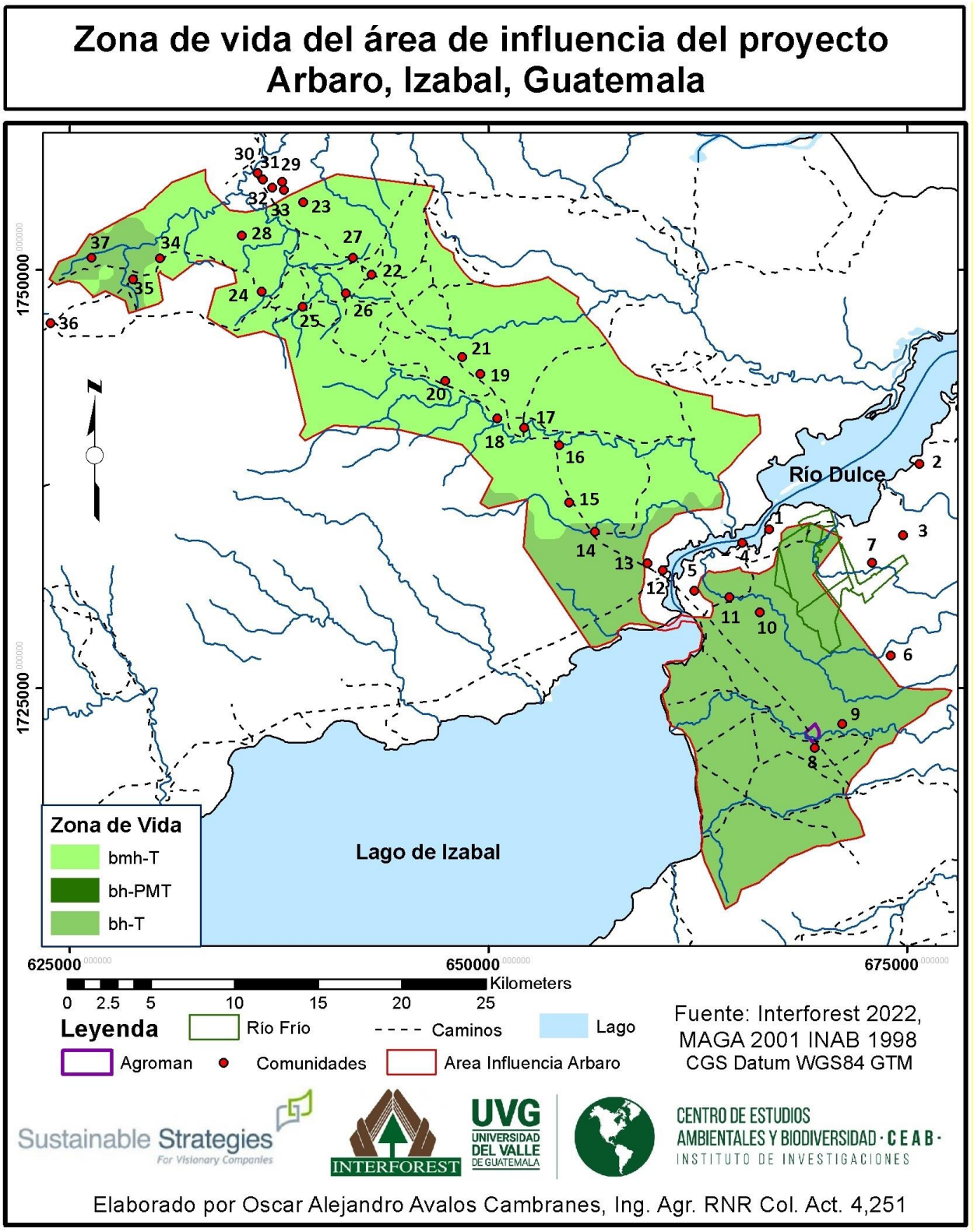

Figure 25 . *Life zone map in the AIP.*

Table 17 . *Names of the communities in life zone in the AIP.*

1	Brisas del Golfete Community	22	Semox
2	Rio Blasta Community	23	Touch it
3	El Zapotillo Community	24	Chocon
4	Las Camelias Community	25	Tamagaz
5	Monte Selti Estate	26	Sabanquix
6	Community Lot Six	27	Tierra Colorada
7	Nuevo Rio Frio Community	28	Monte Alegre
8	Buenos Aires	29	The Paratroopers
9	New San Marcos	30	Chocchoc
10	Buena Esperanza Farm	31	Pavil Estate
11	Hacienda Joya de Oro	32	Hacienda Buena Esperanza
12	Rio Dulce Headwaters	33	El Gran Chaparral Farm
13	Borders	34	The Guitars
14	San Antonio Saja	35	Franco
15	San Felipe de Lara Cooperative	36	Caquchoch
16	La Libertad	37	Chinasejal
17	La Genega	38	Movela
18	San Francisco	39	Chabichoc
19	San Jose Buena Vista	40	Sepemechila
20	Sahia	41	Semacha
21	Smaj	42	Semacar

There are elements that generate a unique context in Izabal due to its geographical position and socio-cultural characterisation. The main issues that mark the social context of the department of Izabal are detailed below.

- **Territorial dispute between Guatemala and Belize:** there is a dispute between the two countries that has lasted more than a century, with Guatemala claiming Belize's territory as its own. The territory claimed by Guatemala stretches from the Sarstun River in the south to the Sibun River in the north, comprising approximately 11,030 km², plus an outlet to the sea and an insular area of the 2,296 km² of Belizean territory, which affects the departments of Petén and Izabal, which border with Belize. In practice, this means that in the border area there is an absence of authorities from both countries and very limited patrolling, allowing for enclaves of illicit activities in the area.

- **Illicit activities:** According to Insight Crime, Izabal is considered a transit route for overland drug trafficking from Honduras to Guatemala, arriving by air or water from Colombia and Venezuela. The department's coastal location and proximity to the Caribbean positions it for the movement of arms, drugs, environmental crimes, human trafficking, mineral resources and the organised crime and extortion activities associated with these illegal activities. Although in the interviews conducted by the consulting team, the existence of these activities in protected areas was mentioned, it is important to note that they have not been reported in the direct area of influence of the farms to be purchased (Insight Crime, 2021). Some of the interviewees stated that the influence of illicit groups is more centred in the area of Lake Izabal and Río Dulce,

due to the issue of access to transport, but that in general they have not approached the communities of the AIP and AID.

- **Forestry culture:** due to the department's forestry vocation, the communities are familiar with tree species, the forestry crop cycle, its impacts, benefits, etc. In the interviews generated by SS, an acceptance of forestry projects in the AIP and a general knowledge of the institutional framework related to forest management and conservation (CONAP, INAB, and FUNDAECO) was observed. However, there is always some tension between the communities living around Protected Areas and the conservation authorities that protect them and do not allow subsistence farming on that territory.

- **Deforestation:** illegal logging is common in the department and affects with greater context, according to the Plan de Desarrollo Municipal y Ordenamiento Territorial (PDM-OT) Livingston, the regions of: Livingston Area Region: Plan Grande Quehueche, Plan Grande Tatin, Río Dulce Border Region: Sector B, Los Ángeles, Aldea Cotoxjá, Nueva Jerusalén (Segeplán, 2018).

- **Plots:** mainly in the north of the department of Izabal, there are plots of land that the state acquired and distributed to military personnel, people displaced by the Internal Armed Conflict, among others. Most of these parcelamientos were carried out more than 50 years ago, so that, from the distribution of properties at that time until now, there are multiple owners who have been buying several plots of land to form larger farms.

- **Invasions of private property:** The Qeqchi' communities residing in the southern zone of Lake Izabal are characterised by persistent invasions of private property. The Fénix Mine, owned by Compañía Guatemalteca de Níquel or CGN, has had sections of its property invaded for over 10 years. The palm oil farms of Naturaceites and its independent palm oil producers, such as Plan Grande and El Murciélago, among others. The flagship case of invasions in the area is that of the sugar cane mill Chabil Utzaj, which was located in the Polochic valley, closed operations, and one of the reasons for closing operations was the process of responding to invasions and the need to evict more than 480 families. The Polochic area is very far from the AIP. Invasions of private property are often linked to illegal activities, which complicates the identification of these invasions as collective movements of indigenous people claiming ancestral rights, or else different causes and movements are combined in the same act of invasion.

- **Controversial mining:** South of Lake Izabal, two Russian mines with plans to expand operate have been controversial. The Compañía Guatemalteca de Níquel and its sister company Pronico, as well as the company Mayaniquel operate in the southern perimeter near El Estor Izabal where relations with the communities have been controversial, including confrontations related to issues of invasions, human rights, public consultation, respect for freedom of opinion, among others. Despite the efforts of the Human Rights Ombudsman's Office, the University of San Carlos, and the

Presidential Dialogue Commission, among others, no long-term vision has been achieved regarding community relations between mining and communities. As an illustrative example of the controversies, on 24 October 2021, the Guatemalan president decreed a state of siege in El Estor for 30 days. Despite this, in December 2021, the consultation process with the indigenous Mayan Q'eqchi' people for the extraction of CGN's Fenix Mine was completed, allowing the operation of the mining project for nickel extraction, although the process is questioned for excluding 13 indigenous communities in the area. Pronico exports nickel ore to Ukraine to be processed there, which could lead to geopolitical tensions between the Russian/Ukrainian management of the company and its exports to these countries.

- **Municipal politics:** Izabal's municipal mayor's office has been debated between Ladino and Q'eqhi' ethnic groups seeking leadership in representation. Interviews with business managers in the area of influence indicated support from the mayor's office for business ventures, particularly forestry. It should also be emphasised that the existence of a development and land-use plan, both at departmental and municipal level, helps the authorities to guide their actions and establish development priorities.

4.3.2. Socio-economic-political overview of the communities linked to the project's AID

For the development of the section on socio-economic and political generalities of the communities of the AID of the project, a 3-day field visit was made to the Project and its area of influence, visiting each of the communities and interviewing a total of 34 people, ensuring more than 1 interviewee in each community, see **Annex 14** for details. The information gathered was backed up with interviews with social managers from other companies in the area of influence, including Perenco, Grupo Occidente, Grupo Campollo, among others, whose functions include interacting with the communities in the AID. Anthropologists specialising in the Q'eqchi' ethno-linguistic group and in the history of the region were also interviewed.

The Project's AID has a total of eight communities linked (either by proximity, services or other variables) to the two farms that make up the AID. These communities are:

1. Buenos Aires,
2. San Marcos,
3. Lot 6,
4. New Rio Frio,
5. Zapotillo,
6. Bonito River,
7. Las Camelias, and
8. Brisas del Golfete.

All of these communities, with the exception of Buenos Aires and San Marcos, are relatively isolated and maintain connections to the main road through dirt roads that cross private properties. In the case of Las Camelias and Brisas del Golfete, their main access is by water, either through private boats or community-owned "cayucos" (types of boats smaller than paddle-powered canoes).

All communities are embedded, to a greater or lesser extent, within four main socio-economic dynamics:

1. The commercial area of Rio Dulce,
2. Pineapple, rubber and cattle farms, among others,
3. The coastal dynamics of Rio Dulce (including "chalet" tourism[60] and fishing) and
4. The subsistence farming dynamics of the community and surrounding areas.

Insertion in these dynamics generates different economic strategies on the part of community members, such as: fishing combined with wage labour (Las Camelias, Brisas del Golfete, Río Bonito); occasional wage labour combined with work on their own land (Nuevo Río Frío and Zapotillo); occasional wage labour combined with agriculture on rented land (San Marcos and Lote 6); or wage labour combined with trade (Buenos Aires).

In terms of socio-political organisation, it is clear that the basic unit of power within the 8 communities is the Community Development Council (COCODE), although there have been initiatives to create other levels of coordination involving several communities (Second Level Mayorships). The relationship with the municipal government of Lívingston is close, and joint projects for piped water and school construction have been generated.

Other influential actors in the region include the oil company (PERENCO, which manages a pipeline for oil distribution, which runs through the "Rio Frio" farm) as well as: CONAP, INAB, rubber, eucalyptus and pineapple farms, Fundaeco, cardamom buyers, fish buyers, boatmen, Interforest, school teachers, among others. More detailed information on these elements is presented in **Annex 8** for each of the eight communities mentioned in this section.

4.3.3. Mapping of Social and Political Actors in the AIP and AID.

The Department of Izabal has been characterised by complex socio-political dynamics, with the presence of the following organisations: Comité Campesino del Altiplano (CCDA), Coordinadora Nacional Indígena y Campesina (CONIC), Comité de Desarrollo Campesino (CODECA), and the Bufete para Pueblos Indígenas. These organisations have supported some communities in their demands for land and in their opposition to mining activity (Interforest, 2021).

Other organisations present in the Department are NGOs linked to environmental issues, such as FUNDAECO, Colectivo Madreselva, AMASURLI; NGOs with a community development focus: RTI International, Heifer, and Mercy Corps; religious NGOs such as CARITAS; and organisations for political mobilisation such as Peace Brigades International, Unidad de Defensores de Derechos Humanos de Guatemala (UDEFEGUA), CONGCOOP, and the Defensoría Q'eqchi' (Interforest, 2021).

[60] By this we mean the private properties along the coast of Rio Dulce used as holiday homes by wealthy families. Some community members have found employment as caretakers or cleaners and maintenance workers on these properties.

The main governmental and non-governmental actors of importance in the AIP, and in the AID

- Governmental institutions
  - Ministry of Education (MINEDUC)
  - Ministry of Public Health and Social Assistance (Ministerio de Salud Pública y Asistencia Social, MSPAS)
  - Secretariat for Food Security (SESAN)
  - National Council of Protected Areas (CONAP)
  - National Forest Institute (INAB)
- Municipal and local authorities
  - Livingston City Council
  - COCODES
  - AMASURLI
- Companies and entrepreneurs
  - Rubber and Eucalyptus Farms
  - Buyers of Cardamom
  - Fish buyers in Rio Dulce
  - Rio Dulce Boatmen
  - Interforest
  - Traders in the Rio Dulce catchment area
  - PERENCO
  - Trecsa
  - Grupo Occidente
  - Campollo Group
- NGOs
  - Fundaeco
  - Casa Guatemala, which works with children and young people on educational and productivity projects.
  - Comité Campesino del Altiplano (CCDA)
  - National Indigenous and Peasant Coordinating Body (CONIC)
  - Committee for Peasant Development (CODECA)
  - Indigenous Peoples' Law Firm
  - Honeysuckle Collective
  - RTI International
  - Heifer
  - Mercy Corps
  - CARITAS
  - Peace Brigades International
  - Unidad de Defensores de Derechos Humanos de Guatemala (UDEFEGUA) (Guatemalan Human Rights Defenders Unit)
  - CONGCOOP
  - Q'eqchi' Ombudsman's Office
- Others:
  - "Chaleteros".

- School Teachers
- Canoe-owning fishermen
- Owners of pick-up trucks operating passenger routes
- Pineapple Industry
- Small cardamom producers
- Small maize producers
- Priests and pastors
- Leaders of the indigenous-peasant movement with influence in the department

An analysis of the main actors in the region, according to their level of influence, provides the following information:

Influence High	Medium Influence	Influence Low
Lívingston City Council COCODES CONAP Rubber and Eucalyptus Farms Fundaeco "Chaleteros". Buyers of Cardamom Fish buyers in Rio Dulce Rio Dulce Boatmen	Interforest PERENCO School Teachers Canoe-owning fishermen Traders in the Rio Dulce catchment area Owners of pick-up trucks operating passenger routes	Pineapple Industry Small cardamom producers Small maize producers Priests and pastors Leaders of the indigenous-peasant movement with influence in the department

A Cartesian map is presented below, in which actors are placed according to two main analytical axes: level of influence in the region, and affinity / proximity to forestry issues (only actors identified as having high or medium influence were placed):

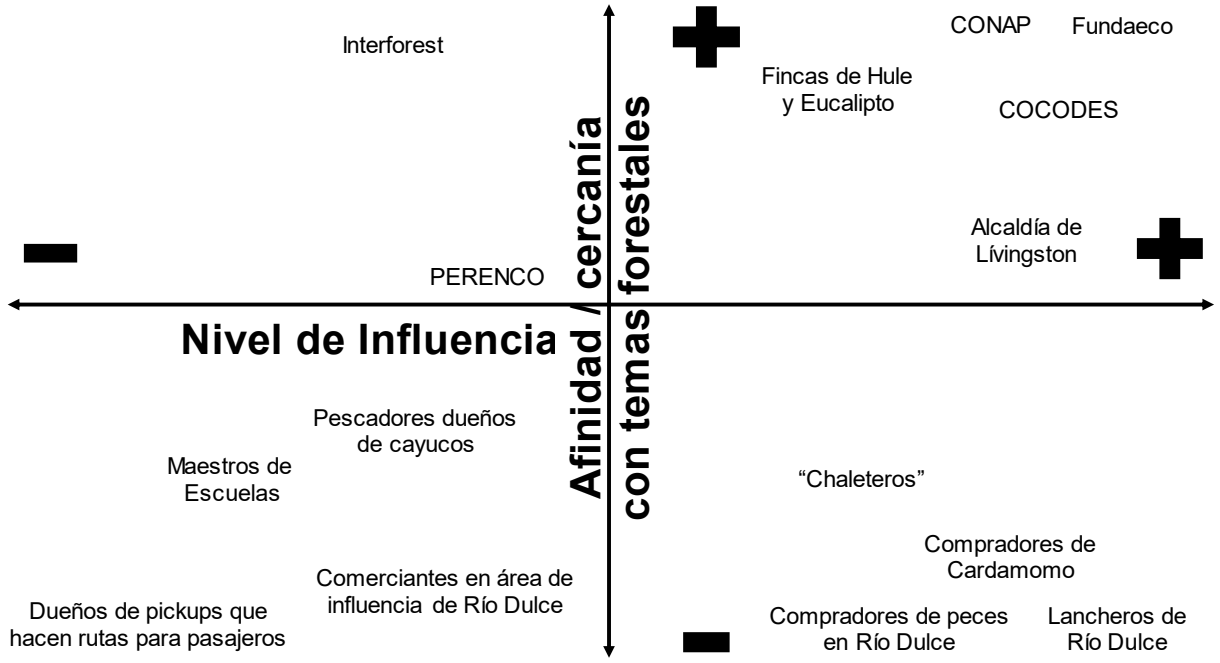

Figure 26. Stakeholder map

4.3.4. Gender.

There are several gender aspects that need to be taken into account in relation to AID communities, as well as the AIP in general when considering gender.

According to data from the Statistical Yearbook of the Ministry of Education, in 2020 only 6 out of 10 school-age children in the municipality of Río Dulce attended school. The primary school repetition rate was 12.92 %, while the dropout rate in basic education was 9.47 %. In the basic cycle, the net coverage rate is 33.15 % (MINEDUC, 2021). Specifically in the project's area of influence, the statistics are even less encouraging, with a literacy rate of 42% and primary coverage of 60% and basic coverage of 27% (Interforest, 2021).

Educational problems start with the physical and human infrastructure of the education system. During the fieldwork, it was found that the COCODES' main achievements were always aimed at building school facilities or negotiating with the municipality to hire teachers. It is important to remember that in the Guatemalan system, teachers must be hired by the Ministry of Education, ideally on a permanent basis. As there is no capacity to cover the whole country, the municipalities, through the management of the COCODES, often fulfil this function.

At both primary and basic levels, for every 100 boys in school there are 92 girls. This still implies a significant lag in gender parity in education (Segeplán, 2020). There are cultural patterns that have privileged the education of boys over that of girls, under the logic that women "do not need" formal schooling to take care of household chores. In addition to

formal education, the possibility of training for work, entrepreneurship, and popular arts and industries should be considered. In several of the communities in the area of direct influence, women mentioned the importance of training programmes for them in areas such as sewing and weaving, handicrafts, among others. Although culturally there are still barriers to women's labour insertion, the long tradition of women working in the chalets in the area adjacent to the river can facilitate their insertion in other areas, including forestry.

In addition, women's participation within the COCODES is very limited. Although many of the women interviewed indicated that they participated in the plenary meetings of the committees, no women were identified as having a leadership position within the committees.

Secondly, the gender division of labour is still very strong, with the result that women have little knowledge and interest in forestry issues. They know that their husbands work or have worked on rubber farms, but they cannot give more details about the advantages or disadvantages of forestry projects, or how they work. The women also have access to different sources of information as they are linked to the work in the "chalets", as it is domestic work in houses with access to radio, television, and, we assume, other printed sources of information.

Perhaps the most relevant gender-related issue relates to land tenure and inheritance practices, and to post-marriage settlement patterns in communities. Women rarely have access to land tenure, and therefore have very limited decision-making power over land. In communities where population pressure and land scarcity is stronger, women's role in dealing with these situations will be less.

4.3.5. Social land use

Land use in both the **AIP and the AID** is varied. There are communities highly dependent on fishing (Brisas del Golfete and Las Camelias), moderately dependent on fishing (Río Bonito), while the others do not have direct access to water sources to carry out this activity. The fishing communities have a close, and at times tense, relationship with the country's conservation institutions (CONAP and INAB), as well as with the environmental NGO Fundaeco. This tension stems from the restrictions imposed on the use of the forest, and in the particular case of the communities closest to the Cerro San Gil reserve, from the conservationist dynamics of the reserve, which sometimes do not fit in with the economic activities of the community members.

The communities of Brisas del Golfete and Las Camelias have particular economic dynamics, mainly living from fishing and tourism, as they are linked to the waterways in the area (Figure 17).

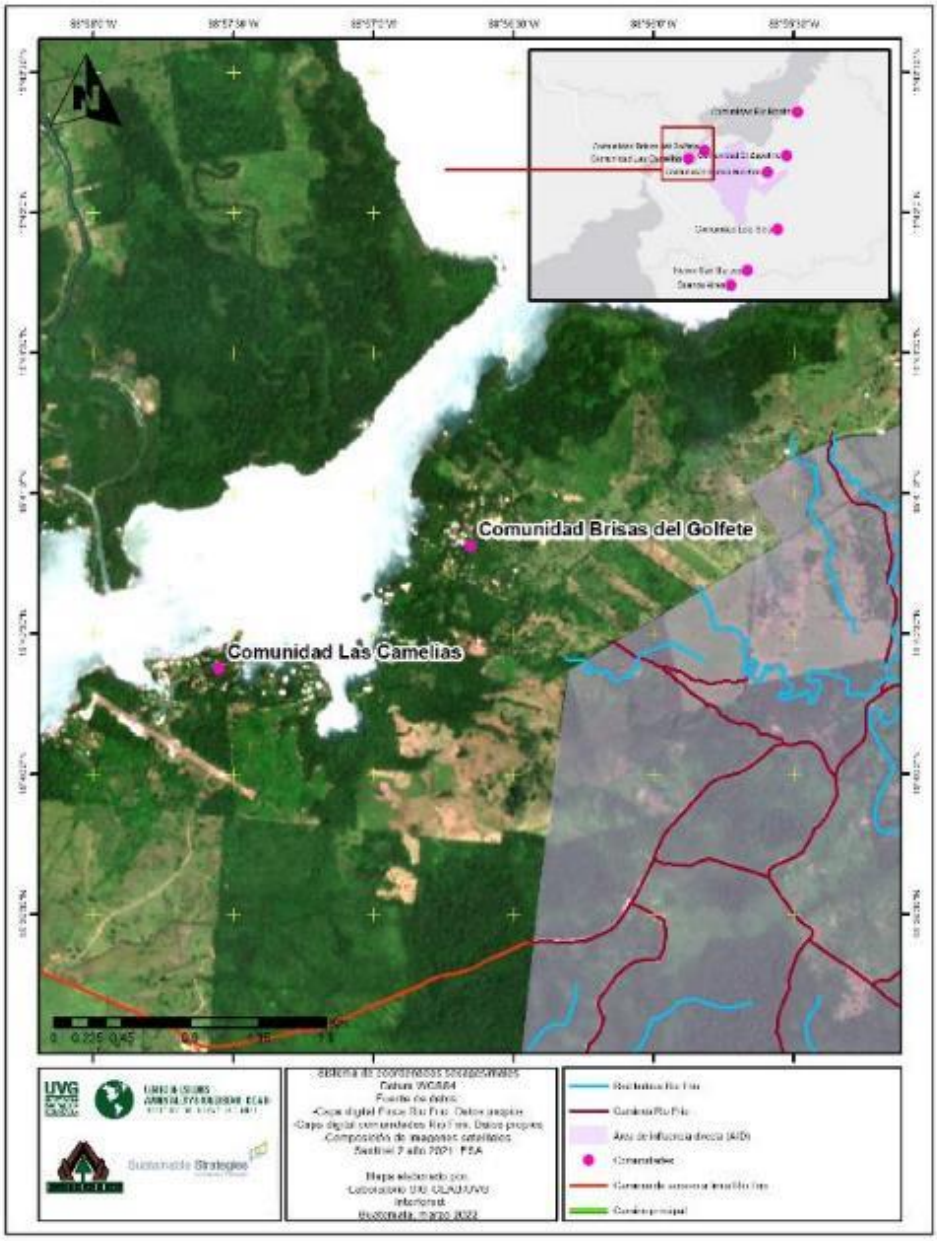

Figure 27. Community Brisas del Golfete and Las Camelias of the AIP. Note their link to the water source, which is the Dulce river.

The case of the community of Nuevo Río Frío is particular and should be considered with special interest as it is a vulnerable community. This community was resettled by Fundaeco 18 years ago, as it was located in the core zone of the Cerro San Gil Protected Area. For this purpose, Fundaeco bought a farm, supported by the Ministry of the Interior to evict the invaders from the farm, and then settled the families of Nuevo Rio Frio. The communities were moved by Fundaeco and then did not receive the other agreed commitments such as fertilisers, development of community infrastructure (roads, communal area, access to water, agrochemicals, etc.) and Fundaeco states that it was "due to lack of economic and technical capacity". We were told that there are no physical records documenting the resettlement process.

At the time of resettlement there were 23 families, these have grown to over 40 families on the same properties. The community is characterised by isolation, with no access to water or electricity. The only public service identified was the school teacher who is paid by the Ministry of Education. The families of Nuevo Río Frío cultivate subsistence agriculture, mainly maize, beans and cardamom. Initially there was an important interest from the interviewees to have access to permanent employment.

Satellite images show an incursion into the crops of this community in the area that was previously part of the finca "Río Frío" and which will now be purchased by Fundaeco. The SS consulting team was unable to access the area as it took more than 2 hours to reach it on foot, and the recommendation was left verbally to the Fundaeco team to visit this area of the border between the Project and the communities' crops.

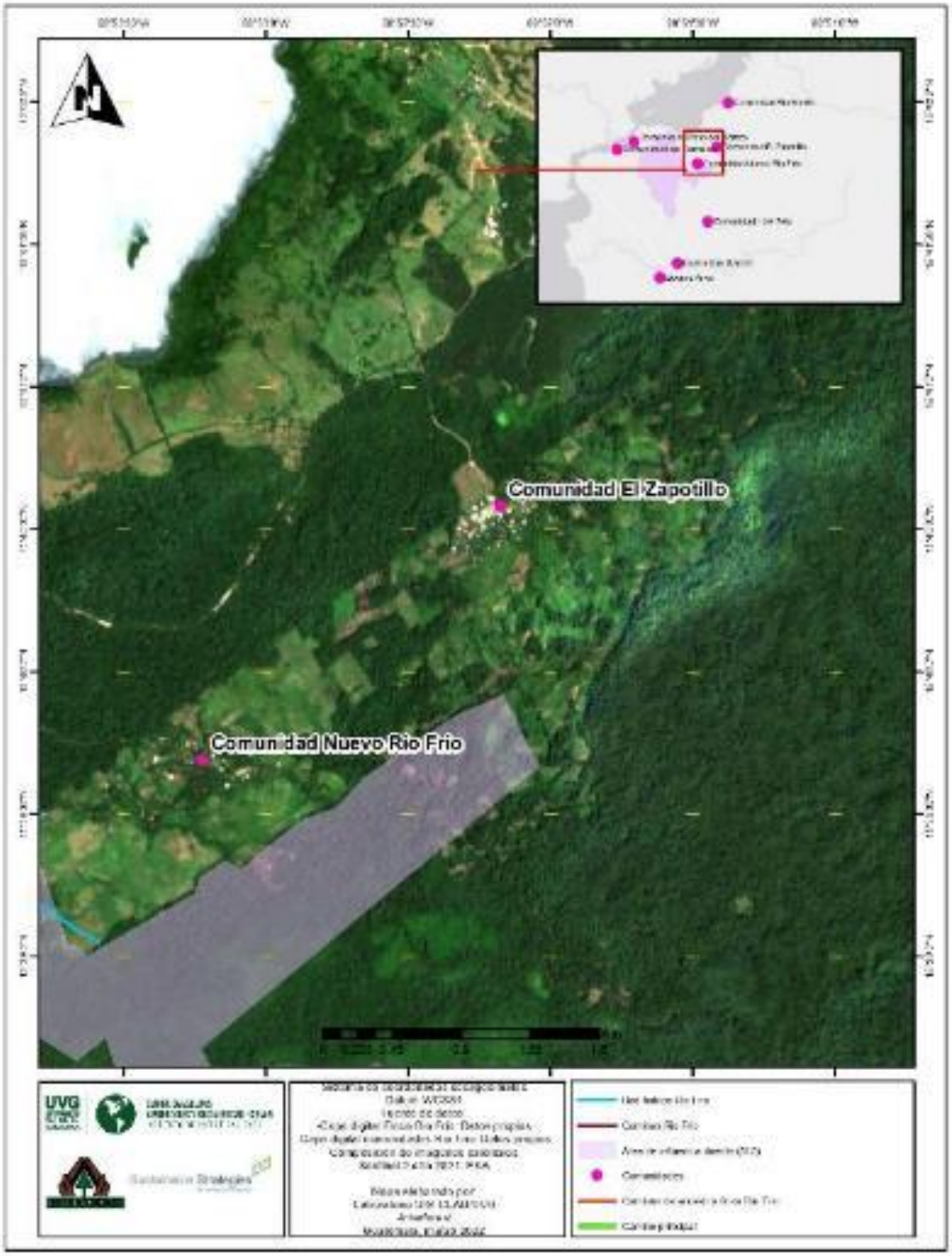

Figure 28. Map of Nuevo Río Frío and El Zapotillo communities.

4.3.6. Land tenure

Land tenure is varied across the eight communities linked to the AID. While Buenos Aires and Lote 6 are managed through market mechanisms, communities such as San Marcos, Las Camelias, Brisas del Golfete are managed entirely through community tenure mechanisms.

In community tenure, it is the COCODEs that decide how land is distributed, to whom it is given, and what is done with land or housing when it becomes vacant. Families can inherit property, as long as they live on it, and are prohibited from selling it to people outside their family nucleus.

In the rest of the communities in this analysis, mixed systems are used, where there is the possibility of buying and selling land, but always with the approval of COCODE. In the case of the communities of Brisas del Golfete and Las Camelias, there is some internal tension due to population growth and land scarcity. In interviews, it was indicated that new couples wishing to start families have to move to other communities or urban centres. This pressure is also felt, although to a lesser extent, in the communities of Zapotillo and Río Bonito.

The general scarcity of land in the region has been supplemented by strategies such as leasing for maize cultivation, a situation that occurs through internal arrangements in communities such as Nuevo Río Frío, or thanks to the goodwill of the "Río Frío" farm, which for some time now has been offering the opportunity to plant maize in exchange for a modest rent for the use of the land, a situation that is regulated through simple but clear letters of commitment between the tenant and the farm.

The only case of invasion of private lands identified in the AID was the one visualised by the consultant team in Nuevo Rio Frio, although this community did not identify it as such. In addition, the issue of land invasion was not identified in the interviews with the community members of the eight communities visited.

In the AII, Fundaeco indicated that it has farms with invasions in the northern zone of the Cerro San Gil Protected Area in the Nuevo Nacimiento San Gil farm. Additionally, during the interviews, a case "in distant lands" was mentioned, that of Cotoxjá-Manzanita, where there was an irregular occupation of a farm owned by a known ex-politician, by members of the communities of Lámpara, Maya Creek, and Laureles.

Five particular considerations are highlighted in relation to land tenure within the AID, i.e. the finca "Rio Frio", and possibly on some AIP farms:

- The Perenco pipeline crosses the farm and a 10 metre right of way is signed with it around the pipeline for the maintenance road for this infrastructure. We understand from verbal conversations with Interforest that this easement has expired and must be updated. The maintenance of the pipeline and its surroundings and the access road next to it is the responsibility of Perenco,

according to verbal indications from Interforest, but we were unable to verify the contract.

- The community uses the right of way according to their free will for access to their houses. The right of way legally belongs to Perenco only. However, the communities use the right of way on the farm, as well as on other farms, to travel to their homes. The guard of the neighbouring farm estimates that approximately 50 vehicles pass through the farm daily using Perenco's easement, see figure 2 with a map of the Rio Frio farm to identify the pipeline route.
- The high voltage power transmission line, in the case of TRECSA. We understand from verbal conversations with Interforest that the contract for the line has expired and will need to be updated. The impact of this transmission line is that the Project will not be able to plant underneath it and that the Project will have the obligation to allow the passage of managers of this company for cleaning and maintenance of infrastructure, see figure 2 with a map of the polygons of the "Rio Frio" farm to identify the passage of the interconnection line.
- At finca "Río Frío" there are currently two guards living on the property, one with his family and the other single, who will have to be evaluated to see if they will continue working with the project. At the farm " "Agroman" a guard is hired from the neighbouring community, Buenos Aires.
- On both farms there are tenants of approximately 1 manzana (approximately 7,000 mts) planting maiz. The Grupo Occidente representative indicated that each of these tenants signs a contract per harvest. SS had access to view a lease contract, which is an informal document with no figures and mentioning a one-harvest season or approximately 4-6 months. In finca "Rio Frio" there are 20 tenants and in finca "Agroman" there are 17 tenants. Although it is true that the informality of these contracts can represent a risk, the fact that interested parties are given the opportunity to lease land has generated a very good perception of the work on the farm among the community. The tenants expect to negotiate access to the land on a crop-by-crop basis and do not take access to the land for their crops as a given. It would be opportune for the current owner of the farms to terminate the lease relationship with the current tenants and/or negotiate a recognition agreement for their crops in case they have to be intervened for the planting of melina before the end of the current harvest.

4.3.7. Relationship with neighbouring AIP communities

The most relevant commercial units in the AIP are Río Dulce and Morales, while the most important political unit is the municipality of Lívingston. Other relations (especially family relations) are with the communities of Lámpara, Creek Maya, Laureles, La Esmeralda, Punaterenas, Quebrada Seca, Esmeralda, Nuevo Nacimiento San Gil, Manzanita, and Tamejá.

Relations among the eight communities linked to the AID, and between the communities and the surrounding farms, are considered cordial, and there were no reports of conflicts over land or for any other community reasons (apart from specific inter-family problems). It is worth noting that within these communities there are several Ladino and several

indigenous communities. In general, community members perceive that life in the communities is peaceful, that it is a safe area, and that everyone gets along well, even between indigenous and mestizo communities.

Migration is beginning to be a relevant factor in some of the AID communities, especially in Buenos Aires and San Marcos, as in the interviews the community members perceived high rates of migration, especially in the last 5 years. It is worth mentioning that there are communities such as San Marcos with a close relationship with the United States due to significant migration to that country. It is worth mentioning that the "Río Frío" farm carried out an organised consultation process within the framework of FSC certification in 2014, and no incidents were reported during the process.

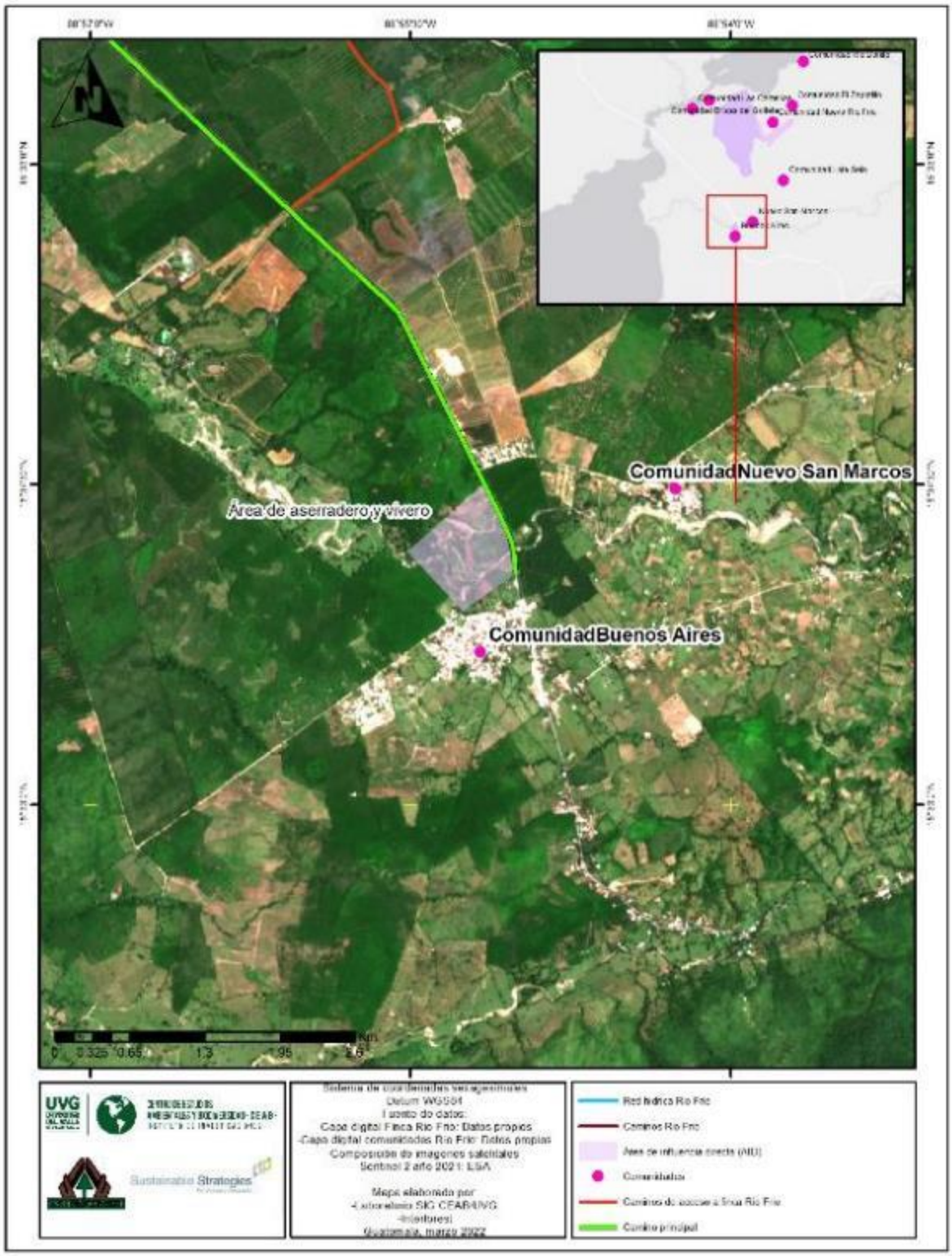

Figure 29. *Map of the Buenos Aires Community and its border with the farm "Agroman".*

4.3.8. Indigenous peoples

Of the 8 communities visited, 5 are predominantly Maya Q'eqchi', the most important indigenous group in the departments of Alta Verapaz, Petén, and Izabal. There is one community (Nuevo Rio Frio) that is mixed (composed of Q'eqchi' and mestizo families), the other three are mainly mestizo: Nuevo Rio Frio, Buenos Aires and Lote 6. Nuevo Rio Frio claims to be mestizo, but several members speak Q'eqchi'.

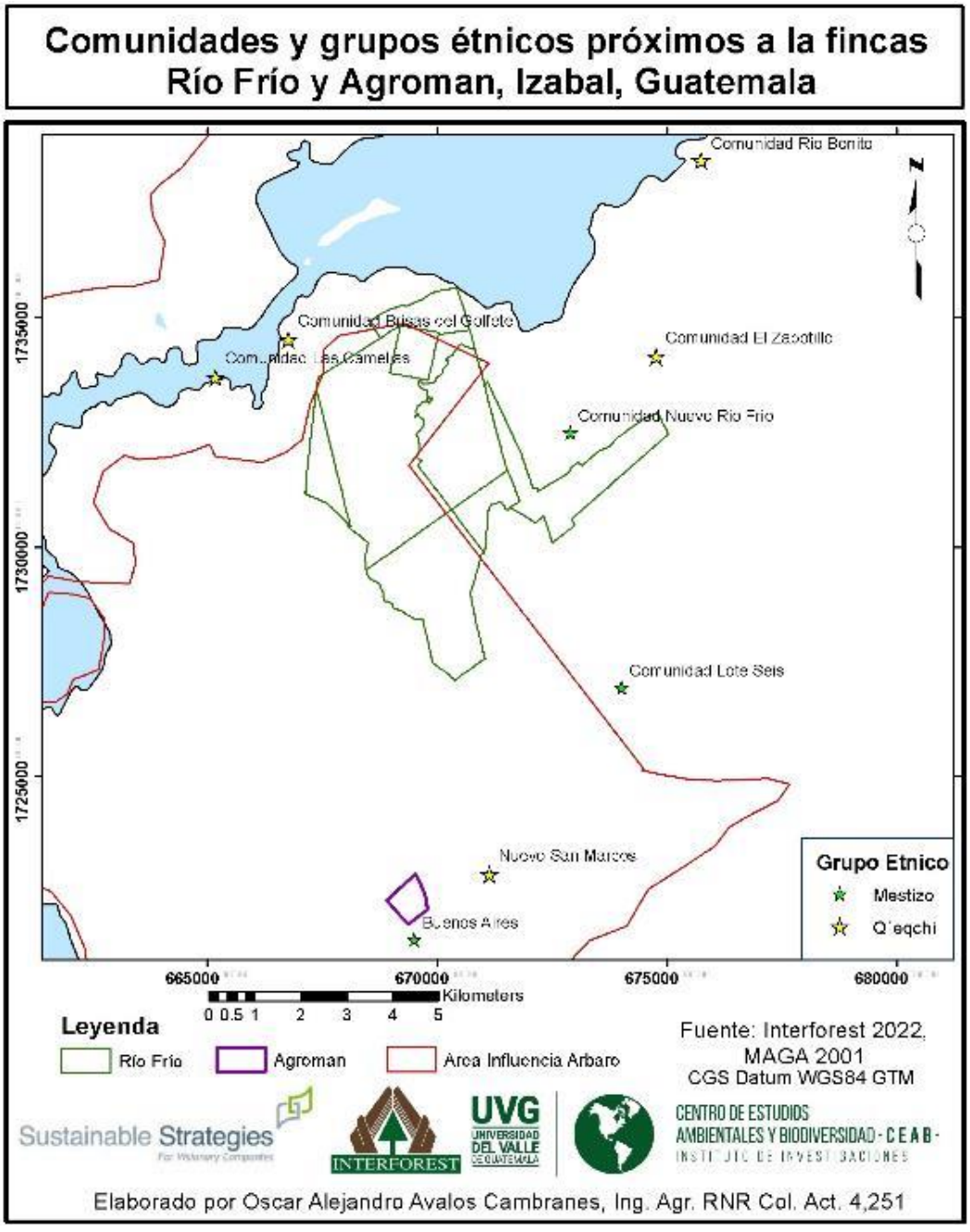

Figure 30. *Map of communities and ethnic groups near the Rio Frio and Agroman farms.*

Most of the population that identifies itself as indigenous is bilingual, with some cases of older women who have a basic command of Spanish, and other cases of young people who no longer speak Mayan languages. Predominantly indigenous communities still preserve Q'eqchi' cultural elements, although these are being lost due to increasing conversion to Protestant Christianity.

Among the elements considered fundamental in the Q'eqchi' cosmovision are: the cult of Tzuultaq'a, and the rituals of Wa'tesink' and Mayehak. The first consists of the belief that nature (the mountain) possesses a divine consciousness, and that it is necessary to consult and request permission for any agricultural or forestry activity in order to be in harmony with this deity (Estrada, 2006). The other two elements will be described below. The existence of movements seeking ethno-cultural claims in the region was not identified.

Figure 31. Mural of the new school in the community of Brisas del Golfete, showing Mayan and pan-indigenous symbolism. Photograph: Andrés Álvarez.

4.3.9. Archaeology

For the development of the archaeological section, a field visit, a review of secondary sources and interviews were carried out.

None of the interviewees mentioned the existence of archaeological or sacred sites in the project's AID. However, these interviewees did identify other archaeological and/or sacred sites in the department and away from the AIP, such as the caves of Tamejá (considered a sacred site and where Mayan and Catholic ceremonies are held) and the archaeological site of Quiriguá.

Databases were consulted at the Ministry of Culture and Sports of Guatemala, the archives of the Department of Prehispanic and Colonial Monuments -DEMOPRE- (2022) and the Archaeological Atlas of Guatemala -AAG- (2022). Information was also consulted that includes the lists of archaeological sites in the department of Izabal, documented by

various archaeological reconnaissance and research projects directed by national or foreign professionals in this region from the 1950s to the present.

However, the official databases are not complete or up to date, since the DEMOPRE database includes 58 archaeological sites, while the AAG database includes 120. In addition, it was established that many archaeological sites do not have any coordinates, only vague references such as cardinal directions, distances and nearby towns. In other cases, the coordinate or registration system is incompatible with the traditional systems (UTM, geographic or GTM), as well as errors in the names of the sites, duplicity in the registers or errors in the municipality to which they correspond.

Therefore, as a complement to this work, we consulted the verification and georeferencing reports of archaeological sites and sacred ceremonial places in protected areas in the department of Izabal, carried out by the RIC-IDAEH Liaison Unit (2011, 2014 and 2017), as well as the report generated by archaeologists from the company TRECSA (2014), carried out between 2013 and 2014 in the AID and AIP, because these correspond to the most recent archaeological work in the area.

Visualising the department of Izabal, a total of 157 archaeological sites were identified with the information collected, of which 96 were discarded because they did not have the corresponding coordinates for their location on a map, and other archaeological investigations carried out in the department of Izabal were not considered because they were too far away from the AIP.

For the AIP, a total of 61 archaeological sites are included in this work, 10 of which are considered sacred ceremonial sites by modern Maya groups and have been grouped according to three criteria:

- Archaeological/historical sites or ceremonial sacred sites (SA/H or LSC) located within the AID,
- SA/H or LSC, within the AIP and
- SA/H or LSC outside the AIP or in Protected Areas of the Guatemalan System of Protected Areas.

Table 18. Archaeological/historical or sacred ceremonial sites located in the different project areas.

Criteria	Outside the AIP or in PA	Within the AIP	Within the IDA	Total
Archaeological / historical sites	40	10	1	51
Archaeological/historical site and Sacred Ceremonial Place	10	0	0	

4.3.9.1. Archaeological/historical sites within the AIP

Ten archaeological or historical sites were identified within the AIP. These were occupied during pre-Hispanic times and two of them record pre-Hispanic and historic occupation (Jocoló Británico and Santa Catarina Xolocó), which will be discussed in the following section.

According to López (1997:338-342) and Mejía et. al. (2014:27) the sites Jocoló Británico and Santa Catarina Xolocó were occupied between the Late Preclassic (250 BC) and the Late Classic (AD 900), consisting of groups of small and dispersed mounds. The largest of these are located at the archaeological site of La Gloria. All these sites have been impacted by the use that has been given to the area either for cultivation or cattle breeding, being those identified in the following list.

Table 1919. Coordinates of archaeological sites within the AIP

No.	Archaeological Site within the AIP	Latitude N			Length W		
		Gra	Min	Seg	Gra	Min	Seg
1	Centre One-La Ciénaga	15	44	0.00	89	5	0.00
2	El Amatillo	15	32	0.00	88	55	0.00
3	British Jolo	15	37	36.00	89	2	34.00
4	Gold Jewellery	15	38	12.00	88	57	9.00
5	Juan Vicente A-C	15	37	43.00	88	55	51.00
6	La Gloria	15	43	21.00	89	0	24.00
7	Las Vegas	15	35	24.00	88	55	11.00
8	San Geronimo Las Conchas	15	42	0.00	89	3	0.00
9	Santa Catarina Xolocó	15	37	10.00	89	2	34.00
10	Tower 124N	15	35	58.60	88	54	35.10

4.3.9.2. Archaeological/historical sites outside the AIP or within a Protected Area

As mentioned, the last criterion taken into account was that of archaeological or historical sites located outside the AIP or within a Protected Area. A total of 33 records were identified, which, being outside the AIP, will not be impacted by any work carried out by the project.

However, it was considered important to include the archaeological site of Cayo de Piedra, which, although located within the Río Dulce National Park, is located less than one kilometre northeast of the Río Frio farm, close to where the pastures and the area where eucalyptus trees have been planted.

This archaeological site, according to López (1997:344), was identified and documented in 1993 by the Izabal Archaeological Project, and consists of a group of eight visible structures, located to the west of the estate of the same name. Although it is currently

located within a protected area and outside the grounds of the "Río Frio" farm, it cannot be ruled out that this sector of the property may have had some use during the pre-Hispanic period, which can only be corroborated by a systematic survey of the area in question.

Table 20. Coordinates of archaeological sites within the IA or within a PA.

No.	Archaeological Site within 1 km of the AIP or within a PA	Latitude N			Length W		
		Gra	Min	Seg	Gra	Min	Seg
1	Cayo de Piedra	15	40	53.50	88	54	2.00

The proximity of other archaeological sites to the AIP, such as the Los Ángeles and Lote Seis sites, has not been ruled out, however, these are areas that will not be used for the time being, so they are not taken into account for the time being.

Table 21. Coordinates of archaeological sites within the IA.

No.	Archaeological Site within 1 km of the AIP or within a PA	Latitude N			Length W		
		Gra	Min	Seg	Gra	Min	Seg
	Los Angeles	15	35	48.80	88	51	12.50
	Lot Six	15	36	15.30	88	52	24.90

4.3.9.3. Archaeological/historical sites and ceremonial sacred sites outside the AIP

Ten archaeological sites were identified that are also considered sacred ceremonial sites by the Mayan Q'eqchi' groups living in the department of Izabal. Most of them correspond to natural caves that were used in pre-Hispanic times for different rituals or burials of important people, as they are considered as entrances or passages to the "*mitnal"*, which is the place where deceased ancestors live.

Today, these caves are still used to carry out various ceremonies, which are established according to the days of the sacred 260-day calendar or Tzolk'in. The only exception of these places is San Miguel Q'uq', which consists of a stone inside a natural hollow, which is used as an altar to perform such ceremonies.

These sacred ceremonial sites, besides being outside the AIP, are currently located within the Rio Dulce, Cerro San Gil and Punta de Manabique protected areas, so there is no problem for their future conservation.

Table 22. Coordinates of archaeological site and ceremonial sacred place outside the IA.

No.	Archaeological Site and Ceremonial Sacred Site outside the AIP	Latitude N			Length W		
		Gra	Min	Seg	Gra	Min	Seg
1	Guacal de Agua Cave	15	48	57.20	88	52	24.00
2	La Cocona Cave	15	43	52.30	88	43	22.70
3	Los Angeles Cave 1	15	36	23.20	88	50	26.50
4	Los Angeles Cave 2	15	36	18.30	88	50	30.80
5	Cave Lamp	15	45	5.50	88	45	26.50
6	Lost Cave	15	38	20.30	88	49	12.90
7	Quebrada Seca Cave	15	43	50.80	88	48	57.30
8	Santa Elena-Tamejá Cave	15	41	53.00	88	41	39.50
9	Tamejá Cave	15	44	8.50	88	47	15.60
10	San Miguel Q'uq'	15	44	33.50	88	30	27.90

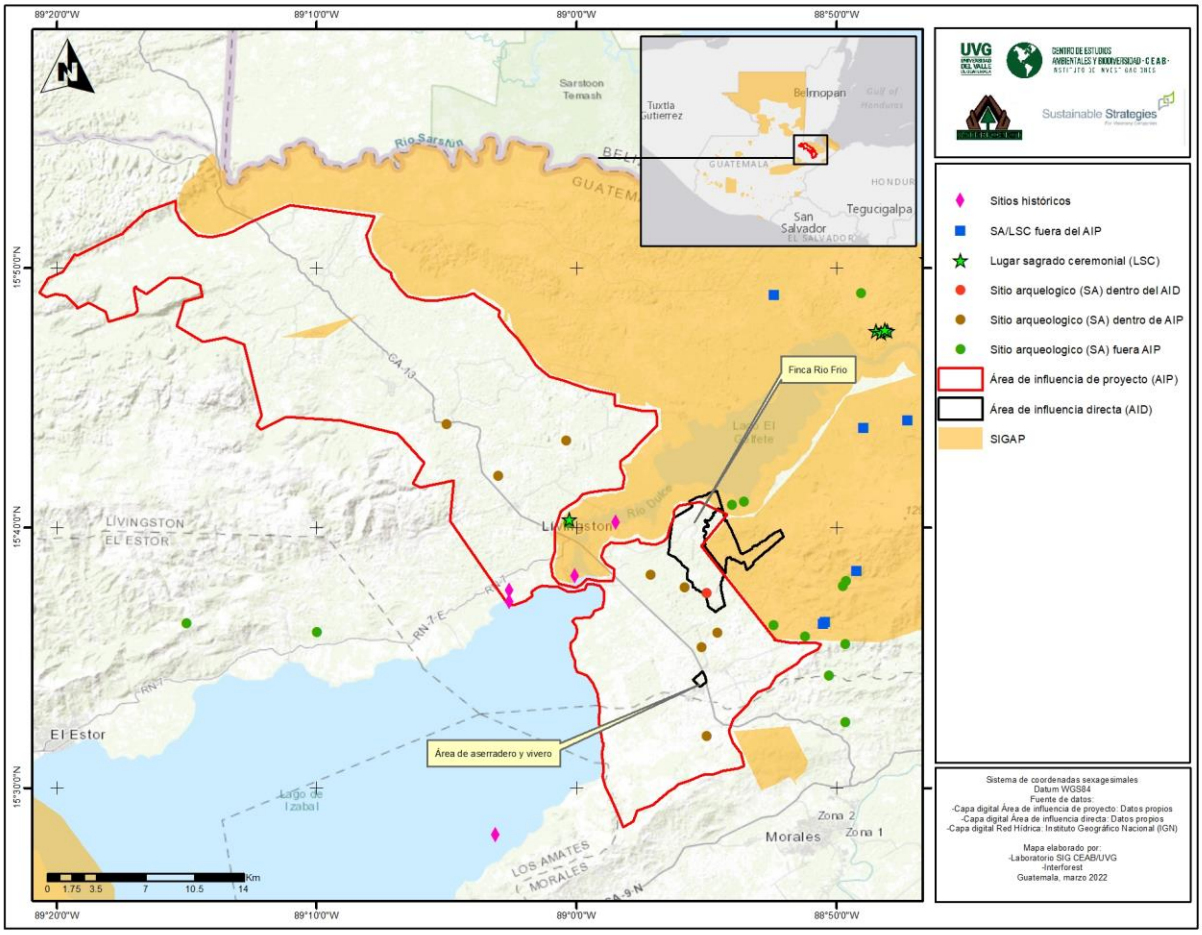

Figure 32. Location of archaeological, historical and ceremonial sites inside and outside AIP.

4.3.9.4. Archaeological/historical sites within the AID

According to this information and the field visit carried out within the farms "Agroman", it was determined that the area currently used as a nursery within the farm "Agroman" has no archaeological evidence of any kind, such as archaeological materials (remains of artefacts) on the surface or pre-Hispanic structures, because this area is very close to the San Marcos River and is subject to possible flooding when winter arrives.

The upper parts of the farm, located in the northeastern part of the property near the asphalted road leading to Río Dulce, which are currently leased to private individuals for the cultivation of maize, were also surveyed. No archaeological evidence of any kind was found in this sector of the farm.

We also visited the southwest area of the farm located on the south bank of the San Marcos River, which borders the community of Buenos Aires, in this area two natural elevations were identified, which may have been conditioned in pre-Hispanic times for the construction of housing structures. This sector, like the previous one, is also leased for the sowing of maize and after an inspection no evidence was identified to corroborate the idea of its use in antiquity.

Through the desk work it was possible to establish that 2.5 kilometres to the north of the property is the archaeological site of Las Vegas and 4.3 kilometres to the south is the archaeological site of El Amatillo. Both sites, although located within the AIP, are sufficiently far from the farm, so it is not considered that any archaeological research should be carried out in this area in the future, especially due to the high amount of sediment that has covered the area due to the river floods and which is currently used as a nursery.

In the case of the finca "Río Frío", subsequent to the desk work, the archaeological site of Juan Vicente D was identified, which according to López (1997:342), was identified by the Izabal Archaeological Project in 1993 and which consisted of 40 to 50 structures, some up to 5 metres high, distributed in several dispersed groups, many of which were extensively disturbed, see **Annex 17 to** identify the recommended next steps.

Table 23. Coordinates of the archaeological site Juan Vicente D.

No.	Archaeological Site within the AID	Latitude N			Length W		
		Gra	Min	Seg	Gra	Min	Seg
1	Juan Vicente D	15	37	30.00	88	55	0.00

The site is currently located within the area of rubber tree trunks and tall undergrowth, so it is possible that part of the site has been destroyed during the mechanisation of the land for the planting of rubber, as no pre-Hispanic structures were identified during the tour of the area. On the other hand, the height of the undergrowth in some sectors does not allow structures less than one metre in height to be seen.

Therefore, a systematic survey of the sector would be required to verify the presence of some groups of structures that have not been damaged by previous agricultural works at a future stage.

It is important to note that, within a radius of one kilometre around this site, especially in the higher parts, fragments of pre-Hispanic artefacts made of obsidian and flint were identified, which during this period were used to manufacture various tools for cutting and food processing (Figure 23).

Figure 33.. Photograph of fragments of pre-Hispanic obsidian artefacts. (Photo: J. Crasborn 2022).

These archaeological materials do not belong to the region, as obsidian, being a glass of volcanic origin, is only found in the highlands of Guatemala. In this case, a brief examination of the pieces identified during the tour leads us to consider that they come from the El Chayal source, located in the department of Guatemala, and it is very likely that they arrived in this region by means of the trade route of the Motagua River.

The flint is of sedimentary origin and is only found among the limestone formations, so it is possible that it came from the north of the department of Izabal, or from the regions of the Verapaces or Petén. No other archaeological materials were found, such as fragments of vessels, which is a very curious fact, since together with obsidian they are two of the most common materials to be found in an archaeological surface survey.

In general terms, it is recommended that prior to any mechanisation or land clearing work in this area, an archaeological survey be carried out, which must be authorised by the Guatemalan Ministry of Culture and Sports. This procedure can take several months, so it is important to take this time into account in the planning of the project to be developed.

The database of archaeological sites consulted indicates that there is another archaeological site called Río Frío, López (1997: 346). This was identified for the first time in 1993 by the Izabal Archaeological Project, which, according to this work, was located

to the west of the farm of the same name, made up of several dispersed mounds, which were very altered by the mechanisation of the terrain.

The reference of the location of this site is not precise and does not allow a proper location. The site should be in the area where eucalyptus plantations or pastures are currently located, as there is no map available to help locate and determine the extension of the site. The presence of pre-Hispanic evidence in this sector cannot be ruled out, due to the presence of several limestone formations with water springs, which may have had a functional or ritual character during the pre-Hispanic period.

Figure 34. Limestone formations north of the finca "Río Frío" (Photo J. Crasborn 2022).

Due to the above, a more detailed archaeological reconnaissance and investigation in this sector is suggested, as another archaeological site called Cayo de Piedra has also been identified nearby, which is described below, see appendix of complementary studies to be carried out.

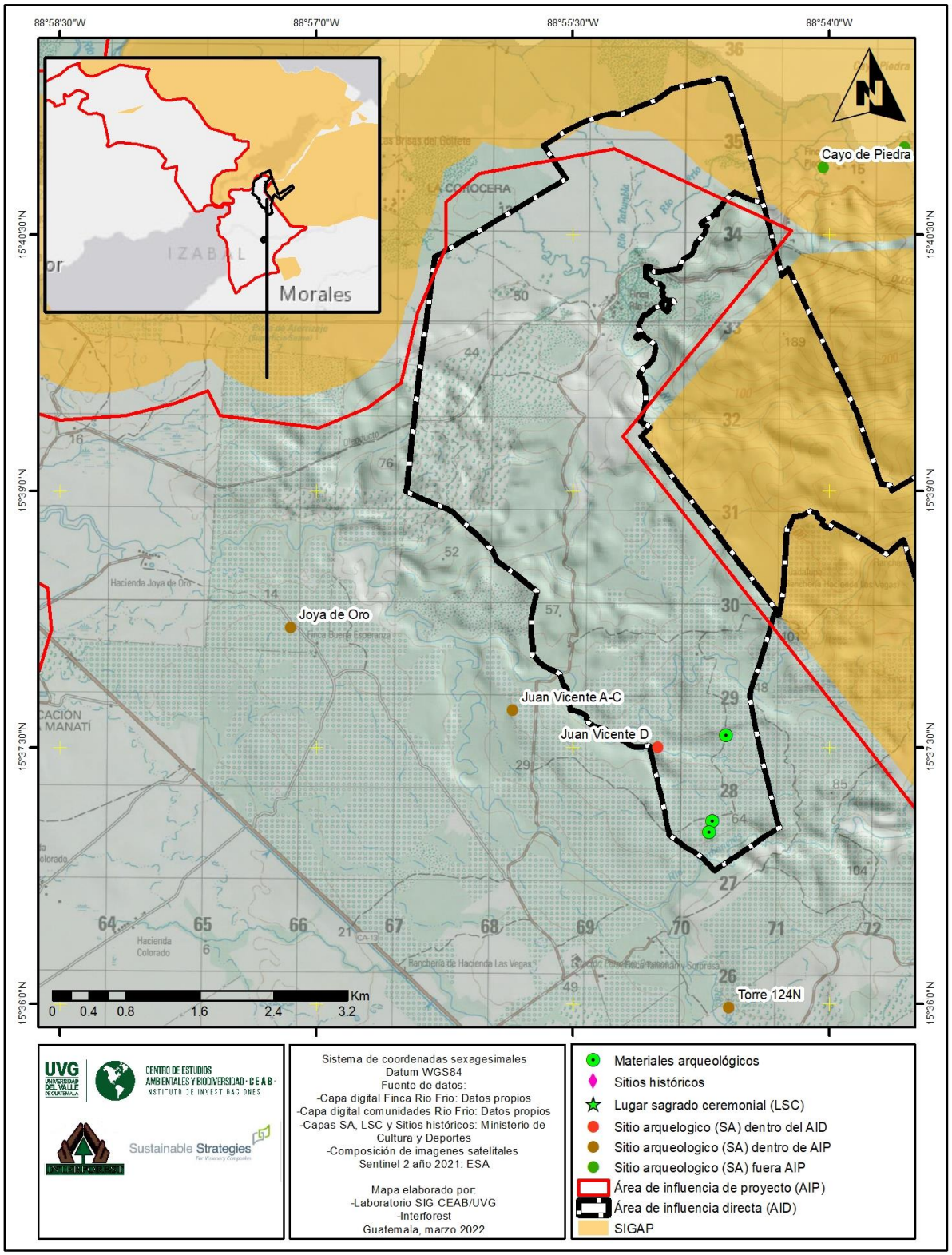

Figure 35. Location of the archaeological site Juan Vicente D and the archaeological materials documented on the surface.

4.3.10. Historical and cultural heritage

Historical heritage is that which corresponds to the Colonial (1524 to 1821), Republican (1821 to 1898) and Contemporary (1898 to 1944) periods, which may be made up of buildings, structures, sculpted monuments or machinery, to mention a few. In the area of direct influence of the project, no heritage associated with the aforementioned periods was identified.

In the AIP, according to the Archaeological Atlas of Guatemala (2022), there are records of the archaeological sites of Santa Catarina Xocoló and Jocoló Británico, which correspond to the colonial and republican periods, respectively, as in the former archaeological materials related to the Dominican friars of the XVI century have been identified, while in the latter artifacts from the beginning of the XIX century from England have been identified (Chang 1992:268). These sites are located on the west bank of the Pedernales River, approximately 4.8 kilometres southwest of Castillo de San Felipe de Lara.

In the AII, other historical heritage sites corresponding to colonial and republican times have been identified, such as: Castillo de San Felipe, Boca Río Blanco, Bodegas Bajas, Naufragio Carolina, Puerto Izabal and Punta Herrería to mention a few, which are directly associated with the shores of Lake Izabal and the Río Dulce and its mouth in the Caribbean Sea (Chang 1992:266 - 268 and Putzeys and Ortega 2001:621-622).

No specific cultural heritage is identified for the AID.

4.3.10.1. Tangible cultural heritage

In terms of tangible cultural heritage, three handmade objects were identified, all linked to the practice of fishing: fishing lines, canoes and harpoons.

Figure 36. Dock in the community of Las Camelias. Photograph: Andrés Álvarez.

- **Tacklines** are made of synthetic fibres and iron hooks, and are the basic tool for fishing, along with the harpoon.
- **Harpoons** are constructed with a wooden base, a sharpened metal harpoon, and a rubber strap mechanism that propels the harpoon towards its target.
- **The cayucos or simple wooden boats** are built with local wood, and represent a strong investment for any family, allowing not only the practice of fishing but also mobility by water, which is very important in the communities of Brisas del Golfete and Las Camelias.

4.3.10.2. Intangible cultural heritage

In terms of intangible cultural heritage, the persistence of the Wa'tesink' and Mayehak traditions was documented. The former, Wa'tesink', is a collective thanksgiving ritual upon completion of the construction of a house or school and includes the preparation of a special meal (usually chicken soup), a night of prayer, and the consumption of alcoholic beverages. The practice was documented as recently as last year, as part of the inauguration of a new school. Mayehak is a more intimate, nuclear family tradition of thanksgiving according to the agricultural calendar.

There are also a number of Catholic traditions, linked to the patron saint festivities of each community, which involve prayers, music and the preparation of special foods such as beef, pork, tamales, or soups.

Both Maya-Q'eqchi' and Catholic traditions have been affected by two trends, one short-term and one long-term. The short-term one was the health emergency caused by COVID-19, which led to the cancellation of Catholic celebrations and a reduction in the celebration of Wa'tesink. The second, more long term, has to do with the conversion of many families to Protestantism, leading to a decrease in participation in these activities.

Figure 37. Evangelical Church in Nuevo Río Frío. Photograph: Andrés Álvarez.

5. Environmental and social impacts

In this section, the impacts identified for the "Forestal del Caribe" project are indicated, considering the baseline work carried out and the information available for the AIP and the AID, considering forestry and industrial activities of the sawmill.

The process carried out required the participation of the parties involved in the ESIA, a comprehensive methodology was followed as indicated below.

5.1. Methodology of the impact identification and assessment process

A matrix was prepared for the analysis and assessment of the impacts identified for the project, taking into account the scope of this strategic-level ESIA. This matrix involved the following stages.

5.1.1. Interactions between environmental factors and project actions

The first step was to establish the interactions between variables in a matrix, which considered the different environmental factors (biotic, physical and socio-cultural) on which the project baseline is based, including their respective environmental aspects to be presumably impacted by the project's actions.

The list of aspects presumably impacted by environmental factors was as follows:

- **Biotic factor:**
  - Flora and
  - Fauna

- **Physical factor:**
  - Groundwater,
  - Surface water,
  - Air,
  - Relief and
  - Soil

- **Socio-economic/cultural factor:**
  - Population,
  - Infrastructure,
  - Land use,
  - Roads,
  - Archaeological sites,
  - Landscape and
  - Health and safety at work.

The project activities with which the matrix interactions were analysed were as follows:

- Construction phase

- Purchase and/or rental of land for the project
- Recruitment of labour
- Use and transfer of vehicles, machinery, equipment, materials and personnel in agricultural and industrial areas.
- Construction, road construction and slope maintenance
- Infrastructure: transitional works, warehouses, offices, sawmill, nursery
- Clearing and preparation of land for sowing
- Planting of forest crops

- Operational phase
  - Harvest (depending on reseeding)
  - Timber transport to the timber yard and industry
  - Industry activity (sawmilling and pallet construction)
  - Agricultural and forestry waste management

The cross-referencing of these elements generated a total of 109 interactions, which were assigned an alphanumeric code. It is important to note that not necessarily each interaction is an impact, as several of them can have the same impact, or the same interaction can have different impacts.

Matriz de convergencia para la identificación de elementos tipo del proyecto; Proyecto Forestal de Melina Izabal, Guatemala.

				ACCIONES DEL PROYECTO SUSCEPTIBLES A PRODUCIR IMPACTOS												
				FASE CONSTRUCTIVA								FASE OPERATIVA				
			ACCIONES (Ai).	Compra y/o alquiler de fincas para el proyecto.	Contratación de mano de obra.	Uso y traslado de vehículos, maquinaria, equipo, material y personal en area agricola e industrial	Construcción y habilitación de caminos, asi como mantenimiento de taludes.	Infraestructura: obras transitorias / bodegas / oficinas / aserradero / vivero.	Limpieza y preparación de terrenos para siembra.	Siembra de cultivo forestal.	siembra	cosecha	Transporte de madera al patio de acopio y la industria	Acvidad de la industria, aserrio y construccion de pallets	Gestion de residuos agricolas forestales
ELEMENTOS DEL ENTORNO AMBIENTAL POTENCIALMENTE IMPACTABLES.	FACTORES AMBIENTALES REPRESENTATIVOS DEL IMPACTO.	FACTOR AMBIENTAL Fj	ASPECTOS PRESUMIBLEMENTE. IMPACTADOS		A	B	C	D	E	F	G	H	I	J	K	L
	BIÓTICO.		Flora	1			1C	1D	1E	1F	1G	1H	1I			
			Fauna	2			2C	2D	2E	2F	2G	2H	2I			
	FÍSICO.		Aguas Subterráneas	3			3C	3D	3E	3F	3G	3H	3I	3J	3K	3L
			Aguas Superficiales	4			4C	4D	4E	4F	4G	4H	4I	4J	4K	4L
			Aire	5			5C	5D	5E	5F	5G	5H	5I	5J	5K	5L
			Relieve	6				6D	6E	6F	6G					
			Suelo	7			7C	7D	7E	7F	7G	7H	7I			7L
	SOCIAL / ECONÓMICO / CULTURAL.		Población	8	8A	8B	8C	8D	8E	8F	8G	8H	8I	8J	8K	8L
			Infraestructura	9	9A			9D	9E			9H	9I	9J	9K	9L
			Uso de la tierra	10	10A			10D	10E	10F	10G	10H				
			Vialidad	11			11C	11D				11H	11I	11J		
			Sitios arqueológicos/históricos	12				12D	12E	12F	12G					
			Paisaje	13				13D	13E	13F	13G	13H	13I	13J		
			Salud y Seguridad en el Trabajo	14		14B	14C	14D	14E	14F	14G	14H	14I	14J	14K	14L

Figure 38. Matrix of interactions between environmental factors and actions of the "Forestal del Caribe" project.

5.1.2. Identification of impacts

Once the interactions were defined, the professional in charge of the environmental factor assigned the name of the corresponding impacts and their description. This stage is

essential as the description details the reasons why the impact is considered likely to occur, whether positive or negative.

Nombre y descripción de impactos identificados para las fases constructiva y operativa del proyecto. Proyecto Forestal de Melina Izabal

Aspecto ambiental.	Elemento tipo (ii).	Nombre del impacto.	Descripción del impacto.
Flora.	1C	Extracción de especies de flora menor por personal del proyecto.	La presencia de personal del proyecto podría provocar la extracción de flora menor, concentrándose en especies que se consideran atractivas como orquídeas, bromelias, heliconias, palmas, helechos entre otros. Esta acción disminuye la variabilidad genética de las especies, provocando disminución de las mismas en el tiempo y una afectación de la biodiversidad de los ecosistemas impactados.
	1D	Afectación a la flora por la construcción y habilitación de caminos dentro de las fincas.	Al habilitar accesos se dará afectación a la flora presentes en el AID. El efecto se generará al tener que remover la capa de vegetación que recubre los caminos abriendo espacios o claros de al menos 4 metros. Esto provocará la eliminación de vegetación de todo tipo, como latizales (plántulas de regeneración menor a 1,5 metros de altura), latizales (árbol con un DAP menor a 10 cm) y fustales (árboles con un DAP mayor a 10 cm), causando la pérdida en la vegetación. La apertura de nuevos caminos facilita el ingreso de personas ajenas al proyecto, lo cual abre la posibilidad para la extracción de flora y otros recursos tanto maderables como no maderables. La creación de nuevos caminos genera fragmentación de ecosistemas, provocando la afectación de la flora por el aislamiento de parches de bosque en los cuales se da la ruptura de interacciones vegetativas propias entre las poblaciones de un determinado ecosistema. Además, la construcción y habilitación de caminos permite el establecimiento de flora exótica invasora, la cual compite por recursos con la flora nativa y dificulta la regeneración de las especies en las áreas circundantes. Por aparte, esta flora exótica invasora provoca acumulaciones peligrosas de biomasa que pueden causar incendios futuros.
	1E	Remoción de la vegetación por la limpieza del sitio donde se construirá infraestructura.	Al realizar la limpieza de los sitios donde se construirá infraestructura, se remueve la vegetación y la capa orgánica existente, creando una afectación directa. El principal caso se daría en el sitio donde se construya el aserradero, bodegas y talleres.
	1F	Destrucción de hábitat por la limpieza y preparación de terrenos para la plantación de melina.	El proceso de limpieza y preparación del terreno puede implicar la eliminación de vegetación (árboles, malezas, arbustos y troncos, sotobosque entre otros) ya sea de manera mecanizada o manual, esto también genera una importante cantidad de materia orgánica a ser dispuesta de manera apropiada. Además el cambio de uso de suelo despoja y mata a varias especies de fauna.
	1G	Contaminación y daño de flora por uso de herbicidas para el establecimiento de las plantulas	El uso de herbicidas si no se realiza adecuadamente podría provocar afectaciones a especies de flora nativa en los hábitats naturales circundantes.
	1H	Eliminación de la flora por chapeo y mantenimiento general del proyecto y el proceso de extracción maderera	El chapeo en las áreas de plantación, si se realizara continuamente, impediría la regeneración de un sotobosque seminatural dentro de las plantaciones de Melina lo que afectaría a las redes tróficas locales y disminuiría la diversidad biológica asociada al parque forestal.

Figure 39. Extract from the impact assessment matrix in the name and description of impacts tab of the "Forestal del Caribe" project.

5.1.3. Assessment of identified impacts

The impact assessment process considered the phase of the project (whether it will be in the construction or operational phase) as well as 11 qualitative attributes to determine the significance of the impact. These attributes are assigned a quantitative value and a mathematical formula is applied to establish bands in which each impact is analysed, thus generating the relevance of the impact. This process is detailed below.

5.1.3.1. Qualitative attributes

The 11 qualitative attributes applied to each impact are as follows:

1. Nature: Determines whether the impact is positive (assigned a value of +1) or negative (assigned a value of -1).
2. Intensity: Refers to the degree of incidence of the actions on the factor analysed. The values to use are:
    a. One (1): if low incidence
    b. Two (2)
    c. Four (4)
    d. Eight (8)
    e. Twelve (12): if it is a total destruction of the factor
3. Extent: Refers to the theoretical area of influence of the impact in relation to the surroundings. Allowable values are:
    a. One (1): if it is of a one-off nature
    b. Two (2): one partial impact
    c. Four (4): if extensive
    d. Eight (8): if it does not have a precise location
    e. +4: four points are added if it occurs in a critical habitat or ecosystem.

4. Timing: Refers to the time between the action and the onset of the effect on the environmental aspect under consideration. The permissible values are:
    a. Four (4): if it is less than one year, i.e. in the short term.
    b. Two (2): if the term is from one to five years, i.e. medium term
    c. One (1): if the term is longer than five years, i.e. long term
    d. +4: four points are added if it occurs in a critical habitat or ecosystem.
5. Persistence: Time the effect lasts from the onset until the initial conditions are resumed. Allowable values are:
    a. One (1): if less than one year old
    b. Two (2): if from one to five years
    c. Four (4): if more than five years old
6. Reversibility: Refers to the possibility that the affected factor can be reconstructed by natural means, not by human intervention. Allowable values are:
    a. One (1): if less than one year old
    b. Two (2): if between one and five years old
    c. Four (4): if it is older than five years or is irreversible.
7. Synergy: Contemplates the reinforcement of two or more single effects. Allowed values are:
    a. One (1): if not synergistic with other actions acting on the same factor
    b. Two (2): if it is a moderate synergy
    c. Four (4): if highly synergistic
8. Accumulation: Refers to the progressive increase in the manifestation of the impact effect. Allowable values are:
    a. One (1): if there are no cumulative effects
    b. Four (4): if cumulative
9. Effect: Refers to the form of manifestation of the effect on a factor as a consequence of an action. Allowable values are:
    a. One (1): if indirect
    b. Four (4): if direct
10. Periodicity: Refers to the regularity of manifestation of the effect over time. Allowable values are:
    a. One (1): if the occurrence is irregular or sporadic
    b. Two (2): if cyclical, recurrent or periodic
    c. Four (4): if constant or continuous
11. Recoverability: Refers to the possibility of total or partial reconstruction of the affected factor by human intervention. Allowable values are:
    a. One (1): if immediately retrievable
    b. Two (2): if medium-term
    c. Four (4): if the recovery is partial and mitigable
    d. Eight (8): if irretrievable

Matriz de importancia de impacto ambiental) para las fases constructiva y operativa del proyecto; Proyecto Forestal del Caribe																
Aspecto ambiental (Fj).	Fase del proyecto.	Elemento tipo (ij).	Nombre del impacto.	Atributos cualitativos											Importancia	Relevancia
				NAT (+ Ó -)	IN	EX	MO	PE	RV	SI	AC	EF	PR	MC		
Flora.	FC	1C	Extracción de especies de flora menor por personal del proyecto.	-1	2	1	4	2	2	2	4	4	1	1	-28	Moderado.
	FC	1D	Afectación a la flora por la construcción y habilitación de caminos dentro de las fincas.	-1	4	2	1	2	2	2	1	4	2	2	-32	Moderado.
	FC	1E	Remoción de la vegetación por la limpieza del sitio donde se construirá infraestructura.	-1	4	1	1	2	2	2	1	4	1	2	-29	Moderado.
	FC	1F	Destrucción de habitat por la limpieza y preparación de terrenos para la plantación de melina.	-1	12	8	8	4	2	4	1	4	2	4	-81	Crítico.
	FC	1G	Contaminación y daño de flora por uso de herbicidas para el establecimiento de las plantulas	-1	4	4	1	1	1	2	4	1	2	2	-34	Moderado.
	FO	1H	Eliminación de la flora por chapeo y mantenimiento general del proyecto y el proceso de extracción maderera	-1	4	2	4	4	4	2	1	4	2	4	-41	Moderado.

Figure 40. Extract from the impact assessment matrix in the impact assessment tab of the "Forestal del Caribe" project.

5.1.3.2. Importance

Importance is the result of the mathematical formula of the 11 qualitative attributes applied to the impact. The result can be a negative number, in case the impact has been determined as negative, or a positive value, in case the impact has been considered as positive.

5.1.3.3. Relevance

As mentioned above, relevance is the band in which the rating obtained from the qualitative attributes is found. The established bands have an interpretation for positive values: Low Impact, Medium Impact, High Impact, Very High Impact. Or for negative values: Irrelevant impact, Moderate impact, Severe impact and Critical impact.

Indicador por color de bandera				Relevancia	Interpretación	Recomendación o dictamen.
1	24	BA	IMPACTOS BENEFICIOSOS	Bajo.	Impacto bajo.	Aplicar medida ambiental para potenciarlo.
25	50	BV		Medio.	Impacto medio.	Valorar posibilidad de medida ambiental para potenciarlo.
51	75			Alto.	Impacto alto.	No requiere ser potenciado / No es posible potenciarlo.
76	100			Muy alto.	Impacto muy alto.	No requiere ser potenciado / No es posible potenciarlo.
-1	-24	BA	IMPACTOS PERJUDICIALES	Irrelevante.	Impacto irrelevante.	No requiere aplicación de medida de control.
-25	-50			Moderado.	Impacto moderado.	Requiere aplicación de medida de control moderada.
-51	-75	BR		Severo.	Impacto severo.	Requiere aplicación de medida de control severa.
-76	-100			Crítico.	Impacto crítico.	Requiere aplicación de medida de control crítica.

Figure 41. Extract from the impact assessment matrix in the impact assessment tab of the "Forestal del Caribe" project.

5.2. Impacts of the "Forestal del Caribe" Project

After the analysis described in the previous section, a total of 55 environmental and social impacts were identified for the "Forestal del Caribe" project. The impacts are the result of the interdisciplinary team's analysis of the biotic, physical and socio-cultural components.

Of the 55 impacts:

- 15 of these were identified for the operational phase,
- 40 could occur in the construction phase of either the first or second phase of the project, or both.

The majority of impacts were negative, falling into the Moderate and Severe categories, which together account for just over 75% of all impacts.

5.2.1. Negative impacts

The categories of relevance of the negative impacts were four as shown in the figure below, these are in order of criticality from lowest to highest:

- Irrelevant Impacts,
- Moderate Impacts,
- Severe Impacts
- Critical Impacts

The main negative impacts for the project by component (biotic, physical and socio-economic/cultural) are shown below, taking only the "Severe Impact" and "Critical Impact" categories of relevance. These are shown in the table below.

Table 24. Negative impacts of the "Forestal del Caribe" project of severe and critical relevance.

Component	Aspect considered	Relevance category	Impact
Biotic	Flora	Critical	Habitat destruction by clearing and preparation of land for melina plantation.
	Fauna	Severe	Killing of snakes by project staff in the construction phase
		Severe	Fragmentation of wildlife habitat by roads
		Critical	Destruction and fragmentation of wildlife habitat by land preparation
		Severe	Destruction and fragmentation of potential planted habitat for wildlife due to 6-year cutting cycles.
		Severe	Killing of snakes by project staff in the operational phase
Physical	Groundwater	Severe	Groundwater contamination by hazardous substances during the construction phase.
		Severe	Groundwater contamination by hazardous substances during the operational phase.
	Surface water	Severe	Pollution of surface water by hazardous substances.
		Severe	Pollution of surface water by hazardous substances during the operational phase.
	Soil	Severe	Soil loss due to activities associated with the construction phase
		Severe	Soil loss due to activities associated with the operational stage
Social	Land use	Severe	Change in land tenure and land use during the construction phase
	Archaeological / historical sites	Critical	Total or partial damage to cultural heritage by works involving the breaking or mechanisation of soil by the project.
	Health and safety at work	Severe	Health risks caused by the execution of project activities in the construction phase.

		Severe	Health risks caused by the implementation of project activities in the operational phase.

As can be seen, some impacts are the same, but at different times, some in the construction phase and others in the operation phase of the project, which is a common situation.

5.2.2. Positive impacts

The positive impacts identified were 10 in two categories of relevance, namely "Medium Impacts" and "High Impacts".

The positive impacts for the project are presented below by component (biotic, physical and socio-economic/cultural), taking the above-mentioned categories of relevance. These are shown in the table below.

Table 25. Positive impacts of the "Forestal del Caribe" project of medium and high relevance.

Component	Aspect considered	Relevance category	Impact
Biotic	Fauna	High	Elimination and/or reduction of illegal logging practices
Biotic	Fauna	High	Establishment of potential planted forest habitat for fauna
Physical	Air	High	Carbon sequestration
	Soil	Medium	Soil protection against erosion
Social	Infrastructure	Medium	Creation and/or improvement of infrastructure.
		Medium	Infrastructure maintenance
	Employment	High	Employment generation
	Social	High	Reducing Authority absence
	Land use	High	Increased demand for transport
	Road	Medium	Road improvement
	Landscape	High	Establishment of new landscape line

As can be seen, most of the positive impacts were identified in the social component.

Subsequently, protective, corrective and compensatory measures proposed for the "Forestal del Caribe" project were identified, identifying the name of the measure and the actions of the environmental and/or social control measure. Sixty-three environmental and social control actions or measures to be implemented were identified.

Table 26 . Protective, corrective and compensatory measures of the "Forestal del Caribe" project of medium and high relevance.

Medidas protectoras, correctoras y compensatorias propuestas para la fase constructiva del proyecto; Proyecto Forestal del Caribe			
Elemento tipo (ij)	**Nombre del impacto.**	**Nombre de la medida.**	**Acciones de la medida de control ambiental o social.**
1C	Extracción de especies de flora menor por personal del proyecto.	Control sobre la extracción de flora menor por parte del personal del proyecto.	Realizar inducción y charlas cortas (5 o 10 minutos máximo) al personal de las obras donde se indique la prohibición de extraer flora menor y advertir las implicaciones de incumplir con esta medida.
1D	Afectación a la flora por la construcción y habilitación de caminos dentro de las fincas.		Rotular los sitios propensos a recibir este impacto, asociados especialmente a cobertura boscosa cercana. La rotulación debe indicar la prohibición respectiva y la norma legal que la rige.
1E	Remoción de la vegetación por la limpieza del sitio donde se construira infraestructura.		Realizar vigilancia por parte del proyecto para identificar anomalías sobre la extracción de flora menor.
1F	Destrucción de habitat por la limpieza y preparación de terrenos para la plantación de melina.		Aplicar las sanciones estipuladas en legislación vigente y los procesos administrativos según corresponda.
1G	Contaminación y daño de flora por uso de herbicidas para el establecimiento de las plantulas		Instalar portones que impidan el acceso a particulares en los sitios donde existan caminos habilitados que permitan el fácil ingreso a áreas especialmente de cobertura boscosa.

These measures were subsequently considered when developing the Management Plan components of the following section.

5.3. Summary of project impacts

All the impacts identified and assessed using the methodology described in section 5.1. of this document are presented in **Annex 16.**

It is important to point out that the impacts identified respond to the scope established for this strategic level ESIA and were carried out with the information available and under the expertise of the work team. In this way, it is not intended to be an exhaustive list or to be a deliverable to the Guatemalan environmental licensing authorities, but rather to support the decision making process for the development or not of the project and thus identify areas or issues that should be developed in depth or considered in the future.

6. Environmental and Social Management Plan

The Environmental and Social Management Plan (ESMP) is a key element to ensure that the operations of the "Forestal del Caribe" Project are carried out in a manner that manages the environmental and social impacts identified in this ESIA and in accordance with the requirements of the identified standards. The following identifies the main components proposed to be developed as part of the ESMS of the "Forestal del Caribe" Project for phase 1 and 2 and with considerations for both the forestry and industrial processes of the sawmill.

6.1 Roles and responsibilities

Project "Forestal del Caribe" will appoint a team responsible for environmental and social issues, consisting of three people dedicated part-time to the project. The capacities and skills of the designated team are considered appropriate to address the potential environmental and social impacts identified as part of the ESIA.

The team covers the following roles:

Table 2727. Roles and responsibilities of the team for social and environmental management

Actor	Abbreviation	Roles and responsibilities
Project Manager	GP	Responsible for engaging in environmental and social management. Responsible for the preparation, implementation and updating of environmental and social policies, plans and procedures in accordance with Arbaro's Environmental and Social Management System. Responsible for legal, occupational health and safety, environmental and labour compliance. Responsible for allocating the budget due and addressed.
Environmental and Occupational Health and Safety Manager	GA	Responsible for EIA and environmental licensing process, coordination of environmental studies, monitoring and reporting. Responsible for overall coordination of project staff to implement ES measures, FSC certification and communication with investors and stakeholders. Responsible for implementing health and safety standards.
Labour and social responsibility	GS	Responsible for the recruitment of staff from the communities. Responsible for compliance with labour regulations. Responsible for the formulation of a stakeholder engagement plan, communication with communities, grievance mechanisms and development projects. Responsible for monitoring and reporting on social actions and projects.

6.2 Policies and procedures

Forestal del Caribe shall develop an ESMP that includes the following components to address the potential environmental and social impacts identified in the previous sections, considering the requirements of the standards in question. Below is a table listing the recommended components to be included in the ESMP and the impacts that each component aims to address. The list is a recommendation and may be structured in a similar way, modifying titles, focus and scope of plans, processes and/or policies as deemed appropriate by the Project.
The ESMP should consider the principle of the mitigation hierarchy, starting with actions to avoid impacts and ending with compensation where necessary.

Table 28 . *Components of the Management Plan*

#	Component of the ESAP	Responsible
1	Environmental and social policy	GP
2	Forest Management Plan (FMP)	GA
3	Recruitment and labour management plan	GS
4	Occupational health and safety plan	GA
5	Emergency preparedness and response plan, fire prevention and fire control measures	GA
6	Physical security plan	GS
7	Transport plan	GA
8	Waste management plan	GA
9	Biodiversity plan	GA
10	Stakeholder engagement plan, information dissemination, and suggestion and complaint mechanism	GS
11	Incidental Findings Procedure	GS
12	Resettlement plan	GS
13	Monitoring plan	GP
14	Environmental and social checklist for new forestry farms	GP
15	Land acquisition plan for expansion	GP

The following are recommendations for minimum content for these components of the ESMP. The actions, considerations and steps to be included in the components of the management system should be addressed to ensure that the identified impacts are appropriately addressed.

6.3 Environmental and social policy

The environmental and social policy shall include a statement of the Project's commitments to comply with industry standards, certifications and best practices. In addition, as part of this policy and/or as complements, it shall consider some other elements that will enable the planning, design and implementation of such practices.

- Environmental and social commitments
- Social and environmental risk matrix
- Profiles of environmental and social staff
- Training and continuing education programme
- Environmental and social budget
- Environmental and social annual operating plan -POA-.
- Classification of environmental incidents
- Recording findings and opportunities for improvement

6.4 Forest Management Plan (FMP)

The forest management plan should seek to maximise the profitability of the harvest and minimise environmental and social impacts, taking into account the requirements of CONAP, FSC, IFC on forest development. This plan assumes the approach typically required in an environmental management plan.

The following components are considered for inclusion:

- Sowing plan,
    i. Excluding areas with:
        1. Primary forest
        2. Secondary forest
        3. River Buffer, Health Code (decree 90-97) states the following: "Article 84. The felling of trees on the banks of rivers, lakes, lagoons and water sources, up to 25 metres from their banks, is strictly prohibited. Violation of this provision shall be punished in accordance with the provisions of this Code". However, in practice, buffers of between 5 and 15 metres are used in the country, without supervision and/or sanctions.
        4. Protected areas
        5. Buffer to power lines
        6. Buffer to pipelines
        7. Areas with slopes greater than 30%. This is due to the fact that according to INAB methodology, the range of 16 to 32%

slope with soil depth less than 20 cm is suitable for forestry use, while slopes greater than 32% with different soil depths are forestry soils (for production purposes the soil depth must be between 50 to 90 cm and greater than 90 cm, for protection purposes the same slope with soil depths between 20 to 50 cm and less than 20 cm) should be used for protection.

8. Buffer to communities adjacent to estates
9. Areas designated as biodiversity corridors between primary and secondary forests and protected areas and/or riparian zones

ii. Other sowing considerations:

1. Tree canopies should be allowed to merge over roads to maintain habitat continuity, in areas where they connect the AID with protected areas.
2. Identification, mapping and specifications for directional felling of all trees selected for logging.
3. Leave trees with a circumference of more than 20 cm in the process of thinning.

- Integrated pest management plan, including herbicides, considering that natural vegetation should not be treated with herbicides.
- Agrochemical management plan
- Training plan
- Flood and erosion prevention plan, including:
  i. Piling of organic matter from ruma to ensure that slopes are not washed away by rainfall.
  ii. Ensuring that drainage does not run directly into rivers, to avoid erosion.
- Watershed management plan, optional
- CO2 measurement and sales plan
- Thinning plan
- Harvest plan
- Riparian zone management plan

6.5 Recruitment and labour management plan

For the recruitment and labour management plan, a number of elements are proposed to be included:

- Labour policy that ensures compliance with national legislation and ILO core Conventions, and IFC Performance Standards, specifically PS2.
- Community hiring procedure, prioritising hiring from communities in the direct area of influence and distributing skilled and unskilled labour hiring within these communities.
- Diversity and inclusion policy, considering different ethnicities, gender and so on. Put special emphasis on the possibility of hiring local women for different positions, e.g. for pruning work.

- Monitoring of contractors' working practices and the conditions of subcontracted personnel.

6.6 Occupational health and safety plan

Development of an Occupational Health and Safety Plan for each farm and/or each tax entity. This plan should include compliance with national requirements for submission to and approval by the Ministry of Labour, in addition to other standards. The plan should include the Occupational Health and Safety Regulations for the Prevention and Control of SARS COV2 Outbreaks in the workplace. Elements to be considered in the plan are:

- Map and assessment of occupational risks according to position and plan of risk control and mitigation measures.
- Training plan with a variety of topics of interest.
- SARS COV2 Outbreak Prevention and Control Plan, in addition to the general OHS Plan and in compliance with national law.
- Proper use, storage and application of agrochemicals
- Provision of first aid kits
- Placement of signage
- Provision of food and accommodation on the farm, if required.
- Personal Protective Equipment (PPE)
- Annual personnel check and accident register.
- Specific measures for hazards in industrial areas such as dust, ergonomic positions and others.

6.7 Emergency preparedness and response plan, fire prevention and fire control measures

Like the Occupational Health and Safety Plan, the Emergency Preparedness and Response Plan should consider the legal requirements in Guatemala per company. Elements to consider in the plan are:

- Mapping of emergency risks and vulnerable zones, especially high fire risk areas.
- Action plan for any emergency, with emphasis on fires and hurricanes.
- Fire and emergency response equipment
- Development of firebreak areas or zones or firebreak lines
- Processes for recording emergencies and quantifying losses
- Spill response plan

6.8 Physical security plan

In case the investor deems it necessary, the physical security plan aims to ensure that the direct and/or subcontracted physical security team for the protection of the farms respects the human rights of the Project personnel, as well as those of the communities in the area of influence. The physical security plan should consider the following elements:

- Contract with reference to the United Nations Guiding Principles on Business and Human Rights
- Annual training for physical security agents on human rights, the components of the ESMP, among others.
- Records of physical security personnel, ensuring that these are up to date and are from outside the AID.
- Physical security incident management plan with relevant authorities.
- Procedure for entering, leaving or passing through the farm.

6.9 Road transport plan

In case the investor deems it necessary, the transport plan ensures that the development and maintenance of roads and access networks is done in a way that minimises impacts, and at the same time regulates the passage of other neighbours to the farms, currently more than 50 vehicles per day.

- Road layout and improvement plan
- Road maintenance plan
- Placement of road signs at risk points on the farms.
- Road safety training for community members and partners, if deemed necessary.

6.10 Waste management plan

The integrated management of solid waste must be carried out from generation to final disposal. It aims to prevent health risks and deterioration of the quality of the environment. The IFC Guide for sawmills should be considered, especially considering sawdust, wood waste and dust. The waste management plan should at least include:

- Collection areas
- Compilation trains
- Sewage effluents
- Mixing zone
- Washing area for containers of agrochemicals and PPE to be deposited at Agrequima, or similar, for proper final disposal.
- Oil and fuel storage
- Procurement of qualified waste managers
- Maintenance of machinery and trucks

6.11 Biodiversity Management Plan

By identifying the level of biotic richness and vulnerability of the project area, each farm will work with each operation to develop a biodiversity plan to ensure timely management of operations and ensure implementation of the mitigation hierarchy in each operation. This involves avoidance, minimisation, reduction and compensation, where necessary.

Prior to the development of the Biodiversity Management Plan, an update of the biodiversity baseline may be required, depending on the Annexes of future studies.

Subsequently, the elements to be included in the Biodiversity Management Plan are:

- Delimit the provisions of forest areas to be conserved, which may include:
  - Primary forest
  - Secondary forest
  - River Buffer
  - Protected areas
  - Species in special conservation status
  - Buffer to power lines
  - Buffer to pipelines
  - Areas with slopes greater than 30%.
  - Buffer to communities adjacent to farms, to ensure that communities are not impacted by agrochemicals and/or other crop impacts.
  - Areas designated as biodiversity corridors between primary and secondary forests and protected areas and/or riparian zones
- Reforestation plan
- Critical Wildlife Translocation Protocol tica
- Plan for signage, no hunting, no logging, others.
- Awareness raising for partners and community members on how to stop illegal activities such as illegal hunting and illegal logging.
- Banning the use of fire on farms
- Prohibit the use of drainage or other high-impact operations in natural or critical habitats
- Conduct training for staff on the ecological importance of endangered species and snakes, recognition of potentially dangerous species from those that are not, and proper management of ophidian accidents.
- Conduct training for personnel on proper techniques for capture, containment and translocation of wildlife.

- Conserve the remnants of natural broadleaved forest, riparian forest and floodplain wetlands that currently exist in the AID as modified and natural habitats providing ecosystem services and stepping stones for the fauna and flora of the region, contributing to the connectivity with the Cerro San Gil forest and the wetlands of the Río Dulce National Park.

- Modify the planting plan for melina so that if the forest planting standard of 1,111 trees/ha is used, 1,109 Melina trees and 2 trees of native fruit and flower producing forest species are planted per hectare from the list of priority species included in the table below. This intensity of fruit tree planting has marginal economic costs for the plantation and allows the fruit trees to function as food "stations" for local wildlife that use the melina plantation as a corridor when the plantation is already established (around year 3-4). This increases the "permeability" of the plantation to the flow of ecosystem services to local communities and increases structural and functional connectivity for threatened fauna in the AID and AIP. Regardless of planting density, ideally there should always be at least 2 fruit trees/ha (ideally 5 fruit trees/ha) at the

end, which has negligible economic costs for the plantation. These can ideally remain during felling, and/or be replanted every 6 years with melina.

Table 29. List of priority forest species for enrichment of melina plantations in the AID to provide food resources for wildlife and increase permeability of the plantations to wildlife passage.

Order	Family	Species	Common name
1. Apiales	Araliaceae	*Dendropanax arboreus*	Palo de danto, zapotillo
2. Ericales	Sapotaceae	*Chrysophyllum cainito*	Caimito
3. Ericales	Sapotaceae	*Manilkara zapota*	Chicozapote, chewing gum
4. Ericales	Sapotaceae	*Manilkara staminodella*	Zapotillo de monte
5. Ericales	Sapotaceae	*Pouteria campechiana*	Canistel, yellow sapote
6. Ericales	Sapotaceae	*Pouteria sapota*	Mamey
7. Myrtales	Myrtaceae	*Psidium guajava*	Guava
8. Rosebushes	Moraceae	*Brosimum alicastrum*	Ramon
9. Rosebushes	Moraceae	*Brosimum guianense*	Coloradillo, quecho verde
10. Rosebushes	Moraceae	*Castilla elastica*	Rubber, bush rubber
11. Rosebushes	Moraceae	*Ficus insipida*	Amate
12. Rosebushes	Moraceae	*Ficus maxima*	Higuerón, amate
13. Sapindales	Anacardiaceae	*Spondias purpurea*	Jocote
14. Sapindales	Burseraceae	*Bursera simaruba*	Chacaj, jiote stick

- Maintain and restore the remaining gallery (riparian) forest in the rivers, streams and creeks of the AID (pending confirmation of whether there is gallery forest in the more detailed soil survey to be carried out as per **Annex 17**) and of the AIP. This should be done through a buffer zone of 10 metres on each side of the river banks and 5 metres on each side of the banks of streams and creeks.
- Maintain the row trees that still exist in paddock areas and in live fences, as they are used by the monkeys to move from habitat to habitat.
- Do not practice weeding of lanes when the melina plantation is already established (year 2-3), in order to focus on eradicating grasses and poaceae with herbicide in the planting zone, but maintain broadleaf plant species that do not compete directly with melina in its establishment and that allow maintaining a relatively diverse undergrowth during the established cutting cycles (6 years) that allows abundance of fauna. The weeding removes both broadleaf and grass species. Usually 3 or 4 clearings are sufficient in the first 2 years, and this operation is rarely required after the third year, thus maintaining 3 years of understorey regeneration in the plantation until the next cutting cycle.
- Translocate fauna encountered during land use change actions. Translocation refers to the movement of living organisms from one area to another, where they

are released. This involves translocating as much of the fauna found in the clearing and land preparation areas as possible to the remaining forests of the AID and AIF. This is particularly important for terrestrial fauna species such as amphibians, reptiles and mammals. This should be done with the support of professional biologists.

- Train staff on the ecological importance of snakes, recognition of potentially dangerous species from those that are not, and proper management of snake accidents.
- Place noise abatement wall (noise barriers) at the boundaries of the AID at the sawmill at "AGROMAN".
- Establish depots for the proper disposal of used agrochemicals and ensure precision spraying/fertilisation practices, reducing input costs and in turn reducing agrochemical run-off and leaching.

6.12 Stakeholder engagement plan, information dissemination, and suggestion and complaint mechanism

The stakeholder engagement and information disclosure plan with the grievance mechanism is the central element for the social management of the Project's impacts. The social management components should consider gender and cultural and ethnic sensitivities, with a high level of participation of indigenous peoples in the area of influence.

Such a plan should include the following considerations:

- Stakeholder map, with a list of contacts. It is suggested to use the different stakeholder mapping and influence level analysis mechanisms defined by Chevalier and Buckles, according to their proposal Social Analysis Systems (Chevalier & Buckles, 2008).
- Social baseline of the communities in the area of influence, through an exhaustive census.
- Details of previous interactions of the farm with communities in the area of influence, through a historical reconstruction with interviews with key actors present in the area in the past (review especially the previous experience of a Melina project).
- Plan for the socialisation of the project, in a transparent and timely manner, including
    - Prior to the start of the Project, free, prior and informed consent
    - During operation, communication on commitments, certifications and gathering feedback
- Human rights policy
- Socially appropriate enquiries, complaints and claims procedure
- Social investment plan, if the project deems it appropriate.
    - It was identified in several communities in the area of influence that women and young people are very interested in becoming technically skilled.

    - The desire to implement investment activities in partnership with communities was identified.
- Procedures oriented towards diversity and inclusion, considering ethnicity, gender and other factors. It is recommended that special attention be paid to the inclusion of women in dialogue, consultation processes and even development plans.

6.13 Incidental Findings Procedure

The chance finds procedure ensures that in the event that an archaeological relic and/or cultural heritage remnant is identified, Project staff will act in a lawful manner and in accordance with the Project's cultural remains commitment. This procedure shall contain at least the following elements:

- Date
- Place
- Location (exact coordinates)
- Area delimited with pita to protect the vestige (mt3)
- Type of find (complete vessel, monument, deposit, other)
- Method of transfer
- Photographs
- Time of notification to the project manager
- Time of notification to authorities (for project manager)
- Other details

6.14 Resettlement Plan

In the event that the investor finds it necessary to resettle the two guardians of the "Río Frío" farm and/or future farms due to economic displacement, a Resettlement Plan must be developed, which must include, according to Arbaro's ESG Policy:

- Project description
- Impacts of the project, alternatives considered to avoid resettlement
- Baseline number of families,
    - Detail of the families and photographic and socio/demographic record of the quality of the families' housing.
    - Socio-economic characteristics
    - Valuation of and compensation for losses
    - The methodology and process for developing such studies, surveys and so on should be detailed.
- Regulatory and institutional framework for resettlement processes.
- Interaction with stakeholders, families to be resettled, NGOs, education leaders, church and/or other community leaders and/or others where applicable.
- Resettlement site including
    - Site detail
    - Details of the construction/adaptation of infrastructure to be carried out
    - Detail of other complementary accommodations, fruit trees, painting, etc.
- Programming of resettlement to new site with details of responsibilities, budget
- Measurement and monitoring indicators
- Among others, if deemed necessary.

6.15 Monitoring plan

The ESMP shall contain a monitoring plan that records the performance of the processes, outcomes and impacts of project operations. In addition to forest production aspects, the company commits to keep environmental and social records and report on these on a quarterly basis.
The following table presents the key elements to be monitored.

Component of the ESAP	Indicator
Environmental and social policy	Annual budget for environmental and social policy % annual budget execution for environmental and social management Number of employees trained in the components of the ESMS plan Number of contractors trained in ESMP components Number of contractors who sign their adherence to comply with the components of the ESMP Number of environmental and/or social incidents
Forest management plan	Ha sown with melina

	Ha of conserved forest Number of applications CO2 captured and sold Drinking water analysis values
Recruitment and labour management plan	% of local unskilled recruits, breakdown by community % of local skilled labour recruitment, breakdown by community % of hires by gender Number of employees and breakdown Level of compliance with local laws: the most important the minimum age, IGSS registration and the minimum wage Level of employee satisfaction Amount of purchases and local consumption Number of complaints to the Ministry of Labour or other bodies
Occupational health and safety (OHS) plan	Level of compliance with health procedures and security: the most important is the use of Up-to-date chemical manuals Number of OHS trainings Number of people trained in the OHS plan and the emergency plan Record of PPE deliveries Training hours and number of participants Number of fatalities Number of accidents Causes of accidents and follow-up measures
Emergency preparedness and response plan, including fire prevention and fire control measures.	Number of simulations carried out Emergency number Number of fires Area impacted by fires in hectares Fire response time
Transport plan	Number of signs on main routes Number of road accidents Length of established or maintained tracks
Waste management plan	Amount of common waste generated Number of materials entered into the ENP Amount of chemical waste generated Number of talks held related to the management of materials, chemical waste, and chemical residues. Amount of waste recycled Fuel consumption Amount of wastewater management monitoring

	Quantity of water consumed
Biodiversity plan	Impacts on biodiversity and line development basic Species diversity and richness Level of compliance with planning and land-use restrictions Number of talks related to biodiversity protection Number of sightings of endangered species Amount of species translocation
Stakeholder engagement, information dissemination, and suggestions and complaints mechanism	List of community communication mechanisms with the company Number of community meetings held Number of calls Number of visits Number of complaints and claims Number of requests for information Number of complaints and claims and applications open for more than 30 days Average response time to a complaint, claim or request Number of community emergencies
Incidental Findings Procedure	No. number of chance finds Number of identified archaeological remains
Monitoring plan	Current registration
Environmental and social checklist for new forest farms	Number of farms assessed in the checklist Number of farms passing the criteria of the checklist
Land acquisition plan for expansion	Number of farms assessed Number of hectares assessed Number of hectares with potential for planting assessed Number of farms to be acquired

6.16 Environmental and social checklist for new forestry farms

The environmental and social checklist or check list for the evaluation of new forest farms to be included in the "Forestal del Caribe" project should include the following elements listed below. For the completion of this form, field visits should be carried out by the environmental and social team and one person from each of the families living on the farm and at least 3 people from each of the communities of influence should be interviewed:

- Name of the farm
- Location of the farm
    - Municipality
    - Km on the access road
- Transport logistics and description of access
    - Number of accesses
    - Routes
    - Distance to sawmill
    - Distance to port
- Total area (ha)
- Type of farm
    - To buy
    - To be leased
- Type of current use (note approximate has by use)
    - Livestock
    - Palm cultivation
    - Forestry
    - Other (please specify):
- Environmental criteria
    - Natural forest and/or wetlands (number of ha)
    - Environmental instrument (yes/no)
    - Protected area on which the farm is located (number of hectares)
    - Water sources (number of metres or kms of travel)
    - Water sources (how many and detail)
    - Zoning of areas with slopes greater than 30% for protection
- Social criteria
    - Number and details of families living on the farm
    - People renting plots of land for milpa planting on the farm and detail
    - Archaeological remains
    - Bordering communities (list and indicate main ethnicity)
    - Communities in the area of influence (list and indicate main ethnicity)
    - Initial community awareness and acceptance of melina
    - Availability and interest in employment in forestry projects
    - Initial interviews indicate incidents or social discomfort (yes/no, detail)
    - Detail processes of consultation and/or communication with current farm owners
    - Discussions in the property and/or region on land tenure (yes/no, please specify)

    - Sections of the farm currently or in the past that have been encroached upon (yes/no, please give details)
- Other criteria
    - Interconnection line concession (yes/no and details)
    - Perenco's pipeline concession (yes/no and details)
- Additional comments
- Signatures
    - Project Manager
    - Environmental and Occupational Health and Safety Manager
    - Labour and social responsibility

6.17 Land acquisition plan for expansion

The Project starts with the 1,000 ha available for planting at the "Rio Frio" farm and will expand to address up to 5,000 ha within the AIP. The Land Acquisition Plan for the expansion of the Forestal del Caribe project shall contemplate:

- Farms within the AIP
- Farms that may be purchased and/or leased.
- Farms that comply with the environmental and social checklist for new forest farms.
- Farms with the greatest expansion of possible area to be planted will be favoured.
- Farms with better accessibility will be favoured.
- Farms with less overlap with protected areas will be favoured.

A comparative database of the various farms with their main attributes will be developed in order to make better decisions.

The governance of the decision making process for the purchase of the farm will be defined jointly between Interforest and Arbaro Fund.

7. Conclusions and recommendations

The ESIA addresses both the first phase applicable to the AID and the second phase of development of the AIP. The ESIA has detailed the legislation that applies to the project, the Project information, the baseline of the area of influence, identified the potential environmental and social impacts of the Project operations, and the proposed Environmental and Social Management Plan to manage the risks according to the mitigation hierarchy.

The ESIA considers that, for the first stage, the purchase of the "Rio Frio" farm entails the purchase of an extension of six properties totalling 2,275 ha. After the initial purchase of properties, Arbaro Fund will proceed to split three portions of land that coincide with a Protected Area to be dedicated to forest conservation. The melina project will be carried out on farms that do not overlap with protected areas. The ESIA considers that, for the second stage, the Project will not operate on farms that overlap with protected areas.

The ESIA did not identify any major impacts that are unmanageable or irreversible. The three main potential impacts are:

- Planting and harvesting in areas of natural and modified habitats with biotic sensitivity.
- Planting and harvesting in areas with possible Mayan archaeological remains, i.e. archaeological heritage.
- Planting and harvesting close to indigenous and vulnerable populations.

It is concluded that the identified adverse impacts are manageable. Many of these impacts are already fully or partially addressed under current and/or planned management by the forest operator, Interforest, as indicated verbally by them, and are part of Arbaro's management system. Other impacts will require the development of management elements that have been detailed in the Environmental and Social Management System section as mitigation measures to further reduce impacts.

It is noted that the project has the potential to have a positive impact, identifying mainly the impacts of:

- Generating employment in areas with a high need for fixed income.
- Sequestering carbon that can be marketed to generate complementary income to that of the forest plantation.
- Restoring forest habitats for flora and fauna species in the region.
- Providing raw material for wooden pallets in an industry where the sustainability debate has not yet matured.

Finally, it is recommended that three specific topics be studied in depth to complete the baseline for the farms of interest, as stipulated in Annex 17 for the "Rio Frio" and "Agroman" farms. First, a land use study, an archaeological study, and a biodiversity study.

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9. Annexes

Annex 1. List of extended legislation to be considered by the Project

Constitution of the Republic of Guatemala	
Article 39	Private property.
Article 43	Freedom of industry, trade and labour.
Article 60	Cultural heritage.
Article 61	Protection of cultural heritage.
Article 63	Right to creative expression.
Article 64	Natural heritage.
Article 66	Protection of ethnic groups.
Article 67	Protection of indigenous land and agricultural cooperatives.
Article 93	Right to health.
Article 94	State obligation on health and social care.
Article 96	Product quality control.
Article 97	Environment and ecological balance.
Article 101	Right to work.
Article 102	Minimum social rights in labour legislation.
Article 118	Principles of the Economic and Social Regime.
Article 121	State assets.
Article 122	State territorial reserves.
Article 123	Limitations in the border areas
Article 125	Exploitation of non-renewable natural resources.
Article 126	Reforestation.
Article 127	Water regime.
Article 128	Use of water, lakes and rivers.
Article 131	Commercial transport service.
Civil and Corporate	
Decree Law 106	Civil Code
Decree 2-70	Commercial Code
Decree 17-73	Penal Code
Ministry of Agriculture	
Decree Law 102-70	The Ministry of Agriculture is responsible for the Direction and Higher Coordination of the Public Agricultural Sector, and through it, the Government of the Republic implements the Country's Agricultural Development Policy.
Decree No. 43-74	Regulatory Law on the Import, Processing, Storage, Transport, Sale and Use of Pesticides.
Governmental Agreement No. 746-93	Regulation on Fertilisers and Fertilisers for Agricultural Use, their Registration, Import, Export, Formulation, Repackaging, Storage and Marketing.
Decree No. 5-2010	Agrochemicals Registration Act.
Decree Law 102-70	The Ministry of Agriculture is responsible for the Direction and Higher Coordination of the Public Agricultural Sector, and through it, the Government of the Republic implements the Country's Agricultural Development Policy.
Decree No. 43-74 Law	Regulating the Import, Processing, Storage, Transport, Sale and Use of Pesticides.
Governmental Agreement No. 746-93	Regulation on Fertilisers and Fertilisers for Agricultural Use, their Registration, Import, Export, Formulation, Repackaging, Storage and Marketing.
Decree No. 5-2010	Agrochemicals Registration Act.
Ministry of Labour	
Decree 1441-1961	Labour Code of Guatemala,
Decree 7-2017	Reforms to the Labour Code
GA 229-2014 and its amendments (GA 51-2015 and 199-2015)	Occupational Health and Safety Regulations
Ministry of Public Health and Social Assistance	
Decree Law 90-97	Health Code
Governmental Agreement 377-90.	Agricultural Pesticides and Related Substances
Ministerial Agreement 001-2000.	Committee on Pesticides
Ministerial Agreement 031-2003.	Domestic Pest Controllers

Ministerial Agreement 1811-2004.	Agricultural Pesticide Plants
Rule 30-03-1987.	Agro services
Technical Standard DRPSA 001-2018.	Wastewater Treatment Plants
Technical Standard DRPSA 002-2018.	Sanitary Sewerage Systems
Ministerial Agreement 573-2011.	Design Standards for Rural Disposal Systems
Ministry of Environment and Natural Resources	
Decree 68-86 of the Congress of the Republic	Law on the Protection and Improvement of the Environment" of 5 December 1986.
Governmental Agreement 137-2016	Regulation for environmental assessment, control and monitoring and its amendments.
Ministerial Agreement No. 402-2021	Taxable List of Projects, Works, Industries or Activities and Updating and their reforms.
Ministerial Agreement No. 236-2006	Reglamento de las Descargas y Reuso de Aguas Residuales y de la Disposición de Lodos", Published 11 May 2006.
Ministerial Agreement 105-2008	Discharge and Reuse of Wastewater and Sludge Disposal
Governmental Agreement 164-2021	Regulation for the integrated management of common solid waste and solid waste
Decree 7-2013 and its regulation	Framework Law to Regulate Vulnerability Reduction, Mandatory Adaptation to the Effects of Climate Change and Greenhouse Gas Mitigation, which proposes the creation of the National Climate Change Fund.
National Council for Protected Areas.	
Decree Number 4-89	Law on Protected Areas and its reforms,
Governmental Agreement 759-90	Regulation of the Law on Protected Areas,
National Forest Institute	
Decree Law 101-96	Forestry Law
Decree 51-2010 and its regulation	Law on Forestry Incentives for Owners of Small Tracts of Land with Forestry or Agroforestry Vocation -PINPEP
Decree 2-2015 and its regulation	Law for the Promotion of the Establishment, Recovery, Restoration, Management, Production and Protection of Forests in Guatemala PROBOSQUE
Decree 122-96	Law Regulating the Registration, Authorisation and Use of Chainsaws.
Resolution JD.05.11.2014	Regulation for the Control of Forestry Enterprises
Resolution JD-03-26.2015	National Forestry Register Regulations.

Annex 2. Tables of permits and licenses with their estimated time to be processed by the Project.

Below are the matrices with the permits and licences required for the Project corresponding to the finca "Río Frío" and "Agroman". As mentioned, there are a series of deadlines for the legal procedures that can be very diverse. They depend on the institution, the workload or the existing governmental mechanisms. Importantly, there are procedures that can be carried out simultaneously, which would shorten waiting times.

In addition, the following is a summary of the average time required to complete the corresponding procedures.

- The time required to obtain the EIA can take approximately 15 days.
- The deadline for obtaining the ETAR authorisation does not depend on any governmental authority to enter into force. Therefore, its issuance period will depend exclusively on the Technician in charge.
- MEM has 30 working days from the submission of the complete authorisation application, including the approved EIA to issue the Hydrocarbon Storage Licence.
- Applications for Building Permits that meet all requirements shall be granted within thirty working days.
- INAB has 60 working days from the submission of the complete authorisation application, including the approved EIA to submit its approval for the following procedures: Change of Land Use; Registration of Voluntary Plantation; Registration of registration as a Sawmill; Approval to the use of Chainsaws and a period of 30 working days to submit its approval for entry to the Probosque Programme. This should not be done prior to the start of the project.

Sustainable Strategies
For Visionary Companies

Cronograma de Licencias

	Licencia / Tramite	Autoridad	May	Jun	Jul	Ago	Sept	Oct	Nov	Dic	Enero	Feb	Mar	Abr	May
1	Cierre de la autorizacion PINFORdel eucalipto - Occidente	INAB													
2	Cierre licencia eucalipto - Occidente	MARN													
3	Cierre de licencia Minera - Occidente	MEM													
4	Solicitud de categoria de proyecto	MARN													
5	Acercamiento a la MUNI	Muni													
6	Firma de acuerdo de compra de FUNDAECO	Privado													
7	Tramite de Constitución de la Sociedad	RM													
8	Tramite de RTU	SAT													
9	Tenencia sobre el inmueble	RGP													
10	Inscripción de Plantación Voluntaria de eucalipto e hule	INAB													
11	Tala de eucalito y hule	Occidente													
12	Inicio tramite desmembración de áreas: Derechos de Posesión, FUNDAECO, Traslape Rio Frio sobre Área Protegida de Rio Dulce. Paso 1, es aprobacion del pano ante el RIC y paso 2, es la inscripcion en el RGP	RIC/RGP													
13	Solicitud de ubicación con relación a Áreas Protegidas	CONAP													
14	Inicio de desarrollo Instrumento Ambiental	MARN													
15	Inicio de desarrollo de documento Reserva Natural Privada	CONAP													
16	Solicitud estudio Arqueológico	IDAEH / MINCUL													
17	Realizacion del estudio Arqueológico	IDAEH / MINCUL													
18	Presentacion del Instrumento Ambiental - EIA-	MARN													
19	Esperada fecha aprobación Instrumento Ambiental -EIA-	MARN													
20	Entrega documento Reserva Natural Privada	CONAP													
21	Autorización tala arboles de Muni o INAB	MUNI/INAB													
22	Inscripción de Plantación Voluntaria de gemelina	INAB													
23	ETAR de Aserradero	MARN													
24	Solicitud de Incentivo Probosque	PINFOR													
25	Inscripción como Aserradero	INAB													
26	Autorización de Motosierra	INAB													
27	Licencia de construcción en Municipalidad	MUNI													
28	Licencia de Almacenamiento de Hidrocarburo	MEM													
29	Reglamento de SSO presentado	MINTRAB													
30	Registro para Pesticidas	MAGA													

Tables of permits and licences required for the finca "Río Frío".

No.	ACTION	DESCRIPTION OF THE CONTINGENCY	EPOCA	DELIVERABLE
		COLD RIVER		
1	The project proponent must be a Guatemalan corporation.	Based on the Political Constitution of the Republic of Guatemala, only Guatemalan persons can develop forestry projects.	Prior to the start of the project authorisation process	Legal stationery consisting of: - Public Deed of Incorporation of a Public Limited Company- Company Trading Licence- Company Trading Licence- Appointment of Legal Representative- Unified Tax Registration Certificate.
2	Closure of the Rio Frio Agroforestry Project, Exp. D-028-12	The property currently has an approved instrument for a project other than the one to be developed. For this, it is necessary for the original proponent, Agropalmeras, S.A., to submit the application for Closure of the Rio Frio Agroforestry Project.	Prior to the start of the project authorisation process	Resolution issued by MARN approving the closure of the Project.
3	Closure of the PINFOR Forest Management Plan	The property currently has a PINFOR Forestry Management Plan for a project other than the one to be developed. For this, it is necessary that the original proponent, Agropalmeras, S.A., submits a request for cancellation or modification of the project.	Prior to the start of the project authorisation process	Resolution issued by INAB approving the cancellation of the Pinfor project.
4	Cancellation of Mining Licence	The property currently has a Mining Exploitation Licence contained in 1039 dated 21 March 2012, and as it will not continue with this activity, it is necessary for Agropalmeras, S.A. to request its cancellation before the MEM.	Prior to the start of the project authorisation process	Resolution issued by the MEM approving the cancellation of the Mining Exploitation Licence.
5	Apply for Project Location to CONAP	Due to the fact that the properties where the project will be developed intersect with Protected Areas, it is necessary, once the areas have been defined, to make a location request to CONAP to be used in the elaboration of the corresponding environmental instrument.	Prior to initiating the drafting of the environmental instrument	Resolution issued by CONAP establishing whether or not the project is located within Protected Areas.

6	Apply to MARN for the categorisation of the project.	Due to the location and nature of the project, it is preferable to ask MARN to categorise the project, and thus submit the appropriate environmental instrument.	Prior to initiating the drafting of the environmental instrument	- Memorial submitted to MARN describing the project. The memorial must be accompanied by a plan of the location of the project and a description of the activities to be carried out. - The MARN will issue a resolution establishing the category of the project.
7	Obtain an environmental instrument and submit it for approval to MARN.	In order to develop any project that may have an impact on the environment, it is mandatory, prior to its development, to obtain an environmental instrument approved by the MARN. If the project is located in a protected area, it must have the favourable opinion of CONAP.	Prior to any action related to the project.	- Environmental Instrument prepared by an Environmental Consultant. - Approval Resolution issued by MARN - Environmental Licence.
8	Environmental Commitments Contract with CONAP	If the project is located in a protected area, an Environmental Commitments Contract must be signed with CONAP.	After obtaining approval of the environmental instrument	Contract executed by public deed between
9	Land Use Change	In order to cut down natural trees, prior to the implementation of the project, it is necessary to have INAB's authorisation to cut down trees.	Prior to any action related to the felling of trees.	Authorisation issued by INAB
10	Voluntary Planting Registration	In order to facilitate the planting, pruning and felling of the Melina plantation, it is necessary to register the project as a Voluntary Plantation with INAB.	After obtaining approval of the environmental instrument	Certification of registration issued by INAB
11	Obtaining Probosque Registration	In order to obtain economic incentives to develop the project, it is possible to seek registration of the project as a Probosque with INAB.	After obtaining approval of the environmental instrument	Certification of registration issued by INAB
12	Chainsaw Registration	In order to be able to use chainsaws in the project, it is necessary to request authorisation from INAB for their registration.	After obtaining approval of the environmental instrument	Certification of registration issued by INAB

Tables of permits and licences required for the farm "Agroman".

No.	ACTION	DESCRIPTION OF THE CONTINGENCY	EPOCA	DELIVERABLE
"AGROMAN				

1	The project proponent must be a Guatemalan corporation.	Based on the Political Constitution of the Republic of Guatemala, only Guatemalan persons can develop forestry projects.	Prior to the start of the project authorisation process	Legal stationery consisting of: - Public Deed of Incorporation of a Public Limited Company- Company Trading Licence- Company Trading Licence- Appointment of Legal Representative- Unified Tax Registration Certificate.
2	Apply to MARN for the categorisation of the project.	Due to the location and nature of the project, it is preferable to ask MARN to categorise the project, and thus present the appropriate environmental instrument.	Prior to initiating the drafting of the environmental instrument	- Memorial submitted to MARN describing the project. The memorial must be accompanied by a plan of the location of the project and a description of the activities to be carried out. - The MARN will issue a resolution establishing the category of the project.
3	Obtain an environmental instrument and submit it for approval to MARN.	In order to develop any project that may have an impact on the environment, it is mandatory, prior to its development, to obtain an environmental instrument approved by the MARN. If the project is located in a protected area, it must have the favourable opinion of CONAP.	Prior to any action related to the project.	- Environmental Instrument prepared by an Environmental Consultant. - Approval Resolution issued by MARN - Environmental Licence.
4	Land Use Change	In order to cut down natural trees, prior to the implementation of the project, it is necessary to have INAB's authorisation to cut down trees.	Prior to any action related to the felling of trees.	Authorisation issued by INAB
5	Voluntary Planting Registration	In order to facilitate the planting, pruning and felling of the Melina plantation, it is necessary to register the project as a Voluntary Plantation with INAB.	After obtaining approval of the environmental instrument	Certification of registration issued by INAB
6	Obtaining Probosque Registration	In order to obtain economic incentives to develop the project, it is possible to seek registration of the project as a Probosque with INAB.	After obtaining approval of the environmental instrument	Certification of registration issued by INAB

7	Chainsaw Registration	In order to be able to use chainsaws in the project, it is necessary to request authorisation from INAB for their registration.	After obtaining approval of the environmental instrument	Certification of registration issued by INAB
8	Sawmill Registration	In order to operate a sawmill, it is necessary to register with INAB.	After obtaining approval of the environmental instrument	Certification of registration issued by INAB
9	Building Licence	In order to build the sawmill, it is necessary to go to the Municipality of Livingston to obtain the corresponding building permit.	Prior to the start of construction	Licence issued by the Municipality

Annex 3. List of reported plant species.

List of plants reported in the Caribbean Forest Project in the regions of the Area of Direct Influence (AID) and Area of Project Influence (AIP). Species reported in the AID are highlighted in blue.

Order	Family	Species
1. Alismatales	Araceae	*Anthurium gracile*
2. Alismatales	Araceae	*Anthurium schlechtendalii*
3. Alismatales	Araceae	*Dieffenbachia pittieri*
4. Alismatales	Araceae	*Dieffenbachia seguine*
5. Alismatales	Araceae	*Monstera dissecta*
6. Alismatales	Araceae	*Monstera tuberculata*
7. Alismatales	Araceae	*Montrichardia arborescens*
8. Alismatales	Araceae	*Philodendron aurantiifolium*
9. Alismatales	Araceae	*Philodendron radiatum*
10. Alismatales	Araceae	*Philodendron sagittifolium*
11. Alismatales	Araceae	*Syngonium angustatum*
12. Alismatales	Araceae	*Syngonium macrophyllum*
13. Alismatales	Araceae	*Syngonium podophyllum*
14. Alismatales	Araceae	*Xanthosoma robustum*
15. Alismatales	Hydrocharitaceae	*Hydrilla verticillata*
16. Arecales	Arecaceae	*Astrocaryum mexicanum*
17. Arecales	Arecaceae	*Attalea cohune*
18. Arecales	Arecaceae	*Bactris major*
19. Arecales	Arecaceae	*Bactris mexicana*
20. Arecales	Arecaceae	*Chamaedorea falcifera*
21. Arecales	Arecaceae	*Chamaedorea neurochlamys*
22. Arecales	Arecaceae	*Geonoma interrupta*
23. Arecales	Arecaceae	*Synechanthus fibrosus*
24. Asparagales	Iridaceae	*Trimezia martinicensis*
25. Asparagales	Orchidaceae	*Caularthron bilamellatum*
26. Asparagales	Orchidaceae	*Corymborkis forcipigera*
27. Asparagales	Orchidaceae	*Epidendrum difforme*
28. Asparagales	Orchidaceae	*Epidendrum diffusum*
29. Asparagales	Orchidaceae	*Epidendrum macroclinium*
30. Asparagales	Orchidaceae	*Epidendrum nocturnum*
31. Asparagales	Orchidaceae	*Laelia rubescens*
32. Asparagales	Orchidaceae	*Liparis nervosa*
33. Asparagales	Orchidaceae	*Masdevallia floribunda*
34. Asparagales	Orchidaceae	*Maxillaria aciantha*
35. Asparagales	Orchidaceae	*Maxillaria egertoniana*
36. Asparagales	Orchidaceae	*Maxillaria hedwigiae*
37. Asparagales	Orchidaceae	*Maxillaria lineolata*
38. Asparagales	Orchidaceae	*Maxillaria ringens*

Order	Family	Species
39. Asparagales	Orchidaceae	*Maxillaria uncata*
40. Asparagales	Orchidaceae	*Polystachya foliosa*
41. Asparagales	Orchidaceae	*Prescottia stachyodes*
42. Asparagales	Orchidaceae	*Prosthechea cochleata*
43. Asparagales	Orchidaceae	*Scaphyglottis behrii*
44. Asparagales	Orchidaceae	*Scaphyglottis prolifera*
45. Asparagales	Orchidaceae	*Sobralia decorates*
46. Asparagales	Orchidaceae	*Trichocentrum luridum*
47. Commelinales	Commelinaceae	*Dichorisandra hexandra*
48. Commelinales	Commelinaceae	*Tripogandra grandiflora*
49. Commelinales	Pontederiaceae	*Pontederia cordata*
50. Commelinales	Pontederiaceae	*Pontederia rotundifolia*
51. Commelinales	Pontederiaceae	*Pontederia sagittata*
52. Dioscoreales	Dioscoreaceae	*Dioscorea bartlettii*
53. Dioscoreales	Dioscoreaceae	*Dioscorea composita*
54. Dioscoreales	Dioscoreaceae	*Dioscorea composita*
55. Dioscoreales	Dioscoreaceae	*Dioscorea floribunda*
56. Dioscoreales	Dioscoreaceae	*Dioscorea spiculiflora*
57. Dioscoreales	Dioscoreaceae	*Dioscorea urophylla*
58. Liliales	Smilacaceae	*Smilax domingensis*
59. Liliales	Smilacaceae	*Smilax spinosa*
60. Pandanales	Cyclanthaceae	*Carludovica palmata*
61. Poales	Bromeliaceae	*Aechmea tillandsioides*
62. Poales	Bromeliaceae	*Androlepis skinneri*
63. Poales	Bromeliaceae	*Pitcairnia punicea*
64. Poales	Bromeliaceae	*Tillandsia bulbosa*
65. Poales	Bromeliaceae	*Tillandsia fasciculata*
66. Poales	Bromeliaceae	*Tillandsia filifolia*
67. Poales	Bromeliaceae	*Tillandsia streptophylla*
68. Poales	Bromeliaceae	*Tillandsia variabilis*
69. Poales	Cyperaceae	*Cyperus mutisii*
70. Poales	Cyperaceae	*Eleocharis interstincta*
71. Poales	Cyperaceae	*Fimbristylis cymosa*
72. Poales	Cyperaceae	*Fimbristylis gabonica*
73. Poales	Cyperaceae	*Fuirena camptotricha*
74. Poales	Cyperaceae	*Rhynchospora cephalotes*
75. Poales	Cyperaceae	*Rhynchospora watsonii*
76. Poales	Cyperaceae	*Scleria gaertneri*
77. Poales	Cyperaceae	*Scleria latifolia*
78. Poales	Cyperaceae	*Scleria mitis*
79. Poales	Poaceae	*Andropogon glomeratus*
80. Poales	Poaceae	*Brachiaria fasciculata*
81. Poales	Poaceae	*Brachiaria mutica*
82. Poales	Poaceae	

Order	Family	Species
83. Poales	Poaceae	*Echinochloa pyramidalis*
84. Poales	Poaceae	*Eleusine indica*
85. Poales	Poaceae	*Eragrostis acutiflora*
86. Poales	Poaceae	*Eragrostis tephrosanthos*
87. Poales	Poaceae	*Gynerium sagittatum*
88. Poales	Poaceae	*Homolepis aturensis*
89. Poales	Poaceae	*Hymenachne amplexicaulis*
90. Poales	Poaceae	*Ichnanthus lanceolatus*
91. Poales	Poaceae	*Lasiacis divaricata*
92. Poales	Poaceae	*Leptochloa neesii*
93. Poales	Poaceae	*Leptochloa virgata*
94. Poales	Poaceae	*Panicum bartlettii*
95. Poales	Poaceae	*Panicum cayennense*
96. Poales	Poaceae	*Panicum fluviicola*
97. Poales	Poaceae	*Panicum hirsutum*
98. Poales	Poaceae	*Panicum mertensii*
99. Poales	Poaceae	*Panicum pilosum*
100. Poales	Poaceae	*Paspalum conjugatum*
101. Poales	Poaceae	*Paspalum plicatulum*
102. Poales	Poaceae	*Paspalum virgatum*
103. Poales	Poaceae	*Pharus parvifolius*
104. Poales	Poaceae	*Phragmites australis*
105. Poales	Poaceae	*Setaria geminata*
106. Poales	Poaceae	*Sporobolus indicus*
107. Poales	Poaceae	*Sporobolus junceus*
108. Poales	Poaceae	*Sporobolus pyramidalis*
109. Zingiberales	Cannaceae	*Canna generalis*
110. Zingiberales	Cannaceae	*Canna indica*
111. Zingiberales	Costaceae	*Costus pulverulentus*
112. Zingiberales	Costaceae	*Hellenia speciosa*
113. Zingiberales	Heliconiaceae	*Heliconia adflexa*
114. Zingiberales	Heliconiaceae	*Heliconia latispatha*
115. Zingiberales	Heliconiaceae	*Heliconia mariae*
116. Zingiberales	Heliconiaceae	*Heliconia psittacorum*
117. Zingiberales	Heliconiaceae	*Heliconia vaginalis*
118. Zingiberales	Marantaceae	*Calathea lutea*
119. Zingiberales	Marantaceae	*Stromanthe hjalmarssonii*
120. Zingiberales	Zingiberaceae	*Alpinia purpurata*
121. Zingiberales	Zingiberaceae	*Hedychium coronarium*
122. Zingiberales	Zingiberaceae	*Renealmia mexicana*
123. Lycopodiales	Lycopodiaceae	*Palhinhaea cernua*
124. Selaginellales	Selaginellaceae	*Selaginella illecebrosa*
125. Selaginellales	Selaginellaceae	*Selaginella tenella*
126. Selaginellales	Selaginellaceae	*Selaginella umbrosa*

Order	Family	Species
127.Apiales	Araliaceae	*Dendropanax arboreus*
128.Apiales	Araliaceae	*Oreopanax guatemalensis*
129.Aquifoliales	Aquifoliaceae	*Ilex guianensis*
130.Asterales	Asteraceae	*Baltimora straight*
131.Asterales	Asteraceae	*Calea trichotoma*
132.Asterales	Asteraceae	*Chromolaena laevigata*
133.Asterales	Asteraceae	*Clibadium arboreum*
134.Asterales	Asteraceae	*Cyanthillium cinereum*
135.Asterales	Asteraceae	*Emilia sonchifolia*
136.Asterales	Asteraceae	*Hebeclinium macrophyllum*
137.Asterales	Asteraceae	*Neurolaena lobata*
138.Asterales	Asteraceae	*Sphagneticola trilobata*
139.Asterales	Asteraceae	*Tithonia diversifolia*
140.Boraginales	Cordiaceae	*Cordia alliodora*
141.Boraginales	Cordiaceae	*Cordia bicolor*
142.Boraginales	Cordiaceae	*Varronia spinescens*
143.Boraginales	Ehretiaceae	*Bourreria huanita*
144.Boraginales	Ehretiaceae	*Bourreria mollis*
145.Boraginales	Heliotropiaceae	*Euploca procumbens*
146.Boraginales	Heliotropiaceae	*Heliotropium verdcourtii*
147.Boraginales	Heliotropiaceae	*Myriopus maculatus*
148.Brassicales	Capparaceae	*Capparidastrum quiriguense*
149.Brassicales	Capparaceae	*Crateva tapia*
150.Caryophyllales	Cactaceae	*Deamia testudo*
151.Caryophyllales	Nyctaginaceae	*Neea amplifolia*
152.Caryophyllales	Nyctaginaceae	*Neea stenophylla*
153.Caryophyllales	Polygonaceae	*Coccoloba belizensis*
154.Caryophyllales	Polygonaceae	*Coccoloba hondurensis*
155.Celastrales	Celastraceae	*Cheiloclinium belizense*
156.Celastrales	Celastraceae	*Crossopetalum parviflorum*
157.Celastrales	Celastraceae	*Hippocratea volubilis*
158.Celastrales	Celastraceae	*Monteverdia belizensis*
159.Celastrales	Celastraceae	*Semialarium mexicanum*
160.Celastrales	Celastraceae	*Tontelea hondurensis*
161.Cucurbitales	Cucurbitaceae	*Cionosicys excisus*
162.Cucurbitales	Cucurbitaceae	*Momordica charantia*
163.Cucurbitales	Cucurbitaceae	*Psiguria warscewiczii*
164.Dilleniales	Dilleniaceae	*Davilla kunthii*
165.Dilleniales	Dilleniaceae	*Tetracera volubilis*
166.Dilleniales	Dilleniaceae	*Tetracera willdenowiana*
167.Ericales	Clethraceae	*Clethra mexicana*
168.Ericales	Cyrillaceae	*Cyrilla racemiflora*
169.Ericales	Ebenaceae	*Diospyros nigra*
170.Ericales	Ebenaceae	*Diospyros yucatanensis*

Order	Family	Species
171.Ericales	Lecythidaceae	*Grias cauliflora*
172.Ericales	Pentaphylacaceae	*Ternstroemia tepezapote*
173.Ericales	Primulaceae	*Ardisia compressa*
174.Ericales	Primulaceae	*Ardisia revoluta*
175.Ericales	Primulaceae	*Ardisia tuerckheimii*
176.Ericales	Primulaceae	*Bonellia paludicola*
177.Ericales	Sapotaceae	*Chrysophyllum cainito*
178.Ericales	Sapotaceae	*Manilkara staminodella*
179.Ericales	Sapotaceae	*Micropholis melinoniana*
180.Ericales	Sapotaceae	*Pouteria campechiana*
181.Ericales	Sapotaceae	*Pouteria gallifructa*
182.Ericales	Symplocaceae	*Symplocos costaricana*
183.Fabales	Fabaceae	*Aeschynomene americana*
184.Fabales	Fabaceae	*Aeschynomene deamii*
185.Fabales	Fabaceae	*Andira inermis*
186.Fabales	Fabaceae	*Bauhinia rubeleruziana*
187.Fabales	Fabaceae	*Calliandra houstoniana*
188.Fabales	Fabaceae	*Calliandra tergemina*
189.Fabales	Fabaceae	*Cassia ferruginea*
190.Fabales	Fabaceae	*Chloroleucon mangense*
191.Fabales	Fabaceae	*Cojoba graciliflora*
192.Fabales	Fabaceae	*Crotalaria longirostrata*
193.Fabales	Fabaceae	*Crotalaria sagittalis*
194.Fabales	Fabaceae	*Dalbergia brownei*
195.Fabales	Fabaceae	*Dalbergia glabra*
196.Fabales	Fabaceae	*Dalbergia stevensonii*
197.Fabales	Fabaceae	*Desmodium glabrum*
198.Fabales	Fabaceae	*Desmodium incanum*
199.Fabales	Fabaceae	*Dialium guianense*
200.Fabales	Fabaceae	*Enterolobium cyclocarpum*
201.Fabales	Fabaceae	*Inga affinis*
202.Fabales	Fabaceae	*Inga cocleensis*
203.Fabales	Fabaceae	*Inga cookii*
204.Fabales	Fabaceae	*Inga edulis*
205.Fabales	Fabaceae	*Inga multijuga*
206.Fabales	Fabaceae	*Inga nobilis*
207.Fabales	Fabaceae	*Inga punctata*
208.Fabales	Fabaceae	*Inga vera*
209.Fabales	Fabaceae	*Inga xalapensis*
210.Fabales	Fabaceae	*Lennea modesta*
211.Fabales	Fabaceae	*Leucaena zacapana*
212.Fabales	Fabaceae	*Lonchocarpus heptaphyllus*
213.Fabales	Fabaceae	*Lonchocarpus hondurensis*
214.Fabales	Fabaceae	*Lonchocarpus luteomaculatus*

Order	Family	Species
215.Fabales	Fabaceae	*Lonchocarpus rugosus*
216.Fabales	Fabaceae	*Machaerium falciforme*
217.Fabales	Fabaceae	*Mimosa pigra*
218.Fabales	Fabaceae	*Mimosa tarda*
219.Fabales	Fabaceae	*Mucuna rostrata*
220.Fabales	Fabaceae	*Full Neptunia*
221.Fabales	Fabaceae	*Ormosia isthmensis*
222.Fabales	Fabaceae	*Ormosia velutina*
223.Fabales	Fabaceae	*Pterocarpus officinalis*
224.Fabales	Fabaceae	*Schizolobium parahyba*
225.Fabales	Fabaceae	*Schnella guianensis*
226.Fabales	Fabaceae	*Schnella herrerae*
227.Fabales	Fabaceae	*Senna quinquangulata*
228.Fabales	Fabaceae	*Swartzia standleyi*
229.Fabales	Fabaceae	*Vigna luteola*
230.Fabales	Fabaceae	*Zygia conzattii*
231.Fabales	Polygalaceae	*Polygala paniculata*
232.Fagales	Myricaceae	*Morella cerifera*
233.Gentianales	Apocynaceae	*Allamanda cathartica*
234.Gentianales	Apocynaceae	*Asclepias curassavica*
235.Gentianales	Apocynaceae	*Cascabela gaumeri*
236.Gentianales	Apocynaceae	*Fischeria scandens*
237.Gentianales	Apocynaceae	*Forsteronia acouci*
238.Gentianales	Apocynaceae	*Funastrum clausum*
239.Gentianales	Apocynaceae	*Gonolobus cteniophorus*
240.Gentianales	Apocynaceae	*Lacmellea standleyi*
241.Gentianales	Apocynaceae	*Malouetia guatemalensis*
242.Gentianales	Apocynaceae	*Pentalinon andrieuxii*
243.Gentianales	Apocynaceae	*Ruehssia laxiflora*
244.Gentianales	Apocynaceae	*Tabernaemontana alba*
245.Gentianales	Apocynaceae	*Tabernaemontana donnell-smithii*
246.Gentianales	Apocynaceae	*Thevetia ahouai*
247.Gentianales	Apocynaceae	*Vailia anomala*
248.Gentianales	Gentianaceae	*Lisianthus brevidentatus*
249.Gentianales	Gentianaceae	*Voyria parasitica*
250.Gentianales	Gentianaceae	*Voyria truncata*
251.Gentianales	Loganiaceae	*Spigelia scabra*
252.Gentianales	Loganiaceae	*Strychnos brachistantha*
253.Gentianales	Loganiaceae	*Strychnos panamensis*
254.Gentianales	Rubiaceae	*Alibertia edulis*
255.Gentianales	Rubiaceae	*Alseis hondurensis*
256.Gentianales	Rubiaceae	*Alseis yucatanensis*
257.Gentianales	Rubiaceae	*Amaioua glomerulata*
258.Gentianales	Rubiaceae	*Appunia guatemalensis*

Order	Family	Species
259.Gentianales	Rubiaceae	*Arachnothryx buddleioides*
260.Gentianales	Rubiaceae	*Arachnothryx linguiformis*
261.Gentianales	Rubiaceae	*Augusta rivalis*
262.Gentianales	Rubiaceae	*Bertiera guianensis*
263.Gentianales	Rubiaceae	*Blepharidium guatemalense*
264.Gentianales	Rubiaceae	*Chiococca alba*
265.Gentianales	Rubiaceae	*Chiococca belizensis*
266.Gentianales	Rubiaceae	*Venous chione*
267.Gentianales	Rubiaceae	*Coussarea imitans*
268.Gentianales	Rubiaceae	*Coussarea paniculata*
269.Gentianales	Rubiaceae	*Eumachia microdon*
270.Gentianales	Rubiaceae	*Exostema mexicanum*
271.Gentianales	Rubiaceae	*Faramea occidentalis*
272.Gentianales	Rubiaceae	*Faramea standleyana*
273.Gentianales	Rubiaceae	*Guettarda combsii*
274.Gentianales	Rubiaceae	*Guettarda macrosperma*
275.Gentianales	Rubiaceae	*Guettarda tikalana*
276.Gentianales	Rubiaceae	*Hamelia longipes*
277.Gentianales	Rubiaceae	*Hamelia patens*
278.Gentianales	Rubiaceae	*Hamelia rovirosae*
279.Gentianales	Rubiaceae	*Mexocarpus tetragonus*
280.Gentianales	Rubiaceae	*Morinda panamensis*
281.Gentianales	Rubiaceae	*Notopleura uliginosa*
282.Gentianales	Rubiaceae	*Palicourea acuminata*
283.Gentianales	Rubiaceae	*Palicourea berteroana*
284.Gentianales	Rubiaceae	*Palicourea deflexa*
285.Gentianales	Rubiaceae	*Palicourea glomerulata*
286.Gentianales	Rubiaceae	*Palicourea mediocris*
287.Gentianales	Rubiaceae	*Palicourea pubescens*
288.Gentianales	Rubiaceae	*Palicourea simiarum*
289.Gentianales	Rubiaceae	*Palicourea tomentosa*
290.Gentianales	Rubiaceae	*Palicourea violacea*
291.Gentianales	Rubiaceae	*Palicourea winkleri*
292.Gentianales	Rubiaceae	*Pittoniotis protracta*
293.Gentianales	Rubiaceae	*Posokeria latifolia*
294.Gentianales	Rubiaceae	*Psychotria costivenia*
295.Gentianales	Rubiaceae	*Psychotria fruticetorum*
296.Gentianales	Rubiaceae	*Psychotria gracilenta*
297.Gentianales	Rubiaceae	*Psychotria horizontalis*
298.Gentianales	Rubiaceae	*Psychotria limonensis*
299.Gentianales	Rubiaceae	*Psychotria lorenciana*
300.Gentianales	Rubiaceae	*Psychotria marginata*
301.Gentianales	Rubiaceae	*Psychotria papantlensis*
302.Gentianales	Rubiaceae	*Psychotria subsessilis*

Order	Family	Species
303.Gentianales	Rubiaceae	*Psychotria tenuifolia*
304.Gentianales	Rubiaceae	*Randia armata*
305.Gentianales	Rubiaceae	*Randia matudae*
306.Gentianales	Rubiaceae	*Richardia scabra*
307.Gentianales	Rubiaceae	*Ronabea latifolia*
308.Gentianales	Rubiaceae	*Rudgea cornifolia*
309.Gentianales	Rubiaceae	*Sabicea villosa*
310.Gentianales	Rubiaceae	*Simira salvadorensis*
311.Gentianales	Rubiaceae	*Remote Spermacoce*
312.Gentianales	Rubiaceae	*Stenostomum lucidum*
313.Gentianales	Rubiaceae	*Uncaria tomentosa*
314.Lamiales	Acanthaceae	*Aphelandra scabra*
315.Lamiales	Acanthaceae	*Justice fimbriata*
316.Lamiales	Acanthaceae	*Odontonema albiflorum*
317.Lamiales	Acanthaceae	*Thyrsacanthus callistachyus*
318.Lamiales	Bignoniaceae	*Amphilophium paniculatum*
319.Lamiales	Bignoniaceae	*Amphitecna breedlovei*
320.Lamiales	Bignoniaceae	*Amphitecna donnell-smithii*
321.Lamiales	Bignoniaceae	*Amphitecna latifolia*
322.Lamiales	Bignoniaceae	*Anemopaegma chrysoleucum*
323.Lamiales	Bignoniaceae	*Bignonia aequinoctialis*
324.Lamiales	Bignoniaceae	*Bignonia binata*
325.Lamiales	Bignoniaceae	*Dolichandra uncata*
326.Lamiales	Bignoniaceae	*Fridericia girl*
327.Lamiales	Bignoniaceae	*Fridericia floribunda*
328.Lamiales	Bignoniaceae	*Lundia puberula*
329.Lamiales	Bignoniaceae	*Spathodea campanulata*
330.Lamiales	Bignoniaceae	*Tabebuia rosea*
331.Lamiales	Bignoniaceae	*Tecoma stans*
332.Lamiales	Gesneriaceae	*Drymonia macrophylla*
333.Lamiales	Gesneriaceae	*Drymonia serrulata*
334.Lamiales	Lamiaceae	*Aegiphila monstrosa*
335.Lamiales	Lamiaceae	*Scutellaria orichalcea*
336.Lamiales	Lamiaceae	*Vitex hemsleyi*
337.Lamiales	Oleaceae	*Chionanthus oblanceolatus*
338.Lamiales	Oleaceae	*Chionanthus panamensis*
339.Lamiales	Plantaginaceae	*Scoparia dulcis*
340.Lamiales	Schlegeliaceae	*Schlegelia parviflora*
341.Lamiales	Verbenaceae	*Citharexylum hexangulare*
342.Lamiales	Verbenaceae	*Duranta erecta*
343.Lamiales	Verbenaceae	*Lantana camara*
344.Lamiales	Verbenaceae	*Lantana trifolia*
345.Lamiales	Verbenaceae	*Stachytarpheta cayennensis*
346.Laurales	Hernandiaceae	*Sparattanthelium amazonum*

Order	Family	Species
347.Laurales	Lauraceae	*Aiouea guatemalensis*
348.Laurales	Lauraceae	*Damburneya coriacea*
349.Laurales	Lauraceae	*Damburneya nitida*
350.Laurales	Lauraceae	*Damburneya salicifolia*
351.Laurales	Lauraceae	*Licaria alata*
352.Laurales	Lauraceae	*Licaria areolata*
353.Laurales	Lauraceae	*Licaria guatemalensis*
354.Laurales	Lauraceae	*Ocotea cernua*
355.Laurales	Lauraceae	*Ocotea leucoxylon*
356.Laurales	Lauraceae	*Ocotea oblonga*
357.Laurales	Lauraceae	*Ocotea rubriflora*
358.Laurales	Siparunaceae	*Siparuna thecaphora*
359.Magnoliales	Annonaceae	*Annona glabra*
360.Magnoliales	Annonaceae	*Cymbopetalum mirabile*
361.Magnoliales	Annonaceae	*Desmopsis erythrocarpa*
362.Magnoliales	Annonaceae	*Desmopsis lanceolata*
363.Magnoliales	Annonaceae	*Guatteria amplifolia*
364.Magnoliales	Annonaceae	*Unonopsis pittieri*
365.Magnoliales	Annonaceae	*Xylopia frutescens*
366.Magnoliales	Magnoliaceae	*Mexican magnolia*
367.Magnoliales	Myristicaceae	*Compsoneura mexicana*
368.Magnoliales	Myristicaceae	*Virola koschnyi*
369.Malpighiales	Chrysobalanaceae	*Chrysobalanus icaco*
370.Malpighiales	Chrysobalanaceae	*Hirtella guatemalensis*
371.Malpighiales	Chrysobalanaceae	*Hirtella racemosa*
372.Malpighiales	Chrysobalanaceae	*Licania hypoleuca*
373.Malpighiales	Chrysobalanaceae	*Licania guatemalensis*
374.Malpighiales	Clusiaceae	*Clusia lundellii*
375.Malpighiales	Clusiaceae	*Clusia minor*
376.Malpighiales	Clusiaceae	*Clusia quadrangula*
377.Malpighiales	Clusiaceae	*Garcinia intermedia*
378.Malpighiales	Dichapetalaceae	*Dichapetalum donnell-smithii*
379.Malpighiales	Erythroxylaceae	*Erythroxylum guatemalense*
380.Malpighiales	Erythroxylaceae	*Erythroxylum macrophyllum*
381.Malpighiales	Euphorbiaceae	*Acalypha aristata*
382.Malpighiales	Euphorbiaceae	*Acalypha diversifolia*
383.Malpighiales	Euphorbiaceae	*Acalypha ferdinandi*
384.Malpighiales	Euphorbiaceae	*Acalypha lancetillae*
385.Malpighiales	Euphorbiaceae	*Acalypha macrostachya*
386.Malpighiales	Euphorbiaceae	*Acalypha mortoniana*
387.Malpighiales	Euphorbiaceae	*Croton arboreus*
388.Malpighiales	Euphorbiaceae	*Croton billbergianus*
389.Malpighiales	Euphorbiaceae	*Croton glandulosepalus*
390.Malpighiales	Euphorbiaceae	*Croton schiedeanus*

Order	Family	Species
391.Malpighiales	Euphorbiaceae	*Croton trinitatis*
392.Malpighiales	Euphorbiaceae	*Dalechampia tiliifolia*
393.Malpighiales	Euphorbiaceae	*Euphorbia tithymaloides*
394.Malpighiales	Euphorbiaceae	*Mabea occidentalis*
395.Malpighiales	Euphorbiaceae	*Manihot esculenta*
396.Malpighiales	Euphorbiaceae	*Sapium macrocarpum*
397.Malpighiales	Hypericaceae	*Vismia camparaguey*
398.Malpighiales	Lacistemataceae	*Lacistema aggregatum*
399.Malpighiales	Malpighiaceae	*Bunchosia lindeniana*
400.Malpighiales	Malpighiaceae	*Bunchosia swartziana*
401.Malpighiales	Malpighiaceae	*Byrsonima crassifolia*
402.Malpighiales	Malpighiaceae	*Malpighia glabra*
403.Malpighiales	Malpighiaceae	*Stigmaphyllon dichotomum*
404.Malpighiales	Malpighiaceae	*Stigmaphyllon lindenianum*
405.Malpighiales	Malpighiaceae	*Stigmaphyllon pseudopuberum*
406.Malpighiales	Malpighiaceae	*Stigmaphyllon puber*
407.Malpighiales	Malpighiaceae	*Stigmaphyllon puberum*
408.Malpighiales	Malpighiaceae	*Stigmaphyllon retusum*
409.Malpighiales	Ochnaceae	*Ouratea lucens*
410.Malpighiales	Passifloraceae	*Passiflora ambigua*
411.Malpighiales	Passifloraceae	*Passiflora biflora*
412.Malpighiales	Passifloraceae	*Passiflora choconiana*
413.Malpighiales	Passifloraceae	*Passiflora coriacea*
414.Malpighiales	Passifloraceae	*Passiflora foetida*
415.Malpighiales	Passifloraceae	*Passiflora guatemalensis*
416.Malpighiales	Passifloraceae	*Passiflora sexocellata*
417.Malpighiales	Peraceae	*Pera barbellata*
418.Malpighiales	Phyllanthaceae	*Amanoa guianensis*
419.Malpighiales	Phyllanthaceae	*Astrocasia austinii*
420.Malpighiales	Phyllanthaceae	*Hieronyma alchorneoides*
421.Malpighiales	Phyllanthaceae	*Margaritaria nobilis*
422.Malpighiales	Phyllanthaceae	*Phyllanthus stipulatus*
423.Malpighiales	Phyllanthaceae	*Phyllanthus urinaria*
424.Malpighiales	Putranjivaceae	*Drypetes guatemalensis*
425.Malpighiales	Rhizophoraceae	*Cassipourea guianensis*
426.Malpighiales	Rhizophoraceae	*Rhizophora mangle*
427.Malpighiales	Salicaceae	*Casearia aculeata*
428.Malpighiales	Salicaceae	*Casearia arborea*
429.Malpighiales	Salicaceae	*Casearia bartlettii*
430.Malpighiales	Salicaceae	*Casearia bicolor*
431.Malpighiales	Salicaceae	*Casearia corymbosa*
432.Malpighiales	Salicaceae	*Casearia icosandra*
433.Malpighiales	Salicaceae	*Casearia tacanensis*
434.Malpighiales	Salicaceae	*Casearia thamnia*

Order	Family	Species
435.Malpighiales	Salicaceae	*Casearia tremula*
436.Malpighiales	Violaceae	*Orthion guatemalense*
437.Malpighiales	Violaceae	*Orthion subsessile*
438.Malpighiales	Violaceae	*Rinorea guatemalensis*
439.Malpighiales	Violaceae	*Rhinorea hummelii*
440.Malvales	Bixaceae	*Bixa orellana*
441.Malvales	Cochlospermaceae	*Cochlospermum vitifolium*
442.Malvales	Malvaceae	*Ceiba pentandra*
443.Malvales	Malvaceae	*Guazuma ulmifolia*
444.Malvales	Malvaceae	*Hibiscus costatus*
445.Malvales	Malvaceae	*Hibiscus rosa-sinensis*
446.Malvales	Malvaceae	*Luehea speciosa*
447.Malvales	Malvaceae	*Malachra capitata*
448.Malvales	Malvaceae	*Melochia villosa*
449.Malvales	Malvaceae	*Mortoniodendron guatemalense*
450.Malvales	Malvaceae	*Ochroma pyramidale*
451.Malvales	Malvaceae	*Pavonia paludicola*
452.Malvales	Malvaceae	*Quararibea guatemalteca*
453.Malvales	Malvaceae	*Quararibea yunckeri*
454.Malvales	Malvaceae	*Theobroma cacao*
455.Malvales	Malvaceae	*Trichospermum mexicanum*
456.Malvales	Malvaceae	*Waltheria indica*
457.Malvales	Muntingiaceae	*Muntingia calabura*
458.Myrtales	Combretaceae	*Combretum laxum*
459.Myrtales	Combretaceae	*Combretum rotundifolium*
460.Myrtales	Combretaceae	*Laguncularia racemosa*
461.Myrtales	Combretaceae	*Terminalia amazonia*
462.Myrtales	Combretaceae	*Terminalia bucidoides*
463.Myrtales	Combretaceae	*Terminalia catappa*
464.Myrtales	Combretaceae	*Terminalia oblonga*
465.Myrtales	Lythraceae	*Cuphea calophylla*
466.Myrtales	Lythraceae	*Cuphea hyssopifolia*
467.Myrtales	Melastomataceae	*Aciotis indecora*
468.Myrtales	Melastomataceae	*Bellucia grossularioides*
469.Myrtales	Melastomataceae	*Henriettea cuneata*
470.Myrtales	Melastomataceae	*Henriettea succosa*
471.Myrtales	Melastomataceae	*Myconia affinis*
472.Myrtales	Melastomataceae	*Miconia ampla*
473.Myrtales	Melastomataceae	*Miconia approximata*
474.Myrtales	Melastomataceae	*Miconia argentea*
475.Myrtales	Melastomataceae	*Myconia crocina*
476.Myrtales	Melastomataceae	*Miconia dentata*
477.Myrtales	Melastomataceae	*Miconia hirta*
478.Myrtales	Melastomataceae	*Miconia hondurensis*

Order	Family	Species
479.Myrtales	Melastomataceae	*Miconia impetiolaris*
480.Myrtales	Melastomataceae	*Myconia lacera*
481.Myrtales	Melastomataceae	*Miconia lateriflora*
482.Myrtales	Melastomataceae	*Miconia laxiflora*
483.Myrtales	Melastomataceae	*Miconia matthaei*
484.Myrtales	Melastomataceae	*Miconia octona*
485.Myrtales	Melastomataceae	*Miconia oinochrophylla*
486.Myrtales	Melastomataceae	*Miconia petiolaris*
487.Myrtales	Melastomataceae	*Myconia prasina*
488.Myrtales	Melastomataceae	*Miconia punctata*
489.Myrtales	Melastomataceae	*Miconia septuplinervia*
490.Myrtales	Melastomataceae	*Miconia spicata*
491.Myrtales	Melastomataceae	*Miconia splendens*
492.Myrtales	Melastomataceae	*Miconia subhirsuta*
493.Myrtales	Melastomataceae	*Myconia sulcicaulis*
494.Myrtales	Melastomataceae	*Miconia triplinervis*
495.Myrtales	Melastomataceae	*Miconia xalapensis*
496.Myrtales	Melastomataceae	*Mouriri exilis*
497.Myrtales	Melastomataceae	*Mouriri myrtilloides*
498.Myrtales	Melastomataceae	*Ossaea micrantha*
499.Myrtales	Melastomataceae	*Triolena izabalensis*
500.Myrtales	Melastomataceae	*Triolena paleolata*
501.Myrtales	Myrtaceae	*Chamguava gentlei*
502.Myrtales	Myrtaceae	*Eugenia acapulcensis*
503.Myrtales	Myrtaceae	*Eugenia aeruginea*
504.Myrtales	Myrtaceae	*Eugenia axillaris*
505.Myrtales	Myrtaceae	*Eugenia biflora*
506.Myrtales	Myrtaceae	*Eugenia capuli*
507.Myrtales	Myrtaceae	*Eugenia chahalana*
508.Myrtales	Myrtaceae	*Eugenia choapamensis*
509.Myrtales	Myrtaceae	*Eugenia flavoviridis*
510.Myrtales	Myrtaceae	*Eugenia galalonensis*
511.Myrtales	Myrtaceae	*Eugenia izabalana*
512.Myrtales	Myrtaceae	*Eugenia koepperi*
513.Myrtales	Myrtaceae	*Eugenia oerstediana*
514.Myrtales	Myrtaceae	*Eugenia rhombea*
515.Myrtales	Myrtaceae	*Eugenia riograndis*
516.Myrtales	Myrtaceae	*Eugenia savannarum*
517.Myrtales	Myrtaceae	*Eugenia trikii*
518.Myrtales	Myrtaceae	*Eugenia venezuelensis*
519.Myrtales	Myrtaceae	*Myrcia chytraculia*
520.Myrtales	Myrtaceae	*Myrcia karlingii*
521.Myrtales	Myrtaceae	*Myrcia megistophylla*
522.Myrtales	Myrtaceae	*Myrcia neolindeniana*

Order	Family	Species
523.Myrtales	Myrtaceae	*Myrcia splendens*
524.Myrtales	Myrtaceae	*Myrciaria floribunda*
525.Myrtales	Myrtaceae	*Psidium guajava*
526.Myrtales	Onagraceae	*Ludwigia hyssopifolia*
527.Myrtales	Onagraceae	*Ludwigia inclinata*
528.Myrtales	Onagraceae	*Ludwigia octovalvis*
529.Nymphaeales	Nymphaeaceae	*Nymphaea ampla*
530.Oxalidales	Connaraceae	*Rourea glabra*
531.Oxalidales	Elaeocarpaceae	*Sloanea schippii*
532.Oxalidales	Elaeocarpaceae	*Sloanea tuerckheimii*
533.Oxalidales	Oxalidaceae	*Biophytum dendroides*
534.Oxalidales	Oxalidaceae	*Oxalis frutescens*
535.Piperales	Piperaceae	*Peperomia cobana*
536.Piperales	Piperaceae	*Peperomia discolor*
537.Piperales	Piperaceae	*Peperomia magnoliifolia*
538.Piperales	Piperaceae	*Piper aduncum*
539.Piperales	Piperaceae	*Piper amalago*
540.Piperales	Piperaceae	*Piper atrichopus*
541.Piperales	Piperaceae	*Piper auritum*
542.Piperales	Piperaceae	*Piper donnell-smithii*
543.Piperales	Piperaceae	*Piper hispidum*
544.Piperales	Piperaceae	*Piper linearifolium*
545.Piperales	Piperaceae	*Piper neesianum*
546.Piperales	Piperaceae	*Piper pseudoasperifolium*
547.Piperales	Piperaceae	*Piper psilorhachis*
548.Piperales	Piperaceae	*Piper purpusianum*
549.Piperales	Piperaceae	*Piper sanctum*
550.Piperales	Piperaceae	*Piper schiedeanum*
551.Piperales	Piperaceae	*Piper trigonum*
552.Piperales	Piperaceae	*Piper tuerckheimii*
553.Piperales	Piperaceae	*Piper yucatanense*
554.Ranunculales	Menispermaceae	*Cissampelos tropaeolifolia*
555.Ranunculales	Menispermaceae	*Hyperbaena mexicana*
556.Rosebushes	Cannabaceae	*Trema integerrima*
557.Rosebushes	Moraceae	*Brosimum guianense*
558.Rosebushes	Moraceae	*Castilla elastica*
559.Rosebushes	Moraceae	*Dorstenia lindeniana*
560.Rosebushes	Moraceae	*Ficus aurea*
561.Rosebushes	Moraceae	*Ficus insipida*
562.Rosebushes	Moraceae	*Ficus maxima*
563.Rosebushes	Moraceae	*Ficus obtusifolia*
564.Rosebushes	Moraceae	*Ficus popenoei*
565.Rosebushes	Moraceae	*Ficus turrialbana*
566.Rosebushes	Moraceae	*Trophis racemosa*

Order	Family	Species
567.Rosebushes	Rhamnaceae	*Gouania obamana*
568.Rosebushes	Rhamnaceae	*Reynosia barbatula*
569.Rosebushes	Urticaceae	*Cecropia peltata*
570.Rosebushes	Urticaceae	*Coussapoa oligocephala*
571.Rosebushes	Urticaceae	*Coussapoa villosa*
572.Rosebushes	Urticaceae	*Myriocarpa longipes*
573.Rosebushes	Urticaceae	*Pilea microphylla*
574.Rosebushes	Urticaceae	*Pourouma bicolor*
575.Rosebushes	Urticaceae	*Urera elata*
576.Rosebushes	Urticaceae	*Urera simplex*
577.Santalales	Loranthaceae	*Oryctanthus cordifolius*
578.Santalales	Loranthaceae	*Passovia pyrifolia*
579.Santalales	Loranthaceae	*Psittacanthus rhynchanthus*
580.Santalales	Schoepfiaceae	*Schoepfia macrophylla*
581.Sapindales	Anacardiaceae	*Spondias purpurea*
582.Sapindales	Anacardiaceae	*Spondias radlkoferi*
583.Sapindales	Burseraceae	*Bursera simaruba*
584.Sapindales	Burseraceae	*Protium confusum*
585.Sapindales	Burseraceae	*Protium multiramiflorum*
586.Sapindales	Meliaceae	*Guarea glabra*
587.Sapindales	Meliaceae	*Guarea grandifolia*
588.Sapindales	Meliaceae	*Trichilia erythrocarpa*
589.Sapindales	Meliaceae	*Trichilia martiana*
590.Sapindales	Meliaceae	*Trichilia mexicoensis*
591.Sapindales	Meliaceae	*Trichilia pallida*
592.Sapindales	Sapindaceae	*Blomia prisca*
593.Sapindales	Sapindaceae	*Cupania scrobiculata*
594.Sapindales	Sapindaceae	*Matayba apetala*
595.Sapindales	Sapindaceae	*Matayba oppositifolia*
596.Sapindales	Sapindaceae	*Paullinia pinnata*
597.Solanales	Convolvulaceae	*Ipomoea aurantiaca*
598.Solanales	Convolvulaceae	*Ipomoea batatas*
599.Solanales	Convolvulaceae	*Ipomoea carnea*
600.Solanales	Convolvulaceae	*Ipomoea peteri*
601.Solanales	Convolvulaceae	*Ipomoea philomega*
602.Solanales	Convolvulaceae	*Ipomoea tiliacea*
603.Solanales	Convolvulaceae	*Ipomoea trifida*
604.Solanales	Solanaceae	*Brachistus nelsonii*
605.Solanales	Solanaceae	*Capsicum annuum*
606.Solanales	Solanaceae	*Cestrum nocturnum*
607.Solanales	Solanaceae	*Cestrum racemosum*
608.Solanales	Solanaceae	*Cestrum schlechtendalii*
609.Solanales	Solanaceae	*Lycianthes nitida*
610.Solanales	Solanaceae	*Merinthopodium neuranthum*

Order	Family	Species
611.Solanales	Solanaceae	*Solanum diphyllum*
612.Solanales	Solanaceae	*Solanum jamaicense*
613.Solanales	Solanaceae	*Solanum nigrescens*
614.Solanales	Solanaceae	*Solanum nudum*
615.Solanales	Solanaceae	*Solanum torvum*
616.Solanales	Solanaceae	*Solanum umbellatum*
617.Solanales	Solanaceae	*Solanum volubile*
618.Solanales	Solanaceae	*Witheringia asterotricha*
619.Cyatheales	Cyatheaceae	*Alsophila tryoniana*
620.Cyatheales	Cyatheaceae	*Cyathea caracasana*
621.Cyatheales	Cyatheaceae	*Cyathea schiedeana*
622.Cyatheales	Cyatheaceae	*Sphaeropteris myosuroides*
623.Hymenophyllales	Hymenophyllaceae	*Didymoglossum curtii*
624.Hymenophyllales	Hymenophyllaceae	*Trichomanes diversifrons*
625.Hymenophyllales	Hymenophyllaceae	*Trichomanes pinnatum*
626.Polypodiales	Dryopteridaceae	*Polybotrya caudata*
627.Polypodiales	Lindsaeaceae	*Lindsaea lancea*
628.Polypodiales	Nephrolepidaceae	*Nephrolepis biserrata*
629.Polypodiales	Polypodiaceae	*Microgramma nitida*
630.Polypodiales	Polypodiaceae	*Microgramma percussa*
631.Polypodiales	Polypodiaceae	*Pleopeltis angusta*
632.Polypodiales	Polypodiaceae	*Pleopeltis michauxiana*
633.Polypodiales	Pteridaceae	*Adiantum tenerum*
634.Polypodiales	Pteridaceae	*Ceratopteris pteridioides*
635.Polypodiales	Pteridaceae	*Pityrogramma calomelanos*
636.Polypodiales	Pteridaceae	*Pteris grandifolia*
637.Polypodiales	Tectariaceae	*Tectaria panamensis*
638.Polypodiales	Thelypteridaceae	*Christella dentata*
639.Polypodiales	Thelypteridaceae	*Goniopteris liebmannii*
640.Polypodiales	Thelypteridaceae	*Goniopteris minor*
641.Polypodiales	Thelypteridaceae	*Macrothelypteris torresiana*
642.Schizaeales	Lygodiaceae	*Lygodium heterodoxum*

Annex 4. List of insect species reported.

List of insect species reported in the Forestal del Caribe in the regions of the Area of Direct Influence (AID) and Area of Project Influence (AIP). Species reported in the AID are highlighted in blue.

	Order	Family	Species
1.	Blattodea	Blaberidae	*Blaberus giganteus*
2.	Coleoptera	Buprestidae	*Euchroma giganteum*
3.	Coleoptera	Chrysomelidae	*Exora olivacea*
4.	Coleoptera	Dynastidae	*Dyscinetus dubius*
5.	Coleoptera	Hydrochidae	*Hydrochus piroei*
6.	Coleoptera	Passalidae	*Passalus punctiger*
7.	Coleoptera	Scarabaeidae	*Canthon femoralis*
8.	Coleoptera	Scarabaeidae	*Deltochilum mexicanum*
9.	Diptera	Culicidae	*Culex interrogator*
10.	Hymenoptera	Apidae	*Trigona corvina*
11.	Hymenoptera	Formicidae	*Cephalotes scutulatus*
12.	Hymenoptera	Formicidae	*Cephalotes minutus*
13.	Hymenoptera	Formicidae	*Cephalotes multispinosus*
14.	Hymenoptera	Formicidae	*Odontomachus ruginodis*
15.	Hymenoptera	Formicidae	*Pheidole obscurithorax*
16.	Hymenoptera	Formicidae	*Pseudomyrmex tenuissimus*
17.	Lepidoptera	Lycaenidae	*Eumaeus toxea*
18.	Lepidoptera	Lycaenidae	*Leptotes cassius*
19.	Lepidoptera	Noctuidae	*Ascalapha odorata*
20.	Lepidoptera	Nymphalidae	*Adelpha iphicleola*
21.	Lepidoptera	Nymphalidae	*Aeria eurimedia*
22.	Lepidoptera	Nymphalidae	*Anartia fatima*
23.	Lepidoptera	Nymphalidae	*Anartia jatrophae*
24.	Lepidoptera	Nymphalidae	*Caligo memnon*
25.	Lepidoptera	Nymphalidae	*Caligo uranus*
26.	Lepidoptera	Nymphalidae	*Chlosyne lacinia*
27.	Lepidoptera	Nymphalidae	*Colobura dirce*
28.	Lepidoptera	Nymphalidae	*Danaus plexippus*
29.	Lepidoptera	Nymphalidae	*Danaus gilippus*
30.	Lepidoptera	Nymphalidae	*Eueides isabella*
31.	Lepidoptera	Nymphalidae	*Hamadryas guatemalena*
32.	Lepidoptera	Nymphalidae	*Heliconius erato*
33.	Lepidoptera	Nymphalidae	*Heliconius sapho*
34.	Lepidoptera	Nymphalidae	*Magneuptychia libye*
35.	Lepidoptera	Nymphalidae	*Marpesia petreus*
36.	Lepidoptera	Nymphalidae	*Mechanitis polymnia*
37.	Lepidoptera	Nymphalidae	*Mestra amymone*
38.	Lepidoptera	Nymphalidae	*Morpho Helenor*
39.	Lepidoptera	Nymphalidae	*Morpho peleides*

Order	Family	Species
40. Lepidoptera	Nymphalidae	*Pareuptychia ocirrhoe*
41. Lepidoptera	Nymphalidae	*Taygetis thamyra*
42. Lepidoptera	Papilionidae	*Papilio anchisiades*
43. Lepidoptera	Papilionidae	*Papilio thoas*
44. Lepidoptera	Pieridae	*Phoebis argante*
45. Lepidoptera	Sphingidae	*Xylophanes cthulhu*
46. Lepidoptera	Uraniidae	*Urania fulgens*

Annex 5. List of fish species reported.

List of amphibian species reported in the Forestal del Caribe project in the regions of the Area of Direct Influence (AID) and Area of Influence of the Project (AIP). Species reported in the AID are highlighted in blue.

	Order	Family	Species
1.	Characiformes	Bryconidae	*Brycon guatemalensis*
2.	Characiformes	Characidae	*Astyanax fasciatus*
3.	Cyprinodontiformes	Poecilidae	*Belonesox belizanus*
4.	Cyprinodontiformes	Poecilidae	*Carlhubbsia stuarti*
5.	Cyprinodontiformes	Poecilidae	*Poecilia mexicana*
6.	Cyprinodontiformes	Poecilidae	*Pseudoxiphophorus bimaculatus*
7.	Cyprinodontiformes	Poecilidae	*Xiphophorus hellerii*
8.	Cyprinodontiformes	Rivulidae	*Cynodonichthys tenuis*
9.	Perciformes	Cichlidae	*Cribroheros robertsoni*
10.	Perciformes	Cichlidae	*Cryptoheros spilurus*
11.	Perciformes	Cichlidae	*Oreochromis mossambicus*
12.	Perciformes	Cichlidae	*Parachromis managuensis*
13.	Perciformes	Cichlidae	*Theraps godmanni*
14.	Perciformes	Cichlidae	*Thorichthys aureus*
15.	Perciformes	Cichlidae	*Trichromis salvini*
16.	Perciformes	Cichlidae	*Old Maculicauda*
17.	Perciformes	Eleotridae	*Gobiomorus dormitor*
18.	Siluriformes	Heptapteridae	*Rhamdia guatemalensis*
19.	Siluriformes	Heptapteridae	*Rhamdia laticauda*
20.	Synbranchiformes	Synbranchidae	*Ophisternon aenigmaticum*

Annex 6. List of reported amphibian species.

List of amphibian species reported in the Forestal del Caribe project in the regions of the Area of Direct Influence (AID) and Area of Influence of the Project (AIP). Species reported in the AID are highlighted in blue.

Order	Family	Species
21. Caudata	Plethodontidae	*Bolitoglossa mexicana*
22. Caudata	Plethodontidae	*Bolitoglossa nympha*
23. Anura	Bufonidae	*Incilius campbelli*
24. Anura	Bufonidae	*Incilius valliceps*
25. Anura	Bufonidae	*Rhinella horribilis*
26. Anura	Centrolenidae	*Hyalinobatrachium viridissimum*
27. Anura	Craugastoridae	*Craugastor chac*
28. Anura	Phyllomedusidae	*Agalychnis callidryas*
29. Anura	Hylidae	*Dendropsophus microcephalus*
30. Anura	Hylidae	*Scinax staufferi*
31. Anura	Hylidae	*Smilisca baudinii*
32. Anura	Hylidae	*Tlalocohyla loquax*
33. Anura	Leptodactylidae	*Engystomops pustulosus*
34. Anura	Leptodactylidae	*Leptodactylus fragilis*
35. Anura	Leptodactylidae	*Leptodactylus melanonotus*
36. Anura	Microhylidae	*Hypopachus variolosus*
37. Anura	Ranidae	*Lithobates brownorum*
38. Anura	Ranidae	*Lithobates vaillanti*

Annex 5. List of reptile species reported.

List of reptile species reported in the Forestal del Caribe project in the regions of the Area of Direct Influence (AID) and Area of Influence of the Project (AIP). Species reported in the AID are highlighted in blue.

	Order	Family	Species
1.	Testudines	Emydidae	*Trachemys scripta*
2.	Testudines	Kinosternidae	*Kinosternon leucostomum*
3.	Squamata	Corytophanidae	*Basiliscus vittatus*
4.	Squamata	Corytophanidae	*Corytophanes cristatus*
5.	Squamata	Dactyloidae	*Norops biporcatus*
6.	Squamata	Dactyloidae	*Norops capito*
7.	Squamata	Dactyloidae	*Norops lemurinus*
8.	Squamata	Dactyloidae	*Norops sericeus*
9.	Squamata	Dactyloidae	*Norops uniformis*
10.	Squamata	Gekkonidae	*Hemidactylus frenatus*
11.	Squamata	Iguanidae	*Ctenosaura similis*
12.	Squamata	Iguanidae	*Iguana rhinolopha*
13.	Squamata	Mabuyidae	*Marisora brachypoda*
14.	Squamata	Phrynosomatidae	*Sceloporus variabilis*
15.	Squamata	Phyllodactylidae Phyllodactylidae	*Phyllodactylus tuberculosus*
16.	Squamata	Phyllodactylidae Phyllodactylidae	*Thecadactylus rapicauda*
17.	Squamata	Sphaerodactylidae	*Sphaerodactylus glaucus*
18.	Squamata	Sphaerodactylidae	*Sphaerodactylus millepunctatus*
19.	Squamata	Sphenomorphidae	*Scincella cherriei*
20.	Squamata	Teiidae	*Holcosus festivus*
21.	Squamata	Teiidae	*Holcosus undulatus*
22.	Squamata	Xantusidae	*Lepidophyma flavimaculatum*
23.	Squamata	Boidae	*Boa imperator*
24.	Squamata	Colubridae	*Drymarchon melanurus*
25.	Squamata	Colubridae	*Drymobius margaritiferus*
26.	Squamata	Colubridae	*Lampropeltis abnorma*
27.	Squamata	Colubridae	*Leptophis ahaetulla*
28.	Squamata	Colubridae	*Leptophis mexicanus*
29.	Squamata	Colubridae	*Mastigodryas melanolomus*
30.	Squamata	Colubridae	*Oxybelis aeneus*
31.	Squamata	Colubridae	*Oxybelis fulgidus*
32.	Squamata	Colubridae	*Phrynonax poecilonotus*
33.	Squamata	Colubridae	*Spilotes pullatus*
34.	Squamata	Colubridae	*Stenorrhina degenhardtii*
35.	Squamata	Dipsadidae	*Clelia clelia*
36.	Squamata	Dipsadidae	*Coniophanes fissidens*
37.	Squamata	Dipsadidae	*Hydromorphus concolor*
38.	Squamata	Dipsadidae	*Imantodes cenchoa*
39.	Squamata	Dipsadidae	*Leptodeira septentrionalis*

Order	Family	Species
40. Squamata	Dipsadidae	*Ninia diademata*
41. Squamata	Dipsadidae	*Ninia sebae*
42. Squamata	Dipsadidae	*Tretanorhinus nigroluteus*
43. Squamata	Dipsadidae	*Tropidodipsas sartorii*
44. Squamata	Elapidae	*Micrurus diastema*
45. Squamata	Elapidae	*Micrurus hippocrepis*
46. Squamata	Viperidae	*Bothrops asper*

Annex 8. List of reported bird species.

List of bird species reported in the Forestal del Caribe project in the regions of the Area of Direct Influence (AID) and Area of Influence of the Project (AIP).

Species reported in the IDA are highlighted in blue.

Note that the information on reported birds is presented as a list and not as a table, to facilitate future monitoring. In addition, this list has been left listed using the English common names for two reasons. First, taxonomic determinations are often made by birdwatchers and citizen science sources such as Merlin and ebird were used to gather information. Second, bird taxonomy is changing recently in terms of genus and families as many groups are under revision causing taxonomic "noise".

	Species - common name in English
1.	*Altamira Oriole*
2.	*American Coot*
3.	*American Pygmy Kingfisher*
4.	*American Redstart*
5.	*Baltimore Oriole*
6.	*Band-backed Wren*
7.	*Bare-throated Tiger-Heron*
8.	*Barn Swallow*
9.	*Barred Antshrike*
10.	*Bat Falcon*
11.	*Belted Kingfisher*
12.	*Black Vulture*
13.	*Black-and-white Warbler*
14.	*Black-bellied Whistling-Duck*
15.	*Black-cheeked Woodpecker*
16.	*Black-crowned Tityra*
17.	*Black-headed Saltator*
18.	*Black-headed Trogon*
19.	*Blue-black Grassquit*
20.	*Blue-gray Tanager*
21.	*Blue-throated Goldentail*
22.	*Blue-winged Warbler*
23.	*Boat-billed Flycatcher*
24.	*Bright-rumped Attila*
25.	*Broad-winged Hawk*
26.	*Bronzed Cowbird*
27.	*Brown Jay*
28.	*Brown Pelican*
29.	*Brown-crested Flycatcher*
30.	*Buff-throated Saltator*
31.	*Caspian Tern*

Species - common name in English
32. Cattle Egret
33. Chestnut-coloured Woodpecker
34. Chestnut-sided Warbler
35. Chimney Swift
36. Cinnamon Hummingbird
37. Cinnamon-bellied Saltator
38. Clay-coloured Thrush
39. Collared Aracari
40. Common Black Hawk
41. Common Pauraque
42. Common Tody-Flycatcher
43. Common Yellowthroat
44. Crested Caracara
45. Dusky Antbird
46. Dusky-capped Flycatcher
47. Eastern Kingbird
48. Eastern Meadowlark
49. Eastern Wood-Pewee
50. Ferruginous Pygmy-Owl
51. Golden-fronted Woodpecker
52. Golden-olive Woodpecker
53. Golden-winged Warbler
54. Gray Catbird
55. Gray Hawk
56. Gray-breasted Crake
57. Gray-breasted Martin
58. Gray-chested Dove
59. Gray-collared Becard
60. Gray-crowned Yellowthroat
61. Great Blue Heron
62. Great Crested Flycatcher
63. Great Egret
64. Great Kiskadee
65. Great Tinamou
66. Great-tailed Grackle
67. Green Heron
68. Green Kingfisher
69. Green-backed Sparrow
70. Green-breasted Mango
71. Greenish Elaenia
72. Groove-billed Ani
73. Guatemalan Tyrannulet
74. Hooded Warbler
75. Hook-billed Kite

Species - common name in English
76. House Wren
77. Ivory-billed Woodcreeper
78. Keel-billed Toucan
79. Kentucky Warbler
80. King Vulture
81. Laughing Falcon
82. Laughing Gull
83. Least Flycatcher
84. Lesser Greenlet
85. Lesser Yellow-headed Vulture
86. Lesson's Motmot
87. Limpkin
88. Lineated Woodpecker
89. Little Blue Heron
90. Little Tinamou
91. Long-billed Gnatwren
92. Long-billed Hermit
93. Louisiana/Northern Waterthrush
94. Magnificent Frigatebird
95. Magnolia Warbler
96. Mangrove Swallow
97. Mangrove Vireo
98. Masked Tityra
99. Melodious Blackbird
100. Mistletoe Tyrannulet
101. Montezuma Oropendola
102. Morelet's Seedeater
103. Muscovy Duck
104. Neotropic Cormorant
105. Northern Beardless-Tyrannulet
106. Northern Bentbill
107. Northern Jacana
108. Northern Parula
109. Northern Rough-winged Swallow
110. Northern Waterthrush
111. Ochre-bellied Flycatcher
112. Olivaceous Piculet
113. Olive-throated Parakeet
114. Orchard Oriole
115. Osprey
116. Ovenbird
117. Pale-billed Woodpecker
118. Pale-vented Pigeon
119. Philadelphia Vireo

Species - common name in English
120. Plain-breasted Ground Dove
121. Prothonotary Warbler
122. Purple Gallinule
123. Red-billed Pigeon
124. Red-eyed Vireo
125. Red-legged Honeycreeper
126. Red-lored Parrot
127. Red-winged Blackbird
128. Ringed Kingfisher
129. Roadside Hawk
130. Rose-throated Becard
131. Royal Flycatcher
132. Royal Tern
133. Ruby-throated Hummingbird
134. Ruddy Crake
135. Ruddy Crake
136. Ruddy Crake
137. Ruddy Ground Dove
138. Rufous-breasted Spinetail
139. Rufous-tailed Hummingbird
140. Scarlet-rumped Tanager
141. Scrub Euphonia
142. Scrub Euphonia
143. Sepia-capped Flycatcher
144. Short-billed Pigeon
145. Slaty-breasted Tinamou
146. Slaty-tailed Trogon
147. Snail Kite
148. Snowy Egret
149. Social Flycatcher
150. Spot-breasted Oriole
151. Spot-breasted Wren
152. Spotted Sandpiper
153. Squirrel Cuckoo
154. Streak-headed Woodcreeper
155. Stripe-throated Hermit
156. Sulphur-bellied Flycatcher
157. Summer Tanager
158. Sungrebe
159. Swainson's Thrush
160. Tennessee Warbler
161. Thick-billed Seed-Finch
162. Tropical Kingbird
163. Turkey Vulture

Species - common name in English
164. Turquoise-browed Motmot
165. Variable Seedeater
166. vireo sp.
167. White-bellied Emerald
168. White-breasted Wood-Wren
169. White-collared Manakin
170. White-collared Swift
171. White-crowned Parrot
172. White-tipped Dove
173. White-winged Becard
174. White-winged Dove
175. Wood Thrush
176. Yellow Warbler
177. Yellow-bellied Elaenia
178. Yellow-bellied Flycatcher
179. Yellow-billed Cacique
180. Yellow-breasted Chat
181. Yellow-faced Grassquit
182. Yellow-olive Flycatcher
183. Yellow-rumped Warbler
184. Yellow-throated Euphonia
185. Yellow-throated Vireo
186. Yellow-winged Tanager

Annex 9. List of mammal species.

The table shows the mammal species reported in the Forestal del Caribe project in the regions of the Area of Direct Influence (AID) and Area of Project Influence (AIP). Species reported in the AID are highlighted in blue.

Order	Family	Species
1. Artiodactyla	Cervidae	*Odocoileus virginianus*
2. Artiodactyla	Tayassuidae	*Dicotyles tajacu*
3. Carnivora	Canidae	*Urocyon cinereoargenteus*
4. Carnivora	Felidae	*Herpailurus yagouaroundi*
5. Carnivora	Felidae	*Leopardus wiedii*
6. Carnivora	Mephitidae	*Conepatus semistriatus*
7. Carnivora	Mustelidae	*Lontra longicaudis*
8. Carnivora	Procyonidae	*Nasua narica*
9. Carnivora	Procyonidae	*Procyon lotor*
10. Carnivora	Procyonidae	*Potos flavus*
11. Chiroptera	Molossidae	*Molossus molossus*
12. Chiroptera	Molossidae	*Molossus rufus*
13. Chiroptera	Mormoopidae	*Pteronotus davyi*
14. Chiroptera	Natalidae	*Natalus mexicanus*
15. Chiroptera	Phyllostomidae	*Artibeus jamaicensis*
16. Chiroptera	Phyllostomidae	*Artibeus lituratus*
17. Chiroptera	Phyllostomidae	*Carollia castanea*
18. Chiroptera	Phyllostomidae	*Carollia perspicillata*
19. Chiroptera	Phyllostomidae	*Centurio senex*
20. Chiroptera	Phyllostomidae	*Desmodus rotundus*
21. Chiroptera	Phyllostomidae	*Glossophaga commissarisi*
22. Chiroptera	Phyllostomidae	*Lonchorhina aurita*
23. Chiroptera	Phyllostomidae	*Mimon bennettii*
24. Chiroptera	Phyllostomidae	*Sturnira lilium*
25. Chiroptera	Phyllostomidae	*Tonatia saurophila*
26. Chiroptera	Phyllostomidae	*Trachops cirrhosus*
27. Chiroptera	Phyllostomidae	*Vampyressa pusilla*
28. Cingulata	Dasypodidae	*Dasypus novemcinctus*
29. Didelphimorphia	Didelphidae	*Didelphis marsupialis*
30. Didelphimorphia	Didelphidae	*Philander opossum*
31. Eulipotyphla	Soricidae	*Cryptotis merriami*
32. Lagomorpha	Leporidae	*Sylvilagus gabbi*
33. Pilosa	Myrmecophagidae	*Tamandua mexicana*
34. Primates	Atelidae	*Alouatta palliata*
35. Primates	Atelidae	*Ateles geoffroyi*
36. Rodentia	Cricetidae	*Handleyomys alfaroi*
37. Rodentia	Cricetidae	*Olygoryzomys fulvescens*
38. Rodentia	Cricetidae	*Oryzomys couesi*

Order	Family	Species
39. Rodentia	Cricetidae	*Ototylomys phyllotis*
40. Rodentia	Cricetidae	*Peromyscus mexicanus*
41. Rodentia	Cricetidae	*Sigmodon hispidus*
42. Rodentia	Cricetidae	*Tylomys nudicaudus*
43. Rodentia	Cuniculidae	*Cuniculus paca*
44. Rodentia	Dasyproctidae	*Dasyprocta punctata*
45. Rodentia	Erethizontidae	*Sphiggurus mexicanus*
46. Rodentia	Heteromydae	*Heteromys desmarestianus*
47. Rodentia	Sciuridae	*Sciurus aureogaster*
48. Rodentia	Sciuridae	*Sciurus variegatoides*
49. Sirenia	Trichechidae	*Trichechus manatus*

Annex 10. Monthly and annual rainfall records in mm for Las Vegas station.

The Las Vegas farm lies to the north-east of the "Rio Frio" farm. It should be noted that the precipitation recorded at Las Vegas is influenced by the orographic effect of the San Gil hill, as the clouds discharge to the north side of the Las Vegas farm. The expected precipitation at the "Rio Frio" farm should be less than this.

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
1990	189.7	82	121	103.4	109.5	215.8	116.9	184.5	219.4	97.1	380.2	346.4	2,165.9
1991	268.2	225.6	34.5	74	87.9	159.3	188.3	190	178.8	335.3	263.7	440.6	2,446.2
1992	136.3	53	49	116.5	135.3	187.8	151.1	142.5	160.4	239.4	218.5	195.2	1785
1993	50.6	14.5	111.9	92.7	84	286.7	173.2	348.1	245.9	163.9	340.2	201.9	2,113.6
1994	185.6	44.4	65	56.5	224.3	92.3	238.2	88.1	346.2	34.5	71.2	189.9	1,636.2
1995	105.6	133	19.2	113.7	9.3	153.5	243.5	198.6	232.3	200.2	129.3	227.8	1,766
1996	47.1	24.3	46.6	93.8	185.5	73.2	320.3	225.3	121.3	308.9	538.3	179.6	2,164.2
1997	57.3	102.6	35	76.6	59.4	209	362.6	314.5	215.2	89	332.1	30.5	1,883.8
1998	76.9	11.5	22.9	32.5	13.4	122	207.5	172.6	64.4	345.6	306.6	232.2	1,608.1
1999	187.7	120.2	22.4	92.2	16.9	228.9	308.9	60.5	314.4	132.6	216.8	141.6	1,843.1
2000	81.2	109.6	104.3	21	185	228.3	218.2	218.2	141.6	206.7	270.7	173.4	1,958.2
2001	127.6	225.3	7.5	46.2	75.6	223.6	146.9	196	129.6	301.1	66.4	164.4	1,710.2
2002	84.5	209.6	37.4	187.5	106.3	215.1	287.6	173	149.1	150.1	217.4	164.4	1,982
2003	239.1	119.2	91.7	64.8	68.3	168.2	284.9	155.2	59	125	270.7	164.4	1,810.5
2004	166.8	136.8	201.2	50.9	128.6	268.2	177.5	124.2	192.1	132.6	316.6	149.7	2,045.2
2005	183.8	14.6	35.7	45.7	132.2	268.2	210.8	165.1	540.7	213.9	256.4	138.2	2,205.3
2006	277.7	108.9	101.1	46	98.5	462.6	236.8	116.4	204	187.3	149.5	339	2,327.8
2007	307.2	31.6	83.1	64.3	13.4	110.3	71.8	326.9	369	258	255.7	30.5	1,921.8
2008	195.4	57.1	67.1	114.6	220	218.6	382.9	122.3	22.8	331.4	78.8	135.6	1,946.6
2009	195.9	108.5	73.6	8.4	68.9	88.3	266.4	235.1	82.4	60.9	270.7	77.4	1,536.5
2010	159.7	54.7	1.8	141.1	265.1	103.4	217.4	439.3	343.5	129.8	236.7	95.8	2,188.3
2011	231.3	65.1	181.8	5.2	51.8	156.8	270.2	196.5	330.3	430.9	105.6	156	2,181.5
2012	104.9	205.7	132.2	29.7	229.7	183.4	236	144	79.3	256.6	90.8	64.2	1,756.5
2013	221.8	246.7	64.5	13.4	86.3	242.2	163	194.1	291.1	133.4	219.5	28.4	1,904.4
2014	198	221	67.3	59.7	202	165.8	222.6	87.9	208.1	319.2	340.1	213	2,303.8
2015	296.3	78.7	289.7	50.2	36.4	149.7	91.8	82.1	206.2	96	591.6	215.3	2,184
2016	80.6	106.3	46.8	40.9	30.6	188.6	36.5	219.5	203.4	227.7	344.2	181.2	1,706.3
2017	135.3	60.3	164.6	17.5	89.3	256.4	158.1	260.6	115.3	373.7	125.5	109.2	1,865.8
2018	158.6	108.5	83.1	25	100.5	122	155	126.1	302.7	211.9	87.2	19.5	1,500.1
2019	66.4	76.2	54.9	68.7	194.6	156.6	185.8	49.2	129.9	163.7	35	57.4	1,238.4
2020	239.3	183.6	183.1	32.7	104	92.4	146.1	109.7	214.2	198.5	1266.1	234	3,003.7
2021	18	134.6	60.6	71.7	173	224.6	201.4	237	257.5	158.5	270.7	164	1,972
Average	158.6	108.5	83.1	64.3	112.1	188.2	208.7	184.5	208.4	206.7	270.7	164.4	1,958.2

Annex 11. Socio-cultural aspects matrix.

Com-munity	Interviews		Ethnolinguistic composition	General characteristics	Land tenure	Economic Activities	Socio-political organisation	Intangible Cultural Heritage	Potential Risks
	Men	Wo men							
Buenos Aires	2	3	Mongrel	Communities very accessible from the main road, and linked to the economic sphere of Rio Dulce.	Market mechanisms.	Salaried work, trade.	COCODES as a basic organisational unit. Increased influence of other groups such as churches, individual entrepreneurs.	Catholic traditions.	*Perenco has consistently intervened in the community, as there are groups linked to organised crime that exert negative influence in the community.
San Marcos	3	1	Q'eqchi'		Community systems.	Wage labour, combined with own labour on rented land. Incipient trade.	COCODE as a basic organisational unit.	Combination of Catholic traditions with Q'eqchi' traditions, such as Wa'tesink and Mayehak.	None.
Lot 6	2	0	Mongrel	Relatively isolated communities, with main access through the estate.	Market mechanisms.			Catholic traditions.	None.
New Rio Frio	3	0	Mestizo (migrants from the East) and Q'eqchi		Market mechanisms combined with Community schemes.	Work on own land, combined with occasional wage labour.	COCODE as a single organisational unit. It is virtually impossible to work with the community without COCODE.	Combination of Catholic traditions with Q'eqchi' traditions, such as the Wa'tesink and the Mayehak. Production of artisanal fishing lines, harpoons, and canoes, all for fishing purposes.	Past tensions with protected areas may lead to conflicts in the future.
Zapotillo	2	1	Q'eqchi'		Community systems. There is a perception of land scarcity in the near future.	Casual wage labour, combined with subsistence farming.			None.
Rio Bonito	3	0	Q'eqchi'	The community is fairly isolated geographically, with access both across the river and through the farm.		Work on owned and leased land, combined with small-scale fishing.			None.
Las Camelias	0	2	Q'eqchi'	Communities are fairly isolated geographically, their main access is through the river. They depend on wells for their access to water.		Mainly fishing, combined with occasional salaried work (guarding or cleaning in private villas).			Long-term population pressure can lead to land conflicts. Communities have nowhere to grow, and the community land tenure system puts pressure on younger families.
Brisas del Golfete	4	2	Q'eqchi'						
*Additional interviews with officials from Interforest, PERENCO, and Fundaeco.									

Preliminary findings:				
Related to land tenure	**Labour-related matters**	**Related to indigenous peoples**	**Related to cultural heritage**	**Other**
The strategy of leasing land to farmers in neighbouring	ALL communities expect new projects to provide	In communities classified as ethnic Q'eqchi', it is perceived that the	Some Q'eqchi' traditions such as Wa'tesink and Mayehak still persist, but	The relationship with neighbouring protected areas is cordial at the moment, but may be a

communities has been positive, although its long-term sustainability needs to be assessed. There is a history of irregular land occupations far from the farm's zone of influence, as in the case of the community of Cotoxjá-Manzanita, a farm belonging to a well-known former politician that was recently invaded by community members from Lámpara, Creek Maya, and Laureles.	employment opportunities for the communities around the farm.	language will remain stable in the medium and long term. Tensions between Catholics and Evangelicals need to be considered, as they could lead to conflict.	these are framed within the broader tension between Catholics and Evangelicals. The former are more inclined to preserve elements of indigenous spirituality, while the latter openly reject these practices. There is a richness yet to be explored around "the fishing cultural complex", which encompasses, in terms of material culture, the manufacture of cayucos, atarrayas, and harpoons, although it could also encompass symbolic elements such as legends, ethnozoology, ethnobotany, and ethno-climatology.	source of tensions in the future, especially in communities identified with population pressure and scarce land availability. In the medium term, access to water may also be key to social stability in the region, as many rely on artesian wells, which are susceptible to drying up or becoming contaminated. Another issue to consider is energy use. All communities rely on firewood for cooking, but in some (such as Buenos Aires), they already buy 100% of the firewood they use. The tension between energy needs, conservation initiatives and the potential closure of guamil use from the implementation of new projects may increase. Several women raised the possibility of implementing development projects focused on them, such as sewing and weaving. International migration is becoming an important factor in communities, especially since the COVID-19 pandemic.

***Stakeholder* identification**		
Influence High	**Medium Influence**	**Influence Low**
Lívingston City Council COCODES CONAP Rubber and Eucalyptus Farms Fundaeco "Chaleteros". Buyers of Cardamom Fish buyers in Rio Dulce Rio Dulce Boatmen	Interforest PERENCO School Teachers Canoe-owning fishermen Traders in the Rio Dulce catchment area Owners of pick-up trucks operating passenger routes	Pineapple Industry Small cardamom producers Small maize producers Priests and pastors Leaders of the indigenous-peasant movement with influence in the department

Annex 12. Field visit agenda.

FINAL AGENDA			
SUNDAY, 6 MARCH: DEPARTURE TO IZABAL			
TIME	**ACTIVITY**	**LOCATION**	**TEAM**
2:00 pm	Departure to Rio Dulce	Hertz zone 13.	Nikki Bahr Oscar Avalos Andrés Álvarez
6:00 pm	Accommodation at Hotel Nana Juana		Nikki Bahr Oscar Avalos Andrés Álvarez
MONDAY, 7 MARCH: FIELD VISIT			
TIME	**LOCATION**	**ACTIVITIES**	**TEAM**
7:00 am	Hotel Nana Juana	Breakfast with Max, Anna, Genoveva.	Nikki Bahr Oscar Avalos Andrés Álvarez
8:30 am	Visit to "Agroman".	Mr Salvador Portillo 5951-1271 (owner of the wood chipping company) Talk to people who are on maize leases. This informal lease expires in August. Talk to 2-3 people in the field. Talk to maize tenants in the field.	Nikki Bahr Oscar Avalos Andrés Álvarez
11:00	Visit to the Community of Buenos Aires.		Nikki Bahr Oscar Avalos Andrés Álvarez
12:00	Lunch in the dining room between Comunidad Grande and the Finca "Agroman".		
1:30	Visit to Rio Frio	Sentry box Pipeline Transmission Line Previous quarry Section to be sold to Fundaeco Talk to people who are on maize leases. This informal lease expires in August. Talk to 2-3 people in the field.	
7:00	Dinner		
6:00 pm	Accommodation at Hotel Nana Juana	Field supervision	Nikki Bahr Oscar Avalos Andrés Álvarez

Annex 13. List of documents reviewed.

#	DOCUMENT

1	Annex 1: Registry and cadastral study of "Rio Frio" and Annexes" Feb 2022
2	Annex 2: Presentation on Interforest, (2021 and 2022) and presentation Interforest companies (2022)
3	Annex 3: Characterization of neighbouring communities: Río Frio and Las Guitarras Farm, Dec 2021- Interforest, S.A.
4	Annex 4: Riparian buffer zones: functions and recommended widths, April 2005 - Ellen Hawes, Markelle Smith
5	Annex 5: Management plan finca "Río Frío", Río Dulce, Izabal, June 2013- Pablo Domínguez
6	Annex 6: Resolution on forest management plan PINFOR 2014 - Agropalmeras, S.A.
7	Annex 7: INAB - Rio Frio Voluntary Plantation Certificate 2015
8	Annex 8: Maps of rubber and eucalyptus plantation (voluntary) Fca, Rio Frio (2015)
9	Annex 9: Rio Frio maps: project overview, general access, biological corridor, administrative sectors, location of communities, land use in neighbouring areas (January 2022) - Interforest, S.A.
10	Annex 10: Historical land use maps "Río Frío" farm: 1994, 2006 (January 2022) and 2021 (Oct 2021) - Interforest, S.A.
11	Annex 11: Rio Dulce National Park Master Plan - CONAP (Sept 2019)
12	Annex 12: Master Plan for the Manantiales Cerro San Gil Protected Reserve (2008-2012)
13	Annex 13: Reassessment Report of Certification (Rainforest Alliance) of forest management of Grupo Agroindustrial Occidente, S.A.(August 2016)
14	Annex 14: Rio Frio maps: firebreak gaps by administrative stand, fences, roads by maintenance need and type, dismemberment proposal (March 2022)- Interforest, S.A.
15	Annex 15: Identification of attributes of high conservation value and natural forest management proposal for the finca "Río Frío", Livingston, Izabal - Fundación Naturaleza por la Vida (Sept 2009)
16	Annex 16: Presentation Gmelina Guatemala Project (2022)- Arbaro Advirsors, Interforest, S.A.
17	Annex 17: Summary of the Melina Izabal Reforestation Project, Guatemala, (2022) - Interforest, S.A.
18	Annex 18: Information Grupo Occidente Administrativo (Río Frío): account statements Agropalmeras S.A. (2022), IUSI pending Fca. Río Frío- Buenos Aires since January 2015 (January 2022), easement plan (Feb 2021), legal structural presentation Agropalmeras, S.A., TRECSA easement deeds.
19	Annex 19: Information Grupo Occidente CONAP(Río Frío): location request (March 2018), protected areas information
20	Annex 20: Information Grupo Occidente legal (Río Frío): Tonnage of shares in Agropalmeras, S.A.
21	Annex 21: Information Grupo Occidente MARN (Río Frío): Environmental diagnosis agroforestry project (rubber, wood and energy) (Nov 2011), Resolution approval "B1"(Feb 2013), Resolution amendment (Sept 2013), payment of bond (2016), Environmental license "B1" (2016-2018), Rainforest certification (2010).
22	Annex 22: Information Grupo Occidente MEM (Río Frío): Mining Licence (2012), Mining Licence Waiver (2015)
23	Annex 23: Evaluated and plans of the Buenos Aires farm (2016)
24	Annex 24: Plans finca "Río Frío": cadastral plan (2017), Maps: finca "Río Frío" with quarry, without quarry, boundaries, boundaries to protected areas
25	Annex 25: Trifoliar Río Frío- Agropalmeras, S.A.
26	Compendium of forestry regulations 2018 -INAB
27	Taxonomy list (2021)- Government of Guatemala

Annex 14. Names of interviewees.

Below is a summary of the people who were interviewed during the field visit, as well as remotely.

#	Name	Institution	Internal	External
1	Luis Mejia	Interforest / Financial Manager	x	
2	Max Garcia	Interforest / Farm Operation Manager	x	
3	Ana Calel	Interforest / Social	x	
4	Genoveva Martínez	Interforest / Biologist	x	
5	Ermenegildo Chocoj	Administrator Finca "Río Frío".	x	x
6	Juan Manuel Recinos	Real Estate Agent		x
7	Pablo Dominguez	Grupo Occidente / Regente Forestal		x
8	"El Mosco	Campollo Group / Social Manager		x
9	Jose Antonio Godoy	Pineapple farm manager		x
10	Vinicio Cerezo	Fundaeco		x
11	Otto Palencia	Fundaeco		x
12	Antonio Minondo	Perenco / Managerial Social Manager		x
13	Juan Luis Lucero	Perenco / Social Manager		x
14	Jorge Monzón	MINECO		x
15	David Garcia	Veterinarians Without Borders		x
16	Tatiana Paz	Vanderbilt University		x
17	Manuel Rax	Security Agent "Agroman".		x
18	Julian	Las Guitarras Estate Manager		X

Interviews and community consultations were conducted with the following people.

#	Name	Community	Age	Gender
1	Cristóbal Ical Calich	New Rio Frio	37	M
2	Gregory	New Rio Frio	35	M
3	Did not provide name	New Rio Frio	19	M
4	William Chocoj	San Marcos	35	M
5	Esperanza Chocoj	San Marcos	48	F
6	José Aníbal Carranza	San Marcos	31	M
7	Alejandro Caal	San Marcos	51	M
8	Did not provide name	Las Camelias	31	F
9	Did not provide name	Las Camelias	62	F
10	Alberto Miguel Ramírez Calel	Buenos Aires	23	M
11	Did not provide name	Buenos Aires	56	M
12	Did not provide name	Buenos Aires	59	F
13	Did not provide name	Buenos Aires	63	F
14	Did not provide name	Buenos Aires	32	F
15	Did not provide name	Brisas del Golfete	61	M
16	Did not provide name	Brisas del Golfete	59	M
17	Did not provide name	Brisas del Golfete	65	M
18	Did not provide name	Brisas del Golfete	43	M
19	Did not provide name	Brisas del Golfete	58	F
20	Did not provide name	Brisas del Golfete	28	F

21	Did not provide name	Zapotillo	27	F
22	Did not provide name	Zapotillo	18	M
23	Did not provide name	Zapotillo	60	M
24	Did not provide name	Rio Bonito	23	M
25	Did not provide name	Rio Bonito	24	M
26	Did not provide name	Rio Bonito	26	M
27	Did not provide name	Lot 6	30	M
28	Did not provide name	Lot 6	21	M

Annex 14. Community interview tool.

Date: _____

Interview No.

Entrevistador/a _____

Greetings.

Presentation:
The consulting firm Sustentable Strategies has been contracted to carry out an initial investigation in Izabal, with the objective of assessing the existing socio-environmental conditions and those necessary for the development and eventual implementation of a forestry project that would allow the planting and use of commercial species.
Although these are initial stages, it is important to have interviews with different people and community representatives, as well as organisations in different points of interest, so we appreciate your collaboration by providing the answers to this interview, your information will be of great use to us. All the information you provide will be handled exclusively by Sustainable Strategies to present the client anonymously (i.e. no specific answers will be associated to particular people).
It is important to clarify that, although the development of these stages does not necessarily imply that the project will be implemented, it will provide first-hand knowledge of the current conditions and the requirements to be considered in the future in the development of subsequent stages.

Questionnaire to record social information and perception of the project.

Entrevistado/a _____

Telephone _____ **E-mail** _____

Community _____ **Time to live in the area** _____

Socio-demographic profile
1. Gender: Female_____ Male_____
2. Age: _____
3. Nationality: _____
4. What is your ethnicity? _____
5. Marital status:

Single		Divorced	
Married		Separated	
Free union		Widowed	

6. Schooling

Preschool		Secondary school completed	
Incomplete primary school		University incomplete	
Primary school completed		Full university education	
Incomplete secondary school		No schooling	
Last year completed			

7. Occupation: What is your occupation, do you have a permanent or temporary job, do you have any other economic activity?

Unemployed		Domestic trades	
Salaried		Pensioner	
Own account		Student	
Occasional work		Another	

8. Branch of activity.

Agriculture and Livestock		Tourism	
Trade		Finance	
Construction		Transport	
Gas, water, electricity supply		Forestry	
Other / Which?			

Life in the territory

9. What is life like here in your community? What are the main problems that people face here?

10. What are the main economic activities in the region?

11. What other communities or villages do you visit and how do you mobilise?

A. For shopping.
B. To visit relatives.
C. To make formalities.

12. What are the most influential organisations and decision-makers in the region (probe government, business, NGOs, churches, etc.)?

13. Are there indigenous communities in this region, what are they and what is the relationship with them?

14. Have you heard of social or community conflicts in this region? What are they due to?

Perception of the project in the area

15.	**Are you aware of forestry projects in the area?**	
16.	**Do you know which species are planted for commercial purposes?**	
17.	**What benefits do you think can be generated from this type of project?**	
18.	**What problems do you think this type of project can generate?**	
19.	**Do you consider forestry projects to be of benefit to the local population?**	
20.	**What suggestions would you give to forestry project developers?**	
21.	**Have you heard of, know people, or have you been displaced by any projects in the region?**	
22.	**What other activities or projects could be developed in the area?**	

23.	**What are the most important environmental resources for local people?**	
24.	**What is your access to water like?**	
25.	**Do you have access to electricity and what can you tell me about this service?**	
26.	**What other services do you have in your household (waste management, drainage, telecommunications, etc.)?**	
27.	**What are the most important traditions and customs in this region?** **A. Dances.** **B. Religious traditions.** **C. Food.** **D. Handicrafts.** **C. Tales, legends, oral tradition.**	
28.	**Do you know if there are archaeological sites (ruins) in this region?**	
29.	**Do you think this is a safe or unsafe region?**	
30.	**How do you usually find out the news?**	

Land tenure

31.	**Are you aware of irregular settlements (invasions) in the area?**	
32.	**How easy or difficult is it to obtain land for local people?**	

Thank you for your cooperation!

Annex 15. Photographic register.

Photo 1SS team on the farm "Agroman".

Photo 2 Perenco pumping station "Río Frío" farm.

Photo 3 Finca "Río Frío".

Photo 4 Mammal footprint finca "Río Frío".

Photo 5: Transmission line "Río Frío" farm.

Photo 6 TRECSA transmission line "Río Frío" farm.

Photograph 7: Fragments of pre-Hispanic artefacts made from obsidian finca "Río Frío".

Photograph 8 Obsidiana "Río Frío" farm.

Photograph 9 Rocas "Río Frío" farm.

Photo 10Vi viendas de guardianes finca "Río Frío".

Photo 11: Area requiring drainage improvement finca "Río Frío".

Photograph 12 Piedra finca "Agroman".

Photograph 13: Water fountain "Agroman".

Photograph 14 Portion of the entrance to the enlarged farm "Agroman".

Photo 15San Marcos river intersecting the farm "Agroman".

Photo 16: Sign at the entrance of the farm "Agroman".

Photo 17: Planting of eucalyptus on the farm "Rio Frio".

Photo 18: Sowing of rubber on the farm "Agroman".

Photograph 19Aqueduct of the Guitarras estate.

Photo 20Entrance to the Guitarras estate.

Photo 21Livestock on Guitarras estate.

Photo 22Perenco pipeline, Guitarras estate.

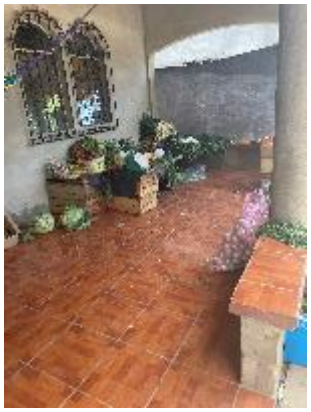

Photo 23: San Marcos Community .

Photo 24Community of Buenos Aires.

Photograph 25. Buenos Aires *Community .*

Photo 26. Community Buenos Aires.

Photograph 27. Nuevo Río Frío Community Church.

Photograph 28. Las Camelias Community.

Photograph 29. Brisas del Golfete Community.

Photo 30. Community around finca "Río Frío".

Annex 16. List of impacts of the "Forestal del Caribe" Project and Protective, corrective and compensatory measures proposed for the Project.

Matriz de importancia de impacto ambiental para las fases constructiva y operativa del proyecto; Proyecto Forestal del Caribe

Aspecto ambiental	Fase del proyecto	Element o tipo	Nombre del impacto.	Atributos cualitativos										Importancia	Relevancia
				NAT (+ Ó -)	IN	EX	MO	PE	RV	SI	AC	EF	PR	MC		
Flora.	FC	1C	Extracción de especies de flora menor por personal del proyecto.	-1	2	1	4	2	2	2	4	4	1	1	-28	Moderado.
	FC	1D	Afectación a la flora por la construcción y habilitación de caminos dentro de	-1	4	2	1	2	2	2	1	4	2	2	-32	Moderado.
	FC	1E	Remoción de la vegetación por la limpieza del sitio donde se construira	-1	4	1	1	2	2	2	1	4	1	2	-29	Moderado.
	FC	1F	Destrucción de habitat por la limpieza y preparación de terrenos para la plantación de melina.	-1	12	8	8	4	2	4	1	4	2	4	-81	Crítico.
	FC	1G	Contaminación y daño de flora por uso de herbicidas para el establecimiento de las plantulas	-1	4	4	1	1	1	2	4	1	2	2	-34	Moderado.
	FO	1H	Eliminación de la flora por chapeo y mantenimiento general del proyecto y el proceso de extracción maderera	-1	4	2	4	4	4	2	1	4	2	4	-41	Moderado.
	FO	1I	Eliminacion y/o reduccion de practicas de tala ilegal de bosques.	1	4	4	4	4	1	2	1	4	4	1	41	Alto.
Fauna.	FC	2C, 2D, 2E y 2H	Atropellamiento de fauna	-1	2	4	4	4	4	2	1	4	1	4	-38	Moderado.
	FC		Desplazamiento de fauna por generación de ruido por los vehículos, la maquinaria, el equipo y el personal.	-1	1	2	4	2	2	2	1	4	1	2	-25	Moderado.
	FC		Afectación a la fauna acuática por fugas de derivados del petróleo.	-1	1	1	4	2	2	2	1	4	1	4	-25	Moderado.
	FC		Matanza de serpientes por personal del proyecto en la etapa constructiva	-1	4	8	1	2	2	4	4	4	4	2	-51	Severo.
	FC	2D	Fragmentación del hábitat de la fauna por caminos.	-1	4	6	8	2	2	4	1	4	2	4	-51	Severo.
	FC	2F	Destrucción y fragmentación de hábitat de la fauna por preparación de terrenos	-1	12	8	8	4	2	4	1	4	2	4	-81	Crítico.
	FC	2G	Establecimiento de un hábitat potencial forestal plantado para la fauna	1	12	8	5	4	2	4	1	4	2	1	75	Alto.
	FO	2H	Desplazamiento de fauna por generación de ruido del aserradero	-1	2	1	4	1	1	2	4	1	4	1	-26	Moderado.
			Destrucción y fragmentación de hábitat potencial plantado para la fauna al tener ciclos de corta de 6 años	-1	4	8	8	2	2	4	1	4	2	2	-53	Severo.
			Matanza de serpientes por personal del proyecto en la etapa operativa	-1	4	8	1	2	2	4	4	4	4	2	-51	Severo.
guas subterráneas.	FC	3C, 3D, 3E, 3F y 3G	Contaminación de aguas subterráneas por sustancias peligrosas durante la fase constructiva.	-1	4	8	4	1	4	2	4	4	1	4	-52	Severo.
	FC	3H	Contaminación de aguas subterráneas por sustancias peligrosas durante la fase operativa.	-1	4	8	4	1	4	2	4	4	1	4	-52	Severo.
guas superficiales.	FC	4C, 4D, 4E, 4F y 4G	Contaminación de aguas superficiales por sustancias peligrosas durante la fase constructiva	-1	4	8	4	1	4	2	4	4	1	4	-52	Severo.
			Contaminación de aguas superficiales por sedimentos ocasionados por las actividades constructivas.	-1	4	4	4	1	1	2	4	1	2	2	-37	Moderado.
	FO	4H	Contaminación de aguas superficiales por sustancias peligrosas durante la fase operativa.	-1	4	8	4	1	4	2	4	4	1	4	-52	Severo.
Aire.	FC	5C, 5D, 5E, 5F y 5G	Contaminación por emisión de gases de combustión durante la fase constructiva	-1	1	8	1	4	4	2	4	1	2	4	-41	Moderado.
	FO	5H	Captura de carbono	1	1	8	1	4	4	4	4	1	4	4	45	Alto.
Relieve	FC	6D, 6E, 6F, 6G	Alteración de la topografía por trabajos asociados a la etapa costructiva	-1	4	4	4	4	4	1	1	4	1	2	-41	Moderado.
Suelo	FC	7C, 7D, 7E, 7F	Pérdida de suelo por actividades asociadas a la etapa constructiva	-1	4	4	4	4	4	1	4	4	2	8	-51	Severo.
			Perdida de capacidad de infiltración del suelo	-1	2	2	4	4	4	1	1	4	2	4	-34	Moderado.
	FC	7G	Protección del suelo contra erosión	1	4	4	1	2	4	2	4	4	4	2	43	Medio.
	FO	7H	Pérdida de suelo por actividades asociadas a la etapa operativa	-1	4	4	4	4	4	1	4	4	2	8	-51	Severo.
Social	FC	8A	Aumento de precios de la tierra y especulación de la misma.	-1	4	4	4	4	2	2	4	4	4	2	-46	Moderado.
	FC	B, 8E, 8F, 8	Generación de expectativas sobre la contratación de mano de obra durante la fase constructiva.	-1	2	4	4	4	2	1	4	4	4	4	-41	Moderado.
	FC	8C	Presión sobre las vías de comunicación existentes.	-1	2	4	4	4	4	1	1	4	4	4	-40	Moderado.
	FC	8D	Inhabilitación temporal de vías existentes.	-1	2	4	4	1	4	1	1	4	1	1	-31	Moderado.
	FO	8H	Generación de empleo en la fase operativa.	1	12	4	1	4	1	1	1	4	4	1	61	Alto.
	FO	8I	Reduccion de vacíos de autoridad	1	1	2		4	1	1	4	4	4	1	26	Medio.
	FO	8J	Aumento de conflictividad por expectativas a proyectos (principalmetne mineros) en la zona	-1	2	4	4	4	2	1	4	4	4	4	-41	Moderado.
estructura y Transpor	FC	9A	Generación de expectativas de mejora y creación de infraestructura en la zona del proyecto.	-1	2	4	4	4	1	1	1	4	4	2	-35	Moderado.
	FC	9D	Inhabilitacion temporal de infraestructura existente.	-1	2	1	4	1	1	1	1	4	1	1	-22	Irrelevante.
	FC	9E	Creación y/o mejora de infraestructura.	1	4	4	4	4	2	2	4	4	4	4	48	Medio.
	FO	9H	Mantenimiento de infraestructura.	1	2	4	4	2	2	1	4	4	2	4	37	Medio.
Uso de la tierra.	FC	10A	Cambio en la tenencia y uso de la tierra durante la fase constructiva	-1	4	8	4	4	4	4	4	4	2	4	-58	Severo.
	FC	10D, 10E, 10F y 10G	Alteración y/o afectación al uso de la tierra durante la fase constructiva	-1	2	4	4	4	4	2	4	4	2	2	-40	Moderado.
	FC	10H	Implementación de nueva normalidad en uso de la tierra durante la operación del proyecto.	1	4	8	2	4	2	2	4	4	4	4	54	Alto.
	FC	11H	Invasion a tierras por interes de siembra de cultivos de subsistencia.	-1	2	8	2	4	2	2	4	4	4	4	-48	Moderado.
Vialidad.	FC	11C	Aumento de transporte en vias comunitarias	-1	4	4	4	4	4	2	1	4	4	4	-47	Moderado.
	FC	11D	Mejora e la vialidad.	1	4	4	4	4	4	4	1	4	4	4	49	Medio.
	FO	11H	Reducción de demanda de transporte.	-1	4	4	4	4	4	2	1	4	4	4	-47	Moderado.
rqueológicos / histór	FC	12D, 12E, 12F, 12G	Daño total o parcial de patrimonio cultural por trabajos que impliquen rotura o mecanización de tierra por el proyecto.	-1	12	8	4	4	4	1	1	4	1	8	-79	Crítico.
Paisaje	FC	13D, 13E, 13F, y 13G	Interrupción y alteración del paisaje.	-1	4	4	4	4	2	4	4	4	4	2	-48	Moderado.
	FO	13H	Establecimiento de nueva línea paisajística.	1	4	4	1	4	4	2	4	4	4	4	47	Medio.
y Seguridad en el trab	FC	14B	Riesgo de contratación de personal sin conocimientos en materia de salud y seguridad.	-1	2	2	4	4	2	1	1	4	1	4	-31	Moderado.
	FC	14C, 14D y 14F	Riesgos a la salud provocados por la ejecución de actividades del proyecto en la etapa constructiva	-1	8	8	4	4	4	2	1	4	1	8	-68	Severo.
	FO	14H	Riesgos a la salud provocados por la ejecución de actividades del proyecto en la etapa operativa	-1	2	2	4	2	2	2	4	1	1	2	-28	Moderado.
	FO	14I	Riesgos a la salud y seguridad comunitaria por uso de agroquimicos y/o paso de transporte	-1	2	8	4	4	4	2	1	4	1	8	-50	Moderado.

TERMINOLOGÍA: FC: FASE CONSTRUCTIVA, **FO**: FASE OPERATIVA

Medidas protectoras, correctoras y compensatorias propuestas del proyecto; Proyecto Forestal del Caribe			
Elemento tipo (ij)	**Nombre del impacto.**	**Nombre de la medida.**	**Acciones de la medida de control ambiental o social.**
1C	Extracción de especies de flora menor por personal del proyecto.	Control sobre la extracción de flora menor por parte del personal del proyecto.	Realizar inducción y charlas cortas (5 o 10 minutos máximo) al personal de las obras donde se indique la prohibición de extraer flora menor y advertir las implicaciones de incumplir con esta medida.
1D	Afectación a la flora por la construcción y habilitación de caminos dentro de las fincas.		Rotular los sitios propensos a recibir este impacto, asociados especialmente a cobertura boscosa cercana. La rotulación debe indicar la prohibición respectiva y la norma legal que la rige.
1E	Remoción de la vegetación por la limpieza del sitio donde se construira infraestructura.		Realizar vigilancia por parte del proyecto para identificar anomalías sobre la extracción de flora menor.
1F	Destrucción de habitat por la limpieza y preparación de terrenos para la plantación de melina.		Aplicar las sanciones estipuladas en legislación vigente y los procesos administrativos según corresponda.
1G	Contaminación y daño de flora por uso de herbicidas para el establecimiento de las plantulas		Instalar portones que impidan el acceso a particulares en los sitios donde existan caminos habilitados que permitan el fácil ingreso a áreas especialmente de cobertura boscosa.
1H	Eliminación de la flora por chapeo y mantenimiento general del proyecto y el proceso de extracción maderera	Planificación de la corta de árboles.	No efectuar corta de árboles sin haber realizado de previo el inventario forestal y adquirido los permisos requeridos para tal actividad.
1I	Eliminacion y/o reduccion de practicas de tala ilegal de bosques.		Notificar el inicio y supervisar el proceso de la tala mediante un profesional en ciencias biológicas.
2C, 2D, 2E y 2H	Atropellamiento de fauna		Valorar el requerimiento de tala, a fin que se garantice una tala racional y proporcionada a los requerimientos constructivos y de seguridad operativa de la LT.

0	Desplazamiento de fauna por generación de ruido por los vehículos, la maquinaria, el equipo y el personal.		Realizar la actividad de corta mediante técnicas de tala dirigida, guiada y supervisada por un profesional forestal.
0	Afectación a la fauna acuática por fugas de derivados del petróleo.		Disponer en dimensiones aprovechables el recurso maderable producto de la tala. Así como realizar los trámites pertinentes ante la AFE para la obtención de las guías y placas requeridas por ley para el transporte de madera.
0	Matanza de serpientes por personal del proyecto en la etapa constructiva		Repicar y apilar ordenadamente en el perímetro del área de trabajo el material vegetal no útil para el propietario (recurso no maderable), de manera que cubra las superficies expuestas a erosión, en especial en zonas con fuertes pendientes. Además esto provee de microhabitats para múltipes especies de fauna.
2D	Fragmentación del hábitat de la fauna por caminos.		No incinerar y/o utilizar sustancias químicas para acelerar la degradación del material vegetal no útil para el propietario (recurso no maderable).
2E			Capacitar a los operadores de maquinaria menor (motosierras) y los ayudantes en técnicas de tala dirigida y manejo de hidrocarburos y derivados del petrolero (aceites y lubricantes).
2F	Destrucción y fragmentación de hábitat de la fauna por preparación de terrenos	Mantenimiento de zonas de cercos vivos	Mantener los árboles en hilera que existen todavía en las zonas de potrero y que los usaban como cercos vivos, pero que también los usan los monos para moverse de hábitat a hábitat.
2G	Establecimiento de un hábitat potencial forestal plantado para la fauna	Mantenimiento de bosques remanentes	Mantener los bosques remanentes como islas de habitat para la fauna y flora de la región, pero con vista de mejorar su conectividad con el macizo de Cerro San Gil y el Parque Nacional Río Dulce.
2H	Desplazamiento de fauna por generación de ruido del aserradero	Enriquecimiento de plantación forestal con especies de flora nativa que proveen alimento a fauna.	Si se usara el estándar de plantación forestal de "tres bolillo" para 1,111 árboles/ha al final, pueden colocar 1,109 árboles de melina y 2 árboles que produzcan frutos y flores nativos por hectarea de lista de especies prioritarias incluida en informe de biodiversidad. Esta intensidad de siembra de frutales tiene costos económicos marginales para la plantación.

0	Destrucción y fragmentación de hábitat potencial plantado para la fauna al tener ciclos de corta de 6 años	Manejo adecuado de agroquímicos	Establecer depositos para la adecuada disposición de agroquímicos utilizados y asegurar prácticas de fumigación/fertilización de precisión, reduciendo los costos de gastos en insumos y a su vez reduciendo la escorrentía y lixiviación de agroquímicos
0	Matanza de serpientes por personal del proyecto en la etapa operativa	Mantenimiento de sotobosque natural en plantación forestal	No practicar chapeo de carriles cuando ya esté establecida la plantación de melina (año 2-3), esto para enfocarse en erradicar las gramíneas y poaceas con herbicida en zona de plateo, pero mantener las especies vegetales de hoja ancha que no compiten directamente con la melina en su establecimiento y que permiten mantener en los ciclos de corta establecidos (6 años) un sotobosque relativamente diverso que permite abundancia de fauna. El chapeo elimina tanto especies de hoja ancha como gramíneas. Usualmente son suficientes 3 ó 4 limpias en los primeros 2 años, y rara vez se requiere de esta operación después del tercer año, con lo cual se mantienen 3 años de regeneración de sotobosque en la plantación hasta el próximo ciclo de corta.
2I	0	Rotulación y mantenimiento de límites de velocidad	Rotular los sitios propensos a recibir este impacto, asociados especialmente a cobertura boscosa cercana. La rotulación debe indicar la velocidad máxima permitida e indicar que hay pasos de fauna.
3B	0	Control de ruido	Prohibir el uso de bocinas o música a alto volumen en vehiculos que tansiten por el área.
3C, 3D, 3E, 3F y 3G	Contaminación de aguas subterráneas por sustancias peligrosas durante la fase constructiva.		Colocar muro de abatimiento del ruido (barreras acústicas) en los limites de las zonas de maquinaria
3H	Contaminación de aguas subterráneas por sustancias peligrosas durante la fase operativa.	Mantenimiento de vehículos y maquinaria	Realizar inspecciones períodicas de vehículos y maquinaria para revisión de fugas.
0	0		Realizar inspecciones priodicas en vehiculas y maquinaria de terceros.
0	0		Inspeccionar mantenimeitno de combustible.

0	0	Sensibilización y capacitación a personal	Realizar capacitaciones a personal sobre la importancia ecológica de serpientes, reconocimiento de especies potencialmente peligrosas de las que no lo son, y manejo adecuado del accidente ofídico.
4A	0	Mantenimiento de zonas de cercos vivos	Mantener los árboles en hilera que existen todavía en las zonas de potrero y que los usaban como cercos vivos, pero que también los usan los monos para moverse de hábitat a hábitat.
4B	0	Control de ruido en aserradero	Colocar muro de abatimiento del ruido (barreras acústicas) en los limites del aserradero en AGROMAN.
4C, 4D, 4E, 4F y 4G	Contaminación de aguas superficiales por sustancias peligrosas durante la fase constructiva	Traslocación de fauna	La traslocación se refiere al movimiento de organismos vivientes de un área a otra, donde son liberados. En este consiste en traslocar la mayor cantidad posible de fauna que se encuentre en las zonas de limpieza y preparación de terreno hacia los bosques remanentes del AID y del AIF. Esto reviste especial importancia para especies de fauna terrestre como anfibios, reptiles y mamíferos. Esto se debe hacer con el apoyo de profesionales en biología.
0	Contaminación de aguas superficiales por sedimentos ocasionados por las actividades constructivas.	Enriquecimiento de plantación forestal para mejorar permeabilidad a paso y utilización por fauna.	Si se usara el estándar de plantación forestal de "tres bolillo" para 1,111 árboles/ha al final, pueden colocar 1,109 árboles de melina y 2 árboles que produzcan frutos y flores nativos por hectarea de lista de especies prioritarias incluida en informe de biodiversidad, que servirán de "estaciones" de alimento para los monos araña (frugívoros) y aulladores (folívoros) que usen la plantación de Melina como corredor cuando ya esté establecida (alrededor del año 3-4). Esta intensidad de siembra de frutales tiene costos económicos marginales para la plantación.
4E	0		Crear corrredores biologicos entre area forestal y area protegida.
4F	0	Mantenimiento de conectividad riparia	Mantener y restaurar el bosque de galeria (ripario) remanente en los ríos, riachuelos y arroyos del AID y del AIF. Esto se debe hacer a través de una zona buffer de 10 metros de cado lado de la ribera de rios y 5 metros de cada ribera de riachuelos y arroyos.

4H	Contaminación de aguas superficiales por sustancias peligrosas durante la fase operativa.	Evitar derrame de diferentes productos	Mantenimiento adecuado a todos los vehículos
5A	Contaminación de aguas superficiales por sustancias peligrosas durante la fase operativa.	Evitar derrame de diferentes productos	Mantenimiento adecuado a todos los vehículos
5B	0		Realizar inspecciones priodicas en vehiculas y maquinaria de terceros.
5C, 5D, 5E, 5F y 5G	Contaminación por emisión de gases de combustión durante la fase constructiva		Inspeccionar mantenimeitno de combustible.
5D	0	Manejo de desechos solidos relacionados a la construcción	Habilitar un vertedero para deposito de materiales para posteriormente enviarlo a un vertedero municipal, el cual no afecte el entorno.
5E	0	Manejo adecuado de combustibles y lubricantes	Manejo adecuado de los lubricantes y combustible para que no afecte las areas del proyecto.
5F	0		
5G	0		
5H	Contaminación por emisión de gases de combustión durante la fase operativa		
5G	Captura de carbono por siembra y crecimiento de arboles	Medicion y venta de carbono	Medir y vender los creditos de carbono
6A	0		
6B	0	Manejo adecuado de combustibles y lubricantes	Manejo adecuado de los lubricantes y combustible para para que no afecte las areas del proyecto.
6C	0	Reducción del impacto de movimiento de tierras	Realizar lel menor movimiento de las tierras y ubicar los excesos que no se utilicen en los caminos en lugares específicos
6D, 6E, 6F, 6G	Alteración de la topografía por trabajos asociados a la etapa costructiva	Manejo de productos: combustible, lubricantes y agroquimicos.	Manejo adecuado de los lubricantes, combustible, productos agroquimico y otros productos para que no afecte las areas del proyecto.
6E	0	Ruma en areas a reforestar	La limpieza de los sitios priorizados para reforestacion deberan de realizarse con maquinaria pequeña para reducir la compactacion en el suelo

6F	0	Manejo de desechos solidos provenientes del personal de campo	Capacitar al personal de campo y encargados sobre la disposicion de los desechos solidos en campo; colocar depositos para colocar desechos solidos en campo.
6G	0	Manejo de productos: combustible, lubricantes y agroquimicos.	Manejo adecuado de los lubricantes, combustible, productos agroquimico y otros productos para que no afecte las areas del proyecto.
6H	0		
7A	0		
7B	0	Mantenimiento de vehiculos motorizados para reducir emisiones	Contar con personal calificado para garantizar el adecuado funcionamiento de los vehiculos y equipos motorizados para reducir la emsiones
7C, 7D, 7E, 7F	Pérdida de suelo por actividades asociadas a la etapa constructiva	Mantenimiento de vehiculos motorizados para reducir emisiones	Contar con personal calificado para garantizar el adecuado funcionamiento de los vehiculos y equipos motorizados para reducir la emsiones
0	Perdida de capacidad de infiltración del suelo	Mantenimiento de vehiculos motorizados para reducir emisiones	Contar con personal calificado para garantizar el adecuado funcionamiento de los vehiculos y equipos motorizados para reducir la emsiones
7E	0	Mantenimiento de vehiculos motorizados para reducir emisiones	Contar con personal calificado para garantizar el adecuado funcionamiento de los vehiculos y equipos motorizados para reducir la emsiones
7F	0	Mantenimiento de vehiculos motorizados para reducir emisiones	Contar con personal calificado para garantizar el adecuado funcionamiento de los vehiculos y equipos motorizados para reducir la emsiones
7G	Protección del suelo contra erosión	Mantenimiento de vehiculos motorizados para reducir emisiones	Contar con personal calificado para garantizar el adecuado funcionamiento de los vehiculos y equipos motorizados para reducir la emsiones
7H	Pérdida de suelo por actividades asociadas a la etapa operativa		
8A	Aumento de precios de la tierra y especulación de la misma.		
8B, 8E, 8F, 8G	Generación de expectativas sobre la contratación de mano de obra durante la fase constructiva.		

8C	Presión sobre las vías de comunicación existentes.	Reducción del impacto de movimiento de tierras	Evitar que el movimiento de tierras no afecte los cuerpos hidricos superficiales, los excesos de materiales contar con lugares adecuados
8D	Inhabilitación temporal de vías existentes.	Reducción del impacto de movimiento de tierras	Las areas a aplanar para realziar las diferentes instalaciones, es necesario que tengan el minimo impacto, evitando afectar las fuentes superficiales de agua
8E	0		
8F	0		
8G	0		
8H	Generación de empleo en la fase operativa.		
8I	Reduccion de vacios de autoridad		
8J	Aumento de conflictividad por expectativas a proyectos (principalmetne mineros) en la zona		
9A	Generación de expectativas de mejora y creación de infraestructura en la zona del proyecto.		
9B	0	Reducción del impacto de movimiento de tierras	Utilizar los sitios donde ya se tienen infraestructura para que se habiliten y reducir el impacto
9C	0	Ruma en areas a reforestar	Utilizar tractores de menor tamaño para reducir el impacto en la compactación del suelo
9D	Inhabilitacion temporal de infraestructura existente.		
9E	Creación y/o mejora de infraestructura.		
9F	0	Programa de Educacion Sexual Integral.	Implementar un programa de educación sexual integral para reducir la presión demográfica y la consecuente demanda por la tierra.
9G	0	Campaña de Comunicacón Efectiva, Staffing Plan.	Implementar una campaña de comunicación sobre las cantidades realistas de puestos de trabajo que se crearán y la proporción de mano de obra local que se contratará.
9H	Mantenimiento de infraestructura.	Plan de Manejo de Caminos.	Implementar un plan de construcción, ampliación, y mantenimiento de las vías de comunicación existentes.

10A	Cambio en la tenencia y uso de la tierra durante la fase constructiva	Campaña de Comunicación Efectiva, Mantenimiento de Vías e Infraestructura.	Implementar una campaña de comunicación sobre las fechas exactas en las que se inhabilitarán las vías de comunicación y la infraestructura existentes.
10B	0		
10C			
10D, 10E, 10F y 10G	Alteración y/o afectación al uso de la tierra durante la fase constructiva		
10E		Programa de Educación Financiera.	Implementar un programa de educación financiera para que los beneficios económicos de las nuevas oportunidades laborales se potencien.
10F			
10G			
10H	Implementación de nueva normalidad en uso de la tierra durante la operación del proyecto.		
11A			
11B		Plan de Manejo de Infraestructura.	Implementar un plan de construcción, ampliación, y mantenimiento de la infraestructura.
10I	Invasion a tierras por interes de siembra de cultivos de subsistencia.		
11C	Aumento de transporte en vias comunitarias		
11D	Mejora e la vialidad.		
11E		Programa de Educación sobre Huertos Familiares y Avicultura.	Implementar un programa educativo para las comunidades, promoviendo la creacón de huertos familiares sobre el terreno del hogar y la crianza de aves de corral.
11F			
11G			
11H, 11K, 11J	Reducción de demanda de transporte.		
12A			
12B			
12C			

12D, 12E, 12F, 12G,	Daño total o parcial de patrimonio cultural por trabajos que impliquen rotura o mecanización de tierra por el proyecto.		
12E			
12F			
12G			
12H			
13A			
13B			
13C			
13D, 13E, 13F, y 13G	Interrupción y alteración del paisaje.		
13H, 13I, 13J	Establecimiento de nueva línea paisajística.	Solicitar autorización al Ministerio de Cultura y Deportes de Guatemala.	Todo trabajo que implique rotura o mecanización de tierra, debe contar con una investigación arqueológica previo al inicio de dichos trabajos, por lo que previo a cualquier actividad de investigación arqueológica, debe contarse con la autorización del Ministerio de Cultura y Deportes de Guatemala, por lo que debe considerarse el tiempo que lleve realizar dichos tramites que son de dos a tres meses.
14A	0	Reconocimiento, Sondeo y Rescate arqueológico dentro del área de influencia directa	Esta actividad incluye realizar recorridos sistematicos en el AID, identificar áreas con potencial arqueológico para su investigación mediante pozos de sondeo y el rescate o investigación extensiva en áreas que posteriormente seran mecanizadas para cultivo, trabajo que dependiendo del área y de la cantidad de personal dentro del equipo de trabajo puede tomar dos o tres meses.
14B	Riesgo de contratación de personal sin conocimientos en materia de salud y seguridad.	Supevisión de trabajos de mecanización o rotura de tierras, en áreas que no fueron investigadas arqueológicas previamente.	La investigación arqueológica no puede abarcar el 100% del AID, ya que solo se puede investigar un porcentaje del terreno, es por ello que se requiere de una supervición en las áreas donde se realicen trabajos de mecanización o siembra para la documentación de hallazgos fortuitos, los cuales se documentaran y se podra continuar con el trabajo que corresponda

14C, 14D y 14F	Riesgos a la salud provocados por la ejecución de actividades del proyecto en la etapa constructiva	Divulgación de los resultados de la investigación arqueológica.	Todos los trabajos arqueológicos que se lleven a cabo pueden ser publicados en circulos academicos y publicos, o pueden darse a conocer por medio de conferencias o platicas en las comunidades cercanas para dar a conocer los hallazagos mas relevantes de estos trabajos.
14E	0		
14F	0		
14G	0		
14H	Riesgos a la salud provocados por la ejecución de actividades del proyecto en la etapa operativa	Plan de Manejo de Especies Nativas.	Implementar un plan de manejo del proyecto que incluya la preservación de algunas zonas de guamil, y la siembra de otras zonas con especies nativas.
14I, 14J, 14K	Riesgos a la salud y seguridad comunitaria por uso de agroquimicos y/o paso de transporte		
0		Plan de Gestión de Riesgos Laborales	Implementar un plan integral de capacitación y de inversión en equipo para asegurar el bienestar ocupacional de los empleados de los proyectos en todas las fases del mismo.
0		Programa de Educación Vial.	Implementar un programa de educación vial con todos los pilotos que trabajen en la zona.

Annex 17. Other studies to be carried out.

Three complementary studies are recommended to deepen knowledge and understanding of the baseline and possible socio-environmental impacts.

1. **Land use capacity study.**

As a recommendation, it is necessary to carry out land use capacity studies to define the categories more precisely (at a scale of 1:50,000 with cartography and field data). This will facilitate the development of a Forest Management Plan that adjusts the use of agrochemicals, incorporation of drainage, among others.

2. **Archaeological survey of the Juan Vicente D site in the Project's AID.**

The desk study in the AIP identified the archaeological site of Juan Vicente D, which according to López (1997:342), was identified by the Izabal Archaeological Project in 1993 and which consisted of 40 to 50 structures, some up to 5 metres high, distributed in several dispersed groups, many of which were extensively disturbed.

The study does not present a map and/or geo-referenced references to the archaeological site, so it was not possible to identify the site in the field, which should be close to the current eucalyptus plantation and pastoral area.

Near the area where the archaeological site should be located, the team's archaeologist identified obsidian and other materials indicative of the presence of Mayan cultural heritage.

In accordance with the provisions of the Law for the Protection of the Cultural Heritage of the Nation, Decree Number 26-97 and its reforms by Decree 81-98, a 5% study of the site to be intervened must be carried out in order to identify possible existing cultural heritage. To do this, a proposal for the investigation must be created, using the regulations as a basis. A letter of financial support for the study is then submitted with a copy of the deed of possession of the land and supporting documents from the legal representative. The study takes approximately 3-4 months to be approved and the study time will take approximately 2 months, depending on the archaeological equipment and the weather.

The law states the following in its articles:

- ARTICLE 2. Cultural heritage. The cultural heritage of the Nation is made up of those assets and institutions which, by operation of law or by declaration of an authority, constitute public and private movable or immovable property relating to palaeontology, archaeology, history, anthropology, art, science and technology, and culture in general, including intangible heritage, which contribute to the strengthening of national identity.

- ARTICLE 4. Rules. The rules for the safeguarding of the Cultural Heritage of the Nation are of public order, of social interest and their contravention will give rise to the sanctions contemplated in the present law, as well as other applicable legal provisions.

- ARTICLE 5. Cultural property. Cultural property may be publicly or privately owned. Cultural property owned or possessed by the public is imprescriptible and inalienable. Those cultural properties of public or private property existing in the national territory, whoever their owner or possessor may be, are part of the National Cultural Heritage Law, and shall be under the safeguard and protection of the State. Any act of transfer of ownership of an immovable property declared as part of the cultural heritage of the Nation must be notified to the Registry of Cultural Property.

- ARTICLE 6. Measures. The measures contemplated herein shall be applicable to property forming part of the Cultural Heritage of the Nation, without prejudice to whether or not there is a declaration of national monument or archaeological zone and other legal provisions.

- ARTICLE 7. Application. The application of this law includes all those items of cultural heritage that are threatened or in imminent danger of disappearance or damage due to:

    - Execution of public or private works for urban or tourist development;
    - Modification of the water conveyance level, construction of dams and dykes;
    - Earth breaking and clearing for agricultural, forestry, industrial, mining, urban development and tourism purposes;
    - Opening of roads and other infrastructure works; and;
    - Earthquakes, geological faults, landslides, landslides and all kinds of natural disasters.

- ARTICLE 8. Preventive or prohibitive ordinances. In the cases referred to in the previous article, the competent authorities shall dictate the preventive or prohibitive measures and ordinances they deem necessary for the conservation and protection of such property.

- ARTICLE 9. Protection. The cultural property protected by this law may not be subject to any alteration whatsoever, except in the case of intervention duly authorised by the General Directorate of Cultural and Natural Heritage. In the case of immovable property declared as Cultural Heritage of the Nation or forming a Historical Centre, Ensemble or Site, authorisation shall also be required from the Municipality under whose jurisdiction it is located.

- ARTICLE 10. Authorizations. The carrying out of terrestrial or underwater excavation work of palaeontological, archaeological or historical interest, whether in public or private areas or properties, may only be carried out with the prior opinion of the Institute of Anthropology and History of Guatemala, and the authorisation of the General Directorate of Cultural and Natural Heritage, and an agreement must be signed. Research work will be regulated by specific regulations.

- ARTICLE 12. Actions or omissions. The property forming part of the Cultural Heritage of the Nation may not be destroyed or altered in whole or in part, by the action or omission of natural or legal persons, whether national or foreign.

- ARTICLE 16. Development of projects. When a public body or a natural or legal person, national or foreign, with proven scientific and technical capacity, intends to develop projects of any kind in historic, urban or rural properties, centres or complexes, and in archaeological, palaeontological or historic areas or sites, covered by this law, it shall, prior to their execution, submit such projects to the approval of the General Directorate of Cultural and Natural Heritage, which shall provide for compliance with the technical conditions required for the best protection and conservation of those, under its supervision and oversight.

Due to the presence of archaeological remains within the AID and the type of activities that will be carried out within the project, such as land clearing and cleaning for agricultural

or forestry purposes, as well as the opening of roads or infrastructure works, therefore, prior to the implementation of these activities, authorisation is required from the General Directorate of Cultural and Natural Heritage (DIGEPACUNAT), as well as a technical report from the Institute of Anthropology and History (IDAEH).

In this sense, the IDAEH's reports generally recommend archaeological research in areas where there are records of pre-Hispanic, colonial or historical remains, an activity that must be carried out by a professional archaeologist who must request the corresponding authorisation from the DGEPACUNAT in accordance with the provisions of Ministerial Agreement 001-2012 or Regulations for Archaeological Research and Related Disciplines, issued by the Ministry of Culture and Sports in January 2012.

In accordance with the descriptions and procedures established in Articles 1 to 48 of these regulations. The archaeological professional must submit to DIGEPACUNAT a proposal for archaeological research, indicating: the area to be worked and its corresponding background, the objectives of the research and the subsequent use of the land, the archaeological work methodology to be used, the duration of such activities, the professional, technical and operational personnel that will form part of the work team and their corresponding paperwork, as well as a budget and a letter of financial guarantee, where the owner of the land undertakes to cover the corresponding expenses incurred during the duration of the work.

This proposal must be elaborated within 15 to 20 days, for its elaboration and the search and compilation of the required supporting documentation, which must be delivered to DIGEPACUNAT, where it is evaluated by DEMOPRE personnel and by the Technical Council of Archaeology (CTA) of the same institution, After giving a favourable opinion to the proposal, they send it to their legal department so that an agreement can be drawn up and signed between the archaeological professional and the Director General of DIGEPACUNAT. The process and authorisation of the archaeological work before this institution takes 2 to 3 months.

With the corresponding authorisation, archaeological work may begin in the area or areas of the project that involve the work necessary for the development of the project (clearing and mechanisation of the land, extension or construction of new roads, or construction of infrastructure). At the moment it is not possible to establish an estimated time for this activity, as it depends on the area to be worked on and the number of professional, technical and operational personnel, as well as the presence or absence of significant archaeological evidence that may be identified during the investigations.

Once the excavation work has been completed, a report must be drawn up and submitted to DIGEPACUNAT for review and approval. In this report, the archaeological professional reports relevant findings and provides suggestions on areas that can be intervened without damaging future heritage or areas that should be preserved due to their scientific interest, This is the only document accepted by institutions such as CONAP or INAB for environmental impact studies, which means that the preparation and delivery of this report generally takes 2 to 3 months, an aspect that should be taken into account.

3. Biodiversity baseline update.

For the "Rio Frio" farm and other possible farms, to update the Biodiversity baseline ensuring that the existing baseline developed in 2009 is complemented to include at least the following information as indicated. This process is recommended to form part of the development of the Biodiversity Plan, indicated in the Management Plan section:

- Update the table of species with special conservation status. Be sure to include a column for LEA, List of Threatened Species of Guatemala. https://www.nationalredlist.org/lista-de-especies-amenazada-de-guatemala-lea-list-of-threatened-species-of-guatemala-2009/
- Radio telemetry monitoring of *Ateles geoffroyi* spider monkey and *Alouata palliata* howler monkey troops inhabiting the AID, to determine their main movement routes in the landscape and to assess the connectivity and permeability of melina plantations and remnant habitats.
- Monitoring of amphibian populations in remnant forests as bio-indicators of the state of the hydrological cycle in the AID region.
- Monitoring of aquatic macroinvertebrate populations in rivers and streams as bioindicators of the state of the hydrological cycle in the AID region.
- Determine the distribution and abundance of the remaining populations of the threatened plant species *Aiouea guatemalensis, Astrocasia austinii, Coussapoa oligocephala, Coussarea imitans, Eugenia chahalana, Eugenia izabalana, Faramea standleyana, Licania guatemalensis, Palicourea mediocris and Pera barbellata.*
- Carry out germplasm collection and germination trials of the threatened flora species *Aiouea guatemalensis, Astrocasia austinii, Coussapoa oligocephala, Coussarea imitans, Eugenia chahalana, Eugenia izabalana, Faramea standleyana, Licania guatemalensis, Palicourea mediocris and Pera barbellata in* order to generate nurseries for the restoration of their populations in the AID and AIP.