REFORESTATION OF DEGRADED LANDS IN THE VALLE CALIFORNIA OF PATAGONIA, CHILE

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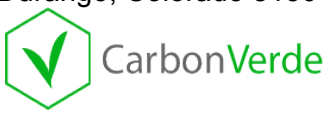

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1 PROJECT DETAILS

1.1 Summary Description of the Project

The project Proponent is SNP Patagonia Sur. The initial project activity instance is located in an area known as Valle California, in the Palena Province of Region X of Los Lagos, Chile. The proposed project will be a VCS registered Afforestation/Reforestation (ARR) grouped project, utilizing the CDM methodology "Consolidated afforestation and reforestation baseline and monitoring methodology AR-ACM0001". All current and future project activity instances will be implemented in the geographic region represented by Regions IX, X, XI, XII and XIV of Patagonia in Chile, and all will apply an identical set of baseline, additionality, and eligibility criteria. The initial project activity instance will be made up of many small plots of land, all of which are parts of larger parcels of land that are currently under ownership of SNP Patagonia Sur.

According to the eco regions classification proposed by Lavanderos, Gastó y Rodrigo, the five regions considered for future project activity instances belong to the temperate kingdom. (Lavanderos et al, 1994)[1]. It is worth mentioning that even though all of the regions belong to the temperate kingdom (according to the above mentioned source), in relation to their specific location their domain within this kingdom may vary. Specifically, each region is classified under the following domains:

- IX Region: (i) Dry summer domain. Mediterranean; and (ii) Humid domain. Temperate Forest.
- X Region: Humid Domain. Temperate Forest.
- XI Region: Humid Domain. Temperate Forest.
- XII Region: Humid Domain. Temperate Forest.
- XIV Region: Humid Domain. Temperate Forest.

Please consider, and as it will demonstrated in this document that these regions also share a similar baseline and additionality case, as explained in Section 1.13 Eligibility Criteria. Thus, all of these activity instances will take place on land deforested due to historical clearing for cattle ranching, and subject to a continued degradation due to over grazing throughout the years.

The grouped project Start Date will be April 30, 2010, and the project crediting period will be 80 years. Due to a first of its kind conservation easement being implemented by SNP Patagonia Sur, the lifetime of the project will be infinite. This grouped project will differ from any reforestation project proposed or implemented in Chile due to its reforestation utilizing native Chilean tree species.

1.2 Sectoral Scope and Project Type

The proposed project falls into Sectoral Scope 14 (see methodology AR-ACM0001). The project is a Reforestation project (VCS AFOLU category ARR: Afforestation, Reforestation and Revegetation) utilizing existing CDM methodology AR-ACM0001, and is a grouped project. The project proponent, SNP Patagonia Sur, intends to add future project activity instances in several locations within regions IX, X, XI, XII and XIV of Patagonia.

[1] Lavanderos, Leonardo, Juan Gastó,, Patricio Rodrigo (1994): "Hacia un ordenamiento ecológico-administrativo del territorio. Sistema de información territorial". Santiago, Pp. 109-117.

1.3 Project Proponent

The project proponent is Agrícola y Forestal SNP Ltda, hereinafter "SNP Patagonia Sur".

Agrícola y Forestal SNP Limitada is a limited liability company incorporated and registered under Chilean law.

Relevant contact information:

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If the addition of a new project activity instance necessitates the addition of a new project proponent, such instances will be included in the grouped project within five years.

The GHG Information Management System

A GHG Information Management System has been developed by SNP Patagonia Sur that describes the roles, responsibilities, and authorities for SNP Patagonia Sur personnel in order to ensure the on-going maintenance of all documentation, procedures, and records relevant to the project as it is developed and monitored. Documents and procedures are reviewed and revised as needed as described in the table below. Relevant documents and procedures shall be maintained electronically on Tortoise in a secure and retrievable manner for at least two years after the end of the crediting period. Records are a specific type of document that records evidence of conformance with this Project Description at a point in time. Records relevant to sections of this Project Description can be maintained electronically on Tortoise or as described by the listed manager in the table below.

The GHG Information Management System roles, responsibilities, and authorities are as follows:

Manager	Summary
General Manager Felipe Zegers	General responsibility across all matters related to this and future instance of carbon project activities.
Forestry Operations Manager Matías Rio	Responsibilities specific to physical and technical aspects of forest plantation, management, and monitoring.
Land Intelligence Coordinator Katie Panek	Responsibility specific to land planning aspects of business.

Chief Conservation Officer Henry Tepper	Overall responsibility for conservation programs undertaken by Patagonia Sur, including the carbon offsets business and relevant activities.
Chief Financial Officer Pablo Valle	Overall responsibility for financial monitoring and management of Patagonia Sur, including accounting related to the carbon offsets business.

General Manager: This individual, currently Felipe Zegers, oversees all aspects of the Carbon Offsets business including sales, marketing, certification, and operational issues. Relevant to this Project Document, this individual directly controls records herein and on-going responsibilities relevant to:

Section 2: Baseline Scenario
Additionality
Section 3: Baseline Emissions
Project Emissions
Leakage
Summary of GHG Emission Reductions and Removals

Forestry Operations Manager: This individual, currently Matías Rio, oversees forest establishment, management, and monitoring. Relevant to this Project Document, this individual directly controls records herein and on-going responsibilities relevant to the:

Section 2: Applicability of Methodology
Project Boundary
Section 4: Monitoring
Data and Parameters Available at Validation
Data and Parameters Monitored
Description of the Monitoring Plan
Section 5: Environmental Impact
Section 6: Stakeholder Comments

Land Intelligence Coordinator: This individual, currently Katie Panek, is responsible for overseeing all matters related to land intelligence, maps, and spatial data. Responsible for collecting detailed information with regard to current and former landowners of properties Patagonia Sur has or is considering purchasing, in addition to physical information about those properties. Relevant to this Project Document, this individual directly controls records herein and has on-going responsibilities relevant to the:

Section 1: Compliance with Laws, Statutes and Other Regulatory Frameworks
Proof of title
Leakage Management

In addition to the three managers above, there is executive level involvement in the operations of the Carbon Offsets business from the Conservation and Finance perspectives.

Chief Conservation Officer: The Chief Conservation Officer (CCO), currently Henry Tepper, ensures that Patagonia Sur's activities adhere to our *Servidumbre ecologica* – a voluntary, legally-binding development limitation similar to a conservation easement. In addition, the Carbon Offsets business is a sub-group of the Chief Conservation Officer's areas of oversight. Specific to this Project Document, the text of the *Servidumbre ecologica*, and ultimate decision-making of which land meets the eligibility criteria for future instances of the project activities, and monitoring the environmental impact of project activities.

Chief Financial Officer: The Chief Financial Officer (CFO), currently Pablo Valle, has ultimate responsibility for managing the finance and accounting of Patagonia Sur's businesses. Specific to this Project Document, the CFO has access to information that supports the financial barrier aspect of Patagonia Sur's additionality case.

1.4 Other Entities Involved in the Project

This project is being developed entirely by Agrícola y Forestal SNP Limitada.

The following affiliated companies shall play an operative role described as follows:

Agricola y Forestal Melimoyu Limitada is a limited liability company established and registered under Chilean law who has acquired and currently owns all of the properties included within the project boundary described in Section 2.3 of this Project Description.

Servicios Turísticos SNP Limitada is a limited liability company established and registered under Chilean law which has been in charge of paying for the baseline studies detailed in Section 3 of the Project Description, as well as establishing itself as paying for the planting services related to the reforestation.

The relation between Agrícola y Forestal SNP Limitada , the project proponent, and Agrícola y Forestal Melimoyu Limitada the owner of the land, is established as both are affiliates of the holding company, Patagonia Sur Management Company LLC. This relationship is elaborated with the incorporation documentation of both entities in the supporting document "Section 1.1. to 1.4 Project Proponent and Other Entities Involved in the Project".

For further reference regarding SNP Patagonia Sur's legal structure, please see a diagram of ownership structure in the supporting document, "Sec 1.1 to 1.4 Project Proponent and Other Participant Entities".

Patagonia Sur would also like to thank Dr. Alvaro Promis - Professor at the Department of Silviculture and Nature Conservation, Faculty of Forest Science and Nature Conservation, University of Chile, Santiago for serving as a Scientific Advisor to Patagonia Sur,

1.5 Project Start Date

The start date for the project is April 30, 2010, which corresponds with the date of the invoice for Patagonia Sur's first supply of native plants from the Mininco nursery located in Mañihuales, XI Region of Aysen.

1.6 Project Crediting Period

The project crediting period for this grouped project shall be 80 years, beginning on April 30, 2010 and ending on April 30, 2090. There will be no harvesting or thinning of trees planted within this project scenario.

1.7 Project Scale and Estimated GHG Emission Reductions or Removals

Please contact SNP Agrícola y Forestal directly for this information at inquiries@patagoniasur.com.

1.8 Description of the Project Activity

The following description of the Project Activity can be found in the supporting document “Section 1.8 and 4 Plantation Establishment and Monitoring Manual”.

The initial project activity instance involves the reforestation of 136.65 hectares of degraded land in region X of Patagonia, in an area known as Valle California (VC).

Introduction

Between the 1930's and 1960's, major fires were set in Southern Chile in order to clear land for cattle and colonize the Chilean territory to establish Chilean sovereignty. This process lasted many years and resulted in an irreversible change in the composition of affected ecosystems with obvious soil erosion and habitat fragmentation.

The first project activities began in 2010, where nearly 57 ha spread over twenty areas were forested. These plantations were established in areas without tree cover, and by using species of the Nothofagus genus, such as the Coihue (*N. betuloides*) and Ñirre (*N. antarctica*).

Forestation activities involve a series of steps aimed at creating a well-planned planting programme. The main forestation steps are the following:

- Identifying suitable planting areas,
- Preparing or readying the land to be planted,
- Transporting the saplings from the nursery to our properties, and remote planting areas,
- Planting itself.

Such preparation requires special attention on the land in order to make the correct decisions at the right time, as well as keeping the relevant records.

Identifying planting areas

The Forestry Operations Manager and Sub-manager of SNP Patagonia Sur identify the planting areas using GIS maps and observations in the field. Once the afforested areas are selected, they are clearly delineated through the use of a GPS in the field. The points are subsequently imported to ArcGIS and Google Earth, where the necessary maps are later generated in order to be presented to CONAF and any other institutions that require them.

At this point, the managers determine which species and how many of each species should be planted in each location. The Forestry Operations Manager relies on knowledge of terrain and hydrologic conditions to decide which species are most suitable for each area.

Once the planting areas are identified, the managers proceed to determine the roads and paths we will use to supply those areas with plants. These paths are cleared by using hand tools, such as machetes, weed eaters and chainsaws when necessary. It should be noted that the planting areas do not usually have access for vehicles, for which reason horses (pack horses) are needed to help supplying the planting areas with saplings.

Fence Building and Repair

It is important to maintain a good fence around reforestation sectors, so that animals in neighbouring premises and those using the roads to reach summer pastures do not destroy the plants. This work is done by staff that maintain Valle California's premises. They generally use recycled materials and fallen trees for repairing the fences.

Plant Supply

The supply of plants comes from the Vivero Mañihuales nursery, owned by the company Forestal Mininco, located in the region of Aysén. The nursery has broad experience in the production of exotic plants and in recent years, has been taking advantage of its greenhouse and irrigation infrastructure, as well as fertilization equipment to produce native plants.

During the 2011 season, 226,500 plants were procured from the nursery. These were divided in the following amounts:

- Coihues: 100,000 plants (*Nothofagus betuloides)*
- Lengas: 71,500 plants (*Nothofagus pumilio)*
- Ñirres: 55,000 plants (*Nothofagus antarctica)*

Total 226,500 plants

Through an exploratory trip by the Forestry Operation Manager, it was established that the Vivero Mañihuales nursery works with transplants from natural nurseries. These plants are deposited in containers and conditioned through controlled temperature, fertilization and irrigation for 1 year.

During the final weeks prior to transportation, the seedlings proceed to "hardening", which involves applying calcium and waiting for the vegetative growth to end and the seedling to become dormant in order to ready them for transport to the field. The nursery must meet this condition that the seedlings are dormant before determining the transport date. In 2011, transport began on April 18th using Patagonia Sur's truck.

The transport boxes hold about 200 seedlings each (the exact number per box depends on their size and foliage). In addition, a gel is applied in order to keep the plants moist during transportation. When the plants arrive at the premises, they are stored in a warehouse to avoid the low temperatures of the area. A Unimoc truck is used to bring the plants nearer to the planting areas. Subsequently, pack horses are used to transport the plants to the planting sites. Each horse can carry around 500 to 800 plants, depending on the plants' size and foliage.

Plant Quality

Plants coming from the nursery must have the shape of the container that held them when they were in the nursery, with fine or secondary roots that look white. Plants must appear without scrapes on the stems or cracked trunks.

The nursery is requested to deliver seedlings with a root/shoot mass ratio that is not less than 2:1, in order to ensure a balance of nutrients and water during transport. Furthermore, the stem must be ligneous with a diameter below 3 millimeters (mm) so that the plant to has a greater potential to withstand extremely cold and snowy conditions.

Damaged plants or those that do not meet the minimal conditions requested are sent back to the nursery for replanting.

Weed control

This task consists in the reduction or elimination of vegetation competing with the species being planted, preventing competition for water, light and nutrients. This activity is needed for proper establishment and growth of the plantation. No chemical weed control will be employed.

Weed control becomes even more relevant considering the topographic restrictions of the area. For proper control, grass weeds must be eliminated in a 30 x 30 centimeter (cm) square where the plant will be located. The bushes in the planting area will not be eliminated. They will be used for the protection of the new plant according to a "plant nursery" technique.

Soil Preparation

This task involves modifying the surface layer of the soil to enhance its physical conditions, thus facilitating the establishment of plants. The soil should be soft and weed-free in a 30 x 30 cm square, with a depth of 25 cm. This way, the soil can retain the appropriate amount of water, therefore encouraging better root development for plants.

Soil preparation will not be conducted with heavy machinery. Only hand tools, such as, machetes, shovels and brush cutters will be used, if necessary.

Pest Control

The main potential risk from pests to the plantation is the presence of Hares (*Lepus europaeus*) (common name: hares) in the reforestation area. The damage they produce may be significant as they can cut off the tops of plants.

An effective natural control in the population of hares is also expected due to the strong presence of foxes in the area. The extent of the damage caused by hares will be monitored through permanent plots. The first examination of damage from hares yielded the results that the hares are not yet a major factor.

The other problem that will directly affect our plantation is the explosive increase of rodents in the area throughout this year, mainly due to the flowering of the Quila (*Chusquea quila*). The extent of this damage will be monitored through permanent plots.

Planting Methodology

The seedlings will be planted at a density of 1,700 plants per hectare (pl/ha) distributed heterogeneously within standard 100 m^2 plots. Therefore the plantation will not be established in rows, but it will use a system that divides a surface of 100 m^2 in 3 rectangles. 6 plants are placed in the outer rectangles and 5 plants are placed in the center rectangle, totalling 17 plants in 100m^2. This will lead to a consistent density of 1,700 pl/ha (see Figure 2), though in a heterogeneous pattern (see Figure 3).

3 workers or *jaloneros* will mark the plots, measure and staking the corners of each 100m^2 square.

The *Jefe de Cuadrilla,* or team leader, will give each planter around 500 plants each day. However, on softer land, each planter may plant as many as 650 plants per day.

Each planter will use a straight shovel that will allow him to loosen the soil and leave a space in the center to place a plant. The root of the plant will be placed on the loosened soil leaving the upper part of the trough at ground level, filling the lateral trenches with the substrate, making sure there are no air pockets and that the substrate becomes compact.

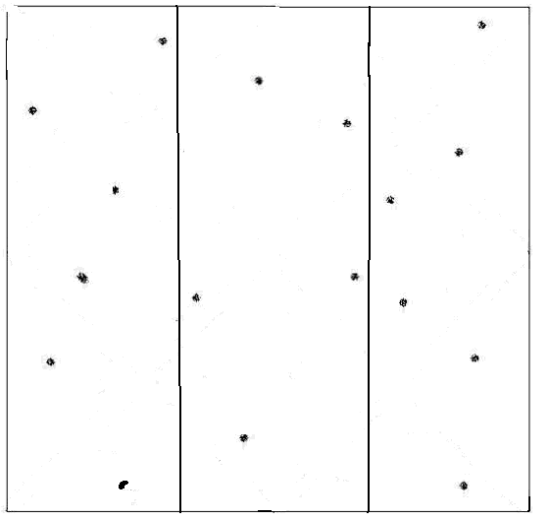


Figure 2: Plantation Grid (100 m²)

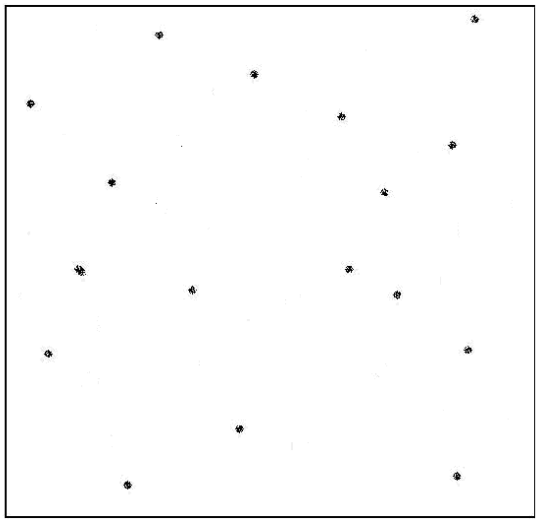


Figure 3: Plantation Result (100 m²)

The plant must be placed firmly in the soil and not become detached when the *jefe de cuadrilla* checks it. If the plant is easily loosened from the ground, the planting must be done again.

The plant should not be planted so deep as for the main stem to be under the soil level, otherwise puddles and rotting may occur.

The *jefe de cuadrilla* will be marking plots from time to time aimed at monitoring that the desired density is being met.

Planting must be made only in those soils already prepared for such end.

Replanting areas with low survival

Each summer the forest monitoring information will be updated, principally occuring during the months of January through March. Based on the results obtained during data collection, Patagonia Sur will proceed to plan the replantation of affected areas between the months of April and May. The objective will be to maintain the desired density in each plantation area.

Fertilization

Fertilizers improve the rooting and development of seedlings, which have great necessity for nutrients. Some of the elements needed by seedlings and thus commonly added to soil are Nitrogen, Phosphorus and Potassium.

However, Patagonia Sur is not using fertilizer on its reforested plantations.

Work Team

For the 2011 planting season, a professional staff with vast experience in Patagonian Afforestation was hired.

The Plantation crew was selected by the Forestry Engineer and comprised of a Forest Technician who will act as *jefe de cuadrilla,* one cook, three line markers or *jaloneros,* and nine planters.

Workers were provided with a camp with ample heat, accommodation, and food in order sustain work requiring great physical effort.

The *Jefe de cuadrilla* kept a daily control of the quantity of seedlings planted and ensured the quality of the plantation in the field by directly reporting any problems to the Forestry Engineer.

The team in charge of pack horses (*pilchereos)* was composed of 5 people and 10 horses, who are tasked with supplying the plantation team with the necessary plants and appropriately distributing them in the places indicated by the Forestry Engineer and the *Jefe de cuadrilla.*

Further Considerations

In order to monitor the appropriate plantation establishment, Patagonia Sur conducts bimonthly tours to correct issues that might be related to the damage produced by hares, frost heaving, twisted plants due to heavy snow, entrance of animals, and to identify the potential mortality issues early and take immediate action.

The lifetime of the project activity is estimated to be infinite based on a permanent conservation easement which is being placed on the land.

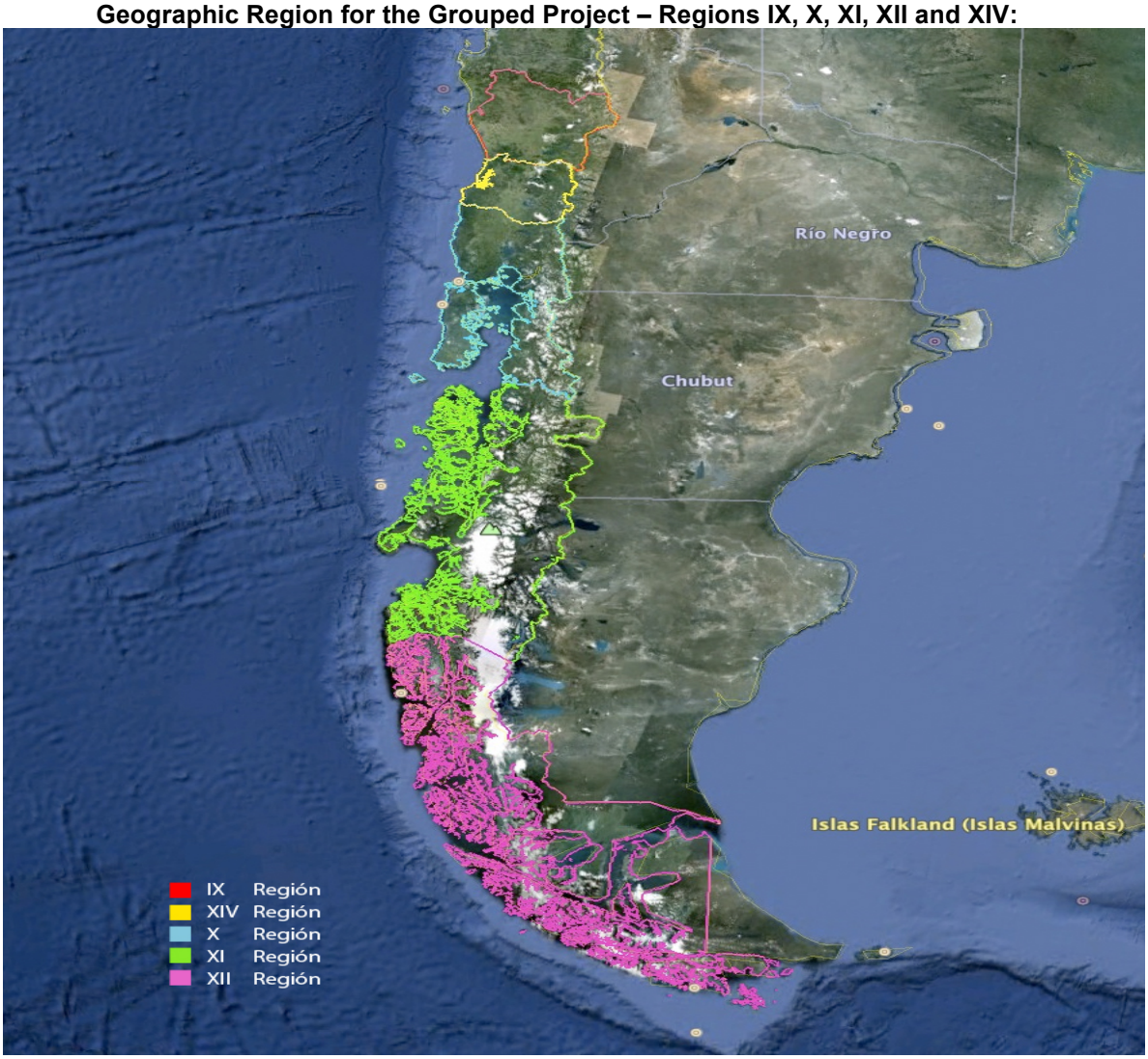
To this date there are some formal legal pending matters in order to finally execute the conservation easement, this is why, Agrícola y Forestal SNP Limitada has signed of to a legally binding agreement in which it commits to established the abovementioned conservation easement in it's Valle California properties. See evidence of this easement in the supporting documents titled "Sec 1.8 Conservation Easement draft" and "Sec 1.8 Contract about and Agreement for the Development of a Sustainable and Restricted Real Estate Project". Which in its clause 4.1 establishes the easement promise.

1.9 Project Location

The initial project activity instance is located in an area known as Valle California, Palena Province in Region X, Chile (See Map, below). All future project activity instances will take place in Regions IX, X, XI, XII and XIV.

Chile, and the Palena Province:

Geographic Region for the Grouped Project – Regions IX, X, XI, XII and XIV:



See Section 2.3 of the Project Description for additional, more specific information regarding project boundaries (including KML files).

1.10 Conditions Prior to Project Initiation

The following history of land use in the project's geographic region is found in the supporting document "Sec 2.5 Additionality".

Before the Patagonia Sur reforestation project, this land was intensively used for grazing. To identify the historical use of the soil, the following sources were taken into account:

1) Recovery of historical information through bibliographic references, which illustrate

settlement processes in the municipality and the region.
2) Recovery of information through interviews with the proponent and settlers of the Valle California and the municipality of Palena to learn the history and uses of the land

The arrival of the settlers happened spontaneously during the first half of the twentieth century; the Chilean government granted the first titles for these properties only in the years 1945 and 1947. Due to the need to obtain land for livestock, settlers eliminated forests through large fires, causing great degradation of the soil due to the abrupt loss of soil protection. Up until today, the areas dedicated to livestock correspond to these areas that were burned in the past –specifically between 1930 and 1965– (Quintanilla, 2005)[2]

Some factors that have determined the regional historic use of land, with livestock as the main activity in the project area, are:
- Cultural aspects and livestock tradition of the first settlers
- Cash flow of livestock production
- Low initial investment
- Low technological complexity
- Existing market for the sale of livestock

In many areas, regeneration of the forest has not been possible due to the constant overgrazing and trampling by animals, which prevents the reestablishment of the original vegetation.

The loss of productivity of the properties has led to a decrease in the incomes from livestock activities of many landowners, and thus to the abandonment of some land. This abandonment has contributed to the abundant regeneration of Radal (*Lomatia hirsuta*), a shrub, but to a lesser extent Ñirre, Coihue, Lenga and some shrub species such as *Berberis, Baccharis* and *Rosa moschata*.

As evidenced by the supporting document titled “Sec 2.5 Additionality _Proof of Prior Consideration of Carbon Offsets Business”, as well as the permanent conservation easement placed on the property, this project has not been implemented to generate GHG emissions for the purpose of their subsequent reduction, removal or destruction. As evidenced in the Quintanilla Paper dated 2005, the project area was already deforested when purchased by Patagonia Sur, due to fires that had been set 70 years prior. Patagonia Sur did not convert the area from native ecosystems within the 10 years prior to the Project Start Date – April 30, 2010.

[2] Quintanilla, V (2005): “Degradacion del bosque nordpatagonico en la cuenca superior del Rio Palena (43°S)”. *Geographicalia*, 47, Pp. 47-68.

In this picture we see a sector for livestock use that has lost its cargo capacity due to overgrazing over the years. Now it is being colonized by *coihue* in the higher areas*, radal* in the mid-slope, and *nirre* and *calafate* in the lower areas.

1.11 Compliance with Laws, Statutes and Other Regulatory Frameworks

All relevant information on SNP Patagonia Sur's compliance with laws, statutes, and other regulatory frameworks can be found in the supporting document, titled "Sec 1.11 Laws Statutes".

1) Land Titles:

Real Estate property in Chile is for the most part privately owned, thus, any transaction regarding ownership is set to be made by private agreements. In this matter the main limitation established by law is in relation with the proper registration of the land title in the Land Registrar (*Conservador de Bienes Raíces*). This registration is deemed to be the only valid way to transfer property rights of land.

Regarding fiscal land (owned by the state), Decree Law N°1939 of Acquisition, Administration and Disposition of Fiscal Assets (*Decreto Ley N° 1939 sobre Adquisición, Administración y Disposición de Bienes del Estado*) regulates the cases and conditions in which the State may sell, buy, lease, etc.

All of SNP´s properties in Valle California were privately acquired, with all the required registrations in the *Conservador de Bienes Raíces de Chaiten* in force.

2) Limitations of Land Use

The main limitation established regarding our properties in Valle California, is the one established in Decree Law N° 3.516 (*Decreto Ley N° 3516, Establece Normas sobre División de Predios Rústicos*) in relation with Law N° 20.443 of Construction and Town Planning (*Ley N° 20.443, Ley General de Urbanismo y Construcción*). Thought and enacted as a measure to control the "urbanization" of rural communities, and to protect agriculture, DL N°3516 declares that no rural property located outside of the established areas for urban development shall be divided in plots under 0.5 hectares, and that any new plot product of such subdivision will not be allowed to change its original designation of use, thus, none of these plots shall lose their qualification as land suitable for agriculture, livestock and/or forestry.

All of SNP's properties are subject to and comply with these legal limitations. Further evidence is found in the certificate of compliance given by CONAF regarding the Decree Law 701 (detailed below), which could only be given to properties with an agricultural qualification and suitable features for reforestation. (See supporting document titled "Sec 1.11 Compliance with CONAF")

All of SNP's properties are subject to and comply with these legal limitations.

3) Regulatory Incentives related to Forestry:

a) Decree Law 701 (*Decreto Ley N° 701, Fija Regimen Legal de los Terrenos Forestales o Preferentemente Aptos para la Forestación, y establece Normas de Fomento sobre la materia*).

This Decree Law establishes incentives for reforestation on degraded land to owners of forest properties (previously qualified as such by the Corporación Nacional Forestal (CORFO)), by subsidizing the cost related to such activities. The reimbursement will be in force after a specific period determined by law, when the authorities confirm the existence and survival of the forested plantations within the frame of conditions previously determined. SNP's reforestation projects costs in Valle California are expected to be partly covered with mechanism. [NOTE: There is no way to be 100% certain that Patagonia Sur will meet the conditions required with all of our reforestation]. Current reforestation areas in Valle California have either been (i) positively qualified as complying with the conditions established by this Decree Law, or (ii) are in the process of being qualified (applications submitted to this date).

For an explanation of the additionality implications of this subsidy, please refer to Project document Section 2.5, as well as supporting documents, "Section 2.5 Additionality" as well as "Section 2.5 Additionality – Financial Barrier Table".

b) Law N° 20.283 (*Ley N° 20.283 sobre Recuperación del Bosque Nativo y Fomento Forestal*)

This law was enacted in 2008 and is expected to create the right incentives in order to promote, recover and improve Chile's Native Forest. However, Laws 20.283 and 701 are mutually exclusive. Therefore, the application of Law 20.283 is unfeasible in relation to this project. Additional information on the law can be found in the supporting document, "Sec 1.11 Laws Statutes".

SNP Patagonia Sur declares that all of the above-mentioned laws, rules and decrees, apply to the whole geographic region considered for the initial project activity as well as future project instances.

1.12 Ownership and Other Programs

1.12.1 Proof of Title

All of the areas which are to be reforested as a part of the initial project activity instance are segments of larger properties which have been acquired by SNP Patagonia Sur. Title documents proving purchase of each of the properties can be found in the supporting PDF document titled "Sec 1.12.1 Proof of Title".

The 20 reforestation lots which represent the project area of the initial project activity instance are located in a single property, El Rosal (998.62 Ha) that is currently owned by SNP Patagonia Sur's affiliated company Agrícola y Forestal Melimoyu Limitada.

Property Identification Number*	Hectares	Name	Domain registry**
104-13	998,62	El Rosal	Property registered under page 898 number 847 of the Property Registry of the Real Estate Registrar of Chaiten of the year 2011.

* The identification number corresponds to the assigned number by the Chilean IRS in order to land tax payment matters (*Rol de Avalúo Fiscal*).
** As proof of title.

The abovementioned property is the result of the merger of the following 3 properties, all previously owned by Agrícola y Forestal Melimoyu Limitada:

Property Identification Number	Hectares	Name
104-13	490,72	El Azul
103-64	369,5	HIjuela Uno Jaramillo
103-83	138,5	Hijuela Dos Rosales

The property merger was completed during the last week of November 2011, therefore some of the supporting documents and certificates are still under the previous property ID numbers (i.e. "Sec 1.11 Laws Statutes and 2.5 Additionality_IRS Certificate" and "Sec 1.11_Compliance with CONAF" as proof of compliance with Corporación Nacional Forestal, CONAF).

1.12.2 Emissions Trading Programs and Other Binding Limits

Currently, no other emissions trading programs or binding limits exist in the geographic region where this grouped project will be developed.

1.12.3 Participation under Other GHG Programs

The proposed project has not been registered and is not seeking registration under any other GHG programs.

1.12.4 Other Forms of Environmental Credit

The project has not generated, nor does it intend to generate any other form of GHG related environmental credit under the VCS Program.

1.12.5 Projects Rejected by Other GHG Programs

The project has neither applied to receive credits from, nor has it been rejected by any other GHG program.

1.13 Additional Information Relevant to the Project

Eligibility Criteria

This initial project activity instance, as well as all future project activity instances shall:

1. Meet the applicability conditions set out in Version 5.2 of CDM Methodology AR-ACM0001, and therefore be established on degraded or degrading land.

2. Use the tree species and planting methodology described in the document entitled “Sec 1.8 and 4 Plantation Establishment and Monitoring Manual”.

3. Apply the technologies or measures in the same manner as specified in the Project Description. This will involve planting trees and following the monitoring regime as described in the document entitled “Sec 1.8 and 4 Plantation Establishment and Monitoring Manual”.

4. Be subject to the baseline scenario determined in “Section 2.4 Baseline Scenario” of the Project Description for the specified project activity and geographic area, and therefore be established on land where the primary use was grazing.

5. Have characteristics with respect to additionality that are consistent with that of the first instance in Valle California, as described in the document entitled “Section 2.5 Additionality”.

6. Take place within temperate climates in the geographic areas defined for this grouped project, Patagonian provinces of Chile, Regions IX, X, XI, XII and XIV.

Leakage Management

In accordance with the applicability conditions of the required tool: “Estimation of the increase in GHG emissions attributable to displacement of pre-project agricultural activities in A/R CDM project activity”, SNP Patagonia Sur utilized the “Guidelines on conditions under which increase in GHG emissions related to displacement of pre-project grazing activities in A/R CDM project activity is insignificant” to demonstrate that leakage in the initial project activity instance is insignificant. For evidence of the use of this tool and its guidance, please see supporting document titled “Sec 1.13 Leakage Statement”.

The VCS Non-Permanence Risk Report has been completed by Patagonia Sur, and determined an overall risk rating of 15 for the project. This rating of 15 implies relatively low risk, and signifies that Patagonia Sur must hold a minimum of 15% of credits in a pooled AFOLU buffer account. However, Patagonia Sur will go beyond this minimum and hold 20% of credits in the pooled AFOLU buffer account. The supporting document titled “Sec 1.13 Non-Permanence Risk“ demonstrates the use of this tool and estimates a minimum of 14,313 credits will be held in the pooled AFOLU buffer account.

Commercially Sensitive Information

At this time the Project Scale and Estimated GHG Emission Reductions or Removals is considered commercially sensitive information and has been excluded from the Project Description.

Further Information

At this time there is no further additional information which would have a bearing on the eligibility of the project, net GHG emissions reductions or removals, or quantification of said reductions or removals, that will not be included in the Project Description and its supporting documentation.

2 APPLICATION OF METHODOLOGY

2.1 Title and Reference of Methodology

The methodology to be applied in this VCS ARR project is the CDM Consolidated afforestation and reforestation baseline and monitoring methodology, AR-ACM0001: "Afforestation and reforestation of degraded land," Version 5.2.

2.2 Applicability of Methodology

Applicability Conditions of AR-ACM0001[3]:

1. The A/R CDM project activity is implemented on degraded lands, which are expected to remain degraded or to continue to degrade in the absence of the project, hence the land cannot be expected to revert to a non-degraded state without human intervention.

> As demonstrated by the supporting document titled, "Sec 2.5 Additionality," the area in which the project will be implemented has been historically used for grazing, and has become degraded to the extent that it is now minimally useful for grazing livestock. Were it not for the project and carbon financing, inefficient grazing would continue at low productivity, and additional degradation of the project area would take place due to continued presence of livestock on the property.
>
> The latest version of the "Tool for the identification of degraded or degrading lands for consideration in implementing A/R CDM project activities" was applied to demonstrate that the project area lands are degraded and degrading. See supporting document titled "Sec 2.2 Degradation", for evidence of the use of this tool.

2. If at least a part of the project activity is implemented on organic soils, drainage of these soils is not allowed and not more than 10% of their area may be disturbed as result of soil preparation for planting.

> Neither the initial project activity instance, nor its future project activity instances will take place on organic soils.

3. The land does not fall into wetland category.

> Neither the initial project activity instance, nor its future project activity instances will take place on wetlands.

Due to the fact that the project scenario will not account for soil organic carbon as a carbon pool (see page 1 of the supporting document titled "Sec 3 Baseline Procedure Document". The methodology states that the project is exempt from the additional applicability conditions.

2.3 Project Boundary

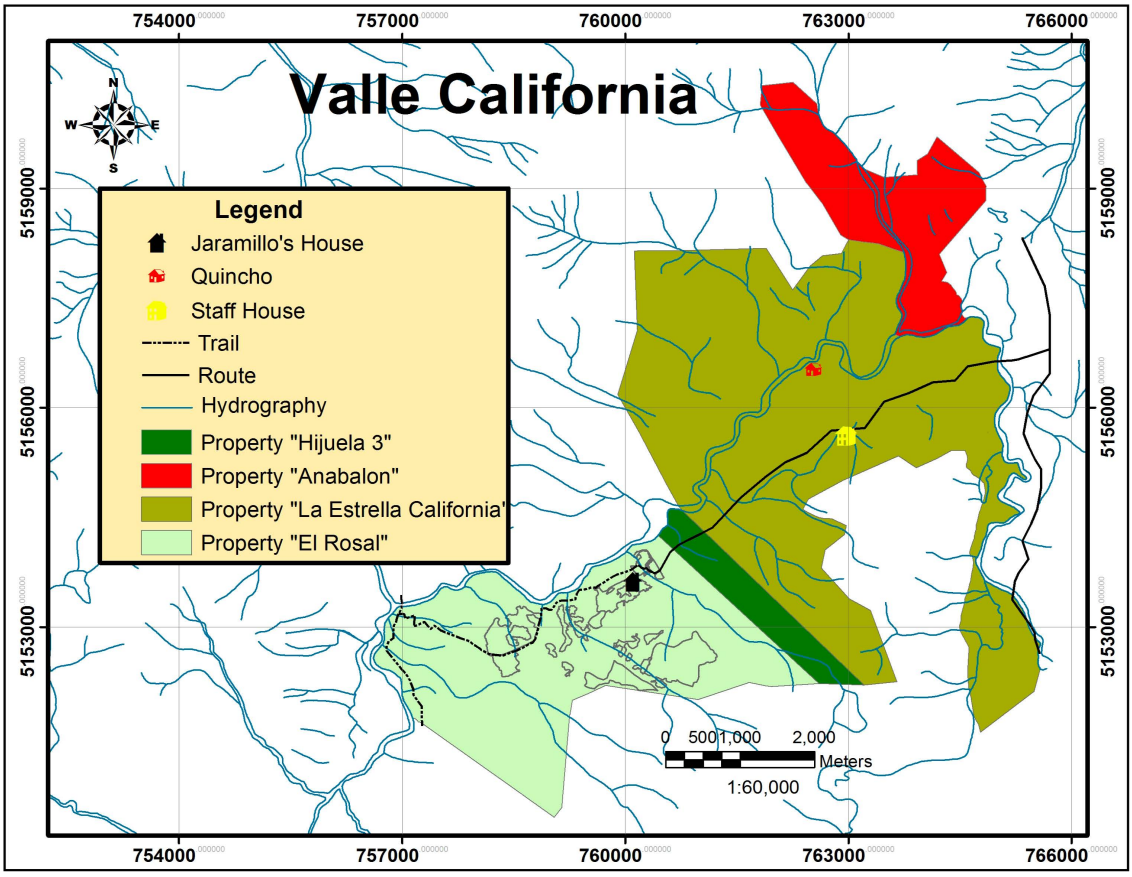
The initial project activity instance is comprised of 20 individual reforestation lots, VC_1 – VC_20, totalling 136.65 Ha. Each lot is described in the following table, and shown on the map below:

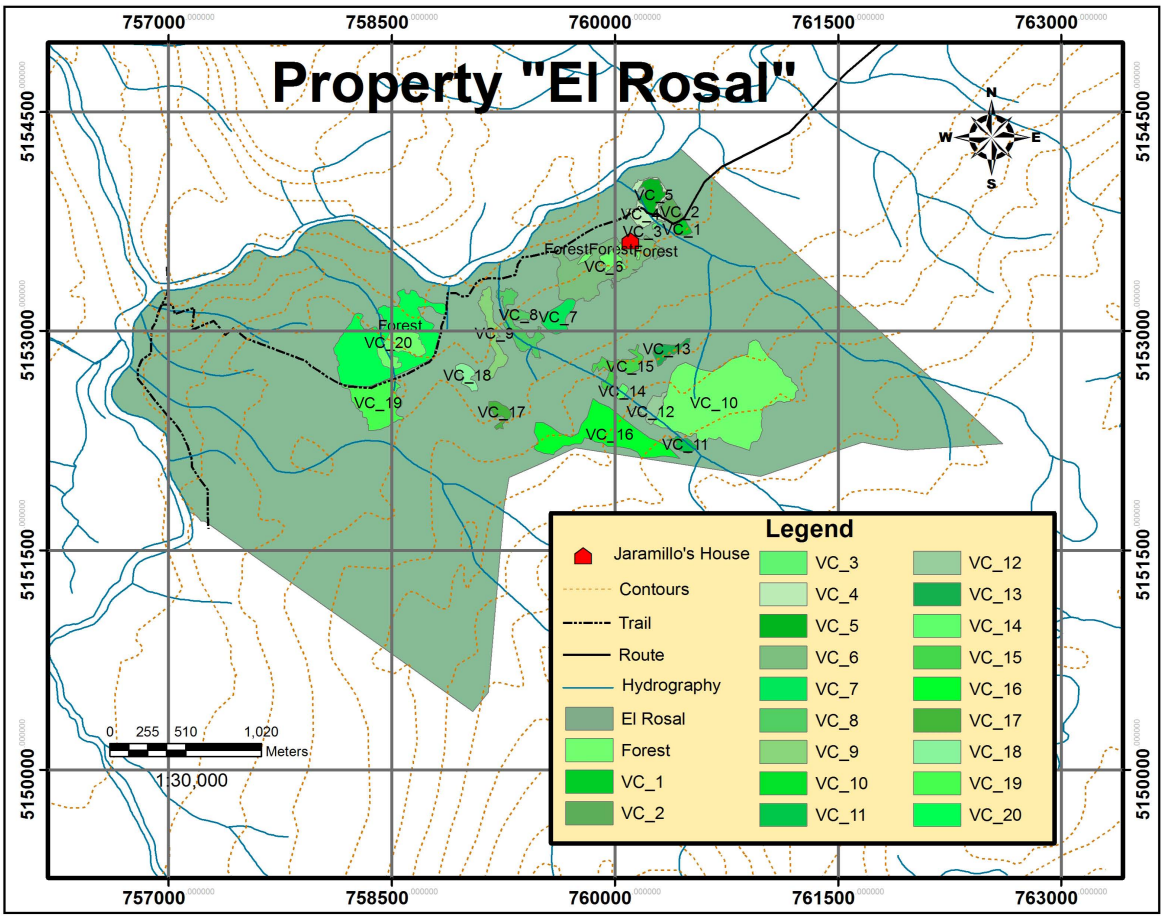
[3] AR-ACM0001, page 2/13: Afforestation and reforestation of degraded land

Valle California Reforestation Project					
Reforestation Lot*	**Forestation year**	**Density (trees/ha)**	**Species planted**	**No. of trees planted**	**Hectares****
VC_1	2010	1300	70% Coihue and 30% Ñirre	1196	0,92
VC_2	2010	1300	70% Coihue and 30% Ñirre	2028	1,56
VC_3	2010	1300	70% Coihue and 30% Ñirre	221	0,17
VC_4	2010	1300	70% Coihue and 30% Ñirre	3744	2,88
VC_5	2011	1700	100% Nirre	4607	2,71
VC_6	2010	1300	90% Coihue and 10% Ñirre	19513	15,01
VC_7	2010	1300	70% Coihue and 30% Ñirre	3900	3
VC_8	2010	1300	70% Coihue and 30% Ñirre	6526	5,02
VC_9	2010	1300	70% Coihue and 30% Ñirre	5473	4,21
VC_10	2011	1700	100% Lenga	72760	42,8
VC_11	2012	1700	100% Lenga	1938	1,14
VC_12	2012	1700	100% Lenga	3400	2
VC_13	2012	1700	100% Coihue	2924	1,72
VC_14	2012	1700	100% Coihue	901	0,53
VC_15	2012	1700	100% Coihue	5474	3,22
VC_16	2012	1700	100% Lenga	25330	14,9
VC_17	2012	1700	100% Coihue	2414	1,42
VC_18	2012	1700	100% Coihue	2533	1,49
VC_19	2011	1700	100% Ñirre	14042	8,26
VC_20	2010	1300	70% Coihue and 30% Ñirre	30797	23,69
			Total	209.721	136,65

* Initials in relation to the lots pictured in the image below.
**Hectares already planted and/or to be planted depending on the forestation year.

The abovementioned reforestation lots are in Valle California within the boundaries of the property El Rosal, which is detailed in Section 1.12.1 of the Project Description. Details of each property's land title can also be found in Section 1.12.1 of the Project Description. Valle California and El Rosal are shown on the map below. For a detailed map of each lot, and the boundaries of the entire Valle California property, please see the supporting KML file titled "Sec 2.3 Project Boundaries".


Valle California
N
W
E
S
Legend
Jaramillo's House
Quincho
Staff House
Trail
Route
Hydrography
Property "Hijuela 3"
Property "Anabalon"
Property "La Estrella California"
Property "El Rosal"
0 500 1,000 2,000
Meters
1:60,000
754000
757000
760000
763000
766000
5159000
5156000
5153000


Property "El Rosal"
757000
758500
760000
761500
763000
5154500
5153000
5151500
5150000
N
W
E
S
VC_5
VC_4
VC_2
VC_3
VC_1
ForestForestForest
VC_6
Forest
VC_20
VC_8
VC_7
VC_9
VC_13
VC_15
VC_18
VC_14
VC_19
VC_17
VC_12
VC_10
VC_16
VC_11
0 255 510 1,020
Meters
1:30,000
Legend
Jaramillo's House
Contours
Trail
Route
Hydrography
El Rosal
Forest
VC_1
VC_2
VC_3
VC_4
VC_5
VC_6
VC_7
VC_8
VC_9
VC_10
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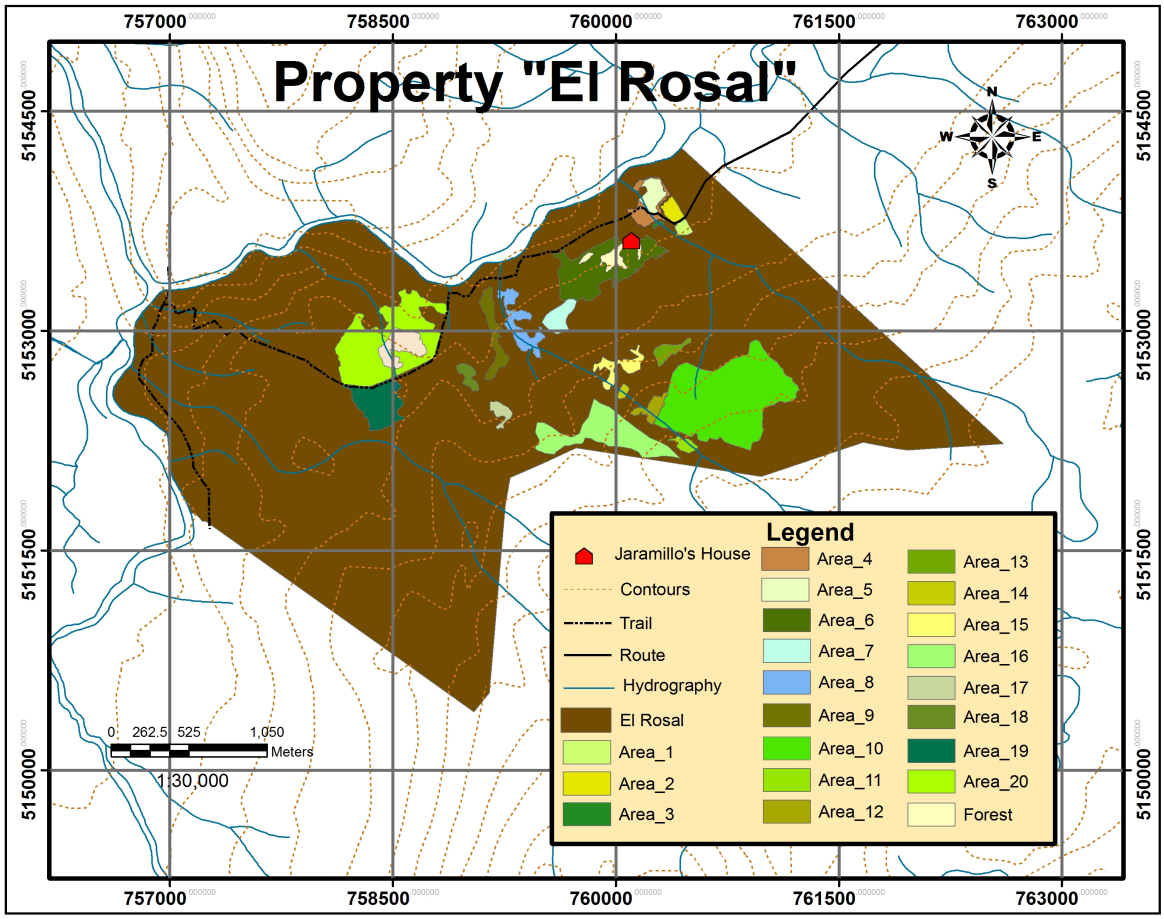
VC_12
VC_13
VC_14
VC_15
VC_16
VC_17
VC_18
VC_19
VC_20



SNP Patagonia Sur has applied the required "Procedures to demonstrate the eligibility of land for afforestation and reforestation CDM project activities" in the supporting document titled " Sec 2.3 Procedures to demonstrate eligibility".

The project follows the provisions of the baseline methodology selected to monitor the changes in the carbon biomass stocks above and below ground. Carbon stock changes in deadwood, litter and soil pools are not monitored, as the guidance provided by AR-ACM0001 V5.2 allows for these to be conservatively estimated to be zero. As mentioned in Section 4 of this Project Document, there will not be any kind of site preparation during this project, not even fertilization, therefore, the planting and management does not lead to sources of GHG emissions by sources and sinks.

Source		Gas	Included ?	Justification/Explanation
Baseline	Source 1	CO_2	Excluded	Potential emissions are negligibly small as there is no burning of woody biomass.
		CH_4	Excluded	Potential emissions are negligibly small as there is no burning of woody biomass.
		N_2O	Excluded	Potential emissions are negligibly small as there is no burning of woody biomass.
		Other		

Source		Gas	Included ?	Justification/Explanation
Project	Source 1	CO_2	Excluded	Potential emissions are negligibly small due to the lack of site preparation and fertilization.
		CH_4	Excluded	Potential emissions are negligibly small due to the lack of site preparation and fertilization.
		N_2O	Excluded	Potential emissions are negligibly small due to the lack of site preparation and fertilization.
		Other		

Burning of Woody Biomass is not a part of the Project Proponent's preparation of the project area for planting of trees, and therefore is not significant, so the required "Tool for testing significance of GHG emissions in A/R CDM project activities" was not demonstrated.

2.4 Baseline Scenario

The baseline scenario for the project area is livestock grazing use. For justification, please see the supporting document titled "Sec 2.5 Additionality".

2.5 Additionality

The methodology requires the use of the "Combined tool to identify the baseline scenario and demonstrate additionality in A/R CDM project activities," and details of its use can be found in the supporting document titled "Section 2.5 Additionality."

The two credible land uses are livestock grazing and reforestation without VCS registration/carbon finance. Both of these land use scenarios are credible alternatives to the development of a VCS ARR project. Ultimately, reforestation without the implementation of a VCS ARR project is prevented due primarily to large financial barriers to independently reforesting the land. Even with the potential subsidy provided through Decree Law 701 (See Section 1.11 of the Project Description on the applicability of Decree Law 701), a reforestation project remains prohibitively expensive due to the long period of tree growth time before benefits can be realized. The Baseline Scenario, following the barrier analysis, is determined as livestock grazing.

Currently, the only other registered afforestation project in Chile is a small scale CDM project involving the plantation of non-native Pine trees in Region VI of Central Chile. Another potential, but yet unregistered project in Region X of Chile consists of planting 489.52 hectares of Ponderosa pine in a managed forest that is thinned in Year 20 and harvested in Year 40. As the project is a non-native, monoculture plantation, which is grown for the sake of timber, it is significantly different from that of Patagonia Sur's, maintaining the additionality of this reforestation project. Patagonia Sur's proposed VCS ARR project is unique in the reforestation of trees native to Chile.

Essential distinctions can be made between SNP Patagonia Sur's proposed ARR project and the projects mentioned above. Therefore, the proposed ARR project activity is not the baseline scenario, and it is additional.

2.6 Methodology Deviations

At this time there are no anticipated deviations from the methodology.

3 QUANTIFICATION OF GHG EMISSION REDUCTIONS AND REMOVALS

GHG Emission Reductions and Removals have been quantified in accordance with the AR-ACM0001 Baseline Methodology Procedure. The entirety of this section (3) of the Project Description is based on the AR-ACM0001 Baseline Methodology Procedure, as outlined in section II of the AR-ACM0001 Methodology. Patagonia Sur has demonstrated their compliance with this procedure in the supporting document titled, "Sec 3 Baseline Procedure Document". This supporting document's component steps (1-7, following the Baseline Methodology Procedure) have been added to the body of this section of the project description according to their specific applicability in quantifying Baseline Emissions(3.1), Project Emissions(3.2), Leakage(3.3), and Net GHG Emission Reductions or Removals(3.4).

Information regarding sampling design in relation to the Baseline Methodology Procedure can be found in Appendix A and Appendix B of the supporting document "Sec 3 Baseline Procedure Document".

Baseline Methodology Procedure (Following Section II of the AR-ACM0001 Methodology):

1. Project Boundary and Eligibility of Land
The project applies AR-ACM0001: Afforestation and reforestation of degraded land - Version 5.2 - in quantifying GHG Emission Reductions and Removals.

The discrete project boundary for the project area has been detailed in Section 2.3 of the Project Description. Its eligibility criteria as a project activity instance have been defined in Section 1.13 of the Project Description, and the applicability of the methodology has been demonstrated in Section 2.2 of the Project Description.

Patagonia Sur has applied the required "Procedures to demonstrate the eligibility of lands for afforestation and reforestation CDM project activities" to demonstrate that the discrete area of land included in the project boundary is eligible for an A/R CDM project activity. See supporting document titled, "Sec 2.2 Degradation".

Table 1: Carbon pools accounted for in the project boundary

Carbon Pools	Accounted For	Justification/Explanation
Above-ground Biomass	Yes	Major carbon pool subjected to project activity
Below-ground Biomass	Yes	Below-ground biomass stock is expected to increase due to the implementation of the A/R CDM project activity
Dead Wood	No	The dead wood carbon stocks in the baseline scenario can be expected to increase less relative to the project scenario, and therefore are conservatively omitted from carbon accounting.
Litter	No	The litter carbon stocks in the baseline scenario can be expected to increase less relative to the project scenario, and therefore are conservatively omitted from carbon accounting.
Soil organic carbon (SOC)	No	Soil Organic carbon stocks are likely to increase in the project compared to the baseline, and therefore are conservatively omitted from carbon accounting.

There is no burning of woody biomass that occurs in the baseline scenario or due to the project activity, thus this GHG emission source is conservatively assumed to be zero.

Table 2: Emission sources and GHGs included or excluded from accounting

Sources	Gas	Included/Excluded	Justification/Explanation
Burning of Woody Biomass	CO2	Excluded	No burning of woody biomass will occur, therefore this source of emissions is excluded.
	CH4	Excluded	
	N2O	Excluded	

2. Identification of the Baseline Scenario and Demonstration of Additionality
The baseline scenario of pastureland for grazing domestic animals had been established in the supporting document titled "Sec 2.5 Additionality" through use of the required "Combined tool to identify the baseline scenario and demonstrate additionality in A/R CDM project activities".

3. Stratification
For this initial project activity instance, the project area has not been stratified because it contains homogenous vegetation types with similar growth rates. There are no organic soils in the project area.

3.1 Baseline Emissions

Baseline Emissions have been estimated in accordance with the AR-ACM0001 Baseline Methodology Procedure, Sections II-4, II-4.1, and II-4.2. (In addition to this section of the Project Description, refer to supporting document, "Sec 3 Baseline Procedure Document").

4. Baseline net GHG Removals by Sinks
The procedure for quantifying baseline emissions or removals entailed sampling biomass within the project boundary to estimate total stocks and then estimating change over the crediting period following the procedure detailed in Section II-4 of AR-ACM0001 Version 5.2.

The baseline net GHG removals by sinks are equal to the sum of the changes in carbon stocks in the selected carbon pools within the project boundary that would have occurred in the absence of the A/R CDM project activity.

Under the applicability conditions of this methodology:

- Changes in carbon stock of above-ground and below-ground biomass of non-tree vegetation may be conservatively assumed to be zero for all strata in the baseline;
- It is expected that the baseline dead wood and litter carbon pools will not show a permanent net increase. It is therefore conservative to assume that the sum of the changes in the carbon stocks of dead wood and litter carbon pools is zero for all strata in the baseline scenario;
- Since carbon stock in SOC is unlikely to increase in the baseline, the change in carbon stock in SOC may be conservatively assumed to be zero for all strata in the baseline scenario.

The baseline net GHG removals by sinks will be determined as:

$$\Delta C_{BSL} = \sum_{t=1}^{t^*} \left(\Delta C_{TREE\_BSL,t} + \Delta C_{SHRUB\_BSL,t} \right) \quad (1)$$

where:

ΔC_{BSL}	Baseline net GHG removals by sinks; t CO_2-e
$\Delta C_{TREE\_BSL,t}$	Change in carbon stock in tree biomass in baseline within the project boundary in year *t*, as estimated in the tool "Estimation of carbon stocks and change in carbon stocks of trees and shrubs in A/R CDM project activities" (See Section 4.1 Carbon stock in living trees at the start of the project activity); t CO_2-e
t	*1, 2, 3, … t** years elapsed since the start of the A/R CDM project activity
$\Delta C_{SHRUB\_BSL,t}$	Change in carbon stock in shrub biomass in baseline within the project boundary in year *t*, as estimated in the tool "Estimation of carbon stocks and change in carbon stocks of trees and shrubs in A/R CDM project activities"; t CO_2-e (Under the applicability conditions of this methodology, changes in carbon stock of above-ground and below-ground biomass of shrub vegetation may be conservatively

Patagonia Sur contracted Instituto Forestal to calculate the baseline removals from trees and shrubs. INFOR collected data within 43 transects they randomly distributed throughout the property. Maps of the transects in relation to the project areas are attached in Appendix A.

Details of this sampling design can be found in Appendix A: Sampling Design.

The results of this analysis found no trees within the transects, and thus net removals from trees is zero. Shrub crown cover was less than 5% of the project area, thus the guidance allows this factor to be considered negligible. Patagonia Sur has chosen to proceed with estimating the removals from shrubs.

4.1 Carbon Stock in Living Trees at the Start of the Project Activity

Patagonia Sur studied the baseline carbon stocks of trees and shrubs; Patagonia Sur found sparse distribution of trees including the following species:
•*Nothofagus pumilio* (lenga)
•*Nothofagus antartica* (ñirre)

Using the tool, "Estimation of carbon stocks and change in carbon stocks of trees and shrubs in A/R CDM project activities", Patagonia Sur undertook to estimate baseline removals from trees and shrubs.

There were no trees discovered within the sampling transects delineated within the project area, and thus baseline removals from living trees is assumed to be negligible.

Baseline carbon stock in shrubs was also determined using the same tool. The baseline stock was determined to be 515.8 tonnes of CO_2-equivalent. Further details can be found in the supporting document "Sec 3 Tool to determine carbon stocks and changes in trees and shrubs." This low number again underscores the extent to which this landscape is deforested.

The exact data collected within the transects on both trees and shrubs can be found in the supplementary spread sheet titled "Section 3 Supporting Data".

.

Using Equation (2), Patagonia Sur assessed that the shrubs within the project boundaries have already reached steady state, as indicated by the growth of 0.01m per year.

$$\Delta C_{BSL} = 0 \quad \textbf{(2)}$$

where:

ΔC_{BSL}	Baseline net GHG removals by sinks; t CO_2-e

Patagonia Sur demonstrated the use of Equation 2, and its determination of when steady state would be reached in the supporting document titled, "Sec 3 Supporting Data".

3.2 Project Emissions

Project Emissions have been estimated in accordance with the AR-ACM0001 Baseline Methodology Procedure, Sections II-5, II-5.1, and II-5.2. (In addition to this section of the Project Description, refer to supporting document, "Sec 3 Baseline Procedure Document").

5. Actual net GHG removals by Sinks

The actual net GHG removals by sinks were calculated using Equation (3).

$$\Delta C_{ACTUAL} = \Delta C_P - GHG_E \quad \textbf{(3)}$$

where:

ΔC_{ACTUAL}	Actual net GHG removals by sinks; t CO_2-e
ΔC_P	Sum of the changes the carbon stock in the selected carbon pools within the project boundary; t CO_2-e
GHG_E	Increase in non-CO_2 GHG emissions within the project boundary as a result of the implementation of the A/R CDM project activity; t CO_2-e

Patagonia Sur has demonstrated the use of Equation 3, and its calculations of actual net GHG removals by sinks, in the supporting document titled "Sec 3 Supporting Data ".

ΔC_P	GHG_E	ΔC_{ACTUAL}
95,421	0	95,421

5.1 Estimation of Changes in the Carbon Stocks

The verifiable changes in the carbon stock in the selected carbon pools within the project boundary were estimated using Equation (4).

$$\Delta C_P = \sum_{t=1}^{t^*} \Delta C_t \quad \textbf{(4)}$$

where:

ΔC_P	Sum of the changes in carbon stock in all selected carbon pools in stratum *i,* since the start of the project; t CO_2-e
ΔC_t	Change in carbon stock in all selected carbon pools, in year *t*; t CO_2-e
t	*1, 2, 3, … t** years elapsed since the start of the A/R project activity; yr
44/12	Ratio of molecular weights of CO_2 and carbon; dimensionless

The change in carbon stock in all selected carbon pools was estimated using Equation (5).

$$\Delta C_t = \Delta C_{TREE\_PROJ,t} + \Delta C_{SHRUB\_PROJ,t} + \Delta C_{DW\_PROJ,t} + \Delta C_{LI\_PROJ,t} + \Delta C_{SOC\_AL,t} \quad \textbf{(5)}$$

where:

ΔC_t	Change in carbon stock in all selected carbon pools in the project scenario, in year *t*; t CO_2-e
$\Delta C_{TREE\_PROJ,t}$	Change in carbon stock in tree biomass in project, in year *t*, as estimated in the tool "Estimation of carbon stocks and change in carbon stocks of trees and shrubs in A/R CDM project activities"; t CO_2-e
$\Delta C_{SHRUB\_PROJ,t}$	Change in carbon stock in shrub biomass in project, in year *t*, as estimated in the tool "Estimation of carbon stocks and change in carbon stocks of trees and shrubs in A/R CDM project activities"; t CO_2-e (under the applicability conditions of the methodology changes in carbon stock of above-ground and below-ground biomass of shrubs may be conservatively assumed to be zero for all strata in the project scenario. However PPs may choose to account for it when carbon stock in shrub biomass in project is expected to increase, e.g. afforestation/reforestation using mixture of trees and shrubs)
$\Delta C_{DW\_PROJ,t}$	Change in carbon stock in dead wood biomass in project, in year *t*, as estimated in the tool "Estimation of carbon stocks and change in carbon stocks in dead wood and litter in A/R CDM project activities"; t CO_2-e
$\Delta C_{LI\_PROJ,t}$	Change in carbon stock in litter biomass in project, in year *t*, as estimated in the tool "Estimation of carbon stocks and change in carbon stocks in dead wood and litter in A/R CDM project activities"; t CO_2-e
$\Delta C_{SOC\_AL,t}$	Change in carbon stock in SOC in project, in year *t*, in areas of land meeting the applicability conditions of the tool "Tool for estimation of change in soil organic carbon stocks due to the implementation of A/R CDM project activities", as estimated in the same tool; t CO_2-e
t	*1, 2, 3, … t** years elapsed since the start of the A/R CDM project activity

Patagonia Sur has demonstrated the use of Equations 4 and 5, and their resulting calculations of the sum of the changes in carbon stock in all selected carbon pools in the supporting document titled "Sec 3 Supporting Data".

5.2 Estimation of GHG Emissions within the Project Boundary

The increase in GHG emissions as a result of the implementation for the proposed A/R CDM project activity within the project boundary was estimated by using Equation 6.

$$GHG_E = \sum_{t=1}^{t^*} GHG_{E,t} \quad \textbf{(6)}$$

where:

GHG_E	Increase in GHG emissions as a result of the implementation of the proposed A/R CDM project activity within the project boundary; t CO_2-e
$GHG_{E,t}$	Increase in non-CO_2 emissions due to burning of biomass of existing vegetation as part of site preparation in year *t*, as estimated in the tool "Estimation of non-CO_2 GHG emissions resulting from burning of biomass attributable to an A/R CDM project activity"; t CO_2-e
t	*1, 2, 3, … t** years elapsed since the start of the A/R CDM project activity

Patagonia Sur has demonstrated the use of Equation 6 and its resulting estimations of GHG Emissions within the project boundary in the supporting document titled "Section 3 Supporting Data". Patagonia Sur concluded that there is no increase in GHG emissions as a result of implementation of the proposed project activity.

3.3 Leakage

In accordance with the applicability conditions of the required tool: "Estimation of the increase in GHG emissions attributable to displacement of pre-project agricultural activities in A/R CDM project activity", SNP Patagonia Sur utilized the "Guidelines on conditions under which increase in GHG emissions related to displacement of pre-project grazing activities in A/R CDM project activity is insignificant" to demonstrate that leakage in the initial project activity instance is insignificant. For evidence of the use of this tool and its guidance, please see supporting document titled "Sec 1.13 Leakage Statement".

Due to this assessment of insignificance, Equation (7) of the Baseline Methodology Procedure was not used to calculate leakage (See supporting document titled "Sec 3 Baseline Procedure Document").

3.4 Summary of GHG Emission Reductions and Removals

Net GHG Emission Reductions and Removals have been estimated in accordance with the AR-ACM0001 Baseline Methodology Procedure, Sections II-7 and II-7.1. (In addition to this section of the Project Description, refer to supporting document, "Sec 3 Baseline Procedure Document").

7. Net Anthropogenic GHG Removals by Sinks

The net anthropogenic GHG removals by sinks is the actual net GHG removals by sinks minus the baseline net GHG removals by sinks minus leakage, therefore, the following general formula can be used to calculate the net anthropogenic GHG removals by sinks of an A/R CDM project activity $\left(C_{AR-CDM}\right)$, in t CO_2-e.

$$C_{AR-CDM} = \Delta C_{ACTUAL} - \Delta C_{BSL} - LK \quad \textbf{(7)}$$

where:

C_{AR-CDM}	Net anthropogenic GHG removals by sinks; t CO_2-e
ΔC_{ACTUAL}	Actual net GHG removals by sinks; t CO_2-e
ΔC_{BSL}	Baseline net GHG removals by sinks; t CO_2-e
LK	Total GHG emissions due to leakage; t CO_2-e

Patagonia Sur has demonstrated the use of Equation 8 and its resulting estimations of net anthropogenic GHG removals by sinks in the supporting document titled “Sec 3 Supporting Data”.

The results of this determine that Net GHG Emission Reductions or Removals are estimated at 94,905.33 t CO_2-e.

7.1 Calculation of tCERs and lCERs

Since this is a VCS project, this section was unnecessary as there was no calculation of temporary or long term CERs.

4 MONITORING

4.1 Data and Parameters Available at Validation

Patagonia Sur followed the "Guideline on conservative choice and application of default data in estimation of the net anthropogenic GHG removals by sink", to results in conservative. To ensure the net anthropogenic GHG removals by sinks to be measured and monitored precisely, credibly, verifiably and transparently, a quality assurance and quality control (QA/QC) procedure will be implemented.

The plan that describes specific QA / QC procedures will be presented in the following:

a) Standard Operating Procedures (SOP) for data collection that will be established for all procedures such as: GIS analysis; field measurements; data entry; data documentation and data storage

b) Training courses will be held for all relevant personnel on all data collection and analysis procedures (to manage and calibrate the various measuring instruments (caliper, diametric tape, hypsometer, compass, GPS, etc).

c) Steps will be taken to control for errors in the sampling and data analysis to develop a credible plan for measuring and monitoring carbon stock and change in the project context. The same procedures shall be used during the project life to ensure continuity.

The data and parameters available at validation are provided below within the tables below.

Data Unit / Parameter:	Biomass expansion factor (BEF)
Data unit:	Dimensionless
Description:	Biomass expansion factor for conversion of stem biomass to above-ground biomass for tree species or group of species j.
Source of data:	Default
Value applied:	1.4
Justification of choice of data or description of measurement methods and procedures applied:	IPCC default value from Table 3A.1.10 of IPCC GPG-LULUCF (2003
Any comment:	

Data Unit / Parameter:	BDR_{sf}
Data unit:	Dimensionless
Description:	Ratio of biomass per unit area in land having a shrub crown of 1.0 and default above-ground biomass content in forest in the region /country where the A/R CDM project is located.
Source of data:	Default
Value applied:	0.1
Justification of choice of data or description of measurement methods and procedures applied:	Guidance: "A default value of 0.10 should be used unless transparent and verifiable information can be provided to justify a different value"
Any comment:	

Data Unit / Parameter:	B_{forest}
Data unit:	t.d.m./ha
Description:	Default above-ground biomass content in forest in the region/country where the A/R CDM project is located.
Source of data:	Default
Value applied:	268
Justification of choice of data or description of measurement methods and procedures applied:	IPCC default value from Table 3A.1.4 of IPCC GPG-LULUCF (2003)
Any comment:	

Data Unit / Parameter:	DB_{Forest}
Data unit:	t.d.m./ha /yr
Description:	Default average annual increment in above-ground biomass in forest in the region/country where the A/R CDM project is located
Source of data:	Default
Value applied:	4.0
Justification of choice of data or description of measurement methods and procedures applied:	IPCC default value from Table 3A.1.5 of IPCC GPG-LULUCF (2003
Any comment:	

Data Unit / Parameter:	Dj
Data unit:	t d. m./m3
Description:	Basic wood density for nothofagus antarctica
Source of data:	Default
Value applied:	0.66
Justification of choice of data or description of measurement methods and procedures applied:	http://www.inti.gov.ar/maderaymuebles/pdf/densidad_cientifico.pdf
Any comment:	

Data Unit / Parameter:	Dj
Data unit:	t d. m./m3
Description:	Basic wood density for nothofagus pumilio
Source of data:	Default
Value applied:	0.58

Justification of choice of data or description of measurement methods and procedures applied:	http://www.inti.gov.ar/maderaymuebles/pdf/densidad_cientifico.pdf
Any comment:	

Data Unit / Parameter:	Dj
Data unit:	t d. m./m3
Description:	Basic wood density for nothofagus betuloides
Source of data:	Default
Value applied:	0.55
Justification of choice of data or description of measurement methods and procedures applied:	http://www.inti.gov.ar/maderaymuebles/pdf/densidad_cientifico.pdf
Any comment:	

Data Unit / Parameter:	R_j
Data unit:	Dimensionless
Description:	Root-shoot ratio for species or Group of species j
Source of data:	Estimated
Value applied:	*0.29* *Exp(-1.085+0.09256*ln(B.Aerea))*
Justification of choice of data or description of measurement methods and procedures applied:	IPCC 2003, Estimated using Bastienne Shlegel Heldt (2000)
Any comment:	

Data Unit / Parameter:	R_s
Data unit:	Dimensionless
Description:	Root-shoot ratio for shrubs.
Source of data:	Estimated
Value applied:	0.4
Justification of choice of data or description of measurement methods and procedures applied:	Table 4.4 of 2006 IPCC Guidelines for National Greenhouse Gas Inventories
Any comment:	

Data Unit / Parameter:	F_j(DBH, H)
Data unit:	kg./tree
Description:	Allometric function for *Nothofagus pumilio* linking a tree diameter (DBH), and possibly tree height (H), to above-ground biomass of living trees.
Source of data:	Estimated
Value applied:	Relevant equation can be found in *Promis, A* (2011)

Justification of choice of data or description of measurement methods and procedures applied:	*Promis, A.; Caldentey, J and Díaz, M ., 2011*
Any comment:	

Data Unit / Parameter:	F_j(DBH, H)
Data unit:	kg./tree
Description:	Allometric function for Nothofagus antarctica linking a tree diameter (DBH),, and possibly tree height (H), to above-ground biomass of living trees.
Source of data:	Estimated
Value applied:	Relevant equation can be found in *Promis, A* (2011)
Justification of choice of data or description of measurement methods and procedures applied:	*Promis, A.; Caldentey, J and Díaz, M ., 2011*
Any comment:	

Data Unit / Parameter:	F_j(DBH, H)
Data unit:	kg./tree
Description:	Allometric function for Nothofagus betuloides linking a tree diameter (DBH),, and possibly tree height (H), to above-ground biomass of living trees.
Source of data:	Estimated
Value applied:	Relevant equation can be found in *Promis, A* (2011)
Justification of choice of data or description of measurement methods and procedures applied:	*Promis, A.; Caldentey, J and Díaz, M ., 2011*
Any comment:	

Patagonia Sur has the only known scientific study of the growth and carbon sequestration of the three species of Beech tree mentioned until now. This study done by Dr. Alvaro Promis was based on Diameter at Breast Height (DBH). The growth curve derived suggests that our plantation will achieve the standard Breast Height of 1.3 meters between five to six years from planting. Therefore, Patagonia Sur is monitoring Diameter at Root Collar (DRC) until that time. In the absence of the relevant equation using DRC, we are replacing DRC for DBH until the plants grow to breast height, and using it in combination with the factor Height to improve the accuracy of the calculation. Patagonia will claim Verified Carbon units after the trees have reached standard Breast Height.

Data Unit / Parameter:	$V_{tree,j}$
Data unit:	m3/ha
Description:	Stem volume of trees of species or group of species j for trees of given age/diameter/height
Source of data:	Estimated
Value applied:	160

Justification of choice of data or description of measurement methods and procedures applied:	IPCC default value from Table 3A.1.4 of IPCC GPG-LULUCF (2003)
Any comment:	

4.2 Data and Parameters Monitored

Data Unit / Parameter:	A_i
Data unit:	ha
Description:	(a) Area of tree biomass stratum i; (b) Area of SOC stratum i of the land meeting the applicability conditions of the SOC tool
Source of data:	Measured
Description of measurement methods and procedures applied:	Measuring geographical position using GPS (latitude and longitude of each polygon sites).
Frequency of monitoring/recording:	Before the start of the project and adjusted thereafter every 5 years.
Value applied:	136,65
Monitoring equipment:	GPS Unit
QA/QC procedures to be applied:	Annual review and new personnel will be trained in data collection. . The GPS was properly calibrated.
Calculation method:	
Any comment:	

Data Unit / Parameter:	$A_{shrub,\ i}$
Data unit:	ha
Description:	Area of shrub crown cover stratum i
Source of data:	Measured
Description of measurement methods and procedures applied:	Measuring using GPS
Frequency of monitoring/recording:	Before the start of the project and adjusted every 5 years
Value applied:	31,97
Monitoring equipment:	GPS
QA/QC procedures to be applied:	Annual review and new personnel will be trained in data collection. The GPS was properly calibrated.
Calculation method:	
Any comment:	

Data Unit / Parameter:	$A_{p,i}$
Data unit:	ha

Description:	Total area of sample plots in tree biomass stratum i
Source of data:	Measured
Description of measurement methods and procedures applied:	Measured using the GPS coordinates
Frequency of monitoring/recording:	Before verification and every 5 years.
Value applied:	1,56
Monitoring equipment:	GPS
QA/QC procedures to be applied:	Training new personal for the data collection. The GPS was properly calibrated.
Calculation method:	39 Parcels * 400 meters per parcel = 15,600 m2 15,600 m2 / 10,000 m2/ha = 1.56
Any comment:	A description of the calculation for Number of Parcels is described in Section 4.3.

Data Unit / Parameter:	$CC_{shrub, i}$
Data unit:	Dimensionless
Description:	Crown cover of shrubs in lands within the project boundary, in shrubs stratum i, expressed as a fraction
Source of data:	Calculated
Description of measurement methods and procedures applied:	In each parcel, the crown length was measured from North - south and East - West for every shrub. With this data, we obtained the total coverage area of shrubs.
Frequency of monitoring/recording:	Before the start of the project and every 5 years
Value applied:	23,4
Monitoring equipment:	Calipers
QA/QC procedures to be applied:	Training new personnel for the data collection. The GPS was properly calibrated.
Calculation method:	(Pi*((crown length N-S)/2)*((crown length E-W)/2))/ total project area
Any comment:	

Data Unit / Parameter:	$CC_{tree\_BSL, i}$
Data unit:	Dimensionless
Description:	Crown cover of tree in the baseline, in baseline stratum i, expressed as a fraction
Source of data:	Calculated
Description of measurement methods and procedures applied:	No trees between the project boundaries exist in the baseline so this measurement does not apply.
Frequency of monitoring/recording:	
Value applied:	
Monitoring equipment:	Data collected on standard paper forms in the field, then stored in digital format.

QA/QC procedures to be applied:	
Calculation method:	
Any comment:	

Data Unit / Parameter:	DBH/DRC
Data unit:	cm
Description:	Tree diameter – Diameter at Breast Height/ Diameter at Root Collar
Source of data:	Measured
Description of measurement methods and procedures applied:	In order to appropriately measure DRC, a metal caliper was used, which is placed over the collar of the plant and then it measures. These measures are recorded on a standard form.
Frequency of monitoring/recording:	Once per year.
Value applied:	n/a
Monitoring equipment:	Metal Calipers
QA/QC procedures to be applied:	Forestry Engineer will check data collected by seasonal employees for each permanent sample plot.
Calculation method:	N/a
Any comment:	This measurement is referred to as DRC until the trees reach breast height. As there were no found within the baseline study, this only applies to trees planted through project activities.

Data Unit / Parameter:	H
Data unit:	cm
Description:	Tree height
Source of data:	Measured
Description of measurement methods and procedures applied:	The height of the trees will be measured by using a one meter folding ruler.
Frequency of monitoring/recording:	Once per year.
Value applied:	n/a
Monitoring equipment:	Folding Ruler.
QA/QC procedures to be applied:	Forestry Engineer will check data collected by seasonal employees for each permanent sample plot.
Calculation method:	
Any comment:	

Data Unit / Parameter:	Stems
Data unit:	cm
Description:	Number and average of height stems.

Source of data:	Measured
Description of measurement methods and procedures applied:	One meter folding ruler is used for measuring the average of height stems.
Frequency of monitoring/recording:	Once per year.
Value applied:	N/a
Monitoring equipment:	One meter folding ruler.
QA/QC procedures to be applied:	Forestry Engineer will check data collected by seasonal employees for each permanent sample plot.
Calculation method:	
Any comment:	

Data Unit / Parameter:	Age of plantation
Data unit:	Year
Description:	Year since the plantation has been established
Source of data:	Measured
Description of measurement methods and procedures applied:	Data collected on standard paper forms in the field, then stored in digital format.
Frequency of monitoring/recording:	Each year if replanting occurs
Value applied:	N/A
Monitoring equipment:	
QA/QC procedures to be applied:	
Calculation method:	
Any comment:	

Data Unit / Parameter:	Number of trees in a plot
Data unit:	number
Description:	Number of trees inside the monitoring plot.
Source of data:	Measured
Description of measurement methods and procedures applied:	Data collected on standard paper forms in the field, then stored in digital format.

Frequency of monitoring/recording:	Once a year
Value applied:	N/A
Monitoring equipment:	
QA/QC procedures to be applied:	Forestry Engineer will check data collected by seasonal employees for each permanent sample plot.
Calculation method:	
Any comment:	

Data Unit / Parameter:	Damage
Data unit:	cm
Description:	Type of animal that is likely cause of damage and height of damage.
Source of data:	Measured
Description of measurement methods and procedures applied:	Register in paper forms.
Frequency of monitoring/recording:	Once a year
Value applied:	
Monitoring equipment:	Data collected on standard paper forms in the field, then stored in digital format.
QA/QC procedures to be applied:	Forestry Engineer will check data collected by seasonal employees for each permanent sample plot.
Calculation method:	
Any comment:	

Data Unit / Parameter:	Survival rate
Data unit:	dimensionless
Description:	Percentage of surviving trees in the field
Source of data:	Measured
Description of measurement methods and procedures applied:	Data collected on standard paper forms in the field, then stored in digital format.
Frequency of monitoring/recording:	Once per year
Value applied:	n/a
Monitoring equipment:	n/a
QA/QC procedures to be applied:	Forestry Engineer will check data collected by seasonal employees for each permanent sample plot.

Calculation method:	Percentage of surviving trees / Total number planted
Any comment:	

4.3 Description of the Monitoring Plan

The organizational structure, responsibilities, and competencies are described in the Section titled "1.3 GHG Information Management System".

Monitoring Plan

It is worth noting that the monitoring plan described below was applied to plantations in 2010. These plantations correspond to afforestations with *Nothofagus betuloides* (Coihue) and *Nothofagus Antarctica* (Ñirre) species. The forested surface in the first stage (2010) accounts for 56.46 ha.

Objectives:

In order to set an appropriate follow-up for the plantations established in Valle California, it was decided that permanent monitoring plots would be built, where the state of the plants, plant engraftment and growth will be assessed, in addition to the potential damage caused by the wildlife of the area.

Material used:

For locating plots, a GPS, Google Earth and ArcGIS was used.

For marking plots, 1.3 m tables were used.

For measuring, a 1 m folding ruler and 1 metal caliper (inch-metric) were used.

For plant marking within plots, 40 cm long PVC rods will be used.

Each PVC rod has a metal label with a unique number for each tree monitored.

Methodology:

In order to determine plots design, the plantation method implemented in 2010 was utilized. This method involved dividing an squared surface of 100 m² through its diagonals and planting 3 individuals by segment (triangles), in addition to one in the center of the area (see Figure 4). With this observation, a size of 400 m² by permanent plot was decided, as a result of the unification of these four surfaces described.

Number of Sample plots:

Patagonia Sur applied the following formula to assess the number of plots necessary:

$$n \cong \frac{t^2 * s\%^2}{E_{\max}\%^2}$$

where n = number of plots, t is a statistical value = 1.8331, s = standard deviation of plot size, and Emax = is a statistical value calculated at the 95% confidence interval. Usage of this formula yielded the recommendation of establishing 39 sample plots or permanent parcels.

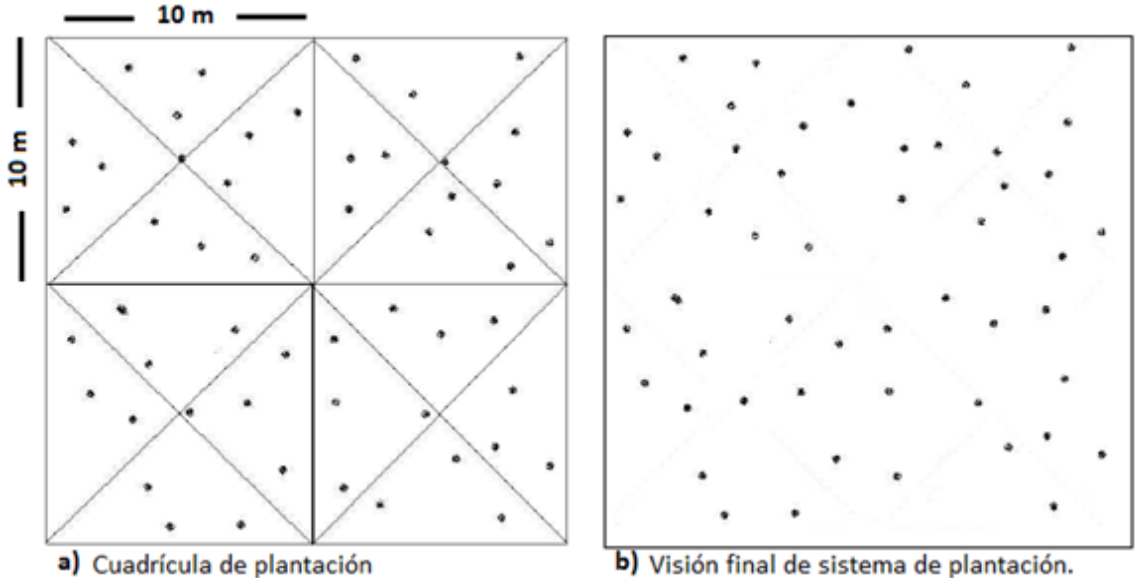


Figure 4: Method for the design of a single plot

For marking plots, the field was walked over by locating geographic spots that will represent different plantation situations. These same spots were then staked as the centers of each plot, as well as its corners.

Once the area is delimited, the next step was to look for all plants within the boundaries of the plot, which, according to the plantation system employed, should have been 52 in each limit. After marking plants, every one with their respective stake--brown colored in the case of the Coigüe de Magallanes and orange in the case of Ñirres--the next step was to number and measure each single individual.

Engraftment Assessment:

The first step in making an appropriate Engraftment Assessment will be to find all plants located in our sampling plots. This would require the help of a third party.

The system is very simple. A search operation is made, which includes a short walk covering the whole surface of the plot, the executor performs this operation following a north-south direction, while the assistant follows it on the opposite direction. This way, we make sure that all the plants in the plots are found and sampled. Each plant will be marked with a PVC rod, which will be marked brown for Coihues, and orange in the case of Ñirres.

Growth Assessment:

In order to assess the growth of plantations, the following variables were measured:

- Diameter at Root Collar (DRC)
- Height (plants height)
- Height increase

a) Diameter at Root Collar (DRC)

In order to appropriately measure DRC, a metal caliper was used, which is placed over the collar of the plant and then it measures. These measures are recorded in a form.

b) Tree Height

The height of plants was measured by using a 1m folding ruler.

c) Height increase

Height Increase was measured using a folding ruler. In some species, height increase is relatively easy to determine by observing the trunk and the markings left by the buds during the last growth.

Registering the increase in height has two objectives. First, to estimate how much the individuals have grown since they were planted up to the sampling date, so that their response to the different situations can be evaluated. Second, to estimate the size of the subjects at the time of refilling.

Analysis of Animal Damage:

In the premises, the roads were fenced to prevent the entrance of cattle in the planting area, thus making plants considerably less vulnerable to this kind to attack.

The wildlife in Valle California includes birds, some frogs, insects, mice and hares, where these last two are the main cause of damage to planting. However, there is a considerable population of mice that could possibly affect our plantation.

Figure 5: Damage caused by mice

The manner of measuring damage is visual. Due to its larger teeth, hares usually cut the entire plant, affecting the core or the above-ground part, while mice primarily affect the plant bark (see Figure 5).

The damage caused by hares affects branches and the tips of plants, causing confusion when the result of the attack is similar to the natural pruning of branches (see Figure 6).

Figure 6: Damage caused by hares

State of the Plants:

The general state of the plants in terms of vigorous growth was measured based on the following criteria.

1. Dead: Plant evidently dead, with no flexibility to touch, causing branches to easily break. Typically, short in height and leafless.

2. Dry: It has brown leaves, no active sprouting, and in most cases, with no length increase in the planting site. Stems are still flexible. Under this circumstance, it was very difficult to determine its survival, so plants were considered dead in many cases, yet with the observation "?" to indicate that the individual can still recover.

3. Recovering Plants that lost their leaves due to the stress of refilling, but which still show signs of some new sprouts. In addition, it is observed in individuals that were attacked, thus losing its tips, at the same time new sprouts emerge on lateral branches or from its core.

4. Weak Plants with few leaves or little color.

5. Strong Individuals in good shape, with live green leaves, new sprouts that has increased its growth. For this category, the term "Firm" was also used.

6. Vigorous: Plants that have successfully settled and experienced a clear growth.

It should be noted that this classification was formulated on a personal basis. It does not rely on any scientific basis, so it tends to be subjective. Its sole purpose is to roughly promote the state of development of every individual in the plantation.

5 ENVIRONMENTAL IMPACT

Positive environmental impacts are integral to a native-species reforestation program, particularly as we are planting in an artisanal, randomized manner. In addition to the sequestration of carbon, the Reforestation and Biodiversity Project by Patagonia Sur creates myriad co-benefits.

As Patagonia Sur's efforts both reforest riparian areas and those near more mature secondary forested areas, the project will create and expand habitat for local biodiversity and improve the health of the Tigre River which flows within Valle California. The carbon offset project creates an alternative source of income derived from the land. As cattle are removed and the forest is re-established, habitat for the following key species is created:

- Puma (*Puma concolor*)
- Kodkod (*Oncifelis guigna*) - a type of leopard
- Huemul (*Hippocamelus bisulcus*) - a small deer
- Andean Condor (*Vultur grifus*)
- Magellanic Woodpecker (*Campephilus magellanicus*)
- Southern river otter (*Lontra provocax*)
- Rufous-legged Owl (*Strix rufipes)*
- Various species of Buzzard (*Buteo sp*)

Many of these species are considered vulnerable to extinction and are thus in critical need of conservation. For example, the Huemul are endemic to this region of Chile and highly sensitive to changes in their environment. Huemul have been marginalized due to habitat loss and competition from domesticated animals. The predatory species of Puma, Kodkod, Southern River Otter, Owls and Buzzards require large, connected habitats and are thus indicators of ecosystem health. The Reforestation and Biodiversity Project supports all of these species in expanding areas they can inhabit and by connecting forested islands.

Finally, CONAF characterized the soil within Valle California as degrading, and therefore recommended reforestation to stabilize the fragile and deteriorating soils. (See supporting document "Sec 1.11 Compliance with CONAF") As we are reforesting riparian areas of the Tigre River, we expect water quality within the river will improve.

As part of the by-laws of our *Servidumbre ecologica,* which is similar to a conservation easement, Patagonia Sur will monitor the environmental impact of its activities at regular intervals.

6 STAKEHOLDER COMMENTS

Representatives of the families (Arratia, Jaramillo, Monje, Lavoz, and Rosales) who are former owners of land that now belongs to Patagonia Sur, and owners of adjacent land, sent letters of support for the Reforestation and Biodiversity Project. Translations of these letters can be found in the supporting document titled "Sec 6 Comments from Stakeholders".

Don Ernesto Jaramillo is one of the former owners who sold to Patagonia Sur, and now lives with Mrs. Nilia Monje (also former owner) on a property north of Valle California, on the way to Palena.

The family of Juan Carlos Arratia (her mother is Sara Anabalón, former owner) has 1one property on the other side of the Tigre River and until recently owned a property adjacent to the north.

Lavoz Macarena (former owner), lived until recently on the farm which she sold to Patagonia Sur, and her husband works indirectly with us.

Rosales Alejo (former owner) currently works as a foreman in Valle California employed by Patagonia Sur.