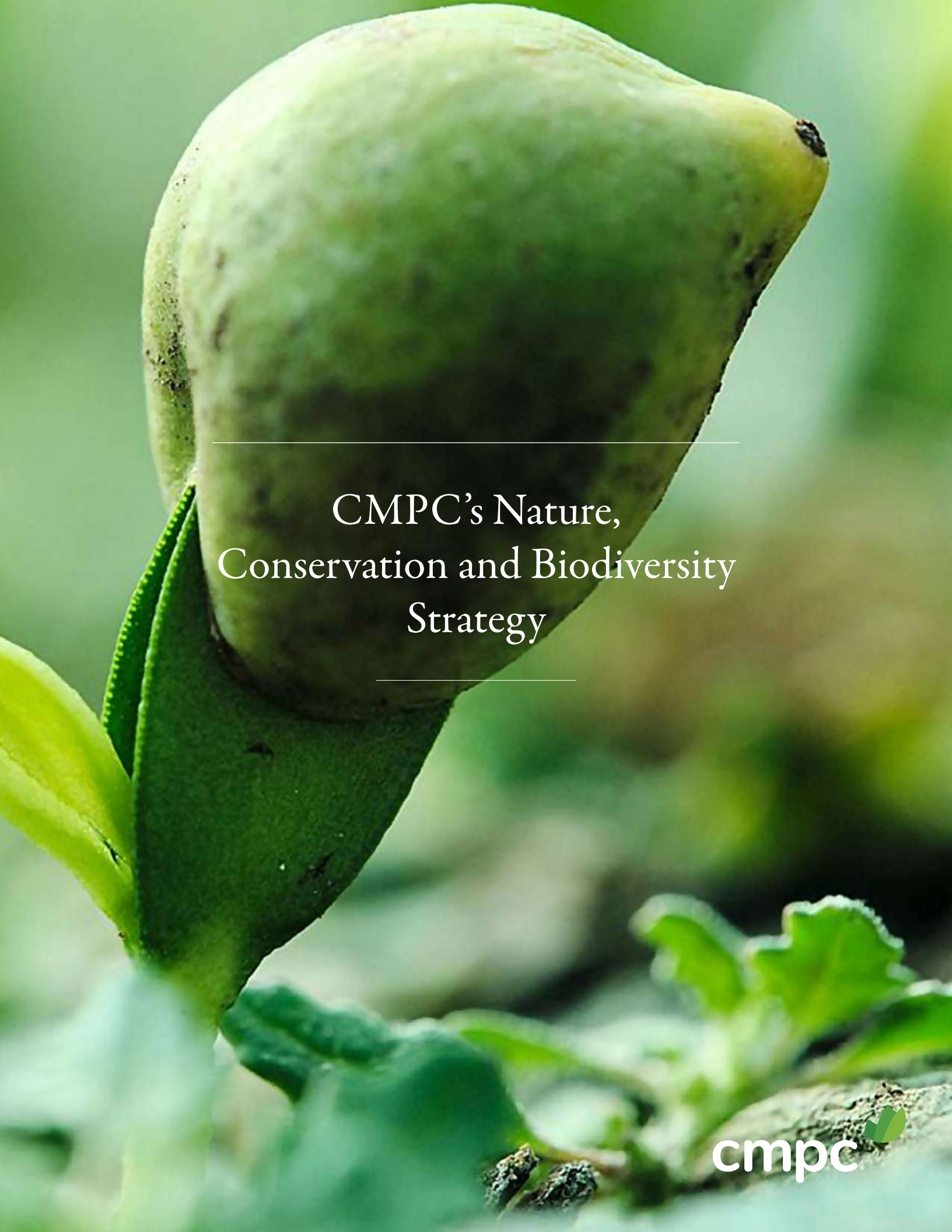

CMPC's Nature, Conservation and Biodiversity Strategy

Name: Empresas CMPC S.A. TIN: 90.222.000-3.
Head office: Agustinas 1343, Santiago, Chile.
Telephone number: +56 2 2441 2000.
Company website: www.cmpc.com

Developed by: CMPC Sustainability

Department Design: Javiera del Campo
CMPC Corporate Affairs Department

CMPC Nature, Conservation, and Biodiversity Strategy

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INTRODUCTION

Forests are the most biodiverse ecosystems[1] on the planet and provide many products that by humans need such as water, food, medicines and raw materials. They also offer multiple socio- economic functions and benefits, creating jobs and growth opportunities in rural areas, as well as recreation, which contributes to people's physical and mental health. They have accompanied humanity since its inception and are a fundamental part of its future by regulating the hydrological cycle, conserving the soil and capturing large amounts of carbon dioxide2, as just some of its main services.

However, worldwide forest ecosystems are threatened, mainly by deforestationand degradation estimated at 13 million hectares each year[3], severely affecting biodiversity and other ecosystems associated with those who share the landscape along with jeopardizing their ability to provide the aforementioned benefits. The most important cause is the change in land use over to agriculture, livestock, infrastructure, real estate expansion, and others.

CMPC's corporate purpose:

We create the natural fiber for a better future,

which is an inherent part of the current way of doing business, bringing a prosperous and sustainable future as a result.

For the Company, conserving and protecting the environment is vitally important, because we understand that CMPC's work and businesses depend on natural resources. The Company is fully aware of being global in nature, part of a new era that challenges businesses and citizens to update patterns of production, consumption and coexistence, moving from a linear economy to a circular one.

To seamlessly integrate and carry out this purpose, everyone at must CMPC guide their actions in a way that adheres to the four core values of the Company:

- **Respect**
- **Integrity**
- **Courage**
- **Collaboration**

[1] FAO and UNEP. (2020). *The State of the World's Forests 2020. Forests, biodiversity and people.* https://www.fao.org/documents/card/en/c/CA8642EN

[2] FAO. *(2016). Forestry for a low-carbon future.* https://www.fao.org/3/i5857e/I5857E.pdf

[3] FAO and UNEP. (2020). *The State of the World's Forests 2020. Forests, biodiversity and people.* https://www.fao.org/documents/card/en/c/CA8642EN

Since its inception in 1920, CMPC has been fundamentally linked to the utilization and transformation of renewable natural resources, but it is only 20 years on that it began cultivating its properties with radiata pine forestry operations in the vicinity of Concepción (Chile).

Towards the end of the 80s, CMPC began a pioneering plantation project in the region of Aysén (Chile), planting mainly ponderosa pine in places that had been devastated by the fires of the 1930s that destroyed nearly 3 million hectares of natural forest, severely eroding its soils.

The role of plantations in erosion control and its impact on greenhouse gas mitigation were understood early on with the launch of the Company's first Environmental Policy in 1991.

In 1993, the Company's first Forestry Project outside of Chile was developed with the establishment of Pinus taeda and Pinus elliottii plantations in the province of Corrientes and Misiones in northeast Argentina.

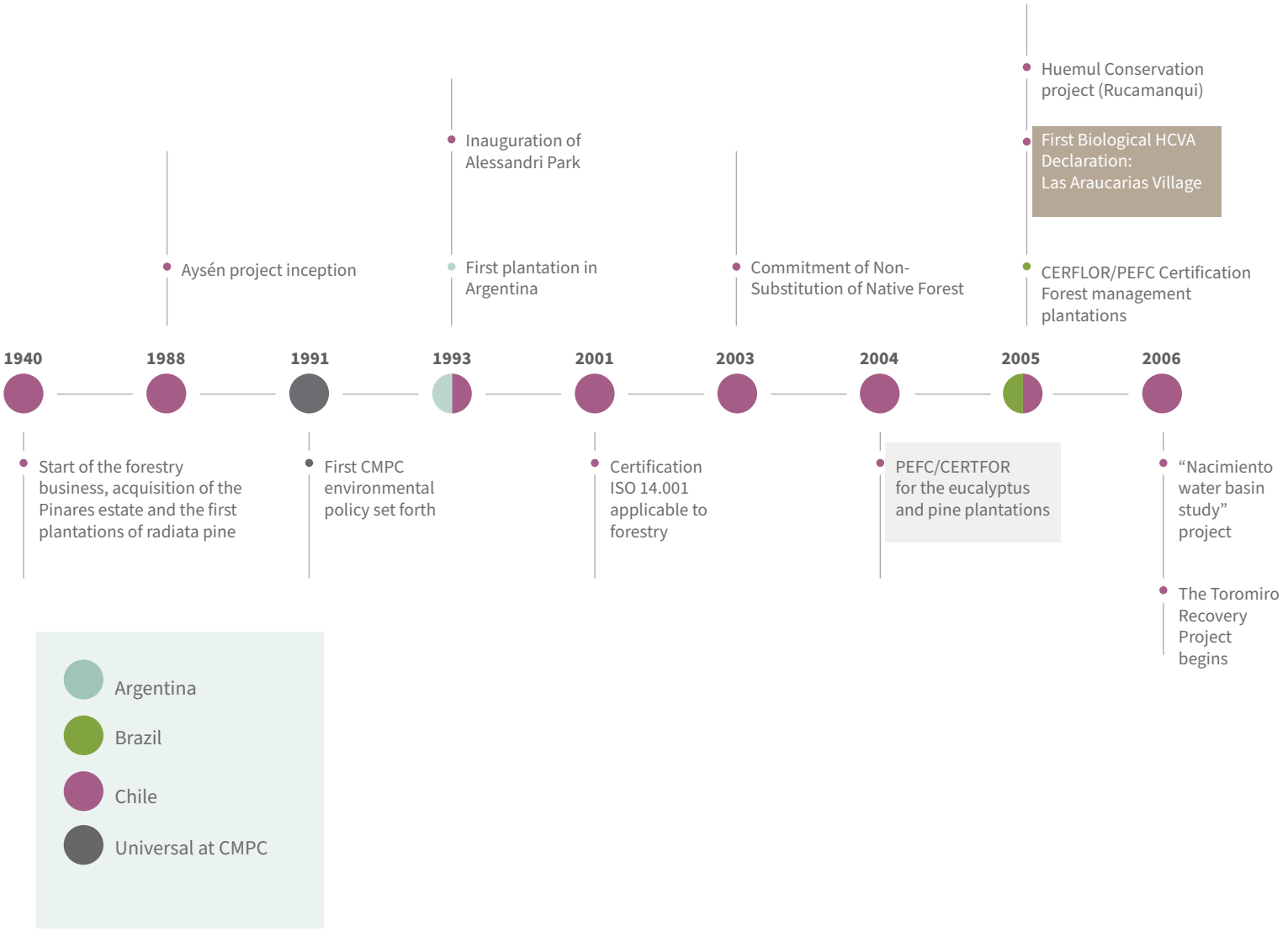
The goals associated with caring for the areas under conservation and protection were clearly taken on with the adoption of ISO 14.001 certification in 2001 by the forest department of CMPC in Chile (Forestal Mininco). This is reflected in its Environmental Policy of 2002, which incorporated the concept of Sustainable Development based on economically successful, socially beneficial and environmentally responsible management. Also, in 2003 the Commitment of Non-Substitution of Native Forest was signed. Then in 2005, with the implementation of the first forest management certification, specific guidelines for conservation areas were defined and systematized and priority areas, called High Conservation Value Areas (HCVA) were established.

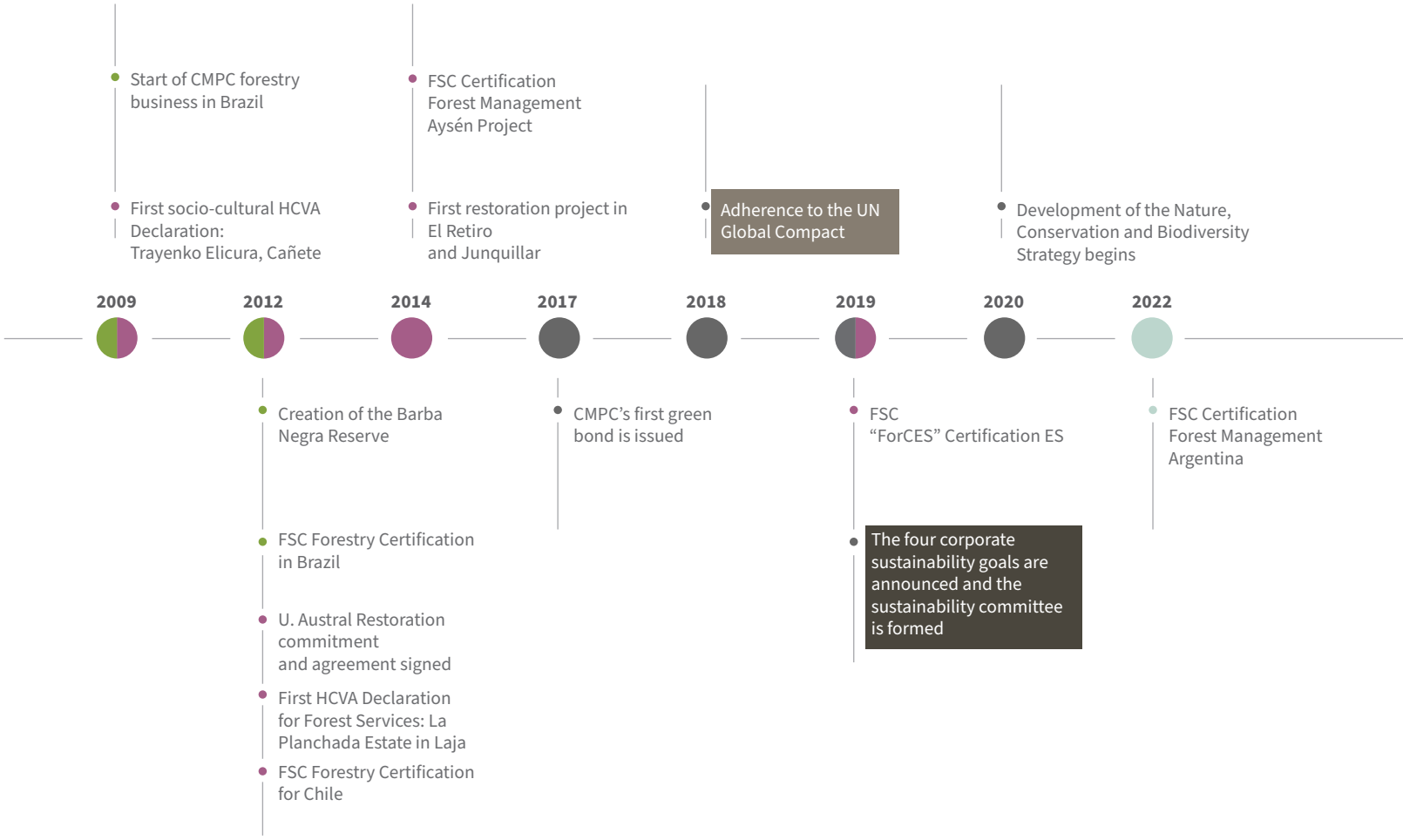
In 2009, the Company began its forestry activities in the state of Rio Grande do Sul (Brazil), with plantations mainly of *Eucalyptus saligna*. The project had already been certified as under forest management since 2005 with the Program for the Endorsement of Forest Certification (PEFC / CERFLOR). In 2012 it is then certified with the Forest Stewardship Council (FSC), just like CMPC's forest assets in Chile. This process would conclude with the certification of the same standard for CMPC's forests in Argentina (Bosques del Plata), thus totaling 99% of its own assets under sustainable forest management certification standards by 2022.

In Chile, along with the FSC certification of 2012, the Voluntary Restoration Commitment was established. To do so, initially the area of native forest that had been replaced by plantations as of 1994 between the seventh and tenth regions was studied to ascertain its reach. This work, commissioned by CMPC, was validated by the Geomatics Laboratory of the Universidad Austral, yielding the conversion result of 8,738 ha. As of last year (2022), the restoration's progress stood at 3,331 hectares. The same work plan was subsequently executed for properties in the Aysén region, resulting in an additional commitment of 1,131 hectares, of which, 54 hectares have been restored so far.

Currently, CMPC manages a total property of 1.3 million hectares in Argentina, Brazil and Chile, with the main goal of supplying its industrial plants, of which 770 thousand hectares are productive plantations and 390 thousand hectares are conservation and protection areas. Until now, the goal for the plantations' total area had been clearly defined as the extraction of raw material for manufacturing wood products, cellulose, packaging products, papers, tissue and personal care products.

Chronology of notable elements associated with Nature, Conservation and Biodiversity at CMPC




2009
Start of CMPC forestry business in Brazil
First socio-cultural HCVA Declaration: Trayenko Elicura, Cañete
2012
Creation of the Barba Negra Reserve
FSC Forestry Certification in Brazil
U. Austral Restoration commitment and agreement signed
First HCVA Declaration for Forest Services: La Planchada Estate in Laja
FSC Forestry Certification for Chile
2014
FSC Certification Forest Management Aysén Project
First restoration project in El Retiro and Junquillar
2017
CMPC's first green bond is issued
2018
Adherence to the UN Global Compact
2019
FSC "ForCES" Certification ES
The four corporate sustainability goals are announced and the sustainability committee is formed
2020
Development of the Nature, Conservation and Biodiversity Strategy begins
2022
FSC Certification Forest Management Argentina

Timeline highlights

Forest Assets and Sustainable Forest Management Certificates (2004 -)

Aware of the growing market demand for renewable products sourced from sustainably managed forests that treat their communities and direct or indirect employees fairly, CMPC began the first certification process of its forests in 2004. The properties were first certified with CERTFOR/PEFC in Chile, and then in Brazil the following year. The forests in Brazil and Chile were FSC certified in 2012, making further advances in the process by incorporating the land in Argentina in early 2022. This means that 99% of CMPC's forest assets are part of one of the aforementioned systems. Compliance is accredited annually with the principles and criteria of the Forest Management and Chain of Custody standards, systematizing ecosystem conservation measures, and monitoring the ecosystem services and its sociocultural attributes.

High Conservation Value Areas (2005 -)

These are defined as physical areas and spaces that have and/or are needed for the existence and maintenance of the identified High Conservation Values that are significant and recognized as unique or exceptional compared to other areas in the same region, either due to their size, number, frequency, quality, density or socio-economic importance. In 2005, the Company's first biological HCVA was created, namely the Villa Las Araucarias (Chile) in the vicinity of Carahue, with the southernmost population of araucaria trees (Araucaria araucana) of the Nahuelbuta Range. Today CMPC has 470 HCVAs totaling 28,010 hectares in Argentina, Brazil and Chile. Of these, 40 are biological with a surface area of 24,711 hectares, protecting such iconic species of flora like the ruil, hualo, pitao and adesmia (Adesmia bijuga), and fauna like the huemul and huillín in Chile, the red-spectacled parrot (Amazona pretrei) in Brazil and the yellow thrush in Argentina.

Adherence to the UN Global Compact (2018)

On February 1, 2018, in a letter written by the then CEO of CMPC, Hernán Rodríguez addressed the Secretary General of the UN, António Guterres, communicating the decision to sign on and support the fulfillment of the 10 principles of the Global Compact covering human rights, labor relations, the environment and the fight against corruption. It has also committed to contributing to the Sustainable Development Goals (SDGs), reporting annually on progress and achievements in these areas, concentrating the information in the Company's Annual Integrated Reports.

Corporate Sustainability Goals (2019)

In New York, on September 23, 2019, within the framework of the United Nations Forum on Climate Action, the current CMPC CEO Francisco Ruiz-Tagle announced the establishment of environmental sustainability goals for the Company focused on:

- Reducing absolute greenhouse gas emissions (direct and indirect) by 50% by 2030
- Reducing industrial water use per produced ton by 25% by 2025
- Becoming a zero industrial waste to landfill by 2025
- Adding 100,000 hectares to conservation

All these commitments were made with 2018 as their baseline.

OBJECTIVES

This Strategy is based on a vision of the future for nature, conservation and biodiversity, wherein the Company seeks **to be a benchmark in guaranteeing the protection and conservation of its heritage and biodiversity, incorporating measures that generate a positive impact on nature, thus benefiting future generations.**

CMPC seeks to establish a conservation strategy focused on the sustainable management of biodiversity, ecosystem services and the solutions provided by nature and its role in mitigating climate change, caring for the environment and contributing to its stakeholders in line with the Company's values.

CMPC's Nature, Conservation and Biodiversity Strategy aims to value its conservation and protection areas, identify and highlight their importance for the sustainability of forest operations, and demonstrate the virtuous relationship between the productive activities that take place on plantations and in conservation areas.

As explained in the vision, the strategy addresses two perspectives that aim toward sustainable management:

- Enhance the essential role of the areas under conservation, promoting the recovery of biodiversity within and beyond CMPC's properties.
- Minimize the impacts that CMPC exerts on ecosystems, as a consequence of its operations, preventing their degradation and fomenting the services they provide to society.

The Strategy is based on four pillars. The first three have the purpose of promoting human well-being starting from nature, while also helping fulfill the goals that the Company has set out for this matter, including a fourth cross-cutting pillar that has to do with a territory-wide perspective. The pillars are as follows:

- **Biodiversity**
- **Ecosystem services**
- **Nature-based Solutions (NbS)**
- **Territoriality**

There are interrelationships among all four of the pillars. Initially, this strategy seeks to identify the current status of each pillar of CMPC operations, and then identify opportunities for potential development within and beyond its properties.

We focus on three action areas to guide the Nature, Conservation and Biodiversity Strategy:

- Environmental and social contribution.
- Role in communications, outreach, and knowledge production.
- Business cases (local development, new businesses, innovation, and others).

Specific Strategy Targets:

- Delineate a clear and shared roadmap that describes the efforts of the various Company departments in terms of nature, conservation and biodiversity.
- Generate positive impacts for the environment, society and the Company through conservation- related activities.
- Reinforce the company's resilience in the face of climate change.
- Contribute to positioning CMPC as a global benchmark in sustainability.
- Leverage the fulfillment of the goal of increasing the areas under conservation, protection and restoration by 100,000 hectares by 2030 with respect to the 2018 baseline.

Enabling conditions for the development of the Strategy:

- Establish its governance structure
- Develop partnerships and collaborative frameworks.
- Make progress with new forms of financing.
- Effectively manage from an operational, productive and conservation perspective.
- Connect to legal and regulatory frameworks, aligning with the Nationally Determined Contributions in Argentina, Brazil and Chile and with the Sustainable Development Goals.
- Apply innovative technologies to make implementation more efficient and effective (monitoring, measurement, identification, and others).
- Generate measurable progress indicators for each of the dimensions and pillars in addition to the further related actions.

Governance of the Nature, Conservation and Biodiversity Strategy

To implement, supervise and monitor CMPC's Nature, Conservation and Biodiversity Strategy, an initial approach is proposed based on the current Company structure, which must be reviewed later on with a view toward dedicated governance specifically designed for achieving the governance objectives which will be implemented at three levels:

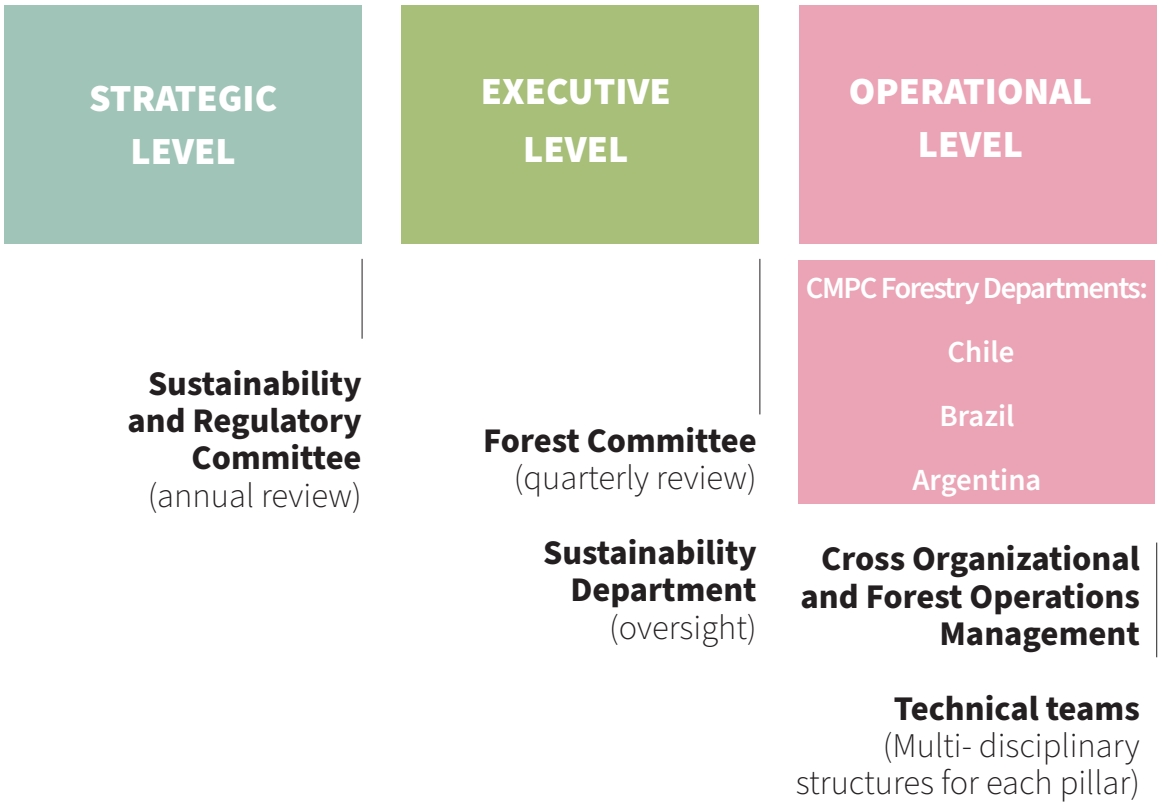


Table 1: Chart developed in-house

► Strategic Level:

At the strategic level, at least one annual review of the implementation of the Strategy will be carried out by the CMPC Sustainability and Regulatory Committee, which meets bimonthly.

► Executive Level:

At the executive level, a quarterly follow-up of the Strategy will be carried out by the CMPC Forests Committee. The Sustainability Department, through the Sustainable Fiber and Conservation Office will coordinate programs for the development of the various Strategy elements along with socio-environmental NGOs. Said Office, supported by academia, shall define and develop lines of research in conservation and biodiversity. In addition, it will be responsible for developing training and culture programs to share information about the Strategy and its implementation with both internal and external audiences. The Office will participate and represent CMPC in national and international arenas that require the presence and positioning of the company.
In order to be able to bring these programs to life, this department will be responsible for reviewing the necessary annual budgets and informing the departments that will execute them. It will also oversee the development and implementation of the proposed activities and the fulfillment of the expected results in adhering to the set deadlines and KPIs. It is also tasked with reviewing the enabling conditions of the Strategy on a consistent, ongoing basis.

► Operational Level:

At the operational level, specific activities will be assigned to the departments responsible for their development and implementation and the relevant technical teams. They will be responsible for complying with the objectives and goals associated with each activity by the deadlines set out for each of them (the specifics on the activities and departments linked to each activity are given in the Annex).

As part of the definitive governance and best practices studied at other companies, the possibility has been raised of forming an Advisory Council with the participation of external institutions such as foundations, NGOs, academia or other stakeholder groups that can contribute to the Strategy based on their knowledge, vision of the territories, scientific rigor, etc., ultimately helping the fulfill the activities and goals laid out in the Strategy.

Nature, Conservation and Biodiversity Strategy and its connection to the Sustainable Development Goals (SDG)

Over the past decade, it has been increasingly clear that sustainability is not limited to individual production sites and/or particular industry sectors. The risks related to water scarcity, biodiversity loss, ecosystem degradation, competition for natural resources or climate change are shared by several stakeholders in productive domains, especially in industries like forestry where there is an undeniable interdependence with the ecosystems in which it operates as well as its surroundings.

To address the world's most pressing social, economic and environmental challenges, each of the United Nations' 17 Sustainable Development Goals (SDGs) and their targets, set out in the 2030 Agenda, require consideration and attention. The forestry sector has the capacity to help advance these goals in a variety of ways. In particular, CMPC has identified the SDGs in which it can have the greatest influence or impact, by taking advantage of its central role in the value chain, and how these connect with the pillars that have been defined in the Nature, Conservation and Biodiversity Strategy.

Given its dependence on natural resources, CMPC has the capacity to drive positive change and make a significant contribution to several of the SDGs through its influence on sustainable forest management and responsible sourcing practices, which aim to preserve forests and their ecosystems. One of the main SDGs where CMPC has an impact is SDG 15: Life on Land, whose underlying objective is to "Sustainably manage forests, combat desertification, halt and reverse land degradation, halt biodiversity loss".

PILAR	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
BIODIVERSITY			●								●	●	●		●		●
ECOSYSTEM SERVICES	●	●	●		●	●	●	●			●	●	●		●		●
NATURE-BASED SOLUTIONS			●		●	●		●	●		●		●		●		●

Table 1

Forestry sector companies especially contribute to SDG 15 by establishing forest management for sustainable land use, i.e. ensuring that forests remain healthy and continue to thrive, providing wood fiber in a renewable way and generating livelihoods for people in and around forests. Additionally, potential trade-offs and negative impacts on biodiversity or water resources need to be carefully addressed. This also includes CMPC's participation in conservation efforts that accelerate land restoration, boost investments in reforestation and other approaches, to diversify forest production systems, with a Strategy that has clear pillars and actions[1].

Deforestation remains a global concern due to the adverse effects it has in terms of climate change, the negative impacts on biodiversity, soil erosion and the implications for forest-dependent communities. Due to the above, having a Strategy for the conservation of the forested properties where the Company operates is necessary in order to ensure their conservation and durability over time, thus contributing to a sustainable future.

To ensure that the contribution of the forest sector to the 2030 Agenda remains relevant and that partnerships continue to focus on the areas where action is most needed, in 2019 the World Business Council for Sustainable Development (WBCSD), developed the "Roadmap for the Implementation of the SDGs in the Forest Sector", with CMPC being one of the companies that co-led this effort and then presented it to the UN.

[1] World Business Council for Sustainable Development. (2019). *Forest Sector SDG Roadmap.* https://www.wbcsd.org/Sector-Projects/Forest-Solutions-Group/Forest-Sector-SDG-Roadmap

Figure 1
Source: Intermediate Technical Training Body (OTIC in Spanish)

Figure 1

METHODOLOGICAL FRAMEWORK

Approach to the Strategy creation process

Table 2: Chart developed in-house

An exhaustive survey of information was done for creating the Strategy, which included cross-sectional work with the teams in the territories where CMPC has properties. These teams are composed of various Company departments, together with key actors from universities, NGOs, Certification Bodies of Forest Management and foreign and domestic institutions specialized in conservation matters. This work included:

- Evaluating CMPC's current status for each pillar.
- Approaching the Strategy from the perspectives of productive operations and conservation areas.
- Proposing and evaluating governance for conservation at CMPC.
- Proposing partnerships and collaborative frameworks for implementing the Strategy.
- Identifying new forms of financing.
- Linking up with existing and future regulatory and legal frameworks.
- Exploring the use of new technologies and innovation to accelerate the Strategy's implementation.
- Generating progress KPIs.

Specifically, the following activities were carried out for implementing the Nature, Conservation and Biodiversity Strategy:

- Setting up the core group, made up of representatives of the Sustainability Department and the Technology and Planning Department to guide the Strategy's development.
- Determining the current state of development, agreements and future potential of the pillars and their sub-categories within CMPC through working groups with representatives of the forestry subsidiaries in Argentina, Brazil and Chile.
- Consulting external stakeholders to understand their aspirations regarding the development of this Strategy.
- Consulting internal stakeholders (forestry operations in the three countries), to figure out what role they should have in this Strategy and their expectations.
- Working with an external consultant to validate the Strategy according to the Theory of Change methodology.

Methodological framework for lines of action within the pillars of the Strategy

Prioritization of pressures on each pillar

In order to be able to evaluate and prioritize activities, projects, initiatives, commitments, or others, a methodology proposed by IUCN[1] was used for each pillar of the Strategy, according to their defined pressures upon conservation and biodiversity. In order to ascertain the impacts and opportunities that the company may bring to bear on the Strategy's pillars and the effectiveness of its responses and to plan and monitor its operations, seven categories of pressures were identified, specifically:

[1] IUCN. (2021). *Guidelines for planning and monitoring corporate biodiversity performance.* https://portals.iucn.org/library/node/49301

PRESSURES	DEFINITION
LAND USE CHANGES	Residential and commercial development, agriculture, energy production and mining, transportation corridors and services.
DIRECT EXPLOITATION (USING BIOLOGICAL RESOURCES)	Hunting and gathering wild animals and plants, logging and timber.
CLIMATE CHANGE	Invasion of ecosystems, sea level rise and desertification. Changes in temperature regimes such as heat waves, cold snaps and ice melt; changes in rainfall and hydrological remnants such as droughts; changes in rainfall timing and increased flooding, severe and extreme weather events such as thunderstorms, blizzards, hurricanes and dust storms).
CONTAMINATION	Domestic and urban wastewater, industrial and military effluents, agricultural and forestry effluents, garbage and solid waste, airborne pollutants such as acid rain, smog or smoke, excess energy releases such as noise and light emissions.
OTHER PRESSURES (FIRE)	Modifications to the natural system (fires and fire suppression, dams and water management/use, other modifications to the ecosystem such as land reclamation and logging, elimination/reduction of human maintenance, such as lack of supplementary feeding or indigenous management of ecosystems.
HUMAN INTRUSIONS AND DISTURBANCES	Recreational activities, wars and civil unrest, work and more.
INVASION BY INTRODUCED SPECIES	Invasive and other problematic species, genes and diseases (invasive non-native exotic plants and animals; problematic native plants and animals such as deer, algae, grasses or overabundant fish; genetic material introduced as pesticide-resistant crops or genetically modified insects, pathogens and microbes).

Table 2

Once the seven types of pressures that affect the pillars of the Strategy for CMPC's properties were recognized and described, each one was evaluated according to its scope and severity, receiving a score from 1 (low) to 4 (very high), according to the impact caused by each one to the Company's properties. Scores were given based on the definitions shown below:

		EXTENT OF THE PRESSURE	PRESSURE SEVERITY
	DEFINITION	The effect size of company activity on the Strategy of the pillar being evaluated.	Within a pressure's potential impact area, meaning the specific places within the pressure's reach where impacts occur, this refers to the level of damage to species habitats and/or ecosystem services that are expected as a result of the pressure. In terms of habitats and ecosystem services, pressure severity is measured as the degree of destruction or degradation, whereas the degree of reduction of key populations is measured for the different species.
1 -	LOW	The pressure is likely to be very limited and affects species, habitats and/or ecosystem services in a small area of the properties (1 - 10%).	When pressure affects a given pillar, it is likely to slightly degrade or reduce habitats and ecosystem services or reduce species populations by 1 to 10%.
2 -	MODERATE	The pressure is likely to be restricted, affecting species, habitats and/or ecosystem services in some of the properties (11 - 30%).	When pressure affects a given pillar, it is likely to moderately degrade or reduce habitats and ecosystem services or reduce species populations by 11 to 30%.
3 -	HIGH	The pressure is likely to have a wide reach, affecting species, habitats and/or ecosystem services in large swathes of the properties (31 - 70%).	Where the pressure affects this pillar, it is likely to significantly degrade or reduce habitats and ecosystem services or reduce species populations by between 31 and 70%.
4 -	VERY HIGH	The pressure is likely to have a significantly wide reach and affect species, habitats and/or ecosystem services in all or the majority of the properties (71 - 100%).	Pressure affecting this pillar is likely to destroy or eliminate habitats and ecosystem services or reduce species populations by 71 to 100%.

Table 3

The scores each pressure gets are then evaluated on a simple pressure importance matrix to calculate the overall importance of a given pressure on the company and biodiversity. Thus, a unique prioritization value is returned, depending on the pressure (ranging from 1 to 4, with 4 having the most priority), combining in this final rating its impact in terms of the scope and severity it has for the Company in matters of conservation and biodiversity.

Table 3 and 4: UICN. (2021). *Guidelines for planning and monitoring corporate biodiversity performance* (pg. 17 and 18). https://portals.iucn.org/library/node/49301

		EXTENT OF THE PRESSURE			
PRESSURE SEVERITY		4 – VERY HIGH	3 – HIGH	2 – MODERATE	1 – LOW
	4 – VERY HIGH	VERY HIGH	VERY HIGH	MODERATE	LOW
	3 – HIGH	VERY HIGH	HIGH	MODERATE	LOW
	2 – MODERATE	MODERATE	MODERATE	MODERATE	LOW
	1 – LOW	LOW	LOW	LOW	LOW

Table 4

Table 5: Chart developed in-house

Prioritization of activities

Based on the pressures assessment results determined by their scope and severity, different activities or initiatives to execute were specified as being able to better address those pressures. We proceeded to identify which of these activities are more important or should have priority implementation for each pillar in order to launch a more efficient response to the identified pressures. This was achieved through a matrix of impacts and enabling conditions wherein the impact produced by the response initiative was then evaluated under 6 parameters (Environmental impact, Social impact, Reputational impact, Required resources, Alliances and Regulatory frameworks), rating them as a 1, 3 or 6 (6 being the one with the most priority).

This will result in a clear understanding of which ones are the most important activities for responding to the seven initially defined pressures and defined as short or medium term pursuit. Those responsible for its execution and the expected subsequent outcomes will also be defined.

The scoring that resulted from the impact matrix and enabling conditions evaluations for each activity that were done for each of the pressures brought to bear on the pillars are shown in the "Prioritization of Activities" Annex.

VALUE	PRIORITY	ENVIRONMENTAL IMPACT	SOCIAL IMPACT	REPUTATIONAL IMPACT	REQUIRED RESOURCES	ALLIANCES	REGULATORY FRAMEWORKS
1	**Low**	No impacts are created	No benefits are generated for local communities	Media at the local level (adjacent community)	Required resources exceed MUSD 50/year	Execution necessitates creating partnerships with +1 organization	There are specific legal restrictions and compliance is complex
3	**Medium**	Positive local impacts are produced (management unit, UM)	Creates benefits Only for nearby communities	Impacts in the local and regional media	Resources required that amount to less than or equal to 50 MUSD/year	At least one partner is needed	Regulated by easily implemented legislation
6	**High**	Positive impacts are generated at a landscape level	High benefits for communities and stakeholders	Foreign and domestic media (NGOs, associations, communities, state entities)	No particular resources are needed	Not required	No legal restrictions

Table 5

DEFINING AND DEVELOPING THE PILLARS

1. **Biodiversity**

1.1 Definition and development of the pillars in the Strategy

Biodiversity refers to the entirety of living organisms that make up all ecosystems on Earth. Short for biological diversity, it refers to all manner of life on the planet. It encompasses the plants and animals we can see, but also the microscopic organisms that live in the soil, the bacteria in the digestive system, and the myriad biological processes that support life on Earth.

Biodiversity is fundamental for the continued existence of human beings on Earth. It serves as a wellspring of resources that maintain the biological processes required for food production, the productive capacity of soils, the creation of natural fibers, and the purification of the water we drink and the air we breathe every day. Living nature inspires mental well-being and offers a broad palette of renewable raw materials and creates the very foundations for what we do as a company

1.2 CMPC's approach

Like any productive company that operates in a sector that is highly dependent on natural resources, CMPC impacts the environment in which it conducts its operations. As a foundational principle, we are guided by the need to understand the impact of these activities on ecosystems, actively focusing our efforts to increase positive impacts and minimize negative ones, especially those that promote conservation, biodiversity and the ecosystems in particular. This is why efforts towards biodiversity must be addressed from two clear standpoints:

- What we can do from within the field of forestry operations to minimize any negative impacts on it, and
- What we can do from the domains of conservation and protection to maintain or increase biodiversity beyond what is required by law, forest certifications and stakeholders.

Conservation efforts will be focused on the biodiversity of species, ecosystems and under- represented forest types, considering existing projects and protected species lists at the domestic and global levels, while prioritizing the biodiversity in our areas of influence.

Restoration will also serve as one of many tools for increasing biodiversity and recovering ecosystems of interest. The main focus will be to maintain and increase the biodiversity of the areas under CMPC's influence, but consideration shall also be given to contributing to initiatives at the domestic and international levels. Even if they are not within our territories, they may have high impacts on biodiversity and the company's reputation.

1.3 Main elements to consider

Sustainability criteria for forestry operations to preserve biodiversity

All the initiatives and actions we undertake build on our core commitment to protect, manage, harvest and reforest our forested properties in a sustainable way. At CMPC we understand that it is possible to harvest tree crops and still maintain bio-diversity by working according to the highest production standards.

CMPC's basic resource is timber, the production of which occurs on large tracts of land. The operations of planting, harvesting and transport consider sustainability criteria aimed at nurturing soil productivity, preventing damage (fires and pests), maintaining and increasing biodiversity along with protecting water and soil and the various functions of forests.

The conservation of natural assets and the protection of forest biodiversity are aspects of all internationally recognized forest management certification standards. These are key elements to ensure that monitoring procedures and processes are applied in all our forestry operations.

Conservation and Biodiversity

At CMPC we've made a commitment to safeguard biodiversity. This includes the identification of areas with high conservation values, the implementation of specific management practices in critical areas (buffering around vulnerable areas, protection zones for watercourses, watersheds and water resources in general), as well as the protection, restoration and regeneration of native forests.

In coordination with NGOs and domestic and foreign experts, it also seeks to identify critical habitat areas for species of interest, such as ruil, adesmia, huemul, and others. Our objective is to ensure that our administration and operations do not impact these areas and minimize the disturbance of the local populations of flora and fauna.

The main actions related to caring for biodiversity and ecosystems include:

- Protection of rare, threatened and endangered species.
- Protection of representative ecosystems and native vegetation.
- Protection of riparian zones.
- Protection of water and soil.
- Restoration of vegetation or ecosystems.
- Management of wildlife corridors.

The work modality will include analyzing the operational impacts on each pillar of the Strategy as well as the reverse effects; i.e., how the pillar being analyzed in turn impacts the plantations and operations being pursued in a particular location.

A review of the specific enabling conditions will come next, be they existing or in development, for each pillar.

1.3.1 Plantation impacts on biodiversity

Current status

The main impacts detected for the biodiversity of CMPC's forest assets are:

- Alteration of protection/conservation areas during the execution of operations.

- Rural fires associated with high post-harvest fuel loads and operations that do not apply sufficient preventive safeguards.

- Degradation and loss of soil caused by operations (logging tracks, incorrect distribution of crop residues and inadequate surface water discharges).

- Contamination of watercourses by agrochemicals, fuels or waste.

- Contamination of watercourses due to soil erosion.

- Decrease in floral supply and pollinating agents due to herbicide applications (in a way that harms beekeeping, as one example).

- Habitat invasion by natural regeneration of introduced species.

The variables that determine these impacts are the planning and implementation of procedures, the size of productive areas as well as the lack of training of both in-house staff and that of service companies (SC).

Potential development opportunities

Some of the opportunities for preventing negative impacts on biodiversity are:

- Enhancing the training of in-house and SC staff on the risks and potential impacts of operations on biodiversity.
- Improving operational planning and control processes, taking into consideration the following:
  - Non-alteration of protection and conservation areas.
  - Analysis of fragmentation at the landscape scale and relative sizes of forest stands for productive and conservation uses.
  - Analysis of species chosen for planting, management plans and rotation lengths.
  - Protocols that consider soil protection in road construction, forest harvesting and land clearance.
  - Preventive silviculture with a focus on protection and conservation areas.

1.3.2 Role of plantations with regard to biodiversity

Current status

- Plantations play a fundamental role for biodiversity, as they maintain the water cycle and the protection of the soil of the terrain in which they are found.

- They are a complement to the refuge and habitat of insects, birds and mammals. This role is enhanced when they are connected to areas of native forest and constitute in and of themselves partial biological corridors.

- The productive function of the plantations helps reduce the human pressure for wood and derivatives that could be exerted on the conservation and protection areas, affecting their biodiversity.

- The dimension of the beneficial role of plants is a function of their species, age, management and surface area.

Potential development opportunities

- Plantations in general can serve as an extension of the protection and conservation areas according to their handling conditions, species selection and combinations, stand size and the impact of these variables on the undergrowth. They may also function as connectors between fragments of these areas or potential shelter for native fauna.

- Greater knowledge of the effect of these variables on plantations at the landscape level and their impact on biodiversity should be ascertained.

- Continue the study of the impact of plants on the biodiversity of the soils in which plantations are grown.

- This knowledge should be considered in the planning stage, so that it can help with maintenance or increase biodiversity.

1.3.3 Impacts of biodiversity on plantations

Current status

- Certain native species of fungi or insects can be hosts or bring diseases or damage to the planted species (Lepidoptera, Hemiptera, fungi).

- The lack of biodiversity management on plantations can cause productivity loss due to competition for water, light and nutrients, or produce mechanical damage (ants, lagomorphs, and others).

1.3.4 Role of biodiversity on plantations

Current status

- Biodiversity plays a positive role in forest plantations, contributing to the natural biological control of existing pests and other potential impacts that may arise on forest plantations.

- Native forests in conservation zones and protection areas that share the same management unit or micro-basin with the plantations enable the presence of a mosaic of landscapes and ecosystems that contribute to the productivity and increase the value of the plants over the long term due to their effect on the stability of the soil and water cycle in the micro- basin.

- From a social point of view, the maintenance or increase of biodiversity favors operational continuity, reducing pressure on plantations.

- It helps to complement the economic activity in a territory, through the multiple uses of forests.

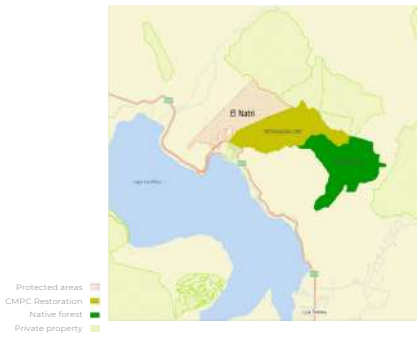
Potential development opportunities

- Increase the multiple uses of the biodiversity in native forests and plantations, permitting their use without impacting sustainability while supporting local development, environmental education and entrepreneurship.

- Certifying the collection and traceability of products made as a result of the biodiversity of native plantations and ecosystems can be a source of increased value for these regions.

- Producing studies on the biodiversity and abundance of populations of flora and fauna in forest plantations in partnership with academia, seeking to enhance possible positive impacts.

PILLAR: BIODIVERSITY
INITIATIVES IN PROGRESS



PROJECT: Native forest nucleus "El Natri"

FINANCING
USD 175M. (own)

AREA
348 ha

LOCATION
Contulmo, Region VIII

OBJECTIVE:
Generate a conservation nucleus by joining the El Natri Nature Sanctuary with a remnant of private native forest, in order to enhance biodiversity

PURPOSE
1. Create a conservation and restoration nucleus roughly 1000 ha in size.
2. Maintain a landscape-scale view to select high-impact conservation projects.
3. Restore part of the Los Peumos estate.
4. Promote joint public-private cooperation.

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1.4 Review of enabling conditions and biodiversity

Partnerships for the development of biodiversity

Current status

For the development of this pillar, CMPC has entered into a number of partnerships of varying natures in the following groups:

- Universities and research centers: Public and private
- Governmental entities: national or regional
- NGOs domestic and international
- Business representation entities: domestic and international
- Others: Other companies, members of civil society

The resulting partnerships are associated with multiple initiatives, especially as regards matters concerning the requirements of responsible forest management certifications, although not exclusively.

Potential development opportunities

Growing our network of partners in all categories to build alliances is a solid possibility. The credibility and leadership that partners have in matters of conservation and biodiversity are of special relevance in these partnerships. An example of this type of project is the CMPC - UC Chair of Sustainability implemented in 2021.

Partnerships should be sought by incorporating other economic sectors that can be a source of value for this pillar without necessarily having participated in prior initiatives to support the preservation or increase of biodiversity. Some examples here would be agriculture/livestock, energy companies, or other stakeholders with an interest in this topic.

Assertively approach landowners with potential for developing projects on their property in partnership with CMPC, as long as this supports the objectives of the Strategy and is in line with the main related activities of biodiversity and ecosystems protection discussed above (1.3 b).

Financing mechanisms for biodiversity

Funding sources can be classified by organizing them into multiple "taxonomies" that have been fully described in the literature on this topic.
In the case of our Strategy, the following groups are potential sources:

- International cooperation (multilateral bodies, multilateral banks).
- Governmental (Ministries of Agriculture, Environment, Science and Technology, and Economy, Development and Tourism).
- NGOs (TNC, IUCN, WWF).
- Private sector (banking with green bonds, carbon credits, offsets, philanthropy).
- CMPC capital and self-financing via ventures associated with conservation.

Current status

Currently, in terms of financing, the vast majority of biodiversity conservation in CMPC is done using the Company's own resources. Green bonds have also been issued for restoration work.

Potential development opportunities

Review the possibility of working with clients that have specific funds set aside for the beneficial management of biodiversity.

Partnership with any of the financing groups described, for biodiversity projects on third- party properties that align with the Strategy and actions determined to be priorities (example: the Maule Fund).

PILLAR: BIODIVERSITY
INITIATIVES IN PROGRESS

PROJECT: Maule Fund

FINANCING
EUR 6M (+ 5 years) (main external investor)

AREA
3,500 ha

LOCATION
VII Region, Maule

OBJECTIVE:
Restore the landscape and biodiversity in the Empedrado district after the fires of 2017

PURPOSE

1. Restore 3,500 ha affected by fires on third-party land.
2. Sequester 1 million tons of CO2eq.
3. Support communities and landscapes to increase their resilience.
4. Diversify landscapes and promote sustainable land use.
5. Prepare, prevent and mitigate forest fires.
6. Diversify and strengthen the rural economy.
7. Build partnerships with domestic and foreign companies and NGOs.

NGPTA arauco

Applicable regulations

International regulations applicable to the three countries are included in the Strategy. Examples of this legislation are:

- Convention on Biological Diversity (CBD).
- Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES).
- Convention on the Conservation of Migratory Species of Wild Animals (CMS).
- Convention on Wetlands of International Importance (Ramsar).
- Biosphere Reserves.

In addition, currently CMPC has certified all of its forest assets through PEFC and FSC in Brazil and Chile and in 2022, Argentina also signed on to FSC. Although forest certification standards are voluntary, to remain certified the company must meet the principles and criteria specifically associated with the care and preservation of biodiversity (FSC Principles 5, 6 and 9 - PEFC 2, 3 and 4).

Other elements to keep in mind include the commitments adopted voluntarily such as:

- The Native Forest Restoration Commitment for those replaced by plantations after 1994 in Chile, totaling 8,738 ha in south central Chile and 1,130 ha in the Coyhaique Project, which must be fulfilled by 2026 and 2028, respectively.
- The commitment was made on the occasion of the Company's 100th anniversary, which means an increase in the conservation area by 100,000 ha by 2030, taking 2018 as the baseline for the land area in these categories. This can be done jointly in Argentina, Brazil and Chile.
- Commitments that are made as part of membership in groups such as the WBCSD, notably including Race to Zero, committed to on the occasion of COP 26 in Scotland with a deadline in 2030, and the Nature Positive campaign for 2050. In both initiatives, the reductions related to the specific commitments for their fulfillment and ways of achieving them remain to be established, and anything that relates to biodiversity must be aligned with the other parts of this Strategy.

Current status

- Argentina: General Environmental Law (No. 25,675), Law on Minimum Budgets for Adaptation and Mitigation to Global Climate Change (No. 27,520) and its Regulatory Decree No. 1030/2020.
- Brazil: Trinational Atlantic Forest Pact and Pampa Biome Conservation Pact
- Chile: Law No. 19.300 on General Environmental Principles Law No. 20.283 on Native Forest Recovery and Forestry Development, Decree 82 Regulation on Soils, Water and Wetlands, Law No. 18.362 on the National System of State Protected Forest Areas, Natural Monuments Decrees and Urban Wetlands Law (21.202)

Potential development opportunities

The following instruments were identified as regulations applicable to conservation or increased biodiversity:

- Law on Native Forest Recovery and Forest Development (Ch).
- Biodiversity and Protected Areas Service (SBAP) (Ch).
- In Rem Right of Conservation (IRRC) (Ch).
- Restoration Regulations, Forest Policy (Ch).
- Law on General Environmental Principles (Ch).
- New Political Constitution of the Republic (Ch).
- Environmental Zoning of Forestry (Br).
- Private Conservation Units (Br).

In Rem Right of Conservation (IRRC)

This is a legal tool whose objective is to preserve the environmental assets of a private property. It consists of a free, voluntary and flexible agreement between an owner and a guarantor of conservation, which becomes the holder of the IRRC, in order to ensure its conservation in the long term. The motivation for establishing an IRRC is a landowner's willingness to protect the nature on their property. With the signing of this agreement, such willingness is expressed as a legacy and legally protected in the long term.

Application of innovative technologies for more effective monitoring, measurement, identification, and others

The application of technologies in activities associated with biodiversity can be connected to multiple fields of science and a range of objectives. Such goals may have to do with the measurement of populations as well as the propagation of species, or their taxonomic determination, genetic affiliation and more.

Current status

- Measurement and monitoring of populations: satellite images, multispectral aerial images, camera traps, drones with LiDAR equipment, Geographic Information Systems Support.

- Vegetative propagation: Use of technologies for macro and micropropagation of species of interest in laboratories and nurseries, including somatic embryogenesis and tissue culture. Execution of PCR and other genetic tests for determination of filiation (phylogenesis) and of species.

Potential development opportunities

Progress in the use of more accurate monitoring systems for images and sound. New applications in the use of drones such as seed planting as well as foliage, water and soil sampling. Determination of populations through e-DNA.

Indicators (KPI)

Current status

There are several KPIs that are used in CMPC as key indicators to measure the current state of biodiversity throughout the forest assets, and in some cases they reflect the areas dedicated to conservation and biodiversity, so that we're better able to grasp the state of progress in these matters.

Some of the KPIs include:

- Number of biological HCVAs on the properties.

- HCVA surface area.
- Surface area of protection zones and bodies of water.
- Categorization and areas of native forest.
- Wildlife sightings.
- Species under conservation in the properties and protected habitats of interest.
- Plant cover of flora.
- Presence of invasive species.
- Restoration areas (progress and percentage with respect to the goals).
- Annual and cumulative progress of surface area with a conservation target (goal of 100,000 ha by 2030).
- Permanent monitoring of parcels.
- Water quality (physical, chemical and micro-biological analysis).
- Soil quality.
- Importance Value Index (Flora IVI).
- Shannon index.

Potential development opportunities

- Biodiversity in plantations.
- Abundance of fauna population for all productive land uses.
- Number of native species produced per season in nurseries.
- Number of plants/species propagated.

ACTIVITIES FOR DEVELOPING BIODIVERSITY

PILLAR: BIODIVERSITY				
PRESSURE: OTHER PRESSURES (FIRE)				
ACTIVITY/ INITIATIVE	**SHORT TERM (0-3 YEARS)**	**MEDIUM TERM (4-10 YEARS)**	**GOVERNANCE (DEPARTMENT)**	**EXPECTED RESULTS**
Firebreak installation on main routes Areas with Tourism Appeal (ZOIT) and SNASPE protected areas for landscape impacts	●	●	Technology and Planning / Planting	Increase the number of hectares under conservation and protection, using the landscape and conservation models with functional biological corridors
Restoration of 3.500 ha (Maule Fund)	●	●	Sustainability	

PILLAR:BIODIVERSITY				
PRESSURE: CLIMATE CHANGE				
ACTIVITY/ INITIATIVE	**SHORT TERM (0-3 YEARS)**	**MEDIUM TERM (4-10 YEARS)**	**GOVERNANCE (DEPARTMENT)**	**EXPECTED RESULTS**
Sustainability goal of 100,000 ha in conservation	●	●	Sustainability	Increase the number of hectares under conservation and protection, using the landscape conservation landscapes under conservation with functional biological corridors
"El Natri native forest hub" project	●	●	Sustainability	
CMPC-UC Biodiversity and Sustainable Development Chair	●		Sustainability	

PILLAR: BIODIVERSITY				
PRESSURE: CONTAMINATION				
ACTIVITY/ INITIATIVE	**SHORT TERM (0-3 YEARS)**	**MEDIUM TERM (4-10 YEARS)**	**GOVERNANCE (DEPARTMENT)**	**EXPECTED RESULTS**
Change in the plantation management standards	●	●	Technology and Planning	Increase the number of hectares under conservation and protection using the landscape conservation models and functional biological corridors
Study the plantations' impact on biodiversity on soil and waterways situated in close proximity to the planted forests		●	Technology and Planning - Sustainability	

PILLAR: BIODIVERSITY				
PRESSURE: LAND USE CHANGE				
ACTIVITY/ INITIATIVE	**SHORT TERM (0-3 YEARS)**	**MEDIUM TERM (4-10 YEARS)**	**GOVERNANCE (DEPARTMENT)**	**EXPECTED RESULTS**
Participation in the PRELA project (MMA regional government)	●		Sustainability-Forestry Relations	Increase the number of hectares under conservation and protection using the landscape conservation models and functional biological corridors
Biological corridor from the El Desprecio Estate to the Los Ruiles Reserve	●		Technology and Planning / Restoration	
Biological corridor in the Contulmo Natural Monument		●	Technology and Planning / Restoration	
Restoration of the San Andrés (Argentina) ecological belt	●		BDP Forestry Office / Environment	
Study of the requirements for biological corridors within the land assets	●	●	Technology and Planning - Sustainability	
Areas declared to have In Rem Right of Conservation (e.g. Yahuilo, Laja lots)	●	●	Sustainability	

PILLAR: BIODIVERSITY				
PRESSURE: DIRECT USE (use of biological resources)				
ACTIVITY/ INITIATIVE	**SHORT TERM (0-3 YEARS)**	**MEDIUM TERM (4-10 YEARS)**	**GOVERNANCE (DEPARTMENT)**	**EXPECTED RESULTS**
Propagation study on vulnerable species of flora (adesmia, queule, ruil, araucaria, pitao, naranjillo; all native to Chile)	●	●	Technology and Planning - Sustainability	Increase awareness about the pillars to reduce the pressures
Comply with the WBCSD Nature Positive commitment	●	●	Sustainability	Net zero impact on the natural and social capital
Participate in the development and implementation of regional policies for biodiversity conservation (Chile)	●		Technology and Planning - Sustainability	Increase awareness about the pillars to reduce the pressures
Refine the operational procedures for planning and control	●		Technology and Planning	Improve the forestry practices to lessen the negative impacts on the pillars
Train CMPC and SC staff about risks and potential impacts on operations regarding the biodiversity	●		Sustainability	Decrease the negative impacts of plantations on biodiversity
Participate in the RECOGE Plan for the Darwin fox (GEF MMA)	●		Sustainability-Forestry Relations	Showcase the areas of Conservation and Biodiversity
Participate in the RECOGE Plan for Queule (GEF MMA)	●		Sustainability-Forestry Relations	Showcase the areas of Conservation and Biodiversity
Produce studies on the biodiversity and abundance of populations of flora and fauna on forest plants in partnership with academia, seeking to enhance possible positive impacts.	●	●	Technology and Planning / Environmental Restoration Studies	Increase awareness about the pillars to reduce the pressures

2. **Ecosystem services** (ES)

2.1 Definition

These are the benefits that human beings obtain from ecosystems, a product of the interactions that take place within them. Eco-systems such as forests, grasslands, mangroves and urban areas provide various services to society. These include resource provision, regulation of ecosystem processes and cultural services that directly affect people. They also include support services needed for maintaining all other services[1].

Supply Services: These are the material benefits that people derive from ecosystems, for example, the supply of food, water, fibers, wood and fuels.

Regulation Services: These are the benefits gained from the regulation of ecosystem processes, for example, the regulation of air quality and soil fertility, the control of floods, crop diseases and pollination, and land degradation.

Cultural Services: These are the immaterial benefits that people get from ecosystems, for example, a source of inspiration, aesthetic manifestations and works of engineering, cultural and religious identity, spiritual well-being and recreational benefits.

Support Services: These are necessary for the production of all other ecosystem services, for example, the availability of habitat for plants and animals, maintenance of genetic and species diversity, soil formation and nutrient cycling.

2.2 CMPC's approach

CMPC's conservation and protection areas provide various ecosystem services that have been prioritized and grouped into seven categories that are being developed under the auspices of the Company's strategy.

The methodology for prioritization is described below: Twenty ecosystem services grouped by type (provisioning, regulating, cultural and supporting) were reviewed. Subsequently, their negative (risks) and positive (opportunities) impacts were evaluated and given a score of 1 to 3 according to their social or environmental contribution. Subsequently, the totals were calculated to select the ES that got the highest scores.

The ES that have priority in the Strategy are contained in *Table 6*:

[1] ONU. (2006). *Ecosystem Millennium Assessment* https://www.millenniumassessment.org/en/index.html

Ecosystem services	Type	Contribution	Implications for CMPC
Tourism, recreational activities, and mental and physical health	Cultural	Social	Possibility of interaction with neighboring communities through access to protection and conservation areas (e.g. Downhill Championship in Angol), evaluating possible impacts according to each area and what they can provide.
Food and medicinal resources	Supply	Social	Manage the extraction and use of non-timber forest resources in native forest and plantations in a sustainable manner. Encourage the sociocultural use of HCVAs.
Fresh water and regulation of water flows	Supply and Regulation	Social and Environmental	Promote the conservation and restoration of riparian ecosystems for the availability of water in quality and quantity for neighboring communities. Mitigate the risk of water scarcity through the maintenance of watersheds and vegetation cover that maintains the water cycle.
Carbon sequestration and storage	Regulation	Environmental	CMPC is evaluating the possibility of managing the native forest to increase the growth and storage of carbon and thus contribute to the mitigation of climate change. Currently, CMPC Chile captures roughly 1.5 MtCO2eq each year (2019).
Pollination and biological pest control	Regulation	Environmental	Conservation and restoration of floral species (e.g. Adesmia) that have specific symbiotic interactions with pollinating species (birds and insects).Identify native species that perform biological pest control and promote specific conservation strategies. Perform control of invasive alien species in conservation areas. Safeguard the interaction of forestry work and its effects on pollinators.
Formation and conservation of soil fertility, nutrient cycling, and erosion prevention	Regulation and Support	Environmental	Soil is the foundational resource on which forests are sustained, vegetation cover gets maintained and grows, the litter layer gets preserved, degraded soils are restored and post-fire restoration is done. Review of gully handling.
Habitat for species and conservation of genetic diversity	Support	Environmental	Conservation of species and their genetic diversity in-situ in conservation areas and ex-situ in the reproduction of native species in nurseries, installation of germplasm banks to preserve key flora species for restoration. Conservation of habitats of critical species (e.g. huemul in Rucamanqui, araucarias in the mountains, ruil), protection of umbrella (e.g. puma) and emblematic species. Other umbrella or key species in ecosystems must be identified to increase their conservation. Note: This is done in conjunction with the Biodiversity pillar.

Table 6

Figure 2
Source: WWF

Table 6
FAO. (2023). *Ecosystem services and biodiversity.* https://www·fao·org/ecosystem-services-biodiversity/en/

Potential development opportunities

The future tourism and recreation potential of these areas of CMPC's properties has to do with the coexistence of the forestry industry and neighboring communities. This is where the Company has enormous potential to generate shared value and promote social development by the opening up these spaces to the community.

Thus, the following must be done:

- Figure out which territories have development potential and register them.
- Consult with the communities about which aspects they value.
- Find ways to partner with community organizations that are willing and/or able to do so either in planning and/or administration.
- Build capacities through specific business development programs.
- Review the potential production of specific areas of research that can be brought to scientific world for study.

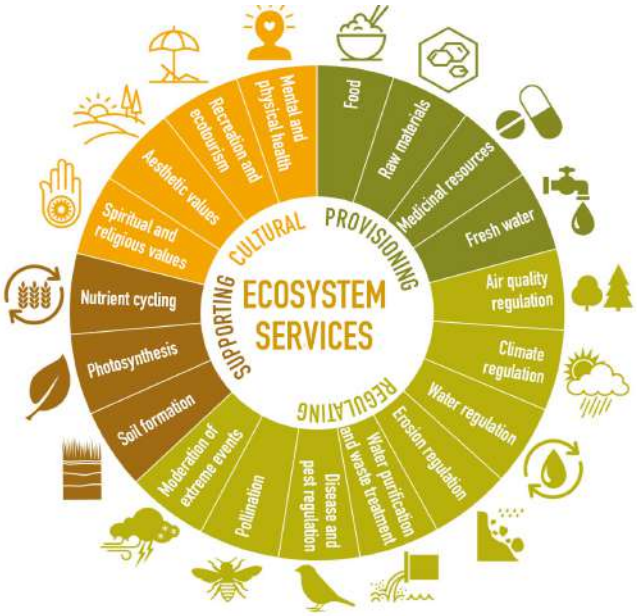

Figure 2

- Associate outdoor recreational and/or educational activities that connect plantations and conservation areas within sustainable management programs.

- Manage plantations so that they bring real protection for conservation areas. These activities may be associated with fuel reductions on the ground, pruning and in firebreaks. Also consider measures to prevent water and wind erosion while having adequate access roads.

- Ensure that communities perceive that forests (native forest and plantations) are part of their environment they get to enjoy, achieving greater inclusion together with increased protection and crime reduction.

Developing the cultural ecosystem service is important because it generates shared social and economic value. In addition, it allows visibility and education about the forestry sector (impacts, benefits and how they are managed), giving the community the option to use the forest in multiple ways, both conservation areas and plantations.

This process must include the participation of local stakeholders, regarding both the planning and administrative aspects, fostering the link between them and the territory.

Projects in development:

- Chile: The Bosque Vivo or “Living Forest" project began in 2022 which aims to create a network of parks where the community can interact with native forests and plantations where they can engage in sports and recreation activities. These are located near key urban centers in the region of La Araucanía (the "Junquillar" park in Angol, "Pumalal" in Temuco and "Lastarria" in Loncoche).

- Brazil: The Barba Negra Nature Reserve located in Rio Grande do Sul, which helps conserve local biodiversity.

2.3 Main elements to consider

Natural ecosystems and the species that support them provide important services, which are used in different ways by society and serves as the foundation of its well-being. The economic development of residents and communities neighboring the different CMPC facilities is often supported or complemented by the extraction and use of natural resources, bio- diversity and the ecosystem services that forest plantations provide in their daily lives.

The ES are a key meeting point in the relationship between the company and its neighbors, and constitute an element of great importance to the development of the Strategy in that they generate great impacts on the other three foundational pillars (Biodiversity, Nature-based Solutions, and a Territory-wide perspective).

Bear in mind that, contrary to what takes place in Argentina and Chile, there are no activities associated with the use of ES done in Brazil.

2.3.1 Tourism, recreation, and mental and physical health

Importance of the ecosystem service

Current status

Tourism and recreation are important due to the flora and fauna as well as the landscape features of the company's forested properties and surrounding areas that, in addition to providing recreation options to local families, are highly sensitive natural wonders from a socio-environmental standpoint. This means that a number of institutions and stakeholder groups remain focused on the forest management of these areas.

To date, the areas of interest in terms of tourism and recreation are not associated with any particular development strategy. Some areas were developed under intentional planning frameworks (e.g.; the "Navigable Carahue River Route Project" on the Imperial River in Chile), while others have been carried out as a result of the continuous use made of them by surrounding communities (for example, El Retiro and Junquillar de Angol in the Araucanía Region) with a resulting plan essentially being developed "on the fly".

Table 7: Chart developed in-house

The activities provided by this ecosystem service in the plantation areas have undergone limited development with guided activities coordinated by the various organizational departments. They are carried out for recreational, educational and/or research purposes. The reason why this type of support is needed is due to ongoing poor practices done without any control measures (forest fires, damage to flora and fauna, timber theft, micro-dumps, and more).

Plantations can serve as extended conservation areas for tourism and recreation, providing a number of benefits similar to those of neighboring natural ecosystems.

Impacts on the ecosystem service

The main impacts are made visible in the drastic landscape modifications and the operational interventions in the terrain that give rise to use and care restrictions for these sites. To this end, we need to work together with communities to prevent harmful impacts on natural ecosystems and plantations. The idea is to get communities to actively protect these places through local partnerships that can create opportunities to inform and educate people about their existence and benefits.

PILLAR: ECOSYSTEM SERVICES (ES)
INITIATIVES IN PROGRESS

PROJECT: Bosque Vivo [Living Forest]

FINANCING
USD 1,412.5M (own)

AREA
2.679 ha (up to december 2023)

LOCATION
Rucamanque, Temuco
Lastarria, Loncoche
Junquillar, Angol

OBJECTIVE:
Enhance the ES: "Tourism, recreation and health", through a network of parks that turn forests and plantations into spaces for linking with our neighboring communities

PURPOSE

1. Opening of forests for sports, recreation and/or educational experiences.
2. Generate entrepreneurship opportunities for neighboring communities.
3. Educate about the importance and attributes of the forestry sector via quality infrastructure.

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Here is a sampling of a few impacts of various forestry tasks:

- The harvesting process makes a strong visual mark that can be seen easily at a distance, changing perceptions about an area while diminishing its visual and tourism appeal.
- Wood transportation heightens the risk perception about the work being done due to the emissions of dust and noise and the collision potential, reducing an area's appeal.
- The safety-associated risk to people that is inherent to forests work limits the ease of access and feasibility of developing tourism and recreation in these territories.

The following activities must be considered in order to mitigate such impacts:

- Incorporate these places in the operational planning (differentiated planning) to create mosaic planting and windbreaks bearing all stakeholders in mind.
- Show the plantations and associated worksites to all stakeholders (every process).
- Set up educational and/or recreational trails and basic equipment (picnic area, ecological restrooms and permits for local businesses).
- Make sure that local communities are aware of the Company's new position on open access, taking appropriate precautions in each case.

BOSQUE VIVO [LIVING FOREST]

PARK NAME	2022 BUDGET (MUSD)	STAGES
Pumalal (Temuco)	752,5	Opening and Operation
Lastarria (Loncoche)	165,0	Opening and Operation
Junquillar (Angol)	165,0	Opening and Operation

Table 7

Review of enabling conditions

Partnerships for developing ecosystem service

Current status

In Chile, tourism, recreation and mental and physical health are supported by athletics groups that use the properties for a number of sports (e.g.; hiking, biking, and more) and recreational activities at beaches or swimming holes near lakes, rivers or the sea.

Potential development opportunities

- Include existing local tour operators: Create sports tourism and recreation zones in contact with nature.
- Create ventures with members of local communities to address the measures laid out above.
- Agreements with public institutions (for Chile: Undersecretary of Tourism, Municipal Tourism Office, Municipal Education Department, and others) to efficiently manage the two options described above.
- Agreement with private entities (for Brazil: Establish an alliance with the Brazilian Service for the Support of Micro and Small Businesses (SEBRAE) to qualify rural tourism initiatives in the Rio Grande area).
- Agreements with schools and universities for guided tours of forestry operations and conservation areas in order to reinforce and communicate the benefits of natural ecosystems, plantations and the forestry sector in general.

Financing mechanisms

Current status

The Company has allocated an annual budget and a grant competition for all citizens, based on the Donations Law in Chile for financing the different activities related to ecosystem services.

These sorts of activities are not being done in a structured way for the time being in Argentina or Brazil on CMPC's properties.

Potential development opportunities

- Resource generation through business concessions in tourist areas.
- Use of funds for conservation.
- Payment for a variety of services that may be set up in the parks (cleaning, tour guides or similar)
- Help for local entrepreneurs with applying to Corfo and/or Sernatur funds for tourism development (Ch).
- Law on Cultural or Sports Donations (Ch - Br).
- In Rem Right of Conservation for environmental education (Ch).

Applicable regulations

Current status

- Law No. 20.423 on the Institutional System for Tourism Development, under the Council of Ministers and the Undersecretary of Tourism (Ch).

Potential development opportunities

- Sernatur's Tourism Quality Seal (Ch).
- Amendments to the Political Constitution of the Republic

Application of innovative technologies for more effective monitoring, measurement, identification, and others

Current status

Currently the areas set aside for these activities are only marked out on the maps of the MINGEO Navigator platform.

Potential development opportunities

Measures can be implemented to better understand the benefits of certain tourism and recreation options:

- Visitor access control and measurement systems.
- Cameras to monitor and protect these areas.

- Digital identification on sites with feature reviews in virtual reality or for use on social media (SM).
- SM advertisement related to the topics (municipalities, Sernatur and other state organizations)..

Indicators (KPI)

Current status

- Number of sites of recreational, educational and cultural interest.
- Participant oversight for sports and recreation.

Potential development opportunities

- Ventures created that are associated with this ecosystem service.
- Jobs produced as a result of these ventures.
- Income produced as a result of these activities/ territories.
- Statistics on inclusion and gender equality of workers.
- Gather users' perceptions and assessments of tourism areas.
- Count the number of people who access the tourism and recreation areas.
- Social perception index.
- Number of fires in these areas.
- Number of timber theft events in these areas.

ACTIVITIES FOR THE DEVELOPMENT OF ECOSYSTEM SERVICES

PILLAR: ES		SUBCATEGORY: TOURISM, RECREATIONAL ACTIVITIES AND MENTAL AND PHYSICAL HEALTH		
PRESSURE: HUMAN INTRUSIONS AND DISTURBANCES				
ACTIVITY/ INITIATIVE	**SHORT TERM (0-3 YEARS)**	**MEDIUM TERM (4-10 YEARS)**	**GOVERNANCE (DEPARTMENT)**	**EXPECTED RESULTS**
Implement the Bosque Vivo project (Chile)	●	●	Forestry Relations	Greater awareness, appreciation, appropriation and use of the protection and conservation areas by the local communities
Define and catalogue other terrain that has potential recreational tourism appeal	●		Forestry Relations	
Evaluate the potential for public use of the Sarita Reserve (Brazil)	●		Institutional Relations	
Open the Barba Negra Reserve (Brazil) for public use	●		Institutional Relations	
Implement the Costa Doce Gaucha Project (Brazil)	●		Institutional Relations	
Implement the Forest School Program	●		CMPC Foundation	

PILLAR: ES		SUBCATEGORY: TOURISM, RECREATIONAL ACTIVITIES AND MENTAL AND PHYSICAL HEALTH		
PRESSURE: DIRECT USE (use of biological resources)				
ACTIVITY/ INITIATIVE	**SHORT TERM (0-3 YEARS)**	**MEDIUM TERM (4-10 YEARS)**	**GOVERNANCE (DEPARTMENT)**	**EXPECTED RESULTS**
Review the potential generation of specific areas of research that can be brought to the attention of the scientific world	●	●	Forestry Relations	Increase awareness about the ES to reduce the pressures on the pillar

2.3.2 Food and medicinal resources

Importance of the ecosystem service

Current status

Non-Timber Forest Products (NTFP) is the name that is most often used for products that come from forests other than wood, which are also of great importance to the economy of rural populations, especially those closely linked to forests and forest plantations.

The market for these products is typically highly informal, with reduced visibility and recognition of the role of the gatherer as a true pillar of this chain, hardly any information about the collected products and a low selling price in the market.

In 2018 CMPC made a list and analysis of NTFP gatherers who enter CMPC forest properties in Chile in order to:

- Identify the gatherers.
- Identify the number of committees.
- Assess the gatherers' current status.
- Hear their suggestions and concerns.
- Incorporate new gatherers.
- Provide a collection kit.
- Give them a collection support guide.

So far no systematic work has been done with these groups and no one has been clearly assigned responsibility for this matter at the organization.

Many NTFPs carry out their work in the productive areas of forest plantations (e.g.; fungi under pine plantations and eucalyptus pollen for honey production).

People in neighboring communities gather these items, which carries great social significance in the areas around CMPC's properties.

Impacts on this ecosystem service

Although in Chile there are protocols for entering CMPC properties and NTFP gatherers comply with established standards without causing any harm, people who carry out harmful actions against biodiversity and ecosystem services, cut down native trees, or steal wood have been detected entering CMPC property.

Weed control operations can affect areas used for NTFP collection, leading to social unrest and conflict. One example is the chemical spraying in the Maqui or Nalca plant areas.

Harvesting can impact areas where NTFPs operate.

In Argentina, NTFP resources are found along the roadside or in firebreaks, so nobody has direct access to the properties.

Such risks are not found in Brazil because ecosystem service activities are entirely prohibited by regulation.

To prevent potential impacts on this ES, the following measures should be considered:

- Detailed identification of all gathered products (mushrooms, rosehip, maqui, etc.) and mapping them out on the terrain.
- Forest management considering the growth or maturation of these products at different times of the year in areas of high demand.
- Careful herbicide application planning (already done in Chile) with honey considered to be a NTFP.
- Coordination and planning with the operations department in case of any leftover fuel that the company cannot use that local communities may be able to put to good use.
- Reinforce education and safety around gathering NTFP from plantations.

Potential development opportunities

NTFPs have future sponsorship potential for which the following opportunities should be considered:

- Identify the current status of each committee to encourage collective work (trade associations) or enhance individual cases depending on each group's cohesion/unity.
- Develop a work plan that includes the training, support and advising for gatherers throughout the production chain for nearby communities (INFOR, NGOs, and other stakeholders).
- Identify areas of high NTFP potential on CMPC properties in order to promote its use in a sustainable manner.
- Encourage the collection of items to make new products (e.g.; jam, mushrooms, juice, medicine, oil, extracts, cosmetics, health foods, and similar.)
- Come up with a training plan for groups that have not been trained yet, including: caring for forests and native plants, fire prevention, self-care and sustainable gathering.

- Publicize the work internally and externally using SM, media, and the Local Fiber store.
- Certify NTFP Chain of Custody and/or Fair Trade. Market food products.
- Create a specialized company department with specific budget to support this program.
- Design firebreak and interface areas with crops that have economic potential.
- Add value to NTFPs gathered on plantations by improving their quality, quantity and attributes (e.g.; types of mushrooms harvested on pine plantations).
- Working group among the countries to design strategies for producing eucalyptus honey.
- Research and development for the NTFP production chain and marketing.
- Study the development and cultivation of all the products that are developed in the plantations to improve their availability and ensure the sustainability of their harvesting.

Review of enabling conditions

Partnerships for developing the ecosystem services

Current status

For developing this ES, CMPC has set up several partnerships with different kinds of stakeholders in the countries where its properties are as follows:

- Argentina: Universities and INTA (National Institute of Agricultural Technology)..
- Brazilian municipalities, government and universities, research and development

institutions such as the Brazilian Support Service for Micro and Small Businesses (SEBRAE), Rural Technical Advisory Company (EMATER) and Brazilian Agricultural Research Company (EMBRAPA).

- Chile: Regional, community and local working groups, gatherers' guilds, inter-cultural hospitals, machis [Mapuche leaders] from different territories and sales at the Espacio Fibra Local [Local Fiber Zone].

Potential development opportunities

Create connections between gatherers and B Corporations for marketing the various products available on the productive terrain and under conservation.

It is essential to develop and reinforce strategic partnerships in each country with public (Chile: SERCOTEC, INDAP, etc.) and private organizations (Argentina: Gatherer's Association), with communities (Brazil: Quilombola and indigenous communities) in order to contribute to local development.

Financing mechanisms

Current status

Currently in terms of financing, the promotion initiatives for the collection of NTFP in CMPC are developed with the company's capital resources.

Potential development opportunities

- Promote and seek new business deals for NTFPs through CMPC's innovation department.
- Support applications to grant competitions State (e.g.; Prodesal-Indap Chile Funds).

Applicable regulations

Current status

The following regulations apply in Chile:

- Law No. 20.283 on Native Forest Recovery and Forestry Development.
- Law No. 20.962 Convention on International Trade in Endangered Species of Wild Flora and Fauna.
- Food regulation of certain NTFP.

Potential development opportunities

- Argentina: Argentine Food Code, National Registry of Apicultural Producers (RENAPA), SAGPyA Regulations, and the National Service of Agrifood Health and Quality (SENASA).

- Brazil: There are opportunities with beekeepers' associations (honey) and the Brazilian Agricultural Research Corporation (EMBRAPA) (use of butia as an ingredient) to create new products and spread the benefits of conservation areas to support these productive activities.

- Chile: Certain regulations on exports and for NTFP gatherers are missing.

Application of innovative technologies for more effective monitoring, measurement, identification, and others

Current status

Right now the following is done for NTFP:

- Basic inventory of gathered products (medicinal and food).

- Inoculation of pine plants in the nursery with the mycorrhizae of species of commercial interest for collection on plantations.

- Semi-annual field campaigns with photographic records in Brazil.

Potential development opportunities

- Create a database of available resources listing species, uses, methods for use, desiccation and conservation.

- Control of output of collected products (PPP).

- Cameras and equipment with different sensors to control the collection process.

- Geolocate sensitive areas, according to the carrying capacity of each NTFP.

- Technological search for alternatives NTFP processing methods.

- Genetically improve and manage species with productive potential (chilean nut, maqui berries, strawberry myrtle, fungi, etc.).

Indicators (KPI)

Current status

- Number of NTFP beneficiaries and guilds.
- Amount of product collected annually (Kg/month).

Potential development opportunities

- Number of honey producers, location, number of hives, production/producer.
- NTFP economic value (harvest/year).
- Diversity, dominance and abundance index.

ACTIVITIES FOR THE DEVELOPMENT OF ECOSYSTEM SERVICES

PILLAR: ES		SUBCATEGORY: FOODS AND MEDICINAL RESOURCES		
PRESSURE: DIRECT USE (use of biological resources)				
ACTIVITY/ INITIATIVE	SHORT TERM (0-3 YEARS)	MEDIUM TERM (4-10 YEARS)	GOVERNANCE (DEPARTMENT)	EXPECTED RESULTS
Development of non-timber forest products (NTFP)	●	●	Public Affairs - Forest	Reduce the pressures on the areas under conservation for stakeholders
Certify the collection and traceability of products generated as a result of the biodiversity of native plantations and ecosystems (which may serve as a source of additional income for these territories)	●	●	Sustainability- Public Affairs - Forest	
Create a specific corporate department for NTFP	●		Forestry Relations	

2.3.3 Freshwater and regulation of water flows

Importance of the ecosystem service

Current status

Natural forests and plantations help keep water ecosystems in peak condition. They not only filter and clean the water, but they also help prevent soil erosion, limit sedimentation and attenuate the risk of landslides. Although forests themselves do consume water, they also improve infiltration rates, ultimately helping to replenish underground aquifers.

The ongoing water shortage has soured the public on intentional rapid growth plantations, absolutely necessitating the cultivation of solid measures to maintain or increase water availability.

In order to make sure there is enough water needed for human health and well-being, socio- economic development and securing eco- systems, CMPC has set up protection and conservation zones for water ecosystems in which measures for properly conserving the protected areas are delineated and put into action. These areas add up to 16% of the Company's forested properties, and they have been mapped out. They are under restrictions regarding forestry operations.

In Chile, CMPC has 397 High Conservation Value Areas with forest services, equivalent to 2,800 hectares of forested properties that supply and provide water access to more than 64,000 people.

Forests, like any other kind of crop, feel the effects of periods of drought or excess of water that can lead to a decrease in productivity.

Understanding how water flows through forest plantations is an essential tool that supports decision-making, mainly in terms of the sustainability of the productive system because it helps maintain the land's productivity. When there are satisfactory ES, productive activities can be more effective as a result of improved consistency.

Plantations' impacts on this ecosystem service

Reduced water availability is the main risk facing this service. This is especially significant for micro-basins and critical areas with limited precipitation, since competition may arise for water availability among the different ecosystem components.

The variables that determine the impacts on water availability may be silvicultural or natural factors, such as climate, soil, and a basin's relief and physiography.

Another important impact on water resources is the alteration in water quality due to operations done in the winter season (harvesting and road construction) when solids get displaced by rainfall. These water resources are monitored to assess their quality before, during and after operations. If any alterations get detected, mitigation measures are then triggered as necessary.

Potential development opportunities

Silvicultural and management practices can benefit water resource quantity and quality if the following actions are considered:

- Planning at the basin scale to improve water resource management by using mosaic planting with different ages and species.
- Researching the role of protection zones in terms of width and floristic composition, depending on their particular location in the basin.

- Studying soil preparation techniques with the goal of positively impacting the quantity and quality of water (subsoiling through the creation of infiltration trenches).
- Designing country-specific solutions, depending on each one's climatic conditions.

Review of enabling conditions

Partnerships for developing ecosystem services

Current status

Currently, there are partnerships with different public and private organizations for water protection at the national and international levels in order to discuss both local and global water scarcity impacts.

Regarding projects, CMPC participates in major initiatives for protecting water resources such as:

- Voluntary Agreement for Catchment Management (AVGC) of the Picoiquen River in the Araucanía Region (Ch).
- Water for Chile Challenge
- Catchment study with the Universidad Austral (Professor Andrés Iroumé) (Ch).
- Studies with the Universidad Federal de Santa Maria (Br)
- Conversation series about water and plantations Forestry (global).

Potential development opportunities

Strategic partnerships need to be created with universities and governmental organizations for catchment management studies to foster the development of this ecosystem service.

In addition, collaborative work with the community is important for maintaining the amount and quality of water resources. Such efforts could serve to prevent pollution as a result of micro-dumps on the banks of natural watercourses or landfills or diverting watercourses without proper permits or water abstraction without having obtained the rights to do so. These are a few examples of issues to address.

Financing mechanisms

Current status

Currently in terms of financing, the research initiatives and water projects are developed using the Company's capital resources.

Potential development opportunities

- Brazil: Law No. 14.119 on National Policy for Payment for Environmental Services (PNPSA).
- Chile: Development Law and National Irrigation Commission.

Applicable regulations

Current status

- Brazil: Law No. 14.119.
- Chile: Law on Recovery of Native Forest and Forestry Development and Regulation of Soils, Waters and Wetlands.

Potential development opportunities

- Brazil: Participation in catchment management committees.
- Chile: Reform of the Water Code and the Political Constitution of the Republic of Chile

Application of innovative technologies for more effective monitoring, measurement, identification, and others

Current status

- Water balance in experimental basins using sensors.
- Quality monitoring of the neighbors' water collection points near the properties.
- Monitoring of productivity and water use efficiency of different genotypes.

Potential development opportunities

- Wheather stations for recording meteorological information for the purpose of keeping long-term records.
- Hydrological runoff modeling
- Monitoring through remote sensors.
- Measurements of water use in different soil types as well as the climate and flow measurement in priority basins (long term).
- Study of water use efficiency in different genetic materials.

Indicators (KPI)

Current status

- Water balance.
- Water quality in HCVA services.
- Number of people supplied.

Potential development opportunities

- Water balance of hydrographic micro- basins.
- Flow rates and annual variation (m3/s).

ACTIVITIES FOR THE DEVELOPMENT OF ECOSYSTEM SERVICES

PILLAR: ES		SUBCATEGORY: FRESH WATER AND REGULATION OF WATERFLOWS		
PRESSURE: DIRECT USE (use of biological resources)				
ACTIVITY/ INITIATIVE	**SHORT TERM (0-3 YEARS)**	**MEDIUM TERM (4-10 YEARS)**	**GOVERNANCE (DEPARTMENT)**	**EXPECTED RESULTS**
Planning at the basin scale to improve water resource management by using mosaic planting with different ages and species.	●	●	Technology and Planning	Decrease the negative impacts of plantations on biodiversity
Voluntary Agreement for Watershed Management (AVGC) Picoiquen River.	●		Technology and Planning - Sustainability - Public Affairs - Forest	Showcase the areas of Conservation and Biodiversity
Implement the Manantiales [Springs] Project, increase the HCVA protection areas connected to RDW	●	●	Technology and Planning/ Restoration - Planting	Improve the forestry practices to lessen the negative impacts on the pillars
Research the role of protection zones in the basin in terms of their width floristic composition and topography	●	●	Technology and Planning / Restoration area	Increase knowledge about the ES, and NbS to reduce pressures on the biodiversity

PILLAR: ES		SUBCATEGORY: FRESH WATER AND REGULATION OF WATERFLOWS		
PRESSURE: CONTAMINATION				
ACTIVITY/ INITIATIVE	**SHORT TERM (0-3 YEARS)**	**MEDIUM TERM (4-10 YEARS)**	**GOVERNANCE (DEPARTMENT)**	**EXPECTED RESULTS**
Look into soil preparation techniques, with the goal of having positive impacts on the quantity and quality of water (e.g. carry out contour subsoiling to serve as a infiltration trenches)	●	●	Technology and Planning/ Forestry Development	Improve forestry practices in order to reduce negative impacts on the pillars

2.3.4 Carbon sequestration and storage

Importance of the ecosystem service

Current status

Forests absorb CO2 and release O2 through the process of photosynthesis. It is important to enhance this ecosystem service due to the constant increase in greenhouse gas emissions into the atmosphere generated mainly by the use of fossil fuels. In addition, developed and developing countries are committed to meeting the carbon neutrality objectives outlined in the 2030 Agenda for Sustainable Development, with reforestation being a very effective method for achieving this goal.

Fast-growing forest plantations are considered to be carbon sinks. They fix CO2 and store it in the various biomass elements, thus serving as a key component of greenhouse gas capture.

The tree's trunk stores the largest quantity of solid carbon, so the use of timber as a final product is what most contributes to carbon storage.

Impacts of plantations on this ecosystem service

Since the purpose of CMPC forest plantations is to make fiber, an inherent aspect of the process is the fact that all stored and sequestered carbon will ultimately be released at harvest time, although the storage period may vary depending on how the particular ways that fiber is used.

Insofar as plantations or related activities are carried out on degraded soils, they'll capture carbon for a period equivalent to its rotation length, thus having a positive impact on emissions.

It is essential to think of productive land as attractive ways to increase carbon stored in the soil by adopting appropriate conservation practices, preventing controlled burns or fires, and promoting agricultural and other practices that limit organic soil loss.

If plantations were to be implemented with a carbon capture target, soil types, species and precipitation should be studied to generate positive impacts.

Potential development opportunities

- Study the possibilities for managing native forest on CMPC property for the purpose of increasing carbon sequestration.
- Figure out how much carbon stock is stored in conservation areas.
- Boost the availability of fiber and increase the percentage of solid products (boards, mass timber, CLT, etc.) in countries where it is possible to do so.
- Systematize the stock calculation methodology for all production species, standardizing all criteria among countries.
- Widen the reach by incorporating carbon sequestration in products, soils and biomass, analyzing the end composition of the latter.
- Encourage the use of forest plantations for the purpose of carbon sequestration (e.g. the Coyhaique project).

Review of enabling conditions

Partnerships for ecosystem service development

Current status

Partnerships with different public and private organizations have been established such as:

- Argentina: Forest Productivity Cooperative (NCSU).
- Chile: Universidad de Chile, Universidad de Concepción, Forest Productivity Cooperative (NCSU), CORMA and Centro para el Cambio Global-UC.
- Brazil: Instituto de Pesquisas Florestais - IPEF / ESALQ -USP,

Potential development opportunities

- Set up partnerships to add more plantation or restoration projects with neighbors, sharing knowledge for the goal of carbon capture.
- Forest Productivity Cooperative (Br).

- Partnerships that foster research, science and new technologies for carbon capture.
- Build alliances to create options for fixed carbon trading prices.

Financing mechanisms

Current status

Green bonds of private banking and of CMPC.

Potential development opportunities

- Mechanisms for selling carbon credits.
- Collaborative projects among private parties.
- National and international grant competitions for studies and research.
- Carbon market (Ch).

Applicable regulations

Current status

- CO2 neutrality (Paris Agreement).
- Each individual country's Nationally Determined Contributions (NDCs) that are considered in the carbon capture.

Potential development opportunities

- Sustainability agendas and sustainable business indices.
- National Landscape Restoration Plan for 2021-2030 .
- Law No. 21.210 Tax Legislation Modernization.

Application of innovative technologies for more effective monitoring, measurement, identification, and others

Current status

- Forest plantations (aerial biomass and soil) and natural forest carbon quantification based on traditional inventories.

Potential development opportunities

- Biomass estimates using LiDAR (natural forests and plantations).
- Carbon balance of various genotypes at different ages and management stages.
- Identification and carbon balance in areas without any available information (native forest).
- Review all types of non-forest ecosystems found in the properties to estimate their carbon sequestration capacity (forest scrub, water bodies, grasslands and others).

Indicators (KPI)

Current status

- Carbon stocks on plantations (ton CO2/ha)..
- Natural forest surface area by type.

Potential development opportunities

- Biomass indicators by forest type and area.
- Catch rate of the predominant species on the properties (different species).
- Incorporation of surface area to carbon sequestration with a view to the goal of zero net emissions by 2040.

ACTIVITIES FOR THE DEVELOPMENT OF ECOSYSTEM SERVICES

PILLAR: ES		SUBCATEGORY: CARBON SEQUESTRATION AND STORAGE		
PRESSURE: CLIMATE CHANGE				
ACTIVITY/ INITIATIVE	**SHORT TERM (0-3 YEARS)**	**MEDIUM TERM (4-10 YEARS)**	**GOVERNANCE (DEPARTMENT)**	**EXPECTED RESULTS**
Study options for handling native forests on company land assets in order to increase carbon capture	●	●	Technology and Planning - Sustainability - Development	Net 0 impact on natural and social capital
Figure out how much carbon stock is stored in conservation areas	●	●	Technology and Planning - Sustainability - Public Affairs - Forest	

2.3.5 Biological pest control and pollination

Importance of the ecosystem service

Current status

Biological control

In general at CMPC Argentina, Brazil and Chile, specific biocontrol agents are used for eliminating the pests affecting plantations. The crucial requirement is to choose the specific type of control needed for application to an equally specific target area. The control agent is dispersed to neighboring plantations as well, which helps out other landowners in the process.

For example, in the pine plantations of Argentina and Chile, biological control is needed for the *Sirex noctilio*, wood wasp, with nematode *Deladenus siricidicola*, specific enemy of that plague and that, once it manages to establish itself in the environment, its natural dispersion surpasses the terrain's boundaries, benefiting other pine producers. There are similar examples for the ant in Argentina and the eucalyptus bug in Brazil and biocontrol is done in Chile for the tip moth, *Gonipterus* sp. and others.

This type of control does not affect protected and conservation areas; rather, it protects them from the application of chemical controls that could contaminate the water or affect the entomofauna varieties that benefit the environment, such as pollinating insects etc.

Pollination

Currently, CMPC has areas of conservation and protection that are not subject to any type of operations, which is an excellent opportunity for the process of pollen transfer.

In terms of beekeeping, work is being done by CMPC, Arauco, PEFC, and INFOR in which the composition of honey from apiaries located in management units gets assessed. This showed that eucalyptus plays a key role in the final product's composition.

Operational plantations with proper sanitation are not only productive, but they serve as a refuge for a wide variety of animals and plants and provides the conditions for their continued growth. This includes pollinating insects, indispensable for the reproduction of many species of native flora. They also provide habitat for birds and small pollinating mammals like hummingbirds and bats.

Plantations increase the availability and variability of pollen (eucalyptus).

Impacts

Biological pest control has no impact on other ecosystem services, only on the target pest and the crop that is being protected. This means it does not affect the service provision in natural environments although it does benefit the service provision on plantations.

In forest plantations, pest control is mainly carried out by biological and silvicultural methods. This is important, since the negative effects on pollinator populations are minimized, which will help with reproduction in the protected and conservation areas.

Areas that need to have a chemical method used to combat a particular pest (Argentina and Brazil), neighbors are notified to remove their hives in event there are beekeepers nearby.

When weed control is implemented, floral supply can be affected by impacting bee activity.

Potential development opportunities

Investigate and conduct risk analyses of the principle pests and their controllers that are available in other countries and the potential impacts they may cause.

Design studies in native forest for increasing pest-related knowledge that could affect them.

Research new pesticides and herbicides that do not adversely affect pollinators.

Establish native tree windbreaks associated with the landscape management of plantations to which pollinating species can be incorporated.

Keep the asset database updated with information on neighbors' beekeeping activities and improve notification protocol to neighbors when chemicals are about to be applied,

Review of enabling conditions

Partnerships for developing ecosystem services

Current status

- Argentina: INTA Montecarlo, National Service for Food Health and Quality (SENASA), Inst. of Microbiology and Agricultural Zoology (ImyZA).
- Brazil: Forest Research Institute (IPEF – PROTEF), EMBRAPA FLORESTA.
- Chile: Phytosanitary Forest Protection Consortium (CPF), Universidad de Concepción and Austral, SAG.

Potential development opportunities

Partnerships will be created based on the biological controls that need to be developed.

Financing mechanisms

Current status

In partnership with the Phytosanitary Forest Protection Consortium (Ch), funds have been secured from the State in addition to the Company's own resources for the development of this ecosystem service.

Potential development opportunities

National grant competitions for studies regarding native forest.

Applicable regulations

Current status

- Argentina: General Environmental Law No. 25.675-2002, Resolution-715-1998-SENASA - National Service for Food Health and Quality (regulates the introduction of biocontrol agents in Argentina), Law No. 6025 Corrientes, 2010: It declares beekeeping activity of Provincial Interest and provides for its promotion and development by protecting honey bees as useful and beneficial insects.
- Chile: There is a wealth of regulations on pest control associated with restrictions and quaternary areas that regulate this activity. Resolution No. 2.229 of 2001 (SAG) is one of the requirements that must be met when wishing to bring biological control agents and pollinators (except bees) to the country that have the ability to multiply.

Potential development opportunities

The standards will be analyzed upon publication.

Application of innovative technologies for more effective monitoring, measurement, identification, and others

Current status

- Chile: Extensive development in the introduction and multiplication of biological controllers of various pests (e.g. Orgilus obscurator for Rhyacionia buoliana or pine tip moth).

Direct evaluation of the presence of biocontrol agents in infestations (control level) is done on plantations, measured through analysis of laboratory, morphological or molecular samples with indirect monitoring through the population assessment of the pest in the field done by specialized personnel.

- Argentina: The presence and abundance of *Sirex noctilio* is assessed through sequential sampling methods.

Parasitism is closely scrutinized in the laboratory, both with wasps emerging from the material inoculated with the biocontrol agent and those emerging from non-inoculated trees.

Use of GPS to geo-reference ants' nests

- Brazil: Monitoring of population fluctuation with yellow glue traps.

Potential development opportunities

Investigation and monitoring of infestation in conservation and protection areas.

Monitoring of the presence of pollinators.

Use of drones, satellite and thermal images for infestation monitoring.

Indicators (KPI)

Current status

- Evaluation of infested terrain: area, infestation percentage, pest rate percentage/ha.

- Biological control of various pests: Surface area where it was applied.
- Evaluation of pest parasitism by percentage.

Potential development opportunities

- Percentage of infestation/ha.
- Percentage of severity/trees/ha.
- Loss value due to pests: USD/ha

ACTIVITIES FOR THE DEVELOPMENT OF ECOSYSTEM SERVICES

PILLAR: ES		SUBCATEGORY: POLLINATION AND BIOLOGICAL PEST CONTROL		
PRESSURE: INVASIVE SPECIES				
ACTIVITY/ INITIATIVE	**SHORT TERM (0-3 YEARS)**	**MEDIUM TERM (4-10 YEARS)**	**GOVERNANCE (DEPARTMENT)**	**EXPECTED RESULTS**
Conduct studies on the native forests to increase the knowledge base about pests that may affect them	●	●	Technology and Planning / Phytosanitary Protection	Increase awareness about the ES biodiversity, and NbS in order to reduce pressures on the pillars
Research and analyze the principal pest risks that exist in other countries, their biocontrol agents and any potential impacts that could result.	●	●	Technology and Planning / Phytosanitary Protection	Improve the forestry practices to properly protect the ES (lessen the negative impacts)

PILLAR: ES	SUBCATEGORY: BIOLOGICAL PEST CONTROL AND POLLINATION			
PRESSURE: CONTAMINATION				
ACTIVITY/ INITIATIVE	**SHORT TERM (0-3 YEARS)**	**MEDIUM TERM (4-10 YEARS)**	**GOVERNANCE (DEPARTMENT)**	**EXPECTED RESULTS**
Research new pesticides and herbicides that don't negatively affect pollinators	●	●	Technology and Planning / Phytosanitary Protection	Improve the forestry practices to properly protect the ES (lessen the negative impacts)

PILLAR: ES	SUBCATEGORY: BIOLOGICAL PEST CONTROL AND POLLINATION			
PRESSURE: DIRECT USE (use of biological resources)				
ACTIVITY/ INITIATIVE	**SHORT TERM (0-3 YEARS)**	**MEDIUM TERM (4-10 YEARS)**	**GOVERNANCE (DEPARTMENT)**	**EXPECTED RESULTS**
Keep the property database of neighbors updated in terms of beekeeping activities and improve the protocol to notify them whenever chemical products are to be applied.	●		Relations Operations and Relations	Improve the forestry practices to effectively protection of the ES (decrease the negative impacts)
Create native tree walls to which insect pollinators can be added for the purposes of landscape improvement on plantations	●		Technology and Planning/ Operations (planting)	Improve the forestry practices to effectively protection of the ES (decrease the negative impacts)

2.3.6 Formation and conservation of soil fertility, nutrient cycling and erosion prevention

Importance of the ecosystem service

Current status

Soil is a natural element composed of minerals, water, gases and organic material that arises from a combination of geological, climate and biological factors. Its sustainable use is the very foundation of CMPC's forest resources and the key to its continuity over time.

Plantations and areas of protection and conservation play a significant role in maintaining the productive potential of the terrain, reduction erosion losses and maintaining the water quality and hydrological flows, supporting the soil formation and fertility conservation, nutrient cycling and erosion prevention.

The techniques used in forest harvesting, land development and establishment are intended to minimize the impact on the loss of productive land potential and water quality.

Some relevant considerations include:

- The seasonality and type of equipment used in harvesting depends on the soil's fragility and gradient, which can limit logging during the winter under certain conditions.

- Controlled burns done for land clearance are employed only in case of an existing risk to neighboring communities. Fire is not used in this way under other conditions. This favors the maintenance of an organic soil stratum that is ready for planting that also reduces the erosion potential.

- In order to keep potential nutrient contaminations under control, fertilizers used in plantations are all slow release and get applied to the planting hole. This enables a significant reduction in the amounts of nutrients that get taken up and any losses due to runoff, percolation or volatilization.

- CMPC uses its industrial biomass by- products like fine ash, dregs and wood biomass fine particles to improve the pH condition and organic matter content and ultimately the nutritional level and some physical properties (moisture retention) of soils that have been somewhat degraded. This is applied to the plantations just once during the entire rotation period and only on plantations two years of age or younger.

We have worked on ravine control under highly specific cases of fragile and very eroded soils. Yumbel-Empedrado is one example of this.

Impacts

The biggest soil impacts caused by forestry may be related to:

- Forest fires that significantly affect soil conditions by eliminating its organic matter, saturating its pores to produce surface runoff and erosive processes.

- Plantation harvesting and road construction for transporting wood.

- Biomass extraction work done using debris from harvesting on certain soil types and gradients can seriously affect productivity over the long term.

- The preparation of soil with subsoiling that doesn't consider contour lines.

- Inadequate waste distribution.

The correct planning and execution of this work will mitigate these impacts by considering the right equipment, season of the year that the work is being done and the soil types.

Potential development opportunities

- Come up with new techniques and models for preventing and quantifying soil losses.

- Start a soil loss monitoring program.

- Map out risks and critical areas for soil conservation in order to optimize the proper planning and execution of forestry operations

- Design a strategy to reduce excessive crop waste so as to prevent fire risks and their negative effects on the soil. For example: Mechanized crushing, fuel use by local communities, and more.

- Guide the planning and execution of forestry operations in light of potential soil loss and fragility.

- Educate about the positive effect of forest plantations on soil preservation (historical role in erosion control).

- Systematically address limiting ravine formation on CMPC properties.

- Maintain/increase forest productivity, preserving soil fertility (examples: species selection, fertilization systems in future rotations, amendments, others).

Review of enabling conditions

Partnerships for developing this ecosystem service

Current status

CMPC has entered into a number of partnerships with several types of stakeholders in order to develop this pillar. Their categories include:

- Universities and research centers, public and private, foreign and international. For example:

  - Argentina: U. Federal de Santa Maria and Forest Nutrition Cooperative (FNC) in the State of North Carolina
  - Brazil: Universidades Federales de RS
  - Chile: Universidad de Concepción, Universidad Austral and FNC in the State of North Carolina)

- Government entities (national or regional).

- Business representation entities (national and international).

Potential development opportunities

- Work on technical issues through trade associations; invite other productive sectors, such as farming.
- Partner with the public sector (such as the Ministry of the Environment in Chile).

Financing mechanisms

Current status

CMPC uses its own capital to develop this ecosystem service.

Potential development opportunities

- CMPC Chile commitments with certification seals and research centers.
- Legislation for specific projects.
- VAT discount for research work (R+D).
- Banking with green bonds (recovery of degraded soils).

Applicable regulations

Current status

- Chile: Law No. 19.561 (1998) Amending Decree Law No. 701 on Forestry Development, and Decree 193 (1998) Approving General Regulations for Decree Law No. 701.
- PEFC and FSC certifications.

Potential development opportunities

Amendments to the Environmental Impact Assessment System (Ch).

Application of innovative technologies for more effective monitoring, measurement, identification, and others

Current status

- Monitoring of areas and plots with soil losses.
- Mechanisms associated with specific projects by subsidiary under agreements made with research institutions and universities.

- Georeferenced site productivity.
- Water erosion monitoring.
- Productivity zones and soil types.

Potential development opportunities

- Remote sensing, drones and multispectral images
- Implementation of permanent monitoring programs for soil losses and gains.
- Site productivity simulators as a function of the possible soil management scenarios.
- Increase nutrient cycling studies, incorporate organic matter and biological soil properties.
- Extend the use of NIR for nutrient verification

Indicators (KPI)

Current status

- No direct soil indicator.
- Plantation productivity MAI (Mean Annual Increment)/ha - Rotation No. (indirect method).
- Soil and plant nutritional levels (%, mg).

Potential development opportunities

- Sedimentation values (ton/ha)

ACTIVITIES FOR THE DEVELOPMENT OF ECOSYSTEM SERVICES

PILLAR: ES		SUBCATEGORY: FORMATION AND CONSERVATION OF SOIL FERTILITY, NUTRIENT CYCLING AND EROSION PREVENTION		
PRESSURE: LAND USE CHANGE				
ACTIVITY/ INITIATIVE	**SHORT TERM (0-3 YEARS)**	**MEDIUM TERM (4-10 YEARS)**	**GOVERNANCE (DEPARTMENT)**	**EXPECTED RESULTS**
Systematically limit ravine formation on CMPC's land assets	●	●	Technology and Planning / Forestry Development	Improve forestry practices in order to reduce the negative impacts on the pillars.
Draw up risk and critical areas maps for soil conservation with the aim of optimizing proper planning and execution of forestry operations	●		Technology and Planning / Forestry Development	
Maintain / increase the forests' productivity while preserving the soil's fertility. This is done through species selection, fertilization systems for future rotations, amendments, etc.	●	●	Technology and Planning - Operations (Planting)	
Guide the planning and execution of forestry operations as a function of the loss potentials and soil fragility	●		Technology and Planning - Operations (Planting)	
Come up with new techniques and models for preventing and quantifying soil losses.	●	●	Technology and Planning / Forestry Development	
Implement program of monitoring of soil loss	●	●	Technology and Planning / Forestry Development	

PILLAR: ES	SUBCATEGORY: FORMATION AND CONSERVATION OF SOIL FERTILITY, NUTRIENT CYCLING AND EROSION PREVENTION			
PRESSURE: HUMAN INTRUSIONS AND DISTURBANCES				
ACTIVITY/ INITIATIVE	**SHORT TERM (0-3 YEARS)**	**MEDIUM TERM (4-10 YEARS)**	**GOVERNANCE (DEPARTMENT)**	**EXPECTED RESULTS**
Educate about the positive effects of forest plantations on soil preservation (historical role in erosion control)	●	●	Public Affairs - Forest	Improve the positioning of the value of CMPC and the industry in social, economic and environmental arenas regarding key stakeholder relations and the social legitimacy of its operations

3. **Nature-based Solutions** (NbS)

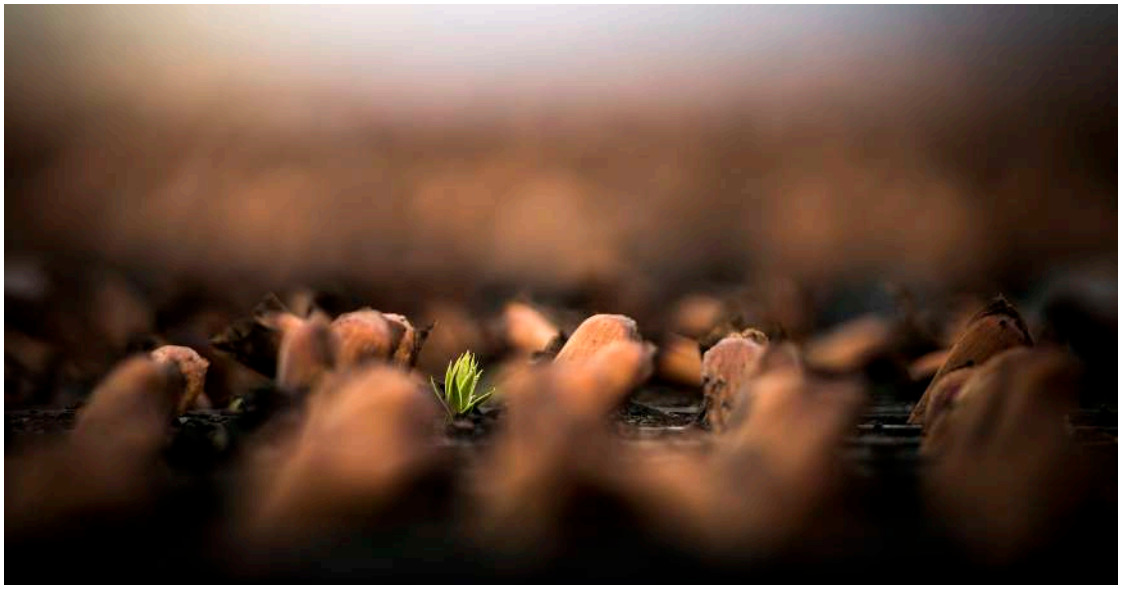
3.1 Definition

These measures are designed to protect, manage and sustainably restore natural or altered ecosystems in a bid to address societal challenges in an effective and adaptable way while simultaneously supporting human well- being and benefitting biodiversity[1].

The overall aim is to help society develop properly and safeguard human well-being in a way that reflects cultural and societal norms and to also reinforce ecosystems' resilience and capacity for renewal and service provision.

Nature-based Solutions begin with the notion that, when ecosystems are healthy and well managed, they provide people with essential benefits and services that enables us to take on the great challenges in society, such as climate change (reducing greenhouse gas emissions), water security (ensuring the safety of water resources), human health (making the air cleaner to breathe), food safety and social and economic development.

[1] UICN. (2016). *WCC-2016-Res-069-SP. Definición de soluciones basadas en la naturaleza.* https://portals.iucn.org/library/sites/library/files/resrecfiles/WCC_2016_RES_069_ES.pdf



3.1.1 Preliminary principles of Nature-based Solutions

The preliminary principles listed below must always be considered when designing Nature-based Solutions (NbS):

- NbS adhere to the rules and principles of nature conservation.
- They can be implemented autonomously or integrated with other solutions to the challenges facing society (e.g. technological and engineering solutions).
- They are determined by natural and cultural contexts whose implementation is site-specific. This includes traditional, local and scientific knowledge.
- They provide social benefits in a fair and equitable manner, which promotes transparency and broad participation.
- They maintain biological and cultural diversity and the ability of ecosystems to evolve over time.
- They are applied at landscape scale.
- They recognize and address the trade-offs between obtaining a few economic benefits through immediate development and future options for producing the full range of ecosystem services.
- These form an integral part of the overall design of policies and measures or actions aimed at addressing a specific societal challenge.

3.2 CMPC's approach

CMPC currently carries out Nature-based Solutions on its properties that have four main approaches for continuing to improve the protection and conservation areas from several different perspectives:

- **Climate change mitigation and adaptation**
- **Ecosystem restoration**
- **Natural infrastructure for water security**
- **Disaster risk reduction (with a special emphasis on wildfires)**

Figure 3: Source IUCN.

Table 8: FAO. (2023). Ecosystems services and biodiversity. https://www.fao.org/ecosystem-services-biodiversity/en/

The NbS are a way to visualize the Nature, Conservation and Biodiversity Strategy's contribution to society, bearing in mind that each one has a different relevance for each individual stakeholder. They all have a special connection to climate change adaptation and mitigation, where their unique roles take on great significance.

Not all NbS can be executed in every area because of varying environmental or social criteria. The approach to take for each NbS will be highly dependent on the terrain. In addition, the NbS are actions that contribute to society's development by their very definition, so the target groups they are designed for must also be clearly specified (local residents, cities, the entire country, and more), and their particular impacts on each group must be measured.

The following table contains a few of the current CMPC practices that are considered NbS that can be enhanced via the Strategy.

The prioritized NbS are detailed in *Table 8*:

Figure 3

Societal Challenge	NbS approach	CMPC practices
Effects of climate change	Mitigation and adaptation to climate change based on ecosystems based on ecosystems	**Adaptation:** Conservation, protection and restoration on steep gradients to prevent landslide and runoff risks. Maintenance of vegetation cover around water bodies to maintain the water cycle and address drought. Implementation of preventive forestry to stave off forest fires and limit ecosystem damage and CO2 release. **Mitigation:** Carbon capture and sequestration through protection and conservation areas, increasing their coverage. Plantations also help maintain carbon stocks. Restoration of degraded soils to maintain C cycle of soils. Make products whose production processes sequester carbon, replacing other high-emissions goods.
Degradation and loss of ecosystems	Restoration of critical ecosystems	Restoration of critical ecosystems that offer high-value ES to the communities: water supply, non-wood forest resources, etc., and/or high biodiversity values.
Exposure to natural disasters	Disaster risk reduction (fires)	Natural infrastructure of forests and riparian ecosystems that reduce the spread of forest fires and regulate water cycles in the event of heavy rainfall. Sustainable Forest Management coupled with landscape management to maintain a mosaic of ecosystems for fire control. Safeguarding conservation attributes in areas under special protection using ongoing monitoring and sustainable management methods. Hillside stabilization to reduce landslide risk. Site specific silviculture meant for fire prevention.
Water shortage	Natural infrastructure for water security	Protection of riparian ecosystems by preventing sedimentation and regulating water cycles. HCVA services maintenance for community water supply. Improving water quality through wetland systems (phytoremediation).

Table 8

3.3 Development

3.3.1 Climate change mitigation and adaptation

Importance of NbS

Current status

Climate change mitigation associated with forestry mainly has to do with carbon sequestration. is the most important contributioItn to carbon neutrality in terms of scale. By way of example, the forestry sector in Chile constitutes 50% of the total carbon capture needed for achieving neutrality at the country level by 2050.

All countries in the CMPC businesses estimate plantation-wide carbon stocks, although the need to standardize criteria and move towards a more precise account is clearly needed, at least on an annual basis.

The main differences between countries have to do with the dimensions they consider in their carbon estimates, which depend on available local information regarding biomass and carbon in biomass for each dimension.

Another important aspect to consider in climate change management is that proper plantation management is done in order to prevent the spread of forest fires. In CMPC Chile although there are advances and places where it is being done, we must move to landscape-scale management in the more susceptible regions. One must recall that fires are one of the most significant causes of ecosystem degradation in addition to being a major source of emissions due to the loss of potential capture by decreasing the forests' land area.

Forest plantations play an important role in climate change. During the rotation period they absorb and store carbon and help remove CO2 molecules from the atmosphere.

This capacity varies depending on the species, management type and rotation length (8, 10, 12 or 15 years or more, depending on a plantation's purpose).

Generally, high-yield genotypes have a higher absorption of "kg C / (m2 year)" in comparison with low-yield genotypes, which of course translates into more productive sites as well.

Plantations play an important role in society by providing biofuel for industry and neighboring communities, decreasing the potential fuel loads (as is the case with grazing contracts), which decreases the chances of forest fires getting started.

Nature-based Solutions will help plantations maintain forest productivity over the long term, reducing productivity losses and preserving natural conservation and restoration forests. They also help increase carbon sequestration with management practices and the sale of carbon credits, productivity improvement and loss reduction.

Benefits can be verified through the numerous models on carbon absorption by plantations. This can be demonstrated through a carbon account that includes the cadastral base, the ratio of above- and belowground biomass of each genotype and their capacity to absorb and store carbon during the rotation period. Currently, we have the emissions inventory and the inventory estimated by the GHG protocol method. In these studies one must pay attention to emissions that come from decomposing forest residues and compare them with the absorption dynamics of the developing forest.

Negative impacts of plantations on NbS

The impacts and risks are found in the process of mechanized forestry operation (harvesting, transport, habilitation, etc.) as a result of greenhouse gas emissions, and the cessation of carbon absorption upon harvesting plantations that had been fixing carbon. Gas emissions are initiated by the decomposition of leaves, branches and bark that remain in the soil after harvest. Research results show that this emission is offset in the first year of eucalyptus forest plantation and growth.

The rotation period is what determines the emissions' impact. The relationship between the areas that are planted and those that are harvested must be analyzed. The ratio needs to be reviewed to see if it is sufficient for a positive carbon balance.

Potential development opportunities

There is great development potential for climate change mitigation in forest plantations by choosing the best species, varieties or materials and management plans that ensure the best use and adaptation of the site to the climate in order to achieve productivity that approximates the site's actual potential while considering its restrictions, thus maximizing carbon capture and storage.

The maintenance of forest plantations with extended rotation periods is one way to increase carbon sequestration. CMPC is studying this option's feasibility, together with the succession of native forests.

The management of natural forests can activate processes of regeneration and greater yield growth with the subsequent increase in carbon sequestration. CMPC Chile has 150,000 ha of natural forests and protection areas with a management potential of approximately 20%. Pursuing this activity with the advice of the indicated stakeholders can increase the carbon fixation of some forest floors that would otherwise only degrade and even become emitters instead of fixers. The feasibility analysis must also be done for areas of native forest in Brazil.

The feasibility of entering the carbon market must be reviewed by appraising the fixation potential for the two activities mentioned above, which is one way to add more value to CMPC's natural capital.

Productive areas must be diversified, using mosaic planting by age and species to incorporate into the native forest landscape, particularly in critical areas where no high-productivity environmental resources are available (occupancy rate, stocking, genotypes, climate, soils, relief). In addition, the relationship between productivity and water flows must be considered.

Explore the potential of using forest plantations with extended rotation periods as carbon sinks.

It is important to explore new species, varieties, proper landscape treatment and management, to maximize carbon sequestration in light of the environmental modifications that may be made due to climate change (increase in temperature, water) reductions and more).

Review of enabling conditions

Partnerships for NbS development

Current status

In order to develop this pillar, CMPC has entered into various partnerships with different stakeholder categories. They can be grouped into the following:

- Universities and research centers (public and private).
- Government entities (national or regional).
- NGOs (domestic and international).
- Business representation entities (domestic and international).
- Others (companies, members of civil society, and other stakeholders).

The cemented partnerships are associated with multiple initiatives for the various NbS.

Potential development opportunities

- In terms of climate change, expand partnerships with key actors to develop new initiatives for carbon capture and progress toward their economic valorization.

Financing mechanisms

Current status

At present in terms of financing, CMPC is pursuing Nature-based Solutions using its own capital resources.

Potential development opportunities

Future financing possibilities for NbS that mitigate and adapt to climate change via carbon credits (carbon sequestration with planted and native forests) should be explored.

Applicable regulations

Current status

Regarding climate change mitigation and adaptation, some international treaties are applicable to all three countries included in the Strategy, such as the Paris Agreement on neutral greenhouse gas emissions. On the occasion of COP26, CMPC joined the "Race to Zero" campaign, which is a voluntary commitment the company made to neutralize its emissions with carbon fixation by 2050.

Potential development opportunities

The future new constitution currently being drafted in Chile may contain amendments regarding climate change mitigation and adaptation.

Application of innovative technologies for more effective monitoring, measurement, identification, and others

Current status

Land assessment using images (planted surface area), measurement of biomass of plantations and natural forests and emission inventories, which include an estimate of carbon sequestration by native and planted forests in line with the greenhouse gas protocol.

Potential development opportunities

- Biomass monitoring with LiDAR (natural forests).
- Carbon balance for different genotypes at different ages, management conditions and life cycle.
- Advance the research into the carbon capture estimates of other types of natural ecosystems found on the properties such as peatlands, wetlands, water bodies, and so on.
- Estimates of emissions from rural fires in different forest types and plantations.

Indicators (KPI)

Current status

- Productive forest land by species and age.
- Areas with native forests (by type).
- Carbon sequestration of productive species.
- Carbon stock inventories of plantations.

Potential development opportunities

- Carbon sequestration verification of native species.
- Effect of native forest management on capture rates.
- Overall carbon capture balance for all of CMPC's combined properties.

ACTIVITIES FOR DEVELOPING NATURE-BASED SOLUTIONS

PILLAR: NbS		SUBCATEGORY: CLIMATE CHANGE MITIGATION AND ADAPTATION		
PRESSURE: CLIMATE CHANGE				
ACTIVITY/ INITIATIVE	**SHORT TERM (0-3 YEARS)**	**MEDIUM TERM (4-10 YEARS)**	**GOVERNANCE (DEPARTMENT)**	**EXPECTED RESULTS**
Case reports that ensure the maximum use and the site's climate adaptation in order to achieve productivity as close to the site's potential as possible	●	●	Technology and Planning / Forestry Development	Increase the knowledge base about ES, biodiversity and the NbS to reduce pressure on biodiversity
Analysis of forest plantations' rotation period extensions in order to increase carbon sequestration (Coyhaique)	●	●	Technology and Planning / Forestry Development	
Estimates of emissions from rural fires in different forest types and plantations	●	●	Technology and Planning / Environmental Studies	
Advance the research into the carbon capture estimates of other types of natural ecosystems found on the properties such as peatlands, wetlands, water bodies, and so on.	●		Technology and Planning / Environmental Studies	
Review the feasibility of entering the carbon market by valuing carbon capture	●		Sustainability - Development	Net zero impact on the natural and social capital

3.3.2 Restoration

Importance of NbS

Current status

Ecological restoration is defined as an intentional activity that initiates or accelerates the recovery of an ecosystem with respect to its health, integrity and sustainability (SER, 2004)[1]. It can also be viewed as the way in which an ecosystem manages to return to its original state from which it was taken as a result of some human activity. It is a process of emulating the succession stages of different biological communities known to inhabit a given area until they achieve an autonomous, viable pathway to permanent establishment in that location.

Along with adding very important environmental values to existing ones, restoration is also a tool to promote standardization in the development of productive activities with the capacity to include new stakeholders in the process, and increase the ecosystem services of interest to our neighbors.

At the moment, there are two initiatives that have led to the development of ecological restoration work at CMPC:

- In 2012 CMPC Chile signed a voluntary commitment with FSC and environmental NGOs to restore the area of native forest replaced by plantations after 1994. This includes the restoration of 8,738 ha in the south central Chile and 1,130 ha associated with the Aysén project. The goal is to complete these projects by 2026 and 2028, respectively.

- Four important commitments to environmental sustainability were signed on the occasion of CMPC's 100 year anniversary, one of which is to increase the conservation and/or restoration area by 100,000 ha using 2018 as the baseline.

[1] Society for Ecological Restoration. (2004). *Principios de SER International sobre la Restauración Ecológica.* https://cdn.ymaws.com/www.ser.org/resource/resmgr/custompages/publications/ser_publications/ser_primer.pdf

The following priorities have been set to guide the site selection for creating and executing restoration programs:

Environmentally relevant selection criteria

- Restoration to increase the land area and populations living in degraded areas with species or forest types that have conservation problems.
- Restoration of the productive function of secondary forests and degraded adult forests (adaptive management of degraded secondary and native forests).
- The restoration of different ecosystems whose land area has decreased as of 1994.
- The restoration of protected areas and zones that facilitate connectivity between fragments of native forest that are pivotal to maintaining biodiversity.
- Increase the coverage of vegetation floors that occupy less than 10% of the land area of the company's properties.
- The restoration of eroded or degraded soils.
- Restoration in HCVA (High Conservation Value Areas).
- Creation of buffer zones in native forests and plantations adjacent to protected areas.
- Protect native forest from invasive species, preferably in protection areas..
- Give preference to priority sites determined by state environmental organizations.

Selection criteria of social relevance

- The restoration of micro-basins and watercourses (protection zones associated with watercourses and degraded soils) that supply water for human consumption to villages or communities close to them.
- The restoration and increase of land with vegetation cover for the production of medicinal plants or other non-wood forest products, with the active participation of local communities.

PILLAR: NATURE-BASED SOLUTIONS (NbS)
INITIATIVES IN PROGRESS

PROJECT: Restoring El Retiro and Junquillar

FINANCING
USD 480M (next 3 years)

AREA
458 ha

LOCATION
Angol, Region IX

OBJECTIVE:
Recover native forests by restoring riparian ecosystems in order to stabilize the Picoiquén riverbed, prevent riverbed overflow and erosion during periods of extreme rainfall and purify and improve water quality

PURPOSE

1. Restore native forest to recuperate biodiversity at the landscape scale.
2. Recoup scenic beauty.
3. Reduce fuels and waste found in the forest.
4. Provide areas for recreation, education and research.

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- Restoration for landscape purposes and visual impact.

- Recovery of other functions and services (re-creation).

Restoration initiatives consider multiple actions of a social and environmental nature and are generally long-term processes that require permanent attention. In addition, since the plantations' rotation periods range from 12 to 24 years, they end up becoming shelters while ecosystem services in the restoration process are being reset. This applies to fauna since animals find more viable habitat conditions compared to other production alternatives like agriculture or livestock.

In general, plantations can be considered as buffer areas, moderating hydrological cycles and erosive phenomena that may affect restoration areas.

Restoration's role on plantations:

- Increase and complement plantation ES, e.g.: Changes in the monotony of the landscape, greater possibilities associated with tourism and recreation, expansion of the variety of available NTFP, and increased biological biodiversity, and more.

- Mitigate the effect of threats like fires or pests.

- Complement the more traditional job opportunities offered by plantations.

- Sustain or improve relationships with neighbors and stakeholders by participating in its development and use.

Negative impacts of plantations on NbS

The main impact is the possible invasion of unwanted species where the restoration is being done, added to illegal felling, animal foraging and lack of disaster prevention measures in these areas, such as fires.

To mitigate potential restoration project impacts, we shall:

- Raise awareness in the communities about the importance and benefits of conservation areas by internal and external personnel of the restored areas. To this end, a communication and outreach program about the restoration projects underway must be created.
- Ramping up research with universities and NGOs to study impacts and seek solutions that will ensure the success of the restoration initiatives.

Potential development opportunities

Great potential for environmental and social value arising from the restoration activities that can be undertaken is foreseen, not only in light of the priorities that came out of the analysis of Company assets, but also by taking a broader view at the landscape level.

Under this mindset, the high-impact actions to take shall be as follows:

- Biological corridors or connectors linking high biodiversity hubs of the company with areas in the same conditions as third-party land, be it private or state-owned.
- Increasing the widths of protection areas Particularly in micro-watersheds associated with rural drinking water projects
- Increase the area of native forest hubs of recognized environmental or social significance.
- Technical and/or financial support for restoration efforts on third-party land for safeguarding biodiversity or restoring critical ESs, and if possible, working in partnership with relevant third parties (the academy, environmental NGOs or other companies, for example).

Research and assess management options and select suitable species to prevent negative impacts stemming from plantations that are nearby areas undergoing the restoration process.

Have forest planning and operations personnel gather substantially detailed information about the location, management and precautionary measures related to these areas to prevent damage from happening during operations.

- The act of restoration is a great opportunity for climate change mitigation by recovering degraded areas with low carbon sequestration in areas that are unsuitable for commercial plantations.

- Feasibility of building partnerships with academia, or environmental NGOs for research and setting up working groups to review the interactions happening between plantations and restoration areas.

- Engender new opportunities for local entrepreneurship in neighboring communities that do not have the opportunity to engage in traditional operational activities.

Review of enabling conditions

Partnerships for NbS development

Current Status

CMPC has entered into a number of partnerships with different stakeholder categories in order develop this pillar. They can be grouped as follows:

- Universities and research centers (public and private).

- Government entities (national or regional).

- NGOs (domestic and international).

- Business representation entities (domestic and international).

- Others (other companies, members of civil society).

The partnerships set up so far are associated with several initiatives for the various NbS.

Potential development opportunities

- Establish partnerships for restoration projects on third-party land, including other productive sectors (farmers, winegrowers, fruit growers), contributing CMPC's experience and management capacity to such initiatives.

- Grow and deepen the existing network of environmental NGOs in the area of restoration to explore new possibilities for joint participation.

Financing mechanisms

Current status

At present, the Nature-based Solutions at CMPC are paid for with the company's capital resources. Some of the funds come from the green bonds issued to pay for restoration initiatives.

Potential development opportunities

For restoration, partnerships must be set up with other forestry companies and/or NGOs to obtain shared financing. In terms of restoration for small and medium- sized landowners, the company may support their requests for specific state funds (e.g. +Bosques Project in Chile).

Applicable regulations

Current status

There are no legal bodies that address restoration in Chile, which is not good since there are others that restrict certain activities in a more generic way that end up limiting the restoration possibilities.

Potential development opportunities

There is potential for new developments in the following regulations in terms of restoration:

- Chile: MINAGRI Restoration Regulations (+Bosques), in preparation. Law No. 21.202 on Urban Wetlands.

- Argentina: FSC commitments and the Wetlands Law.

- Brazil: Rural Environmental Registry (CAR). Restoration phase.

Application of innovative technologies for more effective monitoring, measurement, identification, and others

Current status

- Measurement and monitoring of populations: satellite images, color, black and white, and multispectral aerial images, camera traps, drones with LiDAR equipment, Geographic Information Systems support (ArcInfo workstation, others).

- Vegetative propagation: Use of technologies for macro and micropropagation of species of interest in laboratories and nurseries, including somatic embryogenesis and tissue culture. Performing PCR and other genetic tests for determining filiation (phylogenesis) and species.

Potential development opportunities

Progress in the use of more accurate remote monitoring systems for image and sound. New applications in the use of drones such as fauna monitoring, seed sowing to restore hard-to-reach areas, sampling of foliage, water and soils. Determination of populations through e-DNA.

Carrying out community monitoring of the restoration commitments made with neighbors.

Indicators (KPI)

Current Status

- Annual and accumulated restored land area.

- Percentage of compliance with committed targets.

- Restoration cost per hectare.

- Introduced species removal surface in restoration areas.

Potential development opportunities

The indicators that can be projected in the future in terms of restoration depend on each country's particular situation, each restored area and the standard that is selected to follow for this activity.

Additionally, work should be done to gather data on the following indicators:

- Diversity, wealth, dominance and abundance indexes.

- Land area by restoration development status (started, in process, finished).
- Land area to be recovered in each recovery area.
- Cost of monitoring the restored area.
- Restoration begun on third-party properties (No. and land area).
- Evaluation of the social impact of restoration projects.

ACTIVITIES FOR DEVELOPING NATURE-BASED SOLUTIONS

PILLAR: NbS		SUBCATEGORY: RESTORATION		
PRESSURE: LAND USE CHANGE				
ACTIVITY/ INITIATIVE	**SHORT TERM (0-3 YEARS)**	**MEDIUM TERM (4-10 YEARS)**	**GOVERNANCE (DEPARTMENT)**	**EXPECTED RESULTS**
Support the forest restoration project in Nahuelbuta financed by the European Union	●		Sustainability	Increase the productive and protected hectares using landscape conservation models
Technical and/or financial support for the restoration efforts on third party land for the protection of biodiversity or establishment of critical ES, working insofar as possible through partnerships with key third party players (academia, NGOs, environmental or other businesses)	●		Technology and Planning / Restoration	Showcase the areas of Conservation and Biodiversity
Meet the voluntary commitment (1,130 ha) of Coyhaique FORMIN	●	●	Technology and Planning / Restoration	Increase the number of hectares under conservation and protection using the landscape conservation models and functional biological corridors
Meet the voluntary commitment (8,738 ha) of the South-central FORMIN	●	●	Technology and Planning / Restoration	Increase the number of hectares under conservation and protection using the landscape conservation models and functional biological corridors
Other restoration activities not outlined in the FSC Commitments compensation, post-fire restoration, etc.)	●	●	Technology and Planning / Restoration	Increase the number of hectares under conservation and protection using the landscape conservation models and functional biological corridors

PILLAR: NbS	SUBCATEGORY: RESTORATION

PRESSURE: DIRECT USE (use of biological resources)				
ACTIVITY/ INITIATIVE	**SHORT TERM (0-3 YEARS)**	**MEDIUM TERM (4-10 YEARS)**	**GOVERNANCE (DEPARTMENT)**	**EXPECTED RESULTS**
Have forest planning and operations personnel gather substantially detailed information about the location, management and precautionary measures related to these areas to prevent damage from happening during operations (training)	●		Sustainability -Technology and Planning / Restoration	Increase understanding of the ES, biodiversity and NbS to reduce pressures on the pillars

PILLAR: NbS	SUBCATEGORY: RESTORATION

PRESSURE: INVASIVE SPECIES				
ACTIVITY/ INITIATIVE	**SHORT TERM (0-3 YEARS)**	**MEDIUM TERM (4-10 YEARS)**	**GOVERNANCE (DEPARTMENT)**	**EXPECTED RESULTS**
Get rid of introduced species in protection and conservation areas	●	●	Technology and Planning / Restoration	Improve the forestry practices to lessen the negative impacts on the pillars

3.3.3 Natural water infrastructure

Importance of NbS

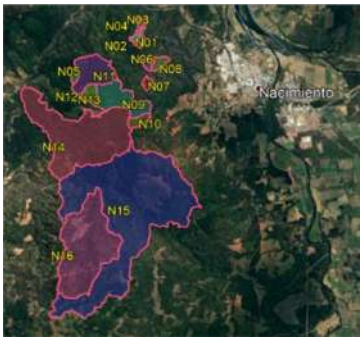
Current Status

The protection areas together with the soil behave like sponges, intercepting rain water and letting it filter down from the surface layer to the deeper soil layers, which results in groundwater recharge of the water table. The infiltrated water is distributed through the landscape in lateral and vertical flows. This water is retained in the clay pores and particles of clay soils. The pores in sandy soils are larger, thus limiting the connection between water and sand particles.

Forests play a key role in biodiversity maintenance, the water cycle and the climate, but in general the societal perception of the effects of forest plantations on water resources is a negative one, especially as concerns the genus Eucalyptus.

The quality of water resources gets compromised when harvesting and road construction tasks are inadequately performed. The particular benefits of carrying out NbS include: the maintenance of long-term forest productivity, ecological balance, local hydrological cycles and surface and groundwater in production areas and reduction of conflicts with the community in critical locations.

PILLAR: NATURE-BASED SOLUTIONS (NbS)
INITIATIVES IN PROGRESS



PROJECT: Hydrological study of CMPC-UACH basins

FINANCING
CLP 57 million / year 2022-2023-2024

LOCATION
Nacimiento, Region VIII

OBJECTIVE:
Generate baseline data for analyzing water availability in vulnerable basins and make management recommendations

PURPOSE

1. Determine the impact of plantations on the quantity and quality of water produced.
2. Analyze how micro-basins contribute to various land uses and its effect on water production.
3. Build alliances with academia.
4. Carry out mosaic planting of suitable ages and protection zones to increase the available water.

Impacts of plantations on NbS

Current Status

Studies have shown that when it comes to large basins, there is no relationship between the outflow and the different ways that land gets used. This means that the size of the area taken up with forest plantations has no impact on water availability in the basins. However, at the micro-basin level, plantations can reduce water availability (minimum flow and groundwater recharge). This is particularly true for critical areas that tend to have limited rainfall, sandy soils and hilly terrain. Nature-based measures may be needed in these places because the rainfall pattern may be insufficient to replace the same amount of water that forest plantations need to grow. The rainfall pattern varies both spatially and temporally and may be irregular in some places. Therefore, if any intervention is required, it should be done in view of the relationship between forests and water resources, including technical and scientific knowledge of water use, genotypes and local soil and climatic characteristics.

Potential development opportunities

The solution here is to manage the landscape in a way that takes the local physiography into account, assessing the carrying capacity of each environment and production site, as some sites may be underutilized. To this end, management strategies must be designed that are adapted to each country/region.

Plantation planning must take into account the availability of water resources, either for the plants' own growth or for the water supply to communities. Percentages of plantations by micro-basin, species composition, management type and rotation length should all be considered.

As water provision is vital for our neighbors, methods to improve its quantity and quality in supplying micro- basins should be reviewed. Topics for review include those associated with protection zones (width and specific composition) and effects of soil rehabilitation (subsoiling type and waste composition). These initiatives will help improve relationships with our stakeholders.

Fostering the restoration of water basins, watercourse protection areas, and rural drinking catchments is essential.

Review of enabling conditions

Partnerships for NbS development

In order to develop this pillar, CMPC has entered into various partnerships with different stakeholder categories. They can be grouped into the following:

- Universities and research centers (public and private).
- Government entities (national or regional).
- NGOs (domestic and international).
- Business representation entities (domestic and international).
- Others (other companies, members of civil society).

The cemented partnerships are associated with multiple initiatives for the various NbS.

Potential development opportunities

- Regarding water infrastructure, it is essential for CMPC to participate in the development of strategic public-private partnerships for managing and protecting watersheds that are connected to its properties in some way. E.g.: Voluntary Agreement for Watershed Management (AVGC) Picoiquen River.
- Expand and complement the existing database of information on watersheds of consequence to the company.

Financing mechanisms

Current status

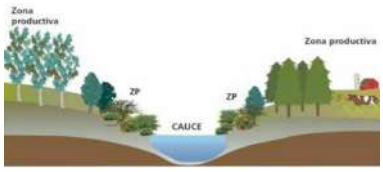
At present in terms of financing, CMPC is pursuing NbS using its own capital resources.

Applicable regulations

Current status

In the case of natural water infrastructure:

PILLAR: NATURE-BASED SOLUTIONS (NbS)
INITIATIVES IN PROGRESS



PROJECT: Expansion of Protection Zones (PZ)

FINANCING
USD 46M (own)

AREA
149 ha

LOCATION
Properties with rural potable water (20 micro-basins from Maule to Araucanía)

OBJECTIVE:
Foster the PZ, generating favorable conditions for protecting water quality while also improving the associated habitat and other ecosystem services they provide

PURPOSE

1. Ensure water quantity and quality in supplying micro-basins.
2. Promote the connectivity between biodiversity and the landscape.
3. Use own financing.
4. Increase carbon capture.
5. Build alliances with neighbors for restoration work.

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- Argentina: Law 25.675 General Environmental

Regime of Environmental Management of Waters (Law No. 25.688), Law on Minimum Budgets for Environmental Protection of Native Forests (No. 26.331)

- Brazil: National Water Resources Policy, Forest Code, protection of APPs (Areas of Permanent Protection/Preservation / LR (Legal Reserve).

- Chile: Native Forest Law, Regulation of soil, water and wetlands.

Application of innovative technologies for more effective monitoring, measurement, identification, and others

Current status

Water balance in experimental basins, flow and quality measurement, monitoring of collection points for consumption (quality), monitoring of water tables and water balance in the plantations.

Water use efficiency and forest productivity according to species (genotype), actual and potential evapotranspiration zoning (A/PET) and hydrological modeling.

Potential development opportunities

- Research and assess water use by different genotypes of pine and eucalyptus trees.

- Plantation zoning including new variables and modeling of vulnerable areas.

- Modeling of the establishment and management of plantations at the micro- basin level to determine effects on water availability and productivity.

- Studies related to protection zone composition and with as pertains to its position in the micro-basin and effect on the quantify and quality of the water produced.

Indicators (KPI)

Current status

- Water quality monitoring for physical and chemical parameters.
- Flow measurement.
- Number of HCVAs of forest services (water production).

Potential development opportunities

- Indicators of water quality standards in relation to forestry operations.
- Evaluation of traces of pesticides in watercourses.
- Identification of natural water infrastructure projects developed on company or third-party properties (location and characterization).
- Communications associated with water conflicts/disputes.
- Percentage of progress in managing communications in connection with water conflicts/disputes.

ACTIVITIES FOR DEVELOPING NATURE-BASED SOLUTIONS

PILLAR: NbS		SUBCATEGORY: NATURAL WATER INFRASTRUCTURE		
PRESSURE: DIRECT USE (USE OF BIOLOGICAL RESOURCES)				
ACTIVITY/ INITIATIVE	**SHORT TERM (0-3 YEARS)**	**MEDIUM TERM (4-10 YEARS)**	**GOVERNANCE (DEPARTMENT)**	**EXPECTED RESULTS**
Identification and monitoring of the HCVA services of the forest	●	●	Land Assets and Protection Technology and Planning / Environmental Studies	Showcase the areas of Conservation and Biodiversity
Re-implement the CMPC-UACH hydrological basin study		●	Technology and Planning / Environmental Studies	

3.3.4 Disaster risk reduction (fires)

The importance of NbS

Current status

The NbS of preventive silviculture is one measure taken on forest plantations that is quite significant when it comes to fire reduction.

This activity is done in conjunction with other measures to minimize forest residues from harvesting, such as in Brazil and Argentina where grazing contracts are signed with neighbors. In addition to the community benefits, this activity plays a crucial role in helping to reduce fine fuels scattered about the terrain.

Priorities for executing forestry operations of preventive silviculture in the interface zones of High Conservation Value Areas are set as a function of the particular vulnerability of these areas to impact or harm as a result of fires.

Currently, there is no interdependence between forestry operations in general and NbS designed to prevent rural or forestry disasters due to the fact that critical fire areas are not considered in the current planning method of forestry operations.

Mosaic harvesting generates less impact on biodiversity in large blocks of plantations. Additionally this action diminishes the amount of combustible material, reducing the risk of catastrophes.

The reduction of forest fuel loads, which facilitates the initiation and propagation of fires, reduces the risk of catastrophe due to this phenomenon in the conservation and plantation areas, ultimately improving relations with the community. To this end, work is being done on preventive forestry, a community network for fire prevention and coordination of controlled burns on third-party properties. The work done with neighboring cattle ranchers in Argentina is example of this.

Impacts of plantations on NbS

The main impact arising from forest plantations after the harvest is the spread of fires due to the high fuel load that remains in the forest stands and that can affect the conservation areas and surrounding communities.

PILLAR: NATURE-BASED SOLUTIONS (NbS)
INITIATIVES IN PROGRESS

PROJECT: Preventive forestry

AREA
12,094 ha (88% progress)

LOCATION
Company property

OBJECTIVE:
Prevent forest fires so as not to lose plantations, native forest, or infrastructure, or cause any socioeconomic harms to neighbors

PURPOSE

1. Prevent adverse effects on ES and local residents.
2. Work in partnership with the community, forestry companies and Conaf.
3. Reduce fuels and waste found in the forest.
4. Prevent climate change effects as a result of GHG emissions.

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The forest management of wastes with large fuel loads is the most critical variable due to the challenge of removing them. Reviewing management plans to reduce waste generation and assessing the economic impact of fire loss are critical tools.

Potential development opportunities

In terms of fires, a common plan should be drawn up for all countries and then particularly suited to each case with proper awareness of all the guidelines, actions and tools to internalize fire prevention at all levels of the organization. The impacts of fire loss in terms of conservation must be assessed.

Prevention measures in forest plantations should be considered from the moment the plantation is established, in line with the provisions of the Manual on Preventive Silviculture.

The key action for potential development of this NbS is joint work with the community to prevent fires (company property and community networks) by spreading awareness about the impact of intentional fires on their properties.

In the rural parts of the macro forest zone, firewood is commonly used for heating and cooking. Developing appropriate programs of firewood donation presents a huge opportunity for reducing fuel loads and building better relationships with local communities.

Cultivating the development of conservation areas collaboratively with the community would bring importance and value to forests, so as to eliminate the occurrence of forest fires.

Review of enabling conditions

Partnerships for NbS development

Current status

In order to develop this pillar, CMPC has entered into various partnerships with different stakeholder categories. They can be grouped into the following:

- Universities and research centers (public and private).

- Government entities (national or regional).
- NGOs (domestic and international).
- Business representation entities (domestic and international).
- Others (other companies, members of civil society).

The cemented partnerships are associated with multiple initiatives for the various NbS.

Potential development opportunities

- To help further reduce the risks of disasters, the alliance with community fire prevention networks should be reinforced, developing dissemination and awareness programs.
- Coordinate at the landscape level fire prevention actions together with other companies in the sector, other productive sectors (farmers), state entities and small landowners.
- Promote partnerships to conduct studies on geographic information systems and innovation.

Financing mechanisms for NbS

Current status

At present in terms of financing, CMPC is pursuing Nature-based Solutions using its own capital resources.

Applicable regulations

Current status

In regards to natural disaster reduction, there are regulations associated with the prevention and use of fire:

- Argentina: Law on minimum environmental protection budgets to control burning activities (No. 26.815).
- Brazil: FEPAM operating license.
- Chile: D.S. 276/1980 of MINAGRI, Decree 733/1982 Interior Min., Decree 100/1990 MINAGRI and Forest Law 4.363/1931.

Utilization of innovative technologies for more efficient and effective implementation of monitoring, measurement, identification and more.

Current status

Use of Wildfire Analyst simulator to determinate the likelihood of fire outbreaks and predict their progression according to climatic and topographic variables as well as fuel conditions.

Use of satellite images and aerial photographs to determine the progress of preventive forestry and fire damages.

Potential development opportunities

The following should be considered for future fire monitoring:

- Improvements to the Wildfires Analyst simulator and consequent improvements in fire behavior prediction.
- Land area saved using the simulator for each fire (for all three countries).
- Local temperatures assessment using sensors.
- ire monitoring with stationary and orbital satellites (OroraTech).

Indicators (KPI)

Current status

- Number of fires per season.
- Land area affected by fire (plantation and conservation area).
- Firebreaks maintenance land area.
- Numbers of community fire prevention network committees.
- Percentage of compliance with requested preventive measures.
- Percentage of compliance with preventive silviculture programs.

Potential development opportunities

- Quantification of community losses (No. of dwellings affected and No. of dwellings saved).
- Estimate of area not burned or saved (ha).

ACTIVITIES FOR DEVELOPING NATURE-BASED SOLUTIONS

PILLAR: NbS		SUBCATEGORY: DISASTER RISK REDUCTION (FIRES)		
PRESSURE:OTHER PRESSURES (FIRE)				
ACTIVITY/ INITIATIVE	**SHORT TERM (0-3 YEARS)**	**MEDIUM TERM (4-10 YEARS)**	**GOVERNANCE (DEPARTMENT)**	**EXPECTED RESULTS**
Preventive silviculture urban - rural interfaces	●	●	Assets and Protection / Forest Protection	Reduction of operational risks related to socio-environmental conflicts theft and fires among other aspects
Manage plantations so that they bring real protection for conservation areas. These activities may be associated with fuel reductions on the ground, pruning and firebreaks. Also consider measures to prevent water and wind erosion while having adequate access roads.	●	●	Assets and Protection / Forest Protection	

4. **Territory-wide perspective** (landscape scale planning)

4.1 Definition

A territory-wide perspective refers to having a complete landscape viewpoint; i.e., going beyond our own physical and operational limits when thinking about our impacts and contributions to biodiversity conservation and the services or solutions it provides, considering all the habitats and stakeholders in a given area.

4.2 CMPC's approach

The territory-wide perspective is the cross-cutting pillar that underpins the other three. It must be taken into account for operations and conservation efforts, incorporating different nuances depending on the specific area where we're working. This will help determine where there are development opportunities due to the pertinence of the territories, ecosystems and/or communities involved. Like the other pillars, operations must consider all the ways to minimize the territorial impact of operations and plantations, and how the different territories can be used according to their conservation potential, building connections with other potential areas and relevant stakeholders in this matter.

The territory viewpoint should always be a criterion used for determining the needed conservation measures that the Strategy should prioritize. It must be viewed as a way to understand the interactions between key aspects of biodiversity, ES and NbS.

Therefore, in strategic terms, conservation, protection and restoration activities must take into account their environmental and social impacts beyond the mere physical limits of the company premises, aiming to meet the goal of main- taining a territorial standpoint at the land- scape scale, building connections among fragmented ecosystems.

The involvement and participation of neighboring communities and other key actors in the region should be a fundamental part of the Strategy's implementation to ensure its validation and acceptance. This should be fulfilled by setting up participatory spaces with the community, listening to perspectives from the different territories, looking out for local interests, considering the rural landscape and generating well-being and shared value for all. In order to achieve the foregoing, some of the critical needs will be the participation and involvement of regional relationships departments, making agreements with local communities and producing medium-term work plans associated with the protection and conservation of the territories with ventures associated with environmental education, ecological tourism and the responsible use of ecosystem services.

Planning and figuring out which measures will be part of the conservation, protection and restoration plans will start at the global scale, based on global databases such as Intact Forest Landscapes (Global Forest Watch), Biosphere Reserves (Unesco), and RAMSAR sites.

From there this moves to the national and regional scales with the SNASPE (Chile) sites, SAG (Chile) protected species lists, etc. This concludes with a review at the local level with the presence of HCVA on company land, existing conservation and protection areas. There is data from the Ministry of the Environment, which has created a conservation and restoration project database that we can use to observe other territories (third parties) and identify potential territories for expansion.

In order to select new terrain for conservation, special importance must first be paid to the existing ecological conditions of the area, checking primarily for the presence or habitats of significant species, whether actual or potential habitats, depending on the distribution of the species.

Secondly, other variables must be analyzed such as social ones, for example, identifying communities that do not have sufficient local recreation areas. Currently there is a conservation gradient on CMPC land, meaning the conservation areas are not evenly distributed throughout the territory. Geographically speaking, they are mostly in areas with steep slopes and not so much in the central valley, such as sandy areas. They are mainly distributed south of the eighth and ninth regions. The foregoing must also be taken into account when addressing the potential for CMPC's conservation expansion in those regions.

Regarding the national territory, there is potential to guide the restoration based on the characteristics of CMPC's properties and that of third parties. Specifically, generating strategic partnerships with neighbors such as CONAF, Arauco, municipal governments, and others.Partnerships should be sought where priority forest types and biodiversity exist.

A key conservation option with a territorial perspective is the creation of biological corridors. Currently, CMPC has two biological corridor projects underway: 1. from the Fundo El Desprecio, to the Los Ruiles Reserve of CONAF and 2. in the Contulmo National Monument. This action must be harnessed and reinforced through the Strategy.

To choose the conservation actions within the Strategy, criteria of environmental and social relevance, previously stablished in the prioritization of restoration activities with ongoing processes, will be used. These are defined as follows:

Selection criteria of environmental importance:

- Increasing the land area and populations in degraded areas with species or forest types that have conservation problems.
- Maintenance of the productive function of secondary forests and degraded adult forests (adaptive management of renewables and degraded natural forests).
- Protection areas and zones that facilitate connectivity between fragments of native forest that are pivotal for maintaining biodiversity.
- Increase the coverage of vegetation floors, that cover an area of less than 10% of the company's assets.
- Recover eroded or degraded soils.
- Restore HCVA (High Conservation Value Areas) with degraded ecosystem services via the NbS.
- Creation of buffer zones in native forests and plantations adjacent to protected areas.
- Protection of the native forest from potentially invasive species, preferably in protection areas.
- Give preference to priority sites of the EAS.

Selection criteria of social importance:

- Basins, micro-basins and watercourses (protection zones associated with watercourses and degraded soils), which supply human water to nearby towns or communities.
- Increase in the land area of vegetation zones for making medicinal plants or other non-wood forest products with the active participation of communities.
- Landscape purposes and visual impact.
- Recovery of other functions and ES.

FUTURE CHALLENGES

Due to the changing world in which we live, the Nature, Conservation and Biodiversity Strategy must be reviewed periodically to include new actions that help achieve its purpose, responding to the demands coming from stakeholder groups and the challenges of the company itself while adopting the technological changes and innovation produced through research.

The implementation of a specific organizational structure for executing the entirety of the Strategy is another key challenge.

The Nature, Conservation and Biodiversity strategy is an integral part of the company's 2030 Strategy, in which CMPC has set out to not only place 100,000 more hectares under conservation and protection, it has set itself the challenge of connecting the company's current 389,000 hectares under conservation with 850,000 hectares of third-party land by 2030. Thus, the aim is to set up biological corridors that help enhance conservation efforts in the territories where the Company operates, enhancing cooperation with public and private entities in conservation in order to counteract the fragmentation of wild areas and the problems that arise therefrom.

This includes the isolation of natural species and populations that are ecologically harmful to wildlife. The connectivity between wilderness, protection areas and national parks is a crucial element.

ANNEXES

Annex: **Prioritization of activities**

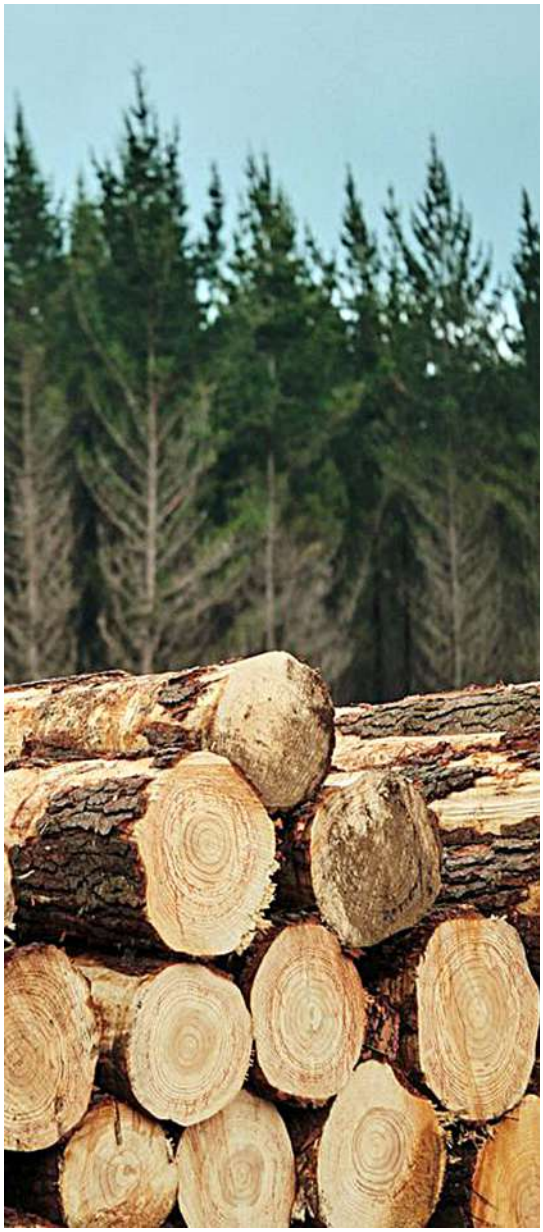
Table 9: Impact matrix and enabling conditions. Table of own elaboration, based on the NGPTA work *Maule Landscape Recovery Fund,* 2021.

Development of an example for prioritizing pressures and associated activities

For the Ecosystem services pillar, the pressure "Wild fires" was identified, which was evaluated with a very high score in scope, because it is likely that the pressure is generalized and affects species, habitats and/or ecosystem services in all or the majority of assets (71-100%). For its part, the severity of the pressure is also very high in said pillar, since it is likely to destroy or eliminate habitats and ecosystem services or reduce species populations by 71-100%.

The description of the activity prioritization matrix can be seen in chapter 3.

Once the scope and severity of the pressure is defined, a series of initiatives and actions are evaluated and prioritized to more efficiently face the identified pressure: "Wild fires". This is done through an impact matrix and enabling conditions (*Table 9*), where the impact generated by said initiative is evaluated in 6 parameters (Environmental impact, Social impact, Reputational impact, Required resources, Alliances and Regulatory frameworks), grading them with values of 1, 3 or 6 (6 being the highest priority).



	IMPACT ENVIRONMENTAL	IMPACT SOCIAL	IMPACT REPUTATIONAL	RESOURCES REQUIRED	ALLIANCES	FRAMEWORKS REGULATORY
WEIGHTING	20%	20%	20%	20%	10%	10%
SCORE	**6**	**3**	**3**	**6**	**6**	**6**
DEFINITION	Positive impacts at the landscape level are generated	Generates benefits only for nearby communities.	Impacts and media at the local and regional levels.	Resources required less than or equal to MUSD 50/ year.	Not required	Regulated by easily implemented legislation.

Table 9

The result of 4.8 (6*0.20 + 3*0.20 + 3*0.20 + 6*0.20 + 6*0.10 + 6*0.10) is obtained from the sum of the weighted ratings of the “Wild fires” pressure, for each of the 6 parameters defined in *Table 9*. This value corresponds to the most relevant activity to respond to the indicated pressure, also assigning timing of action in the short and medium term, responsible of its materialization and expected results after its execution: "Generate a strategy to reduce excessive harvest debris, to avoid fire risks and their negative effects on the soil". The above can be achieved, for example, through mechanized crushing, use of said waste by communities as fuel, among others.

Special thanks to:

Paula Aguirre

Cyntia Almada

Elias Araujo

Hector Ávila

Rodrigo Barneche

Germán Becerro

Julio Becker

Natalia Bilbao

Darlan Bonacina

Norton Borges

Francisco Caporal

Miguel Castillo

Sergio Cerda

Maycon Damasceno

José Carlos de Deus Jr

Catalina Ebensperger

Luciana Esber

Juliana Gomes

Jessica Grevinet

Eugenio Hernandez

Patricio Herranz

Helio Inostroza

Pablo Ivaciuta

Ignacio Lira

Michela Marchesani

Alamiro Navarrete

Mauricio Parra

Matías Pincheira

Tiago Rafael

Francisco Reveco

Paulina Rodríguez

Francisco Rodríguez

Rebeca Sanhueza

Osmarino Santos

Raúl Serrano

Raúl Schenone

Pablo Storti

Eduardo Stumpf

Claudio Torrubiano

Rafael Trujillo

Juan Carlos Valencia

Álvaro Zapata

Lourdes Zismann

CMPC's Nature, Conservation and Biodiversity Strategy

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