BIODIVERSITY CONSERVATION INITIATIVE NAME

Document prepared by Fundación Huellas para un Futuro

Name of the initiative	Aponapó Rainforest Reserve
Initiative holder	Fundación Huellas para un Futuro
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Initiative participants	Team members from Fundación Huellas para un Futuro (http://www.huellasparaunfuturo.org/about-us/)
Version	V1
Date	19/04/2025
Initiative Conservation activities	**Conservation Activities in the Aponapó Reserve** **Preservation** • Isolation of sensitive areas and establishment of ecological buffers • Fragmentation control and protection of native forest remnants

	• Monitoring and patrolling using drones, camera traps, and park rangers • Hunting and fishing restrictions • Informative signage and visitor access control • Invasive species management • Protection of wetlands, springs, and watercourses • Regulation of tourism and recreational zones • Protection of IUCN Red List species • Conservation of rare or endangered habitats and ecosystems • Establishment of permanent monitoring plots • Protection of culturally important species for local communities **Ecological Restoration** • Restoration of degraded areas (function, structure, composition) • Rehabilitation of ecosystem productivity and services • Recovery of ecosystem utility, including cultural and touristic uses • Removal of degradation drivers (e.g. cattle, invasive species, overuse) • Registration of seed trees as germplasm banks • Nursery production of native species for enrichment • Restoration of forest connectivity and biological corridors • Regeneration of native forest through transitional planting of Pinus taeda. • Forest cover recovery in pastures • Wetland and watershed restoration

	• Erosion control and soil restoration **Sustainable Use** • Seasonal bans and physical barriers in critical areas • Controlled public access in fragile ecosystems • Restriction of heavy/damaging machinery • Soil nutrient recycling through agroecological practices • Sustainable agriculture (e.g. shade-grown yerba mate, stevia, pitanga) • Elimination of synthetic agrochemicals • Research and development under the CBD/ Nagoya Protocol • Community participation • Capacity-building and training • Environmental education programs • Knowledge generation **Conservation Mechanisms / Landscape Management Tools (LMT)** • Biological and conservation corridors • Mini-corridors (vegetative strips in productive areas) • Live fences (hedgerows for connectivity and ecosystem protection) • Enrichment planting with native species • Species supplementation for ecological functionality • Multipurpose forests (e.g., agroforestry systems with yerba mate) • Conversion of pastures to forest cover • Restoration of hydrological regimes in wetlands

Grouped initiative	N/A
Applied Methodology	Methodological document. BIOCARBON CERT® Quantifying Biodiversity Credits, Version 4.0 | January 27, 2025
Initiative location (City, Region, Country)	Municipality of El Soberbio, Department of Guaraní, Province of Misiones. Province of Misiones, Argentina. Coordinates Latitude: *27° 2'24.70 "S* Longitude: *54° 8'1.71 "W*
Starting date	21/02/2005
Quantification period	15/07/2019 to 15/07/2029.
First quantification period	15/07/2019 to 15/07/2029.
Monitoring periods and/or the final monitoring period	Total subsequent monitoring periods (15/07/2019 to 15/07/2022), (16/07/2022 to 15/07/2025), (16/07/2025 to 15/07/2028) and final monitoring period (16/07/2028 to 15/07/2029).
Sustainable Development Goals	SDG 12. Responsible Production and Consumption SDG 13. Climate Action SDG 15. Life of Terrestrial Ecosystems

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1 Initiative Eligibility

1.1 Scope of the Biodiversity Standard

[The Initiative is eligible under the scope of the BioCarbon Biodiversity Standard (BBS) by meeting one or more of the following conditions (Mark with an X).]

The scope of the BBS is limited to:	
Biodiversity conservation initiatives include actions for preserving, restoring, and sustainable use of biodiversity.	X
Biodiversity conservation initiatives whose development includes contributions to regional or local conservation strategies.	X
Biodiversity conservation initiatives are generated from compliance with biodiversity loss compensation plans provided that the actions frame in the initiative are additional to mandatory compliance.	X
Biodiversity conservation initiatives that propose voluntary actions for the preservation, restoration, and sustainable use of biodiversity.	X
Voluntary biodiversity credits (BioCredits) are generated by implementing biodiversity conservation initiatives.	X

1.2 Conservation activities and conservation mechanisms

[Mark with an X the type of Conservation Activities under which the Initiative is developed.]

Preservation	X
Isolation of areas, establishment of ecological barriers	X
Isolation of forest fragments	X
Installation of surveillance and control programs	X
Reduction of hunting and fishing activities	X
Other (Signage; Control of invasive exotic species; Protection of wetlands, springs, and watercourses; Management of recreational areas and tourist zones; Identification and conservation of species listed on the IUCN Red List; Conservation of rare or endangered habitats and ecosystems; Establishment of permanent monitoring plots; Protection of culturally significant species for local communities; Connectivity between forest patches.)	X
Ecological Restoration	
Re-establishment	X

Rehabilitation	X
Recovery	X
Removal	X
Other (Identification and registration of seed trees as germplasm banks; Production of threatened native species in nurseries for enrichment and supplementation; Erosion control and soil restoration; Recovery of biological corridors; Connectivity between forest patches; Restoration of wetlands, watercourses, and springs; Reforestation with exotic species as a transition strategy toward native forest)	X
Sustainable Use	X
Purse-seine and other control efforts	X
Limitation on entry and/or actions of the public/tourists to a landscape or ecosystem	X
Limitation of vehicular transport access to a landscape or ecosystem	X
Limitation of heavy or destructive machinery and/or technology that may cause collateral damage to other elements of the landscape or ecosystem	X
Recycling/rotation of soil nutrients	X
Composting	
Sustainable agriculture	X
Limitation of agrochemicals or fertilizers	X
Other (Research and development within the framework of the CBD; Social inclusion in productive activities and seed collection; Training and strengthening of local capacities; Environmental education; Knowledge generation.)	X

[Mark with an X the conservation mechanisms under which the Initiative is developed (Mark with an X).]

Corridors (biological and conservation)	**X**
Mini corridors or connecting strips	X
Closures	
Enclosures	
Live fences	X
Enrichment	X
Supplementation	X
Multipurpose forests	X
Conversion of pastures to forest cover	X
Restoration of the hydrological regime/structure in wetlands	X
Reconstruction of the physical structure of the wetland habitat	X
Mangrove habitat restoration	
Other (include if the activity is not in the list)	

2. General description of the Initiative

Describe the Initiative objectives and activities here, including any activities that will result in voluntary biodiversity credits (BioCredits). Include the following in the description:

(a) A brief description of the existing scenario prior to the implementation of the Initiative activities;

The geographical area where the reserve is located has historically been inhabited by Indigenous communities (Mbya Guaraní). From the 1970s onwards, the region began to be populated by immigrants of diverse origins (Criollo, Brazilian, Ukrainian, Polish), and it was informally subdivided since, at the time, it consisted of unoccupied public lands.

The original continuous forest began to fragment due to partial deforestation, which enabled the creation of small areas for subsistence farming, livestock raising, and grazing on a family scale. As settlement expanded, the Indigenous communities were displaced approximately 15–20 km away from the area.

In the 1980s, the provincial government implemented a cadastral plan and defined parcels (ranging from 20 to 60 hectares) occupied by immigrant families, aiming to regularize and legalize land tenure and ownership.

The Aponapó Reserve, covering 52 hectares, was initially owned by an individual who cleared approximately 6 hectares for pasture, planted 4.5 hectares with exotic species *(Pinus elliottii)*, used 5 hectares for cassava and sugarcane production, and 3 hectares for yerba mate cultivation, along with an additional hectare for infrastructure (a house and sheds). Selective logging of native timber was carried out on approximately 20 hectares. Notably, the region's primary forest provided valuable timber species with diameters at breast height (DBH) between 70 and 110 cm. Given the abundance, the owner opted to preserve mature specimens (DBH between 40 and 60 cm). Furthermore, 20 hectares of the property—due to their steep slopes and inaccessibility—remain as untouched primary forest to this day.

In 2005, Carlos Persini and Verónica San Martín acquired the property from Don Scherer, becoming the second owners of the land. Don Scherer personally toured the property with them, proudly sharing the history and work he had carried out, drawing attention to the size of the remaining tree stumps and sharing insights on the specimens present when he took possession, as well as the management practices that ensured the forest would continue to produce trees of such magnitude.

By decision of the new owners, the property was declared a private nature reserve in 2005. In 2007, they requested its reclassification as Category I *(Red)* under the National Forest Law *(Law 26.331)* from the Ministry of Ecology and Renewable Natural Resources. This classification guarantees the area's permanent conservation.

In 2011, the owners granted usufruct rights over the Reserve to Fundación Huellas para un Futuro —which they founded—for its management and administration, with the goal of expanding and consolidating conservation, restoration, and social inclusion projects developed through multiple programs

(b) Details of how the Initiative activities will result in voluntary biodiversity credits (BioCredits);

The proposed Initiative will generate net biodiversity gains through a comprehensive approach based on conservation, ecological restoration, and the sustainable use of natural resources. These three interconnected components aim to strengthen ecosystem resilience, promote the sustainable development of local communities, and ensure long-term biodiversity conservation.

Conservation

To safeguard biodiversity, the Initiative implements targeted strategies focused on protecting key species and ecosystems. Priority is given to the conservation of native flora and fauna, with a special emphasis on endemic, rare, or threatened species to ensure their long-term survival. The identification and management of High Conservation Value (HCV) areas further guarantees the protection of critical habitats and the provision of essential ecosystem services. Controlling invasive exotic species is another critical aspect, as their removal allows for natural regeneration and the restoration of affected ecosystems. Species monitoring, aligned with IUCN Red List categories, supports status assessments and the implementation of effective conservation measures. Finally, expanding buffer zones around core and high ecological value areas helps reduce human pressures and stabilize ecosystems.

Ecological Restoration

The Initiative promotes the active restoration of degraded ecosystems through the reintroduction of native species and soil quality improvement using regenerative techniques. At the landscape level, strategies are implemented to strengthen connectivity between forest fragments and regenerate biological corridors, enhancing species

movement and ecosystem resilience. Additionally, the Initiative illustrates how reforestation with exotic species, such as *Pinus taeda*, can serve as a transitional tool to recover vegetation cover and facilitate ecological succession toward native forest. In parallel, the restoration of wetlands, streams, and springs contributes to maintaining the ecosystem's hydrological balance, promoting biodiversity and ensuring water supply for local communities.

Sustainable Use

The development of sustainable production models generates socioeconomic benefits without compromising biodiversity. By providing training and building local capacity, the Initiative empowers communities to actively engage in productive activities grounded in agroecological principles and fair trade practices. This ensures the environmental, social, and financial sustainability of the territory, offering economic alternatives that benefit both people and ecosystems. The responsible use of genetic resources is guided by the Nagoya Protocol, ensuring prior informed consent from communities and the fair and equitable sharing of resulting benefits.

Knowledge generation is also a cornerstone of the Initiative. Scientific research is promoted to support sustainable biodiversity management models, with permanent monitoring plots established as benchmarks for ecological restoration. Monitoring systems are designed to assess biodiversity, ecosystem services, and the impact of conservation actions. The use of quantifiable indicators allows for the measurement of progress toward objectives, ensuring transparency and effectiveness in implementation.

In conclusion, the Aponapó Initiative positions itself as a Nature-based Solution capable of delivering measurable net biodiversity gains through conservation, ecological restoration, and the sustainable use of natural resources. In line with the Post-2020 Global Biodiversity Framework, the initiative adopts the Nagoya Protocol as a foundational framework to ensure transparent access to genetic resources, equitable benefit-sharing, and the meaningful participation of local and Indigenous communities. It contributes directly to national biodiversity strategies while advancing the global goals of the Kunming-Montreal Framework through coordinated actions across local, national, and international levels.

Moreover, the development of a sustainable financial model—supported by robust Monitoring, Reporting, and Verification (MRV) systems—will secure long-term funding for conservation, restoration, and sustainable use efforts. With this integrated approach, the initiative not only addresses the biodiversity and climate crises but also serves as a

replicable model for ecological and social impact. Ultimately, the Aponapó Initiative aspires to become a reference case for Latin America and the Caribbean—as a Nature-based Solution and replicable model for the generation of biocredits.

(c) A brief summary of how the Initiative activities will contribute to the achievement of the Sustainable Development Goals;

The Initiative developed at the Aponapó Rainforest Reserve demonstrates its relevance for biodiversity conservation and sustainable development through its **alignment with 14 of the 17 Sustainable Development Goals (SDGs) of the 2030 Agenda.**

In particular, the following three SDGs are especially noteworthy:

SDG 12 – Responsible Consumption and Production
The productive activities within the reserve, managed by Fundación Huellas para un Futuro, serve as a model for community participation and capacity building focused on sustainability. Productive areas include:

- Stevia cultivation
- Pitanga tree plantations
- Yerba mate crops
- Reforestation with Pinus taeda

All of these production systems are registered with OIA under organic certification and are managed using agroecological practices that promote crop rotation, the use of bio-inputs, and the elimination of agrochemicals. This ensures responsible, sustainable production and safe consumption aligned with the highest international standards of quality and environmental health.

SDG 13 – Climate Action
The Initiative benefits vulnerable communities by enhancing their adaptive capacity to climate change through skills development and integration into formal income-generating programs. Mitigation measures fall under REDD+ programs and the National Native Forest Restoration Plan, coordinated by Huellas para un Futuro. The Aponapó Reserve functions as a strategic center for the production of native species, which are distributed free of charge to local communities for:

- Restoration of degraded areas
- Protection of watercourses
- Creation of biological corridors to improve connectivity between forest fragments

These efforts are reinforced by environmental education programs, fostering awareness and community engagement in ecosystem conservation and restoration.

SDG 15 – Life on Land
The zoning of the reserve is designed to maintain, restore, and conserve ecosystems characteristic of the Atlantic Forest (Selva Paranaense), identified as High Conservation Value (HCV) areas. Measures are taken to eliminate poaching and the trafficking of protected species, and to combat deforestation and soil degradation. The Initiative also promotes biodiversity conservation by protecting animal and plant species listed as threatened on the IUCN Red List.

Under the Foundation's management, the Reserve has also become a center for knowledge generation and dissemination, sharing its lessons and experiences for the benefit of society at large.

For more details on the alignment of the Initiative with the SDGs, please refer to ***Section 20: Sustainable Development Goals (SDGs).***

(d) An average estimate of voluntary biodiversity credits (BioCredits) attributable to the Initiative activities.

The estimation of net biodiversity gains is currently underway. The resulting data will allow the calculation of the average number of BioCredits attributable to the Initiative in a transparent and verifiable manner.

2.1 Name of the Biodiversity Initiative

Aponapó Rainforest Reserve.

2.2 Objectives

The Aponapó Rainforest Reserve Initiative, encompassing 52 hectares in the province of Misiones, Argentina, seeks to implement an integrated set of conservation, sustainable use, and ecological restoration activities focused on areas of High Conservation Value (HCV). The overarching objective is to improve the structure, composition, and functionality of native Atlantic Forest ecosystems; increase habitat availability and connectivity for native and threatened species; preserve essential ecosystem services for local and Indigenous communities; and ensure the sustainable use of natural resources through inclusive and participatory approaches.

Specifically, the initiative aims to:

- Restore degraded forest areas through enrichment and supplementation with native species;
- Recover and enhance native forest cover and promote the regeneration of natural vegetation;
- Improve connectivity between forest patches;
- Maintain a network of ecologically sufficient conservation areas, including large landscape-level ecosystems and mosaics (HCV2) as well as biological corridors;
- Eliminate anthropogenic disturbances from the landscape;
- Maintain and enhance soil quality and biodiversity;
- Conserve and improve species diversity, including native, endemic, focal, rare, and threatened species;
- Maintain and enhance forest carbon stocks (canopy, litter, and soil carbon);
- Preserve and improve water quality, as well as the capacity of watersheds to regulate and purify water flows;
- Reduce erosion and land degradation through reforestation and restoration;
- Maintain and improve soil health and productivity, including organic carbon content, soil moisture, organic layer thickness, organic matter percentage, and key nutrients (N, P);
- Protect areas of recreational and/or tourism value;
- Maintain populations and species of cultural significance, especially for the Mbya Guaraní communities, in alignment with HCV6;
- Protect springs, wetlands, and riparian zones through buffer areas and forest belts that restore and maintain the hydrological regime;
- Conserve rare and endangered habitats, as well as IUCN Red List species, by limiting human access, conducting regular monitoring, and promoting natural regeneration;
- Promote the sustainable use of biodiversity through agroecological practices such as shade-grown yerba mate and stevia, nutrient recycling, and the elimination of agrochemical inputs;
- Foster environmental education, local capacity building, and knowledge transfer through workshops, hands-on training, seed collection, and community-led nursery production;
- Strengthen ecosystem monitoring through the establishment of permanent sampling plots;
- Advance research and development in alignment with the Convention on Biological Diversity (CBD) and the Nagoya Protocol, including the identification

of genetic resources, the formulation of species-specific management plans, the implementation of fair and equitable benefit-sharing mechanisms with the active participation of local and Indigenous communities, and the issuance of internationally recognized certificates of compliance to support the sustainable commercialization of biodiversity-based products (e.g., *Eugenia uniflora*).

Through this multifaceted approach, the Aponapó Initiative integrates biodiversity conservation and sustainable development goals, ensuring ecological resilience, social equity, and long-term biodiversity benefits for both people and nature.

2.3 Initiative Conservation Activities and Conservation Mechanisms

The Aponapó Rainforest Reserve implements a series of conservation activities and mechanisms designed to generate Net Biodiversity Gains (NBG) by combining strategies of preservation, ecological restoration, and sustainable use. These actions are supported by specific technologies and targeted measures, including the following:

1. Preservation

a) **Isolation of areas and establishment of ecological/live barriers:** Buffer zones and forest windbreaks are established to function as natural barriers, protecting sensitive areas, reducing the entry of pollutants, and minimizing anthropogenic pressure.
b) **Isolation of forest fragments:** Key fragments of native forest are identified and demarcated to prevent degradation and promote natural regeneration of native species.
c) **Surveillance and monitoring programs:** Drones, camera traps, and ranger patrols are used to prevent and detect illegal activities such as poaching and indiscriminate logging. Local authority partnerships ensure rapid and effective responses to environmental violations.
d) **Reduction of hunting and fishing activities:** The presence of rangers, along with strategically placed "No Hunting" signs, helps deter such practices and protect local wildlife.
e) **Signage:** Informative signs are installed on trails and plots, and access to tourist areas is restricted to minimize human impact on fragile ecosystems.
f) **Control of invasive exotic species:** Eradication and control strategies are applied to reduce the presence of introduced species that threaten biodiversity, favoring the recovery of native flora and fauna.
g) **Protection of wetlands, springs, and watercourses:** Protective forest strips are developed to improve water quality and stabilize watersheds, ensuring clean water for both biodiversity and local communities. This aligns with High Conservation Values

(HCV) 4 and 5, safeguarding essential ecosystem services and key resources for local and Indigenous populations.

h) **Management of recreational and tourism areas:** Emblematic fauna is protected and monitored to promote sustainable ecotourism and environmental education. Access is restricted in low-capacity areas to prevent degradation.

i) **Identification and conservation of species listed on the IUCN Red List (Extinct, Critically Endangered, Endangered, Vulnerable, Near Threatened, and Least Concern):** Species classified as at risk are prioritized, particularly Critically Endangered, Endangered, and Vulnerable species, to ensure their long-term conservation.

j) **Conservation of rare or endangered habitats and ecosystems:** These ecosystems are identified and protected through inventories, monitoring, and restricted access to ensure their preservation.

k) **Establishment of permanent monitoring plots:** Reference plots are created for regular inventories and monitoring to assess the status of native forests and the provision of ecosystem services.

l) **Protection of culturally significant species and sites:** Culturally and subsistence-significant resources and areas for local and Indigenous communities are preserved, supporting both cultural continuity and livelihood needs. This aligns with HCV 6 and promotes intergenerational knowledge transfer.

2. Ecological Restoration

a) **Restoration (RE) of degraded areas regarding their function, structure, and/or composition:** The reserve undertakes reforestation and recovery of degraded areas to restore the ecosystem's original structure and composition, which is vital for regaining natural functionality and biodiversity.

b) **Rehabilitation (REH) of productivity and/or ecosystem services:** Actions are implemented to improve productivity and ecosystem services in affected areas (e.g., eroded soils, degraded forest fragments), enhancing natural ecosystem functions and benefiting local communities.

c) **Recovery (REC) of ecosystem utility and/or different environmental services:** Beyond restoring original functions, the Initiative enhances other services, such as ecotourism and cultural services. It acknowledges the value of culturally important species for Indigenous communities. Efforts include improving water quality in streams and springs and restoring habitats critical for endangered species.

d) **Removal (REM) of degradation agents:** Degrading factors are eliminated through the control and eradication of invasive exotic species, anti-poaching patrols, and the exclusion of livestock from former pasture areas. Additional measures include temporary

limits on tourism and mitigation of human pressures such as destructive technology use.
f) **Identification and registration of seed trees as germplasm banks:** Seed-producing native tree areas are documented for harvesting and propagation in nurseries, ensuring the availability of genetic material for restoration.
g) **Production of threatened native species in nurseries for enrichment and supplementation:** The reserve has its own nursery, registered under INASE *(RNCyFS, Category K1)*, producing 10,000 trees annually. Native species are propagated and planted in pre-selected areas after a growth period.
h) **Erosion control and soil restoration:** Reforestation with native species is implemented to stabilize degraded soils. Pinus taeda is used as a transitional strategy toward native forest recovery.
i) **Recovery of biological corridors:** Ecological corridors are restored and established to ensure connectivity between forest fragments, facilitating wildlife movement and gene flow.
j) **Connectivity between forest patches:** Forest enrichment and natural regeneration strategies are applied to strengthen connectivity and promote more resilient and functional ecosystems.
k) **Restoration of wetlands, watercourses, and springs:** Obstructions are removed and sediment is controlled to improve hydrological flow. Protective forest buffers are re-established, vegetation enriched in monitoring plots, and interventions carried out in microhabitats to enhance ecological function.
l) **Reforestation with exotic species as a transitional strategy:** Pinus taeda is introduced to improve soil structure and initiate forest cover recovery, creating favorable conditions for native species regeneration via nearby forest fragment propagules.
m) **Conversion of degraded grasslands to forest cover:** Degraded grasslands are transformed into wild ecotones by eliminating degrading factors (e.g., invasive species), enabling natural succession and enrichment with native species. These actions support local wildlife, particularly birds, and restore ecosystem functionality and biodiversity.

3. Sustainable Use

a) **Bans and control measures:** Temporary restrictions are enforced in critical areas to allow natural regeneration. Fencing is used to limit access to vulnerable zones and reduce human impact.
b) **Temporal restriction of public/tourist access to landscapes or ecosystems:** Access and tourism are limited in sensitive environments (e.g., wetland protection plots with century-old Lapacho trees, highland marshes, Pitanga forests, tree fern groves), respecting ecosystem carrying capacity and minimizing degradation.

c) **Limitation of heavy or destructive machinery and other damaging technologies:** The use of high-impact equipment is regulated to reduce soil degradation and minimize harm to local flora and fauna.
d) **Soil nutrient cycling/rotation:** Agroecological practices are implemented, such as the use of bio-inputs, crop residues, and cover crops to improve soil quality, maintain fertility, and eliminate dependence on agrochemicals.
e) **Sustainable agriculture:** Organic certification and crop diversification are promoted to encourage sustainable farming practices, minimize environmental impact, and produce high-quality food. Yerba mate is cultivated under native forest cover, and understory species such as edible mushrooms are sustainably harvested.
f) **Limitation of agrochemical and synthetic fertilizer use:** Agrochemicals and synthetic fertilizers are replaced with bio-inputs and regenerative practices, reducing soil, water, and air pollution and protecting biodiversity and community health.
g) **Research and development under the CBD framework:** In partnership with Novachem Lab, the reserve supports R&D projects on natural ingredients for the cosmetics industry, ensuring sustainable practices aligned with the Convention on Biological Diversity.
h) **Social inclusion in productive activities and seed collection:** Local communities are involved in sustainable production and native seed collection, creating economic opportunities and strengthening ecosystem conservation.
i) **Training and capacity building:** Workshops and training on sustainable practices, biodiversity conservation, and agroecological production empower communities in the management of their natural resources.
j) **Environmental education:** Educational programs are developed for various audiences to raise awareness about biodiversity, sustainable resource use, and ecosystem restoration.
k) **Knowledge generation:** Research and studies are conducted to deepen understanding of local ecosystems, biodiversity, and ecosystem services, enabling evidence-based decision-making and effective conservation strategies.

2.4 Initiative location

The Aponapó Rainforest Reserve, located in the Guaraní Department, El Soberbio Municipality, Misiones Province, Argentina, spans 52 hectares. It lies within the buffer zone of the Yabotí Biosphere Reserve, just 3 km away—a site recognized as a UNESCO World Heritage Site under the MAB (Man and the Biosphere) Programme.

The Reserve is part of the Paranaense Rainforest ecoregion (also known as the Upper Paraná Atlantic Forest), specifically within the Montane Forest subregion in eastern Misiones.

Coordinates
Latitude: 27° 2'24.70" S
Longitude: 54° 8'1.71" W

For maps and photographs of the area, please refer to ***Section 5: Geographical Boundaries of the Conservation Initiative***.

2.5 Additional information about the Biodiversity Initiative

The Initiative is being developed in the province of Misiones, a region of extraordinary biological richness within the Upper Paraná Atlantic Forest ecoregion, also known as the Selva Paranaense. This biome, identified as one of the most threatened global "hotspots" *(Myers et al., 2000)*, harbors a remarkable concentration of endemic species and unique ecosystems. It is also listed among the Global 200 ecoregions *(Olson and Dinerstein, 1998; Olson et al., 2000, 2001)*, emphasizing its global conservation significance.

This region harbors the last remaining continuous tracts of the Atlantic Forest in Argentina, spanning approximately 1,123,000 hectares *(Di Bitetti, Placci, and Dietz, 2003)*. Today, it is estimated that only 7.8% of the ecoregion's original forest cover remains *(Holz and Placci, 2003)*, highlighting the critical need for conservation efforts. The remaining forest is largely confined to small, scattered fragments located within areas designated for protection, sustainable use, and conservation *(Placci and Di Bitetti, 2006)*. The primary driver of forest loss and fragmentation in the region is agricultural expansion, with both large-scale and subsistence farming playing significant but distinct roles in the degradation of this ecosystem *(Di Bitetti, Placci, and Dietz, 2003)*.

Biophysical Aspects

Misiones is characterized as a subtropical plateau with no dry season, receiving annual rainfall ranging from 1,450 to 2,000 mm and average temperatures between 16°C and 21.5°C.

Protected Areas

The Aponapó Rainforest Reserve, managed by Huellas para un Futuro, is strategically located within the buffer zone of the Yabotí Biosphere Reserve (YBR), which protects 21.5% of the remaining Atlantic Forest in Argentina. The YBR includes core areas, buffer zones, areas of influence, and transition zones, encompassing Guaraní Indigenous

communities and private properties. Aponapó contributes 35 hectares that have been reclassified as "Category I – Red" under the *Native Forest Law 13.661*, ensuring their strict protection. The reserve also hosts a registered germplasm bank and nursery dedicated to the propagation of native species.

Biological Aspects

The area is home to iconic species such as the jaguar *(Panthera onca)*, tapir *(Tapirus terrestris*), and red howler monkey *(Alouatta guariba)*, along with remarkable diversity: 293 bird species, 45 mammal species (15 of which are threatened), 20 reptile species, and 25 amphibian species. Key ecosystems include montane forests, wetlands, and slope forests that harbor unique plant species such as tree ferns and high-value myrtaceae with significant ecological and cultural importance.

Socioeconomic Aspects

The region faces significant social challenges, including high illiteracy rates and unmet basic needs. Housing and infrastructure are predominantly precarious and built from wood, connected by dirt roads. Local production is marked by the expansion of tobacco cultivation—with serious socio-environmental implications—and ongoing native timber extraction. The prevailing landscape is a diverse mosaic of small patches of native forest, pastures for cattle, yerba mate and tobacco plantations, annual crops, and pine and eucalyptus forestry plots.

Legal Aspects

Misiones has a robust legal framework for the protection and sustainable management of its natural resources, most notably *National Law 26.331 on Minimum Environmental Protection Standards for Native Forests.* The Aponapó Reserve operates under this regulatory framework and benefits from fiscal incentives due to its contribution to environmental preservation. For more information on the consistency of the Initiative with legislation and regulatory frameworks, please refer to the ***Section 19 Consistency with applicable legislation.***

3. Applicability conditions

[Identify and mark with an X if the initiative follows the applicability conditions stated in Section 5 of the Methodology document.]

a)	It aims to restore and/or maintain the state of the biodiversity at a defined point in time in quantitative and qualitative terms, avoiding irreversible losses.	X

b) In situ conservation is the activity on which the initiative's activities are based.	X
c) Conservation activities prevent the partial or total loss of an ecosystem or changes in land use, generating BioCredits.	X
d) Conservation activities prevent the loss (direct or indirect) of a population or species.	X
e) Conservation activities prevent the extinction of an endemic population, species, ecological or cultural value.	X
f) Conservation activities prevent the net loss of diversity at the genetic, species, or ecosystem level.	X
g) Conservation activities prevent the modification of natural systems/ecosystems or unique biotopes.	X
h) Conservation activities prevent the extinction of species, populations, or varieties or decrease their viability to levels that increase their risk of extinction.	X
i) The initiative area within the boundaries is under any other biodiversity compensation scheme, provided that they strictly comply with all the criteria established by the applicable legislation in compliance.	X

4. Normative references

The initiative complies with a broad set of international, national, and provincial legal frameworks, policies, and voluntary standards that govern biodiversity conservation, Indigenous Peoples' rights, environmental protection, and sustainable development.

At the international level, the initiative adheres to the **United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP)** by respecting the rights to self-determination, cultural preservation, and non-discrimination. Indigenous communities, particularly the Mbya Guaraní people, actively participate in decision-making processes and the management of natural resources. Additionally, the initiative fulfills the principles of **ILO Convention 169** on Indigenous and Tribal Peoples, incorporated into Argentine law *(Law 24.071),* ensuring the protection of Indigenous Peoples' relationship with their lands, promoting community education, and valuing ancestral knowledge and cultural identity.

In terms of environmental legislation and biodiversity conservation, the initiative aligns with the **Convention on Biological Diversity (CBD)**, ratified in Argentina by *Law 24.375*. It promotes the three pillars of the CBD: conservation of biological diversity, sustainable use of its components, and fair and equitable sharing of benefits derived from

genetic resources. Consistency with the **Kunming-Montreal Global Biodiversity Framework** further strengthens the initiative's alignment with post-2020 global biodiversity targets.

The initiative also complies with the **Nagoya Protocol** *(Law 27.246)*, ensuring responsible access to genetic resources (e.g., *Eugenia uniflora* – Pitanga), traceability, sustainability, and the implementation of Free, Prior, and Informed Consent (FPIC) and Benefit-Sharing Mechanisms (BSM) with local communities.

Regionally, the initiative supports the **Escazú Agreement** *(Law 27.566)* by promoting environmental transparency, public participation, and the protection of environmental defenders. Programs such as "The Park Ranger at Your School" foster environmental education and community engagement, strengthening the right to a healthy environment.

At the national level, the initiative complies with Argentina's **Native Forest Law** *(Law 26.331)*, which mandates environmental zoning and conservation of native forests. Notably, 35 hectares within the reserve were voluntarily upgraded from *Category II (Yellow)* to *Category I (Red)*, ensuring strict protection. The initiative also aligns with the **Provincial Green Corridor Law** *(Law XVI N° 60)*, supporting ecological connectivity and conservation of the Atlantic Forest remnants within Misiones Province.

Regarding Indigenous land rights, the initiative adheres to **National Law N° 26.160**, which establishes an emergency regarding land ownership by Indigenous communities, prohibiting evictions. In this context, Fundación Huellas para un Futuro, as part of the initiative, submitted a formal request for land title regularization on behalf of the Mbya Guaraní community of Pindo Poty, in accordance with legal procedures.

In the climate and sustainability sphere, the initiative aligns with the **Paris Agreement** under the **UNFCCC**, contributing to global climate goals through ecosystem conservation, restoration, and agroecological practices that enhance carbon sequestration and support Nature-based Solutions. It also meets the objectives of the **UNCCD** *(Law 24.701)* by promoting soil conservation, restoring degraded areas, and enhancing ecosystem resilience against desertification and drought.

The initiative directly supports the implementation of the **2030 Agenda for Sustainable Development**, contributing to multiple Sustainable Development Goals (SDGs) related to biodiversity conservation, climate action, sustainable communities, and education, among others.

At the national policy level, the initiative aligns with the objectives of Argentina's **National Biodiversity Plan**, coordinated by **CONADIBIO**, through conservation, ecological restoration, and sustainable use actions. Fundación Huellas para un Futuro actively participates as a CONADIBIO member, contributing to technical working groups, particularly in restoration planning.

In terms of climate policy, the initiative supports Argentina's **Nationally Determined Contributions (NDCs)** under the Paris Agreement, contributing to mitigation and adaptation actions through the conservation and restoration of native forests and the strengthening of ecosystem services essential for climate resilience.

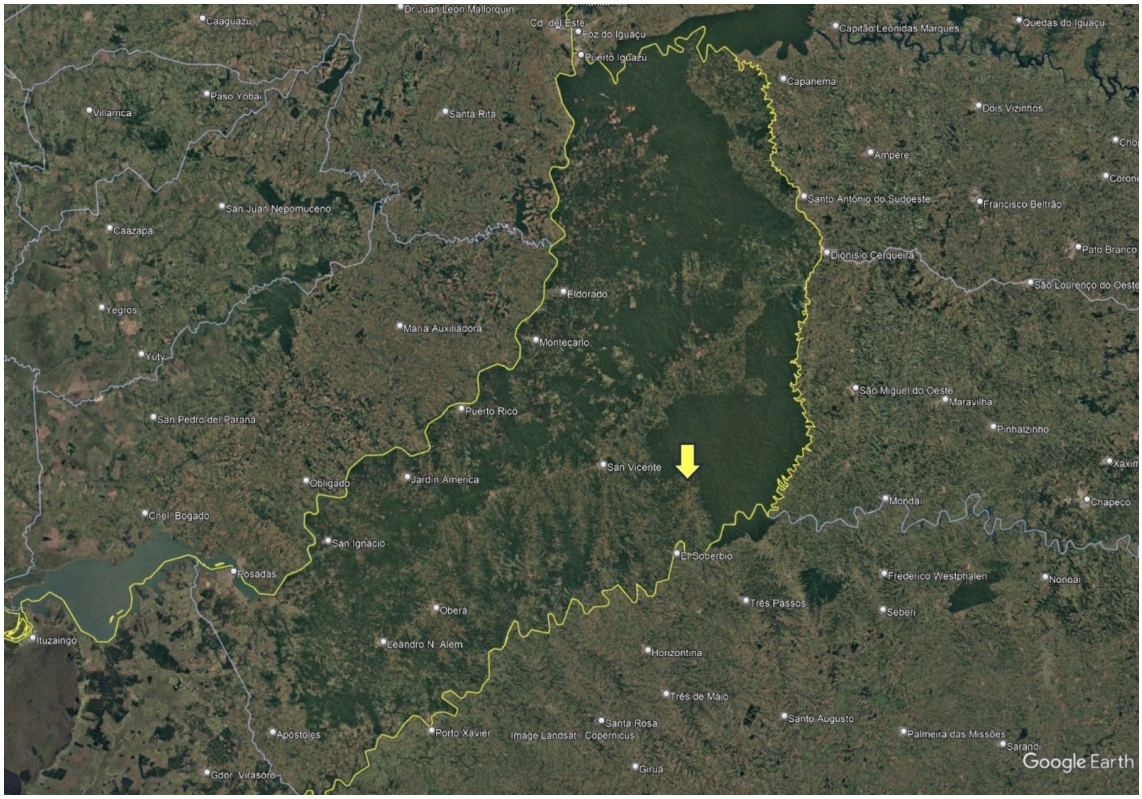
Finally, the initiative has demonstrated international cooperation and advocacy through participation in the **G20 Climate and Environment Working Group** (C20), where Fundación Huellas para un Futuro contributed to shaping policy proposals related to decarbonization strategies, sustainable infrastructure, and climate finance.

Applicable Legislative and Policy Frameworks Summary:

- United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP)
- ILO Convention 169 on Indigenous and Tribal Peoples
- Convention on Biological Diversity (CBD) – *Law 24.375*
- Nagoya Protocol – *Law 27.246*
- Kunming-Montreal Global Biodiversity Framework
- Escazú Agreement – *Law 27.566*
- Native Forest Law – *Law 26.331*
- *Provincial Law XVI N° 60 (Green Corridor Law)*
- *National Law N° 26.160 on Indigenous Land Emergency*
- UNFCCC – Paris Agreement
- UNCCD – United Nations Convention to Combat Desertification – *Law 24.701*
- 2030 Agenda for Sustainable Development (SDGs)
- National Biodiversity Plan – CONADIBIO
- Argentina's Nationally Determined Contributions (NDCs)
- G20 Climate and Environment Working Group contributions

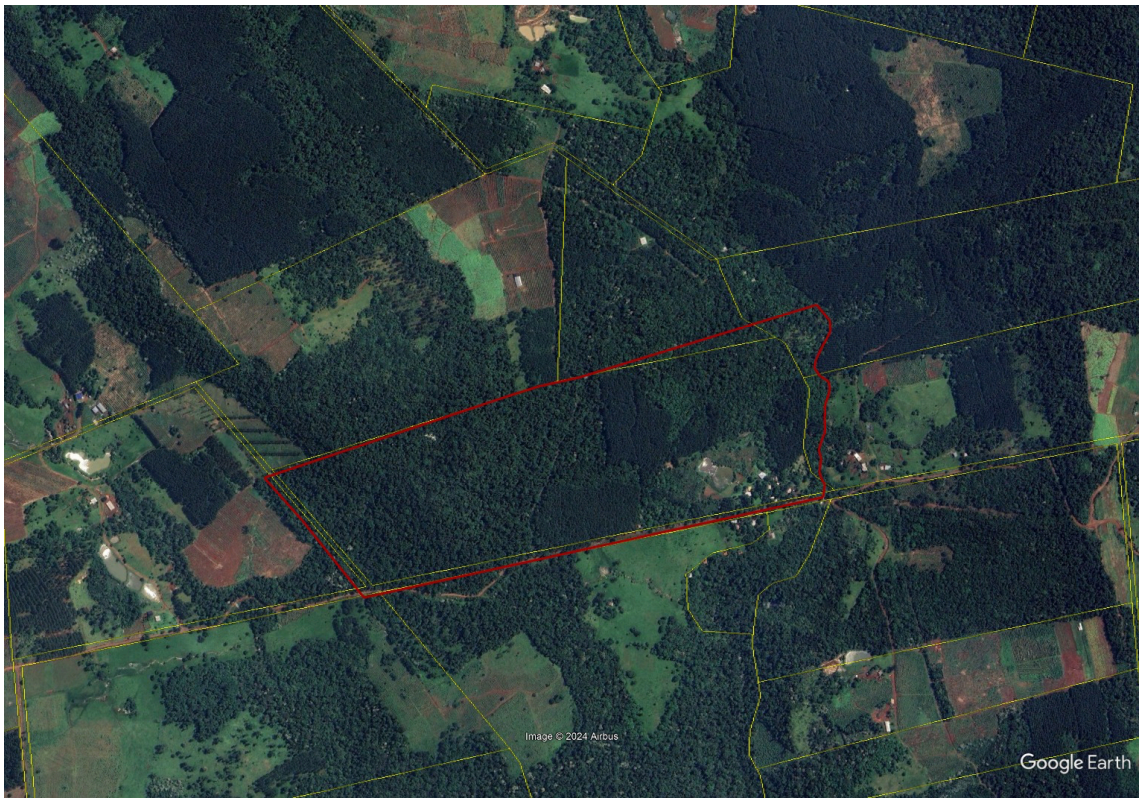
For more information on consistency with applicable legislation, please refer to ***Section 19 Consistency with applicable legislation***.

5. Geographical boundaries of the Conservation Initiative



Aponapó Rainforest Reserve is located within the Paranaense Rainforest Ecoregion, also known as the Upper Paraná Atlantic Forest, specifically in the montane forest subregion situated in the eastern part of Misiones Province.

Expanded view of the area: The Yabotí Biosphere Reserve (250,000 hectares) and the Kaa'guy Porá Region (19,000 hectares) can be seen. The Aponapó Reserve is located 3 km from the Yabotí Biosphere Reserve.



The Reserve's boundaries (52 hectares) are highlighted in red, while surrounding land parcels are shown in yellow. The landscape reveals a productive matrix made up of various economic activities and small patches of native forest.

The Aponapó Rainforest Reserve constitutes a mosaic of diverse ecosystems and land cover types, illustrating the ecological complexity and biodiversity of the Selva Paranaense. Within its boundaries, the Reserve harbors high-altitude lagoon and tree fern forests, tree fern forests, mature forests on steep slopes with southwest and east-facing orientations, spring and wetland protective forests, gallery forests, and wild ecotone transition zones. It also includes areas designated for the regeneration of native forest through transitional *Pinus taeda* plantations, alongside specific plots dedicated to *Stevia rebaudiana* cultivation, shade-grown yerba mate (*Ilex paraguariensis*), pitanga (*Eugenia uniflora*) stands, and a permanent forest monitoring plot.

The distribution and surface area of each ecosystem and land cover type can be observed in the table below:

Ecosystem Type	Hectare
High-altitude lagoon and tree fern forest 1	1.54
Tree Fern Forest 2	1.31
Mature Forest on Steep Slopes (Southwest Orientation)	8.6
Mature Forest on Steep Slopes (East-facing)	8.46
Spring and Wetland Protective Forest	4.95
Gallery Forest	1.75
Wild Ecotone	2.25
Regeneration of Native Forest through Transitional *Pinus taeda* Cultivation	12.1
Permanent Forest Monitoring Plot	0.7
Stevia rebaudiana Bertoni Cultivation	0.28
Shade-Grown Yerba Mate	0.33
Pitanga Forest	0.8
Pitanga Stands	4.63
Total Area Aponapó Rainforest Reserve	**47.7**

It is important to highlight that the stevia cultivation areas and pitanga stands partially overlap with the wild ecotone zone. However, for conservation planning purposes and to clearly distinguish the different conservation objectives, these areas have been delineated separately. This subdivision allows for more accurate management and monitoring, ensuring that strategies are adapted to the specific ecological conditions and conservation goals of each sector within the Reserve.

For a detailed visualization of the polygons and the specific surface area assigned to each ecosystem, please refer to ***Section 7 – Biodiversity Baseline.***

6. Temporal limits and analysis period

Initiative starting date: 21/02/2005.

Quantification period of BioCredits: The Quantification Period for BioCredits is defined as **2019–2029**.

However, it is important to clarify that the initiative began its conservation, restoration, and sustainable use activities in 2005. These early efforts form part of the baseline established for the 2019 assessment.

Monitoring periods:

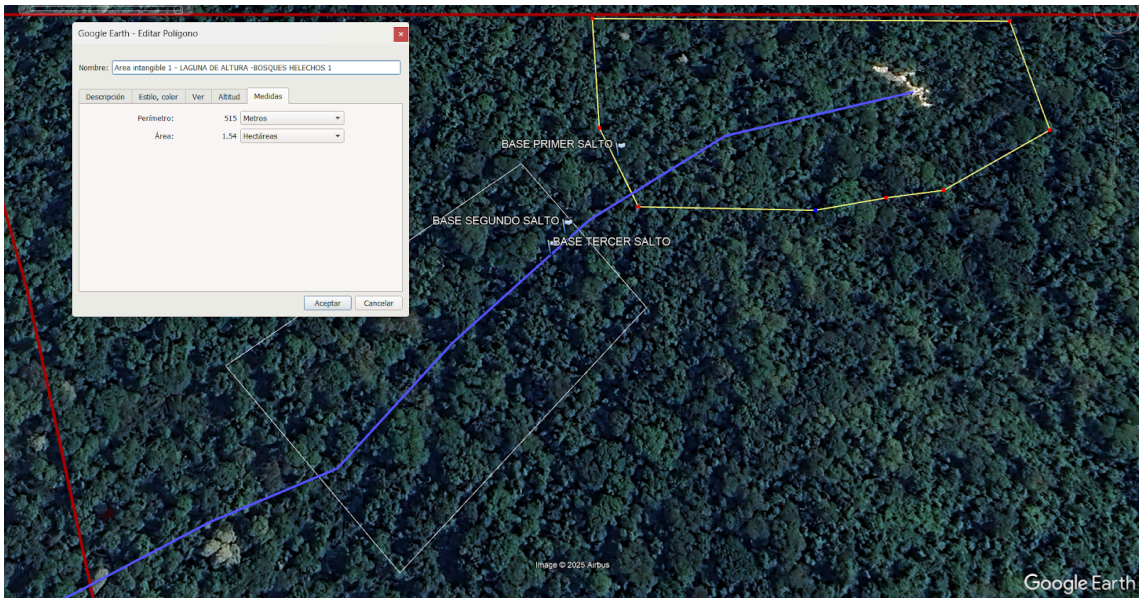
- **Initial Monitoring Period:** July 15, 2019 – July 15, 2022
- **Second Monitoring Period:** July 16, 2022 – July 15, 2025
- **Third Monitoring Period:** July 16, 2025 – July 15, 2028
- **Final Monitoring Period:** July 16, 2028 – July 15, 2029.

7. Biodiversity baseline

Below is a detailed description of the structure and composition of the ecosystem within each of the different land cover/land use types, including the most detailed possible information on climate, soil, and other determinants of biodiversity, landscape features, as well as an assessment of physical and biotic components, and ecosystem information prior to the start of conservation activities.

Ecosystem "High-Altitude Lagoon and Tree Fern Forest 1"

Zoning
Classification of the area according to legal criteria, land use, or conservation categories. *Law 26.331. Category I (red)* according to land use planning.



Source: Google Earth PRO. Official Land Registry of the Province of Misiones. **REFERENCES:** RED – reserve polygon; YELLOW – Intangible Zone 1: High-Altitude Lagoon and Tree Fern Forest 1; BLUE – watercourse generated by the lagoon; WHITE – relationship with polygon of Intangible Zone 2.

Surface Area

Area: 1.54 hectares. Perimeter: 515 meters. Georeferencing obtained in situ (Garmin eTrex 2), verified with Google Earth PRO 2025.

Ecosystem Structure

High-altitude wetlands or lagoons are wetland ecosystems that develop in elevated areas within the undulating landscape of the province. These areas play key ecological roles, such as water regulation, biodiversity conservation, and providing habitats for endemic and migratory species. They are highly important within the mountain landscape and occur at elevations between 400 and 800 meters above sea level, in a context of high biodiversity and strong influence from the humid subtropical climate without a dry season.

Environmental Description

These wetlands are found in hilly and plateau regions of Misiones. They are shallow water bodies, either temporary or permanent, depending on underground watercourses, precipitation (exceeding 2,000 mm annually), and runoff from numerous streams descending into valleys. These ecosystems are essential for biodiversity and water regulation in the region. Their conservation is key to maintaining the ecological balance of the Misiones rainforest and ensuring the survival of many species that depend on them.

Ecosystem Composition

Biotic Components

The understory is characterized by numerous terrestrial and epiphytic bromeliads (such as *Aechmea calyculata*), a high diversity of orchids including the abundant terrestrial *Warrea warreana*, ferns, and other moisture-loving plants like *Peperomia sp., Ruellia sanguinea,* and wild canna lilies *(Canna indica)*—all with high ornamental value. The midstory features shrubs such as *Psychotria carthagenensis* (wild jasmine), *Pilocarpus pennatifolius* (soap tree), *Actinostemon concolor* (wild orange), and abundant Myrtaceae like *Plinia rivularis* (yvaporoity), *Eugenia uniflora* (pitanga), and *Plinia trunciflora* (jaboticaba), whose fruits are especially valued by local residents. The pindó palm *(Syagrus romanzoffiana)* occurs in high densities here, being nearly absent in the rest of the native forest. Other species include Jacaratia spinosa (yacaratiá) and abundant *Merostachys clausenii* (tacuapí). The upper layer includes *Myriocarpus frondosus* (incense tree), *Ceiba speciosa* (silk floss tree), and *Phytolacca dioica* (ombú). Many epiphytes are present: orchids *(Gomesa planifolia, Maxillaria sp.)*, ferns, bromeliads *(Billbergia nutans, Tillandsia sp.)*, epiphytic cacti *(Rhipsalis sp.)*, and climbing shrubs like *Pereskia aculeata*.

Source: Field Survey Document – Fundación Vida Silvestre Argentina, Baseline 2011; Photographs

Listado de mamiferos señalados para Aponapó y alrededores.

Consultas para la sistemática: Canevari y Vaccaro 2007.

Abreviaturas y signos:. **PM**: Preocupación Menor, **PV**: Potencialmente Vulnerable, **Vu**: Vunerable, **EP**: En Peligro, **A**: Amenazada; **CA**: Casi Amenazada; **pd**: poblaciones en disminución, **NA**: no amenazada, **I**: insuficientemente conocida.* Hace aproximadamente 1 año y medio a dos que no se detecta. ** En RBY del otro lado del Aº Paraíso.

Orden, familia y nombre científico	Nombre común	Categoría de conservación		
		Díaz y Ojeda (2000)	Secretaría de Ambiente y Desarrollo Sustentable de la Nación (2004)	LISTA ROJA INTERNACIONAL (IUCN 2010)
DIDELPHIMORPHIA				
Didelphidae				
Didelphis albiventris	Comadreja overa	PM	NA	PM, estable
Didelphis aurita	Comadreja orejas negras	PM	I	PM, estable
Metachirus nudicaudatus	Cuica común		I	I
Chironectes minimus	Cuica de agua	PV	A	PM, pd
XENARTHRA				
Myrmecophagidae				
Tamandua tetradactyla	Oso melero		A	
Dasypodidae				
Cabassous tatouay	Tatú rabo molle		A	
Dasypus novemcintus	Tatú negro		I	
Euphractus sexcintus	Tatú amarillo	PM	NA	PM, estable
PRIMATES				
Cebidae				
*Alouatta caraya**	Carayá	PM	A	PM, pd
Cebus cay	Mono Caí	PV	A	PM, pd
CARNIVORA				
Canidae				
Cerdocyon thous	Zorro de monte	PV	NA	PM, pd
Procyonidae				
Procyon cancrivorus	Aguará popé u Osito lavador		NA	PM, pd
Nasua nasua	Coatí		NA	PM, pd
Felidae				
Herpailurus yagouaroundi	Yaguarundí	PV	NA	PM, pd
Leopardus pardalis	Ocelote o Yaguatirica		A	PM, pd
*Puma concolor***	Puma	PV	NA	PM, pd
*Panthera onca***	Yaguareté	EP	EP	CA, pd
Mustelidae				
Galictis cuja	Hurón menor	PV	NA	PM, desc
Eira barbara	Hurón mayor	Vu	NA	PM, pd
Lontra longicaudis	Lobito de río		I	I, pd

Listado de aves detectadas en Aponapó durante el relevamiento de campo realizado entre 1 y 3 de agosto de 2011

La taxonomía y nombres comunes se basó en la publicación de Narosky e Yzurieta, 2003

Familia	Nombre Común	Nombre Científico
Cathartidae	Jote Cabeza Negra	*Coragyps atratus*
Falconidae	Chimachima	*Milvago chimachima*
	Halconcito Colorado	*Falco sparverius*
Rallidae	Saracura	*Aramides saracura*
	Gallineta Común	*Rallus sanguinolentus*
	Gallineta Negruzca	*Rallus nigricans*
Chararidriidae	Tero Común	*Vanellus chilensis*
Columbidae	Paloma Picazuró	*Columba picazuro*
Psittacidae	Calancate Ala Roja	*Aratinga leucophthalma*
	Chiripepé Cabeza Verde	*Pyrrhura frontalis*
	Loro Maitaca	*Pionus maximiliani*
Cuculidae	Anó Chico	*Crotophaga ani*
Trochilidae	Picaflor Copetón	*Stephanoxis lalandi*
Bucconidae	Chacurú Cara Negra	*Nystalus chacuru*
Picidae	Carpintero Campestre	*Colaptes campestris*
Dendrocolaptidae	Chinchero Escamado	*Lepidocolaptes squamatus*
	Tarefero	*Sittasomus griseicapillus*
Furnaridae	Hornero	*Furnarius rufus*
	Raspahojas	*Sclerurus scansor*
	Pijuí Negrusco	*Synallaxis cinerascens*
	Macuquiño	*Lochmias nematura*
Formicariidae	Batará Goteado	*Hypoedaleus guttatus*
	Choca Común	*Thamnophilus caerulescens*
Tyrannidae	Picabuey	*Machetornis rixosus*
	Benteveo Común	*Pitangus sulphuratus*
	Suiriri Silbón	*Sirystes sibilator*
	Churrinche	*Pyrocephalus rubinus*
	Ladrillito	*Mionectes rufiventris*
	Mosqueta Enana	*Myiornis auricularis*
Corvidae	Urraca Común	*Cyanocorax chrysops*
Troglodytidae	Ratona Común	*Troglodytes aedon*
Mimidae	Calandria Grande	*Mimus saturninus*
Turdidae	Zorzal Chalchalero	*Turdus amaurochalinus*
	Zorzal Sabiá	*Turdus leucomelas*
Vireonidae	Chiví Coronado	*Hylophilus poicilotis*
Parulidae	Arañero Silbón	*Basileuterus leucoblepharus*
	Arañero Coronado Chico	*Basileuterus culicivorus*
Thraupidae	Tangará Bonito	*Chlorophonia cyanea*
Emberizidae	Chingolo	*Zonotrichia capensis*
Icteridae	Boyerito	*Icterus cayanensis*

PERISSODACTYLA				
Tapiridae				
*Tapirus terrestris** y **	Tapir	EP	A	V, pd
CETARTIODACTYLA				
Tayassuidae				
Pecari tajacu	Tateto o Pecarí de collar	PM	NA	PM, estable
Tayassu pecari	Jabalí o Pecarí labiado	PV	A	CA, pd
Cervidae				
Mazama americana	Pardo, venado grande o corzuela roja	PM	NA	I
Mazama nana	Poca o Corzuela enana	PM	V	I
LAGOMORPHA				
Leporidae				
Sylvilagus brasiliensis	Tapetí o conejo	PM	NA	PM, desconocido
RODENTIA				
Sciuridae				
Sciurus aestuans	Ardilla gris	PM	NA	PM, desconocido
Erethizontidae				
Sphiggurus spinosus	Erizo o Coendú chico		NA	I
Caviidae				
Cavia aperea	Cuis	PM	NA	PM, estable
Hydrochaeridae				
*Hydrochaeris hydrochaeris***	Carpincho	PV	NA	PM, desconocido
Cuniculidae				
Cuniculus paca	Paca	PV	NA	PM, estable
Dasyproctidae				
Dasyprocta azarae	Agutí		NA	I, pd
Echymidae				
Kannabateomys amblyonyx	Rata de las tacuaras		I	PM

Abiotic Components

Climate

No meteorological data is available for the property or surrounding area, so climate characterization is based on nearby locations such as San Pedro and Cuartel Río Victoria (an INTA field site 40 km south of San Pedro). Average annual precipitation is around 2,000 mm.

It is dry-humid 33% of the year (summer months), and humid the remaining 67% (autumn, winter, and spring). Temperatures are warm 92% of the year and hot 8% *(Provincial Department of Highways, 2010)*.

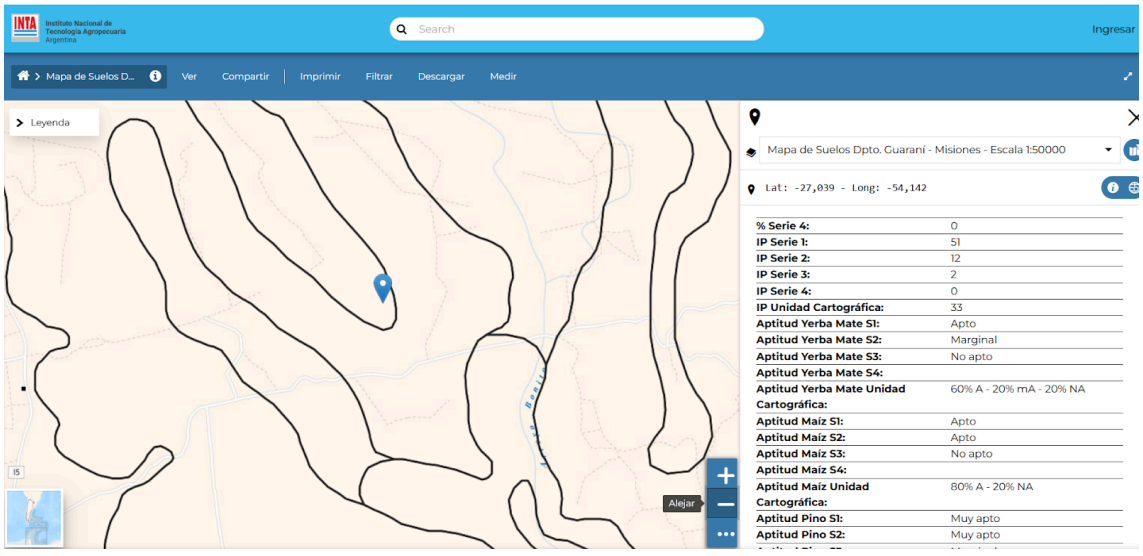
According to a study by Gandolla *(2008, cited in Provincial Department of Highways, 2010)*, which analyzed INTA climate data from 1970 to 2000:

- There is a decreasing trend in rainfall since the early 1990s.
- An increasing temperature trend is also observed starting in the 1990s.
- Although the system generates water excess, these have shown a decreasing trend since the 1990s.
- Monthly water deficits are infrequent and of low magnitude, but 70-80% of them occur between November and March—a fairly extended period.

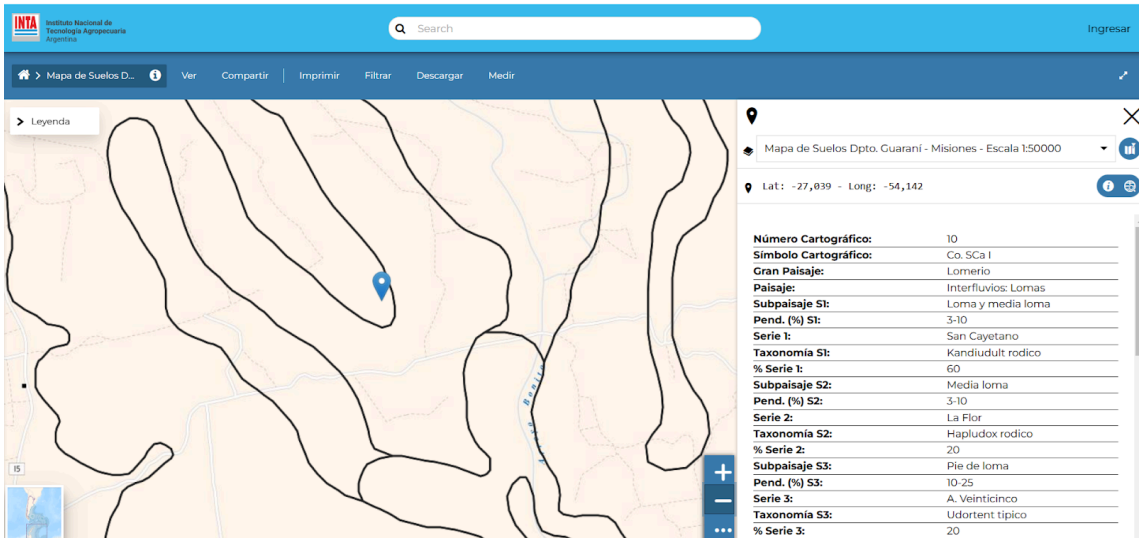
Source: San Pedro Meteorological Station

Soil

These wetlands develop on soils with high water retention capacity, typically sandy or clayey, and are surrounded by the most hygrophilous version of the Misiones rainforest (adapted to high moisture).

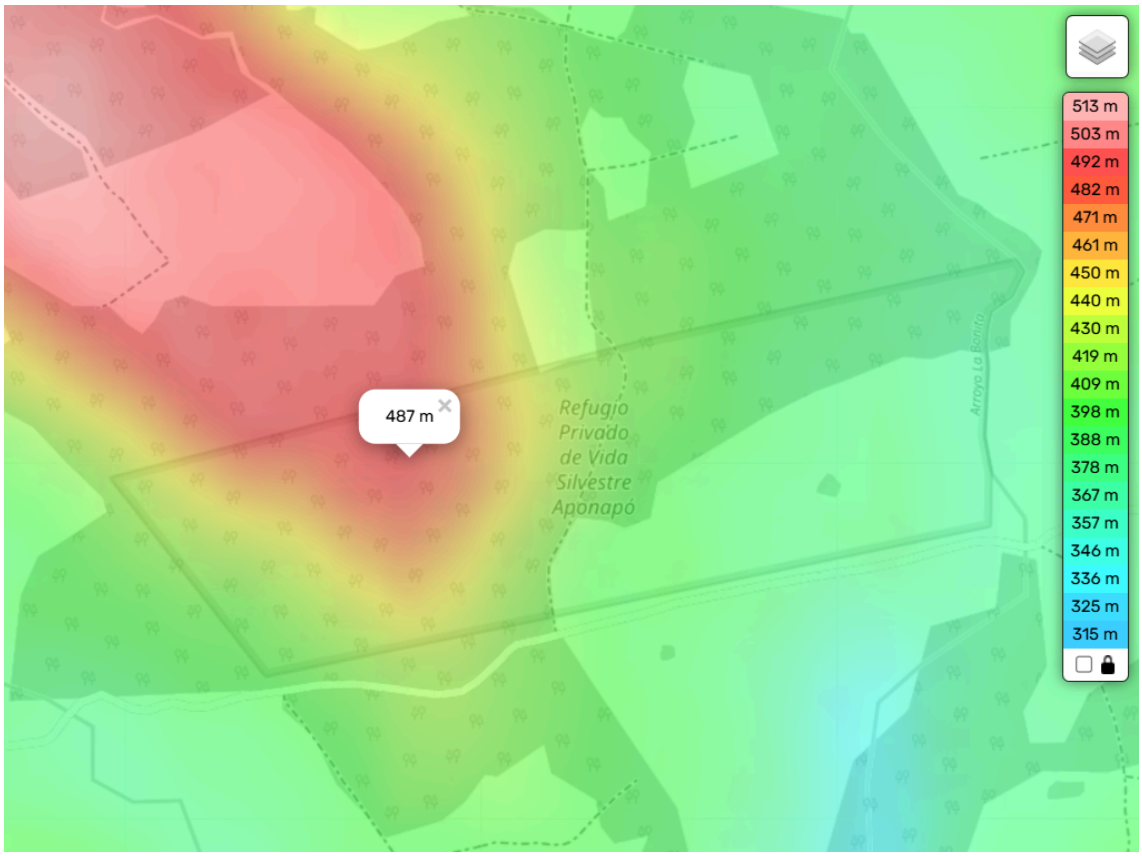


Source: Soil Map, Guaraní Department, Province of Misiones – National Institute of Agricultural Technology (INTA)



Source: Soil Map, Guaraní Department, Province of Misiones – National Institute of Agricultural Technology (INTA)

Topography



Source: topographic-map.com

Landscape Features

1. **Location and Elevation**
    - Found in mountainous regions between 400 and 800 meters above sea level.
    - Present in areas like Moconá Provincial Park, Yabotí Biosphere Reserve, and the central-northern region of the province, such as the Aponapó Reserve.
2. **Hydrology**
    - Fed by seasonal rains and runoff from mountain streams.
    - Some lagoons may connect to rivers or streams as tributaries.
3. **Ecological Function**
    - Serve as water reservoirs and hydrological regulators.
    - Key habitats for biodiversity, especially during dry seasons.
    - Contribute to aquifer recharge and sediment retention.

- Hydrological regulation: Retain and slowly release water, reducing flood risks.
- Biodiversity: Provide refuge and breeding sites for many species, some endemic or endangered.
- Carbon sequestration: The vegetation in these wetlands helps absorb CO_2.

Pre-Intervention State
The area, located within 16 hectares of plateau/flatland of the hill, remained unidentified until 2007, when the flowering and subsequent drying of tacuara bamboo created a temporary opportunity to remove the dry material, clear the area, and prevent potential wildfires. This discovery marked a milestone for the reserve, prompting its inclusion in the management and land-use plan as an INTANGIBLE ZONE exclusively designated for research. It was confirmed that the lagoon was associated with a grove of tree ferns, and that certain waterlogged areas around the perimeter—with permanent moisture—hosted a rich distribution of epiphytes, ferns, orchids, and bromeliads. The area was excluded from all use, and its carrying capacity was set to zero to ensure full protection of soil and ecosystem components. The first surveys and species identification informed the planning of future conservation activities.

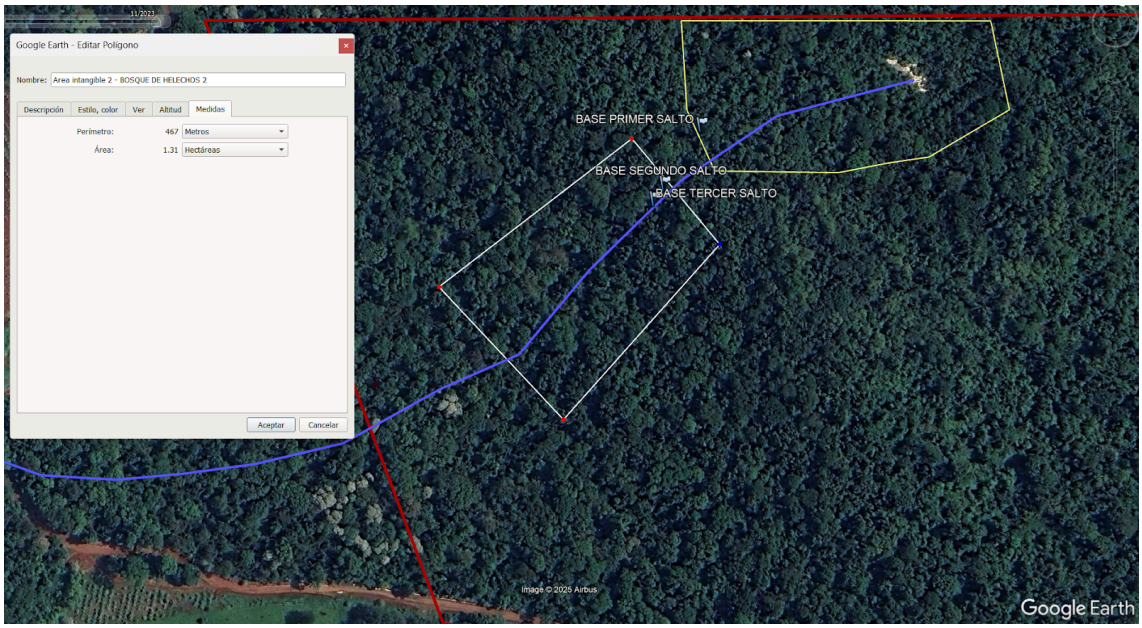
Source: Photographic Records

Relationship with Local Communities
In 2019, the National Native Forest Restoration Plan was launched. To identify at-risk species for propagation, a team of indigenous community members and park rangers explored the area. Indigenous experts (Mbya Guaraní) shared ancestral knowledge of species present in the ecosystem, many of which have a unique local distribution. They also helped identify mammals and other fauna related to the ecosystem's trophic chain.
Some of the identified species contributed—or were expected to contribute (during seasonal windows)—seeds to be propagated in the reserve's nursery.

Source: YouTube Video – Field documentation

Ecosystem "Tree Fern Forest 2"

Zoning
Classification of the area according to legal criteria, land use, or conservation categories.
Law 26.331. Category I (red) under land-use planning.



Source: Google Earth PRO. Official Land Registry of the Province of Misiones. **REFERENCES:** RED – reserve polygon; YELLOW – Intangible Zone 1: High-Altitude Lagoon and Tree Fern Forest 1; BLUE – watercourse generated by the lagoon; WHITE – polygon of Intangible Zone 2 (Tree Fern Forest 2).

Surface Area

Area: 1.31 hectares. Perimeter: 467 meters. Georeferencing obtained in situ (Garmin eTrex 2), verified with Google Earth PRO 2025.

Ecosystem Structure

The ecosystem of tree fern groves on steep slopes in the province of Misiones is a particularly unique environment within the Atlantic Forest (Selva Paranaense). These ecosystems develop in areas of difficult access and present distinctive ecological characteristics.

Ecosystem Composition

Biotic Components

This unit is found on the hillside, descending from the plateau of the high-altitude lagoon. Tree ferns commonly known as chachí bravo are found here, named for the spines on their leaf stalks and trunks. In Misiones, there are two spiny fern species: *Alsophila setosa* and *Cyathea atrovirens* (family *Cyatheaceae*), and one spineless species: *Dicksonia sellowiana* (family *Dicksoniaceae*). Other observed shrubs and trees include

Calliandra foliolosa (plumerillo), *Apuleia leiocarpa* (grapia), *Cedrella fissilis* (cedar), *Myriocarpus frondosus* (incense), catiguá, *Jacaratia spinosa* (yacaratiá), *Parapiptadenia rigida* (anchico), and *Eugenia uniflora* (pitanga).

Sources:

- Field Survey Document – Fundación Vida Silvestre Argentina, Baseline 2011
- Photographs
- Field monitoring and surveys
- Biodiversity inventories

Abiotic Components

Climate and Microclimate

- High relative humidity (around 90%)
- Frequent rainfall throughout the year (1,800 to 2,500 mm annually)
- Average temperature between 18–22°C, with minimal seasonal variation

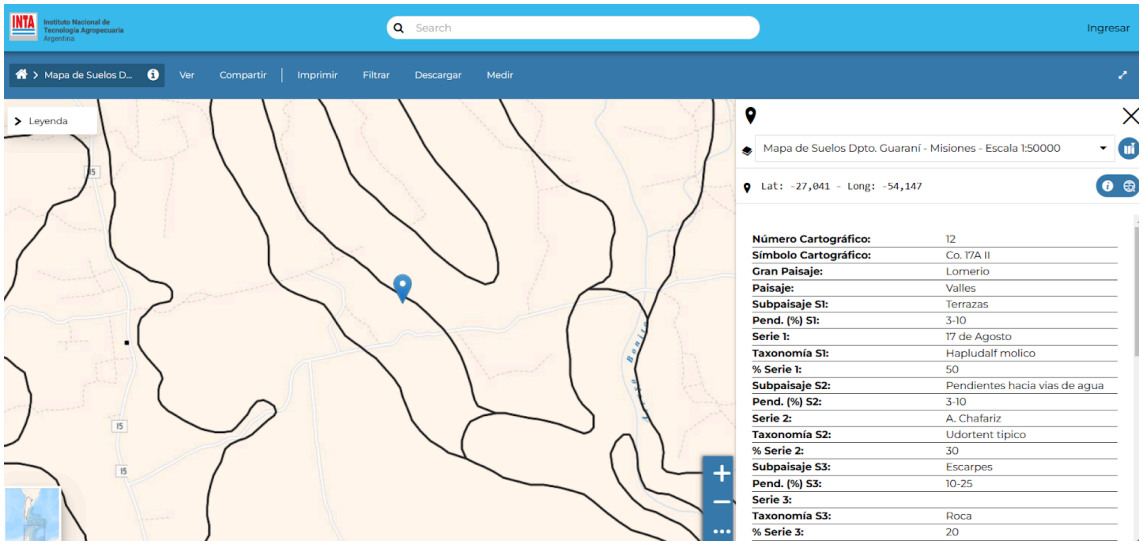
There are no meteorological records from the site or surrounding area, so the climate has been characterized using data from nearby localities such as San Pedro and Cuartel Río Victoria (an INTA field station 40 km south of San Pedro). Average precipitation is approximately 2,000 mm annually.

- 33% of the year is dry-humid (summer months), and 67% is humid (fall, winter, spring)
- Temperatures are warm 92% of the year and hot the remaining 8% *(Provincial Department of Highways, 2010)*
  According to *Gandolla* (2008, cited in the same source), based on INTA's climate data from 1970 to 2000:
    - There has been a decreasing trend in precipitation since the early 1990s
    - A rising trend in temperature has also been observed since the 1990s
    - While the system still generates water surpluses, these have decreased since the early 1990s
    - Monthly water deficits are infrequent and of low intensity, but 70–80% occur between November and March

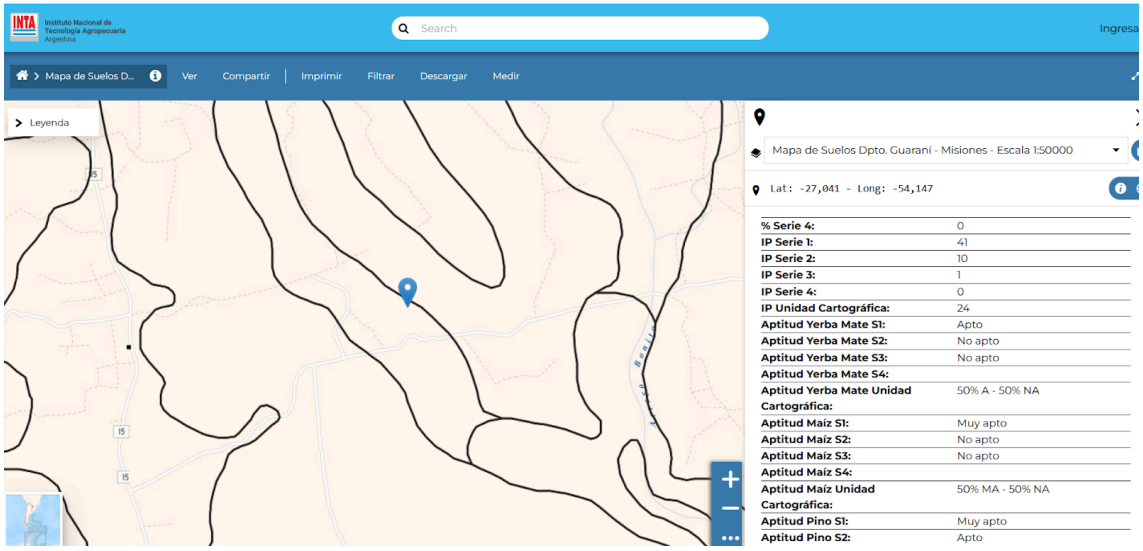
Source: San Pedro Meteorological Station

Soil

- Shallow soils, loamy-clay texture, with high moisture and decomposing organic matter
- Nutrient-rich soil, but highly susceptible to erosion if vegetation cover is lost

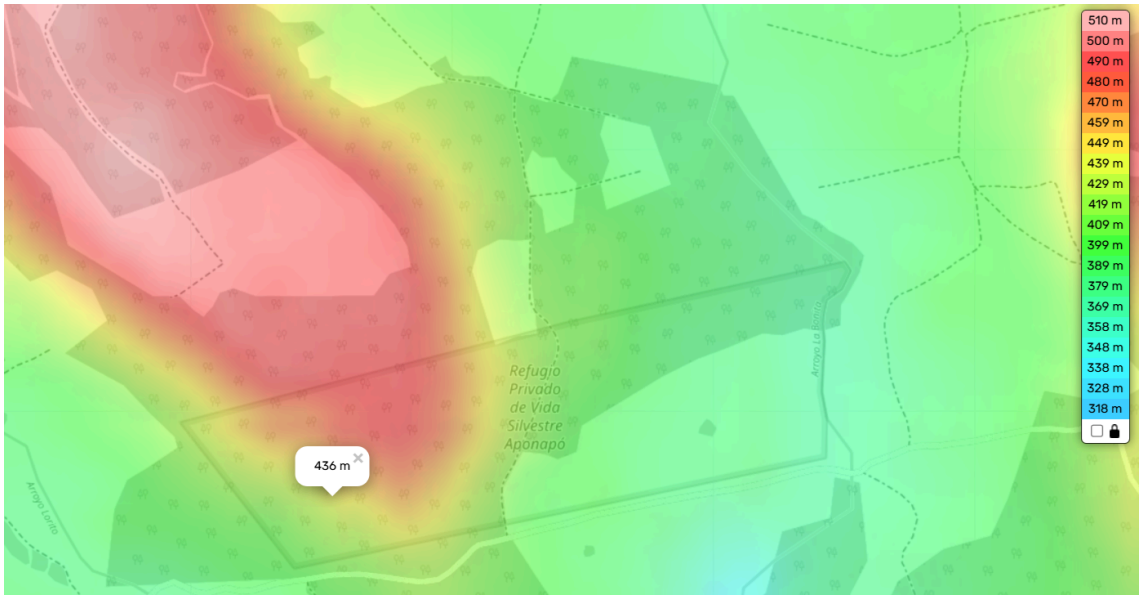


Source: Soil Map, Guaraní Department, Province of Misiones – National Institute of Agricultural Technology (INTA)



Source: Soil Map, Guaraní Department, Province of Misiones – National Institute of Agricultural Technology (INTA)

Topography



Source: topographic-map.com

Landscape Features

- **Primary Forest on Steep Slopes:**
  The area's topography has prevented extraction of species, making this a primary native forest. Water from the plateau flows down rocky, semi-vertical slopes for about 300 meters. Intangible Zone 2 is crossed by this descending stream, which connects the high-altitude lagoon with the El Lorito stream (located 700 meters away), contributing a seasonal flow.
- **Relief:**
  Located on hills and steep slopes with gradients exceeding 30%
- **Ecosystem Services and Conservation Roles:**
  - Erosion control on steep slopes
  - Water regulation (captures and retains rainwater)
  - Carbon sequestration and oxygen production
  - Habitat for unique biodiversity, including endangered endemic species

Pre-Intervention State

Due to its topographic conditions and inaccessibility, the area remained untouched by human activity. It was discovered during a survey of a cascading waterfall (which forms three drops) from its origin to its outlet. This survey led to its inclusion in the conservation and management plan under the High Conservation Value (HCV) category.

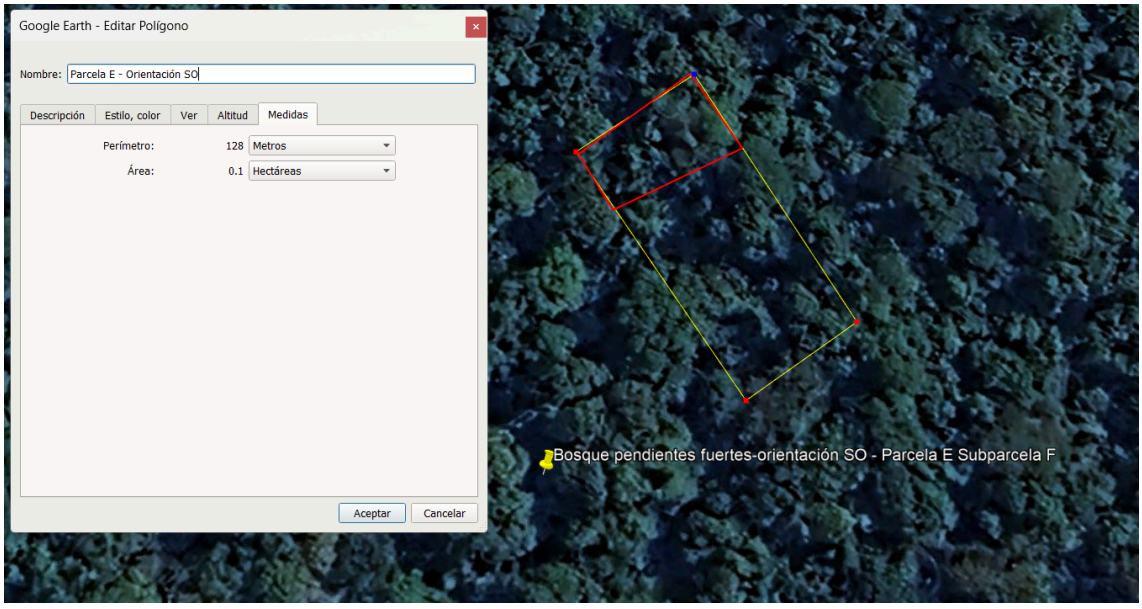
Source: Photographic records available.

Relationship with Local Communities
In 2019, the National Native Forest Restoration Plan was launched. To identify at-risk species and enable propagation, a team of indigenous community members and park rangers explored the area. Indigenous experts (Mbya Guaraní) shared ancestral knowledge of the ecosystem's species—many of which are unique to the region—as well as mammals and their role in the trophic web. Species were identified that provided, or would seasonally provide, seeds for propagation in the reserve's nursery.

Source: YouTube Video – Field documentation

Ecosystem "Mature Forest on Steep Slopes (Southwest-facing)"

Zoning
Classification of the area according to legal criteria, land use, or conservation categories.
Law 26.331. Category I (red) under land-use planning.



Source: Google Earth PRO. Official Land Registry of the Province of Misiones. **REFERENCES:** YELLOW – main parcel E; RED – sub-parcel F

Surface Area

Total area: 8.46 hectares Parcel E: 1,000 m² Sub-parcel F: 300 m². Georeferencing obtained in situ (Garmin eTrex 2), verified with Google Earth PRO 2025.

Ecosystem Structure

The mature forest area on steep southwest-facing slopes includes a permanent monitoring plot, serving as a reference ecosystem for this environment. This unit is located on the slopes of the hill, with various cardinal orientations and solar exposure, descending from the plateau of the high-altitude lagoon.

Descripción del ambiente - Resumen
Bosque maduro primario, sin intervención antropogénica (447 msnm)
Pendiente (45°). Orientación sur, suroeste.
Presencia de árboles semilleros certificados.
Estructura
3 estratos arbóreos bien definidos, cobertura dosel 90 %.
Sotobosque con presencia de helechos (30%), adiantopsis radiata, chlorophyla, anemia tormentosa y phyllitidis, doryopteris nobilis, doryopteris concolor , blechnum brasiliensis, campyloneurum nitidum.
Peperomia, Piper o canilla de vieja, laranjeira, aguay, catiguá, tréboles.
Lianas: Adenocalymma marginatum, Arrabidaea chica, bauhinia mycrostachya, escalera de mono, Cardiospermum spp. Epífitas: caraguatá, guambé.
Suelo
Perfil de suelo rocoso Presencia de hojarasca (4 cms), restos vegetales (troncos y ramas).
Fauna
Mono caí, coatíes, tatú, yacutoro, carpinteros, surucuá, tucanes, paceriformes.
Flora
Bromelias, orquideas

Sources:

- Biodiversity inventories
- Field records
- National Native Forest Restoration Plan

Ecosystem Composition
Biotic Components

Bosque Maduro en pendiente - Ecosistema de referencia			Orientación S-SO		
Parcela-ID	**N.Vulgar**	**N.Científico**	**Altura**	**Estado**	**DAP**
E154171	Yacaratiá	*Jacaratia spinosa*	14	Sano	52
E154172	Maria Preta	*Diatenopteryx sorbifolia*	17	Sano	48
E154174	Mora Blanca	*Alchornea iricurana*	6	Daño 60%	41
E154182	Guatambú	*Balfourodendron riedelianum*	20	Sano	30.5
E154181	Rabo Itá	*Lonchocarpus campestris*	23	Sano	58
E154175	Alecrín	*Holocalyx balansae*	15	Sano	32
E154176	Isapui morotí	*Machaerium scleroxylon*	18	Sano	49
E154177	Carne de Vaca	*Styrax leprosus*	16	Sano	41
E154161	Grapia	*Apuleia leiocarpa*	24	Sano	59
E154178	Camboatá Colorado	*Cupania vernalis Cambess*	5	Daño 70%	31
E154179	Rabo Itá	*Lonchocarpus campestris*	20	Sano	45.5
E154180	Cedro	*Cedrela fissilis*	23	Sano	72
E154162	Blanquillo	*Sebastiania commersoniana*	10	Sano	33
E154163	Maria Preta	*Diatenopteryx sorbifolia*	12	Sano	31
E154164	Ombú	*Phytolacca dioica*	17	Sano	71
E154165	Incienso	*Myrocarpus frondosus*	26	Sano	46.5
E154166	Laurel Negro	*Nectandra megapotamica*	20	Sano	63
E154167	Ceibo	*Erythrina falcata*	18	Sano	30
F450320	Aguay	*Chrysophyllum gonocarpum*	8	Sano	10
F450319	Aguay	*Chrysophyllum gonocarpum*	7	Sano	11
F450318	Azota Caballo	*Luehea divaricata*	13	Sano	17
F450312	Alecrín	*Holocalyx balansae*	14	Sano	11
F450317	Azota Caballo	*Luehea divaricata*	13	Sano	11.5
F450316	Blanquillo	*Sebastiania commersoniana*	13	Sano	11
F450315	Catiguá	*Trichilia catigua*	9	Sano	13
F450313	Isapui	*Machaerium scleroxylon*	12	Sano	15
F450314	Mora Blanca	*Alchornea iricurana*	8	Daño 10%	27
F450330	Aguay	*Chrysophyllum gonocarpum*	11	Sano	14
F450321	Laranjeira	*Actinostemon concolor*	9	Sano	11
F450322	Blanquillo	*Sebastiania commersoniana*	7	Muerto	25
F450323	Blanquillo	*Sebastiania commersoniana*	12	Sano	17

Renovales - DAP entre 2 y 9 cm - Altura entre 1,50 y 6 metros - **PARCELAS E y F**				
Cantidad	**N.Común**	**N.Científico**		
8	Catiguá	*Trichilia catigua*		
10	Guatambú	*Balfourodendron riedelianum*		
10	Camboatá Colorado	*Cupania vernalis Cambess*		
7	María Preta	*Diatenopteryx sorbifolia*		
2	Camboatá Blanco	*Matayba elaeagnoides*		
1	Aguay	*Chrysophyllum gonocarpum*		
8	Alecrín	*Holocalyx balansae*		
6	Cancharana	*Cabralea canjerana*		
4	Anchico Colorado	*Parapiptadenia rigida*		
3	Laranjeira	*Actinostemon concolor*		
1	Guabirá	*Campomanesia xanthocarpa*		
3	Laurel Negro	*Nectandra megapotamica*		
1	Incienso	*Myrocarpus frondosus*		
2	Pindó	*Syagrus romanzoffiana*		
1	Yacaratiá	*Jacaratia spinosa*		
1	Cedro	*Cedrela fissilis*		

Listado de mamiferos señalados para Aponapó y alrededores.

Consultas para la sistemática: Canevari y Vaccaro 2007.

Abreviaturas y signos:. **PM**: Preocupación Menor, **PV**: Potencialmente Vulnerable, **Vu**: Vunerable, **EP**: En Peligro, **A**: Amenazada; **CA**: Casi Amenazada; **pd**: poblaciones en disminución, **NA**: no amenazada, **I**: insuficientemente conocida.* Hace aproximadamente 1 año y medio a dos que no se detecta. ** En RBY del otro lado del Aº Paraíso.

Orden, familia y nombre científico	Nombre común	Categoría de conservación		
		Díaz y Ojeda (2000)	Secretaría de Ambiente y Desarrollo Sustentable de la Nación (2004)	LISTA ROJA INTERNACIONAL (IUCN 2010)
DIDELPHIMORPHIA				
Didelphidae				
Didelphis albiventris	Comadreja overa	PM	NA	PM, estable
Didelphis aurita	Comadreja orejas negras	PM	I	PM, estable
Metachirus nudicaudatus	Cuica común		I	I
Chironectes minimus	Cuica de agua	PV	A	PM, pd
XENARTHRA				
Myrmecophagidae				
Tamandua tetradactyla	Oso melero		A	
Dasypodidae				
Cabassous tatouay	Tatú rabo molle		A	
Dasypus novemcintus	Tatú negro		I	
Euphractus sexcintus	Tatú amarillo	PM	NA	PM, estable
PRIMATES				
Cebidae				
*Alouatta caraya**	Carayá	PM	A	PM, pd
Cebus cay	Mono Caí	PV	A	PM, pd
CARNIVORA				
Canidae				
Cerdocyon thous	Zorro de monte	PV	NA	PM, pd
Procyonidae				
Procyon cancrivorus	Aguará popé u Osito lavador		NA	PM, pd
Nasua nasua	Coatí		NA	PM, pd
Felidae				
Herpailurus yagouaroundi	Yaguarundí	PV	NA	PM, pd
Leopardus pardalis	Ocelote o Yaguatirica		A	PM, pd
*Puma concolor***	Puma	PV	NA	PM, pd
*Panthera onca***	Yaguareté	EP	EP	CA, pd
Mustelidae				
Galictis cuja	Hurón menor	PV	NA	PM, desc
Eira barbara	Hurón mayor	Vu	NA	PM, pd
Lontra longicaudis	Lobito de río		I	I, pd

Listado de aves detectadas en Aponapó durante el relevamiento de campo realizado entre 1 y 3 de agosto de 2011

La taxonomía y nombres comunes se basó en la publicación de Narosky e Yzurieta, 2003

Familia	Nombre Común	Nombre Científico
Cathartidae	Jote Cabeza Negra	*Coragyps atratus*
Falconidae	Chimachima	*Milvago chimachima*
	Halconcito Colorado	*Falco sparverius*
Rallidae	Saracura	*Aramides saracura*
	Gallineta Común	*Rallus sanguinolentus*
	Gallineta Negruzca	*Rallus nigricans*
Chararidriidae	Tero Común	*Vanellus chilensis*
Columbidae	Paloma Picazuró	*Columba picazuro*
Psittacidae	Calancate Ala Roja	*Aratinga leucophthalma*
	Chiripepé Cabeza Verde	*Pyrrhura frontalis*
	Loro Maitaca	*Pionus maximiliani*
Cuculidae	Anó Chico	*Crotophaga ani*
Trochilidae	Picaflor Copetón	*Stephanoxis lalandi*
Bucconidae	Chacurú Cara Negra	*Nystalus chacuru*
Picidae	Carpintero Campestre	*Colaptes campestris*
Dendrocolaptidae	Chinchero Escamado	*Lepidocolaptes squamatus*
	Tarefero	*Sittasomus griseicapillus*
Furnaridae	Hornero	*Furnarius rufus*
	Raspahojas	*Sclerurus scansor*
	Pijuí Negrusco	*Synallaxis cinerascens*
	Macuquiño	*Lochmias nematura*
Formicariidae	Batará Goteado	*Hypoedaleus guttatus*
	Choca Común	*Thamnophilus caerulescens*
Tyrannidae	Picabuey	*Machetornis rixosus*
	Benteveo Común	*Pitangus sulphuratus*
	Suiriri Silbón	*Sirystes sibilator*
	Churrinche	*Pyrocephalus rubinus*
	Ladrillito	*Mionectes rufiventris*
	Mosqueta Enana	*Myiornis auricularis*
Corvidae	Urraca Común	*Cyanocorax chrysops*
Troglodytidae	Ratona Común	*Troglodytes aedon*
Mimidae	Calandria Grande	*Mimus saturninus*
Turdidae	Zorzal Chalchalero	*Turdus amaurochalinus*
	Zorzal Sabiá	*Turdus leucomelas*
Vireonidae	Chiví Coronado	*Hylophilus poicilotis*
Parulidae	Arañero Silbón	*Basileuterus leucoblepharus*
	Arañero Coronado Chico	*Basileuterus culicivorus*
Thraupidae	Tangará Bonito	*Chlorophonia cyanea*
Emberizidae	Chingolo	*Zonotrichia capensis*
Icteridae	Boyerito	*Icterus cayanensis*

PERISSODACTYLA				
Tapiridae				
*Tapirus terrestris*y***	Tapir	EP	A	V, pd
CETARTIODACTYLA				
Tayassuidae				
Pecari tajacu	Tateto o Pecarí de collar	PM	NA	PM, estable
Tayassu pecari	Jabalí o Pecarí labiado	PV	A	CA, pd
Cervidae				
Mazama americana	Pardo, venado grande o corzuela roja	PM	NA	I
Mazama nana	Poca o Corzuela enana	PM	V	I
LAGOMORPHA				
Leporidae				
Sylvilagus brasiliensis	Tapetí o conejo	PM	NA	PM, desconocido
RODENTIA				
Sciuridae				
Sciurus aestuans	Ardilla gris	PM	NA	PM, desconocido
Erethizontidae				
Sphiggurus spinosus	Erizo o Coendú chico		NA	I
Caviidae				
Cavia aperea	Cuis	PM	NA	PM, estable
Hydrochaeridae				
*Hydrochaeris hydrochaeris***	Carpincho	PV	NA	PM, desconocido
Cuniculidae				
Cuniculus paca	Paca	PV	NA	PM, estable
Dasyproctidae				
Dasyprocta azarae	Agutí		NA	I, pd
Echymidae				
Kannabateomys amblyonyx	Rata de las tacuaras		I	PM

Sources:

- Biodiversity inventories and field records
- National Native Forest Restoration Plan
- Field Survey Document – Fundación Vida Silvestre Argentina, Baseline 2011

Abiotic Components

Climate

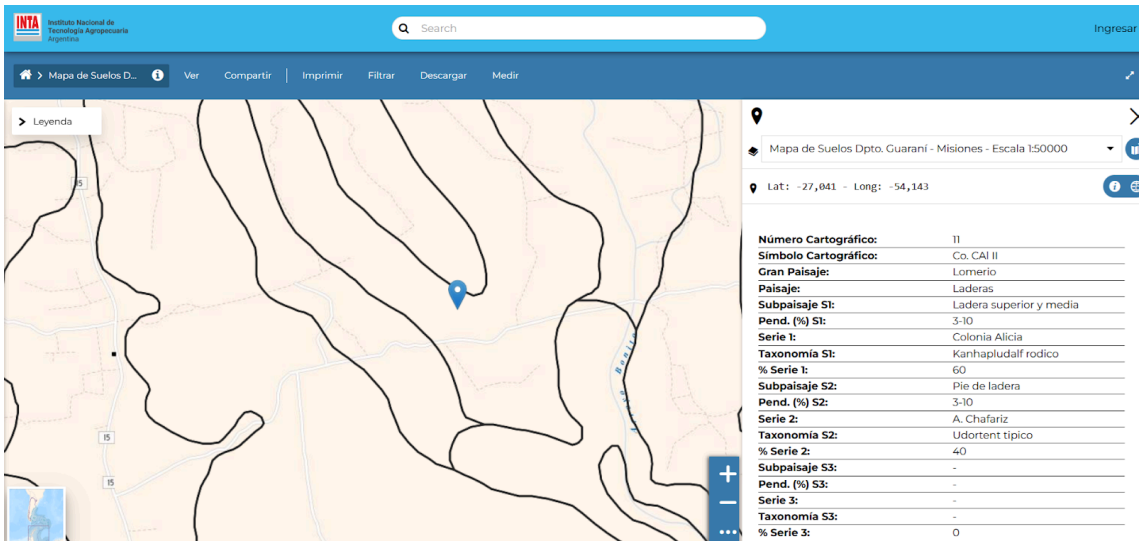
No direct meteorological data is available for the site or its surroundings, so nearby locations such as San Pedro and Cuartel Río Victoria (an INTA field site 40 km south of San Pedro) are used for reference. Average precipitation is about 2,000 mm annually.

- 33% of the year is dry-humid (summer months)
- 67% is humid (autumn, winter, and spring)
- Temperatures are warm for 92% of the year and hot for the remaining 8% *(Provincial Department of Highways, 2010)*
- According to *Gandolla* (2008, cited in the same source), based on climate data from 1970 to 2000 recorded by INTA:
    - Decreasing precipitation trend since the early 1990s
    - Rising temperature trend since the early 1990s
    - Despite being a water surplus system, surplus volumes have decreased since the early 1990s
    - Monthly water deficits are infrequent and low in magnitude, but 70–80% occur from November to March

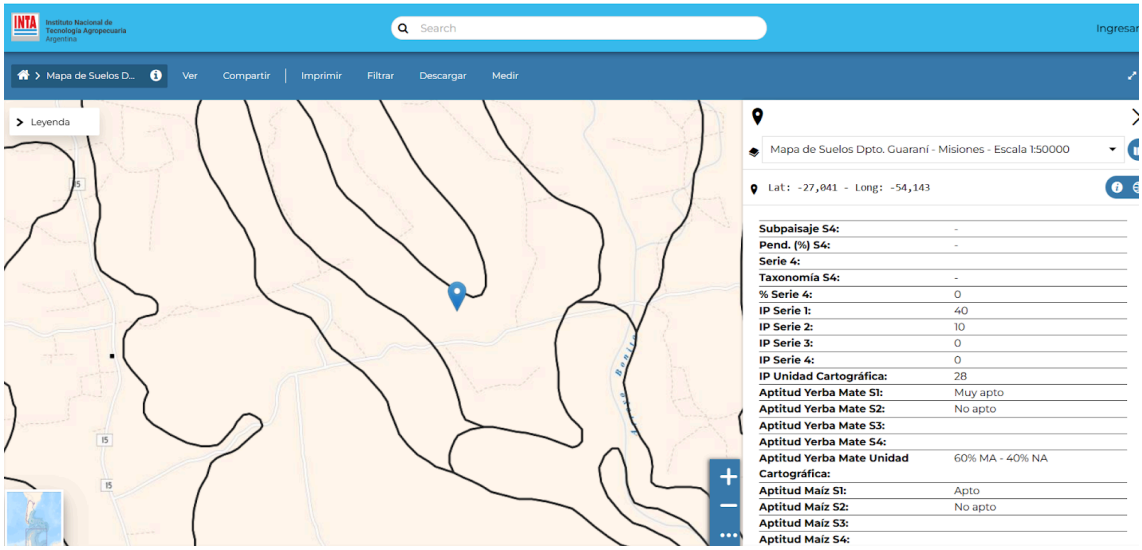
Source: San Pedro Meteorological Station

Soil

Lateritic reddish soils, rich in iron and clay, with high water retention capacity.



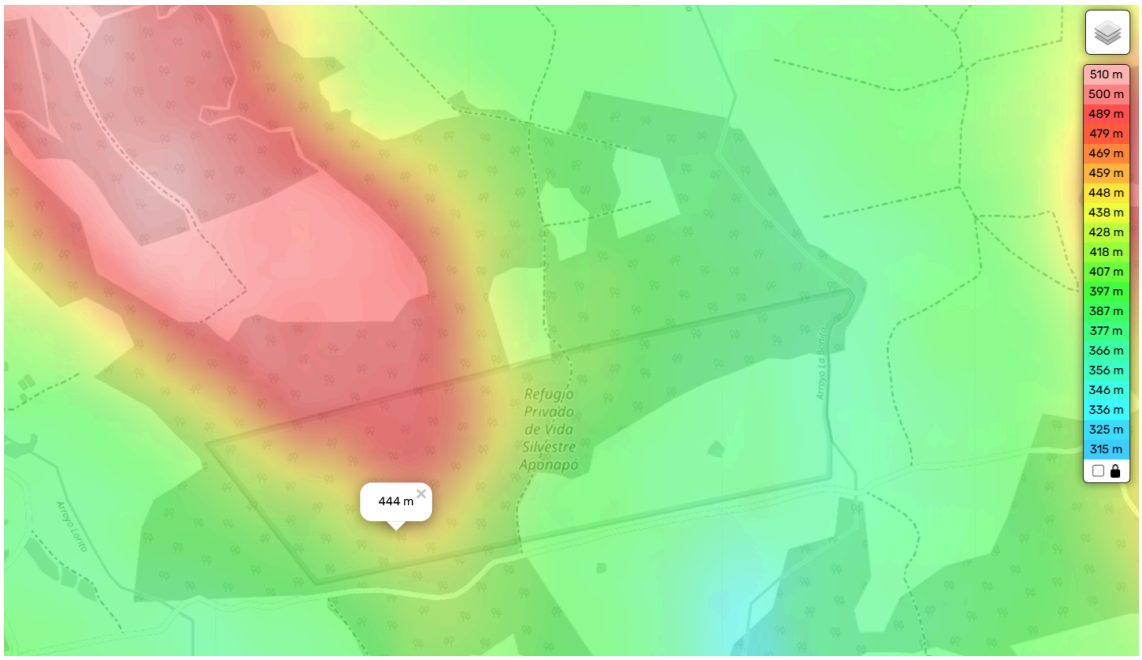
Source: Soil Map, Guaraní Department, Province of Misiones – National Institute of Agricultural Technology (INTA).



Source: Soil Map, Guaraní Department, Province of Misiones – National Institute of Agricultural Technology (INTA).

Topography

The area corresponds to forest on steep slopes. Notably, the topography has prevented any species extraction, and thus the area remains primary native forest.



Source: http://topographic-map.com/

Landscape Features
This forested area lies on steep slopes where natural barriers have protected it from human disturbance, making it a valuable example of undisturbed primary forest.

Pre-Intervention State
Due to its topography and inaccessibility, the area has remained untouched by anthropogenic activity.

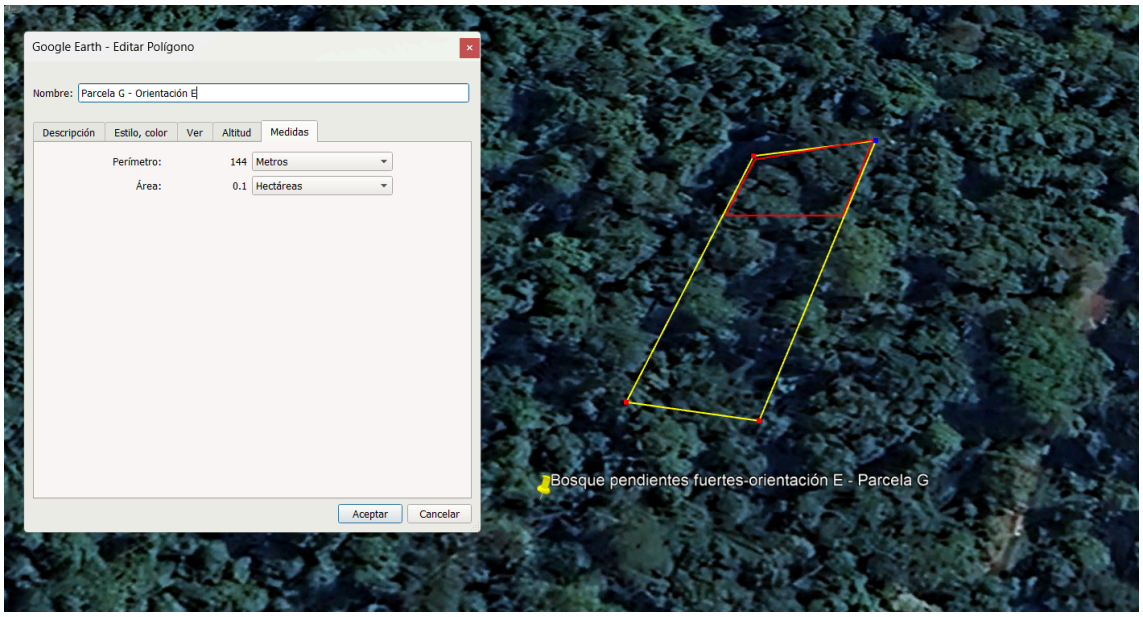
Source: Photographic Records

Relationship with Local Communities
In 2019, the National Native Forest Restoration Plan was launched. A team of indigenous community members and park rangers was assembled to explore the area and identify at-risk species for propagation. Indigenous experts (Mbya Guaraní) shared ancestral knowledge of species present in the ecosystem—many of which are uniquely distributed in this area—as well as information on mammals linked to the ecosystem's trophic chain. Several plant species were identified that provided, or would provide (during seasonal windows), seeds for propagation in the reserve's nursery.

Source: YouTube Video – Field documentation.

Ecosystem "Mature Forest on Steep Slopes (East-facing)"

Zoning
Classification of the area according to legal criteria, land use, or conservation categories.
Law 26.331. Category I (red) under land-use planning.



Source: Google Earth PRO. Official Land Registry of the Province of Misiones. **REFERENCES:** YELLOW – main parcel G; RED – sub-parcel H.

Surface Area

Total surface area: 8.46 hectares. Parcel G: 1,000 m². Sub-parcel H: 300 m². Georeferencing obtained in situ (Garmin eTrex 2), verified with Google Earth PRO 2025.

Ecosystem Structure

Steep Slope Forest:

This mature forest on steep east-facing slopes includes a permanent monitoring plot serving as a reference ecosystem for the local environment. This unit is located on the hillside of the mountain, with various cardinal orientations and sunlight exposures, descending from the plateau of the high-altitude lagoon. It contains tree ferns commonly known as chachí bravo, named for the spines on their leaf stalks and trunks.

In Misiones, there are two spiny fern species: *Alsophila setosa* and *Cyathea atrovirens* (family *Cyatheaceae*), and one without spines: *Dicksonia sellowiana* (family *Dicksoniaceae*). Other species observed include shrubs like *Calliandra foliolosa* (plumerillo), and trees such as *Apuleia leiocarpa* (grapia), *Cedrella fissilis* (cedar), *Myriocarpus frondosus* (incense), catiguá, *Jacaratia spinosa* (yacaratiá), *Parapiptadenia rigida* (anchico), and *Eugenia uniflora* (pitanga).

Descripción del ambiente - Resumen
Bosque maduro (443 msnm)
Pendiente (45°). Orientación Este.
Presencia de árboles semilleros certificados.
Estructura
3 estratos arbóreos bien definidos, cobertura dosel 90 %.
Sotobosque con presencia de helechos (60%), adiantopsis radiata, chlorophyla, anemia tormentosa y phyllitidis, doryopteris nobilis, doryopteris concolor , blechnum brasiliensis, campyloneurum nitidum.
Peperomia, Piper o canilla de vieja, laranjeira, aguay, catiguá, tréboles.
Lianas: Adenocalymma marginatum, Arrabidaea chica, bauhinia mycrostachya, escalera de mono, Cardiospermum spp. Epífitas: caraguatá, guambé. Presencia de caña tacuara (15%), uña de gato y ortiga brava.
Suelo
Perfil de suelo profundo. Presencia de hojarasca (6 cms), restos vegetales (troncos y ramas).
Fauna
Mono caí, coatíes, tatú, yacutoro, carpinteros, surucuá, tucanes, paceriformes.
Flora
Diversos tipos de epífitas.

Sources:

- Biodiversity inventories
- Field records
- National Native Forest Restoration Plan

Ecosystem Composition
Biotic Components

Renovales - DAP entre 2 y 9 cm - Altura entre 1,50 y 6 metros - **PARCELAS G y H**				
Cantidad	**N.Común**	**N.Científico**		
2	Camboatá Colorado	*Cupania vernalis Cambess*		
2	Canela	*Helietta apiculata*		
2	Araticú	*Annona rugulosa*		
5	Ortiga Brava	*Urera baccifera*		
3	Cedrillo	*Guarea macrophylla*		
2	Laurel Negro	*Nectandra megapotamica*		
2	Alecrín	*Holocalyx balansae*		
2	Guayca	*Ocotea puberula*		
1	Kocú	*Allophylus edulis*		
11	Rabo Molle	*Lonchocarpus muhelbergianus*		
6	Guatambú	*Balfourodendron riedelianum*		
1	Laranjeira	*Actinostemon concolor*		
4	Camboatá Blanco	*Matayba elaeagnoides*		
2	Cedro	*Cedrela fissilis*		
3	Isapui	*Machaerium scleroxylon*		
5	Aguay	*Chrysophyllum gonocarpum*		
1	Pororoca	*Myrsine balansae*		

Bosque Maduro en pendiente - Ecosistema de referencia			Orientación E		
Parcela-ID	**N.Vulgar**	**N.Científico**	**Altura**	**Estado**	**DAP**
G154168	Cedro	*Cedrela fissilis*	14	Sano	31
G154171	Cedro	*Cedrela fissilis*	16.5	Sano	68.2
G154170	Laurel Negro	*Nectandra megapotamica*	15	Sano	43.6
G154169	Laurel Negro	*Nectandra megapotamica*	15	Sano	32
G154160	Guatambú	*Balfourodendron riedelianum*	12	Sano	30
G154159	Cedro	*Cedrela fissilis*	8	Daño 60 %	31.8
G154151	Laurel Amarillo	*Nectandra lanceolata*	18	Sano	63.7
G154129	Ombú	*Phytolacca dioica*	11	Sano	58.9
G154152	Yacaratiá	*Jacaratia spinosa*	8	Sano	41.4
G154112	Laurel Amarillo	*Nectandra lanceolata*	23	Sano	85.9
G154113	Cedro	*Cedrela fissilis*	0	Muerto	40
G154114	Guatambú	*Balfourodendron riedelianum*	22	Sano	44.3
H450331	Rabo ita	*Lonchocarpus campestris*	3	Muerto	26
H450332	Aguay	*Chrysophyllum gonocarpum*	5	Sano	10
H450333	Guatambú	*Balfourodendron riedelianum*	15	Sano	23
H450334	Cedrillo	*Guarea macrophylla*	6	Sano	15
H450335	Isapui	*Machaerium scleroxylon*	12	Sano	22
H450336	Isapui	*Machaerium scleroxylon*	9	Sano	14
H450337	Isapui	*Machaerium scleroxylon*	10	Sano	17
H450338	Pata de Buey	*Bauhinia forficata*	7	Sano	12

Listado de mamiferos señalados para Aponapó y alrededores.

Consultas para la sistemática: Canevari y Vaccaro 2007.

Abreviaturas y signos:. **PM**: Preocupación Menor, **PV**: Potencialmente Vulnerable, **Vu**: Vunerable, **EP**: En Peligro, **A**: Amenazada; **CA**: Casi Amenazada; **pd**: poblaciones en disminución, **NA**: no amenazada, **I**: insuficientemente conocida.* Hace aproximadamente 1 año y medio a dos que no se detecta. ** En RBY del otro lado del Aº Paraíso.

Orden, familia y nombre científico	Nombre común	Categoría de conservación		
		Díaz y Ojeda (2000)	Secretaría de Ambiente y Desarrollo Sustentable de la Nación (2004)	LISTA ROJA INTERNACIONAL (IUCN 2010)
DIDELPHIMORPHIA				
Didelphidae				
Didelphis albiventris	Comadreja overa	PM	NA	PM, estable
Didelphis aurita	Comadreja orejas negras	PM	I	PM, estable
Metachirus nudicaudatus	Cuica común		I	I
Chironectes minimus	Cuica de agua	PV	A	PM, pd
XENARTHRA				
Myrmecophagidae				
Tamandua tetradactyla	Oso melero		A	
Dasypodidae				
Cabassous tatouay	Tatú rabo molle		A	
Dasypus novemcintus	Tatú negro		I	
Euphractus sexcintus	Tatú amarillo	PM	NA	PM, estable
PRIMATES				
Cebidae				
*Alouatta caraya**	Carayá	PM	A	PM, pd
Cebus cay	Mono Caí	PV	A	PM, pd
CARNIVORA				
Canidae				
Cerdocyon thous	Zorro de monte	PV	NA	PM, pd
Procyonidae				
Procyon cancrivorus	Aguará popé u Osito lavador		NA	PM, pd
Nasua nasua	Coatí		NA	PM, pd
Felidae				
Herpailurus yagouaroundi	Yaguarundí	PV	NA	PM, pd
Leopardus pardalis	Ocelote o Yaguatirica		A	PM, pd
*Puma concolor***	Puma	PV	NA	PM, pd
*Panthera onca***	Yaguareté	EP	EP	CA, pd
Mustelidae				
Galictis cuja	Hurón menor	PV	NA	PM, desc
Eira barbara	Hurón mayor	Vu	NA	PM, pd
Lontra longicaudis	Lobito de río		I	I, pd

Listado de aves detectadas en Aponapó durante el relevamiento de campo realizado entre 1 y 3 de agosto de 2011

La taxonomía y nombres comunes se basó en la publicación de Narosky e Yzurieta, 2003

Familia	Nombre Común	Nombre Científico
Cathartidae	Jote Cabeza Negra	*Coragyps atratus*
Falconidae	Chimachima	*Milvago chimachima*
	Halconcito Colorado	*Falco sparverius*
Rallidae	Saracura	*Aramides saracura*
	Gallineta Común	*Rallus sanguinolentus*
	Gallineta Negruzca	*Rallus nigricans*
Chararidriidae	Tero Común	*Vanellus chilensis*
Columbidae	Paloma Picazuró	*Columba picazuro*
Psittacidae	Calancate Ala Roja	*Aratinga leucophthalma*
	Chiripepé Cabeza Verde	*Pyrrhura frontalis*
	Loro Maitaca	*Pionus maximiliani*
Cuculidae	Anó Chico	*Crotophaga ani*
Trochilidae	Picaflor Copetón	*Stephanoxis lalandi*
Bucconidae	Chacurú Cara Negra	*Nystalus chacuru*
Picidae	Carpintero Campestre	*Colaptes campestris*
Dendrocolaptidae	Chinchero Escamado	*Lepidocolaptes squamatus*
	Tarefero	*Sittasomus griseicapillus*
Furnaridae	Hornero	*Furnarius rufus*
	Raspahojas	*Sclerurus scansor*
	Pijuí Negrusco	*Synallaxis cinerascens*
	Macuquiño	*Lochmias nematura*
Formicariidae	Batará Goteado	*Hypoedaleus guttatus*
	Choca Común	*Thamnophilus caerulescens*
Tyrannidae	Picabuey	*Machetornis rixosus*
	Benteveo Común	*Pitangus sulphuratus*
	Suiriri Silbón	*Sirystes sibilator*
	Churrinche	*Pyrocephalus rubinus*
	Ladrillito	*Mionectes rufiventris*
	Mosqueta Enana	*Myiornis auricularis*
Corvidae	Urraca Común	*Cyanocorax chrysops*
Troglodytidae	Ratona Común	*Troglodytes aedon*
Mimidae	Calandria Grande	*Mimus saturninus*
Turdidae	Zorzal Chalchalero	*Turdus amaurochalinus*
	Zorzal Sabiá	*Turdus leucomelas*
Vireonidae	Chiví Coronado	*Hylophilus poicilotis*
Parulidae	Arañero Silbón	*Basileuterus leucoblepharus*
	Arañero Coronado Chico	*Basileuterus culicivorus*
Thraupidae	Tangará Bonito	*Chlorophonia cyanea*
Emberizidae	Chingolo	*Zonotrichia capensis*
Icteridae	Boyerito	*Icterus cayanensis*

PERISSODACTYLA				
Tapiridae				
*Tapirus terrestris** y **	Tapir	EP	A	V, pd
CETARTIODACTYLA				
Tayassuidae				
Pecari tajacu	Tateto o Pecarí de collar	PM	NA	PM, estable
Tayassu pecari	Jabalí o Pecarí labiado	PV	A	CA, pd
Cervidae				
Mazama americana	Pardo, venado grande o corzuela roja	PM	NA	I
Mazama nana	Poca o Corzuela enana	PM	V	I
LAGOMORPHA				
Leporidae				
Sylvilagus brasiliensis	Tapetí o conejo	PM	NA	PM, desconocido
RODENTIA				
Sciuridae				
Sciurus aestuans	Ardilla gris	PM	NA	PM, desconocido
Erethizontidae				
Sphiggurus spinosus	Erizo o Coendú chico		NA	I
Caviidae				
Cavia aperea	Cuis	PM	NA	PM, estable
Hydrochaeridae				
*Hydrochaeris hydrochaeris***	Carpincho	PV	NA	PM, desconocido
Cuniculidae				
Cuniculus paca	Paca	PV	NA	PM, estable
Dasyproctidae				
Dasyprocta azarae	Agutí		NA	I, pd
Echymidae				
Kannabateomys amblyonyx	Rata de las tacuaras		I	PM

Sources:

- Biodiversity inventories
- Field records
- National Native Forest Restoration Plan
- Field Survey – Fundación Vida Silvestre Argentina, Baseline 2011

Abiotic Components

Climate
There are no meteorological records from the site or its immediate surroundings, so data from nearby areas such as San Pedro and Cuartel Río Victoria (an INTA station located 40 km south of San Pedro) is used.

Average annual precipitation: ~2,000 mm

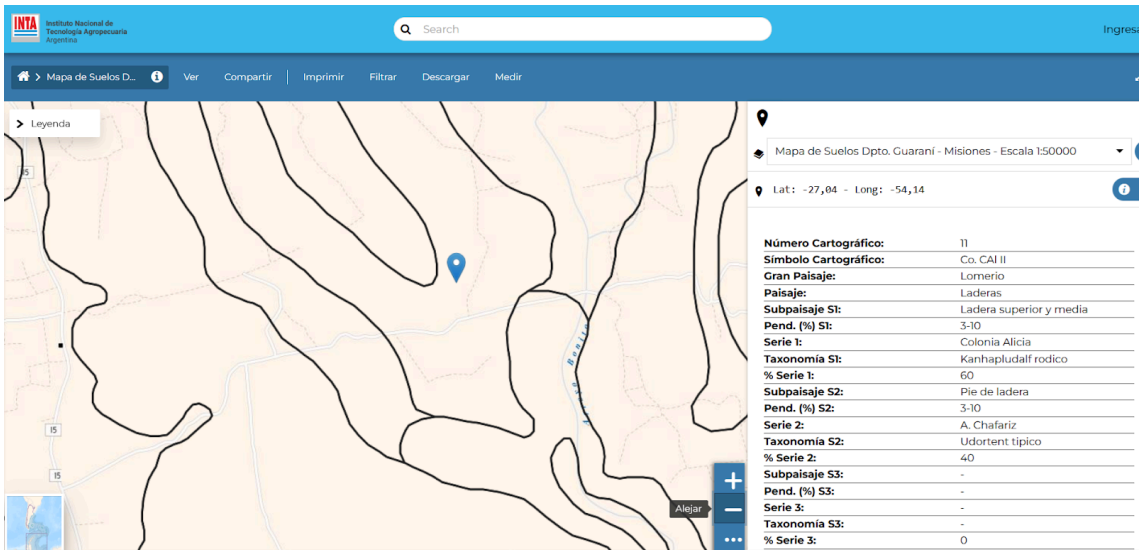
- 33% of the year is dry-humid (summer)
- 67% of the year is humid (autumn, winter, spring)
- Temperatures are warm 92% of the year, and hot for the remaining 8% *(Provincial Department of Highways, 2010)*.

According to *Gandolla* (2008, cited by the same source), based on INTA's climate data from 1970–2000:

- A decreasing trend in precipitation has been observed since the early 1990s
- Temperature trends indicate a warming period beginning in the early 1990s
- Although the system typically generates water surpluses, these have declined since the early 1990s
- Monthly water deficits are rare and minor, but 70–80% occur from November to March

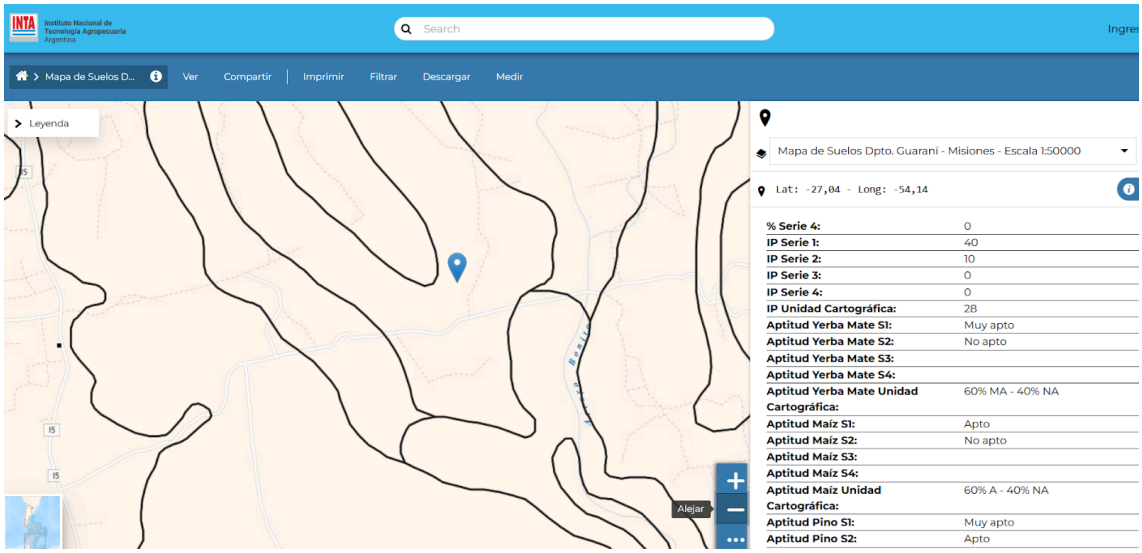
Source: San Pedro Meteorological Station

Soil
Lateritic reddish soils, rich in iron and clay, with high water retention capacity.



Número Cartográfico:	11
Símbolo Cartográfico:	Co. CAI II
Gran Paisaje:	Lomerio
Paisaje:	Laderas
Subpaisaje S1:	Ladera superior y media
Pend. (%) S1:	3-10
Serie 1:	Colonia Alicia
Taxonomía S1:	Kanhapludalf rodico
% Serie 1:	60
Subpaisaje S2:	Pie de ladera
Pend. (%) S2:	3-10
Serie 2:	A. Chafariz
Taxonomía S2:	Udortent tipico
% Serie 2:	40
Subpaisaje S3:	-
Pend. (%) S3:	-
Serie 3:	-
Taxonomía S3:	-
% Serie 3:	0

Source: Soil Map, Guaraní Department, Province of Misiones – National Institute of Agricultural Technology (INTA)

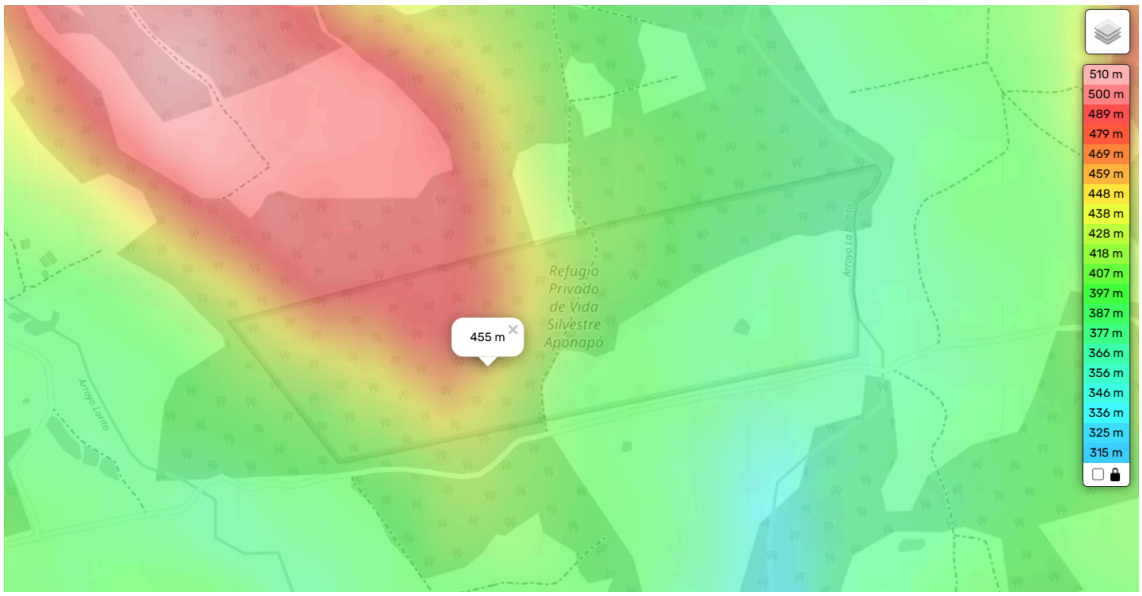


% Serie 4:	0
IP Serie 1:	40
IP Serie 2:	10
IP Serie 3:	0
IP Serie 4:	0
IP Unidad Cartográfica:	28
Aptitud Yerba Mate S1:	Muy apto
Aptitud Yerba Mate S2:	No apto
Aptitud Yerba Mate S3:	
Aptitud Yerba Mate S4:	
Aptitud Yerba Mate Unidad Cartográfica:	60% MA - 40% NA
Aptitud Maíz S1:	Apto
Aptitud Maíz S2:	No apto
Aptitud Maíz S3:	
Aptitud Maíz S4:	
Aptitud Maíz Unidad Cartográfica:	60% A - 40% NA
Aptitud Pino S1:	Muy apto
Aptitud Pino S2:	Apto

Source: Soil Map, Guaraní Department, Province of Misiones – National Institute of Agricultural Technology (INTA)

Topography

The area consists of forest on steep slopes. Notably, the challenging topography has prevented species extraction, preserving it as a primary native forest.



Source: http://topographic-map.com/

Landscape Features

The site corresponds to forested areas on steep slopes. The terrain has naturally protected the site from anthropogenic extraction, maintaining its status as a primary native forest.

Pre-Intervention State

Due to its topography and inaccessibility, the area has remained untouched by human activity.

Source: Photographic records

Relationship with Local Communities

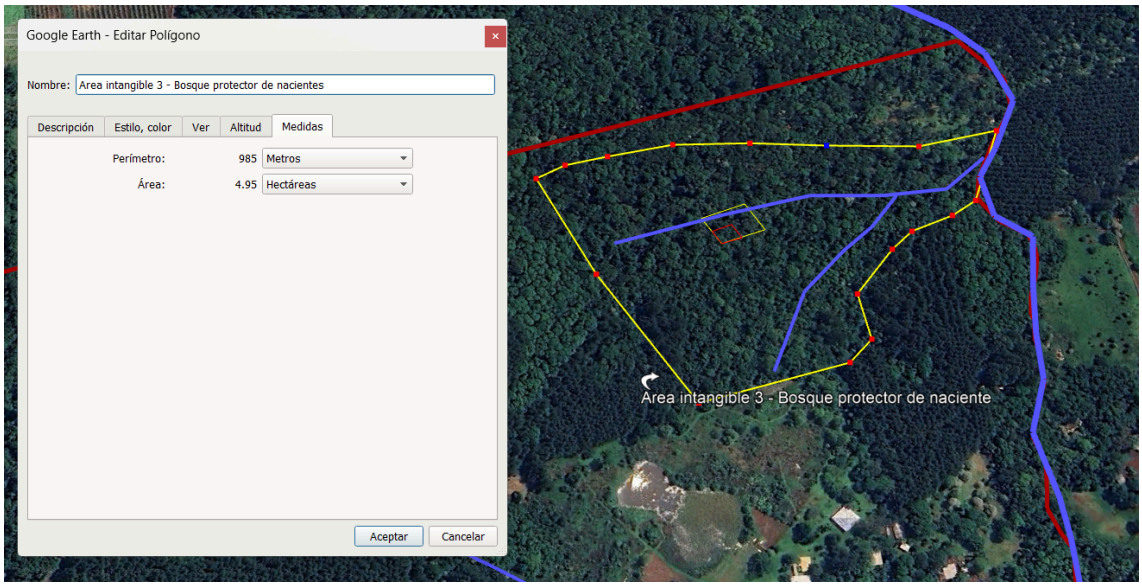
In 2019, the National Native Forest Restoration Plan was launched. A team of indigenous community members and park rangers was formed to explore the area and identify at-risk species for propagation. Indigenous experts (Mbya Guaraní) shared their ancestral knowledge about the ecosystem's plant species—many with limited local distribution—as well as mammals linked to the ecosystem's food web. Species were identified that had already contributed or could contribute (during seasonal windows) seeds for propagation in the reserve's nursery.

Source: YouTube Video – Field documentation

Ecosystem "Protective Forest of Springs and Wetlands"

Zoning

Classification of the area according to legal criteria, land use, or conservation categories. *Law 26.331. Category I (red)* under land-use planning.



Source: Google Earth PRO. Official Land Registry of the Province of Misiones.

Surface Area

Protective forest area: 4.95 hectares. Monitoring plot C: 1,050 m². Sub-plot D: 225 m². Georeferencing obtained in situ (Garmin eTrex 2), verified with Google Earth PRO 2025.

Ecosystem Structure

The Protective Forest of Springs and Wetlands includes a permanent monitoring plot as a reference ecosystem for this specific environment. This unit corresponds to the Lowland Forest category: This term has been generalized to refer to the remaining forest located in the lower parts of the area. This forest aligns with what is known as Mixed Laurel and Guatambú Forest *(Ministry of Ecology and Renewable Natural Resources, 2005 and 2011; Krauczuk, 1998)*. It features a herbaceous layer with diverse ferns, including species from the *Anemia* genus. The shrub layer includes *Piper sp.* (parí paroba), *Urera baccifera* (stinging nettle), wild orange, and *Sorocea bomplandii*(ñandipá). The canopy is mainly composed of laurels such as *Nectandra megapotamica* (black laurel), *N. lanceolata* (yellow laurel), and *Ocotea puberula* (guaica), as well as *Enterolobium contortisiliquum*

(timbó), *Jacaranda micrantha* (caroba), *Erithryna falcata* (seibo de monte), *Schefflera morototonii* (cacheta), ombú, *Holocalix balansae* (alecrín), *Luhea divaricata* (azota caballo), *Diatenopteryx sorbifolia* (maría preta), *Balfourodendron riedelianum* (white guatambú), cedar, *Cupania vernalis* (camboatá), *Cordia trichotoma* (peteribí), *Lonchocarpus leucanthus* (rabo itá), and *L. muehlbergianus* (rabo molle), among others. Emergents include *Parapiptadenia rigida* (red anchico) and *Handroanthus heptaphyllus* (black lapacho), among others.

Descripción del ambiente - Resumen
Bosque de transición (387 msnm) entre bajo húmedo (bosque en galería- 383 msnm) y meseta del Cerro (Bosque maduro, bañado de altura, 520 msnm)
Bosque protector de humedal / naciente tributaria de A° La Bonita
Pendiente (20°)
Estructura
3 estratos arbóreos bien definidos, cobertura dosel 90 %.
Sotobosque con presencia de tacuara (25%)
Predominancia de helechos (50%), adiantopsis chlorophyla, anemia tormentosa, doryopteris nobilis, doryopteris concolor entre otros.
Peperomia, Piper o canilla de vieja.
Suelo
Presencia de hojarasca (4 cms), restos vegetales (ramas).
Fauna
Coatíes, tatú, yacutoro, surucuá, tucanes.
Flora
Bromelias, orquideas

Sources:

- Biodiversity inventories
- Field records
- National Native Forest Restoration Plan

Ecosystem Composition
Biotic Components

Vegetation and Forest Cover

- The wetland includes a grove of mature, fully developed tree ferns.
- Subtropical evergreen forest, with tall trees such as lapacho, guayubira, Misiones cedar, tarumá, and guatambú.
- Dense vegetation cover with multiple strata: emergents, canopy, understory, and forest floor with leaf litter and exposed roots.
- Abundant epiphytes such as orchids and bromeliads adorning tree trunks.

Representative Fauna

- Mammals: jaguarundi, brown brocket deer, crab-eating fox, howler and capuchin monkeys, coatis, paca, and agouti.
- Wide variety of birds, including the toucan and vinaceous-breasted amazon.
- Numerous insects and arthropods, essential for ecosystem function.

Renovales - DAP entre 2 y 9 cm - Altura entre 1,50 y 6 metros - **PARCELAS C y D**				
Cantidad	**N.Común**	**N.Científico**		
2	Chachí manso	*Dicksonia sellowiana*		
4	Chachí Bravo	*Alsophila setosa*		
2	Palmito	*Euterpe edulis*		
1	Palo Rosa	*Aspidosperma polyneuron*		
11	Cerella	*Eugenia involucrata*		
2	Yerba	*Ilex paraguariensis*		
1	Siete Capotes	*Campomanesia guazumifolia*		
3	Guabira	*Cordia americana*		
2	Blanquillo	*Sebastiania commersoniana*		
10	Canela	*Helietta apiculata*		
16	Maria Preta	*Diatenopteryx sorbifolia*		
2	Pitanga	*Eugenia uniflora*		
13	Catiguá	*Trichilia catigua*		
3	Araticum	*Annona crassiflora*		
10	Guabiroba	*Campomanesia xanthocarpa*		
34	Anchico Colorado	*Parapiptadenia rigida*		
1	Samohú	*Ceiba speciosa*		
1	Lechero	*Sapium glandulosum*		
8	Camboatá blanco	*Matayba elaeagnoides*		
2	Mamica de Cadella	*Zanthoxylum hiemale*		
3	Canelón	*Myrsine parvula*		
1	Cedro	*Cedrela fissilis*		
1	Guabiyú	*Myrcianthes pungens*		
1	Naranjero	*Thraupis bonariensis*		
1	Aguay	*Pouteria gardneriana*		
3	Cuncun	*Vallesia glabra*		
1	Tembetarí	*Zanthoxylum fagara*		
3	Incienso	*Myrocarpus frondosus*		
2	Rabo	*Lonchocarpus campestris*		
1	Carne de vaca	*Styrax leprosus*		
1	Lapacho negro	*Handroanthus heptaphyllus*		

Bosque Maduro protector de humedales y nacientes - Ecosistema de referencia					
Parcela-ID	**N.Vulgar**	**N.Científico**	**Altura**	**Estado**	**DAP**
C154192	Guayubira	*Cordia americana*	22 mts	Sano	51
C154188	Carne de vaca	*Styrax leprosus*	18 mts	Sano	31
C154187	Carne de vaca	*Styrax leprosus*	18 mts	Sano	36
C154186	Canela	*Helietta apiculata*	15 mts	Sano	37
C154185	Rabo itá	*Lonchocarpus campestris*	20 mts	Sano	43
C154184	Anchico Colorado	*Parapiptadenia rigida*	25 mts	Sano	62
C154183	Carne de vaca NN	*Styrax leprosus*	14 mts	Daño 30%	43
C154132	Chachí manso	*Dicksonia sellowiana*	4 mts	Sano	30
C154133	Lapacho amarillo	*Handroanthus albus*	16 mts	Sano	84
C154134	Incienso	*Myrocarpus frondosus*	15 mts	Sano	31
C154135	Laurel amarillo	*Nectandra lanceolata*	5 mts	Muerto	36
C154136	Timbó de Campo	*Ateleia glazioveana*	14 mts	Sano	32
C154137	Laurel Negro	*Nectandra megapotamica*	13 mts	Sano	31
C154138	Laurel Negro	*Nectandra megapotamica*	15 mts	Sano	32
C154139	Rabo	*Lonchocarpus campestris*	13 mts	Sano	40
C154140	Camboatá Blanco	*Matayba elaeagnoides*	10 mts	Sano	38
C154130	Guayca	*Ocotea puberula*	15 mts	Sano	50
D450201	Canela	*Helietta apiculata*	6 mts	Muerto	11
D450211	Cerella	*Eugenia involucrata*	9 mts	Sano	10
D450251	Maria Preta	*Diatenopteryx sorbifolia*	16 mts	Sano	24
D450252	Maria Preta	*Diatenopteryx sorbifolia*	8 mts	Sano	11
D450261	Laurel Negro	*Nectandra megapotamica*	8 mts	Sano	10
D450231	Blanquillo	*Sebastiania commersoniana*	9 mts	Sano	10
D450281	Kocú	*Allophylus edulis*	10 mts	Sano	19

Sources:

- Biodiversity inventories
- Field records
- National Native Forest Restoration Plan

Abiotic Components

Climate

There are no meteorological records from the site or its immediate surroundings, so nearby localities such as San Pedro and Cuartel Río Victoria (an INTA field station located 40 km south of San Pedro) are used for reference.

Average annual precipitation: ~2,000 mm

- 33% of the year is dry-humid (summer months)
- 67% of the year is humid (autumn, winter, and spring)

- Temperatures are warm 92% of the year and hot for the remaining 8% *(Provincial Department of Highways, 2010).*

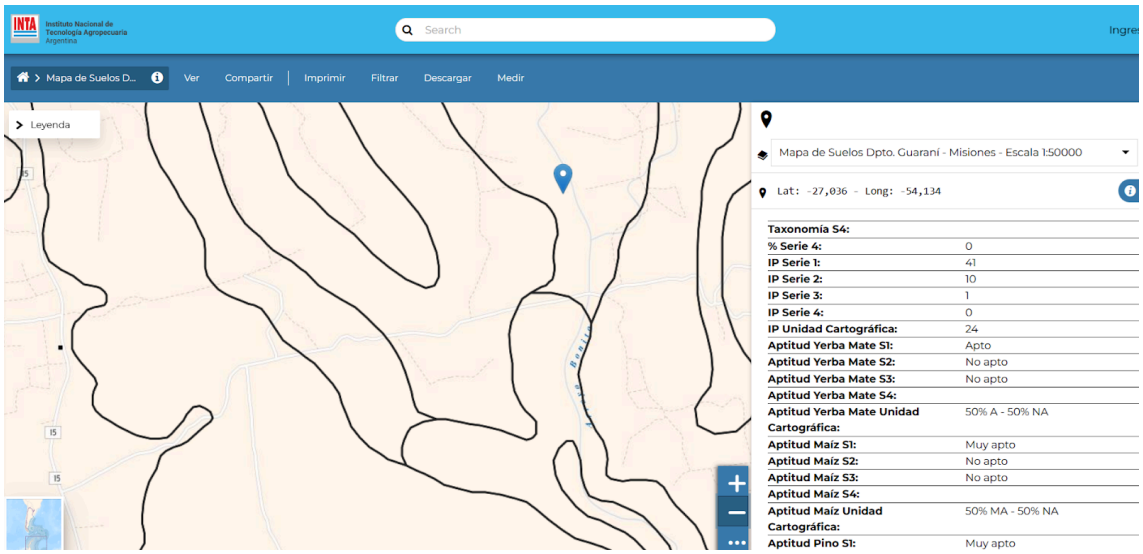
According to *Gandolla* (2008, cited by the same source), based on INTA climate data from 1970 to 2000:

- Decreasing precipitation trend since the early 1990s
- Rising temperature trend since the early 1990s
- Although the system generates water surpluses, these have shown decreasing trends since the early 1990s
- Monthly water deficits are infrequent and low in magnitude, but 70–80% occur between November and March

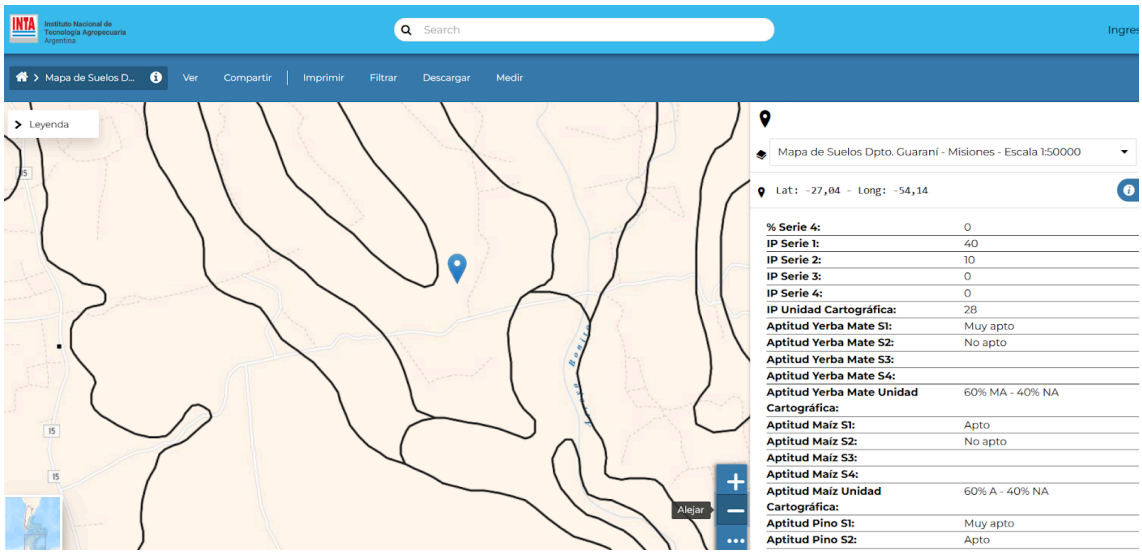
Source: San Pedro Meteorological Station

Soil

Lateritic reddish soils, rich in iron and clay, with high water retention capacity.

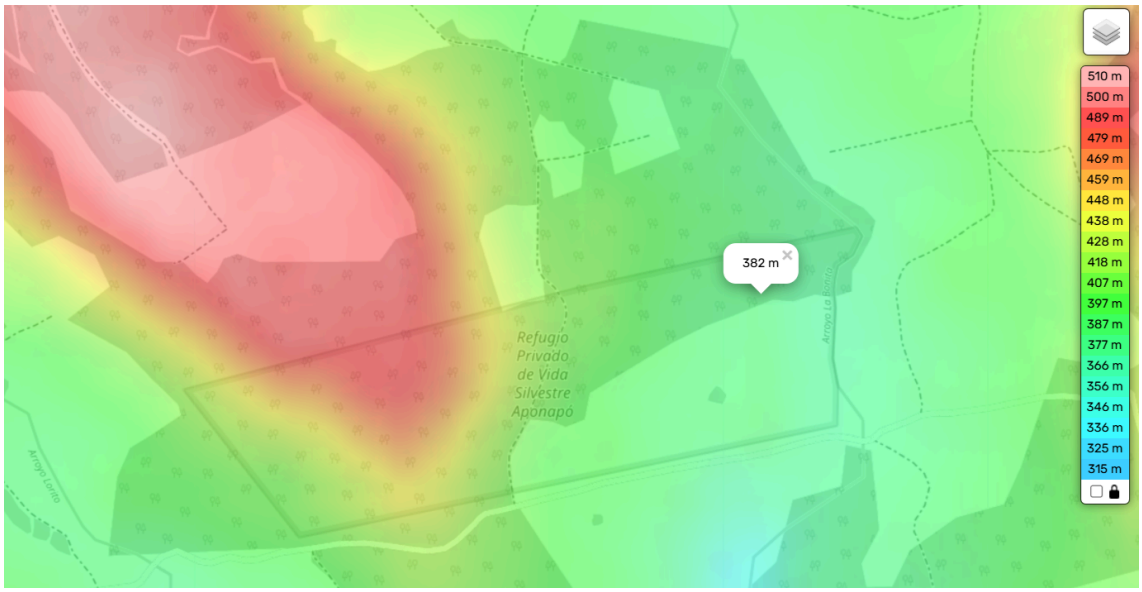


Source: Soil Map, Guaraní Department, Province of Misiones – National Institute of Agricultural Technology (INTA)



Source: Soil Map, Guaraní Department, Province of Misiones – National Institute of Agricultural Technology (INTA)

Topography



Source: http://topographic-map.com/

Landscape Features

Biodiversity and Water Conservation Hotspot. Key landscape features include:

Water Sources and Terrain

- Headwaters of streams that feed into major rivers like the Uruguay.
- Waterfalls and cascades (e.g., Salto La Bonita), generated by the uneven terrain typical of Misiones' rolling landscape.

Ecological Importance

- Regulates the water cycle, preventing soil erosion and ensuring clean water supply.
- Acts as a carbon sink, essential for climate change mitigation.

Pre-Intervention State
Due to its topographic features and inaccessibility, the area has remained untouched by human activity.

Source: Photographic records

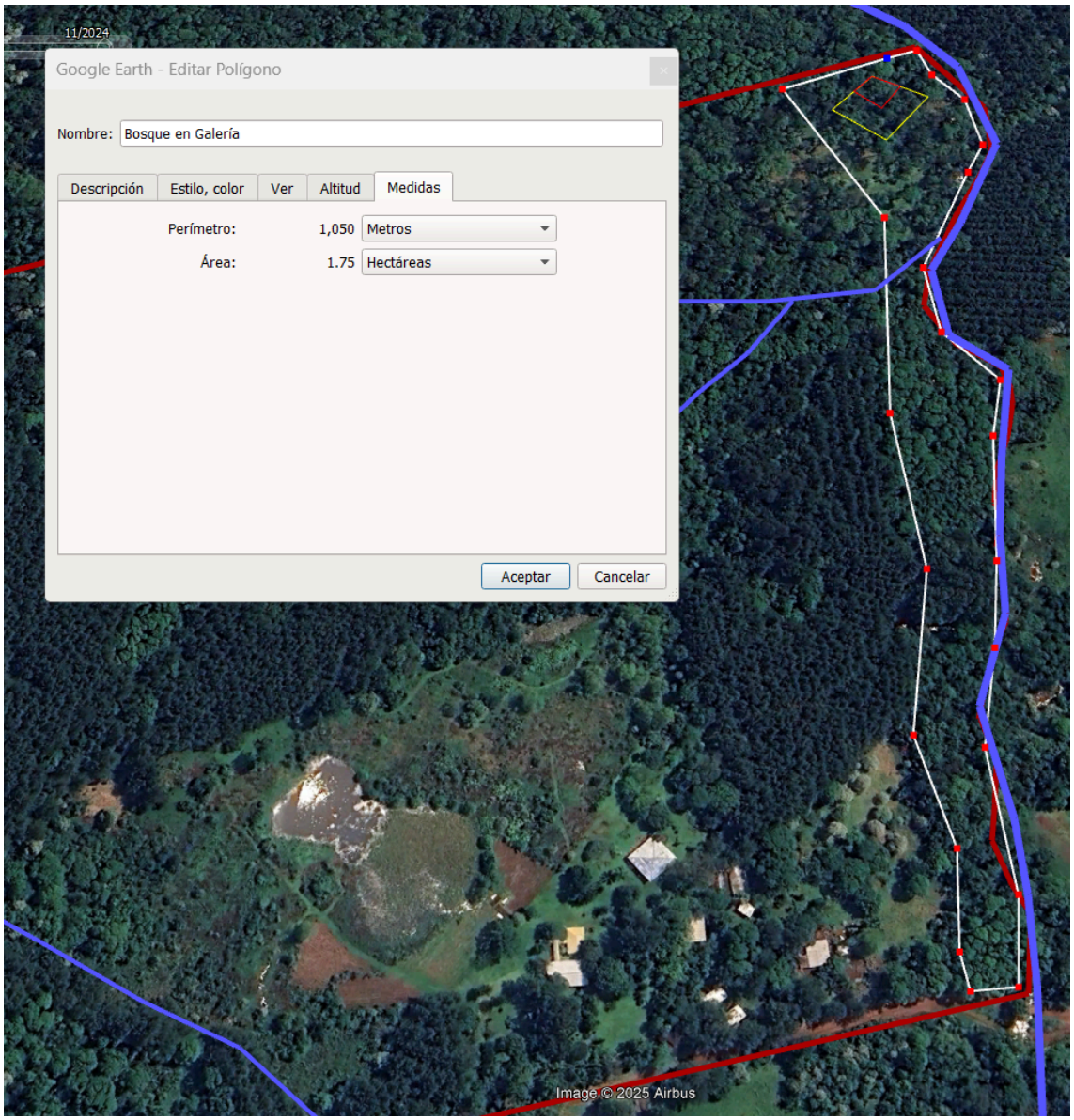
Relationship with Local Communities
In 2019, the National Native Forest Restoration Plan began, with the objective of identifying endangered species for reproduction. A team of indigenous experts and park rangers was assembled to explore the area. Mbya Guaraní indigenous experts shared their ancestral knowledge about the species found in the ecosystem—many of them with a unique local distribution—as well as the presence of mammals and their roles in the trophic web. Species were identified that had already contributed or could potentially provide seeds (during seasonal windows) for reproduction in the reserve's nursery.

Source: YouTube Video – Field documentation

Ecosystem "Gallery Forest"

Zoning

Classification of the area according to legal criteria, land use, or conservation categories. *Law 26.331. Category I (red)* under land-use planning.



Source: Google Earth PRO. Official Land Registry of the Province of Misiones. **REFERENCES:** YELLOW – main parcel A; RED – sub-parcel B; WHITE – perimeter and surface area of the gallery forest; BLUE – springs and watercourses (La Bonita stream); THICK RED – perimeter of the reserve.

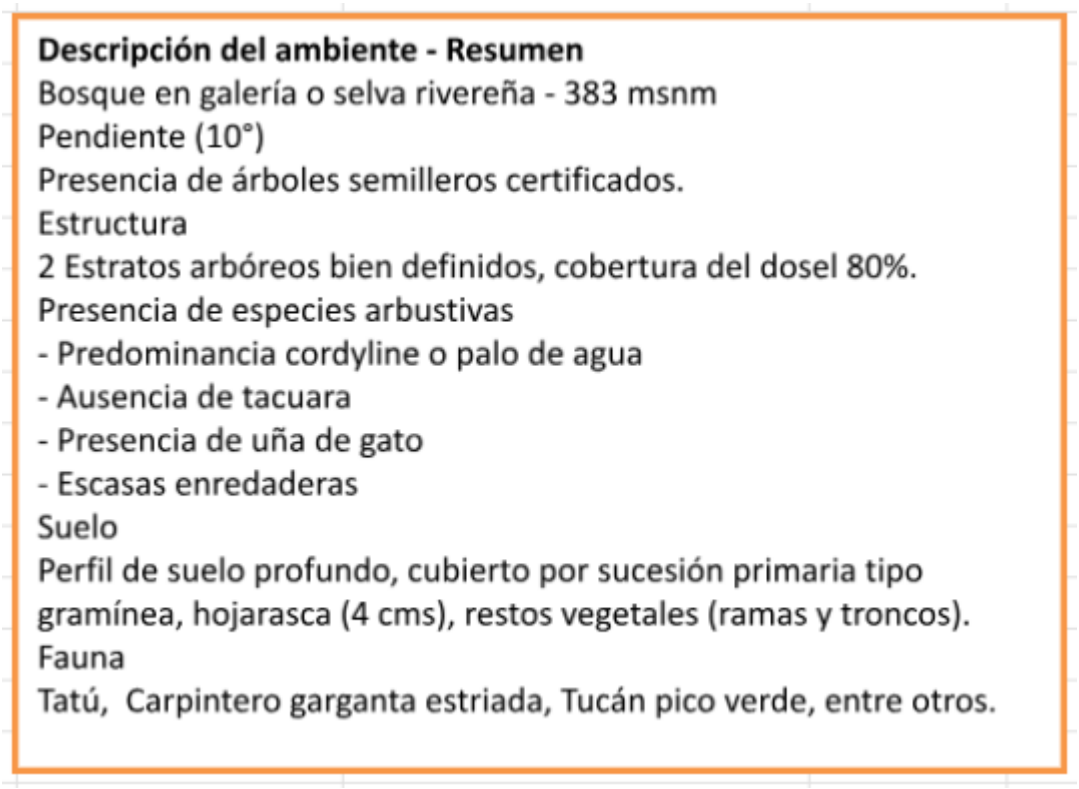
Surface Area

Gallery Forest area: 1.75 hectares. Parcel A: 1,050 m², Sub-parcel B: 225 m². Georeferencing obtained in situ (Garmin eTrex 2), verified with Google Earth PRO 2025.

Ecosystem Structure

The Gallery Forest area includes a permanent monitoring plot that serves as a reference ecosystem for this specific environment. This unit corresponds to the Lowland Forest category, a term used to describe the forest located in the lower parts of the area. This forest matches the type known as Mixed Laurel and Guatambú Forest *(Ministry of Ecology and Renewable Natural Resources, 2005 and 2011; Krauczuk, 1998).*

It features a herbaceous layer with a variety of ferns, including species from the *Anemia* genus. The shrub layer includes *Piper sp*. (parí paroba), *Urera baccifera* (stinging nettle), wild orange, and *Sorocea bomplandii* (ñandipá). The canopy is mainly composed of laurels such as *Nectandra megapotamica* (black laurel), *N. lanceolata* (yellow laurel), and *Ocotea puberula* (guaica), along with *Enterolobium contortisiliquum* (timbó), *Jacaranda micrantha* (caroba), *Erithryna falcata* (seibo de monte), *Schefflera morototonii* (cacheta), ombú, *Holocalix balansae* (alecrín), *Luhea divaricata* (azota caballo), *Diatenopteryx sorbifolia* (maría preta), *Balfourodendron riedelianum* (white guatambú), cedar, *Cupania vernalis* (camboatá), *Cordia trichotoma* (peteribí), *Lonchocarpus leucanthus* (rabo itá), and *L. muehlbergianus* (rabo molle), among others. Emergent trees include *Parapiptadenia rigida* (red anchico), *Handroanthus heptaphyllus* (black lapacho), among others.



Sources:

- Biodiversity inventories
- Field records
- National Native Forest Restoration Plan

Ecosystem Composition
Biotic Components

Renovales - DAP entre 2 y 9 cm - Altura entre 1,50 y 6 metros - **PARCELAS A y B**			
Cantidad	**N.Común**	**N.Científico**	
6	Timbó Colorado	*Enterolobium contortisiliquum*	
31	Timbó de campo	*Ateleia glazioveana*	
2	Samohú	*Ceiba speciosa*	
10	Lapacho negro	*Handroanthus heptaphyllus*	
30	Azota caballo	*Luehea divaricata*	
4	Cedro	*Cedrela fissilis*	
12	Yerba	*Ilex paraguariensis*	
4	Rabo	*Lonchocarpus campestris*	
8	Guayca	*Ocotea puberula*	
1	Siete Capotes	*Campomanesia guazumifolia*	
7	Camboata	*Matayba elaeagnoides*	
5	Guayubira	*Cordia americana*	
1	Anchico Colorado	*Parapiptadenia rigida*	
1	Incienso	*Myrocarpus frondosus*	
2	Cañafístola	*Peltophorum dubium*	
2	Persiguero	*Prunus subcoriacea*	
11	Canelón	*Myrsine parvula*	
2	Canela	*Helietta apiculata*	
3	Pindó	*Syagrus romanzoffiana*	
32	Palo de agua	*Cordyline sellowiana*	
2	Camboatá rojo	*Cupania vernalis*	
2	Teta de perra	*Zanthoxylum hyemale*	
1	Kocú	*Allophylus edulis*	

Bosque en Galería - Ecosistema de referencia					
Parcela-ID	**N.Vulgar**	**N.Científico**	**Altura**	**Estado**	**DAP**
A154141	Persiguero	*Prunus subcoriacea*	20 mts	Sano-Daño 15%	43
A154142	Rabo	*Lonchocarpus campestris*	16 mts	Sano	50.63
A154143	Camboatá Blanco	*Matayba elaeagnoides*	15 mts	Sano	40.5
A154144	Persiguero	*Prunus subcoriacea*	20 mts	Sano	53.2
A154145	Yerba	*Ilex paraguariensis*	13 mts	Sano-Daño 15%	41.5
A154146	Canela	*Helietta apiculata*	15 mts	Sano	31
A154147	Laurel amarillo	*Nectandra lanceolata*	18 mts	Sano	35
A154148	Rabo	*Lonchocarpus campestris*	18 mts	Sano-Daño 20%	31
A154149	Persiguero	*Prunus subcoriacea*	17,50 mts	Sano	31.5
A154150	Persiguero	*Prunus subcoriacea*	20 mts	Sano-Daño 10%	33
A154131	Persiguero	*Prunus subcoriacea*	17 mts	Sano-Daño 10%	38
A154191	Azota caballo	*Luehea divaricata*	16 mts	Sano	60
A154192	Laurel de campo	*Nectandra lanceolata*	4 mts	Muerto	38
A154193	Persiguero	*Prunus subcoriacea*	16 mts	Sano	30
A154194	Persiguero	*Prunus subcoriacea*	16 mts	Sano	30
A154195	Timbó de campo	*Ateleia glazioveana*	17 mts	Sano	36
A154196	Timbó de campo	*Ateleia glazioveana*	17 mts	Sano	34
A154197	Yerba	*Ilex paraguariensis*	15 mts	Sano	30
A154198	Persiguero	*Prunus subcoriacea*	15 mts	Enfermo	34
A154199	Persiguero	*Prunus subcoriacea*	15 mts	Sano	32
A154200	Lapacho amarillo	*Handroanthus albus*	16 mts	Sano	44
A154201	Azota caballo	*Luehea divaricata*	17 mts	Enfermo	57
B450301	Persiguero	*Prunus subcoriacea*	10 mts	Sano	18
B450302	Persiguero	*Prunus subcoriacea*	9 mts	Sano	19
B450303	Persiguero	*Prunus subcoriacea*	5 mts	Muerto	15
B450304	Persiguero	*Prunus subcoriacea*	9 mts	Sano	13
B450305	Persiguero	*Prunus subcoriacea*	8 mts	Enfermo- 50%	15
B450306	Persiguero	*Prunus subcoriacea*	7 mts	Daño 80%	22
B450307	Persiguero	*Prunus subcoriacea*	13 mts	Daño 10%	20
B450308	Camboatá Blanco	*Matayba elaeagnoides*	8 mts	Sano	15
B450309	Persiguero	*Prunus subcoriacea*	2 mts	Muerto	16
B450310	Persiguero	*Prunus subcoriacea*	12 mts	Sano	20
B450311	Laurel amarillo	*Nectandra lanceolata*	2 mts	Muerto	21

Sources:

- Biodiversity inventories
- Field records
- National Native Forest Restoration Plan

Abiotic Components

Climate

There are no meteorological records for the property or its surroundings, so nearby localities such as San Pedro and Cuartel Río Victoria (an INTA field station located 40 km south of San Pedro) are used for reference.

Average annual precipitation: ~2,000 mm.

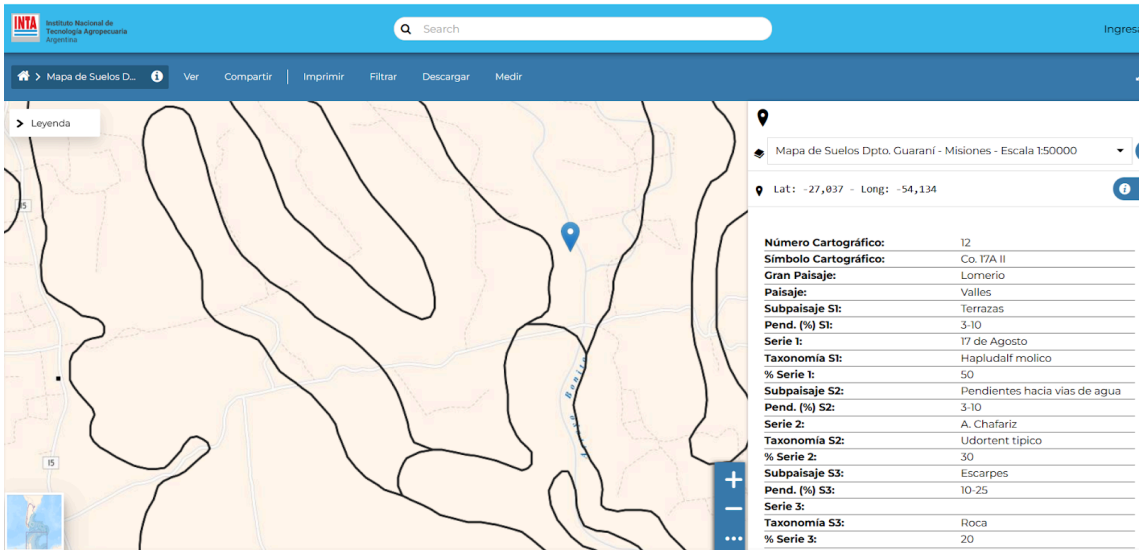
- 33% of the year is dry-humid (summer).
- 67% of the year is humid (autumn, winter, and spring).
- Temperatures are warm 92% of the year and hot for the remaining 8% *(Provincial Department of Highways, 2010)*..

According to *Gandolla* (2008, cited by the same source), based on INTA's climate data from 1970 to 2000:

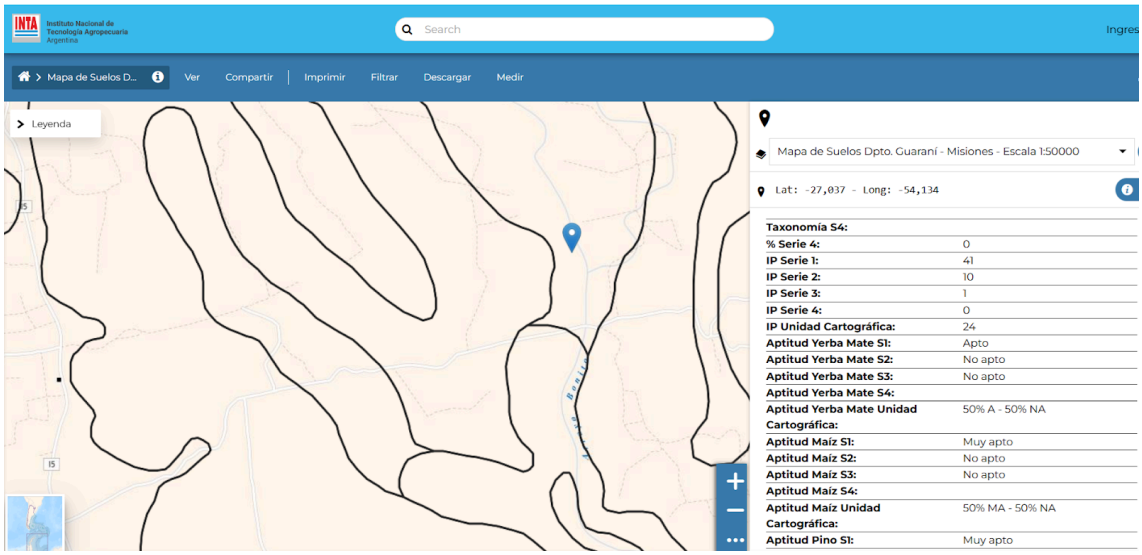
- A decreasing trend in precipitation since the early 1990s.
- An increasing trend in temperature since the early 1990s.
- Despite being a water surplus system, those surpluses have decreased since the 1990s.
- Monthly water deficits are rare and minor, but 70–80% occur from November to March.

Source: San Pedro Meteorological Station

Soil

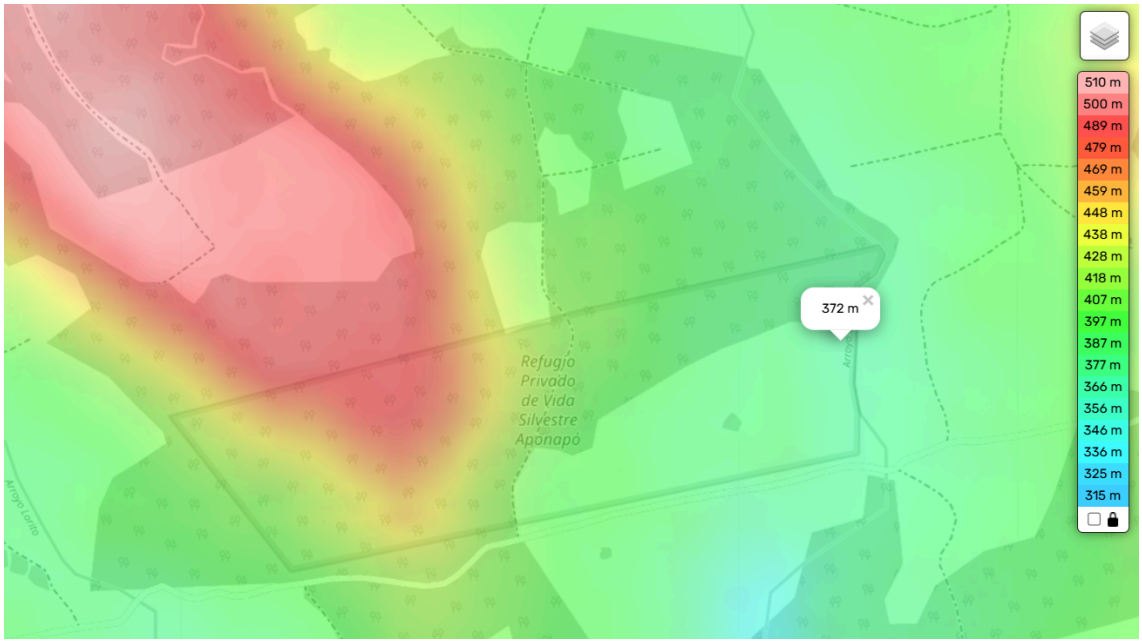


Source: Soil Map, Guaraní Department, Province of Misiones – National Institute of Agricultural Technology (INTA).



Source: Soil Map, Guaraní Department, Province of Misiones – National Institute of Agricultural Technology (INTA).

Topography



Source: http://topographic-map.com/

Landscape Features

Characterized by its rich biodiversity and key role in maintaining water quality and flow regulation. Some of its main landscape features include:

Water Sources and Terrain

- Source zone for streams that feed major rivers like the Uruguay.
- Waterfalls and cascades (e.g., Salto La Bonita) caused by uneven terrain, typical of Misiones' rolling relief.
- Lateritic reddish soils, rich in iron and clay, with high water retention capacity.

Ecological Importance

- Regulates the water cycle, prevents soil erosion, and ensures the supply of clean water.
- Acts as a carbon sink, crucial for climate change mitigation.

Pre-Intervention State

Until 2005, the area served as a watering hole for livestock owned by the previous

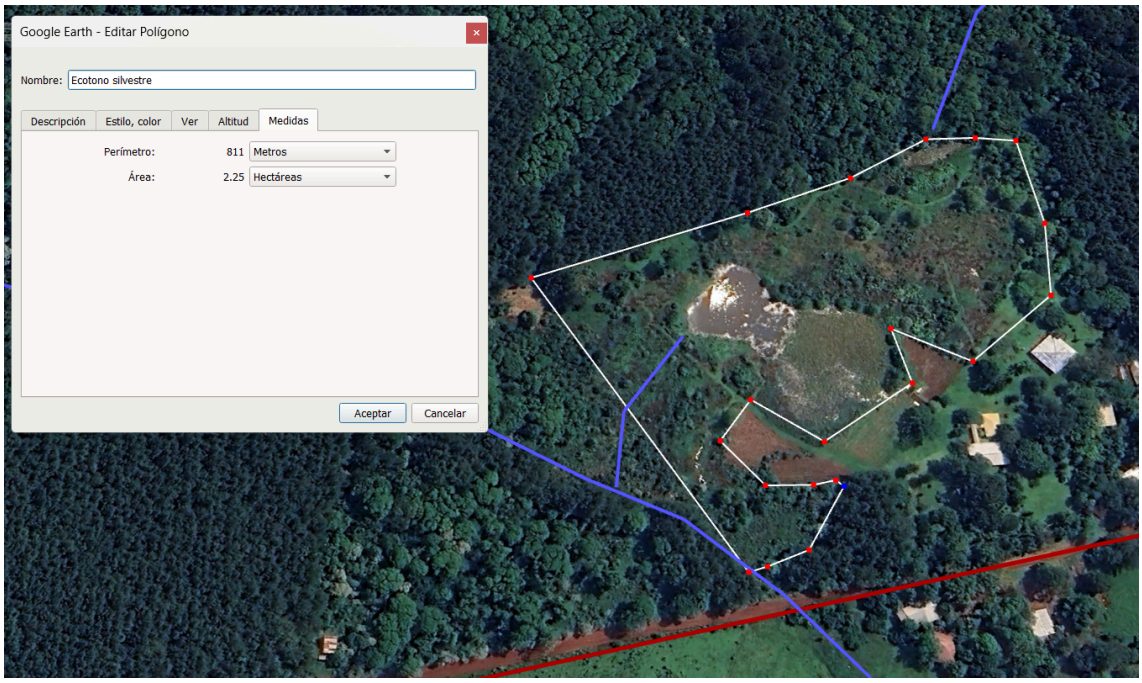
landowner. Despite this, the gallery forest retained its natural characteristics. Source: Photographic records

Relationship with Local Communities. The Gallery Forest ecosystem plays a fundamental role in providing critical water-related ecosystem services, including the natural purification of water, the regulation of hydrological flows, and the protection of water sources from contamination and sedimentation. These forests act as living barriers that filter pollutants, stabilize riverbanks, and maintain the health and resilience of the aquatic systems that local communities depend on. Through participatory environmental education programs and collaborative monitoring activities, the initiative raises awareness about the vital link between forest conservation, water security, and community well-being.

Ecosystem "Wild Ecotone"

Zoning

Classification of the area according to legal criteria, land use, or conservation categories. *Law 26.331. Category II (yellow)* according to land-use planning.



Source: Google Earth PRO. Official Land Registry of the Province of Misiones. **REFERENCES:** WHITE – perimeter and surface area of the Wild Ecotone; BLUE – springs and watercourses (La Bonita stream); THICK RED – perimeter of the reserve.

Surface Area

Total Surface area: 2.25 hectares. Perimeter: 811 meters. Georeferencing obtained in situ (Garmin eTrex 2), verified with Google Earth PRO 2025.

Ecosystem Structure

Wetland, natural lagoon, and spring located within lowland forest, over basaltic rock slabs and rocky outcrops. Presence of native wild species and low-stature trees.

Ecosystem Composition

Biotic Components

Listado de aves detectadas en Aponapó durante el relevamiento de campo realizado entre 1 y 3 de agosto de 2011

La taxonomía y nombres comunes se basó en la publicación de Narosky e Yzurieta, 2003

Familia	Nombre Común	Nombre Científico
Cathartidae	Jote Cabeza Negra	*Coragyps atratus*
Falconidae	Chimachima	*Milvago chimachima*
	Halconcito Colorado	*Falco sparverius*
Rallidae	Saracura	*Aramides saracura*
	Gallineta Común	*Rallus sanguinolentus*
	Gallineta Negruzca	*Rallus nigricans*
Chararidriidae	Tero Común	*Vanellus chilensis*
Columbidae	Paloma Picazuró	*Columba picazuro*
Psittacidae	Calancate Ala Roja	*Aratinga leucophthalma*
	Chiripepé Cabeza Verde	*Pyrrhura frontalis*
	Loro Maitaca	*Pionus maximiliani*
Cuculidae	Anó Chico	*Crotophaga ani*
Trochilidae	Picaflor Copetón	*Stephanoxis lalandi*
Bucconidae	Chacurú Cara Negra	*Nystalus chacuru*
Picidae	Carpintero Campestre	*Colaptes campestris*
Dendrocolaptidae	Chinchero Escamado	*Lepidocolaptes squamatus*
	Tarefero	*Sittasomus griseicapillus*
Furnaridae	Hornero	*Furnarius rufus*
	Raspahojas	*Sclerurus scansor*
	Pijuí Negrusco	*Synallaxis cinerascens*
	Macuquiño	*Lochmias nematura*
Formicariidae	Batará Goteado	*Hypoedaleus guttatus*
	Choca Común	*Thamnophilus caerulescens*
Tyrannidae	Picabuey	*Machetornis rixosus*
	Benteveo Común	*Pitangus sulphuratus*
	Suiriri Silbón	*Sirystes sibilator*
	Churrinche	*Pyrocephalus rubinus*
	Ladrillito	*Mionectes rufiventris*
	Mosqueta Enana	*Myiornis auricularis*
Corvidae	Urraca Común	*Cyanocorax chrysops*
Troglodytidae	Ratona Común	*Troglodytes aedon*
Mimidae	Calandria Grande	*Mimus saturninus*
Turdidae	Zorzal Chalchalero	*Turdus amaurochalinus*
	Zorzal Sabiá	*Turdus leucomelas*
Vireonidae	Chiví Coronado	*Hylophilus poicilotis*
Parulidae	Arañero Silbón	*Basileuterus leucoblepharus*
	Arañero Coronado Chico	*Basileuterus culicivorus*
Thraupidae	Tangará Bonito	*Chlorophonia cyanea*
Emberizidae	Chingolo	*Zonotrichia capensis*
Icteridae	Boyerito	*Icterus cayanensis*

Source:

- Field Survey Document – Fundación Vida Silvestre Argentina, Baseline 2011
- Field monitoring

Abiotic Components
Climate
There are no meteorological records for the site or its surroundings, so climate characterization is based on nearby localities such as San Pedro and Cuartel Río Victoria (an INTA field site located 40 km south of San Pedro).

Average annual precipitation: ~2,000 mm

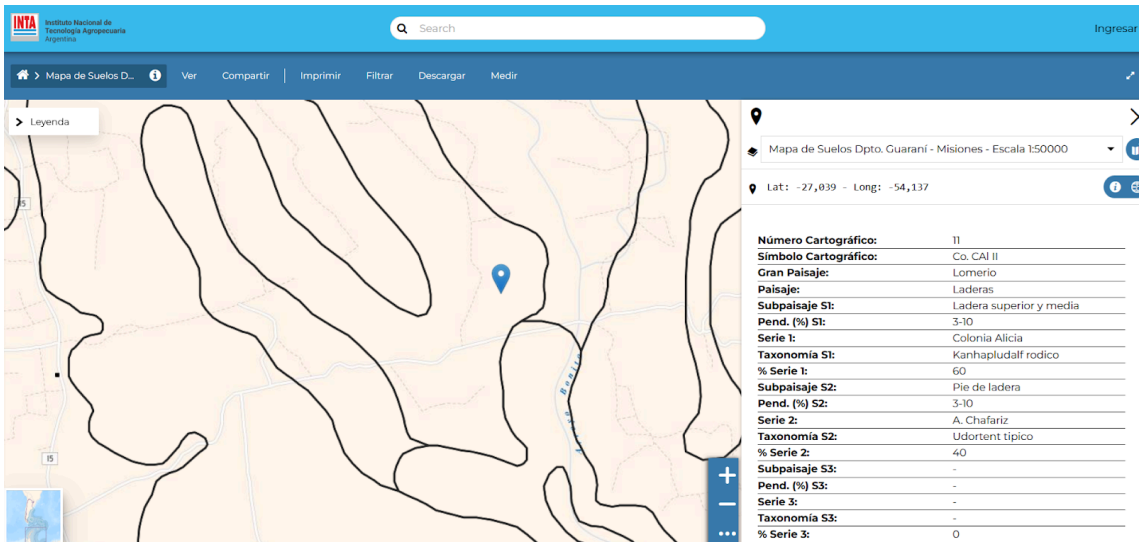
- 33% of the year is dry-humid (summer months).
- 67% is humid (autumn, winter, and spring).
- Temperatures are warm for 92% of the year and hot for the remaining 8% *(Provincial Department of Highways, 2010).*

According to a study by *Gandolla* (2008, cited in the same source), based on INTA's climate data from 1970–2000:

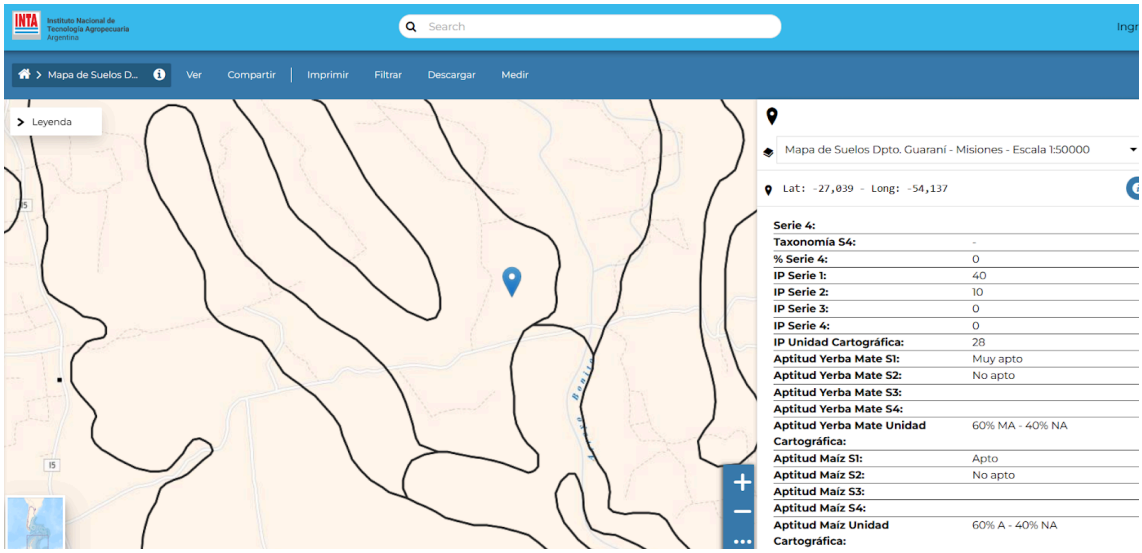
- Decreasing precipitation trend since the early 1990s.
- Increasing temperature trend since the early 1990s.
- Although the system produces water surpluses, these have been declining since the early 1990s.
- Monthly water deficits are infrequent and minor, but 70–80% occur between November and March.

Source: San Pedro Meteorological Station

Soil
Presence of basaltic rock slabs and rocky outcrops.



Source: Soil Map, Guaraní Department, Province of Misiones – National Institute of Agricultural Technology (INTA).



Source: Soil Map, Guaraní Department, Province of Misiones – National Institute of Agricultural Technology (INTA).

Topography

Source: http://topographic-map.com/

Landscape Features

Features of the landscape include topography and proximity to water bodies.

Pre-Intervention State
Previously used as pastureland.

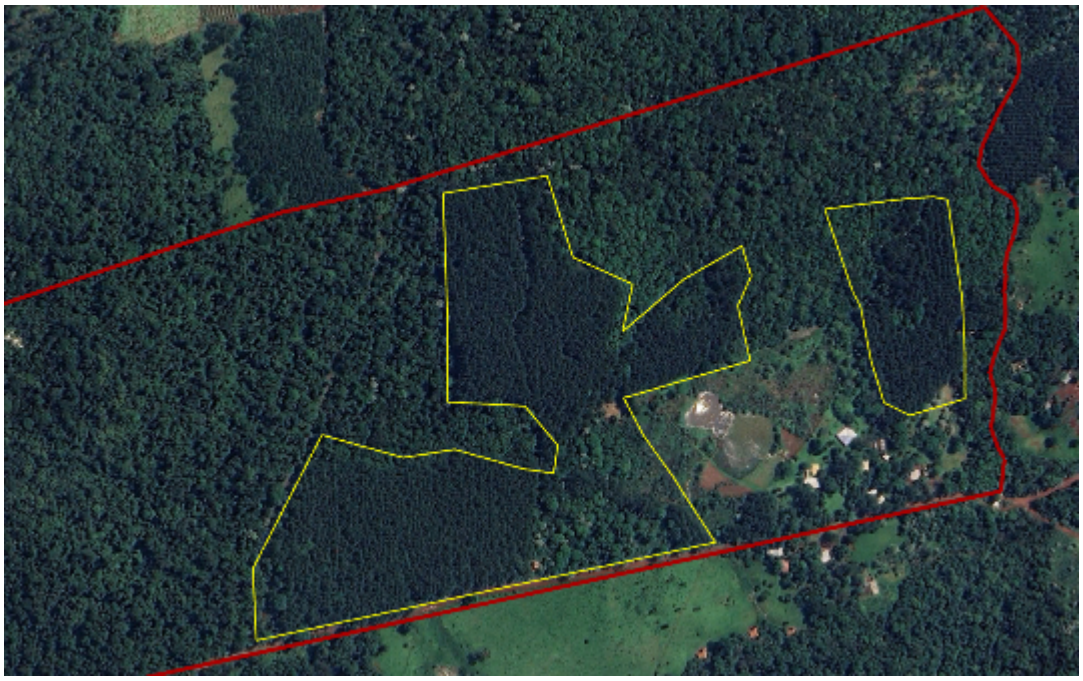
Sources: Historical data review, pre-project comparative analysis.

Relationship with Local Communities
The Wild Ecotone ecosystem contributes to key ecosystem services and High Conservation Values (HCVs) by supporting biodiversity, sustaining pollination processes, and providing critical habitat for a wide variety of resident and migratory bird species. Currently, research is being carried out to identify new native species that could be certified under the Nagoya Protocol, integrating local communities through fair and equitable benefit-sharing mechanisms.

Ecosystem "Native Forest Regeneration through Transitional Cultivation of *Pinus taeda*"

Zoning

Classification of the area according to legal criteria, land use, or conservation categories. *Law 26.331. Category II (yellow)* according to land-use planning. *Law 25.080 – Forest Plantations.*



Source: Google Earth PRO. Official Land Registry of the Province of Misiones.
REFERENCES: YELLOW – blocks with Pinus taeda / mixed forest plantations; THICK RED – perimeter of the reserve.

Surface Area

Total surface area: 12.1 hectares. Georeferencing obtained in situ (Garmin eTrex 2), verified with Google Earth PRO 2025.

Ecosystem Structure

Area degraded due to overgrazing and previous crops. Grassland. Lowland forest. Restoration of ecological connectivity, canopy, and soil forest suitability. Method: Aerial photography, satellite imagery, land cover maps.

Ecosystem Composition

Biotic Components

Presence of small, isolated forest patches and low native species dispersion (natural regeneration). Presence of shrubs and proliferating cane species in parts of the area.

Sources:

- Biodiversity inventories
- Field records

Abiotic Components

Climate

Climate type, average temperature, annual precipitation
There are no meteorological records from the site or surrounding area, so data from nearby localities such as San Pedro and Cuartel Río Victoria (an INTA field site 40 km south of San Pedro) is used for reference.

Average annual precipitation: ~2,000 mm

- 33% of the year is dry-humid (summer months)
- 67% is humid (autumn, winter, and spring)
- Temperatures are warm for 92% of the year and hot for the remaining 8% *(Provincial Department of Highways, 2010).*

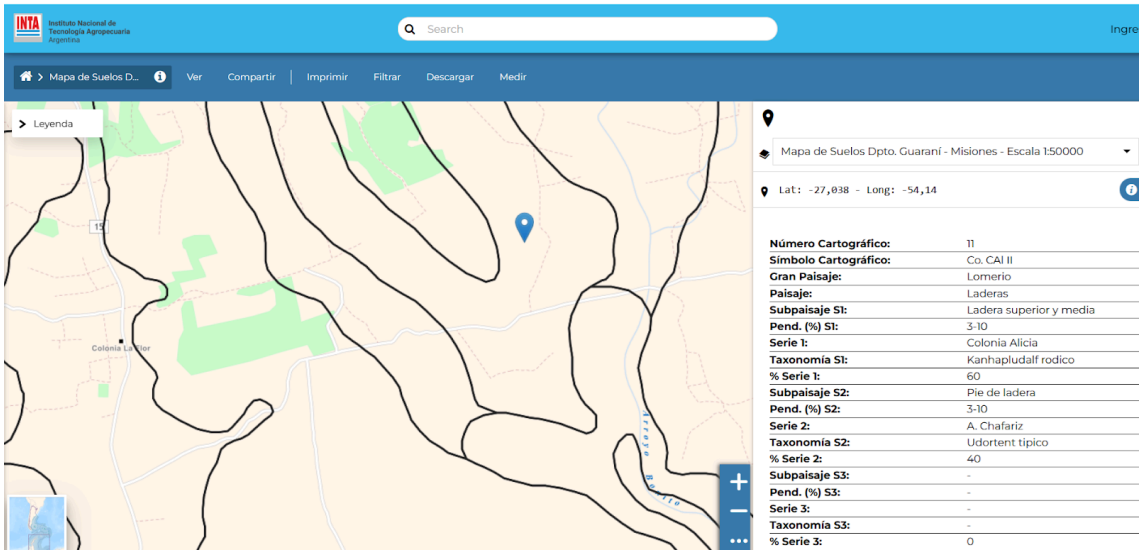
According to *Gandolla* (2008, cited in the same source), based on INTA's climate data from 1970–2000:

- Decreasing precipitation trend since the early 1990s.
- Increasing temperature trend since the early 1990s.
- While the system usually generates water surpluses, these have been declining since the early 1990s.
- Monthly water deficits are infrequent and low in magnitude, but 70–80% occur between November and March.

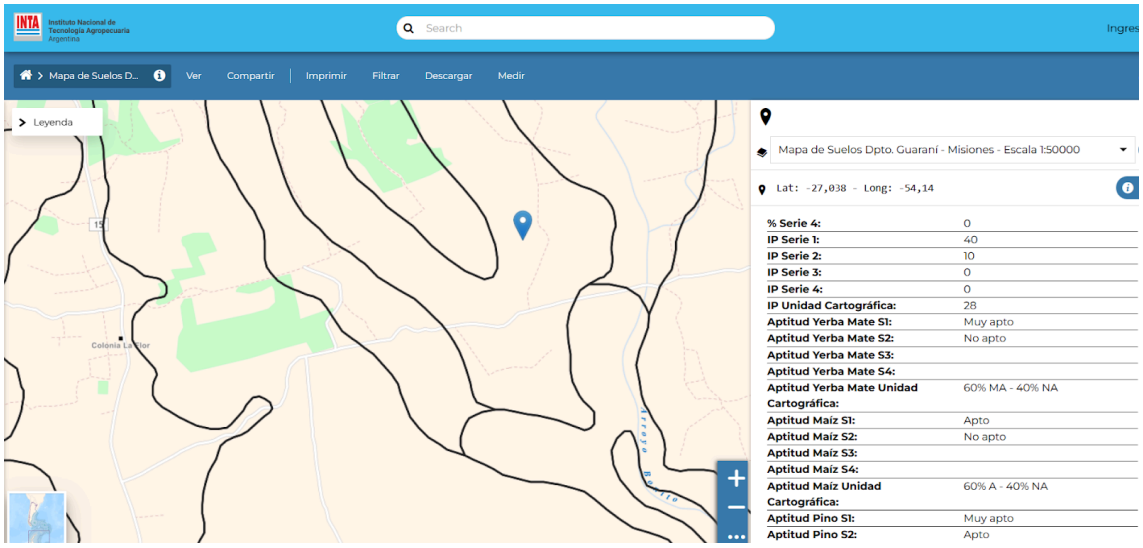
Sources:

- Historical and local meteorological data collection
- Official meteorological data, local weather stations
- San Pedro Meteorological Station

Soil



Source: Soil Map, Guaraní Department, Province of Misiones – National Institute of Agricultural Technology (INTA)



Source: Soil Map, Guaraní Department, Province of Misiones – National Institute of Agricultural Technology (INTA)

To be added in upcoming activities: detailed information on soil type, pH, texture, and organic content will be collected and analyzed as part of the next phase of monitoring and research.

Sources:

- Soil maps
- Laboratory analyses

Topography
Source: http://topographic-map.com/

Landscape Features
Native forest fragmented by anthropogenic activity. Loss of ecological connectivity. Remaining forest patches protect springs that originate at higher elevations and run down slopes (foothill base). Restoration of connectivity enhances the buffer zone around these streams and natural water bodies.

Pre-Project State
Cassava and sugarcane plantations on sloped areas. Pasture and grazing lands on lowland valley floors.

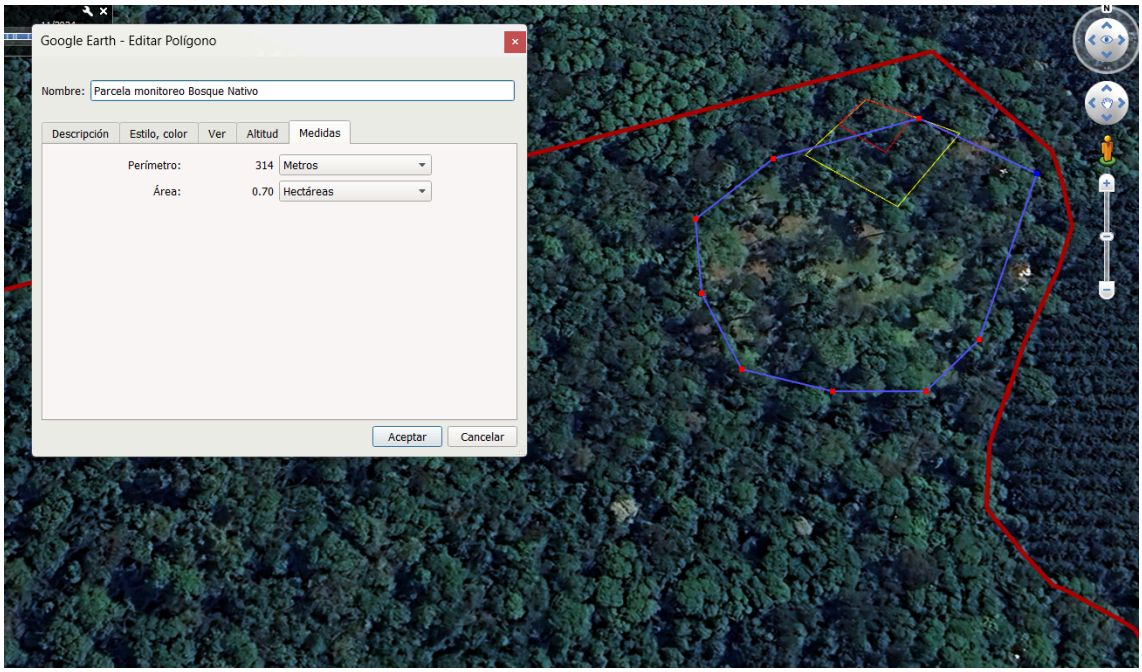
Sources: GIS maps, photographic records, Law 25.080 files

Relationship with Local Communities
The "Native Forest Regeneration through Transitional Cultivation of *Pinus taeda*" model plays a key role in restoring degraded areas and enhancing critical ecosystem services, particularly soil conservation (HCV 4). By stabilizing vulnerable slopes, improving soil structure, and reducing erosion through reforestation (aligned with ES4 of the FSC ecosystem services framework), this approach promotes the gradual recovery of native forest ecosystems. In addition to its ecological function, this model is used for research purposes, allowing the Reserve to study natural regeneration processes, soil recovery dynamics, and the transition from non-native to native species. Research findings are shared with local communities through participatory workshops, training sessions, and field demonstrations, strengthening technical capacities in soil management, ecological restoration, and sustainable land use practices.

Ecosystem "Permanent Native Forest Monitoring Plot"

Zoning

Classification of the area according to legal criteria, land use, or conservation categories. *Law 26.331. Category I (red)* under land-use planning.



Source: Google Earth PRO. Official Land Registry of the Province of Misiones.
REFERENCES: BLUE – perimeter/surface of the Native Forest monitoring plot; THICK RED – perimeter of the reserve; YELLOW and THIN RED – plot A and sub-plot B. This monitoring plot overlaps partially with reference ecosystem plots A and B.

Surface Area

Total Surface area: 0.70 hectares. Georeferencing obtained in situ (Garmin eTrex 2), verified with Google Earth PRO 2025.

Ecosystem Structure
The Permanent Native Forest Monitoring Plot encompasses 0.7 hectares within a native forest area characterized by a diverse assemblage of tree species, understory vegetation, and a semi-closed canopy. Initially impacted by the dense growth of native bamboo *(Guadua trinii)* and lianas, the plot has undergone ecological management to promote the regeneration and growth of native forest species.

Ecosystem Composition
Biotic Components

Listado de mamiferos señalados para Aponapó y alrededores.

Consultas para la sistemática: Canevari y Vaccaro 2007.

Abreviaturas y signos:. **PM**: Preocupación Menor, **PV**: Potencialmente Vulnerable, **Vu**: Vunerable, **EP**: En Peligro, **A**: Amenazada; **CA**: Casi Amenazada; **pd**: poblaciones en disminución, **NA**: no amenazada, **I**: insuficientemente conocida.* Hace aproximadamente 1 año y medio a dos que no se detecta. ** En RBY del otro lado del Aº Paraíso.

Orden, familia y nombre científico	Nombre común	Categoría de conservación		
		Díaz y Ojeda (2000)	Secretaría de Ambiente y Desarrollo Sustentable de la Nación (2004)	LISTA ROJA INTERNACIONAL (IUCN 2010)
DIDELPHIMORPHIA				
Didelphidae				
Didelphis albiventris	Comadreja overa	PM	NA	PM, estable
Didelphis aurita	Comadreja orejas negras	PM	I	PM, estable
Metachirus nudicaudatus	Cuica común		I	I
Chironectes minimus	Cuica de agua	PV	A	PM, pd
XENARTHRA				
Myrmecophagidae				
Tamandua tetradactyla	Oso melero		A	
Dasypodidae				
Cabassous tatouay	Tatú rabo molle		A	
Dasypus novemcintus	Tatú negro		I	
Euphractus sexcintus	Tatú amarillo	PM	NA	PM, estable
PRIMATES				
Cebidae				
*Alouatta caraya**	Carayá	PM	A	PM, pd
Cebus cay	Mono Caí	PV	A	PM, pd
CARNIVORA				
Canidae				
Cerdocyon thous	Zorro de monte	PV	NA	PM, pd
Procyonidae				
Procyon cancrivorus	Aguará popé u Osito lavador		NA	PM, pd
Nasua nasua	Coatí		NA	PM, pd
Felidae				
Herpailurus yagouaroundi	Yaguarundí	PV	NA	PM, pd
Leopardus pardalis	Ocelote o Yaguatirica		A	PM, pd
*Puma concolor***	Puma	PV	NA	PM, pd
*Panthera onca***	Yaguareté	EP	EP	CA, pd
Mustelidae				
Galictis cuja	Hurón menor	PV	NA	PM, desc
Eira barbara	Hurón mayor	Vu	NA	PM, pd
Lontra longicaudis	Lobito de río		I	I, pd

Listado de aves detectadas en Aponapó durante el relevamiento de campo realizado entre 1 y 3 de agosto de 2011

La taxonomía y nombres comunes se basó en la publicación de Narosky e Yzurieta, 2003

Familia	Nombre Común	Nombre Científico
Cathartidae	Jote Cabeza Negra	*Coragyps atratus*
Falconidae	Chimachima	*Milvago chimachima*
	Halconcito Colorado	*Falco sparverius*
Rallidae	Saracura	*Aramides saracura*
	Gallineta Común	*Rallus sanguinolentus*
	Gallineta Negruzca	*Rallus nigricans*
Chararidriidae	Tero Común	*Vanellus chilensis*
Columbidae	Paloma Picazuró	*Columba picazuro*
Psittacidae	Calancate Ala Roja	*Aratinga leucophthalma*
	Chiripepé Cabeza Verde	*Pyrrhura frontalis*
	Loro Maitaca	*Pionus maximiliani*
Cuculidae	Anó Chico	*Crotophaga ani*
Trochilidae	Picaflor Copetón	*Stephanoxis lalandi*
Bucconidae	Chacurú Cara Negra	*Nystalus chacuru*
Picidae	Carpintero Campestre	*Colaptes campestris*
Dendrocolaptidae	Chinchero Escamado	*Lepidocolaptes squamatus*
	Tarefero	*Sittasomus griseicapillus*
Furnaridae	Hornero	*Furnarius rufus*
	Raspahojas	*Sclerurus scansor*
	Pijuí Negrusco	*Synallaxis cinerascens*
	Macuquiño	*Lochmias nematura*
Formicariidae	Batará Goteado	*Hypoedaleus guttatus*
	Choca Común	*Thamnophilus caerulescens*
Tyrannidae	Picabuey	*Machetornis rixosus*
	Benteveo Común	*Pitangus sulphuratus*
	Suiriri Silbón	*Sirystes sibilator*
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Corvidae	Urraca Común	*Cyanocorax chrysops*
Troglodytidae	Ratona Común	*Troglodytes aedon*
Mimidae	Calandria Grande	*Mimus saturninus*
Turdidae	Zorzal Chalchalero	*Turdus amaurochalinus*
	Zorzal Sabiá	*Turdus leucomelas*
Vireonidae	Chiví Coronado	*Hylophilus poicilotis*
Parulidae	Arañero Silbón	*Basileuterus leucoblepharus*
	Arañero Coronado Chico	*Basileuterus culicivorus*
Thraupidae	Tangará Bonito	*Chlorophonia cyanea*
Emberizidae	Chingolo	*Zonotrichia capensis*
Icteridae	Boyerito	*Icterus cayanensis*

PERISSODACTYLA				
Tapiridae				
*Tapirus terrestris*y***	Tapir	EP	A	V, pd
CETARTIODACTYLA				
Tayassuidae				
Pecari tajacu	Tateto o Pecarí de collar	PM	NA	PM, estable
Tayassu pecari	Jabalí o Pecarí labiado	PV	A	CA, pd
Cervidae				
Mazama americana	Pardo, venado grande o corzuela roja	PM	NA	I
Mazama nana	Poca o Corzuela enana	PM	V	I
LAGOMORPHA				
Leporidae				
Sylvilagus brasiliensis	Tapetí o conejo	PM	NA	PM, desconocido
RODENTIA				
Sciuridae				
Sciurus aestuans	Ardilla gris	PM	NA	PM, desconocido
Erethizontidae				
Sphiggurus spinosus	Erizo o Coendú chico		NA	I
Caviidae				
Cavia aperea	Cuis	PM	NA	PM, estable
Hydrochaeridae				
*Hydrochaeris hydrochaeris***	Carpincho	PV	NA	PM, desconocido
Cuniculidae				
Cuniculus paca	Paca	PV	NA	PM, estable
Dasyproctidae				
Dasyprocta azarae	Agutí		NA	I, pd
Echymidae				
Kannabateomys amblyonyx	Rata de las tacuaras		I	PM

Sources:

- Field Survey Document – Fundación Vida Silvestre Argentina, Baseline 2011
- Field monitoring and inventories

Abiotic Components

Climate

There are no meteorological records for the site or nearby areas, so climate characterization is based on nearby locations such as San Pedro and Cuartel Río Victoria (an INTA field station located 40 km south of San Pedro).

Average annual precipitation: ~2,000 mm

- 33% of the year is dry-humid (summer months).
- 67% is humid (autumn, winter, and spring).
- Temperatures are warm 92% of the year and hot for the remaining 8% *(Provincial Department of Highways, 2010).*

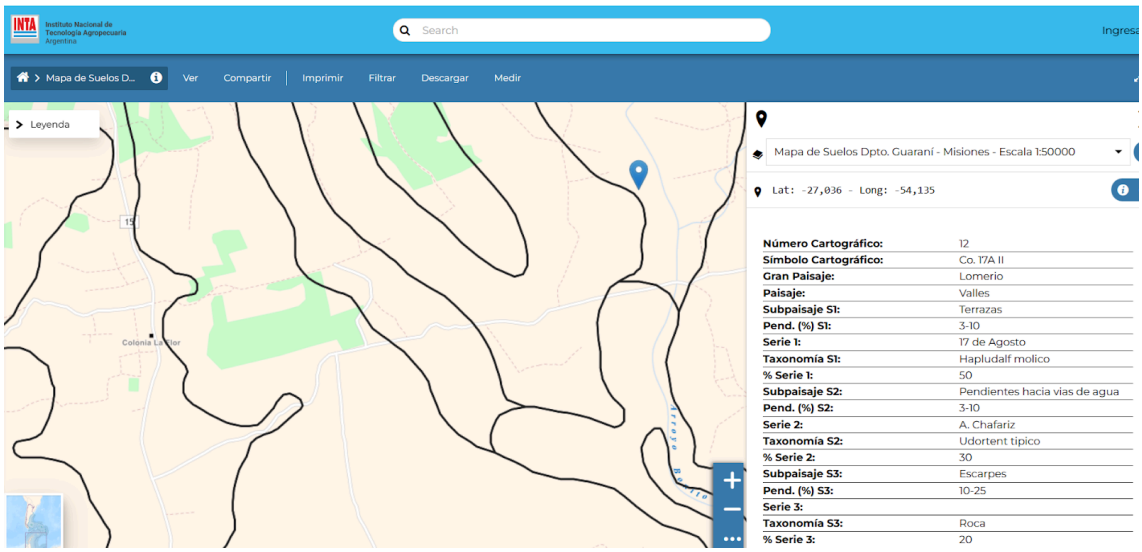
According to a study by *Gandolla* (2008, cited by the same source), based on INTA's climate data from 1970–2000:

- Decreasing trend in precipitation since the early 1990s.
- Increasing temperature trend since the early 1990s.
- Although the system produces water surpluses, those have decreased since the early 1990s.
- Monthly water deficits are infrequent and minor, but 70–80% occur between November and March.

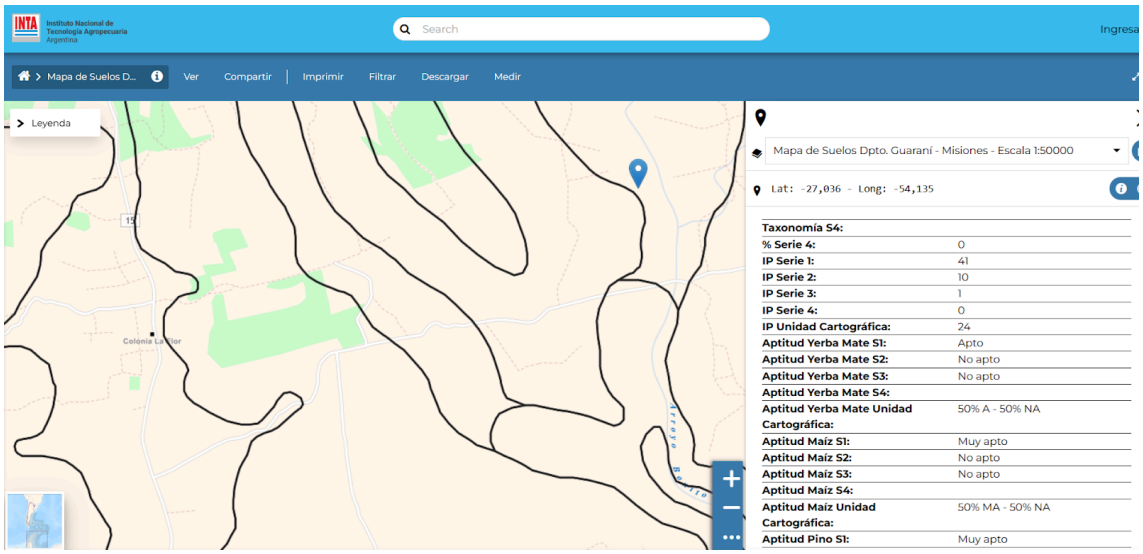
Sources:

- Official meteorological data
- Local climate stations
- San Pedro Meteorological Station

Soil



Source: Soil Map, Guaraní Department, Province of Misiones – National Institute of Agricultural Technology (INTA).



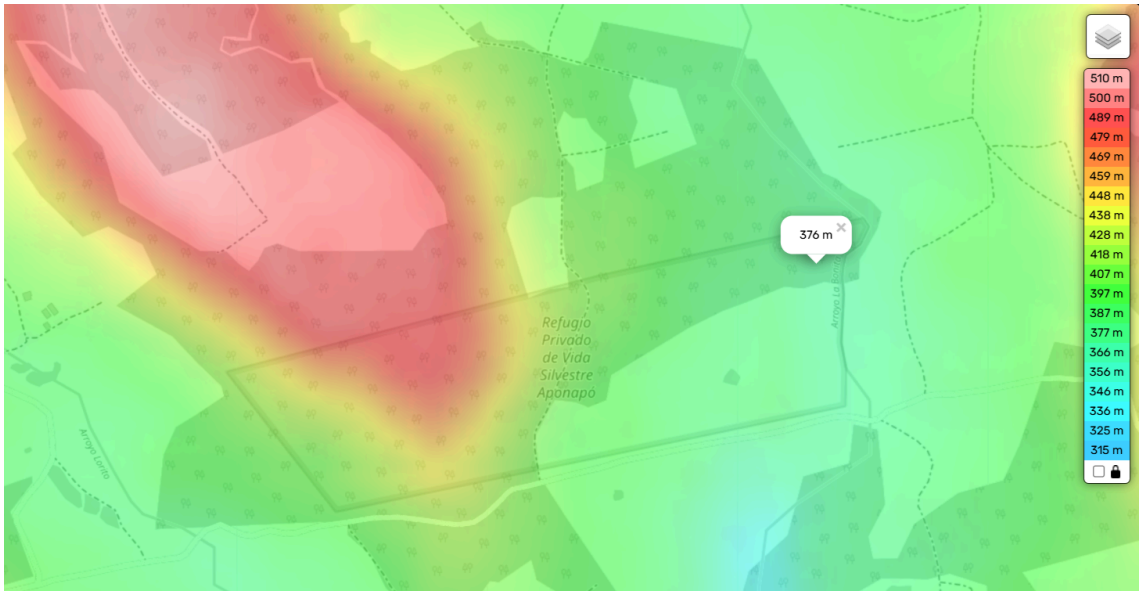
Source: Soil Map, Guaraní Department, Province of Misiones – National Institute of Agricultural Technology (INTA).

To be added in upcoming activities: detailed information on soil type, pH, texture, and organic content will be collected and analyzed as part of the next phase of monitoring and research.

Sources:

- Soil maps
- Laboratory analyses

Topography



Source: http://topographic-map.com/

Landscape Features

The monitoring plot is strategically located within a matrix of protected native forest, enriched restoration zones, and natural watercourses. It serves as an ecological reference point for assessing biodiversity dynamics and forest recovery across the broader landscape. Its proximity to biological corridors, humid forest patches, and riparian zones enhances its role in maintaining habitat continuity, supporting wildlife movement, and contributing to ecosystem services such as carbon sequestration, soil stabilization, and water regulation.

Pre-Project State

Prior to the establishment of the Permanent Native Forest Monitoring Plot, the area was characterized by native forest conditions but experienced significant pressure from the proliferation of native lianas and *Guadua trinii* (tacuara bamboo), which hindered the natural regeneration of forest species.

Relationship with Local Communities

Environmental education programs have been implemented, including activities where school children participated in tree planting within the plot. This initiative formed part of the environmental compensation efforts for an event organized by the University of San Andrés (link), fostering early awareness of conservation and strengthening the connection between younger generations and the restoration of native forests.

Additionally, the Permanent Native Forest Monitoring Plot serves as a research site to compare native forest regeneration under active management and invasive species control versus unmanaged conditions, helping to assess how these different approaches affect the growth and natural regeneration of key species.

Type of coverage/land use: "*Stevia rebaudiana Bertoni* Cultivation"

Zoning

Classification of the area according to legal criteria, land use, or conservation categories. *Law 26.331. Category II (yellow)* under land-use planning. Agroecological and organic production certified by OIA.

Source: Google Earth PRO. Official Land Registry of the Province of Misiones..
REFERENCES: WHITE – *Stevia rebaudiana Bertoni* plots; THICK RED – perimeter of the reserve.

Surface Area

Total surface area: 0.28 hectares (divided into 4 plots of 0.07 ha each). Georeferencing obtained in situ (Garmin eTrex 2), verified with Google Earth PRO

Ecosystem Structure
The stevia cultivation plot spans approximately 0.28 hectares within the regenerated wild ecotone. It features low-growing herbaceous crops *(Stevia rebaudiana)* interspersed with regenerating native vegetation and protected by pitanga living fences. The ecosystem structure includes a ground layer of herbaceous cover, emerging shrubs, and natural forest regeneration. Sustainable agroecological practices—such as organic soil management and the elimination of agrochemicals—support soil health, biodiversity recovery, and the provision of ecosystem services like nutrient cycling, erosion control, and pollination support.

Ecosystem Composition
Biotic Components

Listado de aves detectadas en Aponapó durante el relevamiento de campo realizado entre 1 y 3 de agosto de 2011

La taxonomía y nombres comunes se basó en la publicación de Narosky e Yzurieta, 2003

Familia	Nombre Común	Nombre Científico
Cathartidae	Jote Cabeza Negra	*Coragyps atratus*
Falconidae	Chimachima	*Milvago chimachima*
	Halconcito Colorado	*Falco sparverius*
Rallidae	Saracura	*Aramides saracura*
	Gallineta Común	*Rallus sanguinolentus*
	Gallineta Negruzca	*Rallus nigricans*
Chararidriidae	Tero Común	*Vanellus chilensis*
Columbidae	Paloma Picazuró	*Columba picazuro*
Psittacidae	Calancate Ala Roja	*Aratinga leucophthalma*
	Chiripepé Cabeza Verde	*Pyrrhura frontalis*
	Loro Maitaca	*Pionus maximiliani*
Cuculidae	Anó Chico	*Crotophaga ani*
Trochilidae	Picaflor Copetón	*Stephanoxis lalandi*
Bucconidae	Chacurú Cara Negra	*Nystalus chacuru*
Picidae	Carpintero Campestre	*Colaptes campestris*
Dendrocolaptidae	Chinchero Escamado	*Lepidocolaptes squamatus*
	Tarefero	*Sittasomus griseicapillus*
Furnaridae	Hornero	*Furnarius rufus*
	Raspahojas	*Sclerurus scansor*
	Pijuí Negrusco	*Synallaxis cinerascens*
	Macuquiño	*Lochmias nematura*
Formicariidae	Batará Goteado	*Hypoedaleus guttatus*
	Choca Común	*Thamnophilus caerulescens*
Tyrannidae	Picabuey	*Machetornis rixosus*
	Benteveo Común	*Pitangus sulphuratus*
	Suiriri Silbón	*Sirystes sibilator*
	Churrinche	*Pyrocephalus rubinus*
	Ladrillito	*Mionectes rufiventris*
	Mosqueta Enana	*Myiornis auricularis*
Corvidae	Urraca Común	*Cyanocorax chrysops*
Troglodytidae	Ratona Común	*Troglodytes aedon*
Mimidae	Calandria Grande	*Mimus saturninus*
Turdidae	Zorzal Chalchalero	*Turdus amaurochalinus*
	Zorzal Sabiá	*Turdus leucomelas*
Vireonidae	Chiví Coronado	*Hylophilus poicilotis*
Parulidae	Arañero Silbón	*Basileuterus leucoblepharus*
	Arañero Coronado Chico	*Basileuterus culicivorus*
Thraupidae	Tangará Bonito	*Chlorophonia cyanea*
Emberizidae	Chingolo	*Zonotrichia capensis*
Icteridae	Boyerito	*Icterus cayanensis*

Source:

- Field Survey Document – Fundación Vida Silvestre Argentina, Baseline 2011
- Field monitoring

Abiotic Components

Climate
There are no meteorological records from the site or surrounding area, so climate data is based on nearby localities such as San Pedro and Cuartel Río Victoria (an INTA field station located 40 km south of San Pedro).

Average annual precipitation: ~2,000 mm

- 33% of the year is dry-humid (summer months)
- 67% is humid (autumn, winter, and spring)
- Temperatures are warm for 92% of the year and hot for the remaining 8% *(Provincial Department of Highways, 2010).*

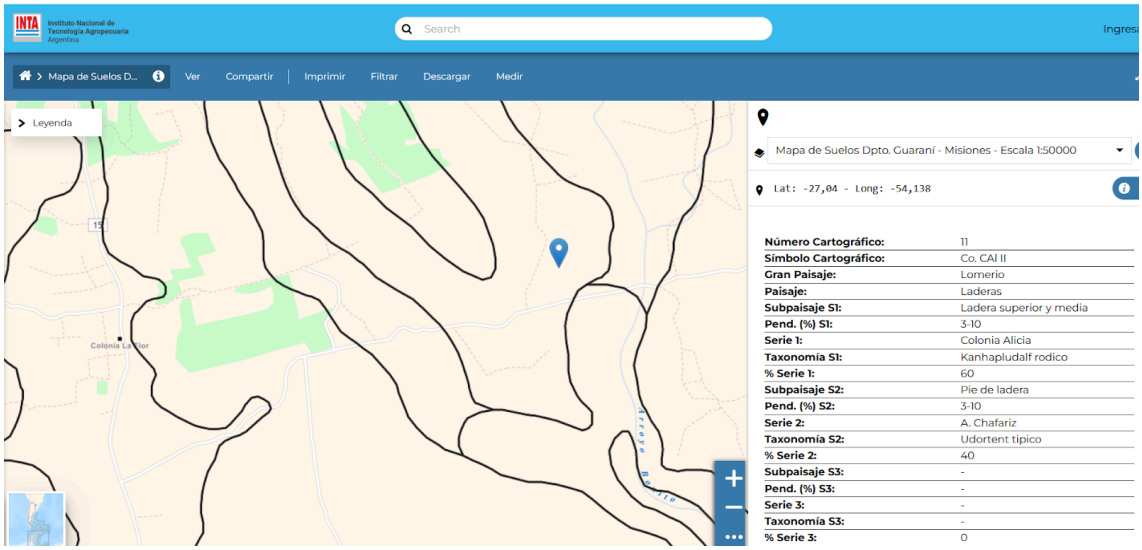
According to a study by *Gandolla* (2008, cited in the same source), based on INTA's climate data from 1970–2000:

- Decreasing precipitation trend since the early 1990s.
- Increasing temperature trend since the early 1990s.
- Although the system generally generates water surpluses, these have been decreasing since the early 1990s.
- Monthly water deficits are infrequent and minor, but 70–80% occur between November and March.

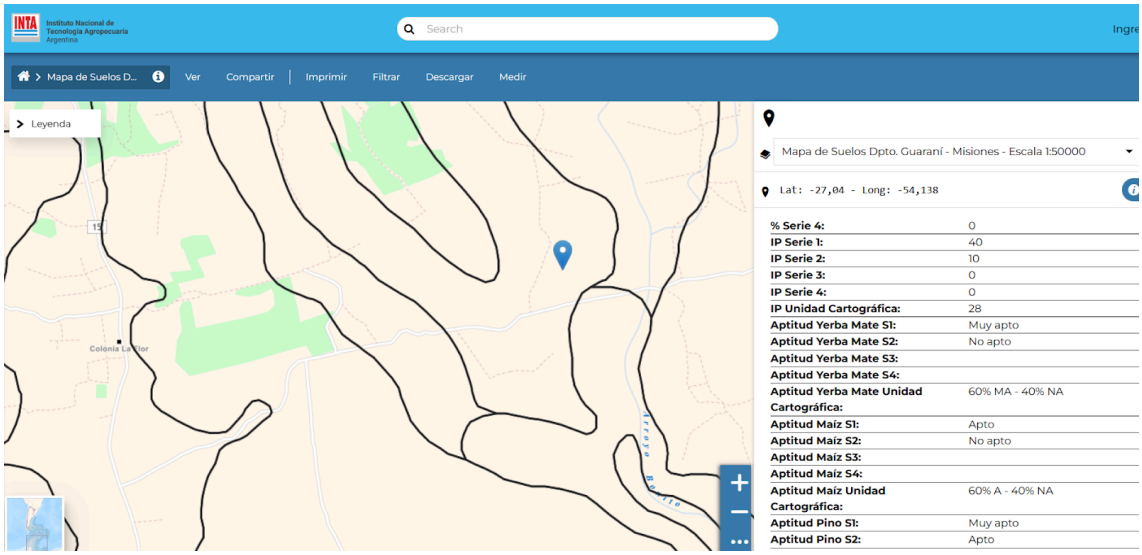
Sources:

- Historical and local meteorological data
- Official meteorological data, local weather stations
- San Pedro Meteorological Station

Soil



Source: Soil Map, Guaraní Department, Province of Misiones – National Institute of Agricultural Technology (INTA).



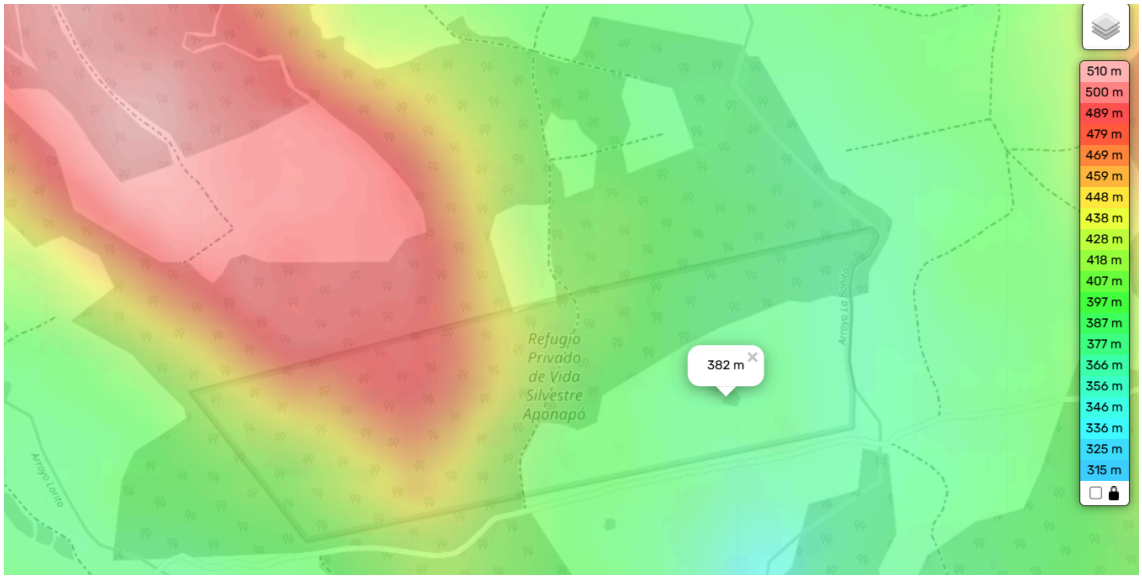
Source: Soil Map, Guaraní Department, Province of Misiones – National Institute of Agricultural Technology (INTA).

To be added in upcoming activities: detailed information on soil type, pH, texture, and organic content will be collected and analyzed as part of the next phase of monitoring and research.

Sources:

- Soil maps
- Laboratory analyses

Topography



Source: http://topographic-map.com/

Landscape Features

The stevia cultivation area is located within a previously degraded pastureland, now a natural wild ecotone undergoing spontaneous regeneration. It is embedded within a landscape mosaic of native forest fragments, wetlands, and restoration areas. The plot is bordered by living fences made of *Eugenia uniflora* (pitanga trees), which enhance habitat connectivity, provide shelter and food for native fauna, and strengthen biological corridors linking isolated forest patches.

Pre-Project State

Previously used as grazing pasture with low stocking density.

Relationship with Local Communities

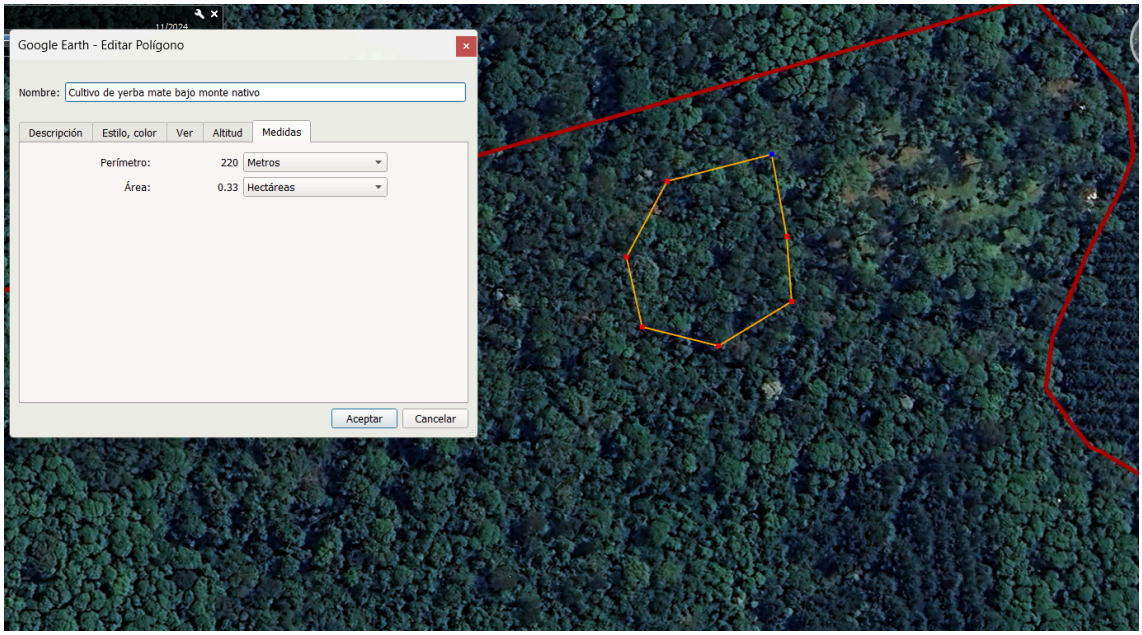
The stevia cultivation initiative is closely tied to the empowerment of local communities through sustainable production practices. Fundación Huellas para un Futuro provides continuous technical support, agroecological training, and capacity-building workshops to community members, promoting sustainable soil management, organic farming techniques, and biodiversity-friendly cultivation methods. Stevia cultivation not only

diversifies local livelihoods by offering an environmentally sustainable source of income, but also reinforces broader efforts in landscape restoration and the conservation of native ecosystems.

Ecosystem "Shade-Grown Yerba Mate Cultivation"

Zoning

Law 26.331. Currently classified as *Category I (red)* under land-use planning. Previously classified as *Category II (yellow)*. Agroecological and organic production certified by OIA.



Source: Google Earth PRO. Official Land Registry of the Province of Misiones
REFERENCES: ORANGE – perimeter/surface of shade-grown yerba mate under native forest; THICK RED – perimeter of the reserve.

Surface Area

Surface area: 0.33 hectares. Perimeter: 220 meters. Georeferencing obtained in situ (Garmin eTrex 2), verified with Google Earth PRO 2025.

Ecosystem Structure

The shaded yerba mate cultivation area is located within a native forest, historically

characterized by the natural proliferation of lianas and *Guadua trinii* (tacuara bamboo). The site maintains a semi-open canopy that allows filtered light to support both the cultivation of yerba mate *(Ilex paraguariensis)* and the regeneration of native understory species. It connects with adjacent natural corridors and conservation areas, strengthening ecological continuity and providing important habitat for local wildlife.

Ecosystem Composition
Biotic Components

Listado de mamíferos señalados para Aponapó y alrededores.

Consultas para la sistemática: Canevari y Vaccaro 2007.

Abreviaturas y signos:. **PM**: Preocupación Menor, **PV**: Potencialmente Vulnerable, **Vu**: Vunerable, **EP**: En Peligro, **A**: Amenazada; **CA**: Casi Amenazada; **pd**: poblaciones en disminución, **NA**: no amenazada, **I**: insuficientemente conocida.* Hace aproximadamente 1 año y medio a dos que no se detecta. ** En RBY del otro lado del Aº Paraíso.

Orden, familia y nombre científico	Nombre común	Categoría de conservación		
		Díaz y Ojeda (2000)	Secretaría de Ambiente y Desarrollo Sustentable de la Nación (2004)	LISTA ROJA INTERNACIONAL (IUCN 2010)
DIDELPHIMORPHIA				
Didelphidae				
Didelphis albiventris	Comadreja overa	PM	NA	PM, estable
Didelphis aurita	Comadreja orejas negras	PM	I	PM, estable
Metachirus nudicaudatus	Cuica común		I	I
Chironectes minimus	Cuica de agua	PV	A	PM, pd
XENARTHRA				
Myrmecophagidae				
Tamandua tetradactyla	Oso melero		A	
Dasypodidae				
Cabassous tatouay	Tatú rabo molle		A	
Dasypus novemcintus	Tatú negro		I	
Euphractus sexcintus	Tatú amarillo	PM	NA	PM, estable
PRIMATES				
Cebidae				
*Alouatta caraya**	Carayá	PM	A	PM, pd
Cebus cay	Mono Caí	PV	A	PM, pd
CARNIVORA				
Canidae				
Cerdocyon thous	Zorro de monte	PV	NA	PM, pd
Procyonidae				
Procyon cancrivorus	Aguará popé u Osito lavador		NA	PM, pd
Nasua nasua	Coatí		NA	PM, pd
Felidae				
Herpailurus yagouaroundi	Yaguarundí	PV	NA	PM, pd
Leopardus pardalis	Ocelote o Yaguatirica		A	PM, pd
*Puma concolor***	Puma	PV	NA	PM, pd
*Panthera onca***	Yaguareté	EP	EP	CA, pd
Mustelidae				
Galictis cuja	Hurón menor	PV	NA	PM, desc
Eira barbara	Hurón mayor	Vu	NA	PM, pd
Lontra longicaudis	Lobito de río		I	I, pd

Listado de aves detectadas en Aponapó durante el relevamiento de campo realizado entre 1 y 3 de agosto de 2011

La taxonomía y nombres comunes se basó en la publicación de Narosky e Yzurieta, 2003

Familia	Nombre Común	Nombre Científico
Cathartidae	Jote Cabeza Negra	*Coragyps atratus*
Falconidae	Chimachima	*Milvago chimachima*
	Halconcito Colorado	*Falco sparverius*
Rallidae	Saracura	*Aramides saracura*
	Gallineta Común	*Rallus sanguinolentus*
	Gallineta Negruzca	*Rallus nigricans*
Chararidriidae	Tero Común	*Vanellus chilensis*
Columbidae	Paloma Picazuró	*Columba picazuro*
Psittacidae	Calancate Ala Roja	*Aratinga leucophthalma*
	Chiripepé Cabeza Verde	*Pyrrhura frontalis*
	Loro Maitaca	*Pionus maximiliani*
Cuculidae	Anó Chico	*Crotophaga ani*
Trochilidae	Picaflor Copetón	*Stephanoxis lalandi*
Bucconidae	Chacurú Cara Negra	*Nystalus chacuru*
Picidae	Carpintero Campestre	*Colaptes campestris*
Dendrocolaptidae	Chinchero Escamado	*Lepidocolaptes squamatus*
	Tarefero	*Sittasomus griseicapillus*
Furnaridae	Hornero	*Furnarius rufus*
	Raspahojas	*Sclerurus scansor*
	Pijuí Negrusco	*Synallaxis cinerascens*
	Macuquiño	*Lochmias nematura*
Formicariidae	Batará Goteado	*Hypoedaleus guttatus*
	Choca Común	*Thamnophilus caerulescens*
Tyrannidae	Picabuey	*Machetornis rixosus*
	Benteveo Común	*Pitangus sulphuratus*
	Suiriri Silbón	*Sirystes sibilator*
	Churrinche	*Pyrocephalus rubinus*
	Ladrillito	*Mionectes rufiventris*
	Mosqueta Enana	*Myiornis auricularis*
Corvidae	Urraca Común	*Cyanocorax chrysops*
Troglodytidae	Ratona Común	*Troglodytes aedon*
Mimidae	Calandria Grande	*Mimus saturninus*
Turdidae	Zorzal Chalchalero	*Turdus amaurochalinus*
	Zorzal Sabiá	*Turdus leucomelas*
Vireonidae	Chiví Coronado	*Hylophilus poicilotis*
Parulidae	Arañero Silbón	*Basileuterus leucoblepharus*
	Arañero Coronado Chico	*Basileuterus culicivorus*
Thraupidae	Tangará Bonito	*Chlorophonia cyanea*
Emberizidae	Chingolo	*Zonotrichia capensis*
Icteridae	Boyerito	*Icterus cayanensis*

PERISSODACTYLA				
Tapiridae				
Tapirus terrestris y ***	Tapir	EP	A	V, pd
CETARTIODACTYLA				
Tayassuidae				
Pecari tajacu	Tateto o Pecarí de collar	PM	NA	PM, estable
Tayassu pecari	Jabalí o Pecarí labiado	PV	A	CA, pd
Cervidae				
Mazama americana	Pardo, venado grande o corzuela roja	PM	NA	I
Mazama nana	Poca o Corzuela enana	PM	V	I
LAGOMORPHA				
Leporidae				
Sylvilagus brasiliensis	Tapetí o conejo	PM	NA	PM, desconocido
RODENTIA				
Sciuridae				
Sciurus aestuans	Ardilla gris	PM	NA	PM, desconocido
Erethizontidae				
Sphiggurus spinosus	Erizo o Coendú chico		NA	I
Caviidae				
Cavia aperea	Cuis	PM	NA	PM, estable
Hydrochaeridae				
*Hydrochaeris hydrochaeris***	Carpincho	PV	NA	PM, desconocido
Cuniculidae				
Cuniculus paca	Paca	PV	NA	PM, estable
Dasyproctidae				
Dasyprocta azarae	Agutí		NA	I, pd
Echymidae				
Kannabateomys amblyonyx	Rata de las tacuaras		I	PM

Sources:

- Field Survey Document – Fundación Vida Silvestre Argentina, Baseline 2011
- Field monitoring and inventories

Abiotic Components

Climate

There are no meteorological records for the site or its surroundings, so the climate is

characterized based on nearby localities such as San Pedro and Cuartel Río Victoria (an INTA field station 40 km south of San Pedro).

Average annual precipitation: ~2,000 mm

- 33% of the year is dry-humid (summer).
- 67% is humid (autumn, winter, spring).
- Temperatures are warm for 92% of the year and hot for the remaining 8% *(Provincial Department of Highways, 2010).*

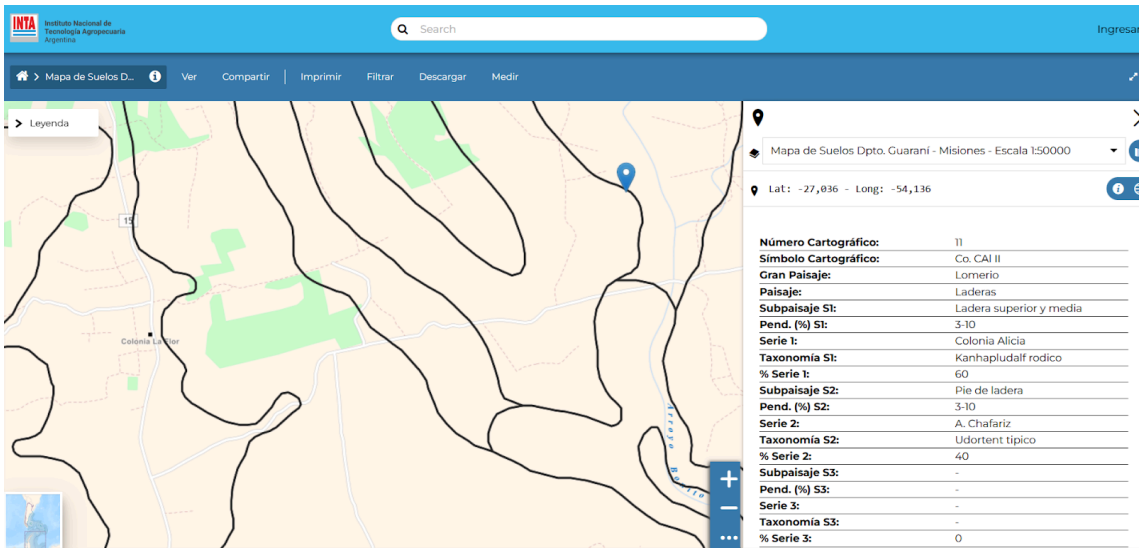
According to a study by *Gandolla* (2008, cited by the same source), based on INTA climate data from 1970–2000:

- Decreasing precipitation trend since the early 1990s.
- Increasing temperature trend since the early 1990s.
- Although the system typically generates water surpluses, these have been declining since the early 1990s.
- Monthly water deficits are rare and of low magnitude, but 70–80% occur between November and March.

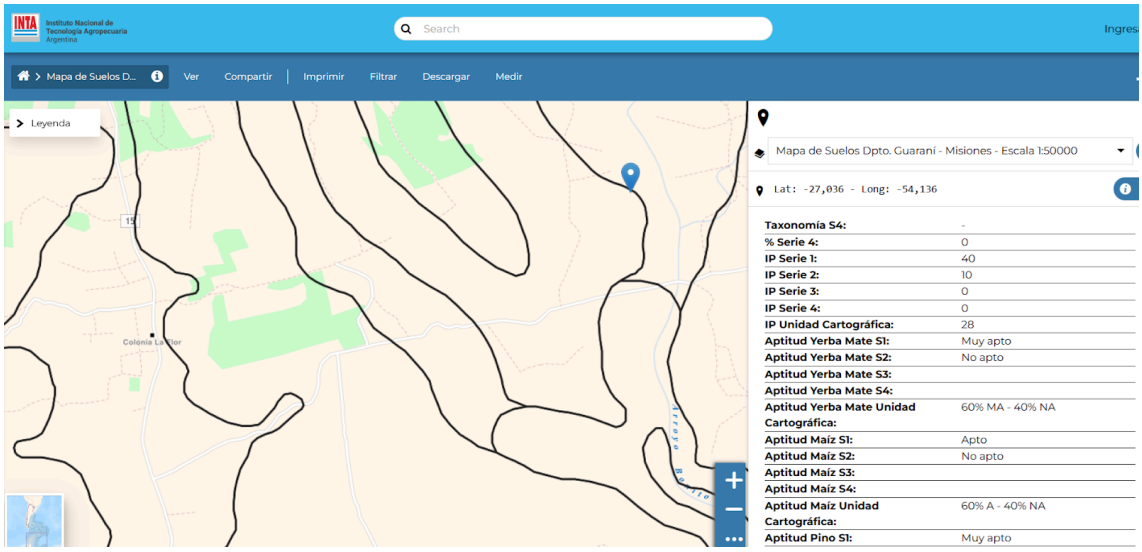
Sources:

- Official meteorological data, local climate stations
- San Pedro Meteorological Station

Soil



Source: Soil Map, Guaraní Department, Province of Misiones – National Institute of Agricultural Technology (INTA).



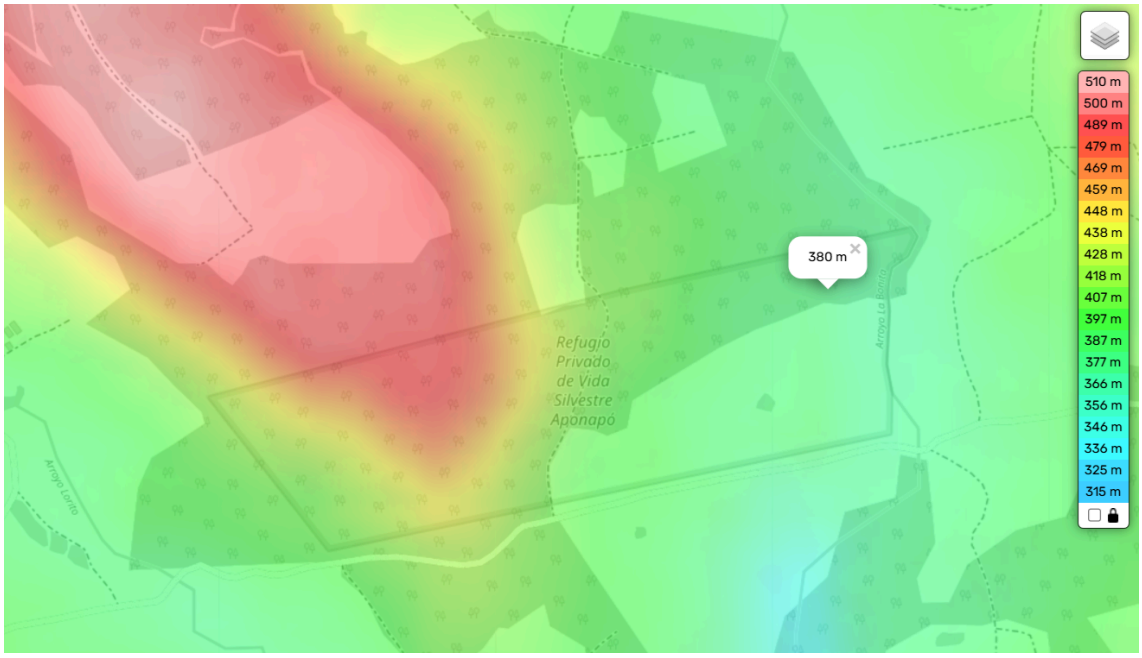
Source: Soil Map, Guaraní Department, Province of Misiones – National Institute of Agricultural Technology (INTA).

To be added in upcoming activities: detailed information on soil type, pH, texture, and organic content will be collected and analyzed as part of the next phase of monitoring and research.

Sources:

- Soil maps
- Laboratory analyses

Topography



Source: http://topographic-map.com/

Landscape Features

The yerba mate under shade system covers approximately 0.33 hectares. It exhibits a multi-strata structure, with an upper layer of native trees providing partial canopy cover, a mid-layer of yerba mate plants, and an understory composed of herbaceous vegetation and regenerating native species. Sustainable management practices—such as manual maintenance, the use of organic bioinputs, and the avoidance of heavy machinery—preserve soil health, promote biodiversity, and maintain essential ecosystem services such as carbon storage, water regulation, and nutrient cycling.

Pre-Project State

Lowland native forest with dense proliferation of lianas and tacuara cane. Sources: Historical data, pre-project comparative analysis.

Relationship with Local Communities

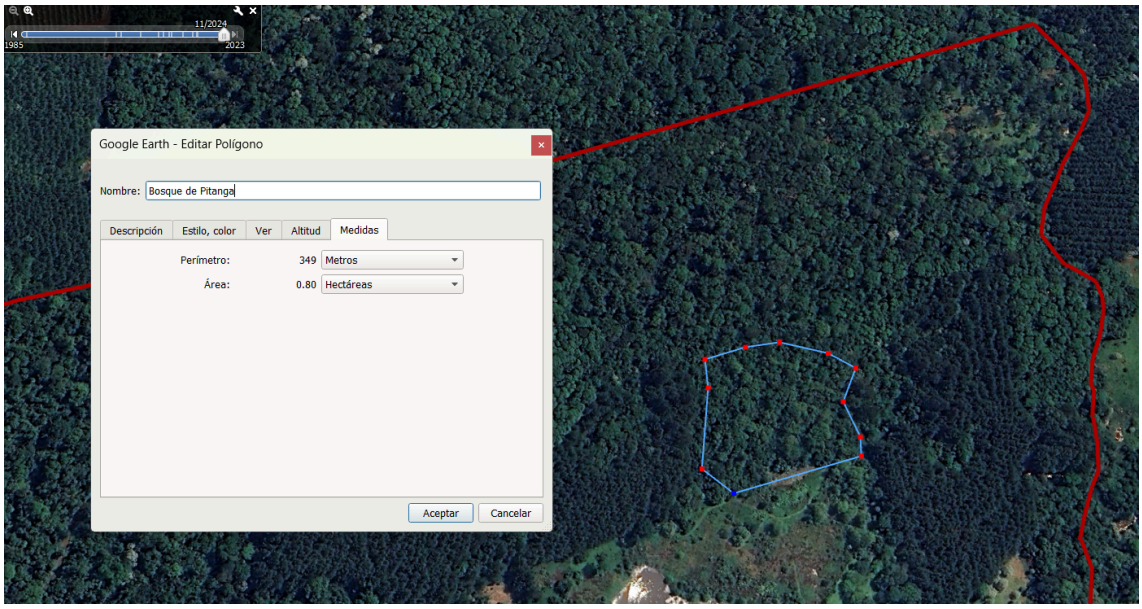
Shade-grown yerba mate cultivation is closely integrated with local community initiatives that promote sustainable agroforestry practices. Through training workshops and technical assistance provided by Fundación Huellas para un Futuro, community

members have been equipped with agroecological techniques, including low-impact cultivation methods that preserve forest integrity. The yerba mate is produced under a participatory model that fosters the active involvement of local and Indigenous communities, honoring their traditional knowledge and cultural values. Moreover, cultivating yerba mate under the forest canopy helps diversify local livelihoods, offering an alternative source of income while enhancing the conservation of native ecosystems.

Ecosystem "Pitanga Forest"

Zoning

Classification of the area according to legal criteria, land use, or conservation categories. *Law 26.331. Category I (red)* under land-use planning.



Source: Google Earth PRO. Official Land Registry of the Province of Misiones.
REFERENCES: LIGHT BLUE – perimeter/surface of primary pitanga forest; THICK RED – perimeter of the reserve.

Surface Area

Total Surface area: 0.80 hectares. Perimeter: 349 meters. Georeferencing obtained in situ (Garmin eTrex 2), verified with Google Earth PRO 2025.

Ecosystem Structure

The Pitanga Forest is a native ecosystem distinguished by a high density of *Eugenia uniflora* (pitanga) and the presence of *Eugenia involucrata* (cerella), along with a rich diversity of other native species. It features a stratified structure, with a well-developed canopy dominated by pitanga and cerella trees, an intermediate layer of shrubs and regenerating trees, and an understory dense with herbaceous plants and natural regeneration. This ecosystem plays a crucial role in ensuring the availability of the species and safeguarding their genetic resources, providing habitat for numerous pitanga specimens and designated seed trees that support the forest's ongoing regeneration and biodiversity conservation.

Ecosystem Composition
Biotic Components

Listado de mamíferos señalados para Aponapó y alrededores.

Consultas para la sistemática: Canevari y Vaccaro 2007.

Abreviaturas y signos:. **PM**: Preocupación Menor, **PV**: Potencialmente Vulnerable, **Vu**: Vunerable, **EP**: En Peligro, **A**: Amenazada; **CA**: Casi Amenazada; **pd**: poblaciones en disminución, **NA**: no amenazada, **I**: insuficientemente conocida.* Hace aproximadamente 1 año y medio a dos que no se detecta. ** En RBY del otro lado del Aº Paraíso.

Orden, familia y nombre científico	Nombre común	Categoría de conservación		
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DIDELPHIMORPHIA				
Didelphidae				
Didelphis albiventris	Comadreja overa	PM	NA	PM, estable
Didelphis aurita	Comadreja orejas negras	PM	I	PM, estable
Metachirus nudicaudatus	Cuica común		I	I
Chironectes minimus	Cuica de agua	PV	A	PM, pd
XENARTHRA				
Myrmecophagidae				
Tamandua tetradactyla	Oso melero		A	
Dasypodidae				
Cabassous tatouay	Tatú rabo molle		A	
Dasypus novemcintus	Tatú negro		I	
Euphractus sexcintus	Tatú amarillo	PM	NA	PM, estable
PRIMATES				
Cebidae				
*Alouatta caraya**	Carayá	PM	A	PM, pd
Cebus cay	Mono Caí	PV	A	PM, pd
CARNIVORA				
Canidae				
Cerdocyon thous	Zorro de monte	PV	NA	PM, pd
Procyonidae				
Procyon cancrivorus	Aguará popé u Osito lavador		NA	PM, pd
Nasua nasua	Coatí		NA	PM, pd
Felidae				
Herpailurus yagouaroundi	Yaguarundí	PV	NA	PM, pd
Leopardus pardalis	Ocelote o Yaguatirica		A	PM, pd
*Puma concolor***	Puma	PV	NA	PM, pd
*Panthera onca***	Yaguareté	EP	EP	CA, pd
Mustelidae				
Galictis cuja	Hurón menor	PV	NA	PM, desc
Eira barbara	Hurón mayor	Vu	NA	PM, pd
Lontra longicaudis	Lobito de río		I	I, pd

Listado de aves detectadas en Aponapó durante el relevamiento de campo realizado entre 1 y 3 de agosto de 2011

La taxonomía y nombres comunes se basó en la publicación de Narosky e Yzurieta, 2003

Familia	Nombre Común	Nombre Científico
Cathartidae	Jote Cabeza Negra	*Coragyps atratus*
Falconidae	Chimachima	*Milvago chimachima*
	Halconcito Colorado	*Falco sparverius*
Rallidae	Saracura	*Aramides saracura*
	Gallineta Común	*Rallus sanguinolentus*
	Gallineta Negruzca	*Rallus nigricans*
Chararidriidae	Tero Común	*Vanellus chilensis*
Columbidae	Paloma Picazuró	*Columba picazuro*
Psittacidae	Calancate Ala Roja	*Aratinga leucophthalma*
	Chiripepé Cabeza Verde	*Pyrrhura frontalis*
	Loro Maitaca	*Pionus maximiliani*
Cuculidae	Anó Chico	*Crotophaga ani*
Trochilidae	Picaflor Copetón	*Stephanoxis lalandi*
Bucconidae	Chacurú Cara Negra	*Nystalus chacuru*
Picidae	Carpintero Campestre	*Colaptes campestris*
Dendrocolaptidae	Chinchero Escamado	*Lepidocolaptes squamatus*
	Tarefero	*Sittasomus griseicapillus*
Furnaridae	Hornero	*Furnarius rufus*
	Raspahojas	*Sclerurus scansor*
	Pijuí Negrusco	*Synallaxis cinerascens*
	Macuquiño	*Lochmias nematura*
Formicariidae	Batará Goteado	*Hypoedaleus guttatus*
	Choca Común	*Thamnophilus caerulescens*
Tyrannidae	Picabuey	*Machetornis rixosus*
	Benteveo Común	*Pitangus sulphuratus*
	Suiriri Silbón	*Sirystes sibilator*
	Churrinche	*Pyrocephalus rubinus*
	Ladrillito	*Mionectes rufiventris*
	Mosqueta Enana	*Myiornis auricularis*
Corvidae	Urraca Común	*Cyanocorax chrysops*
Troglodytidae	Ratona Común	*Troglodytes aedon*
Mimidae	Calandria Grande	*Mimus saturninus*
Turdidae	Zorzal Chalchalero	*Turdus amaurochalinus*
	Zorzal Sabiá	*Turdus leucomelas*
Vireonidae	Chiví Coronado	*Hylophilus poicilotis*
Parulidae	Arañero Silbón	*Basileuterus leucoblepharus*
	Arañero Coronado Chico	*Basileuterus culicivorus*
Thraupidae	Tangará Bonito	*Chlorophonia cyanea*
Emberizidae	Chingolo	*Zonotrichia capensis*
Icteridae	Boyerito	*Icterus cayanensis*

PERISSODACTYLA				
Tapiridae				
*Tapirus terrestris**y***	Tapir	EP	A	V, pd
CETARTIODACTYLA				
Tayassuidae				
Pecari tajacu	Tateto o Pecarí de collar	PM	NA	PM, estable
Tayassu pecari	Jabalí o Pecarí labiado	PV	A	CA, pd
Cervidae				
Mazama americana	Pardo, venado grande o corzuela roja	PM	NA	I
Mazama nana	Poca o Corzuela enana	PM	V	I
LAGOMORPHA				
Leporidae				
Sylvilagus brasiliensis	Tapetí o conejo	PM	NA	PM, desconocido
RODENTIA				
Sciuridae				
Sciurus aestuans	Ardilla gris	PM	NA	PM, desconocido
Erethizontidae				
Sphiggurus spinosus	Erizo o Coendú chico		NA	I
Caviidae				
Cavia aperea	Cuis	PM	NA	PM, estable
Hydrochaeridae				
*Hydrochaeris hydrochaeris***	Carpincho	PV	NA	PM, desconocido
Cuniculidae				
Cuniculus paca	Paca	PV	NA	PM, estable
Dasyproctidae				
Dasyprocta azarae	Agutí		NA	I, pd
Echymidae				
Kannabateomys amblyonyx	Rata de las tacuaras		I	PM

Sources:

- Field Survey Document – Fundación Vida Silvestre Argentina, Baseline 2011
- Field monitoring and inventories

Abiotic Components

Climate

There are no meteorological records for the site or surrounding area, so the climate is characterized using data from nearby localities such as San Pedro and Cuartel Río Victoria (an INTA field station located 40 km south of San Pedro).

Average annual precipitation: ~2,000 mm.

- 33% of the year is dry-humid (summer months).
- 67% is humid (autumn, winter, spring).
- Temperatures are warm for 92% of the year and hot for the remaining 8% *(Provincial Department of Highways, 2010).*

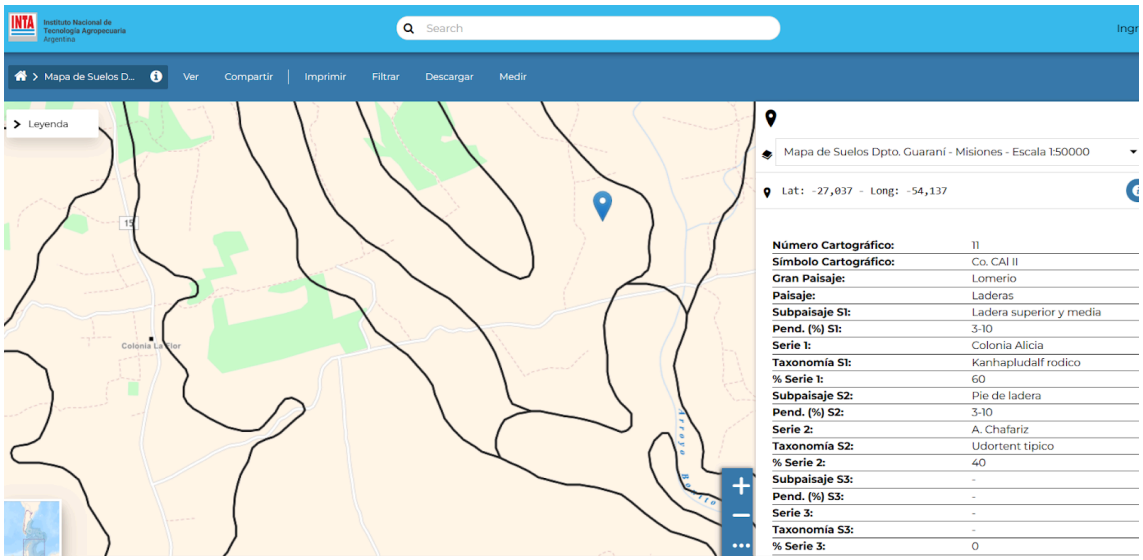
According to a study by *Gandolla* (2008, cited in the same source), based on INTA's climate data from 1970–2000:

- A decreasing precipitation trend has been observed since the early 1990s.
- Temperature trends indicate a warming period since the early 1990s.
- Although the system generates water surpluses, these have declined since the early 1990s.
- Monthly water deficits are infrequent and of low magnitude, but 70–80% occur from November to March.

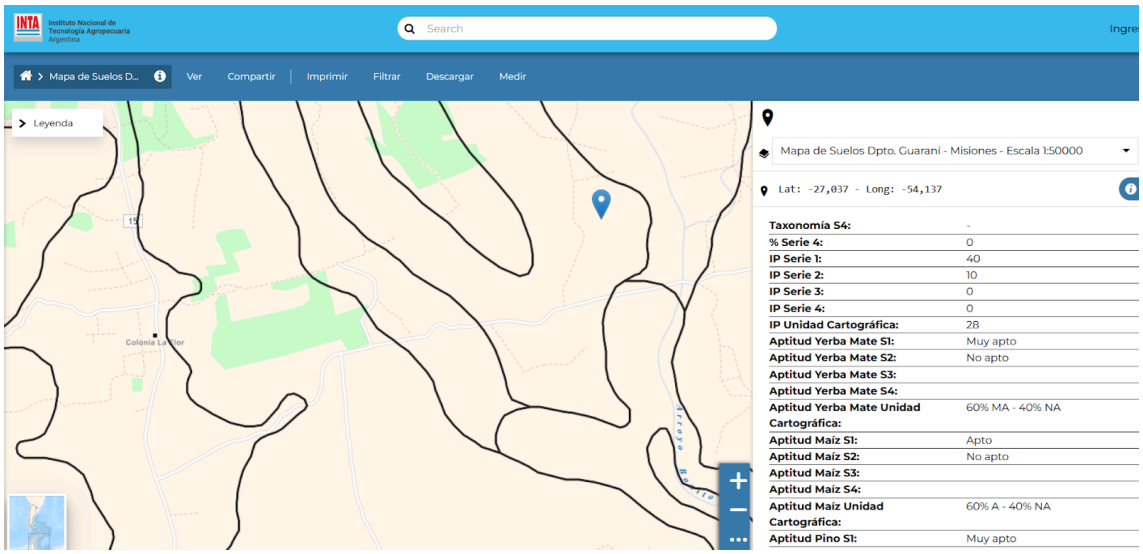
Sources:

- Official meteorological data
- Local weather stations
- San Pedro Meteorological Station

Soil



Source: Soil Map, Guaraní Department, Province of Misiones – National Institute of Agricultural Technology (INTA).



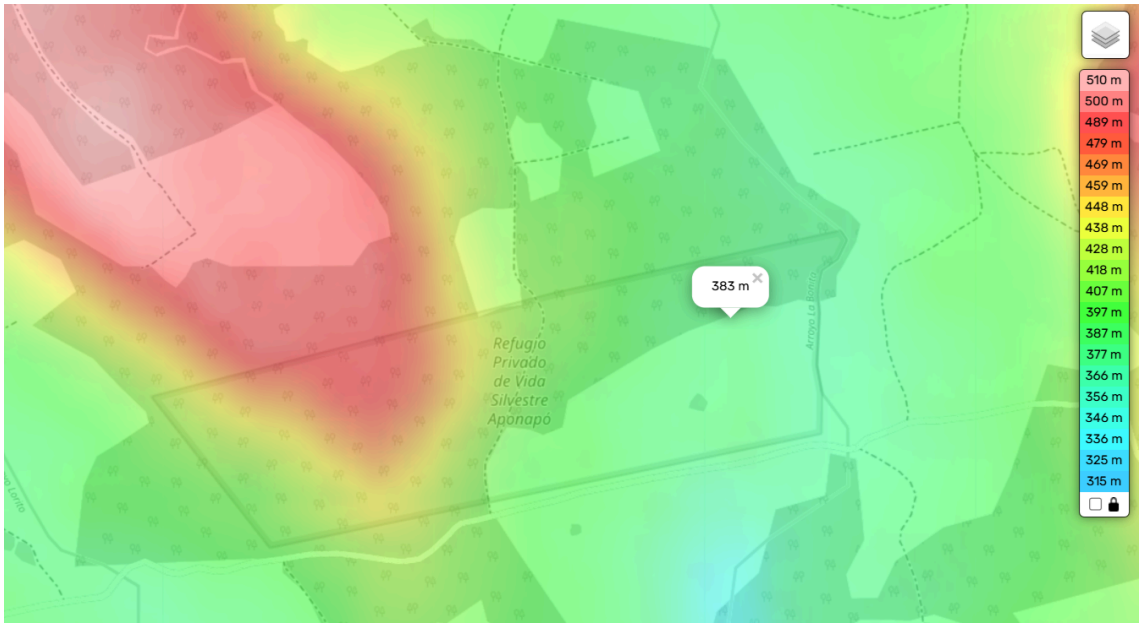
Source: Soil Map, Guaraní Department, Province of Misiones – National Institute of Agricultural Technology (INTA).

To be added in upcoming activities: detailed information on soil type, pH, texture, and organic content will be collected and analyzed as part of the next phase of monitoring and research.

Sources:

- Soil maps
- Laboratory analyses

Topography



Source: http://topographic-map.com/

Landscape Features

The Pitanga Forest is situated adjacent to native forest patches and near loblolly pine *(Pinus taeda)* plantations. It serves as a crucial biological corridor, promoting the movement and genetic exchange of numerous species across fragmented forest landscapes.

Pre-Project State

Primary native forest with no anthropogenic activity Sources: Historical records, pre-project comparative analysis.

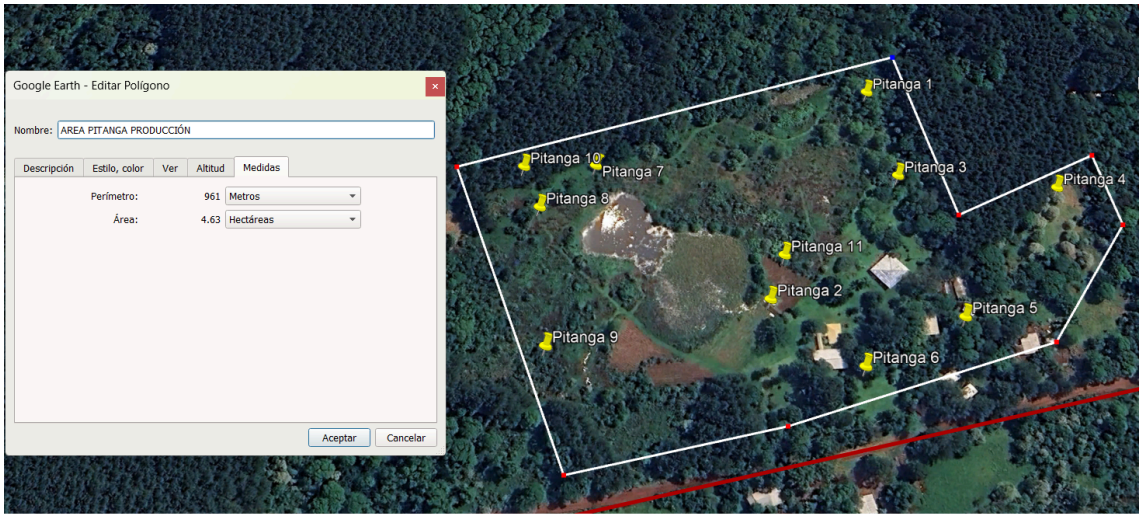
Relationship with Local Communities

Community members have been actively engaged in the conservation of this ecosystem. Their involvement includes the identification of seed trees, the collection and management of seeds and seedlings, and the establishment of enrichment plantings to promote forest regeneration and strengthen biodiversity conservation.

Type of coverage/land use: "Pitanga stands (4.63 has)"

Zoning

Classification of the area according to legal criteria, land use, or conservation categories. *Law 26.331. Category II (yellow)* under land-use planning. Agroecological and organic production certified by OIA.



Source: Google Earth PRO. Official Land Registry of the Province of Misiones.
REFERENCES: WHITE – Pitanga production area; THICK RED – perimeter of the reserve.

Surface Area

Total area under intervention: 4.63 hectares. Includes 11 productive stands of 0.2 ha each, where leaves and fruits are harvested. Georeferencing obtained in situ (Garmin eTrex 2), verified with Google Earth PRO 2025.

Ecosystem Structure

The pitanga stands cover approximately 4.63 hectares and consist of 11 separate plots of around 2,000 m² each. Stands 1, 8, and 9 originated through natural seed dispersal, while stands 2, 3, 4, 7, 10, and 11 were established through active planting efforts. Stands 5 and 6 show a mixed origin, combining natural regeneration with enrichment plantings. The vegetation structure is semi-open, composed predominantly of *Eugenia uniflora* (pitanga), accompanied by native understory species that enhance biodiversity and habitat complexity.

Ecosystem Composition
Biotic Components
Pitanga stands *(Eugenia uniflora)*

Listado de aves detectadas en Aponapó durante el relevamiento de campo realizado entre 1 y 3 de agosto de 2011

La taxonomía y nombres comunes se basó en la publicación de Narosky e Yzurieta, 2003

Familia	Nombre Común	Nombre Científico
Cathartidae	Jote Cabeza Negra	*Coragyps atratus*
Falconidae	Chimachima	*Milvago chimachima*
	Halconcito Colorado	*Falco sparverius*
Rallidae	Saracura	*Aramides saracura*
	Gallineta Común	*Rallus sanguinolentus*
	Gallineta Negruzca	*Rallus nigricans*
Chararidriidae	Tero Común	*Vanellus chilensis*
Columbidae	Paloma Picazuró	*Columba picazuro*
Psittacidae	Calancate Ala Roja	*Aratinga leucophthalma*
	Chiripepé Cabeza Verde	*Pyrrhura frontalis*
	Loro Maitaca	*Pionus maximiliani*
Cuculidae	Anó Chico	*Crotophaga ani*
Trochilidae	Picaflor Copetón	*Stephanoxis lalandi*
Bucconidae	Chacurú Cara Negra	*Nystalus chacuru*
Picidae	Carpintero Campestre	*Colaptes campestris*
Dendrocolaptidae	Chinchero Escamado	*Lepidocolaptes squamatus*
	Tarefero	*Sittasomus griseicapillus*
Furnaridae	Hornero	*Furnarius rufus*
	Raspahojas	*Sclerurus scansor*
	Pijuí Negrusco	*Synallaxis cinerascens*
	Macuquiño	*Lochmias nematura*
Formicariidae	Batará Goteado	*Hypoedaleus guttatus*
	Choca Común	*Thamnophilus caerulescens*
Tyrannidae	Picabuey	*Machetornis rixosus*
	Benteveo Común	*Pitangus sulphuratus*
	Suiriri Silbón	*Sirystes sibilator*
	Churrinche	*Pyrocephalus rubinus*
	Ladrillito	*Mionectes rufiventris*
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Vireonidae	Chiví Coronado	*Hylophilus poicilotis*
Parulidae	Arañero Silbón	*Basileuterus leucoblepharus*
	Arañero Coronado Chico	*Basileuterus culicivorus*
Thraupidae	Tangará Bonito	*Chlorophonia cyanea*
Emberizidae	Chingolo	*Zonotrichia capensis*
Icteridae	Boyerito	*Icterus cayanensis*

Source:

- Field Survey Document – Fundación Vida Silvestre Argentina, Baseline 2011
- Field monitoring

Abiotic Components

Climate

There are no meteorological records for the site or its surroundings, so the climate is characterized using data from nearby localities such as San Pedro and Cuartel Río Victoria (an INTA field station located 40 km south of San Pedro).

- Average annual precipitation: ~2,000 mm.
- 33% of the year is dry-humid (summer months).
- 67% is humid (autumn, winter, spring).
- Temperatures are warm for 92% of the year and hot for the remaining 8% *(Provincial Department of Highways, 2010).*

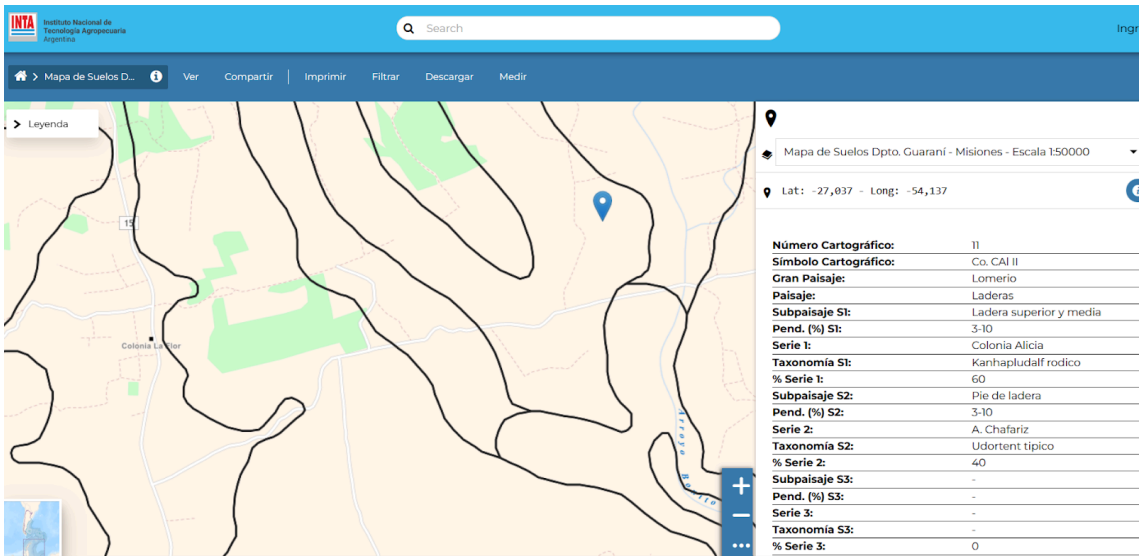
According to Gandolla (2008, cited in the same source):

- Declining precipitation trend since the early 1990s.
- Rising temperature trend since the early 1990s.
- Decreasing water surpluses.
- Monthly water deficits are infrequent and low in magnitude, but 70–80% occur from November to March.

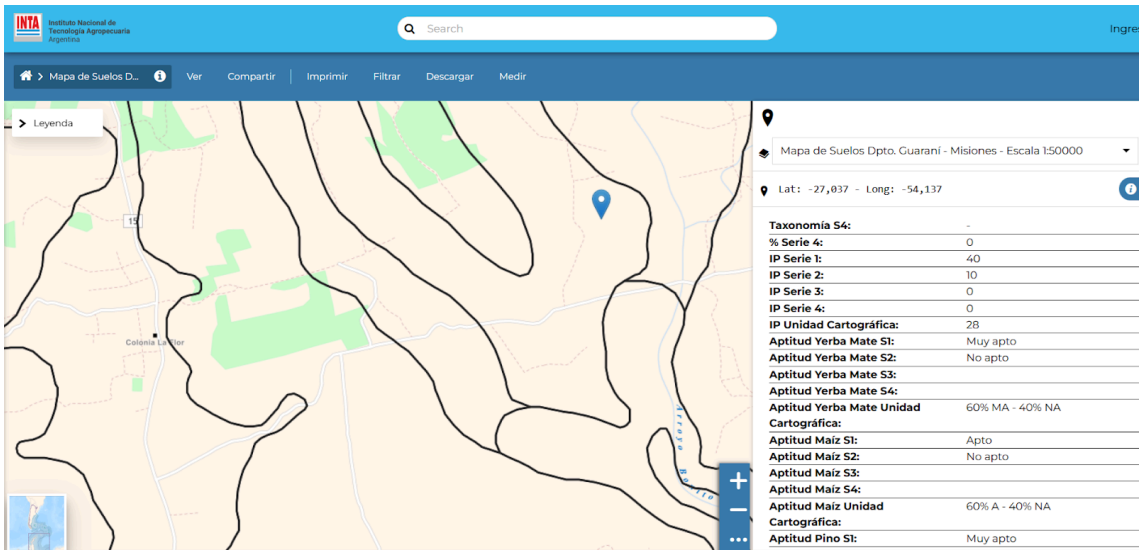
Sources:

- Official meteorological data, local climate stations
- San Pedro Meteorological Station

Soil



Source: Soil Map – Guaraní Department, Province of Misiones – INTA.



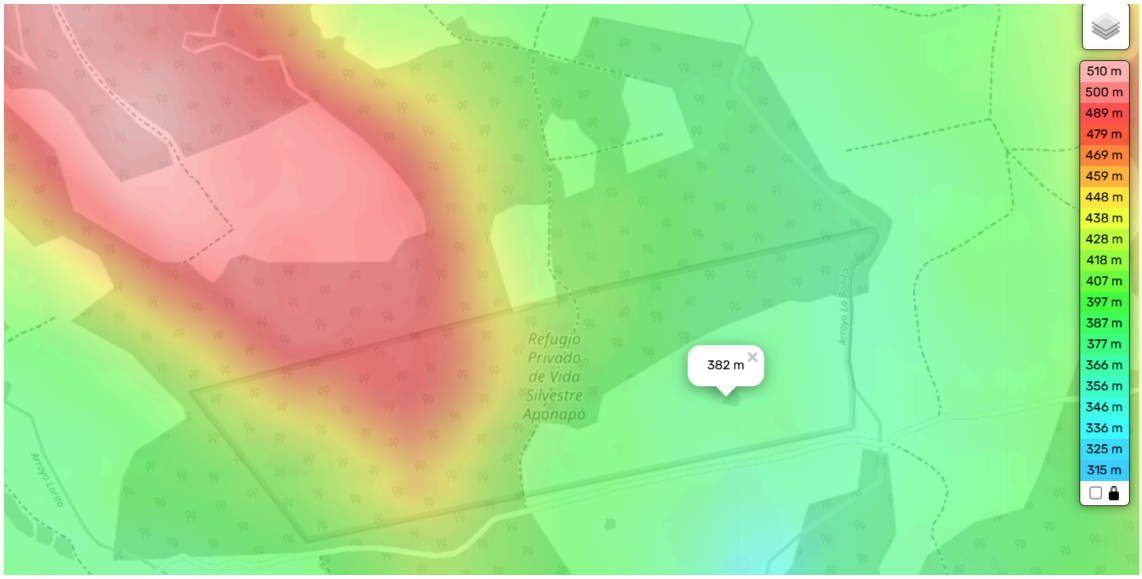
Source: Soil Map – Guaraní Department, Province of Misiones – INTA.

To be added in upcoming activities: detailed information on soil type, pH, texture, and organic content will be collected and analyzed as part of the next phase of monitoring and research.

Sources:

- Soil maps

- Laboratory analyses



Source: http://topographic-map.com/

Landscape Features
The pitanga stands act as biological corridors and stepping stones that enhance landscape connectivity, facilitating the movement and gene flow of wildlife between fragmented native forest areas. Their integration into the landscape contributes to the reforestation and restoration mosaic of the broader conservation initiative.

Pre-Project State
Previously used as pastureland.

Sources: Historical data review, pre-project comparative analysis.

Relationship with Local Communities
Local and Indigenous families actively participate in seed collection, nursery propagation, and field planting. Through continuous training and technical support, they are empowered to sustainably manage pitanga resources and replicate these practices within their own productive plots. Each year, pitanga seedlings are propagated and distributed to beneficiaries to support the development of community-led cultivation areas. Beyond the ecological benefits, the pitanga stands create opportunities for future sustainable commercialization through access and benefit-sharing mechanisms, helping diversify local incomes and reinforce cultural ties to native biodiversity.

8. Additionality analysis

[Demonstrate through qualitative and quantitative assessments that biodiversity and ecosystem conservation would not have occurred if the conservation initiative was not implemented and that these are not attributable to the implementation of legally required actions per the provisions of the BBS Section 10.7 and Section 10.5 of the Methodology document.

Demonstrate additionality through a qualitative and quantitative assessment that can explain, based on measurable metrics, according to the criteria and metrics in Section 13 of the Methodology document.]

NOTE: The following section on additionality analysis is presented in draft form. It describes the conservation objective, its relationship to High Conservation Values (HCVs), the ecosystem status prior to the intervention, and the specific conservation activities implemented to achieve measurable biodiversity gains. The indicators and methodologies for estimating Net Biodiversity Gains (NBGs) are currently under development. They will be based on a qualitative and quantitative assessment, using measurable metrics aligned with the criteria established in Section 13 of the Methodology document.

Conservation Objective: High-altitude lagoon and tree fern forest 1 (1.54 ha)

Relation to HCVs: HCV 1 – Species Diversity, HCV 3 – Ecosystems and Habitats, HCV 4 – Ecosystem Services, HCV 5 – Community Needs.

Pre-Intervention Status: The area, located within the 16 hectares of the hill's plateau/flatland, was identified and characterized in January 2005. In 2007, the bamboo flowered and later died off (a cycle that occurs every 25–30 years). This event created a temporary window suitable for removing the dry bamboo, organizing it to prevent potential fire spread. The discovery of this ecosystem marked a milestone in the reserve, leading to the beginning of surveys and monitoring. It was incorporated into the land-use and management plan as an **INTANGIBLE ZONE** with the sole purpose of supporting research.

Conservation Activities:

- **Preservation**: Isolation of forest fragments; Connectivity between forest patches; Conservation of rare or endangered habitats and ecosystems; Identification and conservation of species listed on the IUCN Red List; Reduction of hunting

activities; Determination and marking of permanent monitoring plots; Knowledge exchange with Mbya Guaraní communities, including the identification and documentation of species of cultural importance;
- **Sustainable use:** Temporary restriction of access and/or public/tourist activities in the landscape or ecosystem; Implementation of environmental education programs in collaboration with local communities.
- **Ecological Restoration**: Removal (REM) of degradation agents.

LMT (Landscape Management Tools):

- Biological and conservation corridors;
- Invasive species control.
- Maintenance of the site's status as an intangible zone through ongoing restriction of public access, dedicated exclusively to scientific research and conservation;

Supporting Documents:

- 2011 Ecological Survey by Fundación Vida Silvestre: Characterization, Diagnosis, and Strategic Guidelines for the Implementation of a Private Nature Reserve.
- Folder with photographic records.
- Entries in ArgentinaNat https://www.argentinat.org/projects/kaa-guy-pora?tab=observations
- GIS Mapping.
- Germplasm Bank: Seed Tree Registry. Silva 17 Project – Biodiversity Conservation in Productive Forest Landscapes (GEF 090118). http://www.huellasparaunfuturo.org/wp-content/uploads/2019/02/Banco-de-Germoplasma.pdf
- Final Report – National Native Forest Restoration Plan.
- REDD+ activities under the National Native Forest Restoration Plan: Video link
- Other documents.

Indicators subject to monitoring for BioCredits determination

- Species composition and richness of aquatic and terrestrial flora (orchids, ferns, bromeliads, epiphytes, etc.).
- Presence and frequency of indicator amphibian species and other fauna associated with wetland ecosystems.
- Presence and abundance of keystone species (camera trap data).

- Lagoon water quality parameters: pH, dissolved oxygen, turbidity, and seasonal depth variation.
- Abundance and diversity of epiphytes on tree ferns and adjacent vegetation.
- Soil moisture and organic matter content.
- Tree fern health and regeneration rate (e.g., number of individuals per plot, height class distribution).
- Absence of disturbance.
- Absence or control of invasive species.
- Recorded traditional knowledge and community participation.

Conservation Objective: Tree Fern Forest 2 (1.31 ha)

Relation to HCVs: HCV 1 – Species Diversity, HCV 3 – Ecosystems and Habitats, HCV 4 – Ecosystem Services, HCV 5 – Community Needs

Pre-Intervention Status: Due to its topographical features and inaccessibility, the area has remained untouched by anthropogenic activity. The site was identified during a survey of the watercourse originating from the high-altitude lagoon, which forms three waterfalls, tracing it from its source to its mouth. This survey enabled its incorporation into the management and conservation plan under the HCV classification. It was designated as an **intangible zone**.

Conservation Activities:

- **Preservation**: Isolation of forest fragments; Connectivity between forest patches; Conservation of rare or endangered habitats and ecosystems; Identification and conservation of species listed on the IUCN Red List; Reduction of hunting activities; Determination and marking of permanent monitoring plots; Knowledge exchange with Mbya Guaraní communities, including the identification and documentation of species of cultural importance;
- **Sustainable use:** Temporary restriction of access and/or public/tourist activities in the landscape or ecosystem; Implementation of environmental education programs in collaboration with local communities.
- **Ecological Restoration:** Removal (REM) of degradation agents.

LMT (Landscape Management Tools):

- Biological and conservation corridors.

- Invasive species control.
- Maintenance of the site's status as an intangible zone through ongoing restriction of public access, dedicated exclusively to scientific research and conservation.

Supporting Documents:

- 2011 Ecological Survey by Fundación Vida Silvestre: Characterization, Diagnosis, and Strategic Guidelines for the Implementation of a Private Nature Reserve.
- Folder with photographic records
- Entries in ArgentinaNat . https://www.argentinat.org/projects/kaa-guy-pora?tab=observations
- GIS Mapping
- Final Report – National Native Forest Restoration Plan
- REDD+ activities under the National Native Forest Restoration Plan: Video link
- Other documents.

Indicators subject to monitoring for BioCredits determination:

- Species composition and richness of terrestrial flora (orchids, ferns, bromeliads, epiphytes, etc.).
- Presence and frequency of indicator amphibian species and other fauna associated with tree fern forest ecosystems.
- Soil quality parameters: pH, moisture content, organic matter content, and soil structure.
- Abundance and diversity of epiphytes on tree ferns and adjacent vegetation.
- Tree fern health and regeneration rate (e.g., number of individuals per plot, height class distribution).
- Absence of disturbance.
- Absence or control of invasive species.
- Recorded traditional knowledge and community participation

Conservation Objective: Mature Forest on Steep Slopes (Southwest Orientation) (8.6 ha)

Relation to HCVs: HCV 1 – Species Diversity, HCV 3 – Ecosystems and Habitats, HCV 4 – Ecosystem Services, HCV 5 – Community Needs

Pre-Intervention Status: Due to the area's steep topography and inaccessibility, it has remained untouched by anthropogenic activity.

Conservation Activities:

- **Preservation**: Isolation of forest fragments; Surveillance and control programs; Reduction of hunting activities; Signage; Establishment of permanent plots for monitoring; Protection of species of cultural value for the communities;
- **Sustainable Use**: Temporary restriction of access and/or public/tourist activity in the landscape or ecosystem; Environmental education activities in collaboration with local communities and schools.
- **Ecological Restoration:** Removal (REM) of agents causing degradation.
- **Other**:
    - A team of indigenous Mbya Guaraní experts and park rangers was formed to explore the area and identify at-risk species for reproduction.
    - A permanent monitoring plot was established as a reference ecosystem for forest restoration.
    - Indigenous experts shared traditional knowledge about local species, many of which are unique to the region.

LMT (Landscape Management Tools):

- Biological and conservation corridors;
- Enrichment.
- Invasive species control.
- Identification and protection of identified seed sources.
- Seed collection for nursery propagation and ecosystem restoration efforts.

Supporting Documents:

- 2011 Survey by Fundación Vida Silvestre: Characterization, diagnosis, and strategic guidelines for the implementation of a private nature reserve.
- Folder with photographic records
- Entries in ArgentinaNat: https://www.argentinat.org/projects/kaa-guy-pora?tab=observations
- GIS mapping
- Germplasm Bank: Seed Tree Registry. Silva 17 Project – Biodiversity Conservation in Productive Forest Landscapes (GEF 090118).

http://www.huellasparaunfuturo.org/wp-content/uploads/2019/02/Banco-de-Germoplasma.pdf

- Reference Ecosystems Document. IUFRO Publication. CONICET publication Permanent Plots of Native Forests in Argentina https://doi.org/10.25260/EA.22.32.2.0.1849
- Final Report – National Native Forest Restoration Plan
- REDD+ activities under the National Native Forest Restoration Plan: Video link
- Other documents.

Indicators subject to monitoring for BioCredits determination

- Species composition and richness in monitoring plots.
- Natural regeneration rate (new native saplings per hectare).
- Number of seeds collected and native seedlings propagated.
- Seedling survival rate after planting.
- Presence and abundance of keystone species (camera trap data).
- Species richness of mammals.
- Area of restored biological corridors (hectares).
- Number of functional connections between habitat patches.
- Reduction in invasive species cover.
- Number of unauthorized access incidents.
- Number of environmental education activities conducted.
- Traditional knowledge records documented.

Conservation Objective: Mature Forest on Steep Slopes (East-facing) (8.46 ha)

Relation to HCVs: HCV 1 – Species Diversity, HCV 3 – Ecosystems and Habitats, HCV 4 – Ecosystem Services, HCV 5 – Community Needs

Pre-Project Status: Due to its steep topography and inaccessibility, the area has remained untouched by anthropogenic activity.

- **Preservation**: Isolation of forest fragments; Surveillance and control programs; Reduction of hunting activities; Signage; Establishment of permanent plots for monitoring; Protection of species of cultural value for the communities;

- **Sustainable Use**: Temporary restriction of access and/or public/tourist activity in the landscape or ecosystem; Environmental education activities in collaboration with local communities and schools.
- **Ecological Restoration:** Removal (REM) of agents causing degradation.
- **Other**:
    - A team of indigenous Mbya Guaraní experts and park rangers was formed to explore the area and identify at-risk species for reproduction.
    - A permanent monitoring plot was established as a reference ecosystem for forest restoration.
    - Indigenous experts shared traditional knowledge about local species, many of which are unique to the region.

LMT (Landscape Management Tools):

- Biological and conservation corridors;
- Enrichment.
- Invasive species control.
- Identification and protection of identified seed sources.
- Seed collection for nursery propagation and ecosystem restoration efforts.

Supporting Documents:

- Fundación Vida Silvestre 2011 Survey: Characterization, diagnosis, and strategic guidelines for implementing a private natural reserve
- Photographic records folder
- GIS mapping
- Records in ArgentiNat https://www.argentinat.org/projects/kaa-guy-pora?tab=observations
- Germplasm Bank: Seed Tree Registry. Silva 17 Project – Biodiversity Conservation in Productive Forest Landscapes (GEF 090118). http://www.huellasparaunfuturo.org/wp-content/uploads/2019/02/Banco-de-Germoplasma.pdf
- Reference Ecosystems Document – IUFRO Publication. CONICET Publication on Permanent Native Forest Plots in Argentina: https://doi.org/10.25260/EA.22.32.2.0.1849
- Final Report – National Native Forest Restoration Plan
- REDD+ activities under the National Native Forest Restoration Plan: Video link
- Additional documentation.

Indicators subject to monitoring for BioCredits determination:

- Species composition and richness in monitoring plots.
- Natural regeneration rate (new native saplings per hectare).
- Number of seeds collected and native seedlings propagated.
- Seedling survival rate after planting.
- Presence and abundance of keystone species (camera trap data).
- Species richness of mammals.
- Area of restored biological corridors (hectares).
- Number of functional connections between habitat patches.
- Reduction in invasive species cover.
- Number of unauthorized access incidents.
- Number of environmental education activities conducted.
- Traditional knowledge records documented.

Conservation Objective: Spring and Wetland Protective Forest (4.95 ha)

Relation to HCVs: HCV 1 – Species Diversity, HCV 3 – Ecosystems and Habitats, HCV 4 – Ecosystem Services, HCV 5 – Community Needs

Pre-Project Status:
Due to its steep topography and inaccessibility, the area has remained untouched by anthropogenic activity.

Conservation Activities:

- **Preservation**: Isolation of forest fragments; Surveillance and control programs; Reduction of hunting and fishing activities; Establishment of permanent plots for monitoring; Protection of species of cultural value for the communities;
- **Sustainable use**: Temporary restriction of public/tourist access to the landscape or ecosystem; Environmental education activities in collaboration with local communities and schools.
- **Ecological Restoration:** Removal (REM) of degradation agents.
- **Other**:
    - A team of Mbya Guaraní indigenous experts and park rangers was formed to explore the area and identify species at risk for reproduction.

- A permanent monitoring plot was established as a **reference ecosystem** for native forest restoration
- Indigenous knowledge contributed to identifying key species (flora and fauna) and seasonal seed windows for nursery propagation.

LMT (Landscape Management Tools):

- Reinforcement of biological corridors linking wetlands to surrounding native forest patches to enhance habitat connectivity.
- Restoration of the hydrological regime in wetlands
- Control and removal of invasive species threatening wetland vegetation and spring water quality.
- Seed collection from key native species for nursery propagation and wetland restoration efforts.
- Enrichment.

Supporting Documents:

- Fundación Vida Silvestre 2011 survey: Characterization, diagnosis, and strategic guidelines for the implementation of a private natural reserve
- GIS maps
- Germplasm Bank: Seed Tree Registry. Silva 17 Project – Biodiversity Conservation in Productive Forest Landscapes (GEF 090118). http://www.huellasparaunfuturo.org/wp-content/uploads/2019/02/Banco-de-Germoplasma.pdf
- Photographic records folder
- Records in ArgentiNat https://www.argentinat.org/projects/kaa-guy-pora?tab=observations
- Reference Ecosystems document – IUFRO publication
- CONICET publication on permanent native forest plots in Argentina: DOI link
- Final Report – National Native Forest Restoration Plan
- REDD+ activities under the National Native Forest Restoration Plan: Video link
- Other documentation.

Indicators subject to monitoring for BioCredits determination:

- Species composition and richness in permanent plots.
- Density of natural regeneration (saplings per hectare).
- Number of seeds collected from key native species.

- Number of seedlings propagated and survival rate after planting.
- Presence and abundance of wetland-dependent mammals, birds, and amphibians (camera trap data).
- Species richness and detection frequency of indicator fauna.
- % reduction in cover or abundance of invasive species in wetland and spring areas.
- Seasonal measurements of pH, turbidity, and dissolved oxygen in springs and wetlands.
- Number of unauthorized access incidents within exclusion zones.
- Number of environmental education sessions held and participant numbers.
- Number of knowledge exchange workshops with Mbya Guaraní communities.
- Documentation of culturally significant wetland species identified.
- Area (hectares) of ecological corridors reinforced or newly established.
- Functional connectivity index between wetland patches and native forest.

Conservation Objective: Gallery Forest (1.75 ha)

Relation to HCVs: HVC 1 – Species Diversity, HVC 3 – Ecosystems and Habitats, HVC 4 – Ecosystem Services, HVC 5 – Community Needs

Pre-Project Status: Until 2005, this area served as a watering site for livestock owned by the previous landowner. The gallery forest preserved its ecological characteristics.

Conservation Activities:

- **Preservation**: Isolation of forest fragments; Isolation of areas and establishment of live/ecological barriers.
- **Sustainable use**: Temporary restriction of public or tourist access
- **Ecological Restoration:** Removal (REM) of degradation agents.
- **Other**:
    - Establishment of a permanent monitoring plot and reference ecosystem, funded independently and supported by the UNDP under *Project PNUD ARG/12/013 – Kaa'guy Porá*, focused on restoring the La Bonita and Paraíso stream basins as part of the National Native Forest Restoration Plan (2019–2022, second call).
    - Environmental education programs using the gallery forest as a demonstration site for sustainable forest-water interactions.

LMT (Landscape Management Tools):

- Biological and conservation corridors.
- Mini corridors or connecting strips.
- Control of invasive species.
- Active restoration of degraded areas through natural regeneration and enrichment planting with species from the germplasm bank.
- Maintenance and expansion of gallery forest buffer zones with additional native riparian vegetation.

Supporting Documents:

- Fundación Vida Silvestre 2011 Survey: Characterization, diagnosis, and strategic guidelines for implementing a private natural reserve
- GIS maps
- Germplasm Bank: Seed Tree Registry. Silva 17 Project – Biodiversity Conservation in Productive Forest Landscapes (GEF 090118). http://www.huellasparaunfuturo.org/wp-content/uploads/2019/02/Banco-de-Germoplasma.pdf
- Photographic records folder
- Enrichment program documentation
- Records in ArgentiNat https://www.argentinat.org/projects/kaa-guy-pora?tab=observations
- Reference Ecosystems publication – IUFRO
- Permanent Forest Plot publication – CONICET DOI
- REDD+ activities under the National Native Forest Restoration Plan: Video link
- Other documentation

Indicators subject to monitoring for BioCredits determination:

- Area (hectares) of gallery forest buffer zones maintained or expanded.
- Survival rate of newly planted native riparian vegetation.
- Water flow regulation metrics (e.g., seasonal stream flow consistency).
- Natural regeneration rate (new saplings per hectare).
- Species richness and composition of enrichment plantings from the germplasm bank.
- Species richness and detection frequency through camera trap.
- Number of environmental education events held using the gallery forest as a demonstration site.

Conservation Objective: Wild Ecotone (2.25 ha)

Relation to HCVs: HVC 1 – Species Diversity, HVC 3 – Ecosystems and Habitats.

Pre-Project Status: Previously used as pastureland.

Conservation Activities:

- **Preservation**: Isolation of forest fragments
- **Sustainable use**: Temporary restriction of public or tourist access;.Limitation of heavy or destructive machinery and other forms of technology that may generate collateral damage to other elements of the landscape or ecosystem; Application of low-impact harvesting trials for native fruits and seed collection
- **Ecological Restoration:** Removal (REM) of degradation agents.
- **Other**:
    - Monitoring of migratory birds using the lagoon/wetland
    - Expansion of buffer zones and connectivity

LMT (Landscape Management Tools):

- Biological and conservation corridors
- Invasive species control
- Enrichment planting
- Conversion of pasture to forest cover
- Expansion of buffer zones

Supporting Documents:

- Aponapó Reserve Land Use and Planning Document
- GIS and photographic records – PNRBN documents
- Communications with IMIBIO
- Novachem/IMIBIO activities:
    - Video 1
    - Video 2
- REDD+ (Acicafoc/FCPF/World Bank) – Community training documents on CBD and the Nagoya Protocol.
- ArgentiNat records https://www.argentinat.org/projects/kaa-guy-pora?tab=observations

- Other documents.

Indicators subject to monitoring for BioCredits determination:

- Survival rate and growth rate of native species planted.
- Natural regeneration rate (number of saplings per hectare).
- Number and area (hectares) of biological corridors established.
- Area (hectares) of expanded buffer zones
- Number of wildlife sightings or detections (camera traps or field observations).
- Number of local participants trained in monitoring techniques.
- Volume and diversity of native fruits and seeds harvested sustainably (measured per season).

Conservation Objective: Regeneration of Native Forest through Transitional *Pinus taeda* Cultivation (12.1 ha)

Relation to HCVs: HVC 1 – Species Diversity, HVC 3 – Ecosystems and Habitats, HVC 4 – Ecosystem Services, HVC 5 – Community Needs.

Pre-Project Status: Sugarcane and cassava plantations on sloped areas; pastureland in valley bottoms. The native forest was fragmented due to anthropogenic activities, resulting in loss of ecological connectivity. Remaining forest patches protect spring heads originating at higher altitudes and flowing down the slope. Restoring connectivity increases the buffer zone for watercourses and natural ponds.

Conservation Activities:

- **Preservation:** Surveillance and control programs.
- **Sustainable Use**: Reduced use of agrochemicals/fertilizers; Limitation of heavy or destructive machinery and other forms of technology that may generate collateral damage to other elements of the landscape or ecosystem.
- **Ecological Restoration:** Restoration (RE) of a degraded area in relation to its function, structure and/or composition; Rehabilitation (REH) of the productivity and/or services of the original ecosystem; Recovery (REC) of ecosystem utility and/or environmental services other than those of the original ecosystem; Removal (REM) of the agents causing the degradation;

- **Other**: Research & Development under the CBD on native plant species with potential commercial value for cosmetic and food product development.; Engagement with academic institutions to document ecological transitions, monitor progress, and publish findings Implementation of environmental education activities for local communities.

LMT (Landscape Management Tools):

- Biological and conservation corridors
- Mini-corridors or linear strips for connectivity
- Multipurpose forests
- Enrichment planting
- Management of regenerating native saplings to strengthen forest recovery.
- Conversion of pasture to forest
- Invasive species control
- Gradual thinning of *Pinus taeda* individuals to accelerate natural succession processes.
- Establishment and monitoring of permanent vegetation plots to assess structural recovery.

Supporting Documents:

- GIS maps
- Photographic records
- Aponapó Reserve Land Use and Planning Document
- R&D programs in collaboration with Novachem/IMIBIO
- Authorization documents for R&D on identified species
- Species enrichment registry document.
- Enrollment in the Forest Promotion *Law (Law 25.080)*
- ArgentiNat records https://www.argentinat.org/projects/kaa-guy-pora?tab=observations
- Other documents.

Indicators subject to monitoring for BioCredits determination:

- Native tree sapling density and survival rate (per species and per hectare).
- Basal area and species richness in enrichment planting zones.
- Number of native saplings managed and their growth rate.
- Soil organic matter content (%).

- Number and diversity of fauna species detected through camera trap surveys.
- Maintenance status and effectiveness of firebreaks.
- Number of environmental education workshops conducted and number of participants.
- Number of community members trained in restoration silviculture and sustainable seed harvesting.
- Number of species with seeds collected and germinated in nursery programs.
- Number of native species studied for R&D in cosmetic and food product development.
- Number of academic publications, reports, or theses based on field research in the Reserve.

Conservation Objective: Permanent Forest Monitoring Plot (0.70 ha)

Relation to HCVs: HVC 1 – Species Diversity, HVC 3 – Ecosystems and Habitats, HVC 4 – Ecosystem Services, HVC 5 – Community Needs.

Pre-Project Status: Native forest area with abundant bamboo (caña tacuara) and vines affecting the development of native forest species.

Conservation Activities:

- **Preservation:** Surveillance and control programs.
- **Ecological Restoration:** Restoration (RE) of a degraded area in relation to its function, structure and/or composition; Rehabilitation (REH) of the productivity and/or services of the original ecosystem; Recovery (REC) of ecosystem utility and/or environmental services other than those of the original ecosystem; Removal (REM) of the agents causing the degradation;
- **Sustainable Use**: Limiting agrochemicals and fertilizers
- **Other**:
    - Gradual control of the proliferation of native bamboo *(Guadua trinii)* and lianas.
      Note**:** Native bamboo *(Guadua trinii)* has long been used by the Mbya Guaraní community as a raw material for cultural, artisanal, and practical purposes. To support the preservation of this ancestral knowledge, the Reserve has organized basketry workshops aimed at promoting Guaraní

art, safeguarding traditional practices, and providing training opportunities for the local community.
    - Implementation of a participatory monitoring protocol, actively involving local community members in data collection and analysis.
    - Monitoring of growth and regeneration rates of target native species planted through enrichment activities.
    - Development of environmental education activities linked to the plot (field courses, workshops, demonstration activities).
    - Hosting of applied research projects with universities to study forest succession, biodiversity, and ecosystem service provision.

LMT (Landscape Management Tools):

- Biological and conservation corridors
- Mini-corridors or connection strips
- Multipurpose forests
- Enrichment planting
- Conversion of pasture to forest cover
- Control and removal of exotic and invasive species to maintain ecological integrity.

Supporting Documents:

- GIS mapping
- Photographic records
- Aponapó Reserve Land Use and Planning Document
- Germplasm Bank: Seed Tree Registry. Silva 17 Project – Biodiversity Conservation in Productive Forest Landscapes (GEF 090118). http://www.huellasparaunfuturo.org/wp-content/uploads/2019/02/Banco-de-Germoplasma.pdf
- Enrichment program documentation
- ArgentiNat records https://www.argentinat.org/projects/kaa-guy-pora?tab=observations
- Reference Ecosystem documents
- IUFRO and CONICET publications on permanent native forest plots in Argentina
- REDD+ training activities (Acicafoc/FCPF/World Bank)
- National Restoration Plan Final Report
- Videos:
    - https://www.youtube.com/watch?v=bHi61me4Eig

    - https://www.youtube.com/watch?v=j-dX3WfqJ6I
- Other documents.

Indicators subject to monitoring for BioCredits determination:

- % change in canopy cover over time
- Species richness
- Basal area and tree density
- Survival and growth rate (%) of target native species planted through enrichment.
- Number of naturally regenerating native saplings per hectare.
- Number of local community members trained and participating in monitoring activities.
- Number of participatory monitoring sessions conducted per year.
- Number of applied research projects implemented in collaboration with universities.
- Number of publications, technical reports, or theses generated from research activities.
- Number of environmental education workshops or field courses delivered.

Conservation Objective: *Stevia rebaudiana Bertoni* Cultivation (0.28 ha)

Relation to HCVs: HVC 4 – Ecosystem Services, HVC 5 – Community Needs

Pre-Project Status: Previously used as pasture and grazing land (low livestock density).

Conservation Activities:

- **Sustainable Use**: Soil nutrient cycling/rotation; Sustainable agriculture; Limiting agrochemical and fertilizer use.
- **Ecological Restoration:** Rehabilitation (REH) of the productivity and/or services of the original ecosystem
- **Other**: Propagation of stevia through cuttings in the nursery and delivery of seedlings to beneficiaries interested in joining the YEVIA project and establishing their own agroecological plots; Community training and capacity building; Host workshops and field schools for local farmers and community groups to replicate the agroecological stevia model on other community plots; Development and delivery of training programs on best practices for organic certification and

sustainable agricultural management; Engage in participatory trials with communities to test stevia diversification strategies (intercropping, agroforestry integration, etc.); Conduct analysis and research on new potential uses of the stevia plant (e.g., nutraceuticals, cosmetics, food innovations); Strengthen market linkage programs to promote value-added stevia products, ensuring higher income opportunities for local producers

LMT (Landscape Management Tools):

- Expand crop density through sustainable planting practices.
- Incorporate native plant barriers (e.g., living fences) around cultivation plots to enhance habitat heterogeneity and ecological connectivity.
- Monitor soil quality and productivity indicators to track long-term agroecological outcomes.

Supporting Documents:

- Project and program execution files
- Reports submitted to the New Zealand Embassy
- Documentation from the National Food Security and Sustainable Agriculture Programs
- INTA training records
- Organic transition initiation document with the OIA. File 7355.
- Video: https://www.youtube.com/watch?v=JlzKFo_Fdos
- Other documents.

Indicators subject to monitoring for BioCredits determination:

- Number of native living barriers planted and maintained.
- Increase in stevia crop density (plants per hectare) and expansion of cultivated surface area (hectares).
- Number of new potential uses for stevia identified through R&D activities.
- Number of workshops and field schools conducted; number of participants trained.
- Number of new stevia plots established by community beneficiaries.
- Number of market linkages created for value-added stevia products.
- Number of participatory diversification trials implemented (intercropping, agroforestry).

- Soil quality indicators (using FSC ES PRO: ES:4 Soil Conservation outcome indicators).
- Number of producers certified or in process toward organic certification

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Conservation Objective: Shade-Grown Yerba Mate (0.33 ha)

Relation to HCVs: HVC 1 – Species Diversity, HVC 3 – Ecosystems and Habitats, HVC 4 – Ecosystem Services, HVC 5 – Community Needs.

Pre-Project Status: Lowland native forest invaded by vines and Guadua bamboo (tacuara), limiting understory regeneration and ecosystem function.

Conservation Activities:

- **Preservation**: Isolation of forest fragments; Surveillance and control programs.
- **Ecological Restoration:** Rehabilitation (REH) of the productivity and/or services of the original ecosystem; Recovery (REC) of ecosystem utility and/or environmental services other than those of the original ecosystem; Removal (REM) of the agents causing the degradation;
- **Sustainable Use**: Soil nutrient cycling and rotation; Sustainable agriculture; Limitation of agrochemicals and synthetic fertilizers
- **Other**: Awareness and environmental education campaigns; Build capacity and share learnings with other families interested in replicating the system; Develop a participatory monitoring protocol with local producers and youth; Conduct regular pruning and understory management to control tacuara (native bamboo), promoting natural regeneration.
  Note**:** Tacuara cane has long been used by the Mbya Guaraní community as a raw material for cultural, artisanal, and practical purposes. To support the preservation of this ancestral knowledge, the Reserve has organized basketry workshops aimed at promoting Guaraní art, safeguarding traditional practices, and providing training opportunities for the local community.

LMT (Landscape Management Tools):

- Biodiversity corridors (biological and conservation)
- Control of invasive species
- Multipurpose forest zones

- Enrich the system by planting native companion species (fruit-bearing and nitrogen-fixing trees).

Supporting Documents:

- 2024 planting log and field map
- Organic certification documentation under transition (OIA)
- ArgentiNat records https://www.argentinat.org/projects/kaa-guy-pora?tab=observations
- Germplasm Bank: Seed Tree Registry. Silva 17 Project – Biodiversity Conservation in Productive Forest Landscapes (GEF 090118). http://www.huellasparaunfuturo.org/wp-content/uploads/2019/02/Banco-de-Germoplasma.pdf
- Photos and georeferenced mapping
- Other documents.

Indicators subject to monitoring for BioCredits determination:

- Number of native companion species (fruit/nitrogen-fixing trees) planted.
- Volume of tacuara (native bamboo) sustainably harvested for cultural and artisanal uses.
- Number of basketry workshops held; number of community members trained.
- Soil fertility improvement indicators (e.g., organic matter content, nutrient levels, using FSC ES PRO).
- Number and diversity of fauna species detected through new camera trap surveys.
- Number of community members trained in agroforestry techniques.
- Increase in biodiversity indicators (species richness, understory regeneration rates).
- Number of new families replicating the agroforestry model.

Conservation Objective: Pitanga Forest (0.80 ha)

Relation to HCVs: HVC 5 – Community Needs, HVC 4 – Ecosystem Services, HVC 6 – Cultural Values.

Pre-Project Status: Primary native forest with no anthropogenic activity, highly preserved and ecologically valuable, hosting a dense population of Eugenia uniflora (pitanga), a culturally and economically important species.

Conservation Activities:

- **Preservation**: Isolation of areas and establishment of live/ecological barriers; Isolation of forest fragments; Surveillance and control programs; Conservation of the pitanga forest as a genetic resource and germplasm bank (seed dispersal).
- **Sustainable Use**: Temporal limitation on public/tourist access; Restriction of heavy or destructive machinery and other technologies that could cause collateral damage; Limitation of agrochemicals and synthetic fertilizers
- **Ecological Restoration:** Removal (REM) of degradation agents.
- **Other**: Capacity building and training in sustainable activities; Evaluate opportunities for cultural and ecotourism integration, ensuring that any activities are aligned with conservation goals and ecosystem protection; Research and Development under the Convention on Biological Diversity (CBD); Start of organic certification process with OIA.

LMT (Landscape Management Tools):

- Reinforce ecological barriers and strengthen biological corridors through natural regeneration and enrichment planting with native species.
- Live fences
- Conversion of pastures to forest cover
- Micro-corridors or connection strips

Supporting Documents:

- Ecological Survey 2011 – Vida Silvestre: Characterization, diagnostics, and strategic guidelines for implementing a private nature reserve
- Folder of photographic records
- GIS mapping
- Germplasm Bank: Seed Tree Registry. Silva 17 Project – Biodiversity Conservation in Productive Forest Landscapes (GEF 090118). http://www.huellasparaunfuturo.org/wp-content/uploads/2019/02/Banco-de-Germoplasma.pdf
- Other internal technical reports

- ArgentiNat records https://www.argentinat.org/projects/kaa-guy-pora?tab=observations
- Camera trap observations
- Other documents.

Indicators subject to monitoring for BioCredits determination:

- Number of *Eugenia uniflora* (pitanga) individuals monitored.
- Increase in native species richness and abundance in enrichment and regeneration areas.
- Number of seeds and seedlings collected, propagated, and planted from germplasm efforts.
- Area (hectares) reinforced through ecological barriers and biological corridors.
- Diversity and abundance of fauna recorded through camera traps and wildlife monitoring (especially frugivorous birds and mammals associated with pitanga).
- Community participation rates in conservation, monitoring, and agroforestry training activities.
- Presence or absence of invasive species within protected pitanga forest areas.

Conservation Objective: Pitanga Stands (4.63 ha)

Relation to HCVs: HVC 5 – Community Needs, HVC 4 – Ecosystem Services, HVC 6 – Cultural Values.

Pre-Project Status: Previously used as pastureland. The area underwent soil degradation, with limited vegetation cover and reduced native biodiversity due to grazing pressure and absence of ecological connectivity.

Conservation Activities:

- **Preservation**: Isolation of areas and establishment of live/ecological barriers; Isolation of forest fragments.
- **Sustainable Use**: Temporal restriction on public/tourist access; Limitation on heavy or destructive machinery and other technologies that could harm the landscape/ecosystem; Sustainable agriculture; Limitation on agrochemicals or fertilizers

- **Other**: Promote low-impact harvesting of pitanga leaves and fruits under sustainable management guidelines; Capacity building and training in sustainable activities; Research and Development under the Convention on Biological Diversity (CBD)

LMT (Landscape Management Tools):

- Live fences
- Enrichment planting
- Strengthen connectivity through the development of micro-corridors
- Conversion of pastures to forest cover
- Micro-corridors or connection strips

Supporting documents:

- Agreement signed with Novachem for R&D.
- Free, Prior and Informed Consent (FPIC) granted by Mbya Guaraní communities (Pindó Poty and Jejy).
- Access and transport permit granted by IMiBio. Samples collected from Aponapó Reserve. Experimental plots established.
- Prior Informed Consent (PIC) and Mutually Agreed Terms (MAT) signed with IMiBio. National validation of the project (Ministry of Environment). *Oleobiota*™ launched internationally. Internationally Recognized Certificate of Compliance (IRCC) issued.
- Productive plots expanded in beneficiary communities. Training workshops on the Nagoya Protocol held. Novachem visited Aponapó Reserve and conducted interviews and sampling. Training on sustainable use of pitanga under Nagoya. Kaa'guy Porá Community Cooperative established.
- Other documents.

Indicators subject to monitoring for BioCredits determination:

- Number of *Eugenia uniflora* and complementary native species planted (and survival rate after one year).
- Area (hectares) expanded with live fences and micro-corridors established.
- Increase in native species diversity and structural complexity (measured in monitoring plots).
- Rate of natural regeneration (number of seedlings per hectare) for target native species.

- Number of workshops and participants trained (indigenous communities, local farmers, and school groups).
- Volume and percentage of pitanga leaves and fruits harvested under sustainable management guidelines.
- Number of collaborative research initiatives completed with IMiBio and Novachem (focused on bioactive compounds).
- Level of community participation in monitoring, sustainable harvesting, and benefit-sharing programs.

9. Characterization of drivers of transformation and biodiversity loss

The main drivers of transformation and biodiversity loss identified are summarized below:

Direct Driver	***Extent***	***Frequency***	***Comments/Observations***
Land-use change	*Low*	*Low*	*Risk minimized through land protection measures since 2005.*
Deforestation	*Low*	*Low*	*Controlled through land protection, active surveillance, presence of a park ranger, an early warning system, and coordination with the Ministry of Ecology and Natural Resources.*
Illegal hunting and wildlife trafficking	*Medium*	*Medium*	*Active surveillance, presence of a park ranger.*

Agricultural expansion	*Medium*	*Low*	*Mitigated through ongoing communication with neighboring landowners, expansion of buffer zones, and enforcement of the Law for the Protection of Native Forests.*
Habitat fragmentation	*Low*	*Low*	*Addressed through habitat connectivity initiatives and conservation corridors.*
Pollution	*Low*	*Low*	*Minimal due to the absence of industrial or large-scale agricultural activities nearby.*
Climate change	*Medium*	*Low*	*Potential long-term impacts; ongoing monitoring to assess changes in species composition, ecosystem resilience, and local climate conditions, including altered rainfall patterns, increased frequency of droughts and heatwaves, frosts, and flooding events.*
Overexploitation of resources	*Low*	*Low*	*Prevented through strict reserve management and controlled access.*
Invasive species	*Medium*	*Medium*	*Presence of Ovenia and other species under active*

			management to reduce ecological impacts.

10. Conservation objectives

Conservation objectives were identified, measured, and monitored using the **Theory of Change (TOC)** framework described in the **FSC Guidance for Demonstrating Impacts on Ecosystem Services**. This methodology provides a structured approach for linking conservation actions to intended outcomes, ensuring that interventions are strategically designed, evidence-based, and results-oriented.

The objectives were established through a comprehensive assessment of the ecological and social values present within the project area. They guide the implementation of restoration, conservation, and sustainable use activities, with each objective directly associated with one or more **High Conservation Values (HCVs)**. The overarching aim is to maintain, restore, or enhance the ecological integrity, ecosystem services, and community benefits provided by the landscape.

Additionally, the design and monitoring of the conservation objectives are aligned with major international frameworks, including the **Kunming-Montreal Global Biodiversity Framework** and the **2030 Agenda for Sustainable Development**. The monitoring plan integrates indicators from the Post-2020 Global Biodiversity Framework, ensuring that progress is assessed against internationally recognized standards. This alignment strengthens the contribution of the initiative to global commitments on biodiversity conservation, climate action, and sustainable development.

Finally, all conservation objectives are clearly and spatially delineated within the boundaries of the proposed initiative. This geographic definition enables targeted management, facilitates systematic monitoring, and supports transparency in reporting on conservation outcomes and Net Biodiversity Gains (NBGs).

11. Sampling effort

To maximize sampling efforts and ensure accurate data collection, permanent monitoring plots were established, along with the designation of reference ecosystems. These activities were implemented with internal funding and support from the United Nations Development Programme (UNDP), within the framework of UN support to

Argentina for the implementation of the National Action Plan on Forests and Climate Change (REDD+ Strategy Argentina). Specifically, these initiatives are part of *UNDP Project ARG/12/013 – Kaa'guy Porá*, focused on the restoration of the La Bonita and Paraíso stream watersheds, within the National Native Forest Restoration Plan (Second Call 2019-2022).

The permanent monitoring plots are located within *Category I (red)* areas, which serve as reference ecosystems. A reference ecosystem is a set of areas and environments in better state of conservation than the sites to be restored, located in a defined geographical location and sharing similar environmental, ecological, and socioeconomic characteristics. These reference ecosystems serve as models for planning ecological restoration activities.

The study of the structure and composition of these reference areas provides key information to guide both the restoration process and the production of native species. The functional state of reference ecosystems establishes the ideal baseline for restoring ecological processes and the spatial design of intervention areas. Its main function is to serve as a model for establishing explicit restoration objectives within a defined timeframe, offer multiple options for the design of restoration sites, and provide a reliable framework for post-intervention monitoring.

To this end, four permanent plots were established within the Aponapó Reserve (Lot 46, *Category I—red zone* of the Land Use Plan), representing the following environments:

- **Gallery Forest**
- **Mature Forest protecting wetlands and springs**
- **Mature Forest on south/southwest-facing slopes**
- **Mature Forest on east/northeast-facing slopes**

The establishment of permanent plots and reference ecosystems provided a systematic baseline for long-term monitoring, minimizing sampling errors and improving the reliability of biodiversity assessments. The use of standardized protocols, repeatable methodologies, and georeferenced plot boundaries ensured the consistency and accuracy of data collection over time.

In parallel, to support the identification and propagation of threatened or locally important species, a specialized team of Indigenous experts and park rangers was formed to conduct field surveys. Experts from the Mbya Guaraní community contributed ancestral ecological knowledge about the species present in the ecosystem, many of

which are unique or endemic to the area. Several priority species were identified that have produced, or could produce, during specific seasonal periods, seeds suitable for propagation and restoration initiatives in the reserve's nursery.

The integration of traditional knowledge with scientific monitoring methods strengthened the robustness and cultural relevance of the conservation initiative, while ensuring a more complete and reliable representation of the area's biodiversity.

12. Metrics for the quantification of BioCredits

The assessment of biological communities and landscape characteristics is currently underway. The process involves quantifying and weighting species diversity and landscape diversity metrics for each land cover and/or land use type, following the methodologies detailed in **Section 13 of the Methodological Document**.

Each metric is calculated for the respective monitoring periods, applying the specific formulas provided in the methodology to ensure consistency and comparability over time. This includes metrics related to species richness and evenness, and landscape composition and configuration, among others, in accordance with established protocols.

13. Quantification of BioCredits

In process.

14. Monitoring plan

The monitoring plan is currently being finalized and will be included in the next version of this document. Adjustments are underway, particularly regarding the selection of qualitative and quantitative indicators, in accordance with **Section 15 of the Methodology document.**

The plan will outline the structure for data collection, the indicators and variables to be monitored, and the quality control measures following **Section 11 of the BBS**. It will ensure that the monitoring system supports the evaluation of Net Biodiversity Gains (NBGs) through reliable and consistent methods.

15. Risk management

In accordance with **Section 16 of the Methodological Document**, a comprehensive risk assessment was conducted to identify potential environmental, financial, and social risks—both direct and indirect—associated with the implementation of conservation activities. Each risk was analyzed based on its nature, potential impact, and likelihood, and categorized accordingly.

Mitigation measures were proposed to address these risks and ensure the long-term maintenance of biodiversity outcomes and BioCredits, both during the active phase of the project and beyond its implementation. The table below summarizes the identified risks, their descriptions, assessed risk levels, proposed mitigation strategies, and corresponding implementation schedules.

Risk Category	**Identified Risk(s)**	**Risk Description**	**Risk Level**	**Mitigation Measures**	**Schedule**
Natural Risks	Extreme climatic events (floods, droughts, wildfires)	Climate-related disruptions that could degrade ecosystems, impact habitats, and reduce the effectiveness of conservation actions.	High	- Implementation of early warning systems. - Diversification of crops. - Restoration of degraded areas. - Food security programs for local communities (e.g., hydroponics in indigenous villages).	Immediate; semi-annual review.
Anthropogenic Risks	Illegal deforestation, poaching, and wildlife trafficking	Illegal exploitation and unsustainable use of natural resources that	Medium /Low	- Strengthening surveillance through satellite monitoring. - Strategic partnerships	Annual programs; quarterly review.

		degrade biodiversity and ecosystem integrity.		with local authorities. - Community training on sustainable practices.	
	Environmental pollution (water, soil, air)	Overuse or misuse of agrochemicals in nearby agricultural areas, potentially contaminating groundwater sources and springs, affecting water quality and aquatic biodiversity.	Medium	- Promote good agricultural practices and responsible agrochemical management. - Encourage the transition to bio-inputs through training and distribution of organic fertilizers. - Establish buffer zones to protect sensitive areas. - Timely communication with neighboring farmers about agrochemical use. - Regular monitoring of groundwater and spring water quality.	Quarterly review; annual monitoring

Financial Risks	Lack of funding to sustain the initiative. Fluctuations in biodiversity credit markets.	Variability in resource availability and market changes that may affect project continuity and scalability.	Medium	- Diversify funding sources. - Establish a contingency fund. - Continuous monitoring of financial indicators.	Quarterly review; contingency fund established within 6 months.
Community/ Social Risks	Conflicts with local communities	Potential tensions or disputes arising from insufficient participation or inequitable benefit-sharing within the project.	Low	- Implement continuous participation and consultation mechanisms. - Provide social management training. - Establish clear and transparent benefit-sharing agreements. - Conduct frequent community visits.	Quarterly meetings; semi-annual evaluations.
Other Risks	Technological infrastructure and monitoring equipment failures	Failures in technological infrastructure, including internet connectivity issues or breakdown of key monitoring equipment (camera traps, GPS devices,	Medium	- Develop backup protocols and redundancy in connectivity (alternative services and cloud storage). - Conduct preventive maintenance and regular	Quarterly review; annual maintenance; periodic equipment tests.

		etc.), potentially disrupting project monitoring and analysis.		testing of critical equipment. - Maintain backup equipment or have a contingency plan for quick replacement. - Train staff in technical problem-solving and contingency protocols.	
	Unexpected events (e.g., pandemics, geopolitical tensions)	Unforeseen events that could disrupt operations and delay project activities.	Medium	- Develop contingency plans, including telework protocols, biosecurity measures, and operational adjustments. - Provide crisis management training..	Updated with each crisis; quarterly review.

16. Uncertainty management

The analysis of uncertainty, including the documentation of information sources, the assessment of data consistency and relevance, and the evaluation of results related to biodiversity credits, is currently under development.

17. Permanence

The initiative has been successfully sustained over the years through a diversified and resilient funding strategy. Resources have been secured from a range of sources, including internal funding, national government contributions, support from embassies (such as

the New Zealand Embassy), grants from multilateral organizations like the World Bank, private sector agreements, and partnerships with various institutions. This multi-source approach has enabled the continuity of activities over time and has strengthened the financial stability and long-term viability of the project.

To further reinforce financial sustainability, the initiative is advancing the development of biodiversity credits (BioCredits) as an innovative financing mechanism, alongside the establishment of strategic partnerships and a contingency fund designed to cover management and monitoring costs.

18. Stakeholder engagement

The initiative was designed and implemented with a strong focus on social sustainability and active stakeholder participation. Stakeholders were identified through a mapping process that included local communities, Indigenous Peoples, private landowners, local authorities, NGOs, and government agencies involved in conservation, forest management, and sustainable rural development.

Engagement was incorporated through a participatory approach based on continuous dialogue, consultations, and collaborative decision-making. From the outset, stakeholder participation was secured through community meetings, workshops, field visits, and bilateral meetings. Special attention was given to the Indigenous Mbya Guaraní communities, whose ancestral knowledge played a key role in identifying priority species, restoration practices, and culturally appropriate management strategies.

Under the subproject *"Bringing REDD+ closer to children, youth, and women of the Kaa'guy Porá project"*, the Mbya Guaraní communities of Pindo Poty and Jejy provided Free, Prior, and Informed Consent (FPIC) to participate in the Nagoya Protocol process. Through this, they authorized the Fundación Huellas para un Futuro to represent them in managing procedures and registering them as providers of genetic resources.

All stakeholder consultations and participation processes have been formally documented to demonstrate how stakeholder input informed the design, adaptation, and implementation of project activities.

19. Consistency with applicable legislation

Compliance with Laws Related to the Protection of Human and Indigenous Peoples' Rights

United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP)
The UNDRIP establishes fundamental rights, including the right to self-determination, preservation of culture, language, traditions, and territory, participation in decision-making processes, and non-discrimination. Source: UNDRIP PDF

The Initiative is consistent with the applicable provisions of UNDRIP by respecting and promoting the fundamental rights of Indigenous Peoples, including their self-determination and the preservation of their culture, language, traditions, and territory. The management of the Reserve integrates practices that ensure active participation of Indigenous communities in decisions affecting them, respecting their ancestral knowledge and cultural values. An inclusive and equitable approach is promoted, ensuring non-discrimination, strengthening the connection between Indigenous Peoples and their land, and fostering their sustainable development in harmony with nature.

ILO Convention 169 on Indigenous and Tribal Peoples
ILO Convention 169 is an international agreement that establishes measures to protect the rights of Indigenous and Tribal Peoples. Source: Convention 169

Adopted in 1989 *(Law 24.071)* and incorporated into the Argentine Constitution, entering into force on July 3, 2001. The Initiative complies with ILO Convention 169 by respecting and protecting the relationship of Indigenous Peoples, especially the Mbya Guaraní communities, with their lands and natural resources. Their ancestral knowledge is valued, and their participation in decision-making is guaranteed. The Initiative also promotes community education and the preservation of their history and languages, fully respecting their religious and cultural values.

Provincial Law VI N° 37
This law establishes a comprehensive support regime for Guaraní communities in Misiones, focusing on respect for their cultural values and way of life. It ensures land ownership, promotes productive activities, integrates culture into education, and protects health. Source: Law VI N° 37

The Initiative aligns with *Provincial Law VI N° 37* by promoting an integral approach that respects the cultural values and way of life of Guaraní communities. The Reserve supports sustainable land access and promotes productive activities that value traditional knowledge, while also strengthening community identity through inclusive educational practices.

National Law N° 26.160
This law declares an emergency regarding the possession and ownership of lands traditionally occupied by Indigenous communities in Argentina. Source: Law N° 26.160
Enacted in 2006 and extended via *Decree 805/2021,* currently valid until 2025, prohibiting evictions. Since 2018, and as part of the efforts led by Fundación Huellas para un Futuro, an official application for land title regularization was submitted on behalf of the Mbya Guaraní community of Pindo Poty (led by Cacique Alejandro Benítez). However, the file remains inactive and unresolved to this day.

Compliance with Biodiversity Frameworks

Convention on Biological Diversity (CBD)
A legally binding treaty with three main objectives:
a) Conservation of biological diversity
b) Sustainable use of its components
c) Fair and equitable sharing of benefits arising from genetic resources
Source: CBD Website

Ratified in Argentina via *Law 24.375* and regulated by *Decree 1347/1997*. The Initiative complies with the CBD's three principles by promoting conservation, sustainable use, and benefit-sharing.

Kunming-Montreal Global Biodiversity Framework
A post-2020 roadmap for achieving biodiversity goals by 2030, transitioning from the Aichi Targets. Source: Kunming-Montreal Global Biodiversity Framework Website

For more information on the consistency of the Initiative with **Kunming-Montreal Global Biodiversity Framework**, please refer to the ***Section 23 Other certification criteria.***

Nagoya Protocol
A legal framework under the CBD regulating access to genetic resources and benefit-sharing. Source: Nagoya Protocol

Entered into force in 2014 and ratified by Argentina through *Law 27.246* in 2015, the Nagoya Protocol is supported by the Initiative through the promotion of responsible access to genetic resources—such as pitanga *(Eugenia uniflora)*—ensuring traceability, sustainability, and the active involvement of local communities through Free, Prior, and Informed Consent (FPIC) and fair Benefit-Sharing Mechanisms (BSM).

Environmental Legislation

Escazú Agreement
First regional environmental treaty with specific protections for environmental defenders in Latin America and the Caribbean. Source: Escazú Agreement

Ratified by Argentina via *Law 27.566* (2020). The Initiative promotes transparency, environmental education (e.g. *"Educational Program: The Park Ranger at Your School"*), and the right to a healthy environment, in line with the Agreement's pillars.

Native Forest Law – Law 26.331
Establishes environmental protection criteria for native forests, requiring land-use planning every 5 years. Source: Law Text

The Initiative complies by conserving and managing native forests. Notably, 35 hectares were voluntarily upgraded from *Category II (Yellow)* to *Category I (Red)*. The Reserve also maintains a native species nursery and seed bank.

Provincial Law XVI N° 60 (Green Corridor Law)

Designates Misiones' forest remnants as an "Integral Conservation and Sustainable Development Area." Source: Green Corridor Law

The Initiative actively supports this law through conservation, ecological connectivity, and forest restoration within the Atlantic Forest ecoregion. Strategically located in the buffer zone of the Yabotí Biosphere Reserve, the Aponapó Reserve serves as a key site for biodiversity conservation and sustainable development.

International Climate and Sustainability Frameworks

UNFCCC – Paris Agreement

The Paris Agreement is a legally binding international treaty on climate change. It was adopted by 196 Parties at COP21 in Paris on December 12, 2015, and entered into force on November 4, 2016. Its goal is to *limit global warming to well below 2°C, preferably to 1.5°C, compared to pre-industrial levels*. Source: Paris Agreement

The Initiative aligns with the applicable provisions of the Paris Agreement by contributing to global climate mitigation goals through the conservation and restoration of key ecosystems that act as carbon sinks. Agroecological practices promote sustainable

land management, helping to reduce greenhouse gas emissions. Additionally, the Initiative supports both adaptation and mitigation to climate change and could serve as a case study for Nature-based Solutions. It strengthens the resilience of local communities and ecosystems to climate impacts, in line with the agreement's commitments.

UNCCD – United Nations Convention to Combat Desertification
This is a legally binding agreement aimed at combating desertification and the effects of drought. Signed in 1994 and entered into force in 1996 following the Earth Summit in Rio de Janeiro in 1992. Its objectives include:
a) Protecting and restoring land
b) Improving living conditions in arid, semi-arid, and dry sub-humid areas
c) Mitigating the effects of drought
d) Encouraging local participation
e) Transferring technology and knowledge
Source: UNCCD Overview

Ratified by Argentina through Law 24.701 on September 25, 1996. The Initiative complies with the UNCCD by implementing agroecological and conservation practices that protect soil and prevent degradation. Through ecosystem restoration and sustainable resource use, the Reserve improves soil fertility, increases vegetative cover, and strengthens ecosystem resilience to desertification and drought. These actions are aligned with the Convention's goals of land protection and community well-being.

2030 Agenda – Sustainable Development Goals (SDGs)
The 2030 Agenda for Sustainable Development is a global action plan adopted by 193 UN member states to create a more inclusive and prosperous world for people and the planet. It is built on three dimensions: economic, social, and environmental. It comprises 17 Sustainable Development Goals (SDGs), which replaced the Millennium Development Goals (MDGs). Source: Agenda 2030

For more information on alignment with the 2030 Agenda, please refer to ***Section 20 Sustainable Development Goals (SDGs)***.

National Biodiversity Plan – CONADIBIO
Argentina's National Biodiversity Plan is based on the CBD and coordinated by the National Advisory Commission for the Conservation and Sustainable Use of Biological Diversity (CONADIBIO), which advises the Ministry of Environment. Main functions:
a) Plan and approve actions for the National Biodiversity Strategy
b) Monitor its implementation

c) Share information on biodiversity-related activities
Source: CONADIBIO

The Initiative aligns with CONADIBIO's objectives on conservation, restoration, and sustainable use of biodiversity. Fundación Huellas para un Futuro, which manages the Aponapó Reserve, is an official CONADIBIO member and actively participates in technical working groups such as the Restoration Working Group.

NDC – Nationally Determined Contributions
NDCs are country-specific commitments to reduce greenhouse gas emissions and adapt to climate change under the Paris Agreement.
Source: Argentina's NDCs

The Initiative aligns with Argentina's NDC commitments by implementing actions that contribute to both mitigation and adaptation. As a model Nature-based Solution, the Reserve focuses on conserving, restoring, and sustainably managing native forests, which act as carbon sinks and help reduce GHG emissions. These efforts reflect the Aponapó Reserve's commitment to the Paris Agreement goals of limiting global temperature rise to 1.5–2°C, while also reinforcing national strategies through the National Climate Change Cabinet and COFEMA.

G20
The G20 is the leading international forum for economic, financial, and political cooperation, addressing major global challenges and shaping public policy. Source: G20 Climate and Environment

Fundación Huellas para un Futuro, manager of the Aponapó Reserve, participated in the C20 Environment, Climate and Energy Working Group's Face-to-Face Meetings in 2018. Their contributions helped shape the G20 Final Communiqué's policy papers, influencing strategies such as long-term decarbonization, promotion of low-carbon and climate-resilient infrastructure, and enhanced climate finance to support sustainability and the transition to greener economies.

20. Sustainable Development Goals (SDGs)

The initiative at the Aponapó Rainforest Reserve contributes to **14 of the 17 Sustainable Development Goals (SDGs) of the 2030 Agend**a, underscoring its strong importance and relevance for both biodiversity conservation and sustainable development.
The only goals that do not fully apply are:

- **SDG 7 – Affordable and Clean Energy**, as renewable energy implementation (solar panels) is still in planning stages.
- **SDG 14 – Life Below Water**, although there is indirect contribution through watershed protection and runoff reduction.
- **SDG 16 – Peace, Justice, and Strong Institutions**, where partial alignment exists through participatory governance and environmental rights promotion.

Among all contributions, the initiative places **special emphasis on three fundamental goals** that are critical for achieving lasting environmental and community impact:

- **SDG 12 – Responsible Consumption and Production**

  The productive activities within the Aponapó Rainforest Reserve, managed by Fundación Huellas para un Futuro, serve as a model for community participation and capacity building focused on sustainability. Productive areas include stevia cultivation, pitanga tree plantations, yerba mate crops, and reforestation with *Pinus taeda*. All systems are managed under organic certification (OIA) and follow agroecological practices that promote crop rotation, the use of bio-inputs, and the elimination of agrochemicals. This ensures responsible, sustainable production and safe consumption aligned with the highest international standards of quality and environmental health.

  Example Indicators:

  - Certified organic production area
  - Reduction in agrochemical use
  - Volume of organic products marketed
  - Number of seed production stands

- **SDG 13 – Climate Action**

  The initiative enhances the adaptive capacity of vulnerable communities to climate change by providing skills development and integrating families into formal income-generating programs. Mitigation measures are implemented through REDD+ projects and the National Native Forest Restoration Plan, coordinated by Huellas para un Futuro. The Aponapó Reserve serves as a strategic center for the production and free distribution of native species to local communities, supporting the restoration of degraded areas, the protection of watercourses, and the creation of biological corridors that enhance connectivity

between fragmented forests. These efforts are strengthened by environmental education programs that foster community engagement in conservation and ecosystem restoration.

Example Indicators:

- Number of native species produced
- Number of enrichment activities
- Area of corridors created
- Tons of CO_2 sequestered
- Ecosystem resilience indices

- **SDG 15 – Life on Land**

  The zoning and management of the Aponapó Rainforest Reserve aim to maintain, restore, and conserve ecosystems characteristic of the Atlantic Forest (Selva Paranaense), identified as **High Conservation Value (HCV)** areas. The initiative actively combats poaching, wildlife trafficking, deforestation, and soil degradation, while protecting native animal and plant species listed as threatened on the IUCN Red List. Furthermore, the Reserve has become a center for knowledge generation and dissemination, promoting best practices in biodiversity conservation for the benefit of society at large.

  Example Indicators:

  - Area (ha) of forests restored and protected
  - Number of seedlings produced and planted
  - % increase in ecosystem connectivity
  - Number of enrichment projects
  - Native species monitoring results
  - Number of certified sustainable management initiatives

In addition to its primary focus on **SDGs 12, 13, and 15**, the initiative contributes to the advancement of several other goals:

- **SDG 1 – No Poverty**
  Integration of local communities into sustainable, fair-trade production systems, improving income and empowering youth and women.

Example Indicators:

- Community satisfaction surveys
- % of communities and families integrated into projects
- Number of training sessions and beneficiaries
- Increase in household income
- Number of IRCC certificates under Nagoya
- % of communities registered with IMiBio as raw material providers

- **SDG 2 – Zero Hunger**
  Promotion of sustainable, organic agriculture that enhances food security, nutrition, and reduces agrochemical dependency.

  Example Indicators:
  - Number of farmers trained
  - Increase in certified organic production
  - Reduction in agrochemical use
  - Increase in bio-input use
  - Number of trainings on non-timber forest products

- **SDG 3 – Good Health and Well-being**
  Support for healthier environments through organic farming, forest conservation, and planned water and air quality monitoring.

  Example Indicators:
  - Area (ha) of forest buffers
  - Well-being surveys
  - Water and air quality parameters

- **SDG 4 – Quality Education**
  Delivery of environmental education and training on biodiversity management, agroecology, and conservation practices.

  Example Indicators:
  - Number of workshops/courses held
  - Number of beneficiaries (by age group)
  - Number of agreements with educational institutions
  - Number of actors and sectors trained

- Number of studies/publications

- **SDG 5 – Gender Equality**
  Promotion of women's leadership and income generation through productive activities and cooperative participation.

  Example Indicators:
  - Female participation ratio
  - Number of women-focused trainings
  - % of women in leadership roles
  - Increase in women's income opportunities

- **SDG 6 – Clean Water and Sanitation**
  Protection of water sources through the establishment of forest buffers and community water monitoring initiatives.

  Example Indicators:
  - Area (ha) of buffer zones
  - Community participation level
  - Number of water analyses

- **SDG 8 – Decent Work and Economic Growth**
  Job creation and income diversification through sustainable production initiatives and conservation activities.

  Example Indicators:
  - Number of jobs created
  - Community income growth rate
  - Number of productive plots
  - Number of new enterprises

- **SDG 9 – Industry, Innovation, and Infrastructure**
  Use of innovative technologies for biodiversity monitoring and support of scientific research infrastructure.

  Example Indicators:
  - Number of technologies implemented
  - Number of strategic technology alliances

- System maintenance/update frequency
- Number of publications generated
- Number of researchers using facilities

- **SDG 10 – Reduced Inequalities**
  Support for vulnerable groups through FPIC processes and fair benefit-sharing mechanisms.

  Example Indicators:
  - Documented FPIC processes
  - Number of initiatives for vulnerable groups
  - % of families integrated into YEVIA under fair trade principles

- **SDG 11 – Sustainable Cities and Communities**
  Promotion of sustainable community development by integrating conservation, education, and economic initiatives.

  Example Indicators:
  - Number of ecotourism and educational activities
  - Area (ha) of ecosystems restored

- **SDG 17 – Partnerships for the Goals**
  Strengthening of cross-sectoral partnerships, alliances, and co-financing initiatives involving diverse stakeholders.

  Example Indicators:
  - Number of alliances and collaborations
  - Amount of co-financing secured
  - Number of actors/sectors involved
  - Frequency/quality of collaboration forums

21. Sustainable Development Safeguards (SDSs)

The initiative addresses a wide range of risks, including those related to land use, water resources, biodiversity, climate change, labor conditions, gender equality, economic impacts, land acquisition and involuntary resettlement, Indigenous Peoples, cultural heritage, community health and safety, and corruption. It fully complies with the **Sustainable Development Safeguards (SDSs)** by systematically identifying, assessing,

and mitigating potential environmental and socio-economic risks throughout its conservation activities. Specific criteria and indicators, aligned with Section 10.12 of the BBS Methodology, have been established to ensure the integration of safeguards across all phases of planning, implementation, and monitoring.

The initiative is also fully consistent with the **REDD+ Cancun Safeguards** *(Decision 1/CP.16)*, as recognized under the UNFCCC. It promotes and upholds the following principles:

- *Ensuring complementarity with national forest programs and international agreements (Safeguard A);*
- *Strengthening transparency and effectiveness in national forest governance structures (Safeguard B);*
- *Respecting the knowledge and rights of Indigenous Peoples and local communities (Safeguard C);*
- *Guaranteeing full and effective stakeholder participation (Safeguard D);*
- *Promoting the conservation of natural forests and biodiversity, and avoiding the conversion of natural forests (Safeguard E);*
- *Implementing measures to address the risks of reversals (Safeguard F); and*
- *Reducing the risk of emissions displacement (Safeguard G).*
  (Source: Huellas para un Futuro – Safeguards)

By adhering to both the SDSs framework and the REDD+ Cancun Safeguards, the initiative ensures that its conservation activities maximize environmental and social benefits, minimize risks, and contribute to sustainable, equitable, and resilient outcomes.

22. Climate change adaptation

The development of a climate change adaptation plan, directly linked to biodiversity conservation actions, is currently in progress. This plan will include impact and climate risk assessments, quantification of impacts, and the definition of adaptation strategies in accordance with **Section 10.13 of the BBS Methodology**.

23. Other certification criteria

High Conservation Values (HCVs) in the Aponapó Reserve

The concept of High Conservation Value (HCV) was first defined by the Forest Stewardship Council (FSC) in its 1996 Principles and Criteria and has since been expanded under the guidelines of the High Conservation Value Network (HCVN).

High Conservation Value	**Description**	**High Conservation Values (HCVs) in the Aponapó Rainforest Reserve**
HCV 1 – Species Diversity	Areas with significant concentrations of biodiversity containing endemic species, rare, threatened, or endangered species, important at global, regional, or national scales.	The Aponapó Reserve hosts exceptional biological diversity, including several IUCN Red List species such as (CR), *Aspidosperma polyneuron* (EN), *Balfourodendron riedelianum* (EN), *Myrcianthes pungens* (EN), *Cedrela fissilis* (VU), and *Ilex paraguariensis* (NT). Extensive documentation through the iNaturalist Argentina database supports the richness and ecological importance of the Reserve.
HCV 2 – Landscape-level ecosystems and mosaics	Large, landscape-scale ecosystems or mosaics significant at global, regional, or national levels, maintaining viable populations of most naturally occurring species.	The Reserve is part of the Green Corridor and the buffer zone of the Yabotí Biosphere Reserve, contributing to large-scale connectivity critical for species like the jaguar *(Panthera onca)*, ensuring genetic flow and long-term species viability.

HCV 3 – Ecosystems and habitats	Rare, threatened, or endangered ecosystems, habitats, or refugia.	The Reserve protects rare environments such as tree fern forests *(Alsophila setosa)*, upland wetlands rich in orchids and bromeliads, gallery forests, and wetland-protecting forests with key species like the century-old lapacho. These ecosystems serve as critical refuges for native fauna and flora.
HCV 4 – Ecosystem Services	Ecosystem services critical in fragile situations, such as watershed protection and soil erosion control.	By implementing the **FSC Ecosystem Services Procedure (ES PRO)**, the Reserve safeguards biodiversity, carbon storage, watershed services, soil conservation, and provides recreational and cultural services. Traditional knowledge is protected through the application of the Nagoya Protocol on Access and Benefit-Sharing (ABS).
HCV 5 – Community Needs	Sites and resources essential for satisfying the basic needs of local communities or Indigenous groups.	The Reserve provides high-quality water, protects soil and natural resources, supports sustainable non-timber forest product (NTFP) use, and strengthens food and nutritional security, contributing directly to the well-being of local and Indigenous communities.

HCV 6 – Cultural Values	Sites, resources, habitats, and landscapes of global or national cultural, historical, or archaeological significance, or of local cultural, ecological, economic, or religious importance.	The Reserve conserves cultural heritage through the protection of species and landscapes critical to Indigenous practices, such as *Philodendron bipinnatifidum*, *Enterolobium contortisiliquum*, and the traditional use of "tacuara" bamboo[1]. These efforts are reinforced through the application of the Nagoya Protocol to maintain ancestral knowledge and cultural identity.

Alignment of the Initiative with the Kunming-Montreal Global Biodiversity Framework

The conservation initiative at the Aponapó Rainforest Reserve aligns comprehensively with the **Kunming-Montreal Global Biodiversity Framework**, contributing directly to its Vision, Mission, and several core Targets.

The **Vision for 2050** envisions *a world living in harmony with nature, where biodiversity is valued, conserved, restored, and wisely used, maintaining ecosystem services, sustaining a healthy planet, and delivering essential benefits to all people.*

The Aponapó Reserve represents a replicable case study of a Nature-based Solution, recognized by the **UN's Equator Initiative** and **Nature for Life**, integrating three critical dimensions: preservation of critical habitats and endangered species, ecological restoration through the recovery of degraded areas and reforestation, and the sustainable use of biodiversity through agroecological practices and responsible management of

[1] *Guaraní Art Workshops were held at the Aponapó Rainforest Reserve (link 1, link 2). These workshops offered training sessions and organized visits for artisans and tourists interested in discovering and developing the traditional crafts of basket weaving and wood carving. The process began with the collection and preparation of raw materials—primarily Guadua trinii (tacuara bamboo) and various roots from epiphytic species. Under the guidance of the community chief (cacique), participants ventured into the forest, where they engaged in an environmental education experience that also introduced them to the Guaraní worldview. The chief identified culturally significant species, collected samples, and demonstrated the preparation techniques for the raw materials, laying the foundation for the artistic work. Throughout the 48 to 72-hour workshops, a direct teacher-student relationship developed between the chief and the participants. Upon completing the artistic sessions, participants visited the Pindó Poty village to interact with the community and gain firsthand insight into their way of life.*

genetic resources. Its triple-impact approach effectively addresses **14 of the 17 SDGs** and reflects the principles outlined in the 2050 Vision.

Aligned with the **Mission for 2030**, the initiative adopts urgent and integrated measures to halt and reverse biodiversity loss. Through the preservation of critical habitats, the ecological restoration of degraded areas with native and transitional species (Pinus taeda), and the recovery of ecosystem functions, the initiative sets nature on a path toward recovery. It also promotes the sustainable use of biodiversity via agroecological practices and the application of the Nagoya Protocol, ensuring fair and equitable benefit-sharing with Indigenous and local communities. Investments in monitoring technologies and capacity building further enhance the effectiveness and replicability of these strategies.

In relation to **Target A** *(Ecosystems and Threatened Species)*, the Reserve's conservation strategies aim to maintain, enhance, and restore the integrity, connectivity, and resilience of ecosystems. Restoration efforts, the creation of ecological corridors, and the protection of critical habitats have significantly expanded natural ecosystems, contributing to the prevention of threatened species extinction and the recovery of native species populations to healthy and resilient levels.

Regarding **Target B** *(Sustainable Use of Biodiversity)*, the initiative promotes sustainable agriculture through the agroecological production of crops such as stevia, pitanga, and yerba mate, reducing dependency on chemical inputs and encouraging the responsible use of non-timber forest products (NTFPs).

The initiative strongly supports **Target C** (*Fair and Equitable Benefit-Sharing)* through the application of the Nagoya Protocol, ensuring that both monetary and non-monetary benefits derived from the use of genetic resources are shared fairly with local and Indigenous communities. Registration of communities as genetic resource providers through IMIBIO, the establishment of benefit-sharing agreements, and the protection of traditional knowledge reinforce this commitment, directly contributing to the sustainable use and conservation of biodiversity.

Finally, the initiative advances **Target D** *(Means of Implementation)* by securing diversified financial resources, including self-financing, national government support, international cooperation (such as UNDP projects), and private sector partnerships (e.g., Novachem/Evonik). Continuous capacity building through workshops, technical training, and knowledge exchanges, along with scientific and technical cooperation agreements,

ensures the initiative's long-term sustainability and aligns financing flows with the 2050 Vision.

Through this comprehensive alignment, the Aponapó Rainforest Reserve not only contributes meaningfully to the Kunming-Montreal Framework but also demonstrates a replicable model for integrated conservation, restoration, sustainable use, and equitable benefit-sharing for current and future generations.