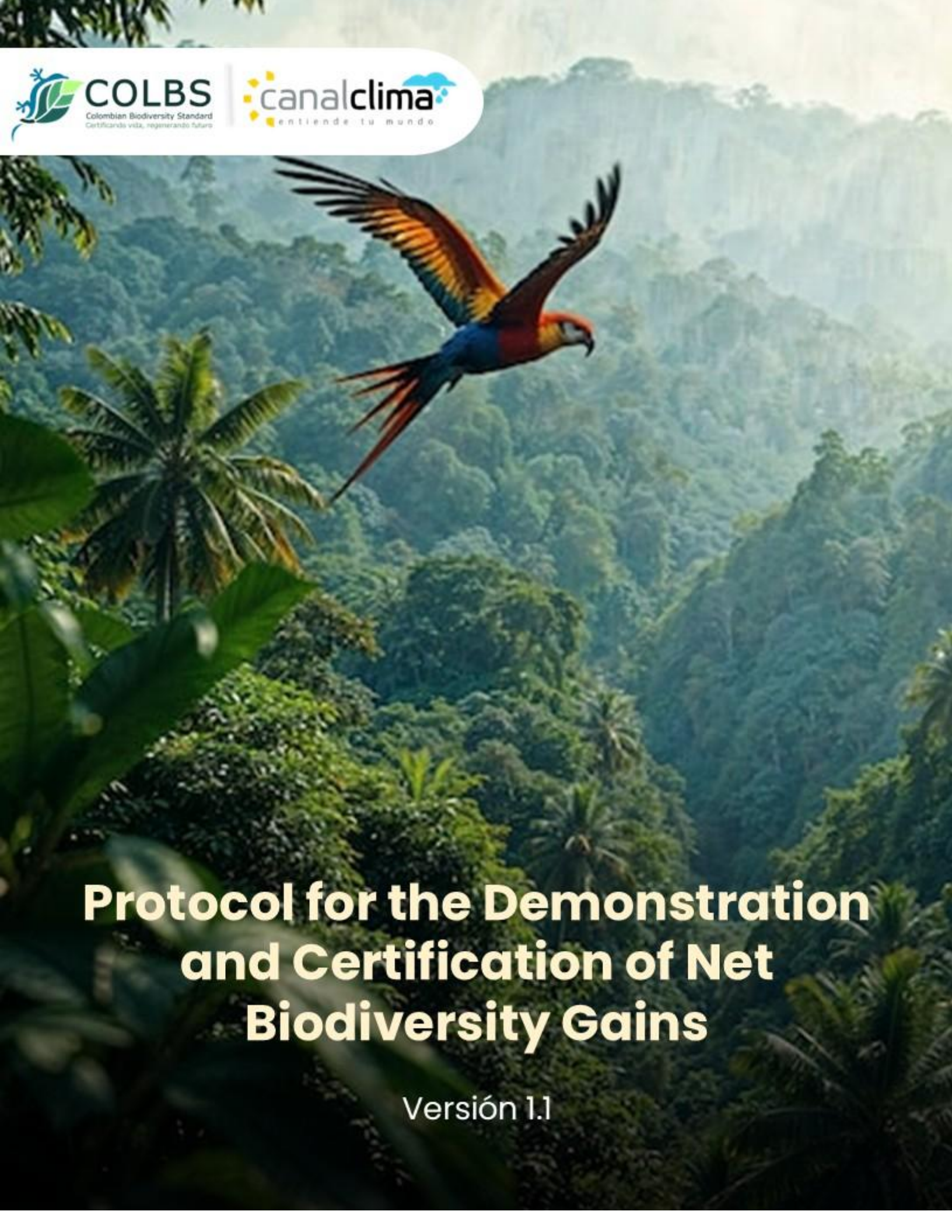

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Protocol for the Demonstration and Certification of Net Biodiversity Gains

Versión 1.1

Protocol for the Demonstration and Certification of Net Biodiversity Gains

Version 1.1

Cover letter

To whom it may concern:

This Protocol is an innovative tool that integrates scientific rigor with the financial viability of conservation projects. Its purpose is to provide developers and financiers with a clear, verifiable, and adaptable technical framework that allows for the measurement, reporting, and certification of positive biodiversity outcomes in a standardized and transparent manner.

This protocol was designed to connect ecological science with investment and compensation mechanisms, offering a practical route for structuring projects that generate environmental, social, and economic value, allowing public and private actors to access emerging biodiversity markets, strengthen their sustainability strategies, and demonstrate, with quantitative evidence, their contribution to ecosystem conservation.

Based on the Ecosystem Condition Index (ICE%)—a robust and replicable metric—the protocol provides a unique methodology for quantifying net biodiversity gains, applicable across multiple geographic contexts, from local restoration initiatives to international green finance programs. It also allows for adaptation to the specific needs of each developer or investor, while ensuring traceability, additionality, and the permanence of outcomes.

Aligned with the Kunming-Montreal Global Biodiversity Framework, the United Nations Sustainable Development Goals (SDGs), and leading environmental reporting and management frameworks such as Taskforce on Nature-related Financial Disclosures (TNFD), Science Based Targets Network (SBTN), and Global Reporting Initiative (GRI 101), among others, this protocol positions itself as a benchmark standard for projects seeking to generate measurable, verifiable, and financeable impacts on nature.

Beyond its technical function, this document represents a pathway of opportunity: to channel resources toward actions that genuinely restore, conserve, and enhance biodiversity. ***Canal Clima*** *makes this protocol available to governments, communities, companies, and international organizations as a tool to drive the transition toward a regenerative and resilient economy, where protecting biodiversity is also a strategic investment decision.*

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Acronyms and Abbreviations

ANLA	National Environmental Licensing Authority (Colombia)
CAR	Regional Autonomous Corporation (Colombia)
FPIC	Free, Prior and Informed Consent
CBD	Convention on Biological Diversity
CTL	Certificate of Title and Encumbrance
DBBSE	Directorate of Forests, Biodiversity and Ecosystem Services
BID	Biodiversity Initiative Document
FIA	Aggregate Importance Factor
FMe	Ecosystem Threat Factor
FMs / FMS	Strategic Significance Factor
GBU	Canal Clima Biodiversity Gain Certificate
NBG	Net Biodiversity Gains
ICE	Ecosystem Condition Index
IDEAM	Institute of Hydrology, Meteorology and Environmental Studies (Colombia)
IIC	Integral Connectivity Index
IPBES	Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services
CAB	Conformity Assessment Body
IPLC	Indigenous Peoples and Local Communities
REAA	Unified Registry of Ecosystems and Environmental Areas (Colombia)
SBTN	Science Based Targets for Nature
SINA	National Environmental System
TAC	Annual Stewardship Rate
TNFD	Taskforce on Nature-related Financial Disclosures
UNDRIP	United Nations Declaration on the Rights of Indigenous Peoples

Glossary

Binding Agreement: A legal document signed by two or more parties that formally establishes commitments, rights, obligations, timelines, and conditions for carrying out specific activities related to the biodiversity initiative.

Additionality: A principle that ensures the benefits generated by a conservation or restoration project would not have occurred in the absence of its implementation.

Habitat Bank: Private or public areas managed due to their high natural resource value. In return for the protection, management, and permanent monitoring of the area, the Habitat Bank operator may establish agreements with third parties holding environmental obligations to meet their legal requirements and compensate environmental impacts from development projects. Habitat Banks operate under a results-based payment scheme, where upfront investments generate measurable and quantifiable conservation outcomes[1].

Biodiversity: The variety of life forms on Earth, including genetic diversity, species diversity, and ecosystem diversity.

Biodiversity Certificate (CB)[2]: Also known in the market as biodiversity credits, "a certificate represents a measured and evidence-based unit of a positive biodiversity outcome that is durable and additional to what would otherwise have occurred".

Landscape Connectivity: An ecological attribute that assesses the spatial continuity of habitat among ecosystems, facilitating species movement and ecological persistence.

Performance Contract: Within Habitat Banks, a formal agreement between the project developer and the financing entity or purchaser of results, in which payments or disbursements are conditioned upon the verifiable achievement of previously established targets, indicators, or performance levels.

Complementarity: A condition ensuring that the area proposed for a Habitat Bank is aligned with current environmental planning and management instruments within the territory (such as Land Use Plans, watershed management plans, protected area

[1] In the case of Colombia: Ministry of Environment and Sustainable Development. (2017, June 5). Resolution 1051 of 2017: Regulating Habitat Banks established in Title 9, Part 2, Book 2, Chapter 3 of Decree 1076 of 2015, and adopting other provisions. Official Gazette No. 50,276.

[2] Biodiversity Credit Alliance. (2024). Definition of a Biodiversity Credit. https://www.biodiversitycreditalliance.org/wp-content/uploads/2024/05/Definition-of-a-Biodiversity-Credit-Rev-220524.pdf

management plans, among others) and effectively contributes to national or regional conservation priorities.

Quota: The tradable biodiversity unit within the regulated Colombian market, representing one (1) hectare of an ecosystem that has been conserved, rehabilitated, recovered, or restored. A quota may be sold only once during the operational lifetime of the Habitat Bank.

Registration Document: Official document compiling the essential and baseline information of a biodiversity initiative for its inscription in the corresponding registry system (Canal Clima or REAA, each with a distinct format).

Improvement Approach: A project type aimed at increasing ecosystem value (progressively improving the Ecosystem Condition Index – ECI) from a degraded baseline, typically through restoration.

Stewardship Approach: A project focused on maintaining the ecological condition of well-conserved ecosystems, particularly those under ongoing threat.

Native Species: A species whose natural distribution includes the host country's territory; a locally native species refers to one inherent to the ecosystem where the project is implemented, at regional or subregional scales [3].

Aggregated Importance Factor (AIF): A multiplier that adjusts the quantity of certificates generated based on the ecosystem's threat level and strategic conservation priority.

ECI (Ecosystem Condition Index): A composite metric that measures ecosystem health through attributes such as structure, composition, function, and connectivity.

Net Biodiversity Gain (NBG): A development approach under which a project must generate a measurable increase in biodiversity compared to its pre-development state, with the objective of leaving the natural environment in better condition.

Ecological Restoration (ER): The process of initiating or accelerating the recovery of a degraded area so that it regains its original function, structure, and composition. The objective is to return the ecosystem to a condition similar to that prior to disturbance.

[3] For Colombia, the Ecosystem Classification System of Colombia developed by IDEAM may be used: IDEAM (Institute of Hydrology, Meteorology and Environmental Studies); Alexander von Humboldt Institute; Ministry of Environment and Sustainable Development.(2017Map of continental, coastal, and marine ecosystems of Colombia: scale 1:100,000. Bogotá, D.C., Colombia.

Rehabilitation (REH): Aims to restore ecosystem productivity and/or services, focusing on functional or structural attributes. The result may or may not resemble the original ecosystem but must be self-sustaining and preserve certain species and services.

Recovery or Reclamation (REC): Seeks to restore utility to an area so that it can provide environmental services that may differ from those of the original ecosystem, reintegrating it into the landscape.

TAC (Annual Stewardship Rate): A constant parameter recognizing the annual stewardship of ecosystem condition, preventing biodiversity loss through conservation actions in projects adopting a stewardship approach.

Certified Biodiversity Unit (BCU): The commercial designation of a Biodiversity Certificate (BC) issued under the Canal Clima standard. It is a tradable instrument representing an integrated conservation outcome: verified net biodiversity gain at a site, weighted by the ecosystem's strategic importance and threat level. It enables organizations to voluntarily invest in high-impact nature-positive outcomes.

Third-Party Verification: An independent evaluation ensuring the quality, transparency, and integrity of reported ecological results.

1 INTRODUCTION

The accelerated loss of biodiversity and the degradation of natural ecosystems represent one of the greatest threats to the planet's environmental, social, and economic sustainability. According to the 2019 Global Assessment Report on Biodiversity and Ecosystem Services of IPBES[4], approximately one million animal and plant species are currently at risk of extinction, underscoring the urgent need for action to reverse this trend. Since the adoption of the Convention on Biological Diversity (CBD) in 1992, the international community has warned about the increasing impacts of land-use change, resource overexploitation, pollution, and climate change on global biodiversity.

Various analyses agree that the global biodiversity financing gap ranges between USD 700 billion and USD 1 trillion annually[5]. Closing this gap requires the development of innovative financial instruments capable of mobilizing resources from public, private, and international cooperation sectors.

In this context, instruments such as protected areas, conservation easements, private nature reserves, and, more recently, habitat banks have emerged as effective mechanisms to halt biodiversity loss, restore degraded ecosystems, and generate co-benefits, including ecosystem service provision, green job creation, and improved community well-being[6]. When properly designed, implemented, and supported both technically and financially, these instruments can significantly contribute to the ecological sustainability of high environmental value areas.

In line with international trends, new mechanisms have emerged to incentivize conservation, restoration, and the sustainable use of biodiversity. Among these emerging instruments, biodiversity certificates and other certification schemes based on measurable conservation outcomes stand out. These mechanisms enable the demonstration of net biodiversity gains in a quantifiable and verifiable manner, opening access to voluntary financing and encouraging companies not only to compensate for impacts, but also to generate positive outcomes for nature (*nature positive*[7]). The consolidation of these schemes requires clear and verifiable technical protocols that guarantee traceability, transparency, and integrity of achieved results.

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[4] IPBES (2019). Global Assessment Report on Biodiversity and Ecosystem Services. Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services.

[5] Deutz, A., Heal, G., Niu, R., Swanson, E., Townshend, T., Li, Z., et al. (2020). Financing Nature: Closing the Global Biodiversity Financing Gap. The Paulson Institute, The Nature Conservancy, and the Cornell Atkinson Center for Sustainability.

[6] Bull, J. W., Suttle, K. B., Gordon, A., Singh, N. J., & Milner-Gulland, E. J. (2013). Biodiversity offsets in theory and practice. Oryx, 47(3), 369–380.

[7] "Nature positive" means ensuring that there is more nature in the world in 2030 than in 2020, with continued recovery thereafter. Sourcehttps://www.naturepositive.org/app/uploads/2024/02/The-Definition-of-Nature-Positive.pdf

In response to this need, Canal Clima develops this document with the purpose of establishing a framework to:

i. Enable the monitoring, verification, and certification of conservation, restoration, and sustainable use initiatives under voluntary or mixed schemes, facilitating certificate commercialization and the mobilization of financial resources from diverse sources; and
ii. Provide methodological guidance for biodiversity quantification in compensation projects (Habitat Banks) integrated into Colombian regulation.

The development of projects under this protocol directly contributes to the achievement of Targets 1, 2, 3, 5, 14, and especially Target 19 of the Kunming-Montreal Global Biodiversity Framework, which calls for mobilizing at least USD 200 billion annually by 2030 from public and private sources [8].

Implementation Pathways of the Protocol

The protocol establishes three pathways for its implementation, which may be adopted independently or in combination by project developer (Table 1, Figure 1). All three pathways share a single quantification methodology, enabling standardized measurement and verification of Net Biodiversity Gains, regardless of the operational approach or the type of financial incentive involved:

- Pathway 1 – Voluntary Biodiversity Certificates: Designed for voluntary initiatives that generate tradable certificates based on verifiable improvements in biodiversity (Section 4).

- Pathway 2 – Habitat Banks: Designed for projects that provide compensatory measures under long-term schemes, meeting specific regulatory and financial requirements (Section 5).

- Pathway 3 – Mixed Projects: Recognizes that a single project may integrate both mandatory and voluntary actions, provided that ecological and financial sustainability of the intervened area is ensured, double counting is avoided, and the areas re independent and properly georeferenced at the time of commercialization (Section 6).

[8] Convention on Biological Diversity (2022). Kunming-Montreal Global Biodiversity Framework (Target 19). https://www.cbd.int/gbf.

Overview and Potential of Biodiversity Certificates

The biodiversity certificate market has scaled rapidly since 2020, driven by the global urgency to address the nature loss crisis and the advancement of the "nature-positive" agenda. Market actors consider it realistic that these instruments will mature and contribute to achieving the 2030 targets of the Kunming-Montreal Global Biodiversity Framework (GBF). Data collected through mid-2024 indicates that the total estimated value of biodiversity credits sold to date ranges between USD 325,000 and USD 1,870,000[9]. These sales have financed positive biodiversity activities or outcomes covering approximately 26,000 to 125,000 hectares globally.

In terms of demand, multinational corporations, financial institutions, and small and medium-sized enterprises (SMEs) are perceived as the main sources of interest. The primary demand driver is brand positioning and marketing, followed by the mitigation of nature-related risks (physical, transition, and/or systemic).

Recently, the European Commission issued a communication in July 2025[10] establishing the "Roadmap towards Nature Credits," underscoring a globally referential regulatory commitment aimed at promoting high-integrity tools and preventing greenwashing[11], double counting, and lack of transparency.

Projections indicate that under an "effective development" scenario, global demand could reach USD 2 billion annually by 2030, positioning nature certificates as a potentially key instrument for mobilizing private finance and helping close the biodiversity financing gap[12], particularly in Latin America, currently considered a hub for the development of biodiversity credit schemes and projects, driven by specific geographic and institutional factors. Pioneer countries include Colombia, Brazil, and Mexico[13].

Alignment and Contribution of the Protocol to Global Sustainability Frameworks

This protocol constitutes a measurement and certification tool that connects local conservation action with global sustainability commitments. Its focus on Net Biodiversity Gain (NBG), through the Ecosystem Condition Index (ICE%), provides a scientifically verifiable foundation for quantifying positive outcomes for nature, in coherence with the Biodiversity Credit Alliance (BCA) and the targets of the Kunming-Montreal Global Biodiversity Framework (GBF).

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[9] Pollination. (2024, September). State of voluntary biodiversity credit markets: Current supply & demand dynamics. Pollination Foundation & Marsden Jacob Associates.

[10] European Commission. (2025, July 7). Roadmap towards Nature Credits. https://eur-lex.europa.eu/legal-content/ES/TXT/?uri=CELEX:52025DC0374

[11] Greenwashing refers to the practice by which companies present themselves as more environmentally responsible than they actually are, with the objective of improving their public image and attracting environmentally conscious consumers, often while concealing more harmful practices.

[12] World Economic Forum. (2023, December). Biodiversity credits: Demand analysis and market outlook. In collaboration with McKinsey & Company. https://www3.weforum.org/docs/WEF_2023_Biodiversity_Credits_Demand_Analysis_and_Market_Outlook.pdf

[13] Croci, E., Lucchitta, B., & Cusa, M. (2025). Biodiversity credits schemes: A comparative analysis. Journal of Cleaner Production, 523, 146382. https://www.sciencedirect.com/science/article/pii/S0959652625017329

In addition, it generates standardized, verifiable, and georeferenced information that enables organizations to comply with international disclosure and reporting frameworks, such as the Taskforce on Nature-related Financial Disclosures (TNFD)[14] and the Global Reporting Initiative (GRI 101: Biodiversity 2024)[15]. Through the ICE%, the protocol delivers metrics on ecosystem condition and changes over time, strengthening compliance with the "Metrics and Targets" pillar of TNFD, the LEAP approach (Locate, Evaluate, Assess, Prepare), and disclosures 101-7 and 101-9 of GRI, which require reporting on ecological condition, impact management, and application of the mitigation hierarchy.

In the field of risk management and environmental performance, the protocol aligns with IFC Performance Standard 6 and the Science Based Targets Network (SBTN) by promoting quantifiable and traceable conservation outcomes under the AR3T framework (Avoid, Reduce, Regenerate, Restore, and Transform). Its Monitoring, Reporting, and Verification (MRV) structure, combined with independent third-party verification, ensures the integrity of ecological and financial data, guaranteeing that certified projects may be recognized within global accountability systems, sustainable finance mechanisms, and high-integrity biodiversity credit markets.

Table 1. Comparison of the Protocol Implementation Pathways

Stages / Pathway	Pathway 1. Voluntary Biodiversity Certificates	Mixed Projects	Pathway 2: Habitat Banks
1. Financing	Financed by individuals or legal entities, public or private, that wish to make a voluntary financial contribution to the protection of biodiversity in vulnerable areas	A viable option when not all hectares are committed under compensation obligations within a Habitat Bank. May receive blended financing	Primarily financed by organizations with environmental compensation obligations or mandatory 1% environmental investment requirements. However, it may also receive blended financing (international cooperation, public-private sector, philanthropic funds)
2. Project Preparation and Design	Project Preparation and Design	Identification of areas designated for compensation and/or voluntary financing.	Identification of areas and analysis of compensation supply and demand
3. Registration Application	Submission of the Project Registration Document (RD) to Canal Clima		Submission to the Ministry of Environment
4. Preparation of Documentation for Registration	Development of the Biodiversity Initiative Document (BID) and baseline	Technical, Financial, and Legal Design of Pathway 1 serves as input for drafting the BID	Technical, Financial, and Legal Design in accordance with Article 4 of Resolution 1051 of 2017
4.1. Baseline Establishment	Baseline establishment applying the Net Biodiversity Gain (NBG) protocol (quantification chapter), compatible with national regulation		

[14] TNFD. (2023, septiembre). Recomendaciones del Grupo de Trabajo sobre Divulgaciones Financieras Relacionadas con la Naturaleza.
[15] Global Reporting Initiative (GRI). (2024). GRI 101: Biodiversity 2024. Stichting Global Reporting Initiative.

Stages / Pathway	Pathway 1. Voluntary Biodiversity Certificates	Mixed Projects	Pathway 2: Habitat Banks
5. Submission to the Authority	Submission of the BID to Canal Clima and referral for third party validation	Submission of the registration request to the Ministry of Environment and third-party validation of the BID through Canal Clima	Submission of the registration document to the Ministry of Environment
6. Verification and Approval	Project registration in the Registration System	Registration of the project as a Habitat Bank in the REAA and, once obtained, registration in the platform for voluntary certificates	Verification and approval by the Ministry of Environment (Habitat Bank registration) in the REAA
7. Release of Quotas	Not applicable	Release of quotas (hectares for compensation) – voluntary component not applicable	Release of quotas (hectares for compensation)
8. Implementation	Implementation of project activities	Implementation of the Management Plan, which serves as input to the Monitoring Plan for Canal Clima	Implementation of the Management Plan
9. Monitoring and Verification	First biodiversity monitoring under the Canal Clima protocol (NBG quantification section)		
10. Verification	Third-party verification and audit of results		
11. Monitoring Report	Preparation of a Monitoring Report with results of the Management Plan and/or monitoring activities		
	Submission of the Monitoring Report to Canal Clima	Submission of the annual report to the Ministry of Environment and Monitoring Report to Canal Clima (Mixed Projects)	Submission of the annual report to the Ministry of Environment
12. Certification	Issuance of voluntary certificates by Canal Clima	Issuance of voluntary certificates by Canal Clima	Not applicable
13. Commercialization	Commercialization of voluntary certificates through the Registration Platform	Commercialization of voluntary certificates through the Registration Platform	Quotas are commercialized according to client needs.

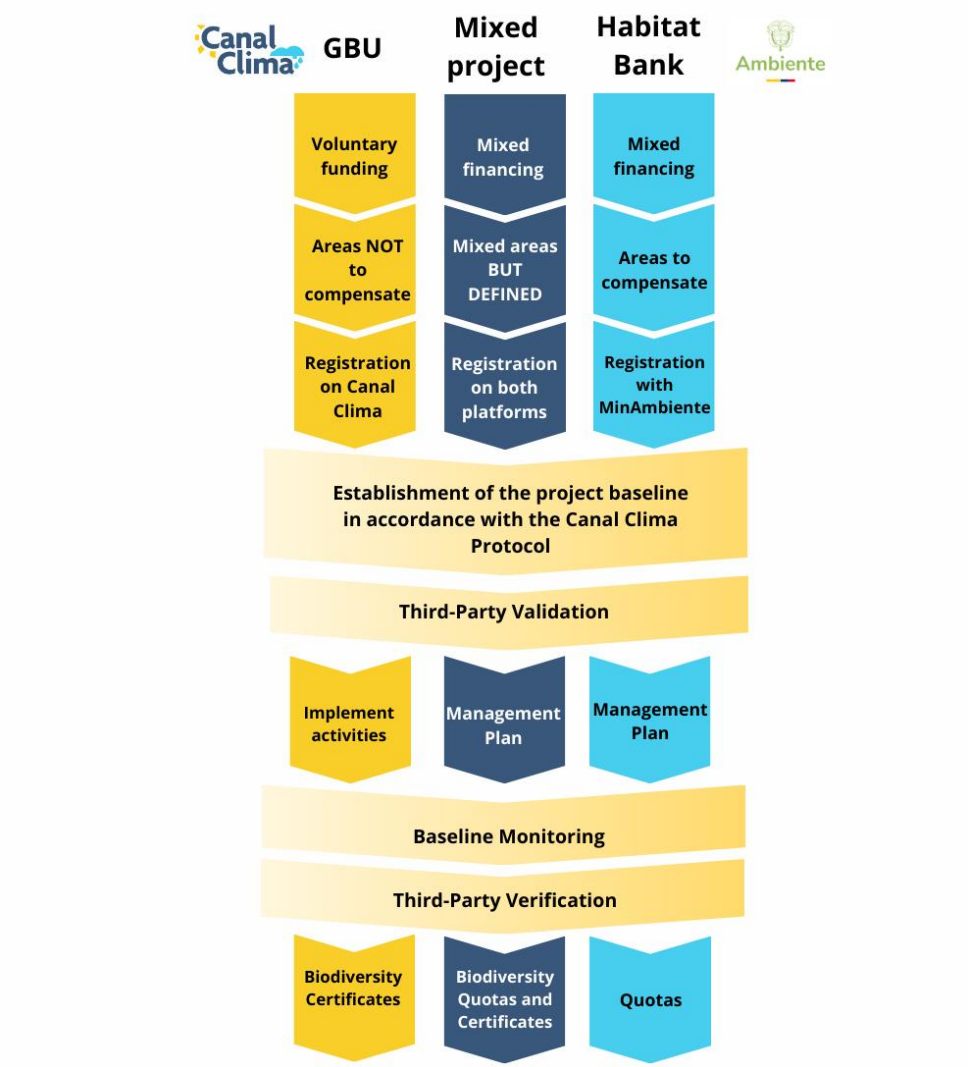

Figure 1. Summary flowchart comparing the implementation pathways: Habitat Banks, Mixed Projects, and GBU.

2 GENERAL CONSIDERATIONS OF THE PROTOCOL

2.1 Objective

To establish the technical, methodological, and procedural guidelines that must be met by projects seeking certification as initiatives demonstrating Net Biodiversity Gains.

This protocol has the following specific purposes:

- Standardizing the process for quantifying biodiversity gains using a robust, replicable, and adaptable methodology applicable to diverse ecosystems.
- Guide the registration and development of Habitat Banks, as well as serve as a basis for quantifying Net Biodiversity Gains throughout the bank's lifecycle.

- Define eligibility, application, verification, and certification criteria for voluntary Biodiversity Certificates issued by Canal Clima.
- Promote the generation of measurable, permanent, and traceable results in terms of conservation, ecological restoration, and territorial governance.
- Facilitate access to national and international financial incentives through the certification of Net Biodiversity Gains.

2.2 Scope

This protocol applies to any public, private, or mixed initiative seeking certification as a generator of Net Biodiversity Gains, under the two possible implementation pathways (regulated and voluntary), and is applicable to:

- International and national initiatives (for the voluntary pathway), and Colombia (for the regulated pathway), that seek to demonstrate Net Biodiversity Gains through conservation, restoration, and/or sustainable use of natural resources.
- Various ecosystem types, including terrestrial and coastal-marine ecosystems, with the possibility of adaptation through technical modules[16].
- Conservation, ecological restoration, and/or sustainable use projects that are either mandatory (compensation-based) or voluntary in nature.

It is intended for:

- Project developers (local communities, NGOs, private organizations, and public institutions).
- Third-party verifiers, technical consultants, and certifiers.
- Investors, financiers, and institutions interested in biodiversity outcomes.

Note: The formulation of this protocol is based on an exhaustive technical and regulatory review. The main legal, technical, and scientific references used in its development are available in the annexes (Annex 1, Annex 2).

[16] Modular adaptation means that the overall methodology remains the same, but certain components—such as indicators, sampling techniques, evaluation criteria, or formulas—may be adjusted according to the ecosystem type and the specific characteristics of the project.

3 GENERALITIES FOR BIODIVERSITY INITIATIVES

The following general aspects must be considered under any of the operational pathways intended for the quantification of Net Biodiversity Gains.

3.1 Eligibility Criteria

For an area or project to be considered eligible under this Protocol, whether as a Habitat Bank or as a voluntary initiative, it must comply with a set of technical, legal, ecological, and financial criteria:

- **Land Tenure and Access to the Territory**: The effectiveness and sustainability of any conservation strategy—whether as a biodiversity loss compensation measure or for the generation of voluntary certificates—depend on legal certainty over the properties where actions will be implemented. Both permanence and additionality, two fundamental principles of environmental compensation in Colombia[17], can only be guaranteed when there is clear, unequivocal, and conflict-free land ownership.

Therefore, developers are required to:

  - Conduct a title study and cadastral status review of the properties proposed for inclusion in the initiative. The diagnostic must include verification and analysis of relevant documents such as the Certificate of Title and Encumbrance (or equivalent), valid public deeds, and cadastral information.
  - Establish long-term binding agreements ensuring the permanence of conservation or restoration actions with the landowners of the areas involved.

- **Area Conditions**:

  - The area may be subject to land-use restrictions or limitations that must be compatible with the conservation objectives of the initiative. This primarily relates to special management areas, protected areas, or land-use restrictions.
  - The area must possess ecological characteristics equivalent to ecosystems potentially impacted by projects generating compensation obligations (for example, projects requiring an environmental license).

[17] Ministry of Environment and Sustainable Development - MADS. (2018). Manual para la Asignación de Compensaciones por Pérdida de Biodiversidad. Resolution 256 del February 22, 2018. Bogotá D.C., Colombia

- The area must demonstrate the capacity to generate biodiversity additionality.

- **Ecological and Biodiversity Criteria**:

  - Interventions must demonstrate tangible, quantifiable, and verifiable improvements in biodiversity[18].
  - They must focus on native species and be oriented toward landscape-scale conservation.
  - Any risk of irreversible biodiversity loss or negative alteration of ecosystem integrity must be avoided.
  - They may not be based on practices that generate ecological or social detriment.
  - They must not involve exploitation or displacement of local communities.

- **Monitoring and Verification Systems**:

  - The initiative must have a transparent, verifiable, and accessible system for permanent monitoring and performance evaluation.
  - It must establish measurable biodiversity attributes, based on reliable and scientifically accepted indicators (Section 6.2.1).

- **Alignment with Conservation Objectives**:

  - Projects must contribute to reducing direct pressures on biodiversity and promote ecosystem conservation in the medium and long term[19].
  - They must fully comply with this Protocol, including all guidelines, requirements, and procedures related to certification and traceability.
  - Initiatives must demonstrate contributions appropriate to their scale and aligned with national goals (National Development Plan, National Biodiversity Strategy) or global frameworks (Kunming-Montreal Global Biodiversity Framework)[20].

[18] Developers are encouraged to formulate initiatives in vulnerable strategic ecosystems such as páramos, wetlands, mangroves, tropical dry forests, floodable savannas, and ecological transition zones, given the high ecological and global relevance of these territories for biodiversity conservation, the water cycle, and climate regulation.

[19] This criterion at the eligibility stage may be addressed through a theoretical review supported by technical and scientific information and may be complemented with maps or spatial analyses when deemed pertinent by the developer.

[20] Canal Clima reserves the right to reject initiatives in areas where the proposed activities are not compatible with environmental regulations or where legal, social, or ecological risks exist.

- **Compatibility with GHG Initiatives**:

    - Biodiversity initiatives may only be registered in areas not eligible under GHG mitigation projects (such as ARR, IFM, REDD+, etc.), to prevent double counting and double benefits within the same area [21]. In this version of the protocol, simultaneous payment for ecosystem services related to carbon and biodiversity within the same surface area is not permitted, unless future market developments or national and international regulations determine otherwise (Spatial Boundaries).

3.2 Participants, Roles, and Responsibilities

The implementation of this Protocol involves multiple actors, both in Habitat Bank projects and in voluntary initiatives. The following describes the key participants within the system, their responsibilities, and, where applicable, the relationships among them.

- **Habitat Bank Operator:** A natural or legal person who registers, operates, and maintains a Habitat Bank before the Ministry of Environment. The operator is responsible for implementing conservation or restoration measures, complying with the mechanism's principles (additionality, permanence, sustainability), and submitting reports to the competent authorities.

  Note: This actor may also act as the project developer if it manages areas intended for the voluntary market.

- **Project Developer**: A natural or legal person responsible for the design, management, and implementation of the biodiversity project. A developer may be a community, NGO, company, consulting firm, or even the operator of a Habitat Bank. Their responsibilities include:
    - Preparing the Biodiversity Initiative Document (BID)
    - Implementing conservation, restoration, and/or sustainable use actions
    - Managing project financing
    - Coordinating technical monitoring
    - Contracting the Third-Party Verifier – Conformity Assessment Body (CAB)
    - Registering the project and certificates with the certifying entity
    - Ensuring the permanence, additionality, and integrity of the initiative across environmental, social, and ecological dimensions

[21] The Evaluation Body (CAB) shall be responsible for conducting a rigorous technical review to ensure that no double counting of environmental benefits occurs.

- **Landowners**: Natural persons, families, associations, or legal entities holding formal ownership title over the property where the project is implemented. They are responsible for guaranteeing legal access to the land and entering into long-term commitments to enable the implementation of project activities.

- **Indigenous Peoples and Local Communities (IPLCs):** Collective actors with presence and rights within the project territory, whether as owners, possessors, or users. Their participation is essential for the ecological, social, and cultural sustainability of projects, particularly in collective territories or areas of significant biocultural value.

- **Certifying Organization – Canal Clima:** The entity responsible for overseeing and certifying the protocol and biodiversity initiatives. Its functions include:
    - Evaluating and updating the protocol and its methodological guidelines
    - Accrediting and supervising Conformity Assessment Bodies (CABs)
    - Reviewing technical reports and issuing decisions regarding project registration and certificate issuance
    - Maintaining and supporting the biodiversity certificate registry platform

- **Third-Party Verifiers – Conformity Assessment Bodies (CABs):** Independent actors accredited to:
    - Validate project documentation and proposed activities
    - Verify reported results through field and desk-based assessments
    - Issue technical validation and verification reports
    - Their determination constitutes a mandatory input for the certifying organization's decision regarding project registration and certificate issuance.

- **Ministry of Environment and Sustainable Development (MinAmbiente):** The Colombian national authority responsible for regulating and registering Habitat Banks, issuing technical guidelines, and overseeing alignment of the mechanism with national environmental policy.

- **Environmental Authorities**: Authorities responsible for evaluating and supervising compliance with environmental obligations (such as biodiversity compensation or the mandatory 1% environmental investment). They verify the implementation of measures carried out through Habitat Banks, although contractual relationships between private parties remain private in nature.

- **Holders of Environmental Obligations**: Legal entities required to comply with biodiversity compensation measures or mandatory environmental investments. These obligations may be channeled through Habitat Banks under performance-based contracts[22].

- **Investors and Financiers**: Actors providing financial resources to the project, either at early stages or throughout implementation. These may include impact funds, corporations, cooperation agencies, development banks, and other stakeholders interested in biodiversity outcomes.

- **Purchasers of Voluntary Biodiversity Certificates**: Entities (companies, governments, NGOs, or individuals) acquiring certificates. Their motivation may be linked to sustainability commitments, positive impact strategies, or biodiversity neutrality goals. Voluntary biodiversity certificates may not be used as a compensation mechanism of any type.

- **Other Actors**: Any person or institution that, without leading the project or holding a direct obligation, wishes to support, co-finance, or participate in its implementation. Their role must be defined on a case-by-case basis and documented accordingly.

3.3 Temporal Boundaries

All initiatives under this Protocol must clearly define their temporal horizons for implementation, monitoring, and duration of results.

- Start Date of the Initiative: The start date is established as the date of formal project registration. For voluntary and mixed pathway initiatives, it corresponds to the date of acceptance within the program's registration system. For Habitat Banks, the start date is the date of incorporation into the Unified Registry of Ecosystems and Environmental Areas (REAA)[23]. The protocol **does not contemplate the retroactive calculation** of Net Biodiversity Gains (NBG) based on ecological indicators from years prior to project registration, due to technical limitations in reconstructing historical conditions with sufficient precision and comparability.

  Note: Although the official start date corresponds to formal registration (Canal Clima or REAA), the protocol recognizes that technical or management activities may have

[22] In other words, the Habitat Bank operator defines and negotiates a unit value per hectare, equivalent to the compensation quota. This value encompasses the costs required to achieve the objective of the environmental compensation proposed by the user, as well as the costs necessary to ensure compliance with established milestones.

[23] The Unified Registry of Ecosystems and Environmental Areas (REAA) is a tool of the Ministry of Environment and Sustainable Development of Colombia, used to implement payments for ecosystem services and other conservation incentives.

been implemented in the project area during preliminary design and formulation phases.

*These **prior activities** may be considered within the baseline or additionality analysis, provided that:*

- *They are clearly documented with verifiable technical evidence (dates, georeferenced locations, activity logs, photographs, reports, etc.).*
- *They do not correspond to prior legal, regulatory, or contractual obligations.*
- *They are not financed through other incentive mechanisms or investment schemes incompatible with voluntary certification.*
- *They are validated by the third-party verifier (CAB) during the initial audit process.*
- *They do not exceed one calendar year prior to acceptance into the corresponding registry.*

- Crediting Period: The Crediting Period is the timeframe during which a verified initiative is eligible to request the issuance of Biodiversity Certificates. Initiatives must propose an initial Crediting Period of no less than 20 years. Upon completion of this period, renewal may be requested up to four (4) times, subject to a comprehensive reevaluation of the project, including: Updating the baseline; and demonstrating that activities continue to meet the additionality requirement.

- Monitoring Frequency: A monitoring event must be conducted at least once per year. To ensure data validity and comparability over time, annual monitoring must be conducted during the same seasonal period and at the same sampling points (Section 8, Section 8.7). The developer shall select the most critical indicators to be monitored in each period; however, at the time of third-party verification, all formulated indicators must have been monitored.

- Verification Frequency: Independent third-party verification must be conducted at least once every three years. The project developer may decide to conduct verification annually or to consolidate up to three consecutive monitoring reports into a single verification event. Certificates may not be issued for periods that have not been satisfactorily verified or for which indicators have not been fully reported.

Note: For Habitat Banks, the duration of the commitment and permanence mechanisms must meet, at minimum, the requirements established by the competent environmental authority for compensation obligations.

3.4 Spatial Boundaries

The project area—whether consisting of a single property or a cluster of contiguous or functionally connected properties[24], must be delineated using geographic coordinates in the CTM 12 system (or the officially applicable coordinate system) for projects in Colombia, or the official system defined by the host country. It must be presented in cartography at a minimum scale of 1:25,000 or higher, with a Minimum Mapping Unit of one (1) hectare.

The location of the initiative must comply with and align with current national planning and territorial land-use instruments (e.g., Land Use Plans – POT, Watershed Management Plans – POMCA) of the host country.

In cases where a Habitat Bank aggregates compensation obligations from multiple projects, the corresponding areas or "quotas" for each individual obligation must be clearly identified and spatially delineated within the bank's records to ensure traceability and prevent double counting. The proponent must provide cartographic documentation in accordance with its territorial context.

The project area designated for the generation of Voluntary Biodiversity Certificates may not overlap with areas being used to fulfill a legal environmental compensation obligation, the mandatory 1% environmental investment requirement, or other regulatory requirements. The proponent must demonstrate that the area is exclusively allocated to the voluntary market, thereby preventing double counting of the same environmental outcome.

3.5 Additionality

Additionality is a guiding principle that ensures that achieved biodiversity outcomes constitute a genuine and direct contribution resulting from the intervention and would not have occurred otherwise. Under this Protocol, additionality is differentiated according to the implementation pathway:

3.5.1 Additionality in Voluntary Biodiversity Certificates

For Voluntary Biodiversity Certificates, it must be ensured that the verified and certified positive biodiversity impacts are a direct and demonstrable consequence of the project's interventions and financing, and that they would not have occurred in their absence[25]. Within this program, additionality must be demonstrated at each verification event, evidencing how existing or emerging barriers are overcome.

For certificate generation, each initiative must present a comprehensive and verifiable additionality argument. This analysis must constitute a dedicated chapter within both

[24] A robust technical justification must be provided demonstrating its functional connectivity.

[25] Biodiversity Credit Alliance. (2024). Definition of a Biodiversity Credit. https://www.biodiversitycreditalliance.org/wp-content/uploads/2024/05/Definition-of-a-Biodiversity-Credit-Rev-220524.pdf

the Biodiversity Initiative Document (BID) and the Monitoring Report (Section 4). It must conclusively demonstrate that project actions:

- They complement and exceed the legal requirements of the region.
- Address and overcome barriers that would otherwise prevent the anticipated biodiversity outcomes.
- Strengthen financial viability and long-term sustainability through revenues derived from biodiversity certificates and access to complementary financing sources, including international cooperation, climate funds, or green investment mechanisms.

The demonstration of additionality shall be constructed through the application of the following interconnected tests, each of which must be thoroughly addressed and documented:

- Regulatory Additionality Test: The project must demonstrate that its activities exceed any applicable legal, regulatory, or contractual requirements. Actions mandated by law, environmental licenses, or judicial rulings are not considered additional and are therefore ineligible for certification.
- Financial and Investment Additionality Analysis: The project must demonstrate that initial and ongoing costs (e.g., inputs, labor, monitoring) require financial support from certificate revenues to ensure long-term maintenance. This analysis must be presented transparently, showing how certificate revenues contribute to the project's financial feasibility and sustainability.
- Barrier Analysis (Non-Financial): The project must identify and document non-financial barriers—such as policy, legal, ecological, or technological constraints—that would prevent biodiversity conservation, restoration, or maintenance in the absence of the intervention. Evidence must clearly demonstrate how the project design, including technical resources and management capacity, directly overcomes these barriers. Examples include:
    - Technical Barriers: Lack of specialized knowledge, absence of appropriate technologies, or inability to implement integrated management practices. The project must also describe the most probable biodiversity loss scenario in the absence of the project, justifying imminent or medium-to-long-term pressures.
    - Institutional or Governance Barriers: Weak governance structures, insecure land tenure, or lack of monitoring and enforcement capacity. The project must demonstrate how certificate-financed actions strengthen site management and governance (e.g., conservation agreements, community surveillance mechanisms, establishment of trust funds).

- Socioeconomic and/or Cultural Barriers: Land-use conflicts, lack of community organization, cultural resistance, or economic dependence on unsustainable activities.

Note: ***Prior activities*** *implemented with voluntary resources may be documented as background or historical contributions; however, they will not generate biodiversity certificates until the verified baseline and monitoring plan have been established. From that point onward, new or strengthened actions—financed through the project and demonstrating additionality or leveraged funding—shall be eligible for certification.*

3.5.2 Additionality for a Habitat Bank

For a Habitat Bank, additionality implies demonstrating that the actions implemented by the Bank provide a new contribution to the preservation, recovery, rehabilitation, and/or restoration of biodiversity because of its management. This means that Habitat Bank interventions must generate demonstrable improvements in the conservation status of biodiversity that would not have been achieved in the absence of the compensation mechanism.

3.6 Principles

The World Economic Forum, in collaboration with the Biodiversity Credit Alliance and the International Advisory Panel on Biodiversity Credits, has established a set of principles aimed at ensuring that biodiversity certificates are effective and aligned with social objectives for nature and people[26]. In addition, COLBS was developed based on the IFC Performance Standards (PS1–PS8), the Equator Principles, and the Cancun Safeguards.

All biodiversity initiatives must comply with these principles, which must be justified and supported by technical, social, and/or regulatory evidence demonstrating their proper implementation:

The principles for biodiversity certificates are grouped into three fundamental themes to ensure their integrity and the integrity of their markets:

1. Verified Positive Outcomes for Nature: Focused on the scientific robustness of environmental, ecological, and biodiversity benefits.
2. Equity and Justice for People: Centered on the respect for rights and inclusion of Indigenous Peoples and Local Communities.
3. Good Governance for High-Integrity Markets: Ensuring transparent and responsible market functioning.

[26] World Economic Forum, Biodiversity Credit Alliance, & International Advisory Panel on Biodiversity Credits. (2025, mayo). High-level Principles to Guide the Biodiversity Credit Market (White Paper). World Economic Forum.

The following principles must be considered in project development:

a) Defined Objectives and Activities: Projects must have clearly defined biodiversity objectives and non-extractive activities that generate measurable, durable, and additional benefits.
b) Demand Integrity and the Mitigation Hierarchy: Clear rules for the use of certificates aligned with the mitigation hierarchy (avoid, reduce, restore).
c) Certificate Issuance and Tracking: Certificates must be issued and tracked through transparent registries that prevent double counting.
d) Additionality: Biodiversity outcomes must not have occurred in the absence of the project. Deliberate degradation to justify additionality is strictly prohibited.
e) Baselines: Robust and scientifically credible baselines are required to assess biodiversity changes, using control sites and temporal data. Digital monitoring tools may complement, but not replace, field data collection.
f) Durability: Positive biodiversity outcomes must be long-lasting, supported by financial and technical capacity to ensure their maintenance over time.
g) Leakage: Projects must assess and mitigate the displacement of harmful activities outside the project boundary.
h) Monitoring, Reporting, and Verification (MRV): Robust MRV systems must be implemented for biodiversity, governance, and socioeconomic outcomes, using scientific methodologies and inclusive participation.
i) Third-Party Audits: Projects must be audited by qualified and independent third parties to validate environmental and social outcomes, including governance performance and FPIC processes.
j) Respect for Human Rights and Indigenous Peoples' Rights: Projects must recognize and respect territorial and resource rights of Indigenous Peoples (in accordance with UNDRIP), as well as the human rights of all marginalized groups.
k) Free, Prior, and Informed Consent (FPIC): FPIC must be respected and maintained for Indigenous Peoples and Local Communities at every stage of the project, ensuring clear and accessible information.
l) Participation of Indigenous Peoples and Local Communities in Governance: Meaningful participation in project design, governance, implementation, and oversight must be ensured where they are involved or affected.
m) Do No Harm: Projects must not cause harm to Indigenous Peoples, local communities, biodiversity, or climate. Socio-environmental safeguards must be implemented, and appropriate remediation provided where harm occurs.
n) Benefit Sharing: Fair, equitable, and transparent benefit-sharing mechanisms must be established, co-designed with communities or stakeholders involved, maximizing their share of benefits.
o) Grievance Mechanisms: Transparent, confidential, and robust grievance mechanisms must be established for all stakeholders, including marginalized groups.

p) Transparent Governance Structure: Governance must reflect stakeholders with legal and customary rights, ensuring effective participation. Information must be publicly disclosed and accessible.
q) Data Sovereignty: The data sovereignty of Indigenous Peoples and Local Communities must be ensured, allowing them to govern the collection and use of data related to their territories and resources. FPIC is required for sensitive data and traditional knowledge.
r) Alignment with Frameworks: Schemes must align with international, national, regional, and local conservation and sustainable development frameworks (e.g., Kunming-Montreal Global Biodiversity Framework, SDGs).

3.7 Identification and Establishment of Risks, Impacts, and Safeguards

Safeguards are measures designed and implemented to identify, prevent, mitigate, and address potential negative impacts on people and the environment arising from project activities, while also enhancing positive outcomes. They ensure that interventions are carried out responsibly, respecting community rights, preserving ecosystem integrity, and promoting equity and sustainability[27].

Safeguards are essential for project development because they:

- Guide the proper implementation of actions, maximizing benefits and minimizing risks.
- Protect the rights of local communities and ethnic groups, including access to resources, cultural integrity, and traditional knowledge.
- Contribute to biodiversity conservation and the maintenance of essential ecosystem services.
- Promote economic viability and equitable distribution of project benefits.
- Strengthen governance, transparency, and institutional accountability.
- Ensure the long-term sustainability of project results.

Each project must document compliance with safeguards in accordance with the following description, which is intended to guide project developers in structuring and drafting this component in order to create a clear, robust, and actionable chapter within the document, integrated into the project lifecycle and adapted to its specific context and scale.

The following guidelines shall be considered in this section:

[27] Camacho, A., Lara, I., & Guerrero, R. D. (2017). Interpretación Nacional de las Salvaguardas Sociales y Ambientales para REDD+ en Colombia. Ministerio de Ambiente y Desarrollo Sostenible, WWF-Colombia, ONU REDD Colombia.

- Guideline 1. Introduction and Justification of Safeguards: Explain the need for the safeguards plan, identifying preliminary environmental, social, and economic sensitivities of the project.
- Guideline 2. Identification of the Regulatory Framework: List and describe applicable national laws, decrees, and resolutions, as well as relevant international policies and agreements. Include regulations related to participation, prior consultation, access to information, ecosystem protection, among others. Additionally, describe how the project will comply with these frameworks.
- Guideline 3. Institutional Roles: Identify the institutions impacted by the project and define their roles in the implementation and oversight of the applicable regulatory framework.
- Guideline 4. Methodology: Describe the methodology used to identify and assess impacts, risks, and benefits, including information sources and stakeholder participation processes.
- Guideline 5. Identification of Impacts and Risks:
    - Environmental: Detail potential risks and impacts on biodiversity, habitats, water and soil quality, and ecosystem services.
    - Social and Cultural: Describe risks and impacts on livelihoods, health, access to resources, cultural heritage, social cohesion, territorial rights, traditional knowledge, and gender equity.
    - Economic: Identify risks and impacts on local economic viability, community cost and income structures, access to markets, and economic diversification.

For each identified impact or risk, specify its nature, magnitude, extent, duration, and probability.

- Guideline 6. Ecosystem and Biodiversity Conservation: For each identified environmental impact, describe specific prevention, mitigation, and/or restoration measures (for example, avoiding sensitive areas or developing restoration plans). The project must not incentivize the conversion of natural ecosystems.
- Guideline 7. Identification and Distribution of Benefits: Detail the expected environmental, social, cultural, and economic benefits, as well as the beneficiaries of each. Additionally, describe the mechanisms to ensure fair and equitable distribution of benefits, both monetary and non-monetary.
- Guideline 8. Measures for Transparency and Access to Information: Specify disclosure mechanisms and channels (for example, workshops, informational materials, radio), the types of information to be shared (such as progress and financial information), frequency, and necessary cultural adaptations.

- Guideline 9. Accountability Measures: Define how and when accountability will be provided to stakeholders and the public regarding management, results, and resource use.
- Guideline 10. Participation Plan: Develop a plan identifying key stakeholders and their interests. Describe how full, effective, free, and informed participation will be ensured throughout the different phases of the project. Include specific methodologies to facilitate participation of vulnerable groups.
- Guideline 11. Free, Prior and Informed Consent (FPIC) and Traditional Knowledge: Where applicable, describe in detail the FPIC process with ethnic groups in accordance with current regulations, and explain how relevant traditional knowledge will be identified, recognized, respected, and incorporated with consent.
- Guideline 12. Territorial Rights: Specify actions aimed at ensuring respect for land tenure and resource use rights.
- Guideline 13. Measures for Economic Viability: Describe how the economic viability of proposed productive alternatives or livelihoods for communities will be assessed and supported, as well as strategies to manage adverse economic impacts.
- Guideline 14. Ecosystem Services: Detail how the provision of key ecosystem services will be maintained or enhanced during project implementation[28].
- Guideline 15. Integration with Territorial Planning: Explain how project actions will align with and strengthen existing territorial planning and land-use instruments.
- Guideline 16. Prevention of Leakage or Impact Displacement: Describe strategies to identify and address the risk of displacement of pressures or negative impacts (3.9. Leakage Analysis).
- Guideline 17. Capacity-Building Needs Assessment: Identify technical, legal, administrative, and governance capacity-building needs of stakeholders to implement and monitor safeguards, as well as the program—including activities, methodologies, and timeline—designed to address the identified needs.
- Guideline 18. Monitoring Indicators: Define clear, measurable, and relevant indicators—both quantitative and qualitative—for each established measure. Specify responsible parties, frequency, sources, and tools for data collection and analysis. Consider the inclusion of community-based monitoring mechanisms. Additionally, describe how monitoring results will be documented and reported, and how they will be used for decision-making and adaptive project management (9. Monitoring and Reporting Plan).

[28] The developer may adopt a national guideline or framework for the definition and classification of ecosystem services or rely on an internationally recognized classification. What is essential is that the selected services are clearly defined, properly justified, and consistent with the ecological and social objectives of the project

- Guideline 19. Design of the Citizen Attention and Grievance Mechanism (CAGM): Describe an accessible, transparent, impartial, culturally appropriate, and free mechanism. Detail procedures, timelines, and resolution instances (for example, through a virtual form), and explain how access channels to the CAGM will be disclosed.

3.8 Applicable Activities

The eligible activities and on-site actions for generating Net Biodiversity Gains and, consequently, Biodiversity Certificates under this protocol are described below. All activities implemented by a project must fall within one of the categories of restoration, conservation, and/or sustainable use, which are applicable to voluntary market initiatives, although they may also be applied in regulated initiatives. The eligible activities are listed below:

- Ecological Restoration
    - Sowing and planting a diverse portfolio of native species of local origin.
    - Reconstruction of topography or rehabilitation of degraded soils.
    - Restoration of hydrological regimes in wetlands or riparian areas.
    - Control and eradication of invasive species that hinder recovery.
    - Recovery of microtopography and soils compacted by machinery or overgrazing.
    - Restoration of seasonal wetlands associated with floodable savannas.

- Rehabilitation
    - Establishment of agroforestry systems with native species.
    - Implementation of silvopastoral systems combining native trees and shrubs with livestock production.
    - Enrichment of secondary forests or degraded areas with native species of ecological value or relevance for connectivity.
    - Isolation of the area through fencing to exclude livestock, agricultural frontiers, and other disturbances.
    - Selective control of invasive species or aggressive grasses that compete with native seedlings.
    - Installation of artificial perches or nucleation to attract seed-dispersing fauna.

- Ecological Recovery
    - Recovery of vegetation covers, with species not necessarily native for erosion control on slopes or critical areas.
    - Soil stabilization with grass or other ground covers to reduce sedimentation in water bodies.

- Preservation
    - Surveillance and patrolling.
    - Fire prevention and control.
    - Control of biological threats.
    - Conservation and governance agreements.
    - Maintenance of boundaries and signage.
- Sustainable Use of Biodiversity
    - Rotational livestock management that maintains native herbaceous cover and increases tree vegetation.
    - Implementation of forest non-timber product harvesting systems.
    - Development of low-impact ecotourism projects, nature-based tourism, and regenerative tourism.

Note: Activities must be defined as a function of the target ecosystem. In non-forested ecosystems—such as savannas and high-Andean grasslands—the system's natural history and inherent dynamics shall be considered, including the role of fire and controlled grazing. These may be managed and not necessarily eliminated, in accordance with technical criteria and conservation objectives.

3.8.1 Ineligible activities

The following activities are explicitly excluded:

- Projects that primarily use exotic, invasive, or transgenic species in their planting or restoration activities.
- Projects that have involved the involuntary displacement of local communities, Indigenous peoples, or wildlife or plant populations.
- Projects that, while generating gains in one indicator, cause significant net harm to another biodiversity attribute or environmental component.

3.9 Leakage analysis

Leakage refers to the involuntary displacement of negative impacts on biodiversity to areas outside the project, as a direct or indirect consequence of its implementation. Although the project generates benefits in the intervention area, unwanted pressures may arise in other zones due to the relocation of activities, displacement of actors, or reconfiguration of land use. Two types are distinguished:

- Primary or direct leakage: Occurs in the immediate surroundings of the project, for example, logging or grazing that shifts to adjacent areas due to restricted access to the intervened property.

- Secondary or indirect leakage: Manifests at a regional or even global scale, as a result of effects in supply chains, market changes, or the displacement of extractive activities.

This section establishes the minimum guidelines that project developers must follow to identify and document potential primary leakage associated with their interventions, as an essential measure to preserve the environmental integrity of the net biodiversity gain certification system. The analysis must be a chapter within the BID and the Monitoring Report (Section 8) and must include the following elements:

- **Identification of displaced activities:** Answer the following questions: What activities could be restricted or modified by the intervention (e.g., agriculture, livestock, logging, fishing, mining)? Is it likely that these activities will be relocated outside the project area?

- **Areas of potential primary leakage:** Describe the territorial context of the intervention area (neighboring land ownership, road connectivity, access, relationship with neighboring communities). Indicate whether there are nearby zones susceptible to receiving displaced pressure.

- **Mapping of leakage areas:** Define the spatial boundary of potential areas for activity displacement, considering the parameters in the previous point, through GIS analysis.

- **Mitigation or prevention measures:** Proposed actions to minimize the risk of leakage, such as:
    - Agreements with neighboring communities
    - Participatory monitoring at boundaries
    - Incorporation of buffer zones or connectors
    - Inter-institutional coordination or complementary territorial actions

Note: Quantification is not required, but a reasoned and documented analysis is required. In projects where a high risk of direct leakage is identified, the developer is expected to propose concrete prevention or follow-up actions. This analysis will be reviewed by the verification body and the certifier and may be adjusted in later phases of the project if leakage potential changes.

3.9.1 Treatment of unmitigated leakage during verification

If the Conformity Assessment Body (CAB) identifies unmitigated primary leakage during a verification event, a discount will be applied to the number of certificates to be issued for that period. This mechanism works as a direct compensation for the displaced damage. It will be calculated in a simple and conservative manner by

reducing, from the total project area used to calculate certificates (in ha), the area affected by leakage.

4 VOLUNTARY MECHANISM INITIATIVES: ROUTE 1 – GAIN BIODIVERSITY CERTIFICATES (GBU)

This section applies to the quantification of voluntary biodiversity certificates through a transparent, verifiable protocol with solid and up-to-date scientific foundations (Figure 2), ensuring that revenues from certificates are used to achieve the proposed conservation and management objectives.

Investment in and development of these biodiversity certificates can help close the financial gap for developing biodiversity protection and conservation mechanisms. The approach of these units is holistic, offering tangible and intangible benefits for biodiversity and associated communities, such as carbon sinks, recovery of ecosystem services, knowledge generation, and reinforcement of nature's intrinsic value.

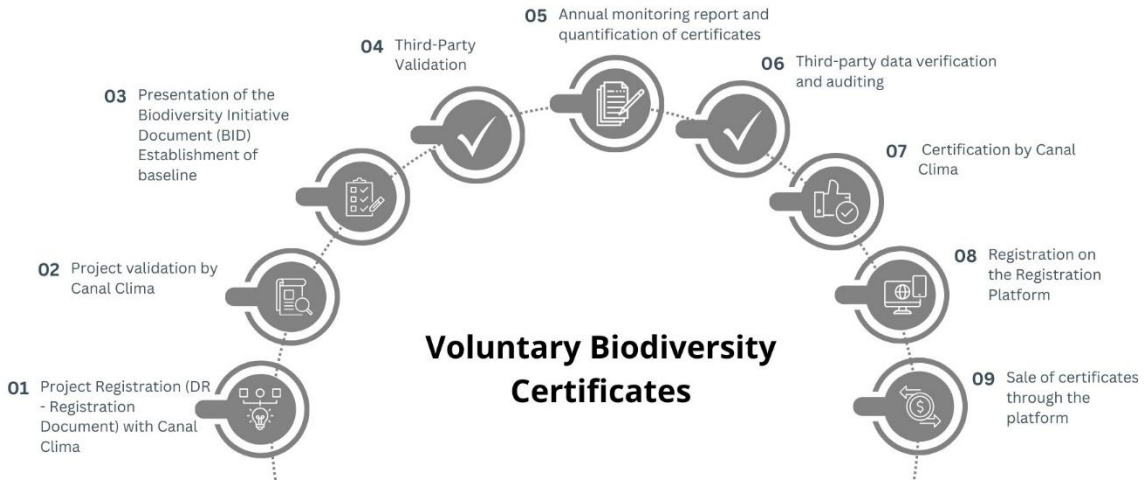

Figure 2. General stages of the procedure for registering and operating projects with biodiversity certificates.

For formal project registration and certification, a Registration Document (RD)[29] containing the project idea must be submitted to the certifying entity and must include the following sections:

- Project name
- Project developer
- Developer contact
- Geographic location

[29] The template will be available on the Canal Clima website

- Project area: a project map must be provided, along with an annex (Shapefile or KMZ) of the project boundaries
- Ecosystems identified in the project area
- Main project app roach: Restoration, Conservation, Sustainable Use and/or multiple
- Initial project financing
- Description of project participants
- Participation and benefits for the local community in the project area
- Description of land tenure arrangements
- Benefit-sharing scheme
- Monitoring plan
- Additional observations on the project context that should be considered by the certifying body

Once the RD (Registration Document) has been submitted and approved by the certifier, the BID (Biodiversity Initiative Document)[30] may be submitted with the following information:

- Executive Summary
- General Description of the Initiative
- Project Eligibility and Boundaries
- Safeguards Compliance
- Additionality Analysis
- Leakage Analysis
- Land Tenure, Rights, and Participants
- Project Action Plan (improvement or stewardship activities)
- Baseline and Monitoring Methodology
- Projected Generation of Biodiversity Certificates
- Contribution Analysis to Global Targets
- Risk Management and Permanence

After registration is completed and monitoring of the established criteria has progressed, the monitoring progress is submitted, from which net gains results and therefore the number of certificates to be issued are obtained. The documentary route is presented in Figure 3.

[30] The template will be available on the Canal Clima website. The project proponent may justify information considered sensitive that requires confidential treatment; this must be approved by Canal Clima.

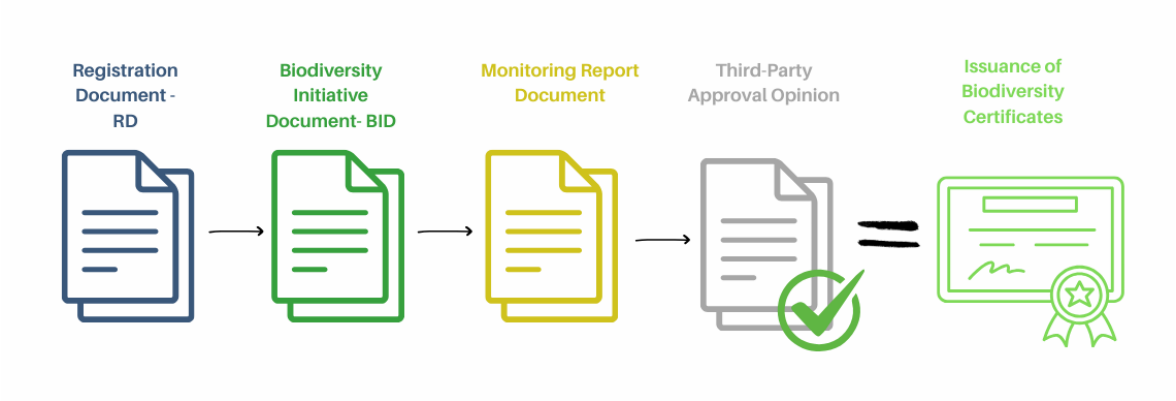

Figure 3. Documentary route to obtain the issuance of biodiversity certificates.

5 COMPENSATORY MECHANISM INITIATIVES: ROUTE 2 – HABITAT BANKS

Habitat Banks are areas intended for the preservation, restoration, and sustainable use of biodiversity within Colombian territory that function as a mechanism to implement environmental compensation obligations and the mandatory 1% investment, operating under a pay-for-performance scheme. This protocol details the steps and requirements necessary to establish and manage a Habitat Bank, in accordance with current regulations[31] (Figure 4), ensuring they effectively contribute to conservation and meet the highest technical and legal standards.

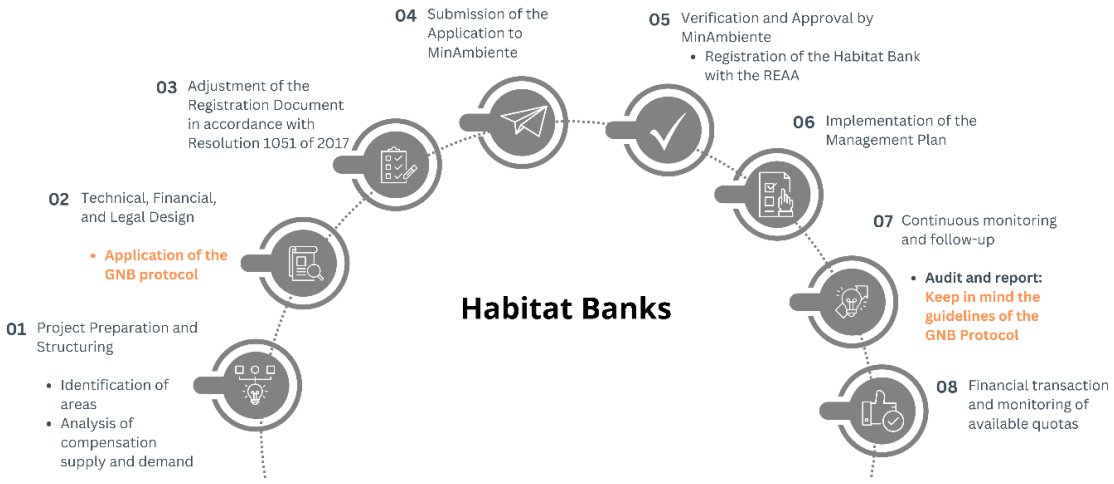

Figure 4. General stages of the procedure for registering and operating a Habitat Bank.

[31] Decree 2099 of 2016, Resolution 1051 of 2017, and Resolution 256 of 2018 of the Ministry of Environment and Sustainable Development of Colombia.

5.1 Registration procedure

The process to register a Habitat Bank with the Colombian Ministry of Environment and Sustainable Development (MinAmbiente), through the Directorate of Forests, Biodiversity and Ecosystem Services, consists of the following steps:

1. **Preparation and submission of documentation.** The interested party must compile and submit the following technical information:

- Justification: Supports the suitability of the proposed area, its additionality and complementarity.
- Location: General description of the area, including extent (in hectares) and geographic location.
- Delimitation: Coordinates in the MAGNA-SIRGAS system (or the official system for the host country) and a digital polygon file in Shapefile or Excel format.
- Characterization and baseline:
    - Physical and biotic study at a minimum scale of 1:25,000.
    - Priority use of validated primary information; secondary only if from official sources.
    - Identification of ecosystems according to the country's official map, with area by ecosystem type[32].
- Conservation objectives: Specific targets in hectares for restoration, conservation and/or sustainable use.
- Work plan: Activities, expected results, duration, and management and impact milestones (basis for pay-for-performance).
- Monitoring and follow-up plan:
    - Qualitative and quantitative indicators (structure, composition, functionality, indicator species).
    - Means of verification, measurement frequency, responsible parties, instruments, and method for results analysis.
- Certificate of title and ownership history: For the properties involved.
- Legal status of the property: Contract legitimizing use of the area (loan agreement, usufruct, lease, trust, etc.).
- Financial mechanism: Operational and administrative description for managing Habitat Bank resources.

Once the documentation is complete, the formal request must be filed (email or physical submission) to MinAmbiente.

2. Evaluation and registration. MinAmbiente has up to 30 calendar days to review the information. If the documentation is complete and meets the requirements, the Habitat Bank will be incorporated into the Single Registry of

[32] Following the CORINE Land Cover methodology adapted for Colombia by IDEAM.

Ecosystems and Environmental Areas (REAA). If any inconsistency or non-compliance is found, the applicant will be notified and may correct the issue or submit a new application.

5.2 Financing and operation

Habitat Banks may be financed through various sources, which may be combined depending on the bank's operational design, including:

- National public or private resources.
- International cooperation funds.
- Resources from the mandatory 1% investment
- Contributions related to environmental compensations
- Other relevant sources, depending on the nature of the project and the applicable legal framework.

Financing, implementation, and operation agreements must be formalized between the parties involved, and compliance is the exclusive responsibility of the signatories.

When a Habitat Bank is used to fulfill environmental obligations (1% investment or compensation for biodiversity loss), express feasibility from the competent environmental authority is required. In addition, the following principles must be met:

- Ensure there are no overlaps between different obligations when they are grouped within the same Bank or under this protocol with the limits of voluntary market initiatives.
- Ensure each obligation can be identified, measured, and traced independently.
- Note that entering into agreements with a Habitat Bank does not exempt the original holder from responsibility before the environmental authority; compliance remains their legal responsibility.

5.2.1 Pay for Performance

Habitat Banks may structure Pay-for-Performance mechanisms in accordance with MinAmbiente's document "Habitat Banks: Mechanism for implementing biotic compensations"[33]:

- This scheme links financial disbursements to the verifiable achievement of environmental targets, such as implementing conservation or restoration actions and improving ecosystem conditions.

[33] Ministerio de Ambiente y Desarrollo Sostenible (2021). Bancos de Hábitat – Mecanismo para la implementación de compensaciones bióticas. Bogotá D.C., Colombia. https://www.minambiente.gov.co/wp-content/uploads/2021/10/Compensaciones-Guía-Bancos-de-Hábitat.pdf

- Payments may be distributed by milestones, for example 30% (start), 30% (progress), and 40% (final completion), based on progress validated by the evaluation body (CAB) or the host country's control entity.
- The model strengthens transparency, efficiency, and trust in Habitat Bank financial management, ensuring resources are allocated in direct proportion to achieved results.

5.2.2 Monitoring, reporting, and follow-up

Monitoring and follow-up must be implemented according to the previously established Monitoring Plan, and results must be periodically reported to competent environmental authorities and official information systems.

- **Implementation of the monitoring plan.** The Bank's responsible party must execute actions defined in the Monitoring and Follow-up Plan submitted for registration, including collecting structural, functional, and compositional indicators, as set out in the approved technical plan. For this plan's development, the guidelines described in this protocol (Section 8) may be used.

- **Periodic reports.** The frequency and scope depend on the type of obligations implemented in the bank:
    - Banks without implementation of environmental obligations[34] (neither 1% nor compensation): A semiannual report must be submitted to MinAmbiente's DBBSE, detailing progress on the Work Plan and Monitoring Plan.
    - Banks that implement environmental obligations (1% or compensation): An annual report must be submitted to DBBSE, including:
        - Compliance status and progress by hectares.
        - Actions implemented.
        - List of follow-up administrative acts issued by environmental authorities.

      Banks that include both areas subject to obligations (such as the 1% and compensations) and areas that are not must submit an annual report.

- **Publication of information.** Monitoring results must be published in SIB Colombia (https://biodiversidad.co/), as part of the Colombian Environmental Information System (SIAC). Following the official guide for data and information publication it is recommended to ensure interoperability and standardization.

[34] This type of bank refers to one that, although registered or in the process of registration with the Ministry of Environment (MinAmbiente), has not yet entered into contractual agreements with companies holding environmental obligations

- **Performance verification.** Verification for pay-for-performance must be carried out by a suitable, external, independent third party, in accordance with the guidelines established in the corresponding section of this protocol (Section 9).

The Bank's responsible party will lead this process and must include verification results in the annual technical report submitted to MinAmbiente.

5.2.3 Non-compliance with obligations

The Habitat Bank's responsible party must ensure timely, complete, and guideline-compliant submission of monitoring and follow-up information to MinAmbiente. Failure to submit these reports -whether by omission, delay, or partial submission— may lead to the Bank's removal from the REAA, thereby losing its status as a valid mechanism for implementing environmental obligations.

Route 2 of this protocol is not related to approvals by MinAmbiente or related environmental authorities, nor does it guarantee immediate acceptance by following the guidelines. This description is for guidance and helps proponents harmonize national regulatory requirements with those required for voluntary markets when Route 1 or Route 3.

6 MIXED PROJECTS

At Canal Clima, we recognize as a mixed project any initiative that integrates, in a structured and verifiable manner, voluntary biodiversity conservation and restoration mechanisms (Route 1 of this protocol) and regulatory Habitat Bank mechanisms (Route 2 of this protocol). These projects must demonstrate their capacity to generate measurable biodiversity benefits both in compliance with legal obligations and through additional contributions, enabling dual certification: on the one hand, with the competent environmental authority, and on the other, within the voluntary verification and registration system.

In addition, if a Habitat Bank project has reached the end of its useful life period approved by the environmental authority, those compensated areas may be considered for biodiversity certificates, initiating Route 1 of this protocol while maintaining the corresponding transparency. Consolidating mixed projects represents a strategic opportunity to expand positive biodiversity impacts, generate robust traceability, and maximize the ecological and financial value of restored or conserved areas.

6.1 Feasibility conditions for a mixed project

To be accepted and certified as a mixed project in Canal Clima, the initiative must meet the following technical and operational conditions:

- Existing registration or registration in process with environmental authority: The project must have an active registration or be in process as a Habitat Bank.
- Georeferencing and precise delimitation: Areas subject to regulatory compensation and those proposed for voluntary certification must be clearly differentiated through georeferencing, maps, and polygons, enabling independent traceability. Under no circumstances may they overlap; they are mutually exclusive in their boundaries.
- Traceability and exclusion of double counting: The project must clearly demonstrate that areas already used to meet regulatory obligations will not be used to generate voluntary certificates, unless the corresponding compensation period has ended.
- Additionality in the voluntary component: Areas or activities proposed for voluntary certification must demonstrate net biodiversity gains additional to those already required by regulation.
- Comprehensive technical documentation: The project must have a Biodiversity Initiative Document (BID), baseline, monitoring plan (the management plan is used as an input), schedule and monitoring methodology, and other components in accordance with this certification protocol.
- Technical, financial, and operational feasibility: The project promoter must demonstrate institutional, technical, and financial capacity to implement activities, maintain monitoring, and undergo external verification processes.
- Compliance with the specific requirements indicated for each of the routes involved in this protocol.

Hypothetical case study

An environmental organization develops a 500-hectare Habitat Bank, duly registered with MinAmbiente. Of these:

- 300 hectares have already been transacted as part of environmental compensation obligations, with acquired commitments and active follow-up.
- The remaining 200 hectares have not been subject to regulatory transactions and are available, with the same ecological conditions and management.

A request is submitted to Canal Clima for the project to be evaluated as a mixed project, certifying the full 500 hectares with differentiated traceability:

- The 300 ha are reported as already sold in the regulated context, with no possibility of double use.
- The 200 ha are proposed as an area available for voluntary certification, with the intention of issuing biodiversity certificates that can be traded in the voluntary market.

Evaluation by Canal Clima: This project is viable as a mixed project, provided that:

- The submitted documentation includes georeferenced maps clearly differentiating the two zones (Figure 5).
- There is a transaction history demonstrating compliance with obligations.
- Non-double counting is guaranteed through the explicit exclusion of the 300 ha corresponding to the Habitat Bank in the regulated context.
- The 200 ha available have an updated baseline and monitoring, and comply with the protocol for quantifying and certifying NBG.

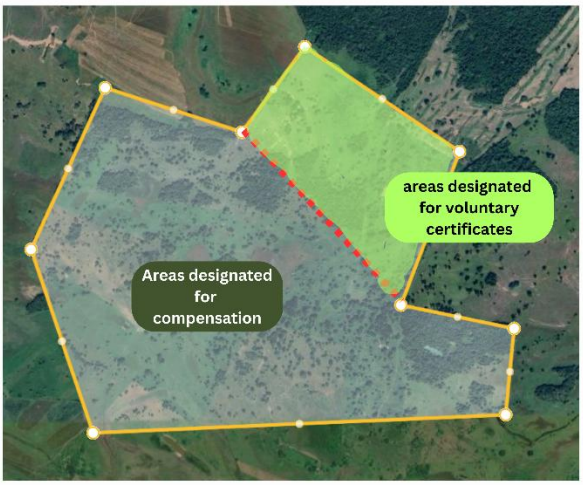

Figure 5 Graphic description of the georeferenced division of areas for compensation actions and voluntary actions.

If the conditions and requirements are met, Canal Clima will proceed with technical validation of the conditions described and approval of the specific requirements for the Route 1 area over the 200 ha proposed, and the corresponding voluntary biodiversity certification will be issued, registering the project on the selected Registration Platform.

Achieving a Net Biodiversity Gain implies that a project actively contributes to improving or maintaining the ecological status of an ecosystem, generating a measurable positive result beyond its initial condition (Figure 6).

This protocol adopts an integral ecosystem approach, where gains are quantified from verifiable improvements in the structural, compositional, and functional condition of the ecosystem. Rather than protecting isolated elements such as species or land cover, it promotes restoration of ecological integrity and long-term landscape resilience.

This protocol presents two approaches depending on the type of intervention:

- **Improvement approach:** For projects that measure net biodiversity gains from increases relative to the biodiversity baseline and subsequent monitoring, usually restoration or rehabilitation projects.

- **Conservation approach:** For projects that recognize the maintenance or stewardship of highly protected ecosystems and avoid net biodiversity loss.

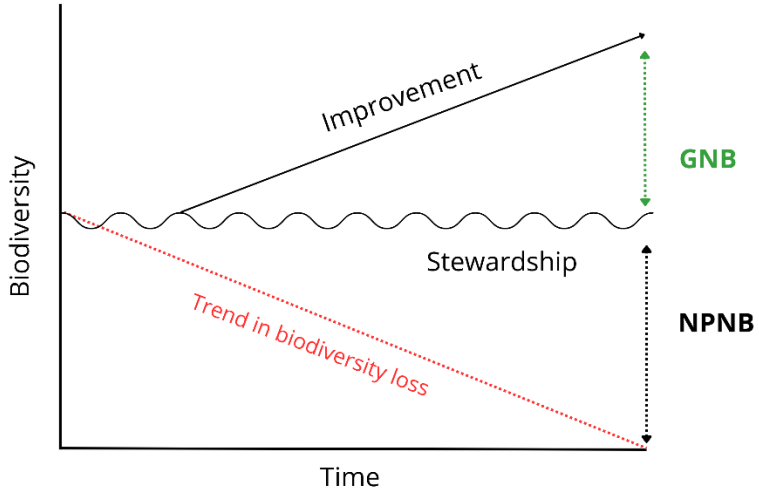

Figure 6. Quantification approaches for a stewardship and improvement project in the ecosystem condition index. GNB (Net Biodiversity Gain) and NPNB[35] (No Net Loss of Biodiversity)

To quantify **Net Biodiversity Gains**, the Ecosystem Condition Index (ICE%) is calculated at the start of the project and in subsequent monitoring events. The difference between these values represents the ecological change achieved by the project, expressed as follows:

$$GNB = ICE_{\%,t2} \quad - \quad ICE_{\%,t1}$$

Where,

$ICE_{\%,t2}$= ICE value in the most recent monitoring.
$ICE_{\%,t1}$= ICE value in the immediately preceding monitoring.

Measurement should always start with the reference scenario or initial baseline, but then use data from periodic monitoring (including previous monitoring) to calculate change over time, during the duration of the project.

[35] No net loss of biodiversity is a principle that requires any damage caused to biodiversity by a development project to be offset so that there is no overall net loss.

6.2 Ecosystem Condition Index (ICE%)

Ecosystem Condition Index (ICE%) is the core of the biodiversity assessment in this protocol. It is a composite metric, expressed on a 0 to 100 scale, reflecting the overall ecological health and quality of an internal ecosystem condition such as its connectivity at the landscape scale. It is calculated from four attributes that together provide a holistic and integrated view of biodiversity (Figure 7), aligned with ecosystem ecology and conservation biology principles:

It is calculated in three steps:

- Selection and measurement of indicators: The developer measures field indicators for each of the four attributes.
- Normalization of indicators: Each measured value is converted to a 0–1 scale.
- Aggregation: Normalized values are averaged to obtain ICE (0–1), which is then multiplied by 100.

6.2.1 Selection and measurement of indicators

Consistency in indicator selection is important; therefore, justification for each indicator and its coherence with the full set will be a key element of verification. Indicators must be relevant and aligned with project activities and objectives. Disparate indicators that do not form a consistent ecological narrative will not be accepted. Section 11.3 presents a list of commonly used indicators for measuring biodiversity in Habitat Banks and biodiversity certificates.

The developer must select and justify the following attributes, which must later be normalized (Section 6.2.3).

- **Biotic Structure of the Ecosystem[36] (Es):** at least two (2) indicators reflecting different architectural dimensions of vegetation.
- **Composition and Structure of Communities (Cc):** at least ten (10) indicators, corresponding to two (2) indicators per selected taxonomic group.
- **Landscape Connectivity (Cp):** at least one (1) integral indicator of spatial connectivity.

[36] It refers to the structural attributes that describe the form, arrangement, and spatial organization of vegetation components within an ecosystem. These dimensions allow for the characterization of the physical and functional complexity of vegetation, which is directly related to biological diversity and the ecological processes occurring within the habitat.

- **Ecosystem Function (Fe):** optional attribute. The developer may include at least one (1) functional indicator[37] if considered pertinent and aligned with project objectives[38].

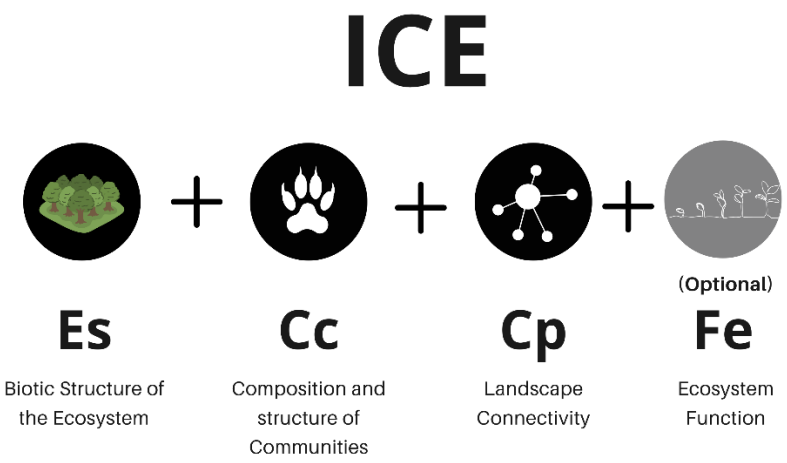

Figure 7. Components of the Ecosystem Condition Index (ICE%).

Attribute: Biotic Structure of the Ecosystem (E_s)

- Justification: Focuses on vegetation structure and architecture, as this forms the habitat base for most terrestrial fauna and regulates key ecosystem functions such as microclimate and soil stability.
- Example indicators: Vegetation cover by strata (%), vertical structural complexity, density of key structural elements (e.g., mature native trees).

Attribute: Composition and Structure of Communities (C_c)

- Justification: Evaluates biodiversity organization at the local scale (alpha diversity). It focuses on composition (species list present) and structure (how individuals are distributed among species). A healthy, resilient community not only has many species but also a balanced structure.
- Requirement: Monitoring must include at least five (5) taxonomic groups. Plants are mandatory; the other four (4) groups may be selected based on the ecological and functional criteria of the project. Possible target groups include (but are not limited to):

[37]its inclusion is recommended in initiatives where objectives explicitly focus on the recovery of key ecological processes (e.g., pollination, nutrient cycling, soil health), or where changes in structure and composition do not fully capture the project's impact. Projects incorporating this type of indicator will receive a distinction, which

[38]Given the high ecological relevance and technical rigor required to incorporate functional indicators, projects that integrate them in a robust and scientifically sound manner may qualify for a "Functional Distinction" within their certification.

- Plants (Mandatory group): Woody and/or herbaceous, depending on the ecosystem and objectives.
- Birds.
- Mammals.
- Fish (if relevant aquatic ecosystems exist in the project).
- Amphibians.
- Reptiles.
- Insects (a functionally relevant focal group must be selected, e.g., pollinators, dung beetles, etc.).

For each selected taxonomic group, the developer must calculate and report at least the following two indicators:

- Species richness (S): Measures the total number of different species recorded for the group.
- Simpson Dominance Index (1-D): Measures the probability that two randomly selected individuals belong to different species; it allows direct interpretation on a 0 to 1 scale. A higher value indicates a more even community and less dominance.

6.2.2 Handling variability in fauna indicators

To avoid interpreting natural fluctuations in populations as biodiversity loss, the following condition is adopted:

If during the first five (5) years of monitoring a fauna indicator shows a value below the baseline, it will be recorded as 0 (no loss) in the ICE% calculation, and the data will be archived in the time series.

Once five monitoring events for the indicator have been completed, its temporal trend will be formally evaluated using statistical models [39]. A statistically negative trend will be considered a technical alert, requiring review of the management plan and implementation of corrective actions.

The developer must analyze and document the possible cause of the decline, considering both natural factors (interannual variability, migrations, ENSO events, demographic fluctuations) and anthropogenic factors (hunting pressure, habitat loss, disturbances). This analysis must be presented in the monitoring report and will serve as input for adaptive adjustment of the management plan.

[39] Statistical models such as Generalized Linear Mixed Models (GLMMs) or Generalized Additive Models (GAMs) are recommended, as they are designed to handle the typical complexities of ecological data (e.g., non-normal distributions, non-linear relationships, and natural variation among sampling sites).

Attribute: Landscape Connectivity (C_p)

- Justification: Evaluates the spatial structure of the ecosystem and its relation to the surrounding landscape, recognizing that higher connectivity promotes species movement, gene flow, and ecological resilience. The Integral Index of Connectivity (IIC) is considered appropriate because it integrates area, connectivity, and sensitivity to fragmentation[40].
- Requirement: IIC must be used as the main indicator. If the developer proposes another index, it must be duly justified and approved by Canal Clima's technical team.
    - IIC ranges from 0 to 1 and increases as connectivity improves. An IIC = 1 would occur in the hypothetical case where the entire landscape is occupied by native habitat.
    - The R package "Makurhini: Analyzing Landscape Connectivity" is suggested for calculating connectivity and fragmentation indices with applications in conservation and land-use planning[41].

***Attribute: Ecosystem Function (F_e).* optional.**

- Justification: Since many functions are intrinsically linked to vegetation and fauna structure and composition, indicators here aim to capture key processes indirectly, such as recovery capacity and the health of basic cycles.
- Example indicators: Natural regeneration rate of woody species, activity of functional guilds (e.g., pollinator visitation frequency), soil health indicators.

6.2.3 Normalization of indicators

Normalization is the process by which an indicator value—each with its own units (%, number of species, individuals/ha, etc.)—is transformed into a dimensionless 0–1 scale. This step is necessary to allow aggregation across different types of variables in the ICE% calculation. Each indicator must reflect an ecological gradient where:

- 0 represents the baseline.
- 1 represents the optimal or desired condition.

The general normalization formula is:

[40] Saura, S., & Pascual-Hortal, L. (2007). A new habitat availability index to integrate connectivity in landscape conservation planning : Comparison with existing indices and application to a case study. Landscape and Urban Planning, 83, 91-103.

[41] Godínez-Gómez, O., Correa Ayram, C. A., Goicolea, T., & Saura, S. (2025). Makurhini: An R package for comprehensive analysis of landscape fragmentation and connectivity (3.0.0). Zenodo. https://doi.org/10.5281/zenodo.14940436

$$N(X_t) = \frac{X_t - X_{min}}{X_{max} - X_{min}}$$

Where:

$N_{(Xt)}$: normalized value of the indicator at time t
X_t: observed or measured value
X_{min}: baseline value
X_{max}: upper reference value (optimal condition)

When an indicator has a decreasing (negative) relationship—i.e., the lower the indicator value, the better the ecological condition—this applies to variables reflecting pressure, dominance, or degradation and the scale is inverted:

$$N(X_t) = \frac{X_{max} - X_t}{X_{max} - X_{min}}$$

Hierarchical normalization approaches

The protocol establishes two hierarchical approaches. The highest-level approach that is feasible must be applied and properly justified.

Level 1: Normalization based on ecological reference values (technically most accepted)

This level is based on ecological anchors defined by observed or documented values in similar or contrasting systems. Minimum and maximum values are set as:

- X_{max}: ecologically optimal condition (pristine or well-conserved state).
- X_{min}: baseline

Acceptable sources, in order of preference:

1. Data from local or regional reference ecosystems.
2. Peer-reviewed scientific literature or institutional technical reports.
3. Management plans, public policy targets, or international standards.

The CSB is responsible for auditing and validating the relevance and robustness of these parameters during review, ensuring they are based on solid ecological criteria and verifiable information sources.

Note: If an indicator Xt exceeds its established Xmax, the normalized value will be recorded as 1.0, and an update of X_{max} must be proposed and approved with the CAB for future monitoring.

Level 2: Normalization based on project targets (justified alternative)

Applies only if Level 1 is not feasible. Reference values are defined based on project parameters:

- X_{min}: value observed in the project baseline (initial condition).
- X_{max}: quantitative improvement target defined by the project.

  Requirements to use this approach:

- Document that there are no reliable external references.
- Technically justify the project target: it must be ecologically realistic, consistent with project actions, measurable, and achievable.

6.2.4 Aggregation

ICE (0–1 scale) is the simple average of ALL individual normalized indicators.

$$ICE_{0-1,t} = \frac{\sum_{i=1}^{n} N(I_{i,t})}{n}$$

Where,
$N(I_{i,t})$: normalized value of indicator i at time t.
n: total number of indicators selected by the developer.

and is finally defined as,

$$ICE_{\%,t} = ICE_{0-1,t} \ x\ 100$$

Where,
$ICE_{0\text{-}1,t}$: ecosystem condition index
$ICE_{\%t}$: ecosystem condition index expressed as a percentage

7 EQUIVALENCE OF GNB TO BIODIVERSITY CERTIFICATES

Two quantification approaches are presented for calculating net biodiversity gains and their equivalence in Biodiversity Certificates (GBU). The developer must select and

justify the approach corresponding to the objectives and the initial condition of the project.

7.1 Certificate equivalence in an Improvement approach (Restoration/Rehabilitation projects)

Applicable to projects whose objective is to increase ICE% above a baseline. Certificates are calculated as a function of net gain:

$$CB_a = Extention\ (ha)\ x\ (ICE_{\%,t2} - ICE_{\%,t1})\ x\ FIA$$

o

$$CB_a = Extention\ (ha)\ x\ GNB\ x\ FIA$$

Where,

CB_a: annual biodiversity certificates
Extent: project hectares
$ICE_{\%t2}$: Ecosystem condition index in the most recent monitoring.
$ICE_{\%t1}$: Ecosystem condition index in the immediately preceding monitoring.
FIA= aggregate importance factor (Section 8.3).
GNB= Net gains in biodiversity

7.2 Stewardship approach (Maintenance of biodiversity projects)

Applicable to projects that maintain ecosystems in high ecosystem condition (requires $ICE_{\%,t0} \geq 90$). Stewardship involves continuous protection and management actions—such as territorial control, fire prevention, control of invasive species, and ecological monitoring—that ensure active conservation of these areas and recognize their ecological and economic value within the protocol. Certificates are calculated annually as a reward for the stewardship service:

$$CB_a = Extention\ (ha)\ x\ TAC\ x\ FIA$$

Where,
CB= annual biodiversity certificate
Extent= project hectares
TAC= Annual Stewardship Rate equals 3.0 points.
FIA= aggregated importance factor (Section 7.3).

The Annual Stewardship Rate (TAC) is a constant equal to 3.0 points, awarded only to stewardship-focused projects and conditioned on maintaining ICE ≥ 90% relative to the baseline. This value is not a direct measurement of degradation at a specific site;

rather, it functions as a standardized and conservative parameter that approximates an annual loss of ecosystem condition that is avoided for the project's conservation actions.

The protocol development recognized high variability in deforestation and degradation rates across ecosystems—for example, in Colombia, the Amazon shows very high transformation rates, while other already highly fragmented areas such as inter-Andean valleys or the Casanare altillanura experience different but still intense pressures on ecosystem remnants (e.g., edge effects, agricultural intensification, degradation by fires).

Calculating a project-specific avoided degradation rate would require complex predictive models and local data that are not always available, significantly increasing transaction costs and potentially creating inconsistencies in evaluation. Therefore, a constant rate was chosen to ensure:

- Methodological consistency: all stewardship projects are evaluated under the same standard.
- Transparency and predictability: a clear and predictable framework for developers and investors.
- Reduced barriers: facilitating participation of projects without resources for complex counterfactual modeling studies.

The selection of TAC = 3.0 resulted from a balance analysis considering three key axes:

- Scientific plausibility and conservatism: 3.0 was set as a plausible and conservative estimate of annual degradation pressure faced by priority ecosystems. While lower than deforestation rates reported in the most active fronts, it recognizes that even ecosystems in already intervened landscapes are subject to chronic degradation that, without active conservation, would result in a measurable loss of structure, composition, and function.
- Market feasibility and financial sustainability: a preliminary analysis of the potential market for biodiversity certificates found 3.0 sufficient to generate a financial incentive that positions conservation as an economically viable land use. A lower rate might not cover operating costs (monitoring, surveillance, prevention, etc.), while a much higher rate might lack technical support.
- Incentive balance with the restoration approach: improvement (restoration) projects have significantly higher implementation and maintenance costs (e.g., purchase of plant material, labor for planting, control of invasive species).

Therefore, TAC = 3.0 was calibrated to adequately reward the valuable service of conservation without overestimating unit generation to the point of discouraging

restoration investment, creating a balance so both conservation and restoration projects are market-viable and necessary to achieve a true Net Biodiversity Gain.

7.3 Calculation of the Aggregated Importance Factor (FIA)

The Aggregated Importance Factor (FIA) is a multiplier that adjusts the number of Biodiversity Certificates generated. Its purpose is to further value gains obtained in high-priority conservation contexts, recognizing that not all biodiversity gains have the same strategic impact. FIA is calculated as the sum of the following factors:

$$FIA = FMe + FMs$$

Where,
FIA= Aggregated Importance Factor
FM_e= Ecosystem Threat Factor
FM_s= Strategic Significance Factor

7.3.1 Ecosystem Threat Factor (FM_e)

Based on the IUCN Red List of Ecosystems [42], a global standard assessing ecosystem collapse risk. A higher multiplier is assigned to projects generating gains in more threatened ecosystems, since these actions are more urgent, often more costly, and contribute directly to preventing irreversible ecosystem losses (Table 2)[43].

Table 2. Value scales for the multiplier factor (FMe) related to ecosystem threat category.

IUCN Category	Multiplier factor
CR (Critically Endangered)	2.00
EN (Endangered)	1.75
VU (Vulnerable)	1.50
NT (Near Threatened)	1.25
LC / DD / NE	1.00

[42] The use of the LRE layer in Tremarctos 3.0 is recommended. https://conservation.maps.arcgis.com/apps/webappviewer/index.html?id=90e0f9ed976c4e238e303dd453a4793b. For projects located in countries other than Colombia, recognized international layers (e.g., WTE, Global Ecosystem Typology, Global Ecosystems Atlas) or equivalent nationally homologated layers may be used, as long as methodological correspondence is documented and comparability with the national ecosystem category applied is ensured.

[43] The categories and reference values associated with ecosystems shall be updated in accordance with revisions published by the IUCN or by authoritative scientific analyses (e.g., Jung et al., 2021). Any such modifications shall be incorporated and formally communicated through the Canal Clima Biodiversity Protocol website.

7.3.2 Strategic Significance Factor (FM_S)

Based on the global priority framework of Jung et al. (2021, Nature)[44], identifying the world's most important terrestrial areas for simultaneous conservation of biodiversity, carbon retention, and water provision (Figure 8). A higher multiplier for projects in high-priority areas recognizes and rewards contribution to multiple global sustainability objectives (Table 3).

Table 3. Value scales for the multiplier factor (FM_S) related to the conservation priority of areas.

Global Priority Range (Jung et al. 2021)	Significance Category	Description	FM
Top 10% (percentile 1–10)	Very High	key ecosystems to conserve biodiversity, carbon, and water.	2.0
Percentile 11–30	High	high contribution to one or two dimensions (e.g.. species or carbon).	1.6
Percentile 31–50	Medium	useful to complement conservation objectives and connect higher-priority areas.	1.3
> 50% (percentile 51-100)	General	no special priority globally but still local value	1.0

To determine this factor, the developer must locate project-area coordinates on the global priority map provided in Jung et al. (2021) (or its updates) and determine the priority percentile in which it falls[45].

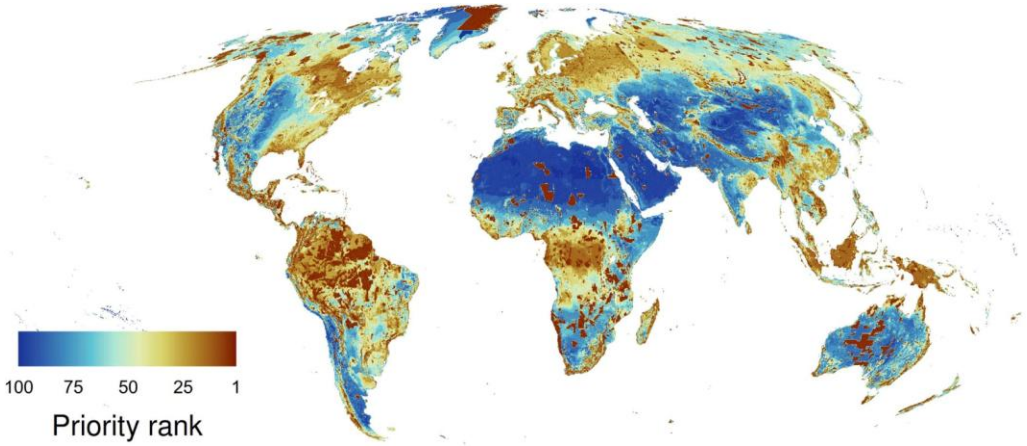

Figure 8. Map of the most (1–10) and least (90–100) important areas to conserve globally based on a multi-criteria analysis of biodiversity, carbon, and water. Adapted from Jung (2021).

[44] Jung, M., Arnell, A., de Lamo, X. et al. Areas of global importance for conserving terrestrial biodiversity, carbon and water. Nat Ecol Evol 5, 1499–1509 (2021). https://doi.org/10.1038/s41559-021-01528-7

[45] Maps may be downloaded from https://zenodo.org/records/5006332, specifically from the layer containing the "Biodiversity Carbon Water" criteria. Evidence of this location and the map's data source must be included in the project documentation.

Local/regional-scale alternative

Recognizing that global-scale analyses may not capture the full ecological and social particularities of a territory, an option is established for the project developer to propose a more detailed (local or regional) evaluation of strategic significance.

If the developer considers that the project area's significance differs from that estimated by Jung et al. (2021), they may submit an alternative methodology to justify a higher FM_S.

The proposed methodology must meet the following rigor criteria:

- **Scientific and Referenced Basis:** The methodology should be grounded in sound ecological principles and, preferably, based on peer-reviewed scientific studies or nationally or subnationally recognized conservation planning frameworks.
- **Multiple Valuation Criteria:** As with the global reference framework, the justification should integrate multiple dimensions of the area's value, including, at a minimum, importance for biodiversity (e.g., presence of threatened or endemic species or unique ecosystems), value for the provision of key ecosystem services (e.g., water regulation, carbon storage), and ecological connectivity[46].
- **Primary and High-Resolution Data:** Priority should be given to the use of the highest resolution and most up-to-date cartographic data available for the study region.
- **Territorial and Conservation Context:** The methodology must demonstrate how the project area aligns with or contributes to conservation priorities established in territorial planning instruments, national or subnational public policies (e.g., Land Use Plans, Biodiversity Action Plans, Nationally Determined Contributions - NDCs).
- **Validation and Transparency:** The methodology and its results must be presented clearly and transparently, allowing for replication. The inclusion of validation processes with relevant local actors, such as environmental authorities, local communities, or academic institutions in the region, will be viewed positively.

The developer must submit a report to Canal Clima along with project documentation. The final decision on accepting the alternative methodology and the resulting

[46] The Environmental Information System of Colombia - SIAC (https://siac-datosabiertos-mads.hub.arcgis.com/), and other open data platforms such as the IGAC Geoportal, IDEAM, and Colombia en Mapa (https://www.colombiaenmapas.gov.co/?u=0&t=2), among others, should be taken into consideration. If the project is located outside Colombia, it must use regional data from the corresponding country.

adjusted FMS assignment rests exclusively with Canal Clima and its technical evaluators, who will ensure rigor and technical justification are consistent with this protocol's high standards.

7.4 Ecological emergency fund

The emergency fund will be intended to finance restoration, mitigation, and recovery actions in response to unforeseen events or force majeure that affect biodiversity within the project area—understood as events beyond the will of project actors[47].

- It will be constituted with a minimum percentage of 10% of net revenues generated by the sale of Biodiversity Certificates in each issuance period.
- These resources will be managed as a specific budget line, owned by the project developer or a duly established trust, with exclusive use for addressing unforeseen events.

To activate the funds, the following will be required:

- Report of the unforeseen event within a maximum period of 30 days after the event.
- Approval by the project holders or actors directly involved
- Verifiable technical evidence (photos, coordinates, maps, field reports, authority reports).
- Fund governance will be led by the project developer with the backing of the designated Evaluation Body (CAB), which must issue a technical report justifying release of resources or reserve units.

In addition,

- To ensure a transparent process, the developer must submit a management report whenever requested by the certifier and/or CAB, detailing accumulated resources, expenditures executed, and available balance. Use of the funds will be subject to independent verification by the CAB in each audit cycle.
- The developer must monitor the affected management indicators for a minimum period of two years.
- The project baseline, given the occurrence of the event, must be updated within a maximum of one year[48]; it may change after registration.
- At the end of the project accreditation period, emergency funds that have not been used will be distributed according to the benefit-sharing scheme agreed by participants.

[47] If it is determined that the event occurred due to an action or omission attributable to any of the project parties or actors, no more than 30% of the fund may be released, and solely for the purpose of mitigating the damage caused.

[48] If an event occurs that alters the ecosystem (ecological disturbance), the project has up to one year to remeasure and adjust its baseline, ensuring that future comparisons (gains or losses) remain valid and fair.

Example,

> A fire affects 20 hectares of the restored area. The event is classified as force majeure. The fund is activated through a technical report by the developer with approval from the CAB and Canal Clima, allocating resources for recovery of the affected zone and temporary compensation for the loss of ecosystem condition.

7.5 Hypothetical case studies

Two hypothetical case studies are presented to illustrate how the formulas for quantifying Biodiversity Certificates (GBU) are applied under different scenarios. These examples are designed to guide developers in calculating and interpreting their own results:

Case 1. Restoration (Improvement) with a conservative result

- Context: A 150-hectare project seeking to restore an area. Ecological improvement is modest.
- Key data:
  - Condition gain (ICE): 10 points (from 25% to 35%).
  - Importance Factor (FIA): 2.80.
- Total calculation: 150 ha x 10 gain points x 2.80 FIA = **4,200 annual certificates.**
- Equivalence: 4,200 GBU / 150 ha = **28 certificates per hectare per year.**

Case 2. A 300-hectare project that protects a highly threatened ecosystem of high strategic importance.

- Annual Stewardship Rate (TAC): 3.0 (fixed value).
- Importance Factor (FIA): 3.35.

Total calculation: 300 ha x 3.0 TAC x 3.35 FIA = **3,015 annual certificates.**

Equivalence: 3,015 GBU / 300 ha = **10.05 ≈ 10 certificates per hectare per year[49].**

8 DEVELOPMENT OF THE MONITORING AND REPORTING PLAN

This chapter establishes methodological and strategic guidelines for planning, executing, and analyzing monitoring of biodiversity and associated environmental conditions. Proper implementation culminates in the periodic generation of a Monitoring Report, a key document to evaluate performance, impacts, and the

[49] Rounding shall be applied conservatively, generally downward, for the final result.

effectiveness of implemented management measures, as well as compliance with the project's environmental objectives and commitments.

8.1 Collection of environmental data

Monitoring environmental variables is essential to understand habitat conditions and their influence on biodiversity. Essential variables to consider must be field-collected data and include:

- Air temperature (°C)
- Relative humidity (%)
- Precipitation (mm)
- Altitude (m.a.s.l.)
- Soil type

8.2 Sampling design for biological data

The sampling plan design must be robust and consider data representativeness, the project's spatial and temporal scale, and the biological characteristics of the taxonomic groups to be evaluated. Method selection must be based on the specific objectives of sampling, groups of interest, available budget, and terrain conditions.

All methodologies must be accompanied by a detailed protocol including equipment description, sampling effort, sampling location, and collection procedures. Options of sampling methods[50], are presented below, allowing flexibility in data collection:

- **Direct sampling / scientific collection**: Enables precise species identification through capture and subsequent release or specimen collection (provided collection permits are granted by the competent environmental authority)[51].
- **Camera traps**: Non-invasive tool for recording terrestrial fauna, especially medium and large mammals and birds; provides data on presence, relative abundance, activity, and behavior.
- **Drones**: Useful for mapping vegetation cover, detecting landscape changes, monitoring large areas, identifying deforestation or regeneration patterns, and in some cases counting megafauna individuals in open areas.
- **Audio recordings (bioacoustics)**: Enables non-invasive monitoring of vocalizing species (birds, amphibians, some mammals and insects), using autonomous recorders or real-time monitoring systems.

[50] Relevant information must be collected in the field and properly documented (including photographic records, field logs, and reports) to ensure traceability. This documentation shall form part of the project annexes.

[51] Such as the Ministry of Environment and Sustainable Development, the National Environmental Licensing Authority (ANLA), or the Regional Environmental Authorities, as applicable.

- **Environmental DNA (eDNA) and metabarcoding:** Cutting-edge molecular methods for detecting species from environmental samples (water, soil, feces). eDNA confirms presence without direct observation, especially useful for rare or elusive species. Metabarcoding identifies multiple species in a single sample, highly efficient for characterizing community diversity (e.g., diets, plankton, soil invertebrate communities).

8.3 Monitoring frequency for biological data

To balance scientific rigor and financial feasibility, the protocol establishes a modular and progressive monitoring approach (Figure 9):

- **Baseline (Year 0):** An initial, comprehensive, robust measurement of all indicators selected by the developer for biodiversity attributes. This unique event establishes the reference value (ICE% t_0) used to determine the protocol route and is an indispensable requirement for project registration.
- **Modular monitoring scheme:** Indicators must be collected as follows:
    - Mandatory annual
        - All indicators of Biotic Structure (Es).
        - All indicators of Landscape Connectivity (Cp).
        - Indicators for the **Plants** taxonomic group (within Community Composition).
        - Indicators for one **Fauna** taxonomic group (within Community Composition) considered most significant for the study area.
    - For the remaining fauna groups, the developer must propose and justify a rotation cycle.
        - Monitoring 2: Fauna Group 2 (e.g., mammals).
        - Monitoring 3: Fauna Group 3 (e.g., reptiles).
        - Monitoring 4: Fauna Group 4 (e.g., amphibians).
    - **Monitoring every 5 years:** The project must report a complete monitoring event in its corresponding report, measuring again **all** original indicators in the same way as in the baseline.
    - To maintain ICE% comparability over time, intermediate-year calculations use a "**data carry-forward**" method (Figure 9):
        - For fixed annual indices, values measured in the reporting year are used.
        - For non-annual indices, the value from the latest available monitoring for that group is used (either baseline or previous intermediate monitoring).

8.4 Data quality control

Quality control is essential to ensure reliability and validity of results. This section includes:

- Species accumulation curves: Fundamental tool to assess sampling effort representativeness. Sampling effort is considered sufficient if the curve shows a clear tendency to stabilize or reach an asymptote; more than 85% of estimated species richness should be captured according to extrapolation models [52].
- Equipment calibration: Periodic verification and calibration of all measuring equipment (GPS, thermometers, pH meters, etc.) to ensure accuracy of environmental and biological data.

Note: All processes of data collection, storage, and analysis must comply with QA/QC protocols. The developer must ensure full traceability of records from field capture to verification by the evaluation body (CAB), including standardized formats, digital backups, and recording dates, responsible parties, and methodologies used.

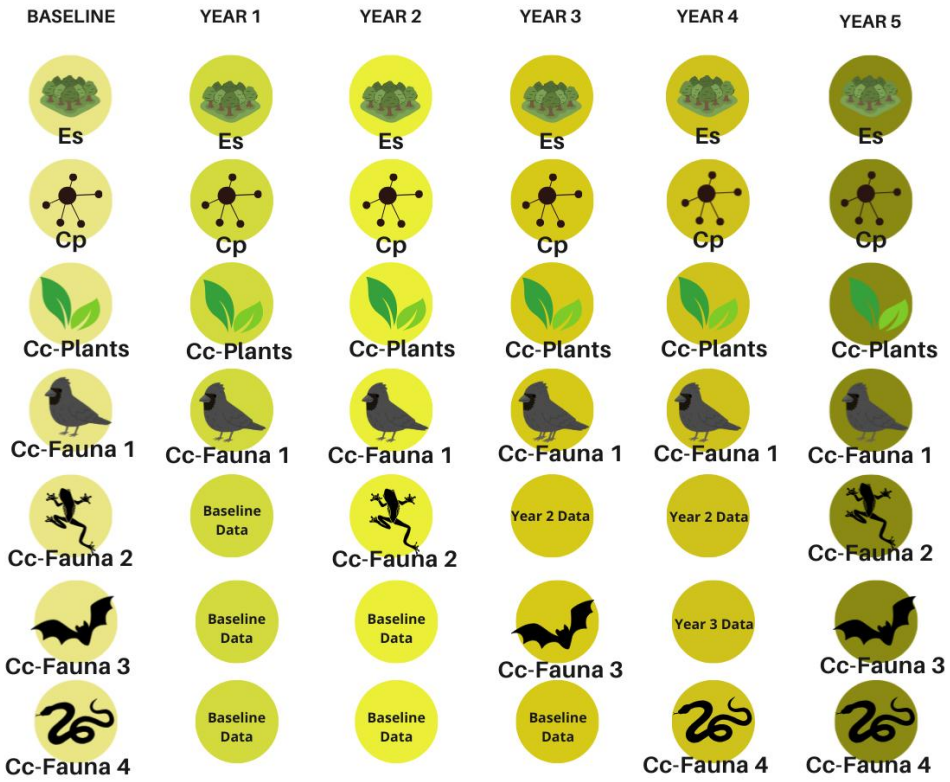

Figure 9. Graphic representation of the atemporal monitoring scheme.

[52] Álvarez, M., Córdoba, S., Escobar, F., Fagua, G., Gast, F., Mendoza, H., Ospina, M., Umaña, A., & Villarreal, H. (2004). Manual de métodos para el desarrollo de inventarios de biodiversidad. Instituto de Investigación de Recursos Biológicos Alexander von Humboldt.

8.5 Data management

Proper data management is crucial for accessibility, integrity, and future use. The following practices must be implemented:

- Use of standardized formats: Implement field recording formats and databases that facilitate standardized data capture, subsequent review, and interoperability with other platforms.
- Publishing and use of open data platforms: Consider publishing data on global open-data platforms such as UN Biodiversity Lab, SIB, GBIF, IUCN Red List of Threatened Species, Movebank, and iNaturalist. These platforms increase data visibility, foster scientific collaboration, and contribute to citizen science. Other relevant platforms may include eBird for birds or group/region-specific data repositories.

8.6 Design of general project indicators

This is where indicators used to assess project performance across various areas are defined. Indicators must be presented in a data matrix with supporting evidence, showing progress and traceability:

- Environmental, social, and economic safeguards indicators (Section 3.7).
- Project activities indicators (Section 3.8).
- Leakage analysis indicators (Section 3.9).

Indicators must be accompanied by:

- Baseline: starting parameter at project start time against which improvements will be generated.
- Target: quantitative objective at the end of the indicator's analysis period considering the baseline scenario.
- Unit of measure: variable used to report the indicator period by period.
- Schedule: temporal representation of proposed monitoring activities for the entire project cycle and their frequency.
- Responsibilities: define roles and responsibilities of teams involved in executing monitoring.

8.7 Monitoring Report

A periodic document generated after implementing the Monitoring Plan to be submitted to MinAmbiente or Canal Clima, depending on the protocol route. Its function is to present, analyze, and interpret the results of what has been monitored.

The monitoring report must include the following sections:

- Executive Summary
- Introduction
- Applied Monitoring Methodology
- Monitoring Results:
    - Environmental data collection.
    - Biological monitoring results.
    - Monitoring of environmental, social, and economic safeguards.
    - Monitoring of project activities.
    - Leakage analysis.
- Analysis and discussion of results:
    - Interpretation of findings, identifying impacts (positive and negative), trends, effectiveness of measures, and possible causes of deviations.
    - Comparison with baseline and project objectives.
- Changes or updates to project design not previously reported
- Disturbances or alterations identified in the project area
- Conclusions and recommendations.
- Annexes
    - databases, maps, reporting matrices, photographs, field records, calibration sheets, etc.

*Note: For Habitat Banks adopting **pay-for-performance**, coherence must be maintained with financial milestones and the certificate issuance schedule. Each monitoring cycle may constitute a verification point for releasing resources or partial issuance of certificates, subject to validation by the CAB.*

9 THIRD-PARTY EVALUATION

This chapter details the responsibilities, principles, and requirements that conforming evaluation bodies (CAB)[53] must meet. Independent evaluation guarantees credibility, transparency, and technical rigor in validation and verification of conservation projects, ensuring compliance with ecological and management milestone.

9.1 Principles

Conforming evaluation bodies must guide their actions according to the following principles:

[53] A third-party evaluation body (also referred to as an independent third party) is an external, impartial entity with no conflict of interest that conducts evaluations, verifications, or certifications to assess compliance with specific norms, standards, or requirements.

- **Independence:** fully independent from the evaluated project, free of conflicts of interest, without bias, and objective in their findings and conclusions, which must be based on evidence generated during the process.
- **Proper conduct:** Act with professional ethics, demonstrating integrity, discretion, confidentiality, and responsibility toward actors involved in the process.
- **Fair presentation:** truthfully and accurately represent evaluation activities, findings, conclusions, and reports, including any significant difficulty or unresolved difference of opinion between parties.
- **Professional care:** Apply professional judgment commensurate with the importance of the task and trust placed by stakeholders, demonstrating necessary skills and competencies.
- **Evidence-based approach:** Use a technical approach grounded in verifiable evidence and appropriate sampling to support findings.

9.2 Eligibility criteria for evaluators

Evaluators must meet specific criteria to ensure integrity, quality, and technical competence of evaluation processes.

9.2.1 General requirements

The protocol recognizes two independent evaluation modalities, designed to ensure high standards of transparency, rigor, and technical experience.

- **Entities under ISAE 3000[54]**

This modality is directed to audit firms that apply the International Standard on Assurance Engagements (ISAE) 3000, recognized for use in audits of non-financial and sustainability information.

Requirements:

- Be a legally established firm and independent of the evaluated project.
- Consistently apply ISAE 3000 in evaluation processes.

Required experience:

- Assurance of non-financial information (sustainability reports, ESG, etc.).

[54] Once the ISSA 5000 standard is fully in force in the relevant countries (or accepted by local and regional regulatory and market stakeholders), the Protocol may adopt ISSA 5000 as the primary standard for sustainability assurance engagements, to align the Protocol with emerging global standards.

- Technical knowledge in environmental assessment and biodiversity management.
- Ideally, experience with reporting frameworks such as:
    - GRI (Global Reporting Initiative): global standards for sustainability reporting.
    - Natural Capital Protocol (NCP): Experience in applying the protocol for measuring, valuing, and reporting natural capital in business decisions, especially in sectors with high dependence on or impact on biodiversity.
    - CDP – Forests and Biodiversity Reporting: Experience evaluating statements made through the CDP (formerly Carbon Disclosure Project), especially those related to land use, forests, and biodiversity.
    - Science Based Targets for Nature (SBTN): Experience in validating or evaluating science-based corporate goals for biodiversity, water, soil, and ecosystems.
    - TNFD - Taskforce on Nature-related Financial Disclosures: Experience in identifying, assessing, and communicating risks and opportunities related to nature. Familiarity with the LEAP approach (Locate, Evaluate, Assess, Prepare) and with integrating biodiversity dependencies and impacts into business strategy and financial decision-making.

- **Conformity Assessment Bodies (CAB)**

This modality is directed to entities specifically accredited to validate and verify environmental initiatives.

Requirements:

- Accredited under ISO/IEC 17029, ISO 14065, ISO/FDIS 17620, ISO/FDIS 17298[55].

Required experience:

- Evaluation of ecological restoration, afforestation, reforestation, and/or biodiversity conservation projects.
- Participation in certification or accreditation standards involving biodiversity seals.

[55] ISO/FDIS 17620 (https://www.iso.org/standard/84992.html), ISO/FDIS 17298 (https://www.iso.org/standard/84899.html).

9.2.2 Legal compliance and integrity

- Demonstrate adherence to current legal and ethical regulations in countries where they operate, and to protocol-specific provisions.
- Not having pending legal proceedings for malpractice or fraud.
- Not have been found responsible in concluded legal proceedings for malpractice or fraud.
- Prior to initiating third-party evaluation, the evaluator designated by the project holder must formally declare to the program the absence of conflicts of interest regarding the project and its holder, as well as familiarity with the initiative and its proponents.

Note: To ensure independence, impartiality, and technical quality of the certification process, CABs must rotate evaluation teams every two (2) consecutive verification cycles. They must also demonstrate verifiable technical competencies through specialization matrices by ecosystem or taxonomic group, ensuring professionals responsible for verification have proven experience.

9.2.3 Technical capacity and resources

The evaluator must have qualified technical personnel and the resources necessary to ensure competence and efficiency across all stages of evaluating projects registered under this protocol.

This includes:

- Demonstrated ability to conduct evaluations under the relevant sectoral analysis framework, including biodiversity.
- Sufficient resources to ensure continuity of technical and operational competence during the time the evaluator remains approved under the protocol.
- Individual accreditation of auditors and reviewers, demonstrating they meet the necessary competencies to perform evaluations in approved sectors and methodologies.

9.3 Approval process for evaluating entities

The approval process for third-party evaluating entities within this protocol responds to the need to have evaluators who are technically competent, independent, and experienced in analyzing conservation and restoration projects. Interested entities may request approval as evaluators through formal communication addressed to Canal Clima, following the guidance established in this document and attaching the corresponding documentation:

a. Certificate of legal existence and representation (or equivalent document).
b. Identity document of the legal representative.
c. Documents supporting accreditation under one of the following modalities:
    - For audit entities under ISAE 3000: evidence of consistent application of ISAE 3000, including a history of similar engagements and experience in sustainability or environmental management.
    - For Conformity Assessment Bodies (CAB): evidence of current accreditation under ISO 14065:2020, ISO/IEC 17029:2019, ISO/FDIS 17620:2025, ISO/FDIS 17298:2025, Granted by a signatory body of the International Accreditation Forum (IAF).
d. List of projects evaluated in environmental and biodiversity-related topics, including successfully completed audits, rejected audits (if applicable), average duration of evaluation processes, and other relevant performance indicators.
e. Position profile and competency framework of the evaluation team: The CAB must provide the minimum education and experience criteria, and/or the technical competency matrix applied internally to assign and supervise the professionals responsible for each evaluation process, in accordance with Sections 9.3.2 and 9.3.3 of this Protocol and Table 4, Evaluator Team Competency Requirements Matrix, of this document.
f. Validation and Verification Agreement: The approved CAB must enter into a Validation and Verification Agreement with Canal Clima under the Biodiversity Credits Program (COLBS), formalizing the scope, duties, and conditions of performance as an evaluator, including obligations related to independence, confidentiality, and report quality. Execution of this agreement is a prerequisite for being authorized as an evaluator under this Protocol.
g. Any additional documentation that the evaluating entity considers pertinent to support its suitability.

During the review process, Canal Clima may request additional information or documentation if deemed necessary. In the case of an unfavorable evaluation, the entity will be notified of the reasons for rejection.

9.3.1 Criteria for the Formation of the Evaluation Team

To carry out independent evaluation processes within the biodiversity component of the Protocol, Evaluation Bodies -including accredited CABs and entities applying ISAE 3000- must establish evaluation teams that ensure technical competence, impartiality, and thematic specialization.

Team Composition: Each entity must have at least two professionals, who will perform the following roles:

- **Evaluation Leader**: The person responsible for leading the process, overseeing the methodological approach, and making final decisions. Preferably:
    - Professional with an undergraduate and postgraduate degree in biology, ecology, environmental sciences, or related fields.
    - Experience in biodiversity monitoring and evaluation in terrestrial, aquatic, or coastal-marine ecosystems.
    - Demonstrated knowledge in biodiversity quantification methodologies, ecological data analysis, and use of tools such as GIS, remote sensing, eDNA, camera trapping, or bioacoustics.
    - Team management skills and experience coordinating environmental audit processes.
    - Ability to interpret and apply biodiversity certification standards and socio-environmental safeguards.

- **Technical Reviewer**: The person supporting the leader, ensuring that all technical aspects are evaluated in accordance with applicable standards and regulations. Preferably:
    - Professional with training and experience in biodiversity monitoring or conservation management.
    - Knowledge of ecological indicators, environmental database management, and technical validation of monitoring reports.
    - Experience in verifying compliance with applicable technical and regulatory standards.
    - Support the leader in reviewing methodological quality and consistency of the information presented.

Team members may be internal or external to the evaluating entity, provided there is a formal contractual relationship guaranteeing their commitment and responsibility. If external experts are appointed, the evaluating entity remains responsible for the quality and consistency of the work performed.

- **Technical expert:** When the evaluation lead or the technical reviewer does not possess the specialized competence required to assess specific components of a project, the CAB may incorporate a technical expert to address that specific gap without compromising the integrity of the process.

  A technical expert is understood as a professional with specialized knowledge in a specific area or discipline that is not sufficiently covered by the core evaluation team. Their participation is limited and targeted: they do not assume responsibility for leading the process nor do they replace the evaluation lead or the technical reviewer in their overall responsibilities; rather, they complement them in the specific technical aspects for which they have been engaged.

The incorporation of a technical expert is subject to the following conditions:

- **Formal designation:** The CAB must notify Canal Clima, prior to the start of the evaluation, of the expert's name, profile, the specific component under their responsibility, and the technical justification for their inclusion.
- **Demonstrable qualifications:** The expert must demonstrate verifiable suitability in the required area of specialization. Canal Clima may object to the designation if it considers that the profile does not meet the standards of the Protocol.

The role of the technical expert may not be used to substitute the minimum general competencies required of the core team under Sections 9.3.2 and 9.3.3. If the core team lacks these competencies, the CAB shall not be deemed eligible for the project.

9.3.2 Competency Requirements

The Protocol requires evaluators to possess training, technical experience, and specific skills in biodiversity monitoring and net biodiversity gain analysis, ensuring high-quality evaluations grounded in scientific and technical principles.

Technical Knowledge and Experience

Evaluators must demonstrate knowledge of the Protocol and its application to the biodiversity component, including:

- Eligibility criteria, additionality, baseline, leakage, and safeguards.
- Methods for quantifying positive biodiversity impacts, such as habitat increase, improvement in ecological integrity, recovery of key species, among others.
- Relevant technical instruments (maps, connectivity models, biodiversity indices, etc.).

Additionally, they must have proven experience in at least one of the following sectors and activities associated with biodiversity conservation and restoration:

- Ecological restoration: Rehabilitation of degraded ecosystems, revegetation with native species.
- In situ conservation: Protection of habitats, biological corridors, community protected areas.
- Biodiversity monitoring: Design and implementation of monitoring plans for flora, fauna, and ecosystem functions.
- Sustainable production: Agroecology, regenerative livestock systems, silvopastoral systems, sustainable bioeconomy.

Professionals must demonstrate the ability to apply technical analysis tools, validate monitoring systems, and verify results based on objective evidence.

The accreditation of these competencies shall be carried out through the documentation of position profiles and/or the competency matrix submitted by the CAB in accordance with item (f) of Section 9.3 of this Protocol.

The CAB is responsible for internally verifying that the professionals assigned to each process meet the requirements of this section prior to initiating the evaluation. Canal Clima may request, at any time, evidence of such internal verification.

9.3.3 Required Skills and Capacities

Designated evaluators must possess the technical competencies, communication skills, and leadership capacities necessary to ensure compliance with the standards established by the Protocol. The main requirements are described below:

- **Evaluation, Data Collection, and Analysis**

Evaluators must have experience in data evaluation, collection, and analysis, focusing on assessing the statements contained in the Biodiversity Initiative Document (BID) and Monitoring Reports (MR). These activities include verifying whether the client has appropriately identified, collected, analyzed, and reported all relevant data, and confirming that corrective actions have been taken to address findings or misstatements..

To effectively perform these activities, evaluators must be able to:

- Apply basic conformity assessment concepts and use auditing techniques.
- Employ statistical sampling methods to select and analyze representative data supporting client statements.
- Verify the accuracy of the data provided, audit the information systems used, simulate reported scenarios, and ensure the quality of information generated during the process.
- Obtain information from various sources using appropriate methods, analyze risks associated with the evaluation process, and propose mitigation measures when necessary.

- **Report Writing**

Evaluators must demonstrate skills in drafting technical audit reports. Reports must be clear, precise, and aligned with the Protocol requirements, ensuring transparency and quality of the information presented.

- **Knowledge of the Protocol and Regulatory Framework**

Evaluators must be knowledgeable about the Protocol requirements, including quantification methods, baseline assessment, additionality, and verification of

compliance with applicable legal and environmental requirements in the host country where the project is implemented, among others.

- **Communication Skills**

The evaluation team must communicate effectively regarding relevant aspects of their activities, ensuring appropriate interaction with all stakeholders. This competency guarantees understanding and alignment throughout evaluation processes.

- **Leadership and Team Management**

The evaluation team leader must demonstrate sufficient knowledge and experience in the processes being evaluated, as well as management skills to coordinate and lead the team. Their responsibility is to ensure achievement of the objectives defined in each process and maintain alignment with the principles of the Protocol.

The accreditation of the skills described in this section shall be carried out through the documentation of profiles submitted in accordance with item (f) of Section 9.3. Canal Clima may establish additional verification mechanisms, including mandatory periodic training or performance audits of the CAB.

The following table summarizes the competency dimensions that the CAB must demonstrate within its evaluation team, in accordance with Sections 9.3.2, 9.3.3, and item (f) of Section 9.3 of this Protocol.

Table 4 Evaluation Team Competency Requirements Matrix

Dimension	Competency Element	Means of Verification	Required Level
Academic background	Bachelor's degree in biology, ecology, environmental sciences, or related fields. A postgraduate degree in conservation or ecosystem-related areas is valued.	Diplomas, degree certificates	Mandatory (undergraduate). Desirable (postgraduate)
Biodiversity experience	Minimum of 3 years in biodiversity monitoring, sampling design, or assessment of terrestrial, aquatic, or coastal-marine ecosystems.	Employment certificates, contracts, project reports	Mandatory for leader. Desirable for technical reviewer.
Knowledge of the COLBS Protocol	Understanding of ICE% calculation, additionality, baseline, safeguards, and the certification process.	Training accredited by Canal Clima or technical entry assessment.	Mandatory for both roles.
Analytical tools	Proficiency in GIS (ArcGIS, QGIS), statistical software (R, Python), and connectivity indices. Bioacoustics or camera trapping is valued.	Training certificates or practical demonstration.	Mandatory ≥ 2 tools.

Dimension	Competency Element	Means of Verification	Required Level
Audit and conformity assessment	Knowledge of ISO 19011, ISO/IEC 17029, or ISAE 3000, and technical verification report writing.	Valid accreditations or demonstrable training.	Mandatory for lead. Desirable for reviewer.
Socio-environmental safeguards	Knowledge of FPIC, IPLC rights, and benefit-sharing. Required if the project involves collective territories.	Proven experience in projects with social or Indigenous components.	Desirable. Required if IPLC applies.
Communication and reporting	Ability to draft clear technical reports and communicate with diverse stakeholders.	Sample reports or references from previous projects.	Mandatory for both roles.

9.4 Guidelines for Compliance Evaluation

Third-party evaluation is a structured technical process involving the collection, analysis, comparison, and presentation of information necessary to determine whether a project complies with the ecological, methodological, legal, and financial commitments established in the Registration Document (RD) and the Biodiversity Initiative Document (BID). This evaluation is conducted during and after project implementation, covering all dimensions of compliance and performance through specialized activities.

Evaluation functions include, among others:

- **Review of the project's technical design:** Assess the guidelines established in the Registration Document and determine whether the Management Plan is coherent, technically feasible, and appropriate to achieve the project's ecological objectives.

- **Assessment of implementation and progress:** Confirm that Management Plan activities are implemented as planned, determine the percentage of progress, and validate compliance with proposed targets, such as regeneration of intervened areas and recovery of ecosystem functions.

- **Independent monitoring:** Obtain and analyze primary and secondary information from reliable sources, including field visits, when necessary, to contrast results reported by the project operator. This information must enable objective evaluation of both ecological status and project performance.

- **Validation of results for certificate issuance:** Confirm that the results achieved objectively and documentarily support the release of Biodiversity

Certificates, in accordance with the scheme proposed in the Registration Document.

- **Methodological verification:** Ensure consistent application of the quantification and evaluation methodology for net biodiversity gains, in accordance with the technical and operational standards defined by the Protocol.

- **Preparation of technical reports:** Deliver complete technical reports to the registration platform and the project operator, ensuring traceability, transparency, and clear justification of findings and decisions.

10 REGISTRATION SYSTEM

The registration system is a centralized digital platform for registration, storage, traceability, and monitoring of initiatives seeking certification for net biodiversity gains. It ensures the integrity of results and information related to conservation, restoration, and sustainable use activities, as well as the different registration stages.

In addition to guaranteeing transparency, interoperability, and traceability of generated certificates, it is designed to facilitate interaction among stakeholders: project developers, certifying entities, evaluators, certificate purchasers, and oversight bodies.

10.1 About the Registration Platform

The platform implements serialization processes, unit accounting, and technologies such as non-fungible tokens (NFTs) to ensure authenticity and uniqueness of certificates.

10.2 Initiative Registration Process

The registration process aligns with the required elements and data model established in this document. The platform may request additional information where applicable. The process is structured in several phases within the registration system, following these steps:

- User account creation (Manager[56], Evaluator, Trader): Organizations must register their user account on the platform, including identity validation.
- Project information entry: A new project is created, including data such as project name, project activity, location, biome, hydrographic zone, expected positive impacts, and supporting images or videos.
- Upload of baseline documentation: Key project documents are attached, such as land ownership certificate, registration document, conservation agreements,

[56] In this section, it refers to the developer or project manager.

baseline study, species list, and required official forms (e.g., filing with MinAmbiente).

- Verifier review: A verifier user designated by the account manager reviews technical information, approves or requests adjustments, and validates the project's stage transition.
- Certificate registration: After approval, potential project certificates are registered according to capacity, and technical indicators are uploaded. Following validation, potential certificates are reported.
- Certificate issuance: Issued upon verification events of project performance, net biodiversity gains, and successful stewardship of stocks.
- Monitoring and follow-up: Indicator sets and periodic updates may be added to verify maintenance or improvement of ecosystem services.
- Certificate management: The project manager or administrator may add new users and manage certificates for retirement, transfer, cancellation, among other actions.

10.3 Data treatment

The selected platform must comply with national and international data protection regulations, ensuring that user-submitted information is handled securely and confidentially. Only information necessary for system transparency will be made public, while sensitive or strategic data will be restricted to authorized users. Account creation includes informed consent and explicit acceptance of personal data processing.

11 ANNEXES

11.1 Regulatory References

This Protocol is based on current Colombian environmental legislation governing impact management and biodiversity loss compensation, as well as the mandatory 1% investment related to water resource use[57]:

- **Law 99 of 1993**: Establishes the National Environmental System (SINA) and mandates investment of at least 1% of the total project value in watershed recovery and preservation activities. It also establishes the requirement for environmental licensing for projects with the potential to cause environmental deterioration (Congress of Colombia, 1993).

[57] Ministerio de Ambiente y Desarrollo Sostenible. (2012). Resolución 1517 de 2012.
Ministerio de Ambiente y Desarrollo Sostenible. (2014). Decreto 2041 de 2014.
Ministerio de Ambiente y Desarrollo Sostenible. (2015). Decreto 1076 de 2015.
Ministerio de Ambiente y Desarrollo Sostenible. (2016). Decreto 2099 de 2016.
Ministerio de Ambiente y Desarrollo Sostenible. (2017). Resolución 1051 de 2017.
Ministerio de Ambiente y Desarrollo Sostenible. (2018). Resolución 256 de 2018.

- **Decree 1791 of 1996 and 1076 of 2015**: Regulate forest use, establishing compensation measures for the removal of vegetation cover, and consolidate environmental regulations into a single regulatory decree (Ministry of Environment and Sustainable Development (MinAmbiente, 2015).

- **Decree 2041 of 2014**: Defines the environmental license as a mandatory prior authorization for projects with significant environmental impact and introduces the Environmental Impact Assessment (EIA) as the primary instrument, including the mandatory 1% investment and the biodiversity loss compensation plan (MinAmbiente, 2014).

- **Decree 2099 of 2016**: Allows implementation of the mandatory 1% investment through mechanisms such as payments for ecosystem services, conservation agreements, or Habitat Banks, within the framework of Decree 1076 of 2015 (MinAmbiente, 2016).

- **Resolution 1517 of 2012 and Resolution 256 of 2018**: Establish and update the Biotic Component Compensation Manual, defining criteria to determine how much, where, and how to compensate under the mitigation hierarchy principle (MinAmbiente, 2012, 2018).

- **Resolution 1051 of 2017**: Regulates the registration and operation of Habitat Banks as a valid mechanism to channel mandatory investments and environmental compensations, ensuring sustainability, additionality, and continuous monitoring criteria (MinAmbiente, 2017).

11.2 Technical References

- IPBES (2019). *Global assessment report on biodiversity and ecosystem services*: Provides the scientific justification for linking ecosystem health with human well-being.
- Alexander von Humboldt Biological Resources Research Institute (2013). Manual of Methods for Biodiversity Inventories: The key national technical reference for project developers in Colombia. The Protocol adopts its recommendations regarding the use of Alpha diversity indices (Species Richness S, Shannon H', Simpson λ) for the Composition attribute and validates the use of Species Accumulation Curves to ensure sufficient sampling effort.
- Jung, M., et al. (2021). *Areas of global importance for conserving terrestrial biodiversity, carbon and water*[58]: Provides the global priority map and methodology underlying the Strategic Significance Multiplier Factor, enabling valuation of projects according to their contribution to biodiversity, carbon, and water conservation at the global scale.

[58] Jung, M., et al. (2021). Areas of global importance for conserving terrestrial biodiversity, carbon and water. Nature, 592(7856), 737-742

- Keith, D.A. et al. (2013). *Scientific Foundations for an IUCN Red List of Ecosystems*[59]: Establishes the scientific basis for the IUCN Red List of Ecosystems, the global standard used in this Protocol to define categories and scoring of the Ecosystem Threat Multiplier Facto.
- Margules, C. R., & Pressey, R. L. (2000). *Systematic conservation planning*[60]: Establishes principles of systematic conservation planning, supporting the mandatory inclusion of Landscape Connectivity as a critical attribute for assessing long-term viability and contextual value of biodiversity projects.
- Ministry of Environment and Sustainable Development of Colombia (2018). Manual for the Allocation of Biotic Component Compensations: Used as a key conceptual reference, particularly in valuing ecosystems based on threat level and applying principles such as additionality and no net loss.
- Noss, R. F. (1990). *Indicators for monitoring biodiversity: a hierarchical approach*[61]: Justifies the selection of Structure, Composition, and Function as core attributes for comprehensive biodiversity assessment and forms the conceptual basis of the Ecosystem Condition Index (ICE).
- SER (Society for Ecological Restoration). (2019). *Principios y Estándares Internacionales para la Práctica de la Restauración Ecológica*: Defines international principles and standards for ecological restoration practice, serving as the mandatory good practice framework for project activities under the Improvement Approach.

11.3 Biodiversity Indices Table

Below is a list of commonly used indicators for biodiversity monitoring within Habitat Bank schemes and biodiversity certificate initiatives:

Table 5 Biodiversity Indices That May Be Considered in Initiatives

Indicator	Primary Attribute	Type of Diversity	Concise Description
Ecosystem Function Indicators			
Organic Matter	Function	Not applicable	Percentage of organic carbon in the soil, indicator of fertility and health.
Biomass	Function	Not applicable	Total amount of living matter in an area, related to the productivity of the ecosystem.
Mortality and recruitment rates	Function	Not applicable	Population dynamics indicate an ecosystem's capacity to regenerate.

[59] Keith, D.A. et al. (2013). Scientific Foundations for an IUCN Red List of Ecosystems. PLoS ONE 8(5): e62111

[60] Margules, C. R., & Pressey, R. L. (2000). Systematic conservation planning. Nature, 405(6783), 243-253.

[61] Noss, R. F. (1990). Indicators for monitoring biodiversity: a hierarchical approach. Conservation Biology, 4(4), 355-364

Indicator	Primary Attribute	Type of Diversity	Concise Description
Adaptation Indicator	Function	Not applicable	Evaluate changes in species that indicate resilience to specific conditions.
Indicators of Structure of Vegetation			
Apical Growth / IMA	Structure (Vegetation)	Not applicable	Plant growth measurements indicate canopy vitality and development.
Distribution by Height Classes	Structure (Vegetation)	Alpha	The proportion of individuals in different height ranges describes vertical stratification.
Hedging Exchange Rate (%)	Structure (Vegetation)	Gamma	Variation in the area occupied by vegetation cover, measured using remote sensing or maps.
Indicators of Composition and Structure (Populations/Communities)			
Specific Richness / Species Richness (S)	Composition (Species)	Alpha	Total number of different species present in a community or site.
Relative Abundance	Composition (Species)	Alpha	Proportion of individuals of a species relative to the total community.
Population Density Index	Structure (Species)	Alpha	Number of individuals of a species per unit area.
Shannon-Wiener (H')	Composition/Structure (Species)	Alpha	Measures diversity by combining species richness and evenness. Sensitive to rare species.
Simpson (D)	Composition/Structure (Species)	Alpha	It measures the probability that two random individuals are of the same species. It gives more weight to dominant species.
Pielou Equity (J')	Composition/Structure (Species)	Alpha	Measures how evenly individuals are distributed among species. It ranges from 0 to 1.
Series de Hill	Composition/Structure (Species)	Alpha	Family of indices that unifies wealth, Shannon, and Simpson into a single framework.
Margalef (d)	Composition/Structure (Species)	Alpha	Relate the number of species to the total number of individuals.
Menhinick (Dmn)	Composition/Structure (Species)	Alpha	Relate the number of species to the square root of the total number of individuals.
Berger-Parker (d)	Composition/Structure (Species)	Alpha	It measures the dominance of the most abundant species.

Indicator	Primary Attribute	Type of Diversity	Concise Description
Brillouin	Composition/Structure (Species)	Alpha	Similar to Shannon, but used for complete collections rather than samples.
Rarefaction Curve / Coleman / Michaelis-Menten	Composition (Species)	Alpha	Methods for assessing whether the sampling effort was sufficient to capture the expected diversity.
Chao1 / ACE / Jackknife	Composition (Species)	Alpha	Nonparametric estimators that predict the total richness of species, including undetected ones.
Whittaker (βw)	Composition (Species)	Beta	It measures the change or difference in the species composition between two or more sites.
Jaccard similarity / Bray-Curtis dissimilarity	Composition (Species)	Beta	They measure the degree to which two communities share Species (Jaccard) or their Structure (Bray-Curtis).
Taxonomic Dissimilarity (Δ*)	Composition (Species)	Beta	It measures the differences between communities considering the taxonomic relationship of the species.
NDVI	Structure / Function	Gamma	(Normalized Difference Vegetation Index) Measures the greenness and vigor of vegetation using satellite images.
CPLAND / CONTAG / PAFRAC	Structure / Composition (General)	Gamma	Landscape metrics that measure the percentage of habitat, its aggregation, and the complexity of its forms.
SIDI	Composition/Structure (General)	Gamma	(Simpson's Diversity Index for Landscapes) Measures the diversity of habitat patches in the landscape.

History of the Document

Version	*Date*	*Description*
1.0	26/01/2026	First version of the protocol - COLBS
1.1	16/03/2026	Clarification on mixed projects Clarification of requirements for CAB