

Valuing the Invaluable:
Foundational Conditions and Corporate Buyer Profiles
in the Swedish Biodiversity Credit Market

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DIVISION OF ENVIRONMENTAL AND ENERGY SYSTEM STUDIES
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MASTER THESIS





Valuing the Invaluable

Foundational Conditions and Corporate Buyer Profiles in
the Swedish Biodiversity Credit Market

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Abstract

This thesis investigates biodiversity credits as an emerging market-based mechanism to promote and fund biodiversity enhancing projects, with a particular focus on their structuring and valuation in a Swedish context.

Employing an abductive approach, the study combines a comprehensive literature review with qualitative interviews conducted with Swedish stakeholders across sectors such as forestry, mining, finance and real estate.

The thesis addresses three core questions: how biodiversity credits are defined and structured, what barriers and opportunities that affect their adoption, and what value drivers that shape organisational perceptions and usage. The literature review outlines biodiversity credit definitions, challenges in quantifying ecological value, policy trends and pricing methodologies while the interviews reveal corporate strategies, perceived benefits and adoption hurdles.

Key findings indicate that credible biodiversity credits require foundational principles like additionality and permanence, drawing parallels with lessons from the voluntary carbon market. The research also identifies different buyer profiles, ranging from high-intensity land users to passive positioners. These perceive and may derive value from biodiversity credits in distinct ways, shaped by their operational contexts and strategic priorities.

This study develops a two-layer framework for understanding biodiversity credit value: a binary threshold of foundational conditions, and a set of corporate buyer profiles that reflect varying engagement logics. By bridging ecological integrity with corporate value drivers, the thesis contributes to the biodiversity finance discourse and offers practical insights for stakeholders seeking to develop credible, relevant, and strategically aligned biodiversity credit solutions.

Sammanfattning

Denna uppsats undersöker biokrediter som en framväxande marknadsbaserad mekanism för att främja och finansiera projekt som stärker biologisk mångfald, med särskilt fokus på deras struktur och värdering i en svensk kontext.

Genom en abduktiv ansats kombineras en omfattande litteraturgenomgång med kvalitativa intervjuer med svenska intressenter från sektorer som skogsbruk, gruvindustri, finans och fastigheter.

Arbetet adresserar tre centrala frågor: hur biokrediter definieras och struktureras, vilka hinder och möjligheter som påverkar deras användning, samt vilka värdedrivare som formar företags uppfattningar och användning. Litteraturgenomgången behandlar definitioner av biokrediter, utmaningar i att kvantifiera ekologiskt värde, policytrender och prissättningsmetoder, medan intervjuerna belyser företagsstrategier samt upplevda fördelar och hinder för adoption.

Resultaten visar att trovärdiga biokrediter kräver grundläggande principer såsom additionalitet och permanens, med lärdomar hämtade från den frivilliga kolkreditmarknaden. Studien identifierar även olika köparprofiler, från aktörer med intensiv markanvändning till mer passiva aktörer. Dessa aktörer ser och kan tillämpa biokrediter på olika sätt, beroende på deras operativa kontext och strategiska prioriteringar.

Uppsatsen utvecklar en tvådelat ramverk för att förstå biokrediters värde: en binär tröskel av grundläggande villkor, och en samling företagsprofiler som speglar olika engagemangslogiker. Genom att knyta samman ekologisk integritet med företags värdedrivare bidrar studien till diskussionen om finansiering av ökad biologisk mångfald och erbjuder praktiska insikter för aktörer som vill utveckla trovärdiga, relevanta och strategiskt förankrade biokreditlösningar.

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Definitions

The following terms appear frequently in biodiversity-related literature and are central to understanding common challenges and concepts in the field. As they are referenced throughout this thesis, concise definitions are included to ensure clarity and accessibility for readers who may not be familiar with the terminology.

Abiotic factors	Abiotic factors refer to the non-living components of an ecosystem, such as soil, water, climate, and nutrient availability. These elements shape environmental conditions and influence the distribution and survival of organisms (National Geographic, n.d.-a).
Additionality	Additionality in the context of biodiversity refers to the net positive impact of an action meant to preserve biodiversity. Ensuring that biodiversity gains are truly additional rather than something that would have naturally occurred anyway (University of Cambridge, 2024).
Baseline	A biodiversity baseline serves as a reference point or starting state against which changes in biodiversity are measured over time (European Environment Agency, 2010). It provides an important benchmark for assessing ecosystem evolution, detecting gradual changes and identifying significant shifts in biodiversity.
Biodiversity	Refers to the biological diversity of a geographical area. According to the European Environment Agency and the United Nations, biodiversity includes the variety of ecosystems, species and genes found globally or in a specific area (European Environment Agency, n.d.; United Nations, n.d.).
Biotic factors	Biotic factors refer to the living components of an ecosystem, including plants, animals, fungi, and microorganisms. These organisms interact with one another and with abiotic factors to form dynamic ecological systems (National Geographic, n.d.-b).
Connectivity	Connectivity in biodiversity refers to the degree to which landscapes, ecosystems, or habitats are linked, allowing for the movement of species, genetic exchange and ecological processes across space. It is essential for maintaining healthy ecosystems, supporting species adaptation and ensuring long-term biodiversity conservation (Tambosi et al., 2013).
Double counting	Double counting occurs when the same preservation effect or biodiversity improvement is counted more than once (BCA, 2024). An example of this could be to issue a biodiversity credit on an already certified area, without doing additional preservation work. This phenomena can lead to overestimations in biodiversity impact.
Double Materiality Analysis	Under the Corporate Sustainability Reporting Directive (CSRD), a double materiality assessment requires companies to evaluate two perspectives: the inside-out impact, which examines how their operations affect people

and the environment, and the outside-in impact, which assesses how sustainability issues, create risks or opportunities for the business (PwC, 2024).

Ecosystem services

Ecosystem services refer to the structures and functions (services) that can be utilised to derive value from natural systems (Danley & Widmark, 2016).

Fungibility

The degree to which a biodiversity impact can be exchanged for another of the same type, in terms of ecological value. In this thesis, it refers to the comparability and interchangeability of credits across projects or methodologies.

Leakage

Leakage in biodiversity occurs when conservation efforts in one area cause biodiversity loss elsewhere, either directly or through broader effects, for example rising resource prices driving more extensive exploitation (Wauchope et al., 2024).

Permanence

Permanence refers to the long-term sustainability and longevity of conservation and restoration efforts. It's important to ensure that biodiversity promoting actions and projects' effects are maintained over time (Wauchope et al., 2024).

Theory of Change

Describes how specific actions lead to measurable improvements in biodiversity. It also outlines key assumptions, risks and expected outcomes. For projects that rely on changes in habitat or land management as a proxy for biodiversity gains, a documented Theory of Change is required to ensure the intervention is both credible and ecologically meaningful (Swedish Biocredit Alliance, 2024).

1. Introduction

1.1 Biodiversity: Definition, Ecological Role and Systemic Risk

Biodiversity as a term is generally used to describe the biological diversity of a geographical area. The definition and conclusive factor as to if a location is deemed to be biologically diverse has historically varied widely, depending on what aspect of nature is examined (DeLong, 1996). According to the European Environmental Agency (EEA) biodiversity includes and is based on the variety of ecosystems, species and genes that is found globally, or in a specific area (European Environment Agency, n.d.). A synonymous definition is proposed by the United Nations (United Nations, n.d.). It is this definition of biodiversity that is used throughout this paper.

Biodiversity is crucial for environmental stability and the general well being of both humans and animals (Chivian, 2002; Britannica, 2024). Declining biodiversity lowers an ecosystem's productivity and diminishes the quality of ecosystem services such as soil maintenance, water purification and food provision. As biodiversity decreases, ecosystems lose complexity and resilience, making them more vulnerable to disturbances and, in extreme cases, risking collapse and transformation into entirely different systems (Britannica, 2024). This loss not only threatens the survival of species but also destabilise economic systems and human society, as humans rely on diverse biological resources for food, materials and medicines (Chivian, 2002; Britannica, 2024; IPBES, 2019).

1.2 Importance and Relevance of Biodiversity and Nature Restoration

The World Economic Forum (WEF) ranks biodiversity loss and ecosystem collapse as the second most severe long-term global risk, defined over 10-year horizons (WEF, 2025a). According to the Global Risks Perception Survey conducted by WEF, which gathered insights from over 900 experts across academia, business, government and society, this risk is expected to worsen due to habitat destruction, climate change and the depletion of resources (WEF, 2025a). Environmental risks have steadily become a top global concern, with biodiversity loss closely linked to extreme weather events and resource shortages. Given these projections, urgent policy action is needed to prevent irreversible ecosystem damage and its economic and societal consequences (WEF, 2025a).

The Kunming-Montreal Global Biodiversity Framework represents an ambitious global strategy to halt and reverse biodiversity loss by 2030, aligning with the long-term vision of living in harmony with nature by 2050. The framework builds on previous biodiversity commitments and sets out 23 specific targets to drive transformative change across ecosystems, economies and societies (Convention on Biological Diversity, 2022).

A critical component of the framework's implementation is financial mobilisation. This component calls for a substantial increase in biodiversity-related funding from both public and private sources. Specifically, it aims to generate at least \$200 billion of funding per year by 2030 through a combination of international financial flows, domestic resource mobilisation and private sector investments. To support this, the framework emphasises the need to stimulate “innovative schemes such as payment for ecosystem services, green bonds, biodiversity offsets and credits and benefit-sharing mechanisms” to channel

financial resources into conservation and restoration efforts while incorporating environmental and social safeguards (CBD, 2022).

Biodiversity credits are a market-based mechanism designed to quantify, certify and incentivise positive and measurable outcomes for biodiversity conservation or restoration. Each credit typically represents a unit of biodiversity that has been preserved or restored, verified through evidence-based assessment and is considered additional to what would have occurred without the intervention (WEF, 2024a). Credits can be bought and sold, providing possible financial incentives for activities that benefit nature.

1.3 Purpose

The purpose of this thesis is to explore the concept of biodiversity credits, with a particular focus on understanding how they are valued and how their design can be optimised to attract market interest.

The research aims to analyse methodologies and frameworks currently used to assign value to biodiversity credits and nature in general. Furthermore, the thesis seeks to identify the key factors that influence organisational interest and investment in biodiversity credits. To support this analysis, the study includes in-depth interviews with senior sustainability professionals at major Swedish corporations, providing first-hand insights into how potential buyers assess the relevance, credibility and perceived value of biodiversity credits in practice.

The thesis places a particular emphasis on the Swedish context. As a country with strong environmental regulations, progressive corporate sustainability standards and a growing interest in nature-based solutions, Sweden offers an interesting case for exploring how biodiversity credits might gain traction.

1.4 Qarlbo Biodiversity

This thesis was written in collaboration with Qarlbo Biodiversity, a Swedish firm founded by Conni Jonsson and currently led by Aleksandra Holmlund. Qarlbo Biodiversity's mission is to generate measurable, nature-positive outcomes through forestry and biodiversity credit projects (Qarlbo Biodiversity, 2025). Qarlbo applies science-based methodologies to enhance biodiversity and climate resilience in production forests. Their work integrates sustainable forestry practices, branded as Qarlbo Nature+®, with the development of biodiversity credits that quantify ecological improvements beyond standard certification requirements (Qarlbo Biodiversity, 2025). These credits are backed by transparent monitoring and verification technologies. While this thesis benefits from valuable insights into biodiversity and the biodiversity credit markets from Qarlbo Biodiversity, no compensation has been received, ensuring the independence and objectivity of the research.

2. Research Questions

The aforementioned global decline in biodiversity has led to an increasing demand for innovative financial mechanisms to support conservation and restoration efforts. Although biodiversity credits have emerged as a potential market-based solution, the market remains underdeveloped, with significant uncertainties surrounding their structure, valuation mechanisms and overall effectiveness in promoting biodiversity conservation (Pollination, 2024; Wunder et al., 2024).

To address these gaps, this thesis explores the fundamental characteristics of biodiversity credits, the key market dynamics influencing their adoption and the economic and ecological considerations that shape their valuation. Specifically, the study seeks to answer the following research questions:

- 1. How are biodiversity credits defined and structured as market based instruments?**
This question seeks to clarify how biodiversity credits are defined and developed. It explores the underlying logic of biodiversity credits, the range of models used in practice and the role of standards, integrity principles and disclosure alignment in shaping their credibility and usability.
- 2. What barriers and opportunities influence the broader adoption of biodiversity credits in the market?**
This question addresses systemic challenges and enablers of market development, including standardisation, credibility, buyer readiness and policy alignment and evaluates how these factors shape the potential for biodiversity credits to gain broader adoption.
- 3. What value drivers influence how biodiversity credits are perceived and could be used by organisations with different operational profiles?**
This question explores how biodiversity credits are evaluated and interpreted in practice, based on an organisation's operational relationship to nature and biodiversity. The aim is to identify key factors that influence perceived value and to understand how different types of organisations might engage with biodiversity credits under varying strategic, communicative and regulatory conditions.

By addressing these questions, this thesis aims to contribute to the ongoing discourse on biodiversity finance, offering insights into how biodiversity credits can be integrated into corporate sustainability strategies and conservation initiatives.

3. Methodology

3.1 Research Approach

This study employs an abductive research approach, iterating between theory and empirical insights to explore the valuation of biodiversity credits in a Swedish context. Since the market is still in an early stage of development, the study focuses on identifying key qualitative factors that influence how biodiversity credits may be valued, such as ecological quality, credibility and buyer motivations.

Conducted in the spring of 2025, the research was structured in three main phases:

1. **Literature Review and Theoretical Foundation:** Establish key market determinants and theoretical perspectives.
2. **Empirical Analysis:** Conduct semi-structured interviews to identify market dynamics and valuation drivers of biodiversity credits in a Swedish context.
3. **Framework Development and Discussion:** Develop a framework for valuation of biodiversity credits based on findings from the literature study and interviews and assess its implications for the Swedish context.

This structure ensures a systematic approach to understanding the emerging biodiversity credit market by integrating theoretical insights with practical empirical findings.

3.2 Literature Review and Theoretical Foundation

In the first phase of the study, a targeted literature review was conducted to establish a conceptual and analytical foundation for understanding how biodiversity credits are defined and valued. The aim was not only to clarify the basic design and function of biodiversity credits, but also to examine the methodological and policy-related complexities that influence their credibility and market potential.

The review covered a broad set of sources, including peer-reviewed journal articles, white papers, policy documents and market reports published by leading organisations such as the World Economic Forum, the Biodiversity Credit Alliance (BCA) and academic institutions. Given that biodiversity credits remain an emerging field with limited peer-reviewed research, recent literature was prioritised where possible, but older sources were also included when relevant and necessary to capture foundational concepts or widely cited frameworks. Although the empirical study focuses on Sweden, the review drew on international literature and policy frameworks.

Key areas of interest include:

- **Definition and function of biodiversity credits**
Their role in conservation finance, market structure and relationship to biodiversity offsetting.

- **Pricing approaches and economic valuation frameworks**
Including lessons from ecosystem services and voluntary carbon markets and their implications for biodiversity credit valuation.
- **Regulatory and policy frameworks**
International and national policies shaping the biodiversity credit market, including voluntary and compliance-based schemes.
- **Emerging demand-side perspectives**
Including potential buyer groups, corporate motivations and the strategic narratives that shape interest in biodiversity credits.

By reviewing these themes, the study builds a conceptual foundation to support further analysis and enable integration with complementary insights from empirical research.

3.3 Qualitative Interview Design and Analysis

The second phase of this study involves empirical research designed to validate and refine the conceptual framework through qualitative stakeholder insights.

3.3.1 Qualitative Interviews

To capture diverse perspectives on the valuation and adoption of biodiversity credits in Swedish context, the study conducted semi-structured interviews with representatives from well recognised companies across Sweden and the Nordics. The sample includes actors from the forestry, construction, energy, mining, real estate, finance and the consumer goods sectors.

Interviewees were selected through purposive sampling to reflect a range of stakeholder types and different levels of market maturity. The selection aimed to include organisations with different relationships to nature and land use, as well as varied incentives for engaging with biodiversity credit markets. All participants are anonymised in this report, but the companies they represent are described by sector and geographic scope to allow contextual interpretation. The participating organisations represent some of the largest and most established actors within their respective sectors in the Swedish and Nordic markets. They also provide a meaningful range of perspectives, from early adopters with strategic biodiversity goals to organisations exploring the relevance of nature-based solutions to their business. Their perspectives therefore offer valuable insights into how biodiversity credit markets may be perceived and shaped by key market players. Table 1 below presents an overview of the anonymised organisations included in the study.

Table 1. Anonymised list of interviewees with geographic scope of their operations.

Sectoral Description	Primary Geographic Scope
Public-sector oriented real estate company	Sweden
Municipally owned energy & utility company	Sweden
Integrated wood industry and construction group	Sweden
Nordic construction and civil engineering firm	Nordics
Renewable energy project developer	Sweden
Large Nordic financial institution	Nordics
Commercially focused real estate company	Sweden
Swedish mining company	Sweden
Nordic food production and consumer goods company	Nordics

The interviews, with a duration around 40 minutes, were conducted digitally, recorded with consent and transcribed using an AI-based tool. Obvious transcription errors were corrected, but the transcripts were not fully edited for publication. Instead, the primary aim was to extract thematic insights relevant to the study's research questions.

The interview guide was developed to explore areas where the literature provided limited guidance or left important questions unanswered. The aim was to form a better understanding of how organisations view and approach biodiversity and biodiversity credits in practice. The questions were grounded in key topics identified through the literature review, but also informed by our assessment of which issues would likely be relevant to potential market participants. While the guide followed a clear structure, the semi-structured format allowed for open-ended responses and follow-up questions based on each interviewee's input.

The interview guide (see Appendix) explored the following core topics:

- **Strategic approaches to biodiversity**
Including how biodiversity is addressed in the organisation's overall sustainability strategy and whether investments such as certifications or sustainable finance instruments play a role.
- **Drivers of biodiversity credit interest**
Interviewees were asked to reflect on whether and why their organisation is considering biodiversity credits. A range of possible motivations were presented when needed, to help the interviewee continue the conversation independently.

- **Perceived value and potential uses of biodiversity credits**
Including what kinds of claims or benefits companies would seek to achieve through credit purchases, for example in relation to branding, stakeholder communication, or risk management.
- **Barriers to adoption and scaling**
This included questions about current limitations, both internal and external, that may hinder investment in biodiversity credits. Interviewees were encouraged to reflect on what would need to change in order for such investments to become feasible or attractive and what they view as necessary for a future market to be trustworthy and scalable.
- **Perspectives on valuation and pricing**
Interviewees were asked what characteristics of a biodiversity credit would influence their willingness to pay, such as verification level, duration of impact, connection to specific ecosystem services, or geographical relevance and how they would evaluate whether a credit offers sufficient value relative to its cost.
- **Preferences related to project and supplier characteristics**
Including questions on preferences for project geography and types of suppliers.

While the guide provided structure, the semi-structured format allowed for follow-up on emergent themes and respondent-specific perspectives. This flexible approach aligns with the study’s abductive research design, which emphasises iterative movement between theory and empirical findings.

3.3.2 Interview Analysis Approach

The interview data was analysed using a thematic approach. The aim was to identify patterns, divergences and key insights related to buyer perspectives on biodiversity credits across different sectors.

Following transcription, the material was reviewed in full and responses were grouped according to these core themes.

While the structure of the analysis was informed by the interview guide, the process remained flexible and iterative. As the material was analysed, additional nuances and themes emerged, allowing for both convergence and divergence in stakeholder perspectives to be captured. This approach enabled a structured yet adaptive understanding of how biodiversity credits are understood, evaluated and approached in practice.

The analysis focused on identifying both:

- Common patterns where multiple respondents expressed similar views or concerns.
- Contrasting perspectives, where sectoral differences, organisational roles, or strategic priorities shaped divergent attitudes.

Where relevant, representative quotations were selected to illustrate key points, while maintaining respondent anonymity. To avoid excessive repetition of the full sector descriptions, shortened references (e.g. “the mining company”, “the municipal energy company”) are used throughout the results section for clarity and readability.

3.4 Framework Development and Synthesis

The final phase of the research involved developing a conceptual-practical framework to structure key factors influencing biodiversity credit valuation. This was done by integrating insights from both the literature review and the empirical interview material, again, following an abductive approach that allowed iterative movement between theory and empiricism.

The first step involved identifying foundational conditions for credit legitimacy, based on recurring principles across both academic sources and stakeholder interviews.

In the second step, the research team developed a set of operational buyer profiles to reflect how different types of organisations relate to biodiversity through their operations, assets, or value chains. These profiles were not predefined, but derived interpretively by clustering common patterns observed across interviews. Sector labels were deliberately avoided in favour of operational characteristics to better capture variation in how biodiversity credits may be understood and used.

Finally, for each operational profile, a structured reflection was conducted to explore how biodiversity credits may be perceived, applied or integrated depending on the organisation's context. These reflections were based on both stakeholder perspectives and literature, with particular attention to perceived drivers of value and practical relevance.

3.5 Use of Artificial Intelligence

In this thesis, generative artificial intelligence (AI) tools, including OpenAI's ChatGPT and xAI's Grok, have been used as supportive tools in three ways:

First, AI has been applied for brainstorming and ideation, helping to refine structure, themes, and conceptual frameworks. Second, AI has been used for language improvements, in order to improve clarity and sharpen formulations. Lastly, reference management and finalisation of interview transcripts were assisted by AI tools to ensure consistency and accuracy.

It is important to emphasise that all AI use was preceded and succeeded by independent critical thinking. The ultimate responsibility for the content rests with the authors.

4. Literature Review and Theoretical Foundation

4.1 Definition of Biodiversity Credits

Biodiversity credits, sometimes referred to as biocredits, have recently emerged as a mechanism to both quantify and incentivise the conservation and restoration of biodiversity (Ducros & Steele, 2022). In essence, each credit represents a measurable unit of biodiversity that has been preserved or restored and can be bought and sold through dedicated markets or conservation finance initiatives.

A widely cited definition describes biodiversity credits as certificates representing a measured and evidence-based unit of positive biodiversity outcome, one that is durable and additional to what would otherwise have occurred (WEF, 2024a). While terminology in this emerging field is still evolving, biodiversity credits are generally understood to reflect actions that generate verifiable benefits for both nature and biodiversity.

According to Ducros and Steele (2022), biodiversity credit schemes generally fall into three broad categories, although these are not mutually exclusive:

1. **Preserving biodiversity**

This approach focuses on halting further decline in areas that are already under threat. Often, the biodiversity value of a site is compared to that of a reference site, ensuring that the measured indicators do not drop below a baseline.

2. **Restoration**

Some initiatives target landscapes or ecosystems that have degraded and require restoration. To maintain their value in this model, biodiversity credits are tied to measurable increases in biodiversity over time, such as improvements in ecosystem services or enhanced habitat connectivity.

3. **Supporting existing conservation efforts**

Lastly, biodiversity credits can be designed to reward the ongoing protection of sites and encourage further conservation. By compensating those who have already invested time and resources into managing key habitats, these schemes aim to sustain and potentially expand successful conservation practices.

Ducros and Steele (2022) emphasise that these models can overlap or be combined, depending on local contexts and objectives. They also stress that financial mechanisms like biodiversity credits should be tailored to local needs and ecological realities to achieve lasting conservation outcomes. However, while Ducros and Steele clearly outline three categories: avoiding biodiversity loss, restoring degraded areas and supporting existing conservation, the World Economic Forum (2024b) chose to concentrate on just the first two: preserving existing biodiversity and undertaking restoration efforts. This discrepancy shows a divergence in how different organisations conceptualise the scope of biodiversity credits.

In practice, Ducros and Steele (2022) highlight the importance of aligning credit design with local conservation needs, whether preserving at-risk habitats or rewarding ongoing management. WEF (2024a)

extends this conversation by underscoring the practical complexities of measuring and verifying biodiversity outcomes. Both sources ultimately emphasise the need for clear standards and robust reporting to maintain the integrity of biodiversity credit markets.

4.1.1 Distinguishing Biodiversity Credits from Biodiversity Offsets

While biodiversity credits and biodiversity offsets share the common goal of incentivising conservation, the two concepts differ in their historical roots, regulatory contexts and intended applications (Wauchope et al., 2024). Biodiversity offsets first emerged in the 1970s as a response to environmental damage caused by development activities, emphasising a “no net loss” principle: any biodiversity loss at a development site should be compensated with equivalent (or greater) gains elsewhere (Wauchope et al., 2024; Bull et al., 2013). In other words, offsets are intended to counterbalance the negative impacts of infrastructure or resource extraction projects through habitat restoration or protection, typically following legal requirements.

A central feature of biodiversity offsets is their integration into what is called the mitigation hierarchy (see Figure 1) (Wauchope et al., 2024; Bull et al., 2013). This hierarchy prescribes a stepwise process to manage the environmental impacts of development: (1) avoid impacts whenever possible (e.g., by relocating a project or modifying its footprint), (2) minimise impacts if avoidance is not feasible, (3) restore onsite damage as far as possible and finally, (4) offset (or compensate) any residual impact that cannot be fully mitigated in the preceding steps. Because offsets occur at the end of this sequence, their use assumes that all other prevention and reduction measures have been exhausted.

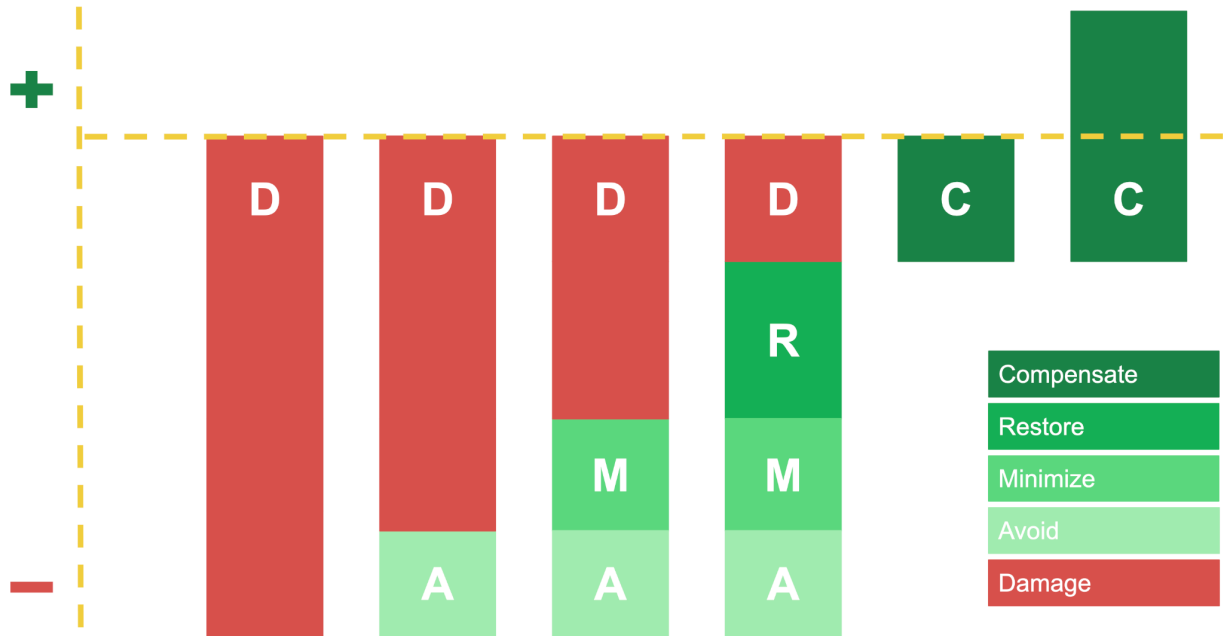


Figure 1. Illustration of the mitigation hierarchy.

By contrast, biodiversity credits are newer and often designed to finance proactive conservation or restoration projects independently of a specific negative impact (Wauchope et al., 2024). Rather than solely compensating for unavoidable harm caused by developers, biodiversity credits can be sold to any party interested in supporting measurable positive biodiversity outcomes, such as preserving a threatened habitat or restoring degraded landscapes even if those parties have not directly caused the degradation they are funding. In theory, this distinction implies that biodiversity credits are not necessarily a license to destroy elsewhere, nor are they always tied to a single development project.

However, as Wauchope et al. (2024) argue, the divide between offsets and biodiversity credits can be blurry. Since voluntary credit schemes could be used to claim “net positive” or “no net loss” outcomes, any positive benefit they generate may ultimately serve as a compensatory mechanism for a project’s negative impacts, thus functioning similarly to an offset. The International Advisory Panel on Biodiversity Credits even lists offsetting as one potential use-case, meaning that voluntary biodiversity credits could, in practice, be used to balance out damage from development projects (ibid.).

In summary, biodiversity offsets and biodiversity credits share conceptual overlap but differ in their origins and how they are commonly intended to be applied. Offsets are deeply embedded in policy frameworks that mandate compensation for ecological harm, at the final stage of the mitigation hierarchy. Biodiversity credits can on the other hand function more broadly to both fund standalone conservation initiatives and perhaps, in some cases, to offset impacts. Recognising when credits are used proactively versus when they essentially replace or complement traditional offset obligations is crucial for evaluating the true additionality and overall effectiveness of these market-based conservation tools.

4.2 Quantifying and Crediting Nature

WEF (2024b) points out that biodiversity credit projects can vary significantly in terms of how a “unit” of biodiversity is defined and measured. One initiative might track changes in species populations, whereas another might focus on factors like habitat area or ecological connectivity (ibid). These differences can make it challenging for buyers or investors to compare credits directly and to determine which projects best align with their conservation or business objectives. WEF (2024b) therefore recommends a structured review of key project characteristics, urging stakeholders to adopt consistent metrics and transparent methodologies that ensure the credibility of biodiversity credits.

4.2.1 Challenges in Defining a Unit of Nature

Defining a unit of nature or biodiversity is both philosophically and technically complex. According to Wauchope et al. (2024), biodiversity is typically understood as the variability among living organisms at all levels, whereas nature more broadly encompasses abiotic components such as waterways, soils and landscapes. Consequently, when practitioners propose a standard, fungible unit of nature (something that can be bought, sold, or traded), several key challenges emerge according to Wauchope et al. (2024):

1. **Multi-Faceted Value of Biodiversity:** Biodiversity holds ecological, cultural, spiritual and economic benefits. Attempting to reduce these benefits to a single, generalised metric can obscure or oversimplify crucial site-specific characteristics, such as connectivity, rarity, or local cultural values.

2. **Composite Indicators and Trade-Offs:** Methodologies may use a “basket of metrics,” combining multiple indicators (e.g., species richness, habitat structure, presence of threatened species) into a single composite score. Inevitably, this means trade-offs are embedded in the final number (e.g., gains in one species could cancel out losses in another). The relative weighting of these metrics significantly affects how “one unit” is defined.
3. **Ecosystem Heterogeneity:** A hectare of tropical rainforest cannot be equated simply to a hectare of boreal forest, yet many credit methodologies aim for a high degree of comparability or fungibility across biomes. Some schemes address this by “tiering” credits, which designates different price levels or categories to reflect conservation priorities or ecological importance.
4. **Baseline Determination:** Whether a credit is linked to conservation (avoidance of further loss) or restoration (improvement over a baseline), any “unit of nature” must be measured relative to some reference point. That reference point may be an estimate of historical natural conditions. These estimates are inherently uncertain, especially in changing climates and dynamic ecosystems.

Translating biodiversity’s complexity into standardised “credits” or “units of nature” is driven by the hope that markets can mobilise significant financial resources for conservation (Wauchope et al., 2024). At the same time, efforts to use universal metrics risk commodifying “noise”, such as natural fluctuations or measurement errors, rather than genuine ecological improvements. Additionality, permanence and leakage also remain pressing concerns. If the credited gains are not truly extra, if short-term improvements do not persist, or if harmful activities are simply shifted elsewhere, then the underlying goals of halting and reversing biodiversity loss are undercut (Wauchope et al., 2024).

Despite the complexity in defining a standard unit of nature, a common foundational market approach is to link one biodiversity credit to a specific area over a set time period, typically one hectare per year. This convention aligns with reporting guidelines from the Science-Based Targets Network (SBTN) and is highlighted in recent market analyses (WEF, 2024b). However, while this area-based definition offers a pragmatic starting point for quantification, it does not in itself reflect the intended ecological impact or the project’s Theory of Change. The actual biodiversity outcomes, such as the quality, type, and duration of the improvements, depend on project-specific interventions, measurement methods, and integrity standards.

4.2.2 Emergent Models for Quantification of Biodiversity Improvement

WEF (2024a) identifies three emergent models for translating the actual biodiversity improvements into credits. These models differ in how they combine, prioritise and interpret ecological data, reflecting the diverse challenges of creating credible, fungible and impactful biodiversity credits.

- **Comprehensive Aggregated Model**
This model merges various indicators, such as habitat structure, species counts and abiotic factors, into a single composite index. It enables a more integrated perspective on biodiversity but requires extensive data collection and analysis.
- **Critical Indicator Model**
This approach focuses on discrete or keystone indicators, such as flagship species, to measure

conservation outcomes. While it is less data-intensive, it risks overlooking broader ecosystem interactions and may not capture the full complexity of biodiversity changes.

- **Mosaic Compilation Model**

This model takes a holistic approach by incorporating biotic, abiotic and socioeconomic measures. While it provides a more comprehensive understanding of ecological and community-level changes, it requires greater time, expertise and resources to implement effectively.

These three models align with the challenges Wauchope et al. (2024) outline, especially regarding how fungibility, additionality and accurate baselines can affect credit integrity. The Mosaic Compilation Model, for instance, resonates with Wauchope et al.'s (2024) concern about ensuring permanence and preventing leakage by including local context. WEF (2024a) reveals the breadth of approaches available to projects, demonstrating how actors can handle the core difficulties of measuring, attributing and monetising biodiversity gains.

4.2.3 Linking Biodiversity to Sustainability Disclosures and International Standards

A further insight from the World Economic Forum (2024a) is the importance of aligning biodiversity metrics with existing corporate disclosure regulations and frameworks, such as the ones provided by the Corporate Sustainability Reporting Directive (CSRD), Taskforce on Nature-related Financial Disclosures (TNFD) and the methodology provided by the Science Based Targets Network (SBTN). While Wauchope et al. (2024) focus on methodological rigor and the ecological underpinnings of measurement, WEF (2024a) shows that credit schemes potentially gain significant credibility and market relevance when tied to recognised reporting frameworks. This connection not only lowers the information barriers for businesses looking to invest in conservation but also simplifies the path for those businesses to reflect their conservation investments in public disclosures. Consequently, biodiversity credits that fit well with these global standards may enjoy broader acceptance, as they adhere more naturally into existing environmental, social and governance (ESG) reporting practices.

The following is a further description of the three principal reporting frameworks and methodologies introduced above:

The CSRD, introduced by the European Union, mandates comprehensive sustainability disclosures from companies operating in or interacting with the EU. This includes the reporting of biodiversity-related impacts and dependencies, encouraging firms to measure, manage and finance biodiversity outcomes. The CSRD reporting is subject to use the ESRS (European Sustainability Reporting Standard) framework, where topic E4 covers biodiversity and nature use. Biodiversity credits, particularly those verified by credible schemes, can help demonstrate active contribution toward mitigation or nature recovery efforts (European Commission, n.d., 2023).

The TNFD provides a voluntary but rapidly adopted framework for disclosing material nature-related risks and opportunities. A central feature of TNFD is its emphasis on double materiality, requiring companies to report not just how nature affects their operations, but how their operations affect nature (Pollination, 2024). Over 400 companies globally are expected to align with the TNFD by 2025 (ibid).

Biodiversity credits may offer one practical tool for demonstrating progress on risk reduction and impact mitigation, while enhancing nature-related transparency.

The SBTN, building on the momentum of science-based climate targets, provides guidance for setting science-based targets for nature. Building upon the mitigation hierarchy (avoid, minimise, restore & , compensate), it has become a conceptual backbone for nature-positive strategies. While not formally endorsing biodiversity credits, the SBTN framework aligns with their use in the latter stages of the hierarchy, particularly in long-term restoration and ecosystem regeneration (Pollination, 2024).

While these frameworks provide structure for voluntary and mandatory reporting, they rely on consistent and credible underlying data. As a result, the development of international standards for biodiversity measurement is gaining traction. Standardisation efforts aim to harmonise definitions, metrics, and methodologies, all of which are critical for integrating biodiversity considerations into sustainability disclosures.

The International Organisation for Standardisation (ISO) launched the technical committee ISO/TC 331 on Biodiversity in 2020 with the goal of developing globally applicable standards to guide organisations' contributions to biodiversity and sustainable development. The committee aims to define principles, frameworks and measurement methods for biodiversity in a way that supports consistent and credible action across sectors and geographies. ISO/TC 331 collaborates closely with other technical committees that, for example, focus on soil, water, biotechnology, and food systems to ensure coherence (ISO, 2025).

Sweden actively contributes to this process through SIS/TK 623, a national committee on biodiversity. This standardisation initiative enables Swedish stakeholders to influence the development of global biodiversity standards and ensures that Swedish perspectives are represented. As the work progresses, these standards are expected to provide a shared foundation for how biodiversity is defined, measured, and integrated into organisational strategies and disclosures (SIS, 2025).

4.2.4 Trade-Offs Between Scientific Rigor and Practical Implementation

Both Wauchope et al. (2024) and WEF (2024a) acknowledge the tension between the scientific complexity of biodiversity measurement and the operational realities of on-the-ground conservation. Although more data-intensive methods can yield better insights, the associated costs and technical demands can discourage potential credit issuers or buyers. WEF (2024a) points out that less resource-intensive approaches may appeal to a wider range of stakeholders, even though they may compromise precision. The decision to adopt a composite index or rely on a simpler metric, for example, hinges on balancing ecological results with financial and logistical viability.

Finally, WEF (2024a) highlights the role of local communities and indigenous peoples in shaping the success or failure of biodiversity credit schemes. Wauchope et al. (2024) also touch on equity, but WEF (2024a) explicitly argues that translating local perspectives and socioeconomic factors into measurable indicators can bolster the long-term legitimacy and impact of conservation efforts. Although adding local welfare or social metrics can blur the focus on purely ecological objectives, it may minimise conflict, ensure community engagement and preserve gains once formal monitoring ends. Any crediting mechanism that ignores these considerations risks unintended consequences such as displacement or economic hardship for the community, thereby jeopardising the trust essential for a robust biodiversity credit market.

Viewed together, Wauchope et al. (2024) and WEF (2024a) provide complementary perspectives that deepen the understanding of how biodiversity can be abstracted into tradeable units. By synthesising insights from both, it becomes clear that any sustainable biodiversity credit system must balance ecological accuracy and cost-efficiency, integrate corporate disclosure requirements and remain sensitive to local stakeholders. The dual lens of emphasising the conceptual underpinnings as well as spotlighting specific considerations can offer a more nuanced foundation for comparing, evaluating and ultimately advancing biodiversity credit methodologies.

4.2.5 Quantifying Land-Use in Sweden Using the CLIMB Methodology

While frameworks such as the Comprehensive Aggregated Model or the Mosaic Compilation Model offer important theoretical foundations, practical applications in specific national contexts are equally important. In Sweden, a promising development is the CLIMB methodology (Credible Land Impact Measurement for Biodiversity), which is designed to quantify changes in land-use and restoration potential across land-use projects. Developed by the environmentally focused consultancy firm Ecogain in collaboration with academic experts, CLIMB adapts the UK's Defra Biodiversity Metric 3.0 to Swedish and Nordic ecosystems (Ecogain, n.d.). The method builds upon the internationally established mitigation hierarchy. Unlike general biodiversity credit standards, CLIMB offers a detailed calculation model with predefined parameters (although primarily focused on land-use, not living organisms), KPI definitions tailored to different land-use types and an applied user manual. Its purpose is to make nature impact measurable and comparable within a Swedish regulatory and ecological context. The development of CLIMB was carried out as part of a multi-stakeholder collaboration within the Swedish Mining Innovation programme, with participation from Ecogain, Talga, Vattenfall, LKAB, Skanska and others in close consultation with an Advisory Board consisting of representatives from academia, government agencies and industry (Ecogain, n.d.)

CLIMB enables companies to quantify their residual nature impact after mitigation efforts, potentially forming a basis for credible, targeted use of biodiversity credits to address ecological harm. CLIMB helps operationalise the link between impact measurement and market-based compensation mechanisms, providing a concrete pathway from land-use planning to ecological accountability.

While other tools and project-level assessment frameworks exist, CLIMB was selected for closer examination in this thesis due to its ambition to standardise and quantify land use measurement in a Swedish context. As more companies and projects begin to adopt the methodology, a snowball effect may reinforce its role as a national reference point. Its stakeholder-backed development makes it particularly relevant as a potential bridge between land-use impact measurement and biodiversity credit implementation.

4.3 Credit Structuring Dynamics

4.3.1 Integrity Guardrails

To be effective, biodiversity credits must be founded upon robust integrity guardrails that ensure genuine, measurable and lasting gains for biodiversity, while avoiding social and ecological harm. Across existing biodiversity credit standards, integrity is maintained through a set of mechanisms including ecological credibility, additionality, independent verification and respect for human rights.

A central component of credit integrity is the use of scientific, measurable indicators to quantify biodiversity outcomes. Both the WEF and The Swedish Biocredit Alliance (SBA) emphasise that credit issuance must be tied to defined biodiversity objectives, baselines and measurable indicators that reflect real ecological change (WEF, 2025b; SBA, 2024). The selection of indicators must be evidence-based and aligned with the project's Theory of Change (a method for explaining how specific interventions are expected to lead to desired development outcomes). Projects may aim to preserve existing biodiversity, restore degraded ecosystems, or shift land management practices toward lower impact alternatives, but a clear link must be established between action and outcome.

Permanence and additionality are other critical criteria. Credits must represent gains that would not have occurred without the project and represent gains that last. The SBA provides guidance on demonstrating additionality based on the project type and explicitly states that manipulations that inflate the potential of crediting is strictly prohibited (SBA, 2024). Projects must also define credible baselines and ensure that these reflect the most likely trajectory in the absence of any biodiversity promoting activities. The WEF supports this by stressing the importance of additionality by making it one of their “High Level Principles” for biodiversity credits (WEF, 2025b).

A third pillar of integrity is independent validation and transparent verification. Both standards require third-party audits to confirm project eligibility, adherence to methodologies and progress against ecological targets (WEF, 2025b; SBA, 2024). This includes robust monitoring, reporting and verification (MRV) systems, which both sources define as essential to ensure transparency, scientific credibility and accountability in measuring biodiversity outcomes (WEF 2025b; SBA, 2024) These third party audits must be carried out by accredited entities with appropriate expertise and at regular intervals. Transparent reporting, public disclosure of project data and mechanisms to address uncertainty are also required to uphold market credibility.

High-integrity credits must also respect the rights and participation of Indigenous Peoples and local communities (IPLCs). Both sources emphasise that IPLCs must be meaningfully consulted, using culturally appropriate methods and that Free, Prior and Informed Consent (FPIC) is a fundamental prerequisite where applicable (WEF, 2025b; SBA, 2024).

Finally, the governance surrounding biodiversity credit markets plays a vital role in maintaining integrity. This includes the use of transparent registries, clear documentation of credit issuance and retirement and publicly available information on ownership and land rights (WEF, 2025; SBA, 2024). Both the WEF and SBA frameworks focused on voluntary biodiversity credit markets, anticipate a growing regulatory landscape and the WEF (2025b) stress that market design must evolve to avoid the integrity and trust issues seen in early carbon markets.

Taken together, these guardrails collectively define the main requirements for a high-integrity biodiversity credit. By aligning both environmental and social safeguards with independent oversight and clear governance, the frameworks aim to ensure that biodiversity credits are credible, trustworthy and genuinely contribute to nature-positive outcomes.

4.3.2 Project Flow

In a typical biocredit market, the project flow involves several interconnected actors, each playing a distinct role in ensuring the credibility and effectiveness of biodiversity credits. The process generally

begins with a project proponent, such as a land manager, conservation organisation, or company, submitting a project application to the relevant registry or oversight body. This initial application outlines the project concept, proposed methodology, and intended biodiversity outcomes. An administrative screening is then conducted to ensure completeness and alignment with the applicable framework (BCA, 2024). Once accepted, the project proponent may proceed to formalise the project design and baseline assessments.

Third-party validators and verifiers play a critical role in ensuring the integrity of the project by assessing whether the proposed activities, baseline data, and monitoring plans meet established standards (BCA, 2024). Validation may involve iterative feedback loops, where modifications are requested before approval is granted. Once the project is validated, the implementation begins, often following an action plan that details interventions and monitoring requirements over the project's lifespan. Regular third-party verifications are required to assess progress against biodiversity objectives and to confirm that reported outcomes are accurate (BCA, 2024).

Credits are typically issued only after successful validation and verification, at which point they become available to buyers. Buyers of biodiversity credits may include corporations seeking to offset impacts or achieve nature-positive goals, financial institutions integrating nature into portfolios, or public entities supporting conservation targets. The system is designed to ensure traceability and accountability through registries that record project details, credit issuance, and retirement status. Overall, the biocredit project flow aims to balance scientific rigor, transparency, and accessibility, creating a structured pathway for generating and transacting biodiversity credits that reflect real ecological outcomes (BCA, 2024).

4.4 Current Developments in Biodiversity Policy Across Europe

This section examines recent biodiversity policy advancements in Europe. Looking at the EU's Nature Restoration Regulation (NRR) and Britain's Biodiversity Net Gain (BNG) policy, it aims to describe the regulatory landscape surrounding the growing biodiversity credit market central to this thesis. The NRR, with its legally binding restoration targets and BNG, with its mandatory net gain requirements, exemplify innovative policy frameworks that indirectly or directly drive demand for conservation mechanisms such as biodiversity credits. By reviewing these policies and their academic reception, this section provides a clearer view of how biodiversity goals are being integrated into European regulatory systems, offering useful context for how different policy frameworks may shape the development and implementation of biodiversity credit markets.

4.4.1 The European Union: Legally Mandated Nature Restoration

The Nature Restoration Regulation (NRR), in use since August 2024, establishes the first EU-wide and legally binding framework to restore damaged ecosystems. It addresses the fact that over 80% of European habitats are in poor condition and aims to halt this biodiversity loss, contribute to climate mitigation and enhance food security. The NRR sets a legally binding target to restore at least 20% of the EU's land and sea areas by 2030 and all ecosystems in need of restoration by 2050, thereby reversing decades of ecological degradation (European Commission, 2025b, 2025c).

The regulation recognises that biodiversity is essential for ecosystem resilience, the delivery of critical services such as clean air, water filtration and pollination and for mitigating natural disaster risks. By

promoting natural restoration in law, the NRR elevates biodiversity conservation to a strategic EU priority. Member states will be required to submit national restoration plans by September 2026, detailing restoration areas, ecological methods, financing strategies and how efforts are in line with existing EU policies in agriculture, forestry, water and climate (European Commission, 2025b).

Some of these legally binding targets focus specifically on restoring biodiversity. These include reversing the decline of pollinator populations by 2030, restoring at least 25 000 km of free flowing rivers and re-establishing critical habitat types lost due to land-use. Furthermore, urban and agricultural ecosystems must show increasing trends in biodiversity indicators such as grassland butterfly populations, farmland birds and tree canopy cover. Forest ecosystems are required to improve on metrics like deadwood volume and species diversity. Member states must begin reporting progress in 2028, the full implementation being monitored by the European Environment Agency (European Commission, 2025b, 2025c).

The NRR supports the EU Biodiversity Strategy for 2030 and the Kunming-Montreal Global Biodiversity Framework and it frames ecological restoration as a cost-effective, nature-based solution to interconnected crises. With benefits estimated at 8–10 times greater than the cost, NRR positions biodiversity restoration as essential not only for ecosystems, but also for climate resilience, economic stability and long-term human wellbeing (European Commission, 2025c).

4.4.1.1 Possibilities and Limitations of the NRR

While the NRR is a significant legislative achievement for the European Union, its real impact will depend on how well it is put into practice and how effectively it fits with existing policy frameworks (Lees & Pedersen, 2025). Academic literature widely recognises the regulation's ambitious goals, especially its potential to make restoration a central concern across different sectors and member states (Aggestam, 2024). However, several scholars point out that the regulation gives national authorities a lot of freedom in how they interpret and apply its rules, which could lead to different approaches and uneven results across the EU (Lees & Pedersen, 2025; Perissi, 2025).

One major challenge is how to define and implement key concepts such as free-flowing rivers which require technical clarity and cooperation between countries to maintain ecological connections (Stoffers et al., 2024). In addition, aligning restoration goals with other important EU policies, especially the Common Agricultural Policy and National Energy and Climate Plans remains inconsistent. This increases the risk of policies working against each other or causing confusion (Perissi, 2025). The weakening of some targets during the legislative process, along with a shift from strict commitments to more aspirational language in certain areas, has also raised concerns about whether NRR can fully meet international biodiversity goals, such as those in the Kunming-Montreal Global Biodiversity Framework (Aggestam, 2024).

Despite these challenges, the NRR is seen as an important step towards including nature-based solutions in the EU's wider sustainability agenda. If strong governance, clear monitoring and better coordination across sectors are achieved, the regulation has great potential to foster measurable ecological improvements and the NRR could thus contribute to the growing biodiversity credit market and bring long term benefits for both the environment and society.

4.4.2 Great Britain: The Biodiversity Net Gain Policy

Another development on the global biodiversity scene is the implementation of the BNG policy in Britain. Mandated by the Department for Environment, Food and Rural Affairs (DEFRA), the BNG policy was introduced and became compulsory for major developments in England in February 2024 and for small sites in April 2024. From late November 2025 the policy will extend to developers of Nationally Significant Infrastructure Projects (NSIP), not just small and major developments and thus include almost all new infrastructure projects in Britain. BNG states that any biodiversity harm induced by an infrastructure development must be compensated by 110%, resulting in a gain in biodiversity (DEFRA, 2024a).

4.4.2.1 Measurement Methodology

Because of the widespread application of BNG the biodiversity measurements methods of the policy are of great interest. They will be explored below:

BNG is measured using the statutory biodiversity metric, which categorises biodiversity units into three main types: area habitat units, hedgerow units and watercourse units. Each type corresponds to a different habitat feature, area units are used for habitats measured in hectares (e.g. grasslands, woodlands), hedgerow units for linear features measured in kilometres and watercourse units for rivers, ditches and similar features (DEFRA, 2024b). The mandatory 10% net gain requirement applies separately to each unit type, prohibiting cross-compensation between categories to maintain type-specific compensation.

The statutory biodiversity metric accounts for habitat size, type, condition and strategic significance. For newly created or ecologically enhanced habitats, it also considers difficulty of implementation, time to reach target condition and distance from impacted sites. These factors determine the number of units lost through development and the units required to achieve at least 10% net gain (DEFRA, 2024a).

To meet the 10% net gain requirement, developers must follow a hierarchy of biodiversity gain options. The preferred approach is to deliver gains on-site, within the development boundary. Where this is not sufficient or possible, biodiversity improvements may be secured off-site, either on land under the developer's control or by purchasing off-site units on the private market. If neither of these options can fulfil the requirements, developers may resort to purchasing so called statutory biodiversity credits. These are financial contributions to nationally administered habitat creation projects.

For most developments, a qualified ecologist must carry out the assessment using the statutory metric. Small-scale projects may use a simplified tool, though it is limited to so-called non-sensitive sites (DEFRA, 2024a).

The statutory biodiversity metric is intended for iterative use throughout the design process, allowing for subsequent evaluation and adjustment of site plans (DEFRA, 2024a).

4.4.2.2 Statutory Biodiversity Credits

As stated above, if developers are unable to meet the mandatory 10% BNG requirement, the final alternative is the purchase of statutory biodiversity credits (DEFRA, 2024b).

The number and type of statutory credits required are determined using the statutory biodiversity metric tool, which calculates residual deficits across three habitat categories: area habitats (classified into tiers A1-A5), hedgerows (H) and watercourses (W). A spatial risk multiplier of 0.5 is applied to all statutory credits, meaning that one credit equates to 0.5 biodiversity units (DEFRA, 2024b).

Statutory credits are purchased through a centralised sales platform operated by Natural England, a national agency, on behalf of DEFRA. Credit prices reflect the costs of habitat creation, monitoring and maintenance, with an additional mark-up to avoid skewing the off-site private market. Developers may purchase fractional credits and must submit proof of purchase as part of their biodiversity gain plan (DEFRA, 2024b).

Before purchasing credits, developers are also required to provide evidence that delivering BNG through on-site or off-site interventions is not viable. This includes demonstrating that at least three credible off-site providers were contacted without success. However, if the biodiversity unit deficit is less than 0.25 units, this requirement of evidence is removed.

All statutory credit purchases are permission-specific and non-transferable, meaning they are tied to a single planning application and cannot be reused or reassigned to other developments. (DEFRA, 2024b).

Funds generated through the credit system are reinvested into habitat creation and enhancement projects in England, in line with the Environment Act 2021 (DEFRA, 2024b).

4.4.2.3 Possibilities and Limitations of Britain's BNG Policy

An early evaluation of England's BNG policy by zu Ermgassen et al. (2021) found it promising for deterring biodiversity loss and encouraging habitat restoration, with most biodiversity units (95%) delivered on-site or nearby. However, later studies highlight implementation challenges, including widespread non-compliance, metric limitations and a neoliberal planning context that often prioritises economic growth. Thornhill et al. (2025) revealed consistent gaps between approved biodiversity measures and their actual delivery in residential developments, largely due to limited expertise, weak enforcement and a focus on charismatic species like bats. Marshall et al. (2024) further questioned the metric's effectiveness, showing it aligns only modestly with plant diversity and fails to reflect outcomes for birds and butterflies. Knight-Lenihan (2020) adds that BNG's reliance on offsetting lacks empirical support and is undermined by declining public oversight. He argues that the policy's success may depend on stronger governance and greater involvement from non-governmental actors. Complementing these critiques, Ronish and Hilburn (2022) offer a more optimistic view, describing BNG as a historical policy shift with the potential to support large-scale ecological recovery, if better integrated with planning and supported by collaboration and adequate ecological expertise.

While current evidence highlights substantial challenges, BNG still provides a framework with the potential to align development with biodiversity goals. Realising this potential, however, will require improved ecological oversight, more consistent enforcement and ongoing refinement of the underlying tools and metrics. The statutory biodiversity credit system may also serve as a reference point for the emerging biodiversity credit markets. Where it could offer practical lessons in credit issuance, monitoring, and regulatory integration.

4.5 Current Methodologies for Pricing of Ecosystem Services

Biodiversity is crucial not only for maintaining biological and ecological balance of biotopes around the world, but also for harboring and creating substantial economical value through these biotopes' ecosystem services (WEF, 2020). Ecosystem services can, for example, be timber growth, water filtration or irrigation. Biodiversity and ecosystem services are relatively closely linked, where the deterioration of one often leads to an impairment of the other. However it is important to note that this relationship isn't causal (Liu et al., 2010; Pascual et al., 2010). Prolonged harm to ecological systems can lead to impairment of these ecosystem services (Ceglar et al., 2024; Roe, 2019). Between 1997 and 2020, a 23-year time span, the global value of economic activities moderately or highly dependent on ecosystem services is estimated to have grown from 33 trillion dollars according to Costanza et al (1997) to 44 trillion dollars according to the WEF (2020), which is in line with consumer price index growth during the time (Statistiska Centralbyrån, n.d.). Nonetheless, the economic value of these services remain substantial, and thus a small decrease in the effectiveness of these systems may result in severe financial and societal consequences.

Historically, the valuation of nature and nature-related services has been carried out using the Ecosystem Services Valuation (ESV) framework (Liu et al., 2010). Today, the most common methods for ESV typically fall into six categories, which will be presented below. It is worth considering whether these methods could also be applicable to the valuation of biodiversity and biodiversity credits.

4.5.1 ESV Methods

4.5.1.1 Market Price-Based Approaches

These approaches use actual market prices or market proxies as direct measures of ecosystem service values. If an ecosystem good or service is traded or has a clear proxy, its market price serves as a monetary indicator. For instance, the value of timber production can be determined from its market price. Likewise, the carbon sequestration services provided by forests are often valued using carbon credit prices. Prices may also be adjusted to remove market distortions such as taxes or subsidies to better reflect true economic value (Selivanov & Hlaváčková, 2021; Liu et al., 2010).

4.5.1.2 Production Function Approach

The production function approach evaluates ecosystem services based on their contribution to the production of commercially traded goods. This approach is particularly relevant for ecosystem services that serve as inputs into economic production processes, such as pollination services enhancing agricultural productivity or watershed services improving water quality and thus agricultural yields. Under the production function technique, ecosystem services are valued based on their incremental contribution to production outputs, unlike the market price-based approach, which directly values ecosystem services through the value of goods traded in markets. (Liu et al., 2010; Selivanov & Hlaváčková, 2021).

4.5.1.3 Cost-Based Approaches

Cost-based methods infer the value of ecosystem services based on the costs society would face if these services were lost. The underlying assumption is that the ecosystem service is worth at least what it would

cost society to replace, mitigate, or avoid losing it. Common methods include replacement costs, which estimate the price of artificially replacing a lost service, damage cost avoided, reflecting losses prevented by ecosystem services and mitigation or restoration cost methods, quantifying costs to mitigate or restore ecosystem degradation. For example, the value of flood protection from a forested watershed might be estimated as the cost of constructing flood control infrastructure otherwise needed. These methods are particularly suited to assessing regulatory services, such as the storm protection provided by mangroves (Selivanov & Hlaváčková, 2021; Liu et al., 2010).

4.5.1.4 Revealed Preference Methods

Revealed preference methods estimate the value of ecosystem services based on observations of people's actual behaviours in closely related markets. Two prominent techniques are the travel cost method and hedonic pricing. The travel cost method uses the expenses and time people spend visiting recreational sites, such as national parks, as reflections of the value they place on these sites. For instance, the recreational value of a forested park could be calculated based on visitors' travel expenditures. Hedonic pricing assesses how environmental amenities influence market prices, typically for real estate. For example, a higher price for homes located near forests or lakes, compared to similar homes without such proximity, reveals the market value of these natural amenities (Selivanov & Hlaváčková, 2021; Liu et al., 2010).

4.5.1.5 Stated Preference Methods

In cases where market data is scarce, stated preference methods can be utilised. These methods use surveys that ask individuals about their willingness to pay for specific environmental changes. The primary techniques are contingent valuation and choice modeling, often implemented through discrete choice experiments. Contingent valuation surveys directly examine respondents' maximum willingness to pay for environmental changes. Choice modeling, in contrast, asks respondents to select their preferred scenarios from bundles of different ecosystem attributes and associated costs, allowing researchers to deduce values for each attribute. Both methods effectively estimate what monetary trade-offs individuals are willing to make for ecosystem service benefits. These techniques are versatile and capable of capturing value of resources or services that aren't directly consumed, proving particularly valuable for ecosystem services without explicit market indicators, such as biodiversity conservation and cultural significance (Selivanov & Hlaváčková, 2021; Liu et al., 2010).

4.5.1.6 Benefit Transfer

Conducting primary valuation studies for every site or context is often impractical and costly. Benefit transfer offers a practical alternative by adapting existing valuation estimates from previously studied contexts to similar scenarios elsewhere. Analysts typically compile values from relevant literature, frequently employing meta-analysis and adjust these values based on differences in income, demographics, or ecological characteristics. For instance, valuations from existing studies on recreational benefits of temperate forests can be adjusted and applied to approximate the recreational value of comparable forests in other regions (Liu et al., 2010; Selivanov & Hlaváčková, 2021).

4.5.2 Possibilities and Limitations of ESV Methods

One of the main strengths of ESV methods is that they help make the benefits of nature visible in economic terms. Services like carbon storage, clean water, or recreational opportunities are often overlooked simply because they don't appear in markets. By assigning these services a monetary value, ESV reframes ecosystems as active, measurable contributors to society and the economy. This shift in perspective has played an important role in justifying conservation investments, shaping land-use policies and highlighting the economic rationale for protecting ecosystems (Liu et al., 2010).

However, translating nature's value into numbers is far from straightforward. Ecosystems are complex, interconnected and heavily shaped by local context. To date no single method can fully capture the dynamic relationships between ecological processes and the many ways humans benefit from them (Selivanov and Hlaváčková, 2021). Most valuation approaches rely on simplifications to make these services quantifiable. For instance, estimating the cost of replacing wetland-based flood protection with built infrastructure may ignore the broader ecological or cultural functions that wetlands provide (Chee, 2004).

One of the most persistent challenges in ESV is the difficulty of accounting for non-market and non-use values, things like knowing a species exists, preserving ecosystems for future generations, or protecting culturally significant landscapes. Stated preference methods, such as contingent valuation or choice modelling, try to tackle this by gathering people's views through surveys. While flexible and theoretically inclusive, these methods are vulnerable to bias, hypothetical responses and gaps in public understanding of ecological systems (Chee, 2004). Revealed preference methods, in contrast, rely on actual behaviour, for example, what people spend to visit natural areas, but are limited to use values and market-linked choices (Atkinson et al., 2012; Liu et al., 2010).

On a more practical level, many ESV methods demand large amounts of detailed and often interdisciplinary data. Models that assess how ecosystems contribute to things like crop yields or water quality require ecological, spatial and economic inputs that are not always readily available, particularly in developing or remote areas (Chee, 2004; Selivanov and Hlaváčková, 2021). To deal with data scarcity, some turn to benefit transfer methods, where values from one context are adjusted and reused elsewhere. While cost-efficient, this approach carries significant risks: if the social or ecological context is too different, the results can be misleading (Atkinson et al., 2012).

Because of these limitations, a growing number of researchers argue against relying on any single valuation method. Instead, they promote a pluralistic, transdisciplinary approach that combines methods from economics, ecology and the social sciences (Liu et al., 2010; Mace et al., 2012). The goal is not to find a perfect number, but to inform decisions that are ecologically sound, socially fair and contextually appropriate.

Hybrid frameworks offer one promising way forward. These approaches combine quantitative tools like cost-based or production models with participatory and qualitative inputs, such as stakeholder workshops or sociocultural assessments. For example, in forest management, integrating biophysical modelling with local community values can highlight trade-offs between timber production, biodiversity and cultural heritage (Baciu et al., 2021).

Finally, it must be reiterated that biodiversity and ecosystem services are closely intertwined and often boost one another, but the two don't always have a mutually reinforcing relationship (Bullock et al. 2011). The valuation of biodiversity differs from the valuation of ecosystem services as it involves aspects that aren't strictly monetary, such as cultural and other ethical values that are associated with biodiversity conservation (ibid., IPBES, 2022). ESV is a process aimed at quantifying the contributions of ecosystem services towards human welfare. It includes both monetary and non-monetary methods (Liu et al., 2010). There are however many similar characteristics to their valuation. With this in mind Pascual et al. (2010) still propose that the valuation methods used in the pricing of ecosystem services could contribute to and be interesting to utilise in the valuation of biodiversity.

4.6 Dynamics of the Voluntary Carbon Market

To further explore how a functional market for biodiversity credits might emerge, it is instructive to examine the development of the voluntary carbon markets. Both markets rely on quantifying and trading environmental related aspects that are difficult to price, face similar challenges related to quality, integrity and valuation, and attract private actors under voluntary or semi-voluntary conditions. The evolution of the Voluntary Carbon Markets, particularly its shift from a fragmented to structured market, may offer useful insights into how biodiversity credits could be standardised, valued, and developed.

4.6.1 Background

Voluntary carbon markets (VCM) are decentralised networks in which carbon credits, each typically representing one tonne of CO₂ reduced or removed, are issued by projects and purchased by actors who don't have any legal obligation to offset emissions (CSIS, 2023). Since 2020, VCMs have grown substantially and begun to formalise. In 2021, the market's value reached nearly \$2 billion (up from <\$200 million in 2016) amid a surge of corporate net-zero pledges (ibid.).

Recent years have seen hybrid models appear, where private organisations, in collaboration with governments and in alignment with their objectives, integrate private standards to create more organised voluntary carbon markets. For example, in 2022 the London Stock Exchange launched a voluntary carbon market designation (label ensuring transparency and quality) for investment funds, aiming to bring carbon credit financing onto a public exchange with standardised reporting requirements (CSIS, 2023; London Stock Exchange, 2022). This framework moves trading away from obscure over-the-counter deals toward a more transparent platform, helping investors assess credit quality and risk. Other notable developments include the EU's proposal for a Carbon Removal Certification Framework (2022) to establish official standards and registries for carbon removal projects (CSIS, 2023).

In summary, since 2020 the VCM has evolved from a loose, project-by-project market toward more structured models that incorporate standardisation, public registries and regulatory involvement to enhance credibility.

4.6.2 Pricing Mechanisms

The pricing or valuation of credits on the VCM depends on both the cost of project implementation, the issuing date of the credit and the demand from buyers seeking to lower climate impact or reputational benefits (Senken, 2023). Traditionally, carbon credit prices were negotiated and set for each separate deal,

resulting in a wide price-range depending on project type, location and other benefits such as community and ecological advantages. Since 2020, a spike in demand has driven prices upward: average credit prices nearly doubled from around \$4 per tonne in 2021 to over \$7 per tonne in 2022 (ibid.). Nature-based carbon credits, such as forestry projects, often result in a premium for their additional ecological benefits whereas credits from purely emission reductions tend to be cheaper (CSIS, 2023).

During the VCM's history, drastic market corrections have occurred. After the record 2021 surge, the volume of VCM transactions halved in 2022 (from 516 MtCO₂ in 2021 to ~254 Mt in 2022) amid growing scrutiny of the quality of the credits (Congressional Research Service, 2024). Quality considerations such as additionality, permanence and leakage have also been shown to influence credit value. Credits that meet stringent standards or stem from projects with verified sustainable development co-benefits are consistently valued higher according to Senken (2023), while those of doubtful integrity can become essentially worthless, as occurred in the collapse of the Chicago Climate Exchange, where oversupply of low-quality credits drove prices to near-zero (CSIS, 2023). The average price of high quality credits averages in the range \$30-\$50, substantially higher than the total average (ibid.).

To address these differing challenges revolving valuation, the VCM ecosystem has introduced different “tiers” for credits and other new rating mechanisms. Independent initiatives like the Integrity Council for the Voluntary Carbon Market (ICVCM) are developing quality benchmarks called Core Carbon Principles in order to classify high-integrity projects, which may fetch higher prices (CSIS, 2023). At the same time, some trading platforms have now started to offer standardised contracts for credits classified as a certain type, for example “nature-based removal credits”, which has helped to establish reference prices. However, valuation remains ambiguous: a pair of credits both representing one ton of CO₂ can vary in price if one involves rainforest restoration with community benefits and the other an industrial gas capture project. In essence, the voluntary market is pricing not just carbon but sometimes carbon plus attributes. This dynamic suggests that transparent disclosure of project attributes and third-party ratings will continue to be crucial for accurate pricing, a lesson that could translate into biodiversity credit valuation, where attributes like species protected will vary by project (ibid.).

It is important to point out that even though the credits are “voluntary”, they’re often intertwined with emerging compliance or compliance like elements. Companies may face direct or indirect economic pressures to buy offsets, as an example, investors might favour firms with climate-neutral strategies.

In summary, the voluntary carbon market since 2020 has been propelled by a mix of self-regulation motives (sustainability strategies and future-proofing) and market opportunity for climate-positive projects. These incentives can inform how a biodiversity credit market might attract participants, through a combination of regulatory anticipation, public image benefits and the creation of tangible financial rewards for conservation actions.

4.7 Demand Analysis: Who Buys Biodiversity Credits and Why?

Although still predominantly voluntary, biodiversity credit markets are attracting a growing range of buyers with differing motivations and applications for their purchases. Demand spans corporate actors, financial institutions, governments, NGOs, philanthropists and even retail-facing companies. Understanding the different types of demand requires examining both the actor types and the strategic use

cases emerging in the market. According to the World Economic Forum (2023), potential buyers are motivated to engage with biodiversity issues due to various factors, including internal strategy, values, or financial dependencies.

4.7.1 Corporate Buyers

The World Economic Forum (2023) identifies corporations as the largest perceived potential buyer group for biodiversity credits. The following outlines their potential internal and external drivers for purchasing such credits.

4.7.1.1 Internal Drivers of Demand

One internal key driver of companies is the desire to preserve ecosystem services that support core operations, such as pollination, water availability and soil fertility. Firms in manufacturing, retail and consumer goods are increasingly investing in biodiversity improvements to safeguard the reliability and affordability of their raw material inputs (WEF, 2023). In many cases, downstream buyers seek biodiversity credits generated by upstream suppliers in agriculture and forestry heavily dependent on ecosystem health.

Another internal motivator is mission alignment. Approximately one-third of companies surveyed by WEF (2023) identified their organisational purpose as a reason to invest in biodiversity. Expressing environmental values is increasingly seen as a competitive advantage in talent attraction and brand identity. Firms that have historically focused on carbon neutrality are now exploring biodiversity as a complementary pillar in their sustainability narratives.

4.7.1.2 External Drivers of Demand

In addition to internal business cases, corporate demand for biodiversity credits is increasingly shaped by external expectations, from regulators, investors, consumers and civil society. This pressure is particularly evident in sectors with significant land-use impacts, such as agriculture, forestry and mining, where visibility and scrutiny are high. Here, biodiversity credits serve not only as a mitigation tool but also as a symbolic commitment to environmental responsibility, helping companies reinforce their social licence to operate (WEF, 2023).

Another common driver is market differentiation. As consumers become more attentive to sustainability credentials, biodiversity stewardship is increasingly seen as a value-adding feature. Biodiversity credits can support green marketing claims, enable product storytelling, or form part of membership commitments like “1% for the Planet” (BCA, 2023; WEF, 2023). However, these strategies are only effective when underpinned by credible metrics and robust third-party verification, especially in light of broader concerns around greenwashing.

A third driver is the rising role of financial markets. Biodiversity performance is now being incorporated into ESG ratings and firms that demonstrate alignment with high-integrity biodiversity initiatives may see improved access to capital or lower financing costs (BCA, 2023). Shareholder pressure is also increasing, particularly around the quality and transparency of sustainability claims (ibid). In this context, biodiversity credits offer a mechanism to link corporate finance to measurable biodiversity outcomes.

As introduced in chapter 4.2.3, a key component of regulatory anticipation, arguably one of the most powerful external drivers of demand for biodiversity credits, is the increasing influence of global sustainability reporting frameworks. These frameworks are increasingly integrating nature-related issues into corporate disclosure and target-setting requirements, pushing companies to seek instruments, such as biodiversity credits, that demonstrate alignment with emerging expectations of action.

4.7.1.3 Strategic Use Cases for Corporate Buyers

WEF (2023) identifies five primary (potential) use cases for biodiversity credits, which align with the drivers outlined above:

- 1. Enhancing climate projects with biodiversity outcomes**
Companies purchasing nature-based carbon credits may also buy biodiversity credits to ensure their climate investments yield measurable co-benefits for nature. This stacking or bundling approach helps mitigate the risk of supporting ecologically harmful monocultures or projects lacking additionality.
- 2. Securing ecosystem services**
Firms dependent on natural inputs may purchase biodiversity credits to improve the resilience of upstream ecosystems. For example, a food producer might finance watershed restoration in a growing region to ensure water availability for suppliers.
- 3. Contributing to nature recovery beyond direct impacts**
Some companies invest in biodiversity credits to support global or regional conservation goals, regardless of their operational footprint. This can enhance brand image, attract talent and signal alignment with the Kunming-Montreal Global Biodiversity Framework.
- 4. Bundling with consumer products**
Consumer-facing companies may incorporate biodiversity credits into product offerings, e.g., selling a premium product that funds habitat restoration. This appeals to environmentally conscious consumers, but requires careful claims management to avoid misleading narratives.
- 5. Offsetting residual biodiversity impacts (contested use case)**
Some actors are exploring the use of biodiversity credits to compensate for impacts that remain after the mitigation hierarchy. However, this approach remains controversial due to unresolved questions about fungibility, additionality and the risk of legitimising ongoing harm (Pollination, 2024).

4.7.2 Other Types of Buyers

Beyond corporate actors, financial institutions are emerging as both direct and indirect participants in biodiversity credit markets. Some, such as multilateral development banks, are already integrating biodiversity safeguards into lending frameworks, effectively incentivising borrowers to engage with credit systems (BCA, 2023). Others, including asset managers, may favour investing in companies with nature-conscious operations, thereby indirectly catalysing demand. Financial institutions also play a structural role in shaping how biodiversity credits are priced and understood. As BCA (2023) notes,

shareholder pressure can push companies to avoid greenwashing and financial actors are contributing to the development of valuation methodologies.

Governments play multiple roles, including as possible buyers of biodiversity credits to meet domestic conservation or development goals. Public procurement of credits could be used as a policy tool to redirect subsidies toward ecosystem restoration. Some national and subnational governments have also introduced or are piloting mechanisms that blend public finance with voluntary credit purchases, for example, to support peacebuilding and rural livelihoods in post-conflict regions like Colombia (BCA, 2023).

Philanthropic foundations and NGOs represent some of the earliest and most mission-aligned buyers. These actors often fund biodiversity projects to advance specific conservation objectives or social co-benefits, such as job creation or Indigenous land rights. Their interest typically lies in high-integrity, measurable impact rather than commercial return and they may help de-risk early-stage credit schemes through catalytic funding (BCA, 2023).

4.7.3 Key Barriers and Enablers of Market Demand

Despite increasing interest from corporates, financial institutions and governments, the biodiversity credit market remains undeveloped and fragmented. The gap between stated interest and actual transaction volumes can be partly explained by a set of structural and perceptual barriers. On the other hand, there are a number of emerging enablers that may help unlock demand and scale the market.

4.7.3.1 Barriers to Market Demand

A central challenge is the lack of clarity around what biodiversity credits represent and how they relate to real ecological impact. Biodiversity outcomes are less easily quantified and inherently site-specific in comparison to carbon markets, making comparability and standardisation more difficult (WEF, 2023; BCA, 2023). This fuels uncertainty around what claims can credibly be made, particularly in light of increasing regulatory scrutiny and reputational risk linked to greenwashing (Pollination, 2024).

Another barrier is the fragmentation of standards and metrics. Without consolidated principles for MRV and claims, buyers face a complex and time-consuming due diligence process. Many are reluctant to engage in a market where liability and reputational risks remain unclear or unallocated (BCA, 2023). Some also point to the lack of universally accepted definitions, particularly for terms such as "nature-positive", as a reason to delay entering the market (WEF, 2023).

Moreover, many credit buyers are concerned about supply-side reliability. Issues such as unclear land tenure, insufficient inclusion of Indigenous Peoples and Local Communities (IPLCs) and the absence of safeguards for additionality, permanence and leakage undermine trust in the environmental and social integrity of credits (WEF, 2023; BCA, 2023). Buyers may also hesitate due to low liquidity and the absence of secondary markets, which limit tradability and exit options (BCA, 2023).

Cost is also a limiting factor. High project development costs, combined with the expenses of measurement, reporting and verification, especially in the absence of economies of scale, can make high-integrity credits expensive relative to their perceived reputational or ESG value (Pollination, 2024).

4.7.3.2 Enablers of Market Demand

At the same time, several developments are helping to reduce these barriers and foster demand growth.

First, the emergence of global sustainability reporting frameworks, such as the CSRD, TNFD and SBTN, are increasing pressure on companies to assess and disclose their nature-related impacts (Pollination, 2024; BCA, 2023). Biodiversity credits offer a concrete and verifiable means to demonstrate positive action, especially when embedded in broader nature strategies.

Second, there is growing alignment around integrity standards. As mentioned, organisations such as the Biodiversity Credit Alliance are developing methodologies that will enhance the credibility of claims and provide clearer MRV guidelines. New technologies such as eDNA, remote sensing, bioacoustics and satellite imagery are making verification more cost-efficient and precise (WEF, 2023).

Another key enabler is the consolidation around common principles and frameworks, which helps reduce transaction costs, build trust and enable investments. Stakeholders have called for standardised credit types, registries and legal infrastructure to improve comparability and transparency across markets (WEF, 2023; BCA, 2023).

Governments can also play a catalytic role through policy alignment, including fiscal incentives, public procurement, land tenure reform and biodiversity finance strategies aligned with the Global Biodiversity Framework (WEF, 2023).

Lastly, the business case for biodiversity is slowly improving. As biodiversity becomes material to ESG ratings and investor decision-making, companies are increasingly aware of their dependencies on nature and ecosystems and the financial risks of inaction. Biodiversity credits may become part of a broader portfolio of tools used to secure operational resilience, reputational value and access to nature-positive finance (WEF, 2023; BCA, 2023).

4.8 Pricing Methodology

Pricing in environmental markets may (but are not limited to) reflect either the cost of generating environmental outcomes or the perceived value of those outcomes to buyers. While the biodiversity credit market remains fairly underdeveloped, insights from related fields such as ecosystem services valuation and carbon credit markets can inform the construction of pricing models relevant to biodiversity credit finance.

A cost-based pricing model sets the price of a good or service based on the cost of delivering it, including implementation, administration and opportunity costs. In the context of ecosystem services, such approaches are replacement cost, avoided damage cost and mitigation cost methods (Pascual et al., 2010; Selivanov & Hlaváčková, 2021). These methods aim to reflect the minimum economic value of preserving or restoring an ecosystem by estimating what it would cost to replicate its functions through artificial means or to offset its loss. Applied to biodiversity credits, a cost-based model may include expenses such as MRV, restoration action, third-party certification and lost income from alternative land uses, such as timber production.

A value-based pricing model focuses on the buyer's willingness to pay, reflecting the perceived value derived from the purchase (Nagle & Müller, 2018). In a biodiversity credits context, this might include ecological, reputational, or strategic value for the buyer. For example, companies may be willing to pay a premium for credits that enhance their nature-positive narrative or help address double materiality under the TNFD framework.

While both pricing models offer distinct logics, they are not mutually exclusive. Evidence from the voluntary carbon market suggests that credits with higher integrity and additional co-benefits tend to command higher prices (Senken, 2023). Translating this to biodiversity credits implies a hybrid dynamic in which implementation costs and perceived buyer value are closely intertwined. Delivering high-integrity outcomes typically entails greater monitoring and opportunity costs, reinforcing the relevance of cost-based pricing even in markets driven by reputational or strategic value.

In sum, the development of a pricing framework for biodiversity credits may benefit from integrating elements of both cost and value-based models. Such an approach acknowledges the ecological and financial realities of conservation efforts while also recognising the role of demand-side incentives in shaping market prices.

4.8.1 A Hybrid Pricing Model: Qarlbo Biodiversity's Approach in Swedish Production Forestry

One example of a hybrid pricing model that incorporates both cost and ecological value can be seen in the methodology used by Qarlbo Biodiversity for biodiversity credits originated from Swedish production forestry. The company defines a project price either as a total amount over a fixed number of years and as an annualised price per hectare. The base price is calculated from the total cost of the project, including payments for conservation activities, ecological assessments, third-party verification and the opportunity cost of lost timber revenues (Qarlbo Biodiversity, 2025). This reflects a standard cost-based pricing logic.

However, the final credit price is further adjusted using a biological relevance factor (BRF), typically ranging from 1.0 to 1.5. This multiplier reflects the ecological importance of the project area, looking at factors such as habitat quality, connectivity and the rarity of the present species. The inclusion of the BRF introduces a value-based component, as it seeks to capture perceived ecological significance rather than direct financial cost. It should be noted that this value-based factor is determined by the issuer, rather than being based on buyer input or revealed willingness to pay. As such, the BRF reflects a project-side valuation of ecological significance, which may or may not align with the perceived value or priorities of potential buyers (Qarlbo Biodiversity, 2025).

Taken together, the model represents a hybrid between cost- and value-based pricing (although value here is determined by seller), where conservation costs provide a pricing floor and ecological value influences the final premium.

While other pricing approaches for biodiversity credits exist internationally, this section focuses on Qarlbo Biodiversity's model due to its application in Swedish production forestry and its integration of both cost and ecological value components. As one of the first structured pricing models for biodiversity credits in Sweden, it provides an interesting and concrete case for analysing how pricing logic is operationalised in practice.

5. Interview Analysis

This chapter presents the empirical findings from the qualitative interviews. Drawing on the perspectives of nine anonymised interviews across a range of companies in the Swedish and Nordic sectors, the aim is to identify key themes related to how biodiversity credits are understood, evaluated and approached in practice.

The structure of the analysis follows the main topics covered in the interview guide. These topics were developed to explore practical and strategic aspects of biodiversity credit markets that were not fully addressed in the literature. The results are presented thematically, with each section summarising recurring insights, highlighting contrasting perspectives and referring to specific stakeholder views to reflect the range of responses.

To avoid lengthy formulations and repetition, the anonymised company descriptions listed in Table 1 have been assigned shorter labels, as presented in Table 2. These short forms are hereafter used throughout the thesis when referring to the respective organisations.

Table 2. Short labels of previous full descriptive label of interviewees

Full Descriptive Label of Interviewee	Short Label
Public-sector oriented real estate company	The public-oriented real estate company
Municipally owned energy & utility company	The municipal energy company
Integrated wood industry and construction group	The wood and construction group
Nordic construction and civil engineering firm	The construction firm
Renewable energy project developer	The renewable energy developer
Large Nordic financial institution	The financial institution
Commercially focused real estate company	The commercial real estate company
Swedish mining company	The mining company
Nordic food production and consumer goods company	The consumer goods company

5.1 Strategic Approaches to Biodiversity

5.1.1 Biodiversity's Role in Sustainability Strategy

Biodiversity has increasingly become an element of corporate sustainability strategies for the interviewed organisations. Several of the companies have, in the past few years, explicitly integrated ambitious biodiversity goals into their top-level strategies and more than half of the companies have started to explore methodologies to measure their impact on biodiversity or the baseline ecological value of their assets. For example, the renewable energy developer, prompted by their operational permit process, treats

biodiversity as “a part of our overarching strategy” and has even set a target to achieve a net-positive biodiversity impact in the coming years. This company underwent a double materiality analysis that clearly showed that biodiversity is becoming an increasingly prioritised issue among stakeholders, elevating its strategic importance and helping in securing leadership support. Similarly, the public-oriented real estate company now, through SBTN, includes biodiversity in its strategy. It is currently restoring green areas, mapping biodiversity through nature value inventories on its properties and applying the mitigation hierarchy, seeing it as important in its responsibility as a landowner. In contrast, organisations that are driven more by policy display a softer attitude. The municipal energy company is guided by the municipality’s environmental program with “ambitious but vague” biodiversity goals and admits that translating these into actions is challenging due to the goals’ lack of specific metrics, the company’s limited knowledge of which biodiversity measures are most effective and the municipality’s focus on actions within its geographical boundaries.

Overall, most organisations recognise biodiversity as an increasingly important issue (often revealed to them by recent double materiality assessments linked to new EU reporting requirements) and are incorporating it into strategies, though the degree of formality and ambition varies.

5.1.2 Main Tools and Activities

The tools and activities adopted to manage and measure biodiversity differ by organisational type. Several have started with baseline assessments and monitoring. As stated above, the public-oriented real estate company conducts nature value inventories on its properties, classifying habitats into value classes to track changes over time. The renewable energy developer has implemented a biodiversity risk assessment tool for projects and given project teams new biodiversity KPIs, requiring “Biodiversity Positive Initiatives” in the field. They also pilot new methods like the CLIMB method to quantify land impacts and test “biodiversity footprint” assessments in projects. The consumer goods company has also tried using an array of methods, it participated in the Mistra BIOPATH (a Swedish research program exploring pathways for integrating biodiversity into business decision-making (Mistra Biopath, n.d) to trial the TNFD framework and assess biodiversity-related risks, then tested SBTN guidelines. The renewable energy developer also stated that they are exploring approaching the SBTN framework, stating that “it would provide us with measurable outcomes and a structured way to follow up.”.

On the other hand, the wood and construction group relies on existing certifications to manage biodiversity. The group requires around 85% of its forestry operations to be FSC or PEFC certified, which it states “goes beyond” legal forestry requirements. This company has recently, in combination with their implementation of CSRD, conducted a double materiality analysis and as a consequence begun developing policies and action plans for biodiversity related issues, both in their forestry and construction branch.

Meanwhile, less nature-centered firms have started with symbolic or small-scale initiatives. For example, the municipal energy company hosted a webinar and will create an “urban biotope” green area at its headquarters, acknowledging these as modest steps while the organisation still “lacks knowledge” on further biodiversity actions.

In summary, many of the interviewed organisations are implementing internal tools: risk assessments, biodiversity metrics, land management practices, pilot projects and leveraging certifications in their biodiversity strategies.

5.1.3 Disclosure-related Drivers

Internally, new regulatory reporting processes and stakeholder expectations have been key to elevating awareness on biodiversity.

Several interviewees cited CSRD and other regulations and frameworks as a catalyst for this awareness and them starting to assess their biodiversity impacts. The construction company noted that under CSRD, biodiversity is now a required reporting area and its stakeholder analysis identified biodiversity and ecosystems as an area where the company has significant impact and can make a positive difference. This finding led the firm to start developing metrics and action plans for biodiversity. Similarly, the wood and construction group's stakeholders and owners have expectations for the company to extend its biodiversity efforts beyond forestry into its construction business, especially after conducting the CSRD mandatory double materiality analysis mentioned above.

In the real estate sector, the commercial real estate company has prioritised biodiversity by aligning with corporate values and stakeholder interests. The sustainability head at the company identified biodiversity as a priority through stakeholder dialogues with owners and investors. When they launched a formal sustainability strategy about a year ago it for the first time incorporated biodiversity goals.

While regulatory frameworks such as CSRD have clearly played a role in raising awareness and triggering internal processes, it is worth noting that recent adjustments at the EU level, including the so-called Omnibus Directive, may delay or reduce the scope of CSRD implementation. Therefore, the long-term influence of CSRD on corporate biodiversity action remains reliant on how these changes are interpreted and applied in practice (European Commission, 2025a).

5.1.4 Biodiversity as an Opportunity or Risk

Organisations differ in whether they frame biodiversity primarily as an opportunity or a risk. Nearly all recognise a risk component, biodiversity loss is seen as a risk that could have a magnitude similar to climate change in sectors like renewable energy. The renewable energy developer explicitly ascribed biodiversity great importance by stating “you can almost say that biodiversity is the new climate issue” and described it as a crisis that could threaten ecological systems' stability. It also linked good biodiversity practices as a commercial opportunity by explaining its ability to secure permits and develop community acceptance for projects by having a positive impact on biodiversity.

The mining company likewise treats biodiversity as a serious issue that requires working on several fronts simultaneously to avoid ecological and social risks. Furthermore they are developing an internal compensation strategy to meet a net positive goal in the coming ten years.

Other companies initially approached biodiversity more as a compliance issue. The municipal energy company admitted it does not act on biodiversity beyond what regulations require. They will only invest in offsets or credits if its public owner mandates it or their customers demand it. However, even compliance-focused entities are slowly shifting. As an example, the construction firm follows the

mitigation hierarchy, and sees potential in the biodiversity credit market only when it has reduced its own impacts sufficiently. On the other hand, there are firms that emphasise both opportunity and responsibility. The consumer goods company is motivated not just by reducing risks (like securing supply chains) but by a value-driven desire to contribute positively to ecosystem restoration beyond the company's own footprint.

In summary, the interviewed companies largely frame biodiversity as a risk issue, especially in relation to regulation and ecological stability. Some also recognise strategic opportunities, such as improving stakeholder relations or facilitating permitting processes.

5.2 Drivers of Interest for Biodiversity Credits

When it comes to interest in biodiversity credits specifically, the drivers vary by organisation depending on their relationship with nature and their strategic context. While a clear majority of organisations expressed genuine interest in the topic, many also admitted to having limited foundational knowledge about what biodiversity credits entail or how they could meaningfully support their sustainability objectives. This variation in perspective is reflected in a number of distinct but related motivational factors that are explored below.

5.2.1 Operational Dependence on Nature

Organisations whose core business relies on ecosystem services or natural resources exhibit great interest in biodiversity credits as a tool to safeguard those resources and, by extension, to secure the long-term viability of their operations. For instance, the consumer goods company stated that “We are very aware of our dependence on agriculture, forestry, and marine ecosystems. They must function for us to be able to produce our products”. It recognises that degraded ecosystems pose a direct threat to its supply chain and therefore financial performance as illustrated by their statement “if ecosystems degrade, it affects the availability and price of our raw materials, which is a financial risk”. This dependency drives a desire to not only reduce its negative impacts but also invest in positive restoration. Biodiversity credits are being investigated as one option, since the company itself “doesn't own land” and would need external partnerships: “we need to work with partners, suppliers or other initiatives” to achieve on-ground improvements. Similarly, the wood and construction group acknowledge operational links to nature as its forestry and wood products depend on sustainable forest management in the long run.

This understanding creates an incentive to support biodiversity credit initiatives. Even companies not extracting physical resources see indirect dependencies. The financial institution is aware that biodiversity loss in client sectors translates to credit and investment risks as shown by their statement “Risk is a central aspect. I would say that it is primarily the link between biodiversity and risk, along with the guidelines and signals we receive from the ECB, that drives our work.” and it explicitly says that it is driven to explore market-based solutions and opportunities like biodiversity credits. In contrast, organisations with minimal direct dependence show little interest, e.g. the municipal energy company noted its operations aren't materially affected by biodiversity day-to-day and thus it has “no active interest” to pursue credits absent outside pressure.

5.2.2 Brand Positioning and Reputational Aspects

Many organisations are aware of the branding value by being proactive on biodiversity, or conversely, the reputational risk if they are seen as neglecting it. Several interviewees see biodiversity credits as a potential communication tool to demonstrate responsibility. For example, the public-oriented real estate company views supporting biodiversity projects (whether through its own actions or credits) as a way to tell a positive story that resonates with stakeholders. It drew parallels to its climate offsetting journey. Instead of claiming abstract neutrality, it's now more effective to say "we helped restore a wetland or created a nature reserve", a narrative with high communication value. Buying biodiversity credits could allow such concrete storytelling. Likewise, the renewable energy developer mentioned biodiversity efforts as a way to build goodwill and community acceptance in a polarised debate, thus benefiting its brand and project approvals. However, the branding aspect is double-edged. The commercial real estate company stressed caution: while credits could show that a company is taking responsibility, they immediately "raise the question" of what damage was caused, potentially portraying the company as responsible for the environmental harm. This fear of greenwashing is a strong disincentive which will be discussed further in the following section. Still, reputational leadership is a clear motivator for some of the interviewees.

Along with the examples above, the financial institution is open to innovation to position itself as a forward-thinking sustainable finance leader. The consumer goods company expressed moderate interest in biodiversity from a consumer communication perspective. They noted that biodiversity is significantly harder to communicate than climate-related efforts, as there is no simple metric or widely recognised label that resonates broadly with consumers. While certifications and branding such as the rainforest alliance frog can be helpful, their impact depends on whether consumers understand and value what they represent, something that tends to vary by product category. For more everyday products, it can be particularly difficult to convey biodiversity benefits in a way that feels relevant. By contrast, for certain high-risk commodities like cocoa, it is often more straightforward to highlight sustainability efforts, as consumers are more used to seeing and trusting labels in that context. In the current 2025 market, driven by low prices, they also noted that sustainability messaging is often perceived as a cost driver, which can limit its traction among price-sensitive consumers, even when that perception is inaccurate.

In summary, brand-related drivers are present but nuanced. Many firms see potential communication benefits in supporting biodiversity credits, but they are wary of the reputational pitfalls if not done credibly.

5.2.3 Stakeholder Pressure

External stakeholders play a key role in driving companies' interest in biodiversity credits. Investor expectations were frequently mentioned. For example, the commercial real estate company noted that its owners and financiers have increasingly raised biodiversity in stakeholder dialogues, pushing it to consider solutions that address impacts. Furthermore, the financial institution is influenced and pressured by regulators and central banks who are expecting banks to assess and report nature-related risks. These external requirements make biodiversity credits interesting for the organisations who see it as a potential tool to meet new compliance expectations or stakeholder demands. Public authorities can also exert pressure: the municipal energy company is 100% city-owned and stated plainly that it would only consider voluntary biodiversity compensation if the city (its owner) or its customers explicitly required it. Currently, neither is the case, but a change in political or public sentiment could introduce such demands

(e.g. the city's environmental program urging action has prompted the company to "increase its understanding" of biodiversity issues).

In sum, many organisations are reactive to external pressure: interest in credits often stems from anticipating future regulatory requirements, investor criteria, or community expectations around biodiversity, rather than from internal enthusiasm alone.

5.2.4 Regulatory and Financial Pressure

The evolving policy landscape is a clear driver. Several organisations are preparing for a reality where offsetting biodiversity losses may be compulsory. For instance, the commercial real estate company mentioned external developments like the UK's biodiversity net gain law as a signal of what could emerge in Sweden. This anticipation makes them view fungible biodiversity credits as a potential future compliance mechanism (for use "when on-site measures aren't enough" in a development project). This has the commercial real estate company and the public-oriented real estate company considering credits to stay ahead of the curve and be prepared for future requirements. The construction company similarly expects it may eventually be required to offset residual impacts, it fully subscribes to the principles of the mitigation hierarchy first, but sees buying biodiversity credits later as a possible necessity to meet regulatory or client-imposed net gain targets.

The general interest is tied to risk mitigation rather than any financial profit. The mining company indicated it would consider credits if they could assist them in their last mile efforts to reach its net-positive goal by 2030, essentially as an insurance policy if its internal efforts fall short. The renewable energy developer noted that meeting potential permitting standards (like stricter biodiversity requirements in court processes) could drive the use of credits as well. In contrast, without regulatory push or clear incentive, interest wanes. The municipal energy company cited "absence of a business model" and "no customer demand" as reasons it currently has zero interest in buying credits.

In conclusion, potential future regulations and financial benefits or risk mitigation (access to capital, compliance cost avoidance, etc.) are key drivers for many. Companies are positioning themselves to comply with or capitalise on these emerging requirements, which in turn sparks their interest in biodiversity credits.

5.2.5 Sectoral Trends and Peer Practices

In heavy industries that rely on legal permits, like mining, there is an expectation (from both regulators and society) that companies compensate for significant land and biodiversity disturbances. Because of this, the mining company is developing a biodiversity compensation strategy and is closely monitoring the evolving practices (like the standardisation of CLIMB metrics in Sweden) to ensure it can meet industry expectations. Meanwhile, the renewable energy developer sees where the wind industry is headed. They anticipate biodiversity obligations in permitting, so it is bracing for that future by monitoring recent court cases and evolving methodologies to measure impact (such as CLIMB).

5.3 Perceived Value and Potential Uses of Biodiversity Credits

Interviewees discussed how biodiversity credits might add value to their organisations and how they would potentially use them. They also voiced concerns about credibility. The key perceived uses and value propositions, as well as doubts, are summarised below:

5.3.1 Communication and Storytelling Value

A common view is that biodiversity credits could carry significant value if used to support compelling conservation stories. Several stakeholders noted that contributing to visible biodiversity outcomes can enhance a company's narrative. The public-oriented real estate company illustrated this by comparing statements: a concrete example involving the purchase of biodiversity credits to help restore old-growth forest was seen as significantly more impactful than a vague claim of protecting a grass area or allowing ditches to rewild. The former provides a tangible, inspiring outcome that stakeholders can appreciate. For companies with positive contributions as part of their ethos, credits could be a way to demonstrate net-positive impact in a concrete way. The consumer goods company indicated interest in credits partly to signal that it is not just minimising harm but actually "contributing to ecosystem restoration," which could differentiate its brand.

5.3.2 Compensation and Other Use Cases

Many stakeholders view biodiversity credits through the lens of the mitigation hierarchy, as a last step to compensate for impacts that cannot be avoided or fully restored on-site. There was broad consensus that credits make sense only after a company has no other option to prevent and reduce its own biodiversity footprint. For example, the commercial real estate company sees biodiversity credits as a possible compensation mechanism when on-site measures are not enough. This implies using credits to offset residual impacts of development projects (e.g. when creating a new building unavoidably harms an ecosystem, the company might purchase credits to fund restoration elsewhere). The public-oriented real estate company articulated the same logic with reference to the mitigation hierarchy: first avoid impacts, then minimise, then restore and "only as a last resort compensate".

The mining company described a similar stance, it is prioritising its internal compensation strategy, but if it finds itself falling short of reaching their net positive goals, it "might have no choice" but to purchase credits as a compensatory measure, assuming they would be a viable method to do so.

One of the primary perceived uses of biodiversity credits thus seems to be to offset residual impacts in order to meet a no-net-loss or net-positive status, in line with the mitigation hierarchy. Some also see a role in supply chain or indirect impact compensation where credits could be interesting to address indirect nature impact, mirroring a Scope 3 perspective from climate science. The public-oriented real estate company gave a hypothetical example of quantifying the biodiversity impact of the procurement of its building materials (e.g. timber and concrete sourced from various practices) and potentially buying a calculated number of credits to offset that biodiversity damage. While this is still a theoretical scenario, it shows that some see compensation uses beyond immediate project impact: as part of value-chain footprint management or voluntary contributions to broader conservation goals.

In all cases, however, organisations emphasise that credit use must be tied to actual impact. They are generally opposed to arbitrary offsetting for its own sake. Credits are perceived as useful if they

legitimately compensate for quantified losses or enable positive contributions that align with a company's impact profile.

Their general view is that ideally compensation should occur in proximity to the damage, credits for local restoration would weigh heavier than distant projects, to ensure relevance. This indicates that when credits are used, they want them conceptually tied to the impacted area for true compensation. The renewable energy developer already practices avoid/minimise rigorously but historically only did restoration/compensation when legally required, it noted a "shift in recent years" toward considering more proactive compensation due to increased expectations and requirements in order to acquire permits. Now, it sees voluntary biocredits as a complement for any biodiversity loss that cannot be handled within the project boundary, especially if required to achieve its net-positive goal. In that use case, credits could, if a viable option, serve to counterbalance the company's biodiversity impacts.

5.3.3 Strategic Alignment of Biodiversity Credits

A recurring theme is that any adoption of biodiversity credits, in order to be of any interest, must align with and be integrated into the company's overall sustainability strategy and existing frameworks. Firms do not want credits to be a standalone gesture, they want them to fit into their broader approach. For example, the construction firm analogised its climate strategy: it follows Science-Based Targets principles which according to the company require cutting 90% of emissions before using any carbon offsets and it intends to carry "the same principle into biodiversity work". This means biodiversity credits would only come into play once it has reduced their impacts as much as possible. The mining company expressed that integrating biodiversity credits into its use of the CLIMB methodology would significantly enhance credit usability, stating, "If we are to use biodiversity credits for compensation, we must be able to link them to CLIMB points to compare them with our own impact." They emphasise that compensation, whether mandatory or voluntary, must be locally relevant and tied to their actual biodiversity footprint to ensure credibility. This highlights a desire to incorporate credits into quantitative targets and accounting rather than treat them as ad hoc contributions.

The wood and construction group stated that biodiversity credits would be considered only if they "integrate into the existing business model and contribute to commercial value," underscoring that credits must make sense within its normal operations.

In essence, organisations see value in biodiversity credits if those credits help fulfill their goals in a way that aligns with their sustainability strategies. If credits remain outside their strategy, the perceived value is low. Therefore, much of the current discussion revolves around how biodiversity credits could be incorporated in companies' sustainability roadmaps so that their utilisation feels like part of the plan and a contribution towards their internal goals.

5.3.4 Concerns over Legitimacy and Trustworthiness

Interviewees consistently raised concerns about legitimacy. They worry biodiversity credits might lack credibility or be perceived as "greenwashing" if not done right. One major concern is whether credits truly represent real ecological benefit and long-term impact. The renewable energy developer stated that the long-term ecological value of credits mainly rest on the nature of the conservation activities and how well they can be verified, listing this uncertainty as an important barrier, stating "Verifiability is crucial. I want to be able to monitor and follow up on the intervention myself".

The mining company similarly is concerned that without robust standards, any actions backed by biodiversity credits might not attain sufficient legitimacy. This company prefers not to be a first-mover in a market without established rules and verification methods, highlighted by their statement: “Being the first to act in an area without clear rules is always more challenging”.

The financial institution said “Transparency is extremely important. Equally important is that the projects maintain high integrity” and that communications about them must be transparent and backed by verification and long-term monitoring. They explicitly draw on its carbon market experience: “We don’t want to see the same growing pains in the biodiversity space that we’ve seen with carbon credits”. Having seen pitfalls there, it is cautious not to engage in biodiversity projects without high quality and clear measurement methods.

To mitigate these doubts, organisations stress transparency and third-party validation. Several said a trusted third-party certification of credits would be of value when they might consider them (e.g. the real estate companies both noted third-party verification is “central”). The wood and construction group expressed skepticism about an increase in new eco-labels, preferring recognised standards like FSC to be the basis, otherwise the market could become fragmented and confusing.

Overall, the perceived value of biodiversity credits is tightly linked to their integrity. Many participants would likely see true value in biodiversity credits if a robust, standardised system ensures the credits equate to real, additional and lasting biodiversity gains. Until then the potential uses are theoretical benefits overshadowed by concerns about integrity and the perceived value of biodiversity credits will remain low.

5.4 Barriers to Adoption and Scaling of Biodiversity Credits

The interviews revealed numerous barriers that currently prevent organisations from investing in biodiversity credits or could hinder scaling such a market. These range from internal knowledge gaps to external uncertainties, presented below.

5.4.1 Internal Capacity and Knowledge Gaps

A basic barrier is the lack of internal know-how to engage with biodiversity credits. Several organisations are still building their understanding of biodiversity measurement and management, so credits feel premature. The municipal energy company exemplified this as it admitted it “lacks knowledge” on which biodiversity actions yield the most benefit and has only taken small steps so far. For such organisations, the idea of purchasing credits is too far ahead of their internal capabilities. They first need to comprehend their own biodiversity footprint and options. This status applies to all interviewed companies to varying degrees, none reported having full clarity on their biodiversity impact or a complete plan for how to mitigate it.

As the mining company is in the midst of developing its internal compensation strategy and mapping its impacts with CLIMB, its biggest barrier to buying credits now is that this internal strategy is not fully developed. They want to determine how much they can achieve internally before considering external credits. The sentiment that companies need to know their own impact and what they can do about

themselves first, suggests companies need to mature in their internal biodiversity work before adding the complexity of credits, although it also could be a potential solution to residual impacts.

Additionally, within large organisations, not all departments are at the same level of readiness. The financial institution noted that its asset management arm is further along on biodiversity integration than its lending side, implying that until internal alignment and education occur across the business, committing to credits (which might involve portfolio or client considerations) is difficult. Similar observations were made by the renewable energy developer, which emphasised that even within their own sustainability and environmental teams, the understanding of biodiversity remains uneven. Differentiating between an environmental impact assessment and a true biodiversity risk analysis still requires significant internal education. According to them, explaining the commercial value of biodiversity efforts to their finance and commercial departments continues to be a challenge. In short, many companies are still on the learning curve with biodiversity. Limited expertise and undeveloped internal processes form a barrier to engaging in a new credit mechanism at this stage.

5.4.2 Uncertainty about Definitions, Standardisation and Claims

A major external barrier is the current perceived lack of clear standards, definitions and regulations around biodiversity credits. Interviewees repeatedly mentioned that the “rules of the game” are not yet established. The mining company expressed hesitation to be a pioneer in an “unclear market”. It specifically pointed to the absence of a “clear and established standard or practice for biocredits in Sweden”. If that was in place, it would change the conditions and make adoption more feasible. Similarly, the financial institution listed “clear standards and methodological frameworks” as the top requirement to scale up investment in biodiversity credits. Without agreed methodologies to quantify credits and robust verification protocols, companies do not feel confident in what they would be buying. There is also uncertainty in terminology and claims. Companies are unsure what buying a credit actually entitles them to claim. The public-oriented real estate company wondered how a credit would be used “in our own reporting” and even whether credits could be resold or transferred, indicating basic market rules are unclear. The municipal energy company highlighted difficulties linking credits to its own operations or reporting as a barrier. This reflects a broader uncertainty: how do you connect an external biodiversity project (the credit) to your impact accounting in a credible way? Until standards answer questions like this, companies are reluctant to participate.

The fear of being accused of false or exaggerated claims also makes them extremely cautious. As noted in earlier, many worry about saying “we bought credits” and being challenged on the implication. This is partly because there is no consensus yet on best-practice claims for biodiversity offsets. The overarching barrier here is a classic chicken-and-egg problem of an emerging market. Without clear standards and regulations, most companies prefer to wait, but without corporate participation, standards and markets evolve slowly. All nine organisations indicated in some way that greater clarity, whether via government regulation, industry standards, or accepted accounting methods, is a precondition for serious investment in credits.

5.4.3 Limited Supply and Standardisation of Credits

Several participants implied that the availability of credible credits is another bottleneck. Today, there are few standardised biodiversity credit projects available in Sweden. The construction company remarked

that the market needs to “get going” and that it might be helpful if they could even start buying credits now and hold them for later use. This comment suggests that right now, suitable credits are not readily accessible for them to purchase (especially credits that would meet their quality expectations and be usable in the future). The financial institution mentioned “larger project volumes” as one factor needed to scale investment, implying that currently, the volume of biodiversity projects that could generate credits is too small or fragmented to attract big buyers. A related barrier is the lack of standardisation of credit units. Again, unlike carbon credits (which are generally standardised as one tonne CO₂), biodiversity credits could be based on different metrics, making them hard to compare, something that worries buyers. Until credits are more uniform in how they are measured and certified, companies see risks in purchasing something that may later be deemed inadequate.

The collection of these supply-side barriers make it difficult for companies to engage with this market. Most are effectively waiting for a more consolidated, mature supply with clear standards before they commit to any effort to purchase biodiversity credits.

5.4.4 Financial Prioritisation and Uncertain Business Case

Another barrier is the perceived lack of a strong business case or immediate financial return for investing in biodiversity credits. Companies operate with limited resources for sustainability and many do not (yet) see biodiversity credits as a priority use of funds. The renewable energy developer pointed out that due to political and economic challenges facing its industry, there is currently a low willingness to pay for sustainability initiatives, which “limits” the uptake of credits further, even if the concept is interesting. Unless a company can justify the expenditure, either through risk avoidance, regulatory necessity, or brand benefit, it won’t be prioritised. Several companies emphasised that internal actions take precedence over external compensation, in line with the mitigation hierarchy. Rather than turning to biodiversity credits directly, they, as previously stated, prioritise avoiding, minimising and restoring impacts within their own operations. For example, both the public-oriented real estate company and the wood and construction group noted they have “good conditions to work on this ourselves” and therefore focus on in-house measures. Credits may be considered later, but only when on-site solutions are no longer feasible or sufficient. The lack of revenue or cost savings from credits also plays a central role. Unlike energy efficiency (which lowers costs) or certified products (which can sometimes command a premium), biodiversity credits are typically a pure cost unless they unlock something (like permit approval or investor capital). Right now, many do not see that unlock. However, a few see emerging financial drivers that could strengthen the business case: the commercial real estate company mentioned that future project opportunities (e.g. new development requiring offsets) could make credits necessary.

At present, the ROI on biodiversity credits is unclear. Therefore, in internal budget discussions, spending on credits is hard to justify. This financial hesitation is a major barrier. Until companies either have to buy credits (due to regulation or stakeholder demands) or derive clear value (risk reduction, marketing, new business opportunities, etc.), they will remain reluctant. In essence, many are adopting a wait-and-see stance rather than committing funds to biodiversity credits now, reflecting an uncertain value proposition relative to other sustainability investments.

5.4.5 Concerns about Greenwashing and Public Scrutiny

Fear of being accused of greenwashing or facing public backlash is a strong barrier woven throughout the interviews. Several organisations worry that using biodiversity credits could attract negative attention if stakeholders view it as trying to “buy absolution” for environmental harm. As previously mentioned, the commercial real estate company was very clear that any use of credits would be communicated carefully, if at all. Their representative said they likely would not launch a big publicity campaign if they bought credits, specifically because it “immediately raises the question of: “What are you compensating for?”, potentially portraying them as polluters. This company perceives the reputational risk of credits as higher than with carbon offsets, fearing the public will assume a significant ecological harm was done, since direct harm to a biotope is far more tangible than emitting an arbitrary amount of carbon dioxide.

Accordingly, the commercial real estate company sees the communication value as ambivalent, it can provide value by displaying responsibility, but could also invite criticism. The municipal energy company also expressed a cautious approach to claiming biodiversity credit purchases, emphasising modest language such as “we have planted eelgrass meadows” rather than overstating impact with claims like guaranteeing their future, to maintain credibility and avoid public scepticism.

These legitimacy concerns also align with upcoming regulatory efforts at the EU level. In June 2024, the Council of the EU adopted its general approach on the Green Claims Directive, which aims to combat greenwashing by introducing minimum requirements for substantiation, communication, and third-party verification of environmental claims, including those related to biodiversity. In this context, biodiversity credit buyers must anticipate stricter rules: vague or unverified ecological claims could be deemed misleading, underscoring the need for standardised methodologies, transparent verification, and robust monitoring systems to establish trust (Council of the EU, 2024).

5.5 Perspectives on Valuation and Pricing of Biodiversity Credits

When considering how biodiversity credits should be priced and what organisations might be willing to pay for them, the interviewees highlighted several factors. Their perspectives indicate that willingness to pay is closely linked to the perceived quality of the credits and the tangible value they offer to the buyer.

5.5.1 Willingness to Pay and Influencing Factors

Generally, organisations indicated they would pay for biodiversity credits only if the credits deliver clear value (be it risk mitigation, compliance, or co-benefits). The actual willingness to pay (WTP) varies by sector and drivers. The financial institution is driven by risk management and regulatory compliance, implying that credibility is more important than low price, they are willing to pay a premium for high-quality credits that meet their needs. In fact, the bank said traceability and robust impact are paramount, implying it would pay more for credits that are demonstrably effective and verifiable, since this would minimise reputational or regulatory risk (where failure would be costlier than the price of the credit). The commercial real estate company suggested that WTP might depend on the business potential unlocked by the credit. For example, if a credit is needed to facilitate the start of a development project (hence influencing rental revenue), that potential revenue can justify a higher price. They indicated they would weigh factors like property values and project economics when deciding what is financially reasonable to spend on credits. The renewable energy developer noted it would be more willing to pay for

credits that yield higher utility, specifically mentioning that credits which provide multiple benefits (bundling biodiversity and climate benefits, plus local community engagement) would increase its willingness to pay. Essentially, if a credit achieves several strategic goals, it's worth more to them. However, that same company also acknowledged that current economic and political pressures in the renewables industry keep overall WTP low. This illustrates that budget realities can cap the price even if the biodiversity credits themselves are valued. On the low end, companies with no immediate drivers have virtually no willingness to pay: the municipal energy company noted small economic volumes in existing environmental schemes and no mandate from their owner for spending more. It would not allocate significant funds (or any funds) to buy credits voluntarily under current conditions since the available sums would only finance minimal restoration actions. The wood and construction group only sees credits as “thinkable if they contribute to commercial value”, meaning if a credit helped sell a product or satisfy a paying customer requirement, otherwise paying for credits is not justified.

In summary, willingness to pay is highly context-dependent: companies driven by compliance or brand protection are prepared to pay more (quality-adjusted), whereas those without clear drivers have very low WTP. Influencing factors that consistently raise WTP include local relevance, regulatory enforcement, co-benefits (climate or social) and strategic importance of the credit to unlocking business opportunities. Conversely, factors like tight industry margins, lack of necessity, or unclear benefits keep WTP low.

5.5.2 Cost-Based vs. Value-Based Pricing

There was a discussion of how credits should be priced, whether based on the cost of producing the biodiversity outcomes or the value those outcomes provide to buyers. Some interviewees leaned towards a cost-based pricing model for fairness and transparency. For example, in discussions about forestry-based credits, it was noted that one approach is to price credits at the level that makes the landowner whole (covering the opportunity cost of not harvesting timber plus the restoration or conservation costs). The wood and construction group's representative agreed that someone must be willing to pay that price for it to work. This reflects an understanding of cost-based pricing, covering the providers' losses and expenses yields a biodiversity gain without leaving them worse off, but only if a buyer accepts that price.

Some companies also take the value based view, if a credit helps them overcome hurdles and secure a project worth millions, its value to them is high regardless of the provider's cost. The commercial real estate company blending WTP with project economics reflects a value-based mindset, the price has to make sense relative to the benefit (e.g. enabling a profitable development or satisfying investor expectations). The renewable energy developer also aligned with value-based thinking when saying credits that contribute to multiple strategic goals makes them more attractive. They are essentially pricing in the value of regulatory compliance, brand strengthening, community engagement and multi-goal fulfillment that a high-quality credit provides.

The consensus seems to be that price should reflect quality and impact (value) but also be grounded in reality (cost). For now, buyers say that they would not pay above cost unless the extra value from biodiversity credits is clear. They also understand that they won't pay less than the cost or the projects wouldn't be sustainable. Thus, a balanced pricing approach is needed. One that covers costs of biodiversity restoration and aligns with the use-value to the buyer, whether that is risk reduction, compliance, or goodwill.

5.5.3 Geographical Relevance and Willingness to Pay More for Local Projects

Location was identified as a significant factor in valuation. Many organisations expressed a preference for local or regional credits and are willing to pay more for projects close to their operations. The renewable energy developer was very clear that it prioritises compensation “within the same region” as its impact, to ensure local stakeholders see the benefit and to facilitate follow-up. It avoids distant or foreign offsets because those risk creating new problems and reduce credibility. This local preference is tied to value as a credit in the same area has greater potential for building community acceptance and for the company’s credibility. It may therefore justify a higher price compared to remote projects given the added reputational and relational benefit (and it questioned the legitimacy of remote offsets entirely). The financial institution also stated that while it is not absolutely limited to local projects, it prefers credits in its home market, the Nordic region, and would assign a sort of quality premium to proximity. While the institution expressed a preference for Nordic projects and that there is value in local projects, it did not indicate that proximity alone would justify a higher price. The commercial real estate company likewise noted geographic relevance is important when it gave a vivid example that it would be absurd to trade off improving a distant ecosystem for damaging a local one. The consumer goods company is different since its impacts are more global (farms and fisheries in various countries), for them, geographic relevance means focusing on weak points in their supply chain rather than near their head office or production sites. In practice, that means companies find credits more legitimate and valuable when there is a clear linkage between the credit project and the impact being compensated.

While none put a specific number on the premium for local, the sentiment local equals more valuable was common. Conversely, credits in unrelated geographies are less attractive. The public-oriented real estate company speculated that credits restoring nature near the original damage would count for more in its eyes than those elsewhere.

Generally, all sectors recognised that spatial context affects the perceived worth of a credit. This means that a fungible market for biodiversity credits may not be possible globally and buyers may have to segment by region. Willingness to pay is higher when the project location resonates with the buyer’s own impact footprint or stakeholder base. As a result, local projects might secure better funding, whereas distant ones would need to offer other exceptional value to command a high price.

5.6 Preferences for Project and Supplier Characteristics

When contemplating from whom or where they would buy biodiversity credits, organisations expressed preferences regarding the types of projects, the nature of credit suppliers and transparency requirements. Their collective insights suggest a profile of the “ideal” biodiversity credit below.

5.6.1 Preferred Types of Suppliers

Most organisations do not have a strict preference for the category of credit supplier. The vast majority stated that they had no particular preference regarding whether the biodiversity credit issuer was a private landowner, a government entity, or a non-governmental organisation. Instead, they emphasise credibility and integrity of the supplier. The commercial real estate company stated it has no specific preference on who the seller is, “as long as the provider is serious, transparent and not controversial”, (specifically not on a sanctions list), adding that third-party verification is essential. This sentiment was echoed broadly. A

supplier being a government entity or well-known conservation NGO might inherently confer trust, but a reputable private company or landowner with proper certification could also be acceptable. The key is that the supplier should cooperate with independent audits and standards. In practice, this translates to expecting credit providers to share detailed project documentation, methodologies for measuring biodiversity gains and to allow third-party audits. Many interviewees implicitly trust third-party standards as a proxy for transparency. By insisting on third-party verified credits, they ensure an external body has audited the project, which aids traceability and confidence. The ideal supplier is one that can demonstrate professionalism, transparency, third-party validation and alignment with accepted conservation standards.

5.6.2 Project Types

Companies have clear preferences regarding the nature of the projects they would support via credits. Habitat restoration or conservation projects that are local to the companies' location of impact (or at least regional) are broadly favoured. As discussed in the previous chapter, geographic relevance is highly valued. Local projects are seen as more legitimate and beneficial for the companies' stakeholders.

Many organisations also specified the type of interventions they find valuable. The renewable energy developer listed it values projects that “strengthen ecosystems (e.g. wetland restoration) and contribute to both climate and biodiversity goals”. So projects with dual benefits (like wetlands that sequester carbon and improve biodiversity) are very attractive. The financial institution likewise appreciates “combined climate and nature measures”, referring to so-called stacked or bundled credits that deliver both carbon and biodiversity benefits. This indicates a preference for projects that deliver multi-dimensional sustainability outcomes. On the other hand, purely symbolic or trivial projects would not meet their expectations, e.g. simply letting grass grow or small-scale ornamental actions are not interesting to buyers, as stated by the public-oriented real estate company “that restoring an old-growth forest has much higher value than protecting some grass areas”.

In terms of habitat type, preferences align with each company's impact area or interest. Forestry-related projects (like turning productive forest into set-aside reserves) might appeal to those in construction/wood sectors or any company looking to offset land-use impacts. Wetland restoration was mentioned by multiple interviewees as a desirable type of project. Urban or semi-urban habitat projects can be of interest to the real estate and the municipal energy companies, as those relate to their operations. Agricultural biodiversity projects (such as flower strips) were stated to be relevant to the consumer goods company, which has participated in an initiative with the goal of supporting farmland biodiversity. The company indicated it currently engages in biodiversity promotion through supporting projects.

5.7 Additional Relevant Insights

Beyond the specific themes above, the interviews provided broader insights into market readiness, practical challenges and innovation opportunities surrounding biodiversity credits:

5.7.1 Influence of Carbon Market Experience

The stakeholders frequently drew analogies to carbon offsets and climate action, indicating that lessons from the carbon market are informing their approach to biodiversity credits. A few notable insights emerged from this comparison:

5.7.1.1 Avoiding Past Mistakes

The public-oriented real estate company reflected on how it used to claim climate neutrality by offsets and how that stance became unsustainable as perceptions changed. Now the focus is on actual actions and transparent storytelling. They are carrying this lesson into biodiversity, recognising that merely buying credits won't be enough, they must also show on-the-ground efforts and be careful in claims.

5.7.1.2 Permanence and Quantification Issues

The commercial real estate company's discussion about permanence (permanently altering an ecosystem can't be offset by a few years of protection commitment) reveals a sensitivity to issues that also plague carbon offsets (permanence, additionality). They are essentially saying they hope biodiversity credits are designed to overcome some of the criticisms hurled at carbon credits (like temporary forestry projects for a permanent emission).

5.7.1.3 A Cautious Approach Shaped by Carbon Market Pitfalls

The financial institution referenced experiences in carbon markets (where some projects were discredited) as a reason to demand higher quality and be very cautious with biodiversity credit projects. It states a possibility to use similar due diligence processes for biodiversity credits as it does for carbon removals. Companies do not seem to treat biodiversity credits in isolation. They will likely leverage frameworks and risk checks from voluntary carbon markets, possibly making the entry bar higher for biodiversity credits.

Overall, the insight is that biodiversity credit development will not happen in a vacuum. It will be heavily informed by prior carbon offset experience, for better or worse.

5.7.2 Practical Challenges in Implementation

The interviews highlighted some ground-level challenges in implementing biodiversity compensation, even outside of credits. Again, one is the difficulty of measuring and comparing impacts and offsets. The mining company highlighted the challenges that could arise if one were to convert CLIMB points into mitigation outcomes enabled by biodiversity credits. It underscores that companies need tools to quantify how much offset is needed for X amount of negative impact, a complex task given biodiversity's multifaceted nature. Without solving that, companies can't even know how many credits to buy, or what type of projects. Another challenge is land availability and partnerships. The mining company mentioned it needs to secure agreements with landowners and find suitable areas for compensation near its sites, something that is far from straightforward. Even if a biodiversity credit system were in place, someone would still need to identify land and implement mitigation measures on the ground. For credits to be viable, specialised intermediaries or easier processes may be needed to handle these tasks for buyers.

5.7.3 Innovation and Opportunities

Despite all hesitancy, the interviews show sparks of innovative thinking about biodiversity credits. One idea is the concept of stacked credits or co-benefit projects. Several noted the appeal of projects that count for both climate and biodiversity. This points to integrated project design. It could attract funding from two value streams (i.e. climate and biodiversity budgets), improving project viability.

Finally, several organisations are actively participating in knowledge networks and pilots (Mistra BIOPATH, TNFD pilots, CLIMB standardisation). This not only builds capacity but also means when the time is right, they will be ready to innovate by actually executing credit transactions or even generating credits from their own operations.

In conclusion, while cautious, these stakeholders are exploring creative ideas on the periphery of the formal market. Once key barriers are addressed, a number of latent opportunities could quickly materialise, accelerating the biodiversity credit market in Sweden from concept to reality.

6. A Dual Framework for Biodiversity Credit Legitimacy and Value Creation

6.1 Foundational Conditions for Market Legitimacy

Before exploring how different organisational contexts shape the perceived value of biodiversity credits, it is essential to identify a set of foundational conditions that determine whether a credit holds any legitimacy at all. These conditions act as prerequisites: unless they are in place, other value-enhancing aspects become irrelevant. This first stage of the framework draws on both theoretical foundations and empirical insights and focuses on where literature and stakeholder perspectives converge on the need for basic integrity, clarity and credibility in the design of biodiversity credits. Rather than offering additive value, these foundational elements serve as entry criteria for participation in a functional and trustworthy market. They form a binary threshold: if unmet, the perceived value of the credit collapses regardless of its other qualities. The following section presents these foundational factors, establishing a baseline from which more context-dependent value can later be explored.

Stakeholders and literature converge on a common insight: certain conditions must be fulfilled before a biodiversity credit can be perceived to have any meaningful value. Across interviews, concerns around integrity, credibility and trust were repeatedly raised. As the renewable energy company put it, “verification is crucial. I want to be able to monitor and follow up on the intervention myself.” The financial institution stated it as: “We don’t want to see the same growing pains in the biodiversity space that we’ve seen with carbon credits”.

The literature echoes this concern. Both WEF (2025b) and the Swedish Biocredit Alliance (SBA, 2024) emphasise the importance of scientific credibility, additionality and independent verification. These are not optional enhancements, they are the minimum requirements for legitimacy. The same applies to baseline clarity and permanence, without which any claim of biodiversity gain risks being challenged as uncertain or reversible (Wauchope et al., 2024).

Several interviewees referred to these requirements as necessary “guardrails” to prevent the market from being discredited. This includes the importance of third-party validation, transparency in project documentation and traceability of credit ownership. Notably, the mining company and financial institution both expressed hesitation to engage in a system lacking clear rules, suggesting that participation is contingent on a shared understanding of what credits represent and how their impacts are measured.

Finally, companies’ expectations around suppliers reinforce the importance of these foundational factors. It was less important who issued the credit, private landowner, NGO, or government, than whether the project met key integrity principles: transparency, professionalism and compliance with robust, preferably standardised, verification processes.

These foundational conditions are not new phenomena solely tied to biodiversity credits. Rather, these requirements have, to a great degree, been shaped by lessons from adjacent markets. Most lessons stem from the evolution of the VCM where the existence of low quality credits and questionable verifications of said credits led to market instability and reputational damage. Interviewees’ and literatures’ concerns

reflect a desire to avoid similar pitfalls in the biodiversity space. Likewise, the field of ESV illustrates the complexity of assigning credible and accurate value to ecological functions. Its methodological limitations, especially in capturing non-market and long term values reinforce the need for valuation frameworks that are transparent, verifiable and robust.

Together, these precedents, stakeholder interviews and the literature review have informed the view that foundational guardrails are not optional improvements but essential prerequisites for the biodiversity credit markets' legitimacy.

These insights suggest that a biodiversity credit's perceived value is binary at the foundational level: either these criteria are met, or the credit is deemed worthless.

6.1.1 Defining the Foundational Conditions

Building on this consensus, five key conditions emerge from both literature and stakeholder insights as the foundational layer of biodiversity credit legitimacy:

Additionality

Credits must reflect biodiversity outcomes that would not have occurred without the project. Both WEF (2025b) and SBA (2024) list this as a non-negotiable principle, reinforced by companies' concerns about inflated claims and unclear baselines.

Permanence

Biodiversity gains should be maintained over time and not reversed. Stakeholders, particularly from the real estate sector, raised concerns that temporary interventions cannot justify long-term claims, especially in ecosystems that are vulnerable to disturbance.

Baseline Integrity

All credited improvements must be measured relative to a clearly defined, scientifically credible reference point. As Wauchope et al. (2024) note, uncertainty around baselines undermines the ability to demonstrate ecological gain.

Verifiability and MRV (Monitoring, Reporting, Verification)

Projects must be auditable, with credible third-party oversight and transparent documentation. Interviewees repeatedly stated that they would not consider buying credits without externally verified data, citing MRV systems as critical for trust.

Transparency and Governance

Credits must be traceable and the market must offer transparency around issuance, retirement, ownership and land tenure. This includes making project documentation publicly available and using robust registries, as emphasised by both literature and respondents.

6.2 Operational Profile Clustering in the Biodiversity Credit Market

Having established the foundational conditions required for a biodiversity credit to hold any perceived legitimacy, the second layer of the framework considers how buyers derive value from biodiversity credits once these core requirements are fulfilled. This component of the model shifts the analytical focus from

the supply-side logic of credit integrity to the demand-side logic of organisational engagement, exploring how different types of companies may evaluate, interpret and apply biodiversity credits in practice.

Rather than segmenting buyers by industry or sector, this part of the framework introduces a set of operational profiles that reflect how companies interact with nature through their operations, asset or value chains. These profiles were developed as an interpretative output of the research team, based on common patterns observed across the interview material. While not a formal product of coded thematic analysis, the profiles synthesise recurring logics and contextual conditions expressed by the respondents. Each profile represents a distinct rationale for engaging with biodiversity credits. The aim is to present how contextual factors shape credit relevance across different types of buyers.

The following five operational profiles were developed by the research team based on recurring patterns in how interviewed organisations relate to biodiversity. These profiles form the structural foundation for comparing how different types of buyers may interpret and apply biodiversity credits.

High-Intensity Land Users

Organisations whose core activities involve direct and often large-scale alteration of land, typically requiring environmental permits and regulatory oversight. Interviewed companies in the study include the mining company, the renewable energy developer and the construction firm.

Land-Based Asset Owners

Organisations that manage land with lower ecological intensity, often in built or semi-natural environments where biodiversity is relevant for long-term asset value, stakeholder relations, or ESG positioning. Interviewed companies in the study include the public-oriented real estate company and the commercial real estate company.

Value Chain-Dependent Actors

Organisations that do not directly manage land but are reliant on ecosystem services and biodiversity conditions across their supply chains. The interviewed company representing this profile is the consumer goods company.

Nature-Indirect Institutions

Organisations that do not interact with biodiversity operationally but are exposed through financial relationships, investments, or regulatory disclosure frameworks. The interviewed company representing this profile is the financial institution.

Passive Positioners

Organisations that acknowledge the relevance of biodiversity but lack clear internal mandates, strategic direction, or operational mechanisms to act. Interviewed companies in the study include the municipal energy provider and the integrated wood and construction group.

6.4 Insights by Operational Profiles

This section presents a set of targeted reflections for each operational profile that were developed in the clustering section and synthesise how biodiversity credits may be perceived and applied by each profile. The core aim is to highlight what makes biodiversity credits valuable from the perspective of different

organisational types. By highlighting the most distinct characteristics and use cases, the analysis offers tailored recommendations for how organisations in these categories might derive strategic, communicative, or regulatory value from engaging with biodiversity credits.

6.4.1 High-Intensity Land Users

These organisations' core activities involve direct and often large-scale disruption of natural environments, typically requiring environmental permits and regulatory oversight. For these actors, biodiversity credits are most valuable when used to address residual impacts that cannot be mitigated on-site, effectively extending the final step of the mitigation hierarchy. While these are traditionally linked to regulatory offsetting, voluntary biodiversity credits may serve a similar function, especially when used to support “no net loss” or “net positive” claims. The degree of impact that these actors have raises expectations around integrity, making verifiability, baseline robustness and additionality non-negotiable. Instruments like the Swedish CLIMB methodology (Ecogain, n.d.) offer practical tools for quantifying land-use, and possibly the opportunity to link it to credible, measurable credit use.

The growing policy landscape, exemplified by the EU's Nature Restoration Regulation and the UK's Biodiversity Net Gain framework, further normalises market-based ecological compensation, particularly in land-intensive sectors. Interviewees pointed to the idea that future permitting may require formal offsetting. Voluntary credit use today may thus offer strategic value by preparing companies for tomorrow's compliance frameworks. To deliver on this potential, however, credits must not only meet high integrity standards, they must also be geographically and ecologically relevant to the project's impact zone.

Finally, while communication and branding are not primary motivators for this group, credits may carry reputational value if used transparently. Supporting measurable, locally anchored restoration outcomes can enhance a company's standing with regulators, investors and communities. However, respondents from this profile consistently emphasised that credibility depends on traceability, independent verification and a clear link to actual impact.

In sum, for High-Intensity Land Users, biodiversity credits can be valuable, but only if they are technically rigorous, locally grounded and tightly aligned with internal compensation strategies.

6.4.2 Land-Based Asset Owners

Organisations in this category typically manage large-scale real estate or infrastructure assets with moderate ecological impact, such as urban or semi-natural environments. For these actors, biodiversity is primarily relevant for stakeholder engagement and ESG positioning, even if it is not always central to core operations.

For these actors biodiversity credits are seen primarily as a potential tool for voluntary compensation when straightforward mitigation options are insufficient or unfeasible. While they are not primary candidates for large-scale offsetting, several companies in this category have expressed interest in using credits to support a broader value-chain approach. For instance, one interviewee suggested that biodiversity damage linked to the purchasing of timber or concrete could potentially be addressed through credits, hinting at an emerging perspective on biodiversity responsibility that mirrors how Scope 3 emissions are measured within climate science. However, such strategies remain exploratory and would require methodological development before widespread adoption.

Voluntary credits could also be valuable if used to signal environmental responsibility in a credible way. Several respondents emphasised that supporting visible, locally relevant biodiversity outcomes could enhance stakeholder communication, particularly if linked to high-profile projects or restoration narratives. At the same time, reputational sensitivity is high: credits that appear to compensate for vague or distant impacts may backfire, raising concerns about greenwashing.

From a financial perspective, willingness to pay for biodiversity credits is likely to depend on the value they unlock. The commercial real estate company noted that if a credit enables a new project to proceed, by fulfilling permitting requirements, then its cost may be justified relative to the project's returns. In this view, pricing is not necessarily based on the credit's production cost, but on the strategic or economic value it could provide within a specific business context.

In summary, for Land-Based Asset Owners, biodiversity credits could potentially support sustainability narratives and compensate for impacts that cannot be addressed on-site, including indirect or supply chain-related effects. While organisations may express interest in integrating credits into broader ESG strategies, actual use remains limited. To unlock their potential, clearer methodologies for assessing upstreams supply-chain biodiversity impacts may be needed to ensure credibility and alignment with existing sustainability frameworks.

6.4.3 Value Chain-Dependent Actors

Organisations in this group do not directly manage land but depend on functioning ecosystems across their supply chains. For these actors, biodiversity is not primarily a site-level concern, but a systemic dependency. The consumer goods company interviewed exemplifies this logic, recognising that its financial performance relies on the health of agricultural, forestry and marine ecosystems. This awareness translates into a dual motivation: safeguarding supply chains while aligning with a broader responsibility to contribute positively to nature.

Biodiversity credits could potentially serve as a tool for supporting conservation in upstream production areas. In particular, they may offer a way to invest in ecosystem resilience in landscapes that the company does not control, addressing indirect biodiversity impacts. However, methodological gaps are a challenge. Current credit schemes are typically not designed to account for value chain-linked impacts and companies expressed the need for more robust, context-specific frameworks before such use cases can be scaled credibly.

Communication value may also play a role, but it has to be with nuance. The consumer goods company noted that biodiversity is harder to communicate than climate and consumer understanding is often limited. Still, in select product categories, especially those involving high-risk commodities like cocoa, there may be potential to link biodiversity credits to consumer-facing narratives, provided the impact is verifiable and relevant. These opportunities are strengthened when credits align with recognised disclosure frameworks like TNFD or SBTN, which lower internal barriers to adoption and increase integration into ESG strategies.

In sum, for value chain-dependent actors, biodiversity credits could likely offer both operational and reputational value. However, their utility depends on credible links between credit projects and ecosystem services vital to the business. As such, further development of methodologies for supply chain relevance and impact attribution may be necessary to unlock this profile's demand for biodiversity credits.

6.4.4 Nature-Indirect Institutions

Nature-indirect institutions, such as financial actors, insurance providers and certain types of real estate owners, do not manage land or extract resources themselves. For these organisations, biodiversity is not primarily about operational exposure, but rather about portfolio risk, regulatory compliance and ESG positioning. Biodiversity credits, in this context, are considered more as strategic enablers than as tools for ecological compensation.

The most cited driver of interest among this group is the anticipated alignment with disclosure frameworks such as CSRD and TNFD. According to WEF (2024b), biodiversity credits that align with such frameworks could help companies meet future reporting requirements and demonstrate tangible support for nature-positive goals. This view was echoed by interviewees, who suggested that credible biodiversity credits might be a useful way to show progress on emerging standards, even if their use remains exploratory for now.

Credibility is especially important for this group. Unlike operational companies that might emphasise on-the-ground impact, nature-indirect institutions often rely on external validation, comparability and clear governance structures to assess credit value. As such, their willingness to engage with biodiversity markets is closely linked to the presence of standardised metrics, traceable outcomes and robust third-party verification, as emphasised by both WEF (2024b) and the SBA (2024). Fragmentation in current standards and the lack of a universally accepted biodiversity “unit” remain barriers to broader uptake.

6.4.5 Passive Positioners

These organisations tend to approach biodiversity as a policy-driven or compliance-related issue, rather than a strategic priority. While they may recognise biodiversity as increasingly relevant, their engagement remains limited unless externally prompted, typically through regulation, reputational risk, or expectations from owners or financiers.

This pattern is especially visible among municipally owned or publicly oriented entities, such as the energy utility company in your study, which acknowledged that its biodiversity efforts are minimal and unlikely to expand without external mandates.

In summary, for Passive Positioners, biodiversity credits are unlikely to gain real traction without regulatory backing or institutional incentives. Clear standards, mainstream adoption and integration with reporting frameworks like CSRD or TNFD could help build trust over time, but for now, interest remains largely passive and conditional.

6.5 Framework Summary and Visualisation

This section presents a visual summary of the proposed dual framework for biodiversity credit valuation. The framework consists of two interlinked layers:

- At the foundational level, a set of five integrity requirements must be met for a biodiversity credit to hold any legitimacy. Without these, credits are unlikely to be perceived as valuable, regardless of other factors.

- Once these conditions are fulfilled, the value of biodiversity credits is shaped by the specific context in which buyers operate. The framework identifies five operational profiles that reflect different buyer logics, motivations, and potential applications of biodiversity credits.

The figure below (figure 2) illustrates the relationship between these two layers: the foundational conditions act as a non-negotiable base upon which different operational profiles derive context-specific value from biodiversity credits.

The Biodiversity Credit Integrity & Value Driver Framework

High-Intensity Land Users	Land-Based Asset Owners	Value Chain Dependent Actors	Nature-Indirect Institutions	Passive Positioners
Direct residual impact compensation; regulatory focus; high integrity essential.	Primarily indirect impact compensation; stakeholder positioning	Supply chains security; reputational value	Reporting compliance; portfolio risk; credibility	Low engagement; interest driven by regulation and external pressure
Foundational Conditions				
Additionality	Permanence	Baseline Integrity	Verifiability and MRV	Transparency and Governance

Figure 2. The biodiversity credit integrity & value driver framework

7. Discussion

7.1 Framework Discussion

The framework presented in Chapter 6 was developed to explore how biodiversity credits are perceived and valued across different types of organisations. As previously described, it builds on both literature and interview findings and aims to clarify the conditions for legitimacy as well as the contextual factors influencing operational profile specific value creation through biodiversity credits. This section reflects on the framework's construction, its intended use, and the methodological and practical limitations of the approach.

7.1.1 Foundational Conditions

The first part of the framework outlines the basic requirements that must be met for biodiversity credits to be perceived as legitimate. These conditions were consistently emphasised in both the literature and interviews, underscoring that integrity, transparency and scientific credibility are not optional features but prerequisites for market functionality.

Our synthesis confirms a common insight: if these foundational guardrails are not in place, any additional value, whether strategic, communicative or financial, becomes irrelevant. This binary framing of legitimacy may appear reductive, but it reflects a pragmatic reality already visible in adjacent markets such as voluntary carbon. In that sense, this part of the framework does not aim to offer a new valuation model, but rather to clarify the minimum threshold that must be passed before value creation can even be meaningfully discussed.

7.1.2 Operational Profiles: Structure and Intention

The second layer of the framework clusters potential buyers into operational profiles based on how they relate to biodiversity through their business activities. The profiles are interpretive and relatively broad as they were constructed by the research team to synthesise patterns observed in the interviews. A more extensive set of interviews may have enabled deeper segmentation or additional profiles.

Despite this limitation, our aim was to develop profiles that are general enough to allow recognition. Our hope is that an organisation encountering this framework will be able to identify with at least one profile and, through that lens, better understand how biodiversity credits could be relevant to their specific context. In that sense, the framework is intended as a practical entry point, not just for theoretical mapping, but for real-world reflection and engagement.

This also links to one of the framework's broader ambitions: to make the biodiversity credit market more accessible and understandable from a buyer's perspective. In a landscape where biodiversity is often seen as too complex or uncertain to quantify, our approach has been to sidestep the question of precise valuation and instead focus on perceived value. Rather than defining what biodiversity is worth in monetary terms, we ask what makes it valuable to different types of organisations.

7.1.3 Implications for Market Development

By structuring buyer perspectives in this way, the framework can also serve a secondary function: informing suppliers, policymakers and market designers about what different types of buyers are likely to find meaningful, useful or necessary. Understanding how value is perceived is a critical part of building a functioning market, especially in an emerging field where the product (a biodiversity credit) is not yet widely understood or accepted.

The framework thus provides a lens through which value can be discussed not only in technical or ecological terms, but in terms of alignment with organisational logic. This offers a way forward in a market that, by its nature, resists easy quantification. In that sense, the framework is less about solving the biodiversity valuation problem and more about reframing it, from asking how much is nature worth? to: what makes nature-based instruments valuable to different actors?.

7.2 Expanding the Analysis: Broader Themes Beyond the Framework

While the framework developed in Chapter 6 offers a structured way to compare how different types of organisations perceive and create value through biodiversity credits, several important themes emerged throughout the research that fall outside its formal structure. These elements, though not directly incorporated into the operational profiles or foundational legitimacy conditions, are conceptually significant and warrant separate reflection.

7.2.1 Implications from the Voluntary Carbon Market

One such area is the extensive body of literature and market experience stemming from the voluntary carbon market. Multiple stakeholders referenced the carbon credit market, both as a cautionary tale and as a source of institutional learning. The biodiversity credit market is often framed as a “next generation” mechanism, yet the legacy of credibility challenges in the VCM looms large. Interviewees expressed concern about greenwashing, inconsistent verification practices, and the low-quality credits in the carbon space, all of which have led to reputational damage and regulatory scrutiny. These experiences have shaped expectations for biodiversity credits, reinforcing the demand for robust governance, high integrity, and third-party verification as non-negotiable prerequisites.

7.2.2 Ecosystem Valuations’ Impact on Value Creation

Another theme that surfaced repeatedly is the role of ecosystem services valuation. While our framework deliberately avoids attempting to quantify biodiversity value in monetary terms, the broader academic and policy literature continues to grapple with this challenge. ESV offers important conceptual tools for understanding how nature contributes to human well-being and economic systems. However, its methodological limitations, particularly in capturing non-market values and long-term ecological change, highlight the difficulty of translating ecological complexity into clear and fungible units of value. These limitations further justify our decision to shift focus from absolute valuation to context-specific perceived value, as explored through the operational profiles.

7.2.3 Reflections on Pricing and Quantified Valuation

The question of pricing emerged as a distinct theme, both in the literature and throughout our research process. Pricing refers to the point at which valuation becomes quantified and a transactional price is established through agreement between buyer and seller. Although the topic was touched upon during interviews, many respondents emphasised that it was premature to provide concrete figures, given their organisations' current level of preparedness. As a result, it proved challenging to extract quantifiable insights through interviews.

This limitation further reinforced our choice to approach valuation from a different angle, focusing instead on the underlying value drivers associated with each operational profile. Nonetheless, one insight that did emerge was the notion that cost-based pricing, particularly tied to landowner compensation or project implementation costs, likely sets the lower bound for biodiversity credit prices. From there, perceived value can vary across operational groups depending on contextual relevance and strategic alignment. These reflections point to a promising area for future research, particularly as more transactional data becomes available and the market matures.

7.2.4 Looking Forward: Navigating a Complex and Evolving Landscape

Collectively, these broader themes underscore the multifaceted and dynamic nature of the emerging biodiversity credit market. While the framework developed in this thesis offers a structured lens for understanding current perceptions and potential use cases, it represents only one piece of a larger puzzle. The market is being shaped not only by organisational readiness and strategic intent but also by external forces, including evolving policy landscapes, scientific debates, and societal expectations around credibility and impact. As such, future frameworks will need to engage more deeply with these systemic influences, integrating both micro-level insights and macro-level developments to remain relevant and actionable in a rapidly changing context.

7.3 Limitations of the Study

Despite its contributions, the study has some limitations. Its focus on Swedish corporations may not fully apply to regions with different regulatory or ecological contexts and the relatively small, purposive interview sample limits the generalisability of the results. The early stage of the biodiversity credit market means findings rely on perspectives rather than real-world trends, adding uncertainty.

Additionally, the study's geographical scope might overlook other critical aspects of the biodiversity credit market, such as the social dimension. The research also focuses on the demand side of the market, which limits the exploration of supply-side dynamics and other market perspectives.

These factors suggest caution when extending the results beyond the specific scope of this study.

7.4 Further Research

Looking ahead, future research could refine and further explore biodiversity credits' potential. Exploring and standardising measurement tools for land-use like CLIMB and their potential incorporation into the credit space might improve trust and comparability. Also, studying credits' role in addressing supply

chain biodiversity impacts could broaden their use-case. Both are interesting aspects and improvement areas of biodiversity credits that appeared during this study and could boost their adoption.

Another avenue for future research is how biodiversity credits could become attractive to institutional investors, not necessarily through direct financial return, but by fulfilling roles in risk management, impact reporting, or policy-aligned capital allocation. This includes studying how credits might be integrated into sustainability-linked mandates, blended finance structures, or portfolio-level biodiversity strategies. If scaled and standardised, biodiversity credits could move from symbolic corporate use to a more embedded role in sustainable finance.

Finally, a complementary study examining supply-side requirements, value drivers and stakeholder interests would enhance our demand-side analysis of the up and coming Swedish biodiversity credit market. Such a study could highlight operational challenges, regulatory obstacles, and resource limitations faced by credit suppliers, while also clarifying what motivates them. These insights would contribute to a more complete understanding of the emerging biodiversity credit market.

8. Conclusion

This thesis explored how biodiversity credits are perceived and valued by corporate actors. Drawing on literature and interviews, it examined the conditions required for credibility and the contextual factors shaping buyer engagement.

Two major insights emerged from the interviews and literature study:

First, biodiversity credits must fulfil foundational conditions such as additionality and permanence, drawing lessons from the pitfalls of the voluntary carbon markets. Without these, credits are regarded as lacking credibility and hold no value. This finding underscores the centrality of trust and integrity in the establishment of a functioning biodiversity credit market.

Second, the study identified a diverse array of buyer profiles, each characterised by distinct motivations and engagement strategies. This heterogeneity suggests that the market is far from uniform and will require tailored approaches to effectively meet the varying needs and expectations of different operational contexts.

Overall, this thesis contributes to a deeper understanding of how biodiversity credits are perceived and valued by corporations and explores their emerging role within the evolving landscape of biodiversity policy. It also identifies key challenges related to the design, credibility and adoption of these instruments. On this foundation, the study offers both a direction for future research and practical guidance for stakeholders seeking to better understand this growing market.

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Appendix

Interview Guide

Section 1: Questions about strategy, drivers and barriers

1. **How does your organisation work with biodiversity at an overarching level?**
2. **Have you made any investments related to your sustainability strategy?**
If clarification is needed: transparency in the supply chain, green certifications, compensation (offsets), green bonds, etc.
3. **What drives your interest in biodiversity credits and are you considering including them in your sustainability strategy?**
4. **Organisations work with biodiversity and invest in biodiversity credits for various reasons. What are your drivers for this?**
If clarification is needed:
 - **Operational dependency** – You depend on natural resources such as pollination, water, or soil quality (e.g., agriculture, food, forestry) and want to secure long-term access.
 - **Value-driven** – You want to demonstrate that you care about more than just climate, e.g., to strengthen your brand or attract talent.
 - **External pressure** – You are influenced by demands from investors, authorities, or consumers, especially if you operate in a sector with significant environmental impact.
 - **Market positioning** – You want to stand out, e.g., through storytelling, environmental certifications, or membership in initiatives like “1% for the Planet.”
 - **Financial and regulatory motives** – You want to improve your ESG rating, attract capital, or prepare for upcoming requirements (such as CSRD, TNFD, or SBTN)*You may recognise several of these – or have other reasons.*
5. **There may be communicative value in purchasing biodiversity credits. What types of claims or statements would you want to make if/when you purchase them?**
6. **Would you be interested in compensating through biodiversity credits if a model existed, even without regulatory requirements?**
7. **What would need to change for you to scale up or accelerate investments in biodiversity credits?**
8. **What is currently preventing you from investing in biodiversity credits?**
9. **How do you view voluntary biodiversity credits in relation to your actual environmental footprint?**

Section 2: Questions about valuation and pricing

10. **Which characteristics of a biodiversity credit are most important to you, and how do they affect what you are willing to pay?**
If clarification is needed: degree of verification, permanence, connection to specific ecosystem services, geographical proximity

11. **How do you view pricing in relation to the drivers you have as a buyer?**
12. **How do you reason about the geographical location of projects if you were to consider purchasing biodiversity credits?**
13. **Would you be willing to pay more for projects located near your operations?**
14. **How does uncertainty around impact measurement, verification, or long-term outcomes affect your willingness to invest – and pay?**
15. **How would you go about assessing the value of biodiversity credits for a potential purchase?**
If clarification is needed: Would you hire external experts, compare different options, or rely on internal criteria to ensure quality and cost-effectiveness?
16. **What would make you feel that a biodiversity credit corresponds to its value or provides sufficient benefit relative to its cost?**
17. **Which factors do you think should be included in a future pricing model for biodiversity credits?**
If clarification is needed: Examples include cost-based pricing (based on landowner's costs for preservation/restoration) or value-based pricing (based on perceived buyer value such as risk minimisation, brand benefits, or regulatory compliance).
18. **What type of actor would you prefer to buy biodiversity credits from – and why?**
If clarification is needed: For example, private landowners, government agencies, or non-profit organisations.
19. **Are there other aspects of pricing that you think are important to highlight?**