

# Conservation through conversation:

A framework for shareholder  
engagement on biodiversity

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# Colophon

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## Abstract

The loss of biodiversity poses a significant threat to both the environment and the financial system. Pension funds and insurance companies, as major long-term investors, are uniquely positioned to influence corporate action on biodiversity through shareholder engagement. Based on a review of academic and policy studies as well as on interviews, our study explores how financial institutions can effectively engage in biodiversity-related issues and identifies four key criteria for effective engagement:

1. **Knowledge** – Financial institutions need to build internal capacity through education and external partnerships to understand biodiversity and its impact.
2. **Workable metrics and targets** – Investors should adopt clear metrics to measure biodiversity impact, while acknowledging challenges in data quality and standardization.
3. **Size of equity stake** – A larger equity stake gives investors more influence. Collaboration with other investors can help amplify efforts.
4. **Momentum and legitimacy** – Building momentum and legitimacy is crucial, as initial efforts often set the stage for broader action.

Our study highlights the importance of collaboration, strategic partnerships, and the need for a clear escalation strategy to ensure continued engagement. Efforts such as co-funded coalitions and shareholder resolutions can be effective, even if immediate results are not always visible.

## Samenvatting

Het verlies van biodiversiteit vormt een aanzienlijk risico voor zowel het milieu als het financiële systeem. Als langetermijnbeleggers zijn pensioenfondsen en verzekerings-maatschappijen in een unieke positie om invloed uit te oefenen op het gedrag van bedrijven met betrekking tot biodiversiteit, via engagement. Op basis van een overzicht van academische en beleidsstudies alsmede van interviews onderzoekt deze studie hoe financiële instellingen engagement kunnen voeren op biodiversiteits-kwesties en identificeert vier belangrijke criteria voor effectieve engagement:

1. **Kennis** – Financiële instellingen moeten interne capaciteit opbouwen door middel van onderwijs en externe samenwerking om biodiversiteit en de impact ervan te begrijpen.
2. **Werkbare indicatoren en doelstellingen** – Beleggers moeten duidelijke indicatoren identificeren om de impact op biodiversiteit te meten, rekening houdend met uitdagingen in datakwaliteit en standaardisering.
3. **Grootte van aandelenpositie** – Grotere aandelenposities geven beleggers meer invloed. Samenwerking met andere beleggers kan engagement versterken.
4. **Momentum en legitimiteit** – Opbouwen van momentum en legitimiteit is cruciaal, aangezien initiële inspanningen vaak de basis leggen voor bredere acties.

De studie benadrukt het belang van samenwerking, strategische partnerschappen en de noodzaak van een duidelijke escalatiestrategie om effectieve engagement te waarborgen. Succesvolle vormen van engagement, zoals coalitievorming en aandeelhoudersresoluties, kunnen effectief zijn, ook al zijn directe resultaten niet altijd zichtbaar.

## Executive summary

Biodiversity loss poses a systemic threat to the global economy, the financial system, and the long-term viability of human well-being. As institutional investors, pension funds and insurance companies are both exposed to and contributors to biodiversity risks through their portfolios. This report provides a framework for how these financial institutions can engage companies in their portfolios to reduce biodiversity loss and enhance nature-positive outcomes through shareholder engagement.

Despite growing recognition of biodiversity's material relevance in financial, ecological, and reputational terms, engagement on this topic remains underdeveloped compared to climate change. Based on an extensive literature review and interviews with experts, this report identifies four foundational criteria for effective biodiversity engagement:

1. Knowledge
2. Workable metrics, indicators, and targets
3. Size of equity stake
4. Momentum and legitimacy

Each of these is necessary to design an engagement strategy that is credible, context-sensitive, and capable of driving real-world biodiversity outcomes.

Knowledge is a prerequisite for targeted engagement. It requires not only internal capacity building, such as integrating ecological expertise into financial institutions, but also collaborative learning via coalitions, NGOs, and interdisciplinary partnerships. Biodiversity is a complex, locally differentiated issue that calls for systems thinking and cross-sectoral coordination.

Metrics and indicators remain a significant bottleneck. While initiatives such as the Taskforce on Nature-related Financial Disclosures (TNFD) and the Partnership for Biodiversity Accounting Financials (PBAF), and tools such as ENCORE lead to greater harmonization, we see that data gaps, methodological inconsistency, and overreliance on aggregated or self-reported data persist. Effective engagement must therefore balance quantitative assessments with qualitative judgment.

The size of equity stakes influences engagement leverage. Larger investors are more likely to secure access to corporate management and to influence governance outcomes. For smaller investors, collaborative engagement, meaning coordinated action with aligned peers, amplifies voice and reduces transaction costs. Examples such as the Investor Policy Dialogue on Deforestation (IPDD) demonstrate the effectiveness of collective action, including at the sovereign level.

Momentum and legitimacy are essential for sustained influence. Frontrunner institutions play a key role in setting precedents, normalizing biodiversity as a fiduciary concern, and catalyzing broader sectoral change. Transparency, escalation protocols, and alignment between voting behavior and engagement goals all contribute to the legitimacy of the engagement process.

The report concludes with a structured engagement framework and offers practical recommendations to institutional investors.

## Introduction

The loss of biodiversity, mainly caused by human interference, is increasingly becoming a worldwide challenge. The economy as a whole and the financial system as well are deeply embedded in the earth's biosphere (NGFS, 2020). We depend on the services that ecosystems supply us with, and at the same time we deplete them through economic and other mismanagement (Dasgupta, 2021). Multiple studies find that over half of the world's gross domestic product is moderately to highly dependent on nature, and estimates of the value of all ecosystem services range from 44 to 125 trillion US dollars (Global Canopy, 2021; NGFS, 2020; World Economic Forum, 2019). The Dutch Central Bank (DNB) estimates that the biodiversity footprint of the Dutch financial sector is roughly equivalent to a loss of 58,000 km<sup>2</sup> of pristine nature, with roughly 80% of the companies in the asset portfolios of Dutch financial institutions contributing to this. At the same time, it estimates that 36% of the asset portfolios of Dutch financial institutions is 'highly or very highly dependent on one or more ecosystem services' (DNB, 2020). This highlights the need for financial institutions to formulate effective strategies to deal with biodiversity. Recognizing these risks, Dutch pension funds and insurance companies have increasingly incorporated biodiversity considerations into their investment strategies. For example, a 2024 report by the Dutch Association of Investors for Sustainable Development (VBDO) revealed that 83% of the top-fifty Dutch pension funds now include biodiversity in their responsible investment policies. Additionally, 74% incorporate biodiversity in their voting decisions (VBDO, 2024).

A broad variety of strategies is currently being explored or could be relevant – on the public as well as the private side. The public financial sector is not scoped in this report, but private financial institutions could advance their biodiversity strategies through the flow of capital (e.g., sustainability-linked loan facilities, issuing green bonds, launching dedicated funds, or divestment) or through their relationships with the companies they invest in. The best-known examples are exclusion policies (i.e., excluding companies from investment based on biodiversity-linked criteria) and engagement policies (van Tilburg et al., 2022).

### *Shareholder responsibility and engagement*

Although companies were long viewed as only responsible for generating profits (Friedman, 1970), in recent years the discussion about whether maximizing shareholder value should be their only goal has been reignited (e.g., Hart & Zingales, 2017). Broader corporate responsibilities could include environmental and social issues. Similarly, there is increasing debate about the responsibility of shareholders (e.g., Schoemaker & Schramade, 2023). At least some institutional and private shareholders have broadened their goals from strictly financial to avoiding unethical behavior, mainstreaming social and environmental issues in risk management, and finally the consideration of real-world impact (Busch et al., 2021). Inves-

tors have two main broad ways to respond to ethical considerations and/or the ambition to have real-world impact: divesting from companies or engaging with companies through their investment portfolios.<sup>1</sup> Engagement is defined as investors exercising their rights to influence the way businesses are managed or, more broadly, ‘investor empowerment’ (Dimson et al., 2015; Ringe, 2021). In the last decade, shareholder engagement has become one of the most popular strategies to address environmental, social, and governance (ESG-) related problems from an investor perspective (Dimson et al., 2015; Wagemans et al., 2018). As discussed above, also pension funds have increasingly incorporated biodiversity considerations into their investment decisions and voting behavior. The 2024 report by the Dutch Association of Investors for Sustainable Development (VBDO) revealed that all of the 50 largest Dutch pension funds engage in biodiversity and related topics such as deforestation (VBDO, 2024).

#### *Engagement on biodiversity: increasing attention*

While topics like climate change and a variety of social issues have matured, engagement specifically on biodiversity is still growing. Lambooy et al. (2018) found that ‘tangible strategies for successfully tackling [biodiversity and natural capital] issues’ are absent. The approaches developed so far are not linked clearly enough to (financial) risks and opportunities in the past, present or future (Flammer et al., 2025; Lambooy et al., 2018). Biodiversity is increasingly included as a topic in sustainable finance and engagement, but regulations on disclosure and policies addressing biodiversity are lacking (Grigg et al., 2020). Yet, despite these regulatory and conceptual gaps, there is growing evidence that institutional investors are beginning to treat biodiversity as a financially relevant issue. Ali et al. (2024) find that institutional investors are beginning to recognize biodiversity as a material concern and are actively influencing companies to be more transparent through biodiversity-related disclosures. This emerging engagement reflects a growing realization that biodiversity loss poses systemic risks and that disclosure can be linked to long-term financial performance.

While climate change and biodiversity are distinct ecological issues, they are closely interconnected: climate change is one of the primary drivers of biodiversity loss, while the degradation of ecosystems diminishes their ability to absorb and mitigate greenhouse gas (GHG) emissions (Giglio et al., 2025). While planetary boundaries related to biodiversity have been more significantly breached than those related to climate (van Tilburg et al., 2022), environmental concerns in ESG investing have historically been framed primarily through the lens of climate risk. However, this is beginning to change. As Karolyi & Tobin-de

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<sup>1</sup> There is a debate in the literature on the effectiveness of divestment to generate real-world impact (e.g., Berk & van Binsbergen, 2025; Gantchev et al., 2022). We consider a discussion of this debate to be outside the scope of this study. In our view, it is also generally challenging to assess the effectiveness of engagement relative to divestment in generating impact.

la Puente (2023) argue, biodiversity finance is emerging as the next major frontier in sustainable investing, with growing recognition of its systemic implications. Investors, regulators, and financial institutions increasingly acknowledge that the stability of global financial systems is tied not only to a stable climate, but also to the health of natural ecosystems.

Recent biodiversity conferences reflect a shift in corporate engagement. COP15 saw financial institution participation grow from merely one at COP14 to nearly 200 (UNEP FI, 2022), while COP16 in Cali, Colombia had a record 1,261 business delegates, with finance as the sector that was represented most (UNEP FI, 2024). Reflecting this momentum, Garel et al. (2024) find that investor sensitivity to biodiversity risk increased notably after COP15, with market evidence of a biodiversity footprint premium emerging in response to related policy developments.

Despite growing business involvement, financing biodiversity remains a challenge. Policymakers have failed to mobilize the pledged \$200 billion per year by 2030, and only 5% of businesses have assessed their impact on nature (Reuters, 2024). While initiatives like the “Cali fund” could generate \$1 billion annually, the lack of strong regulations continues to hinder financial integration (Reuters, 2024). Although progress is being made, significant financial redirection is needed to meet biodiversity targets.

#### *Aim of this study*

This study aims to provide an overview of the current state of affairs of the practice of engagement in relation to biodiversity. We aim to answer the question: how can financial institutions effectively engage in the topic of biodiversity? We provide an overview of the latest insights from academia and other relevant organizations such as central banks, the Finance for Biodiversity pledge, and NGFS. A series of interviews provides further understanding of the standpoints of relevant actors in the field: financial institutions, NGOs, corporations, and other stakeholders.

#### *Structure of the report*

This report has two parts. The first part is explorative; it summarizes the findings from literature, presents an overview of interview findings, and takes a close look at some practical examples. It starts with a description of biodiversity and at what levels harm is being done. We then discuss the connection to the economy and the link with finance. We provide an overview of the main literature in shareholder engagement and present some expert findings. The second part synthesizes these insights and presents a framework for shareholder engagement on biodiversity. It includes recommendations for pension funds, insurance companies, and other institutional investors and an overall conclusion.

## Part I: Current state of affairs

### Biodiversity

#### *Understanding biodiversity*

Biodiversity exists at multiple levels, from genes and species to ecosystems and the ecological processes that sustain them. The Convention on Biological Diversity (CBD) defines biodiversity as “the variability among living organisms from all sources including, inter alia, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part; this includes diversity within species, between species and of ecosystems” (The Convention on Biological Diversity, 2006).

Ecological diversity is a key aspect of biodiversity, for two reasons. First, genetic variation among species fosters a wide range of functional traits, enabling self-organizing, regenerative ecosystems that regulate life on earth (Steffen et al., 2015). Second, each organism holds a unique genetic makeup developed over millions of years, shaping the genetic potential for future life (Steffen et al., 2015). In this sense, biodiversity represents both the sum of all life and the potential for life to come.

Throughout this report, the terms nature, biodiversity, environment, and ecosystems are used. Biodiversity is understood as defined in Article 2 of the Convention on Biological Diversity. In this context, nature encompasses both the living and non-living components of the earth, including biodiversity as well as abiotic elements such as landforms, climate, and weather. The term environment generally refers to the broader physical, chemical, and biological conditions in which organisms exist, while ecosystems describe dynamic complexes of plant, animal, and micro-organism communities and their non-living environment interacting as a functional unit (The Convention on Biological Diversity, 2006).

#### *Conceptualizing nature and ecosystem services*

Despite the significant distance of everyday human experience from the environment since the Industrial Revolution, society and the economy remain deeply embedded in and dependent upon nature (Dasgupta, 2021). Biodiversity provides critical ecosystem services that underpin human well-being and economic activity (Winn & Pogutz, 2013). The Common International Classification of Ecosystem Services (CICES) framework categorizes these services into three primary types: provisioning, regulating and maintenance, and cultural (Haines-Young & Potschin-Young, 2018).

Provisioning services include the tangible materials and energy obtained from ecosystems such as food, fresh water, and fuel, resources vital to human survival. Regulating and maintenance services sustain ecosystem stability by maintaining atmospheric composition, regulating climate and water flow, decomposing waste, and controlling pests and diseases.

These functions create the necessary conditions for the continued supply of provisioning services. Cultural services encompass non-material benefits, reflecting the cultural, aesthetic, spiritual, and recreational relationships that humans have with nature (Dasgupta, 2021).

The indispensable role of biodiversity in sustaining human quality of life is highlighted by the fact that many ecosystem contributions are irreplaceable, with no viable manmade substitutes (Díaz et al., 2019). The current negative trends in biodiversity loss already undermine approximately 80% of the United Nations Sustainable Development Goals (Díaz et al., 2019).

Different approaches exist for measuring corporate biodiversity impacts. Kennedy et al. (2023) identify the ecosystem services approach and the natural inventory approach as predominant methods. The ecosystem services framework adopts an anthropocentric perspective, focusing on mapping the flow of benefits that humans derive from ecosystems, while the natural inventory approach employs an ecocentric lens, emphasizing the quantification of specific biodiversity components or stocks. However, both approaches exhibit limitations, particularly in their inadequate integration of ecosystem dynamics and threshold effects. Moreover, framing biodiversity primarily as a service to humans risks reinforcement of an instrumental and reductionist valuation of nature (Victor, 2020). This anthropocentric valuation contributes to biodiversity loss by justifying large-scale exploitation and implying that natural resources are substitutable.

Recognizing the intrinsic value of nature, as its worth is independent of human utility, is therefore critical for challenging the ideological underpinnings that have facilitated its degradation (Díaz et al., 2019; Thompson, 2016). A scholarly debate continues between valuing biodiversity for its intrinsic worth versus its instrumental benefits, with some experts advocating a focus on cultivating a virtuous, ethical relationship between humans and nature (Thompson, 2016).

### *Biodiversity loss*

The possibility of irreversible destabilization of the earth system is no longer theoretical; most biodiversity indicators currently reveal alarming declines. The extinction rate today is estimated to be ten to a hundred times higher than the baseline average of the last ten million years, with approximately 25%, around one million, of assessed species and plant groups now classified as threatened (Díaz et al., 2019).

The direct drivers of biodiversity loss, ranked by their relative impact, include land and sea use changes, direct exploitation of organisms, climate change, pollution, and the invasion of alien species (Díaz et al., 2019). On land and in freshwater systems, change in land use, particularly agricultural expansion, is the most significant driver, accounting for one-third of terrestrial land being used for crop growing and animal husbandry. Direct

exploitation through harvesting, logging, hunting, and fishing follows as the second most impactful driver. In marine environments, direct exploitation, primarily overfishing, constitutes the principal threat, with land and sea use change via coastal development and aquaculture also contributing substantially.

Underlying these direct pressures are a range of indirect drivers, such as societal values and behaviors, demographic trends, trade dynamics, technological development, and governance structures (Díaz et al., 2019). Effective conservation and sustainable use of biodiversity necessitate addressing these direct and indirect drivers. Under current trajectories, biodiversity goals, including those aligned with the Paris Agreement, will not be met unless urgent transformative change takes place (Díaz et al., 2019; Kok et al., 2018).

#### *The role of economic sectors in biodiversity impact and dependency*

A company's impact and its dependence on biodiversity is closely linked to its economic sector and position within the supply chain. This report classifies businesses according to their traditional sectors: the primary sector involves resource extraction; the secondary sector involves the transformation of resources; the tertiary sector provides services. Additionally, the term 'industry' refers to the specific products or services that a business offers.

Primary sector companies, such as those in mining, fishery, and agriculture, engage in direct physical interaction with nature, making their biodiversity impact readily attributable. Secondary sector companies, such as manufacturers of food, textiles, and paper, are connected to biodiversity indirectly via supply chains. Tertiary sector firms, including pension funds and insurance companies, influence biodiversity through their investments and services supporting primary and secondary sectors. Thus, all sectors share responsibility for the impact on biodiversity regardless of direct interaction (van Oorschot et al., 2020; Wilting & van Oorschot, 2017).

The sectoral position also determines appropriate biodiversity actions. Primary sector firms should focus on sustainable ecosystem use and restoration within their operations. Secondary and tertiary sector companies must critically examine and influence their supply chains by assessing sourcing practices, minimizing environmental pressures in production, implementing circular economy principles, and adopting compensation schemes for their ecological footprints (van Oorschot et al., 2020). Notably, processors, traders, retailers, and investors hold central positions within supply chains and therefore possess substantial leverage to encourage sustainable practices among primary producers and consumers alike (Wilting & van Oorschot, 2017). Pension funds furthermore shape corporate sustainability by promoting proactive environmental strategies and greater transparency (Barrera & Wagner, 2023).

Structural path analysis reveals that nearly half of biodiversity impacts occur upstream of a company's direct suppliers (Wilting & van Oorschot, 2017). However, companies

predominantly track direct supplier impacts, leading to significant underestimation of biodiversity loss in supply chain assessments. This oversight diminishes recognition of the role of downstream companies and underscores the necessity of targeting all supply chain actors for biodiversity action (Finance for Biodiversity pledge, 2022).

#### *Company activities and biodiversity impacts*

Certain company activities exert particularly significant direct impact on biodiversity. These are concentrated mostly in the primary sector, including fisheries, agriculture, harvesting, and mining. Díaz et al. (2019) highlight fisheries as having the largest biodiversity footprint, approximately four times greater than that of agriculture. Agricultural activities such as land clearing, crop production, and fertilization contribute 25% of global greenhouse gas emissions. Mining, occupying approximately 1% of terrestrial land, causes extensive local and regional damage through pollution and habitat destruction. Offshore mining activities, including oil and gas installations, are on the rise, with around 6,500 platforms worldwide.

The global harvest of roundwood continues to exceed planted forest area, with an estimated 3.89 billion cubic meters removed in 2017, split evenly between industrial use and fuelwood consumption (Dikau et al., 2021). Resource extraction and infrastructure development, including dams, roads, and urban expansion, inflicts severe damage on local biodiversity and accounts for an estimated 40% of global habitat loss despite urban areas covering less than 3% of the terrestrial surface (Ren et al., 2023). Rapid and often poorly planned urban growth, particularly in Africa and East Asia, exacerbates these impacts.

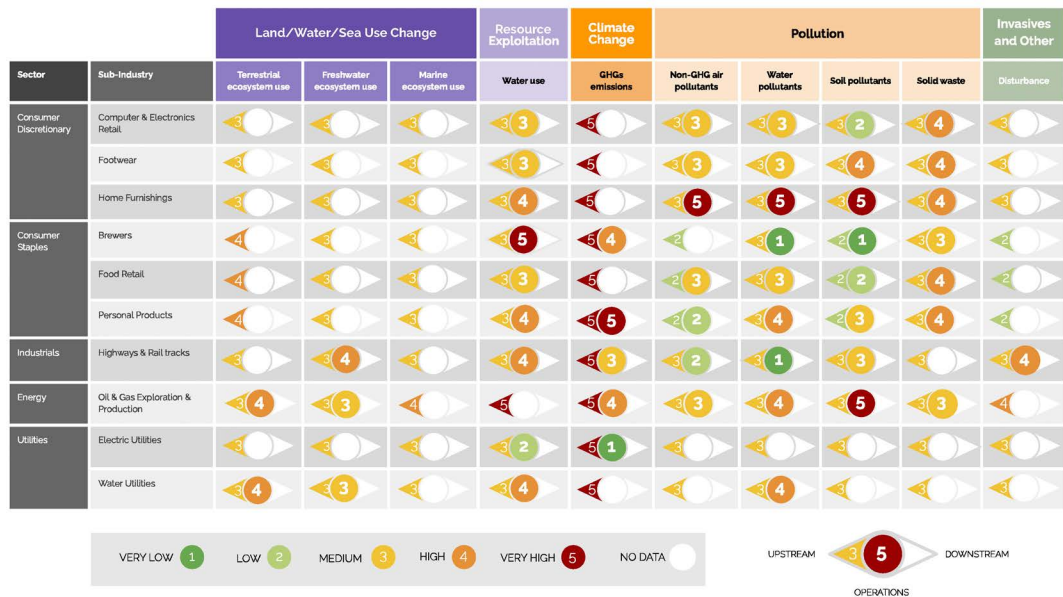
Tourism also increasingly contributes to biodiversity pressures, with its carbon footprint rising by 40% between 2009 and 2013, notably from transport and food consumption. The environmental footprint is also intensified by high-end tourism options. Additionally, air and sea transport of goods and people accounts for 15% of global CO<sub>2</sub> emissions and has facilitated the spread of invasive species. The number of global air flights doubled from 1980 to 2010, while seaborne cargo has quadrupled in the same period (Dikau et al., 2021).

Although only few companies engage directly in these activities, many others indirectly drive biodiversity loss through their interconnected supply chains. Shareholders, especially those in responsible pension funds, can catalyze improvements in environmental practices such as renewable energy adoption and transparency, thereby addressing upstream impacts (Barrera & Wagner, 2023).

#### *Industry-specific interactions with biodiversity*

The industry that a company engages in and its associated value chains critically shape its interaction with biodiversity. Industries frequently identified as highly dependent on biodiversity include agriculture, forest products, fishery, fashion (textiles, apparel, luxury goods), and food, beverage, and tobacco. Those with the most substantial negative impacts include

Figure 1: A useful tool for assessing the impact and dependencies of specific industries and subindustries is developed by ENCORE.



Source: Finance for Biodiversity Pledge (2022)

agriculture, food and beverage, infrastructure and mobility, energy and mining, fashion, and others such as pharmaceuticals, cosmetics, and consumer electronics (Finance for Biodiversity pledge, 2022).

Kurth et al. (2021) estimate that four dominant value chains, namely food, infrastructure and mobility, energy, and fashion, account for approximately 90% of biodiversity loss, with food and agriculture responsible for over half of this. Figure 1, developed by ENCORE, offers a comprehensive tool for assessing industry-specific impacts and dependencies.

### Geo-spatial considerations in biodiversity impact assessment

A globalized economy and intricate supply chains disperse biodiversity impacts across distant geographies, thereby complicating attribution and accountability. Studies indicate that between 80% and 99% of the biodiversity impact linked to food consumption in industrialized countries occurs abroad (Green et al., 2019). Two factors complicate impact assessments: complex supply chains that obscure local biodiversity loss drivers, and the regional specificity of biodiversity impacts, which highly depend on location (Green et al., 2019).

The earth’s natural environments exhibit immense geo-spatial variation, shaped by millions of years of evolutionary responses to differing combinations of water-energy dynamics, geology, and tectonics (Roy, 2012). Each type of ecosystem displays unique structural and functional characteristics, hosting distinct species populations and genetic diversity. Consequently, environmental pressures and the resilience of ecosystems vary regionally, affecting biodiversity loss differently.

Specific ecosystems warrant special attention due to their ecological importance and vulnerability. Tropical and subtropical forests, covering 52% of forested areas globally, store 70% of forest carbon stocks but face rapid deforestation mainly driven by commercial agriculture and local land use changes (Díaz et al., 2019). Temperate grasslands, although covering only 5-10% of terrestrial surfaces, are highly biodiverse but heavily degraded due to habitat conversion and fragmentation. Wetlands, covering approximately 6% of land surface, provide crucial ecosystem services but have declined by about 31% between 1970 and 2008, primarily due to land use changes and pollution. Shelf systems, extending from shorelines to 200 meters deep, cover 8% of earth's surface and produce 90% of global marine biomass, yet face intense pressures from fishery, pollution, and noise disturbance (Díaz et al., 2019).

#### *Biodiversity hotspots and conservation priorities*

In light of limited conservation resources, conservation efforts have prioritized biodiversity hotspots, regions characterized by exceptional species richness and endemism but facing severe habitat loss. The Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) recognizes 35 terrestrial hotspots, covering about 17.3% of the earth's land surface. These hotspots experience biodiversity declines approximately 74% faster than the global average (Díaz et al., 2019).

While hotspots are generally affected by the same threats as global biodiversity, pressures on them are often more intense and sometimes unique to specific hotspots (Brooks et al., 2002). The Critical Ecosystem Partnership Fund currently supports conservation in ten such hotspots, each of which faces particular threats detailed in Table 3.

Despite their practical utility, the biodiversity hotspot concept faces critique. Its reliance on species counts oversimplifies the complexity of biodiversity and may marginalize broader ecological regions essential for biodiversity generation and maintenance (Marchese, 2015). Furthermore, spatial analyses reveal a weak correlation between areas of high species diversity and those providing critical ecosystem services, thus underscoring the need for a more nuanced approach to conservation prioritization (Kareiva & Kareiva, 2017).

#### **Biodiversity's relation to finance**

The most significant way financial institutions, such as pension funds and insurance companies, interact with biodiversity is through the companies they invest in. As enablers of economic activity, the way financial institutions allocate capital determines the extent of human demands on nature (Dikau et al., 2021).

Table 3: The 10 conservation hotspots supported by the Critical Ecosystem Partnership Fund

Biodiversity	Main threats
Tropical Andes	Population pressure and migration Transportation infrastructure Dams for hydroelectric production and irrigation Mining Overexploitation of species Hunting and illegal trade
Mountains of Central Asia	Habitat change Poaching, excessive hunting, and collection of plants Overgrazing Human-wildlife conflict Invasive and alien species
Mediterranean basin	Pressure on water resources Forest fires Pollution Agricultural intensification and land abandonment Infrastructure and residential development Transportation infrastructure
Wallacea	Small-scale and illegal logging Unsustainable small-scale fishing Hunting and collecting Industrial agriculture and forestry Expansion and intensification of smallholder agriculture and livestock
Madagascar and the Indian Ocean Islands	Deforestation Hunting for local consumption Trafficking of animals and plant species Invasive animal species Climate change
Indo-Burma	Hunting and trade of wildlife Agro-industrial plantations Hydropower dams Agricultural encroachment Infrastructure Logging
Guinean Forests of West Africa	Agriculture Bushmeat hunting and wildlife trade Logging Overfishing Oil and gas extraction Fuelwood and charcoal production Mining
East Melanesian Islands	Deforestation Agriculture Mining Coastal development Overharvesting
Caribbean Islands	Biological resource use: over-exploitation and control Agricultural and aquaculture expansion and intensification Invasive species and infection disease Residential, commercial, industrial, and tourism development

### *Double materiality*

A defining characteristic of the relation between finance and biodiversity is that financial institutions both impact and are affected by biodiversity. This is referred to as the concept of double materiality (Barker & Mayer, 2025). Following from this, when financial institutions contribute to biodiversity loss, they actively contribute to the risks they hedge against, by exacerbating the decline of ecosystem services (Dikau et al., 2021). On the one hand, financial institutions are affected by biodiversity. Due to the embeddedness of the economic system within nature – and its reliance on ecosystem services – the companies that the financial sector invests in are dependent on biodiversity. On the other hand, financial institutions contribute to its deterioration through their allocation of capital to activities and companies that harm biodiversity. Currently, an estimated USD 78-91 billion is invested in global biodiversity finance per year. However, estimates on the financial flows needed to reach important biodiversity milestones (such as the Aichi targets) come to USD 150-440 billion annually (Tobin-de la Puente & Mitchell, 2021). However, the financial sector actively invests in companies that increase exposure to environmental risk (Dikau et al., 2021). Despite pension funds leading in investments in socially responsible assets, a recent study found that over GBP 300 billion of UK pension money is invested in companies and financial institutions exposed to high deforestation risks (Tobin-de la Puente & Mitchell, 2021). Although investment in biodiversity restoration and protection is necessary, financial flows that negatively impact biodiversity must be reduced as well (OECD, 2020; working group biodiversity, 2021). Policy reforms, such as elimination of harmful subsidies, can help close the biodiversity finance gap (Matthews & Karousakis, 2022).

### *Risks*

Through the financial sector's endogenous relation with biodiversity, it is exposed to physical/systemic, transition, and reputational risk (van Tilburg et al., 2022). Physical and systemic risks are risks associated with the dependence of the financial sector on biodiversity. Physical risks are the result of failing ecosystem services leading to inaccessibility or disruption of a natural resource – usually on a local scale. This can represent credit and investment risks due to poor investment results or business default (working group biodiversity, 2021). The DNB estimates that Dutch financial institutions hold investments totaling EUR 510 billion (36% of their portfolio) that are highly dependent on one or more ecosystem services, thus exposing them to physical risk (van Toor et al., 2020). Systemic risks are declines in the market value of investment portfolios due to largescale failure of ecosystem services. This risk is difficult to estimate, as it requires forecasting many interconnections and feedback loops, and is therefore not integrated in day-to-day risk management (van Tilburg et al., 2022; van Toor et al., 2020). Increasingly, the concept of 'green swans' is emphasized (Bolton et al., 2020; Chandellier & Malacain, 2021; van Tilburg et al.,

2022). These are unpredictable, climate-related events with potentially severe and systemic financial impact. They involve complex, non-linear risks that are hard to model. Pension funds and insurance companies, with their long investment horizons, are especially vulnerable to the physical and systemic risks of ecosystem services degradation. Disruptions in natural resources can lead to diminished asset values and compromised returns over time. The World Economic Forum's Global Risk Report 2025 underscores "biodiversity loss and ecosystem collapse" as a top global risk for the next decade. This highlights the potential financial implications for long-term investors such as pension funds (Elsner et al., 2025).

Risks related to the impact that financial institutions have on biodiversity are transition risks and reputational risks. Transition risks result from misalignment in a financial institutions portfolio with transformational economic change. A good example of such a situation is the debate around Rabobank's portfolio of high transition risk borrowers in the agricultural sector (Manifest Climate, 2022). Such risk can result from technological breakthroughs, stricter government measures and regulations, or changing customer preferences that lead to stranded assets (Dikau et al., 2021; van Toor et al., 2020). Pension funds are highly regulated entities, and evolving regulatory landscapes concerning environmental, social, and governance (ESG) factors can pose significant transition risks. For example, new regulations in the UK require every pension scheme to assess its exposure to climate change, compelling schemes to establish appropriate governance, strategies, targets, and metrics related to climate risks (Brown, 2021). Also, the Dutch Central Bank (DNB) has urged pension funds to address ESG risks, noting that 37% of pension funds have not started assessing these risks and thus not adhering to regulatory requirements (DNB, 2024). While these examples do not focus on biodiversity loss specifically, such development can be expected in the future. Indeed, the emergence of a "biodiversity footprint premium" in stock returns following major biodiversity policy developments, such as the Kunming Declaration and the launch of the Taskforce on Nature-related Financial Disclosures (TNFD), indicates that investors are beginning to price in the uncertainty and prospect of future biodiversity regulation or litigation. This premium implies that firms with a larger negative impact on biodiversity (higher Corporate Biodiversity Footprint or CBF) are expected to earn higher returns to compensate investors for these heightened transition risks. The stock prices of firms with large biodiversity footprints reacted negatively around these policy announcements, suggesting that investors were revising their valuations downwards due to anticipated regulatory changes. This effect is particularly pronounced in countries with low biodiversity protection, where the expected stringency of future regulations and thus the risk premium is higher (Garel et al., 2024).

Closely related to this are reputational risks, which stem from negative behavior of companies in the portfolio. DNB finds that 14% of the Dutch financial institution portfolio is invested in companies with recent environmental controversies (van As et al., 2021). Given

their fiduciary duties and public accountability, institutional investors, especially pension funds, face growing reputational and financial risks when associated with investments that contribute to biodiversity loss. Negative publicity can erode stakeholder trust and undermine long-term fund performance. More substantively, biodiversity loss introduces tangible financial risks through disrupted supply chains, regulatory shifts, ecosystem degradation, and declining natural capital, all of which can threaten asset values and long-term returns (Finance for Biodiversity pledge, 2022). However, integrating biodiversity considerations into investment strategies presents fiduciary dilemmas. Traditionally, fiduciary duty has focused on maximization of risk-adjusted returns, which can lead to a narrow interpretation that prioritizes short-term financial performance over broader sustainability outcomes (Richardson, 2009). Biodiversity investments may carry uncertain costs, less established performance metrics, or longer time horizons, potentially leading to misalignment with conventional financial objectives (Khan et al., 2016).

Recent academic discourse, however, challenges this narrow framing. Emerging legal and policy perspectives argue that ignoring material environmental risks, such as those posed by biodiversity loss, could constitute a breach of fiduciary duty, especially where such risks threaten long-term value creation (Hawley et al., 2011; Sullivan et al., 2020). In this light, fiduciary duty is increasingly seen as not only permitting but requiring consideration of systemic risks such as biodiversity loss. By proactively addressing such risks, pension funds can better align with evolving interpretations of fiduciary responsibility that incorporate environmental, social, and governance (ESG) factors as financially material concerns (Sullivan et al., 2020).

A practical example of these dilemmas can be seen in recent developments in the Dutch pension sector. For example, the “*motie Aartsen*” in the Lower House explicitly encouraged pension funds to prioritize financial returns above broader sustainability goals or “other politically driven causes” (Aartsen, 2024), highlighting the tension between narrow fiduciary interpretations and evolving societal expectations. At the same time, large pension funds such as ABP have experimented with expanding their mandate: in March 2024 the fund announced €30 billion in investments focused on climate, nature, and biodiversity. ABP justified this move in part by pointing to member surveys indicating that a majority of participants support sustainable investing, even if this could result in a lower pension (*Wat Vinden Deelnemers van Onze Beleggingen?*, n.d.). This creates a normative dilemma: should fiduciary duty reflect only financial optimization, or also the expressed values and long-term interests of beneficiaries? A comparable dilemma is that of *Spence v. American Airlines, Inc.*, a U.S. case under ERISA. Participants argued that the airline breached fiduciary duties by letting corporate ESG goals influence its retirement plan investments. The court agreed the duty of loyalty was violated, although it found no breach of prudence since industry standards had been followed (“*Spence v. American Airlines, Inc.*,” 2025).

This is part of the broader context of ESG backlash in the financial and pension worlds. As these examples show, there is increasing political, regulatory, and public pushback against pension funds that incorporate environmental or social goals in their investment strategies. Some argue that such funds are going beyond their core financial goal, with the possibility of higher risk or underperformance, especially in times of economic stress. All these examples (ABP's survey-based mandate, Motie Aartsen, and Spence v. American Airlines) highlight a key fiduciary dilemma: whether fiduciary duty should be limited to maximizing financial returns (as traditionally interpreted) or should also encompass non-financial goals such as biodiversity protection, climate mitigation, and ethical concerns, and whether it should include the values of beneficiaries and long-term societal risk.

#### *Strategies and instruments for financial institutions to tackle biodiversity issues*

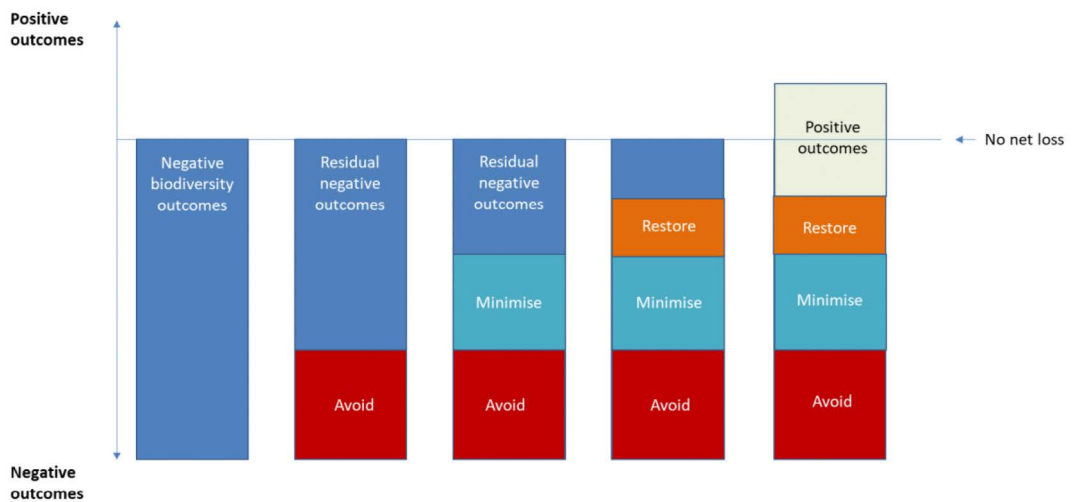
In recent years, a growing number of institutional investors have begun to recognize biodiversity as a financially material issue. For example, over two hundred financial institutions with more than €23 trillion in total in assets under management have signed the Finance for Biodiversity Pledge, committing to set targets and report on biodiversity-related risks (Signatories, 2025). Similarly, the Dutch pension fund PFZW has committed to reducing by 50% the CO<sub>2</sub> emissions and biodiversity footprint of its portfolio by 2030, thus integrating biodiversity criteria into its engagement and divestment strategies (PFZW, 2024). These and other actions as presented in table 4 reflect a growing awareness within the financial sector that biodiversity considerations are becoming increasingly relevant from both ethical and financial perspective.

Common strategies to tackle biodiversity issues are awareness-raising, adoption of commitments and initiatives, investment allocation, stewardship, policy development, and meaningful data gathering (Grigg et al., 2020). In particular, the Mitigation Hierarchy (see Figure 2) elaborates on which elements to prioritize when transitioning from net negative to net positive outcomes, starting with avoidance and minimization of negative impacts, then restoration of areas of biodiversity degradation, and lastly incorporation of positive actions (Grigg et al., 2020). To enable that, investors need to build internal capacity to ensure awareness of the importance of biodiversity. When allocating investments, biodiversity-related risks and opportunities must be assessed, and filters must be put in place to exclude companies based on biodiversity criteria. Capital could be allocated to sectors or businesses that avoid and reduce biodiversity loss and increase positive biodiversity outcomes. Stewardship can be utilized to engage with companies that avoid and minimize biodiversity impacts. Particular attention should be paid to companies that engage in activities that have known negative impacts on biodiversity, such as deforestation (Grigg et al., 2020).

Table 4: Concrete examples of investor commitment to the topic of biodiversity

Institution/Initiative	Type of Action	Description
<b>Finance for Biodiversity Pledge</b>	Commitment & Target Setting	Over 200 financial institutions with a combined total of €23+ trillion AUM committed to setting targets and reporting on biodiversity risks and impacts ( <i>Signatories, 2025</i> ).
<b>AXA Group (France)</b>	Investment Allocation & Fund Creation	Committed €1.5 billion to biodiversity-positive investments; launched biodiversity-focused fund with IUCN (AXA group, 2022).
<b>PFZW (Netherlands)</b>	Emission & Biodiversity Footprint Reduction	This Dutch pension fund aims to cut biodiversity footprint and CO <sub>2</sub> emissions in half by 2030. Integrates biodiversity in engagement and divestment strategies (PFZW, 2024)
<b>ASN Bank (Netherlands)</b>	Biodiversity Policy & Exclusion Criteria	Aims for a net positive impact on biodiversity by 2030. Incorporates biodiversity in investment criteria; excludes harmful sectors (ASN bank, 2023).
<b>BNP Paribas Asset Management (France)</b>	Investment & Policy Engagement	Developed a biodiversity roadmap, integrated natural capital analysis in ESG assessment, and excludes companies driving deforestation (BNP Paribas, 2024).
<b>Cardano (previously "ACTIAM") (Netherlands)</b>	Stewardship & Biodiversity Metrics	Integrates biodiversity into stewardship; uses biodiversity impact metrics to guide investments and corporate engagement. Also collaborated with the impact institute, launching a dataset to measure the biodiversity impact of companies and their value chains (Impact Institute, 2023).
<b>Storebrand (Norway)</b>	Screening & Exclusion	Excludes companies involved in tropical deforestation from portfolios. Advocates biodiversity-focused policy reform (Storebrand, 2024a).

Figure 2: The mitigation hierarchy



Source: "ecology by design" <https://www.ecologybydesign.co.uk/ecology-resources/biodiversity-mitigation-hierarchy>

While policy regarding biodiversity is less developed than that regarding climate change, further developments in the EU Taxonomy, the Convention on Biological Diversity's post-2020 global biodiversity framework, and the Biodiversity Strategy of the EU for 2030 show that biodiversity will increasingly be included in sustainable finance policy. Investors can engage with policymakers to ensure incentives that drive biodiversity loss and increase pressure on disclosure. Investors should engage with companies to increase the availability of meaningful and consistent biodiversity data (Grigg et al., 2020). To help guide investors and businesses on how to assess their interaction with nature, the Taskforce on Nature-related Financial Disclosures (TNFD) has created the voluntary analytic assessment process LEAP (locate, evaluate, assess, prepare). Furthermore, the need to harmonize and standardize methods and instruments to map biodiversity impacts and dependencies is well-recognized. The Partnership for Biodiversity Accounting Financials (PBAF), an industry-led initiative that was established in the Netherlands in 2019, is one of the instruments that aims for this by assisting financial institutions in assessing and disclosing the impacts and dependencies of their loans and investments on biodiversity. PBAF seeks to integrate biodiversity considerations into financial decision-making by providing standardized methodologies and tools (PBAF, n.d.-a).

### **Shareholder engagement**

The previous section explored the concept of biodiversity and its relation to finance. This section dives into shareholder engagement, as a general practice in financial institutions but also in relation to biodiversity. A brief history of the practice explains the important role that it gained in the financial sector. Several types of shareholder engagement are explored to understand which are suited to deal with biodiversity and which are not.

#### *The rise of shareholder engagement*

Shareholders engage with investees on several topics. Current practice increasingly focuses on influencing corporate decision-making and stretches beyond formally submitting resolutions or voting at annual meetings. Such engagement is an increasingly important instrument and, while it is still mostly used in the communication with larger companies, mid-sized companies are engaged with as well (Gatti et al., 2022). This practice has its origin in a strict focus on financial performance (Friedman, 2007). However, there is growing focus on social and environmental issues. Different developments, starting in the first decade of this century, have emphasized the need of all levels to act on these issues. These developments include the emergence of the concept of "ESG" through the United Nations Global Compact in 2004, the adoption of sustainable development goals by the UN in 2015, and the Paris Agreement in 2016 (Ringe, 2021). Arguably, the inclusion of the private sector in social justice ideals has also contributed to the conceptualization of environmental and social

issues as a risk to be managed (Michelon et al., 2020). Increasingly, awareness on social and environmental issues stretches beyond the avoidance of unethical behavior and strictly risk management towards a concern for real-world impact (Busch et al., 2021). While engagement is on the rise as an important practice for financial institutions to deal with social and environmental challenges, the effectiveness of such practice is debated in literature. Derwall & Koedijk (2022), for example, find that although shareholder engagement can improve profits and the ESG score of targeted corporations, there is little evidence that ESG engagement results in clear improvement of the actual environmental and social impact of these corporations. Gatti et al. (2022), however, find that shareholder engagement is effective in the sense that it leads to corporate practice changes and that it affects voting behavior. Networks driving shareholder engagement mainly consist of fiduciary managers, asset managers, ESG data providers, and other economic sector actors. These networks have a fundamental role in steering engagement, while actors from societal and policy networks seem to have limited influence. Pension funds specifically do not rely on societal actors like NGOs or policy networks to shape their engagement strategies (Wagemans et al., 2018).

#### *Types of engagement*

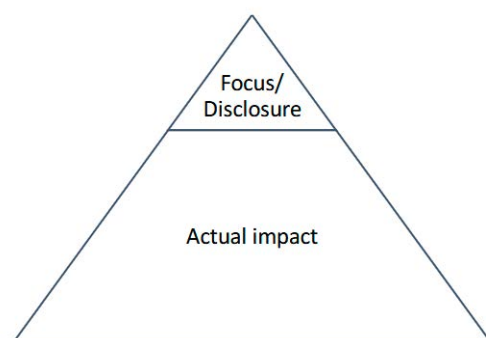
Investors can engage with portfolio firms in multiple ways, such as writing letters to the firm, asking questions at annual meetings, filing for shareholder resolutions, and discussions with management or the board (Goodman & Arenas, 2015). Such discussions can be either private or public, with private dialogue often being described as the main approach (Dyck et al., 2017; Krueger et al., 2019; McCahery et al., 2015). As to private engagements, 75% of ESG engagements are financially material and, in general, investees engaged with financially perform better (Bauer et al., 2023). Shareholder resolutions on environmental and social issues rarely come up for voting (Dyck et al., 2017). One study found that while pension funds often engage with companies through these methods, the effectiveness of these actions is impacted by several factors, such as the openness of the company, the types of contact used (e.g., letters, phone calls, face-to-face meetings), and whether the engagement is prepared well. However, engagement is at times fragmented, with ESG and financial topics being addressed separately by different teams, thus reducing the potential for integrated engagement (Wagemans et al., 2018).

#### *From disclosure to impact and targets*

Engagement on biodiversity has until now focused primarily on disclosure. Ali et al. (2024) found that companies are rewarded for disclosing relevant information on business policy, biodiversity management, and the valuation of ecosystem services in the value chain. This suggests that there is a financial incentive for companies to be transparent about their biodiversity efforts. However, there is a need for transition towards greater focus on impact

and targets. Between 2006 and 2012, companies vastly increased their CSR8 disclosures due to transparency proposals by shareholders. However, the actual CSR practices of these companies appear to have worsened over that same period (Michelon et al., 2020). This clearly illustrates the necessity of moving beyond solely asking questions and increasing disclosure. While this might help investors in assessing risks, it does not extend to society by creating impact (Doan & Sassen, 2020). The Finance for Biodiversity pledge (2022) provides guidance for financial institutions on engaging with companies to drive meaningful biodiversity action. The related guide emphasizes setting clear objectives and targets to achieve tangible outcomes and moving beyond mere disclosure to actual impact. The Norwegian Government Pension Fund Global (GPF) exemplifies impactful engagement on biodiversity. In 2021, Norges Bank Investment Management (NBIM) issued an expectation document that urges companies to integrate biodiversity risks into their governance, strategies, and risk management and to move beyond disclosure to concrete action (NBIM, 2021). Earlier, in 2017, GPF engaged directly with agribusiness firms linked to deforestation, including Bunge, urging them to halt harmful practices. It also divested from companies that failed to address deforestation risks, thus demonstrating a shift from disclosure to impact-driven engagement (Storebrand, 2024b). Recent findings by Shen et al. (2024) emphasize that while transparency-based activism is useful, it often fails, in the absence of a clear link to operational change, to change corporate behavior. Instead, engagement efforts that incorporate target-setting and escalation mechanisms are more likely to lead to environmental benefits. New empirical evidence confirms the value of shareholder engagement beyond disclosure. Hoepner et al. (2024) find that successful ESG engagements, especially on environmental issues, can significantly reduce the downside risks of companies, such as reputational and regulatory hazards. They determine that environmental engagements reduce Value at Risk (VaR) by up to 9% of the standard deviation after successful milestones are reached, thus illustrating tangible benefits to both firms and investors. This risk-based rationale reinforces the importance of goal setting and follow-through in engagement.

Figure 3 schematic overview



Source: Authors

On the other hand, moving beyond disclosure may also lower the success rate of engagement. In fact, when reorganization is demanded, the chance of success lowers by 16.3% compared to the overall rate (Barko et al., 2022). Still, Hoepner et al. (2024) suggest that even partial engagement success (e.g., acknowledgment of concerns) already leads to fewer environmental incidents. This challenges the idea that only full reorganization yields impact and highlights the incremental value of dialogic processes. Moreover, their study makes clear that climate and biodiversity engagements are particularly effective compared to other ESG themes. While governance engagements often target board structure or compensation, aspects that primarily affect firm value, environmental topics tend to directly influence operational risks and sustainability outcomes. This insight is highly relevant when designing biodiversity-focused strategies.

#### *How to engage most effectively*

The academic literature on the effectiveness of engagement is rather limited, partly because it is hard to obtain high-quality data on engagements. Also, related literature studies are characterized by several limitations, ranging from limited data and generalizability to a general lack of causal evidence. We thus need to be cautious in drawing hard conclusions from this literature. That being said, the literature has produced a number of interesting insights that we summarize and draw upon below. Engagement is a process that involves two conflicting interests: it is a process of cooperation but also confrontation between investors and firms. It is reputational threat and dialogue coming together in an effort to create common ground between the two parties. This should lead to mutual understanding despite initially conflicting interests. The key steppingstone in this process is the 'frame', a shared definition of the situation that creates common ground (Beunza et al., 2022; Ferraro & Beunza, 2018). This process also emphasizes the mutual aspect of engagement, as investors must show commitment and discipline in order to gain trust and motivation from the firms to fully accept the engagement (Ferraro & Beunza, 2018). Private engagement furthermore consists of steps with multiple rounds of dialogue and an action plan in the end. Hoepner et al. (2024) describe a structured process of engagement success using four milestones: raising a concern (M1), acknowledgment (M2), firm action (M3), and successful resolution (M4). On average, 33% of engagements reach M4, indicating the importance of persistent, multi-stage dialogue for impact. The action plan is essential, as it describes the goal and recommendation of the engagement, and this is where it can move beyond disclosure efforts towards actual target setting and impact (Semenova & Hassel, 2019). Hoepner et al. (2024) provide further evidence that engagements with clearly defined objectives and milestone tracking significantly reduce reputational and financial risk, particularly in environmental themes. They show that effective engagement can act as a governance substitute, especially in areas with weak regulation or oversight. Shen et al. (2024) also highlight

the role of persistent, targeted engagement in shaping corporate climate and biodiversity strategies, particularly where reputational and regulatory risks are high. Their findings reinforce the need for outcome-driven dialogue frameworks. This is also advocated by the Finance for Biodiversity Pledge (2022). They identify three steps for engagement: determining goals and targets, planning the engagement and tracking the process, and validating the engagement results.

Even though creating impact is the most integral part of engagement, very few investors analyse their impact through engagement owing to the lack of suitable metrics. Some determinants have been described that affect the impact of engagement, such as the cost of reform for the company, investor influence, and the company's level of ESG experience (Kölbel et al., 2019). As to pension funds, legitimacy-related factors were shown to be particularly significant, with extensive preparation and linkage of sustainability and biodiversity issues to financial materiality being key for effective engagement. While factors such as urgency and power were also considered important, they were assessed as less influential (Allen et al., 2012; Wagemans et al., 2018). In addition to legitimacy, power, and urgency, other key elements were identified that influence the effectiveness of engagement, namely the openness and willingness of the investee to engage, plus the positions and interests of internal stakeholders, particularly managers, regarding corporate social responsibility (CSR), as factors foster a productive engagement process. The persistence of engagement is also important and underlines the need for a consistent and ongoing stream of dialogue. Ultimately, the urgency within the investee's internal processes and deadlines also determines how quickly and effectively engagement can be achieved (Ferraro & Beunza, 2018; Wagemans et al., 2018).

#### *Escalation hierarchy*

Engagement can be seen as a sequence of actions or phases (Beunza et al., 2022; Schormair & Gilbert, 2021). Shareholder engagement practices entail several actions, which can be viewed in an escalating order. An escalation hierarchy is a ladder of consequential actions if the engagement efforts prove to be unsuccessful. Some studies find an escalation strategy to be an integral part of engagement (Birkmose & Madsen, 2020). An escalation ladder is characterized by a set of actions that involve increasing intrusion by the investee and in the relationship between investor and investee. At the bottom of the ladder, actions start with sending letters to the company and having informal or sometimes formal dialogue with the company. A step higher on the ladder, investors might consider issuing or supporting shareholder resolutions or voting. Usually, the ultimate action is excluding the company from the investment universe. However, this means that the investor will not be able to exercise influence over the company (Lambooy et al., 2018). What type of actions an investor can take typically depend on the jurisdiction that the investor falls under (PRI, 2018). Robeco

Asset Management, for example, considers escalation strategies like ‘contacting the board, issuing a public statement, using voting, filing a resolution, seeking legal remedies, and reducing exposure’ in the investment universe. Furthermore, Robeco could seek collective engagement, attend a shareholder meeting in person, or consider adverse proxy voting instructions at a shareholder meeting. Lastly, the nomination of directors is an escalation action (Robeco, 2024). UN PRI mentions contacting the board, either directly or at a shareholder meeting, collaboration with other investors, the use of public statements or media campaigns, filing resolutions, voting against the re-election of directors, submission of nominations for the board, legal actions, threatening to reduce exposure or (as a last resort) divestment (PRI, 2018). Divestment can be normatively motivated but also motivated by an increased perception of risk (PRI, 2021). Before divesting completely, investors can also stop providing additional capital to the company. An example of this is asset manager Storebrand, which put Bunge and ADM under observation (Storebrand, 2024b). It should be noted that adjusting the weightings of an investment is only possible for active investors (PRI, 2018). Aside from divestment, litigation is also seen as a last-resort action, which can even be motivated by fiduciary considerations (PRI, 2018). When escalation is considered appropriate is a matter of investor preference and should be part of the engagement policy. Importantly, Shen et al. (2024) emphasize that escalation, particularly through collaborative investor efforts and reputational pressure, can create significant change, especially when companies are unresponsive. However, they also warn that divestment goes at the loss of future influence, thus potentially undermining long-term strategic pressure. Lastly, while the actions above can be used solely for escalation purposes, they can also be considered as valuable stand-alone measures. This underscores the importance of communicating to the investee whether a measure should be seen as escalation and as disapproval of lack of progress in the engagement process.

#### *Engagement on biodiversity*

Although the topic of biodiversity is gaining awareness, policies and regulation on disclosure are still often lacking (Grigg et al., 2020). The focus still lies mostly on climate (Azizi et al., 2025). And even when the engagement is targeted on ESG issues, investors still often focus on traditional financial activism (Semenova & Hassel, 2019). Typical target firms still have the same characteristics: large, young companies with low leverage. These have not been adapted for engagement on ESG-specific issues, and biodiversity is still a more specific and complex topic. The term biodiversity is often considered unclear and complex by both investors and firms and as ambiguous due to the complexity of interactions and feedback loops, uncertainty of outcomes, and non-linear dynamics. To deal with that, the subject is regularly broken down into indicators that can vary across investors, with the distinct indicators being assigned different degrees of materiality by both investors and investees.

A 2018 study shows that most materiality was assigned to carbon emissions, while other indicators, such as water use, land use, and chemicals received little attention (Lambooy et al., 2018). Due to the perceived vagueness of the concept and indicators, investor expectations on good practices are not aligned or consistent. This prevents companies from fully understanding what investors require (Grigg et al., 2020). Furthermore, the dependencies and impact on biodiversity are also highly localized across value chains. For engagement purposes, this makes it challenging to aggregate biodiversity data at company level (Grigg et al., 2020). Water use may be an important indicator in regions with considerable water scarcity, but not in others. For example, five countries in Asia are responsible for 60% of plastic waste emission into the ocean (Ritchie, 2021). This makes pollution or ocean protection as indicators specifically important for parts of the value chain in these areas. The specific locality of the issue emphasizes the need to involve local stakeholders and gain better understanding of local conditions (Heinsbroek et al., 2024). The inaugural Indigenous Peoples Forum at COP16 highlighted the contributions by Indigenous communities to land conservation and sustainable resource management, underscoring the importance of integrating their knowledge into global strategies against biodiversity loss (Indigenous Peoples Forum, 2024). Furthermore, studies highlight that conservation efforts are more effective when they support the environmental stewardship of Indigenous peoples and local communities, leading to better long-term outcomes for biodiversity preservation (Dawson et al., 2021). This can also emphasize the importance of specifying the engagement topic to a particular realm or biome, geographical area, and biodiversity challenge, such as 'deforestation in the Amazon rainforest' (Finance for Biodiversity pledge, 2022).

#### *Data and metrics and the challenges*

Finance for Biodiversity Pledge identifies five primary quantitative measurement approaches: the Corporate Biodiversity Footprint (CBF), the Biodiversity Footprint Financial Institutions (BFFI), the Species Threat Abatement and Restoration (STAR), the Global Biodiversity Score for Financial Institutions (GBSFI), and the Biodiversity Impact Analytics powered by the Global Biodiversity Score (BIA-GBS). PBAF can also be added to that lexicon. PBAF aims to standardize existing impact and dependency mapping tools and harmonizes qualitative and quantitative approaches. It has published three 'standard works' for several financial institutions, ranging from those that start with the topic of biodiversity to those that have more experience and are ready to be implemented. The Exploring Natural Capital Opportunities, Risks and Exposure (ENCORE) can be used for risk management, communication, and stakeholder engagement, as well as for biodiversity target setting and portfolio alignment. It includes both dependencies and impact and looks at spatial data. However, the assessment is done based on generic global screening and should be complemented with more specific data. It also does not include impacts and dependencies

of the upstream and downstream value chain. Since the five different drivers for biodiversity loss are only fully included for three out of six measurement approaches, and since the approaches focus on different coverage, scopes, metrics, and data types, they will likely result in a variety of outcomes (Díaz et al., 2019). This is a recurring issue in the world of ESG ratings and attempts to quantify environmental impacts, as environmental ratings from six major rating agencies correlate for a mere 0.53 (Berg et al., 2022). An additional problem is the quality of data. Data are often either self-reported or derived from algorithms, which affects reliability in a negative way (Ringe, 2021). Even when standardized metrics were established, appropriate biodiversity data on firm level were still lacking (Grigg et al., 2020). Many firms already report on environmental impact, mainly on their CO<sub>2</sub> emissions. However, water and land use reports are frequently still not in place. The creation of a benchmark such as the biodiversity impact of the MSCI world index could motivate companies to report more extensively (Finance for Biodiversity Foundation, 2024). Existing measurement approaches do not adequately assess biodiversity loss throughout the supply chain, while 45% of biodiversity loss caused by the food and chemical industries in the Netherlands occurred in the upstream supply chain. Furthermore, 50% of the loss in the supply chain occurred abroad (Wilting & van Oorschot, 2017). This emphasizes the need to look beyond direct and sectoral impact, towards analysis of supply chain and local characteristics. Recent developments in biodiversity measurement tools seek to fill this gap by incorporating supply chain dependencies and risks. For example, the WWF Biodiversity Risk Filter enables businesses and financial institutions to assess biodiversity-related risks along their supply chains (WWF Biodiversity Risk Filter, 2023). Table 5 provides a comparative overview based on the themes discussed throughout this chapter, to clarify how biodiversity-specific challenges differ from or overlap with general responsible investment issues.

Obtaining data is difficult as well. Most data are self-reported, which assumes that a firm knows what is going on in the supply chain. That is often not the case. This transparency fallacy means that the degree of transparency that can be achieved is hindered by the current supply chain conditions around multinational corporations, including the complexity of supply chains, the geographical and cultural distance between the links, and the resistance to transparency measures by suppliers (Gold & Heikkurinen, 2018). It is important to differentiate between direct impact/dependencies that relate to the firm's own activities, and indirect impact/dependencies that relate to the upstream and downstream supply chain activities. Sectors downstream in the value chain are among the targets that are prioritized to engage with, in order to drive systemic change throughout the whole value chain (Finance for Biodiversity pledge, 2022). The complexity and ambiguity regarding biodiversity metrics and data are problematic for both investors and firms, to the point of even preventing investors from investing in biodiversity (Bassen et al., 2025). Despite the standardization ambitions of PBAF, global standardized metrics are still lacking. This results

Table 5: Biodiversity-Specific Challenges vs. General Responsible Investment Challenges

Biodiversity Challenge	Relation to Responsible Investment (RI) Challenge
<b>Localized nature of biodiversity impacts and dependencies</b>	Unlike climate (global), biodiversity risks are highly context-specific, making standardized investment analysis and engagement more difficult.
<b>Double materiality (finance impacts and dependencies on biodiversity)</b>	This concept is core to RI but more complex for biodiversity due to less quantifiable, multi-directional effects and feedback loops.
<b>Lack of standardized metrics and data</b>	Similar to ESG in general, but more severe for biodiversity: indicators are fragmented, less developed, and lack comparability.
<b>Conceptual ambiguity of Biodiversity</b>	Unlike carbon emissions, biodiversity lacks a single focal metric, making communication and target-setting difficult.
<b>Supply chain opacity and indirect impacts</b>	More pronounced for biodiversity: upstream and downstream impacts are often hidden and regionally dispersed across biomes.
<b>Lagging regulatory frameworks</b>	Biodiversity policies are less mature than climate or governance policies, making regulatory alignment more speculative.
<b>Less investor experience and awareness</b>	Biodiversity is newer and less embedded in investor routines, tools, or mandates than other ESG topics such as climate change.
<b>Measurement complexity (non-linear, uncertain outcomes)</b>	Many biodiversity impacts are irreversible, interdependent, and qualitative, unlike typical RI indicators that are based on quantification.
<b>Reputational risks with cultural sensitivity (e.g., Indigenous rights)</b>	ESG covers reputational risk, but biodiversity uniquely intersects with local culture, land rights, and equity issues.
<b>High degree of collaboration needed (e.g., with local actors)</b>	Collaboration is common in RI, but biodiversity demands engagement with non-traditional actors (e.g., Indigenous groups, ecologists).
<b>Mismatch with fiduciary norms (long time horizons, unclear returns)</b>	Biodiversity investments often conflict with short-term financial performance norms, raising RI dilemmas.
<b>Low integration in mainstream ESG frameworks</b>	While climate and governance are widely integrated, biodiversity lags in terms of tools, ratings, disclosures, and benchmarks.
<b>Greater reliance on qualitative judgment</b>	Compared to climate data-driven tools, biodiversity assessment requires a more precautionary, qualitative approach.

in unaligned or inconsistent investor expectations on good practices. However, since the characteristics of biodiversity loss are not compatible with traditional financial risk management tools, mitigating actions on a precautionary basis are advisable (Kedward et al., 2020). These actions would be justified mostly by qualitative assessments of system-wide risks, instead of attempting to gather detailed quantitative data. Also, Kan (2021) sees a division in measurement approaches into ‘broad’ and ‘detailed’ categories. The broad category means screening the entire portfolio at surface level to identify the lowest performers, whereas the detailed category entails a more detailed screening of a few potential new investments to help steer them towards improvement.

#### *Quantitative versus qualitative measures: A synthesis*

There is considerable focus at the intersection of biodiversity and finance on improving biodiversity reporting and biodiversity indicators. This is meant to create quantitative evaluations of biodiversity impacts and dependencies, potentially tying this to a monetary figure that can be used in risk evaluations. This has definite benefits, including increased accountability, facilitating materiality assessments and decision-making, enabling quantitative target setting, and improving communication of the risks and dependencies in a financial setting.

However, the conversion of biodiversity metrics into monetary values also suffers from several difficulties, leading to a struggle to provide meaningful estimates (Kedward et al., 2020). No universal metric for biodiversity exists, nor is any single metric all-encompassing. Recent studies point out that existing valuation methods often oversimplify biodiversity, neglecting complex ecological interactions and cultural values (Binner et al., 2025). Additionally, monetary assessments risk distortion of conservation priorities as they favor quantifiable aspects of biodiversity while overlooking critical but less tangible ecosystem functions (Strange et al., 2024). These challenges highlight the need for multi-metric approaches that better capture the full ecological and societal value of biodiversity.

The concept of biodiversity is complex in terms of interactions and feedback loops, uncertainty of outcomes, and a general non-linear dynamic (Giglio et al., 2023). This is further amplified by the concept of double materiality. Understanding biodiversity data and measurements is a matter of both risk and impact. Moreover, monetary valuations implicitly assume the substitutability of biodiversity, where an area that provides similar ecosystem services is equated to another (Atkinson et al., 2012; Victor, 2020) or might result in an undervaluation of sectors that contribute less to GDP but with societal implications (Dikau et al., 2021). Furthermore, monetization of biodiversity is the ultimate anthropocentric valuation of nature, where biodiversity only has value to the extent that it provides a service to humans (Victor, 2020). To deal with these complexities, Kedward et al. (2020) propose a synthesis between quantitative methods and a more qualitative, precautionary, and common-sense dimension. PBAF is one of the standards that emphasizes harmonization of both quantitative and qualitative assessments. A qualitative first scan can help identify the high-impact risk sectors. This can be supplemented with more in-depth and more detailed quantitative assessment (PBAF, n.d.-b).

#### *Cooperation between investors and other stakeholders*

One emerging trend is collaborative engagement (Derwall & Koedijk, 2022). Collaborative engagement increases investor empowerment, lowers the associated costs, creates a system of checks and balances, and can result in major successes. Especially for engagement on environmental and social topics, coordination can be beneficial. Collaborative engagement is characterized by a two-tier engagement, with a lead investor and support by collaborative investors. This approach leads to higher success rates, especially when the leader is geographically, linguistically, culturally, and socially suitable for the target firm (Ceccarelli et al., 2021; Dimson et al., 2015). Research conducted on Dutch pension funds showed that cultural proximity between investor and investee can improve engagement effectiveness (Wagemans et al., 2018). Collaborative engagement is a signal of being committed to resolving ESG issues. Main challenges of cooperative engagement include free-rider problems, competition between investors, coordination costs, and the regulatory

barrier of coordination such as “fair disclosure”, in which collaborative parties should first disclose their collaboration (Ringe, 2021). A significant number of investors state that they do not collaborate on engagement because of legal concerns (McCahery et al., 2015). Coordination platforms such as the UN PRI ICCR, Ceres, The Platform Living Wage Financials, and FAIRR could help overcome these problems. Current collaborative engagements in biodiversity focus mostly on deforestation, while little attention is paid to other biodiversity-related topics (Finance for Biodiversity pledge, 2022). (Goodman & Arenas (2015) state that engagement with legitimate impact requires the participation of all affected by the decision. This is especially important for issues which are culturally sensitive. However, marginalized stakeholders might reject such action, fearing the profit-oriented strategies of companies and investors involved. One specific type of engagement that could take these difficulties into consideration is sovereign ESG engagement. Sovereigns are key players in shaping the sustainable landscape, both locally and globally. They can set policies, influence regulatory boundaries, and are aware of cultural characteristics and other country-specifics (van Zanten et al., 2023). Particularly in low-income countries with high biodiversity, there are unsymmetrically high data gaps. This emphasizes the need for building capacity for biodiversity monitoring at country level (Stephenson et al., 2022). Community-based biodiversity finance focuses on investments in biodiversity management strategies led by Indigenous peoples and local communities (IPs & LCs), who often own and manage vast regions. Effective support requires understanding these community-driven pathways and tailoring finance mechanisms to their readiness, rather than imposing top-down initiatives. Key anchor points for these finance strategies include the recognition of rights, compensation for damage, and acknowledging the value of their biodiversity and traditional knowledge (Hill et al., 2025).

### *Critique*

The Platform for Responsible Investments (PRI) coordinates collaborations of investors to engage in ESG issues. A platform as such can reduce the challenges that cooperation between investors can present. These challenges include coordination costs, free-rider problems, and regulatory barriers. The PRI has initiated several collaborative investor-led engagements, including Climate action 100+. Climate action 100+ emerged as an investor-led initiative, motivating corporations to take action on climate change. Although many financial institutions have joined, the initiative has received criticism for being largely ineffective. Only 10 out of 45 participating companies have set net-zero goals for 2050, and none of them have met the benchmark indicators. Also, from the side of investors, the efforts have been undermined. Even though 23 of 45 companies failed to achieve full compliance with any benchmark indicator, the investors still voted in favor of the incumbent director in half of these 23 companies (MajorityAction, 2022). The large number of participants in the initiative resulted in a decline of commitment strength (Ceccarelli et al., 2021). In response

to the failure of Climate action 100+ and the gap in action on biodiversity loss, Nature Action 100+ was launched at COP15 in 2022 to drive corporate action on biodiversity loss. It engages companies in high-impact sectors to promote nature-positive strategies and to integrate nature-related risks into business practices. Unlike climate-focused initiatives, Nature Action 100 prioritizes reversing biodiversity decline by 2030 through collaborative engagement. With support by organizations such as the Finance for Biodiversity Foundation and IIGCC, it sets clear expectations for corporate biodiversity conservation, sustainable land use, and supply chain transparency (Nature Action100, 2022).

### **Expert findings**

We conducted a round of interviews among experts in the field in connection with this report. We summarize the most relevant findings here. They are structured along four themes: internal operations, measurement, share size, and systemic change.

#### *Expert Interview design and implementation*

As part of this research, a series of semi-structured interviews was conducted to gather expert insights on biodiversity and shareholder engagement. This qualitative approach involved a balance between structured inquiry and open-ended discussion, allowing for both comparability across interviews and the exploration of individual perspectives.

Eleven experts were interviewed, selected for their diverse backgrounds in academia, financial institutions, civil society organizations, and sustainability research. The interviewees included: Arthur van Mansvelt (Achmea Investment Management), Emilio Marti (Assistant Professor, Rotterdam School of Management, Erasmus University), Hannah Greep (BankTrack), Jan Willem van Gelder (Profundo), Luc van Haren (Triodos), Martin Fuchs (PhD student, Rotterdam School of Management, Erasmus University), Merel Hendriks (NWB Bank), Miriam van Gool (EcoValue), Nicolas Poolen (WWF-NL), Peter van der Werf (Robeco), and Steve Kennedy (Associate Professor, Rotterdam School of Management, Erasmus University).

The interviews focused on current practices, challenges, and opportunities related to biodiversity integration in financial decision-making and engagement strategies. Responses were analyzed thematically to identify common patterns and diverging viewpoints relevant to the study objectives.

#### *Internal operations*

The first topic identified in relation to internal operation issues is capacity building. Hiring people with new, perhaps unconventional, forms of knowledge (such as ecologists, biologists, ethicists, etc.) is necessary to build the required skill set and bridge the gap between ecology knowledge and the complexities of firms and financial institutions. This goes for

internal capacity (e.g., at executive level but also at all operational levels) as well as for the specific capacity within engagement teams. The latter can also be acquired by smart cooperation with peers in the field, which would also save costs.

The second topic is strategy. Biodiversity is a matter of company (and investor) strategy. The four-pillar strategy from TNFD is a preferable approach. Specifically, it is wise to look at how the concept of nature is integrated in the entire organization and to what degree the strategy is prepared for nature-related scenarios. Board-level responsibility for the concept of biodiversity is paramount in this.

### *Measurement*

As discussed above, there are considerable complications in measuring biodiversity. First, there is the problem of specificity. Using aggregated metrics, such as a global figure for deforestation by a company, seems undesirable. While on the one hand it makes things more workable, a lot of granulated information is lost on the other hand in such an aggregated indicator. Also, biodiversity is very location-specific (which makes the data non-substitutable). Moreover, while it may seem an appropriate quantitative measure, it is unclear how more quantitative considerations can be included. Successful engagement requires in-depth knowledge of the company and of the relation to the company. Relying on standardized metrics only does not suffice; instead, it is wise to look at the supply chain of the company and the context of the location it is embedded in. This is challenging because companies are often active in multiple locations at once. The impact in location A can be diametrically different from that in location B. The term 'biodiversity' is found to be too broad in and of itself. Rather, investors can report on specific topics such as water or pollution.

This leads to the second consideration, which is the continuum between holistic versus sub-indicators. With biodiversity, information needs to be broad and specific at the same time. This is challenging. On the one hand, it requires investors and investees to break overarching goals down into thoughtful intermediary sub-goals. On the other hand, awareness of biodiversity requires a form of 'holistic thinking'.

Thirdly, measuring impact is still in its infancy. Retrieving data 'from the ground' is important. Furthermore, investors should be aware that it is often the big companies that are most susceptible to shareholder demands, but these demands are often too incremental.

Lastly, it is difficult to attribute impact to the engagement efforts, causally or otherwise, especially in the case of sovereign engagements. Moreover, much preparatory work is often done by NGOs. While they create the momentum, investors can make use of that.

*"We are talking about the health of the system, and the urgency of that is underrated if you do not look at the full concept of biodiversity."*

### *Size of equity stake*

The first challenge identified is how investors should decide whom to engage with. While it does not make sense to engage strictly with companies that only want to improve themselves when pressured, these might be precisely the companies that cause harmful impacts. An indicator for successful engagement is having 'an ally' in the investee company. While engaging with companies that already disclose information on biodiversity is important, investors should not forget to raise awareness at companies that do not yet report on the topic. It was observed that a serious engagement strategy requires engaging on most if not all companies in the investor's portfolio. However, this is hardly possible for asset managers or banks with over a thousand companies in their portfolio. Consequently, among respondents there was some critique on excessive diversification and consequently fragmented shareholder portfolios.

The second challenge is whether to engage or divest. Several respondents argued that divestments have little direct impact, but they change norms and rules that then enable other shareholders to create impact. This is an important interplay. Divestment can also have detrimental long-term financial consequences for the companies involved (lower stock price, higher cost of capital), especially when done by a sizable number of investors. Having a serious escalation or perhaps even exit strategy is considered crucial. At the same time, a joint approach based on mutual commitment and common ground is also critical. Filing resolutions is also viewed as a currently undervalued but important mechanism.

The third challenge is transparency versus goal-setting. While many engagement efforts focus on increasing corporate disclosure, steering on actual reduction of negative impact or increase of positive impact requires goal-setting. Both are needed. Transparency comes first, but goal-setting must quickly follow. Investors should be aware of the geographical disparities in this. In some regions around the world, transparency on this topic is not yet top-of-mind.

Fourth, monitoring and accountability are important instruments. Engagement should be a process, not a one-off event. This minimally requires annual engagement, a record of progress tracking, and mutually agreed terms to check in on.

Fifth, the topic of common ground was mentioned. Engagement should be a collaborative process. Rather than merely pursuing demands and finger-wagging, investors should work together with investees and create incentives (e.g., providing additional capital). This entails asking the right questions, providing the right incentives, and seeing investees as partners. The governance of both investor and investee should also align with this process.

The sixth topic is legitimacy and groundwork. Legitimacy can be broken down into legitimacy of the shareholder and the legitimacy of demands of the shareholder. The legitimacy of the shareholder means that the engagement efforts cannot replace the lack of legitimacy at investor level (e.g., engaging with one specific oil company while investing in fossil fuels

elsewhere in the portfolio is hardly a sustainable strategy). The legitimacy of the demands of the shareholder is more context-driven. The more mainstream something is, the more it is perceived to be legitimate. Awareness that the 'ground has to be prepared' for biodiversity is critical. Shareholders should also contribute to this broader context, where it becomes legitimate to talk about biodiversity. This also involves field building activities in which investors develop certain standards, make statements, set a precedent, act as an example, and so on.

Lastly, on the topic of coordinated engagement, it was observed that this can serve as a cost-saving instrument that can add weight to the discussion because more investors are involved (and thus larger joint share size). It can also ensure harmonization of investor demands. However, to prevent a free-rider effect and to ensure that the engagement efforts are ambitious enough and well-organized, it is important to collaborate with like-minded investors.

*"Divestments have little direct impact, but massive symbolic influence"*

#### *Systemic change*

While engagement is seen as a useful tool, there are systemic challenges to overcome. Firstly, portfolio size is an issue. The number of companies included in most portfolios is considered too big and fragmented for an investor to have any real impact. This might call for reducing the number of companies in portfolios that have large negative biodiversity impact. Investors such as pension funds and asset managers should have far fewer companies in their portfolio so they can really get a better understanding of the companies they invest in. Otherwise, engagement is pointless.

Secondly, long-term commitment is an issue. One observation was that investing should be "brought back to its roots" - invest in a company because you believe in it. Simply buying and selling shares does not address biodiversity. Pension funds and insurance companies, with their long-term investment horizon, could play into this.

Lastly, principle-driven investors play an important role in preparing the ground. This applies, for example, to religious funds or NGOs that actively engage on normatively motivated topics, thereby preparing the ground and the societal debate. Such preparational work is important for more mainstream investors to build on.

The overall conclusion was that business must be willing to take steps that hurt, especially when it comes to climate change and biodiversity. The biodiversity problem will not be solved without things changing fundamentally. Building on that momentum is necessary, even though it might not create direct return. This requires institutional investors with long-term investment horizons, such as pension funds and insurance companies, which do not need an immediate business case rationale to justify their actions. While it can increase

profits for all shareholders in the long term, the biodiversity problem is often not possible to capitalize on as a single (first mover) investor.

## Conclusion

Biodiversity applies to all past, current, and future life on earth. That makes it a complex concept. The loss of biodiversity is happening at an unprecedented rate and is predominantly caused by human interference. Most biodiversity indicators are currently on the decline, making it increasingly a worldwide challenge. The key direct drivers of this are changes in land and sea use, direct exploitation of organisms, climate change, pollution, and invasion of alien species. There are harmful impacts across all economic sectors, corporate activities, industries, and multiple locations. We outline the main conclusions in the table below.

<b>Sectors</b>	Most harm occurs in the primary sector, but processors, traders, retailers, and investors in the secondary and tertiary sectors play a key role in influencing primary producers
<b>Activities</b>	Fishery, agriculture, harvesting, and mining (also in oceans) are most damaging. Also infrastructure, tourism, and transportation cause harm. A minority of companies engage in these activities as their core business, but most companies rely on and encourage these activities.
<b>Industries</b>	Agriculture, forest products, as well as fishery, food, beverages, tobacco, infrastructure, and mobility, energy and fashion.
<b>Geo-spatial factors</b>	Biodiversity impacts are often felt in distant and dispersed locations, thus complicating the attribution of responsibility. Specific attention must be given to (sub)tropical dry and humid forests, temperate grasslands, wetlands, and shelf systems.
<b>Hotspots</b>	35 hotspots are identified, characterized by a combination of exceptional biodiversity and facing considerable habitat loss, with decline at 74% faster than average. Hotspot approach is also criticized for being oversimplifying.

Over half of the world's GDP is moderately to highly dependent on nature, making it a sensitive issue, with a clearly economic and financial angle as well. The financial sector is exposed to biodiversity risks on a physical/systemic, transitional, and reputational level. The most significant way in which financial institutions interact with biodiversity is through the companies they invest in. A defining characteristic for the relation of finance to biodiversity is the concept of double materiality. Strategies to deal with biodiversity vary, and a common standard is yet missing.

One instrument for financial institutions to deal with biodiversity is shareholder engagement. This consists of a variety of actions that can be categorized as private and public. Private dialogue is the main approach. While this is increasingly employed in practice to address social and environmental issues and increasingly focuses on real-world impact, social and environmental resolutions are still seldom voted on. Central to a workable engagement strategy is escalation strategy. As a last resort, investors may need to be prepared to divest. Collaborative engagement efforts have proven to be effective tools, although some criteria still need to be met. The focus in engagement has mostly been on disclosure, but impact and target-setting are gaining traction. To track progress, it is

important to measure impact and to interpret the subsequent data. Currently, there are multiple limitations to the availability, quality, and granularity of biodiversity impact data. Furthermore, due to the non-linear dynamics of biodiversity loss, it is necessary to find a means to include forward-looking qualitative data as well. Often, the data available cover mostly self-disclosed reports, and 'information from the ground' is missing. Engagement on biodiversity-related topics is considered difficult, due to the non-linear dynamics and ambiguity of the topic. Companies often do not fully understand what investors require, and demands among investors are not always harmonized. Biodiversity is highly context- and location-specific, making it difficult to aggregate impact data and subsequent demands at company level. Current collaborative engagement efforts on biodiversity are mostly targeted on deforestation and disregard other relevant topics. Inclusion of a variety of stakeholders in the engagement process (local communities, governments, NGOs, etc.) is considered important. PBAF is a promising initiative that tries to combine, standardize, and harmonize different types of impact and dependency data into a common methodology. Recently, PBAF introduced the Biodiversity Footprinting Standard: Financed Impact, providing financial institutions with a framework to assess and disclose biodiversity-related risks and impacts (PBAF, 2023).

From the findings, we conclude that there are several indicators for successful engagement. First, financial institutions need to build capacity. They may need to do this together or with a broader range of stakeholders, making it possible to integrate new knowledge into the organization. This holds for the tone-at-the-top as well as throughout the operation. Biodiversity should furthermore be seen as a matter of strategy.

Secondly, there is a need for meaningful data. Data should be specific (detailed enough and portraying real impact on the ground) but workable. Furthermore, the approach should be both holistic as well as topic-driven.

Thirdly, share size is important. Financial institutions should decide who to engage with and should decide whether divestment is an exit strategy if the engagement does not go as planned. While divestments have little direct impact according to several experts, they have symbolic power. Finding common ground, setting targets, demanding transparency, monitoring progress, and building legitimacy are other important factors. The role of principle-driven investors should not be underestimated. They engage in field-building activities at times when others are unwilling to do so. As such, they 'prepare the ground'.

Collaborative engagement can be a valuable and effective instrument. It enables bigger share size, harmonizes investor demands, and is cost-saving. At the same time, there is a risk of free-rider effects and a lack of ambitious and profound objectives. Lastly, there are several systemic challenges that surround the topic of biodiversity engagement. The main challenges are portfolio size and long-term commitment. Many portfolios are too fragmented to allow effective engagement, reducing the investor's ability to understand and

influence individual companies. Long-term commitment is essential, as biodiversity loss is a systemic issue that requires persistent and principled action, beyond short-term financial returns. Addressing these challenges will require a shift in investment philosophy towards more concentrated, value-driven investment that is supported by robust data, meaningful stakeholder collaboration, and a willingness to lead rather than follow.

## Part II: A framework for biodiversity engagement

### Framework

Investors select investees to engage with. Engagement is applied to companies that do not currently meet ideal criteria but have the potential to do so. Based on the insights from literature and the round of interviews, we propose a framework for biodiversity engagement. This framework consists of four elements: (1) knowledge, (2) workable metrics, indicators & targets, (3) size of equity, and (4) momentum & legitimacy. We consider all four elements necessary for a successful biodiversity engagement strategy.

### Knowledge

Engagement requires knowledge and investigation. Affinity with the investee is necessary. For this, financial institutions need to build capacity, both internally within financial institutions as well as externally in meaningful coalitions.

#### *Building internal capacity for knowledge and investigation*

- This includes incorporating new, perhaps unconventional forms of expertise into your organization.
- Biodiversity is a matter of strategy, which requires awareness and willingness to act at the top of the organization, all the way down to operational level. We recommend appointing at least one board member who would be responsible for the topic of biodiversity and striving for a diverse board and organization (Carvajal et al., 2022).
- Decisions made at management level and corporate behavior are key issues for biodiversity (Michie, 2022). We therefore suggest extending this strategy to the targeted companies for engagement.

#### *Building external capacity can be done through meaningful coalitions and through strategic partnerships*

- Meaningful coalitions are, for example, collaborative efforts between financial institutions. Financing such coalitions is an area of concern since coalitions usually require one financial institution to take the lead and others to support. Pension funds and insurance companies, with their long-term investment horizons and fiduciary duty to manage sustainability risks, are well-positioned to take on this leadership role. Furthermore, the incentives should be aligned. There have been experiments with acquiring external funding, setting up co-funded foundations or setting up a lead rotation system within the coalition. The latter requires a great deal of trust among the coalition members. Another suggestion is to view the coalition members as a syndicate, all providing finance for the engagement efforts. The fund is divided on the basis of the costs involved. The lead

investor then takes up a proportionally bigger amount of the fund to cover for the costs involved. Finally, Dimson et al. (2025) suggest that PRI Collaboration Platform can act as a third-party coordinator in several forms of collaborative engagement efforts (PRI, 2018).

- There are several examples of strategic partnerships between financial institutions and NGOs. Recently, BNP Paribas Foundation has partnered with the Intergovernmental Oceanographic Commission of UNESCO to protect ocean ecosystems (“2025 Call for Projects,” n.d.). Additionally, Danish pension funds such as AP Pension and Pension-Danmark have partnered with the Planetary Responsibility Foundation to develop an industry standard to assess biodiversity impact (Aveo, 2025).

#### *Workable metrics, indicators and targets*

Literature and expert findings identify considerable problems with data obtainability, data quality, and lack of data standardization. There are several metrics to use, each with their own advantages or disadvantages. Recent initiatives, such as the Biodiversa+ guide on harmonization of biodiversity monitoring (“Guide on Harmonising Monitoring Protocols,” 2025) and the ISO/TC 331 standards for biodiversity (*ISO/TC 331 - Biodiversity*, 2022) are working to address these challenges by improving data interoperability and standardization. While this field will emerge, building an engagement strategy requires acting today. We suggest carefully considering which metric the investor wants to use and why.

- There are companies that already apply workable indicators. Financial institutions could accelerate those approaches and place these on the agenda together with other companies.
- A possible success indicator is to evaluate in what way the investee has identified biodiversity as a topic of strategy, and to what extent there is demonstrable management awareness and willingness on the topic.
- Most experts agree that making biodiversity concrete and target-driven is an important strategy. Examples could be to require investees to minimize deforestation in certain areas, or to increase water quality in other areas.

#### *Size of equity stake*

Size matters. That holds especially for the size of equity stake. Pension funds and insurance companies, given their size and long-term investment horizon, are in a good position to take a leading role in driving biodiversity-related engagement. Their large equity stakes make them influential and more likely to secure a ‘seat at the table’ when engaging with corporations. On the other hand, investors with smaller stakes may find it harder to have meaningful influence individually. Teaming up with other like-minded investors can help. This way, your engagement efforts are backed by more investors (i.e., more equity).

*Collaborative engagement has the potential to be effective, cost-reducing and helpful in building momentum*

- A workable size of the coalition. Collaboration is most appealing for mid-sized investors, and investors are more likely to engage when the target is domestic. Lead investors often have the “necessary resources, skill, motivation and skin in the game” (Dimson et al., 2025). Collaborative engagement initiatives can also be too big to have real effect. This is one of the critiques that Climate Action 100+ received.
- Ensuring profound incentives and forming a coalition of the willing is paramount. This requires mutual trust. Especially when the lead investor is appointed on rotation, there is a risk of parties backing out of the initiative at some point. Defining a growth model with an intentional horizon of seven years could serve as a trust basis to deal with these risks.
- Strategic partnerships with NGOs can be useful.

*Sovereign engagements, also in collaborative efforts, can be effective.*

An example is the Investor Policy Dialogue on Deforestation (IPDD), where investors engage with the governments of Brazil and Indonesia on deforestation risks (*Investor Policy Dialogue on Deforestation - About*, n.d.). Another example is the coalition of six global environmental organizations that leverage sovereign debt conversions in order to fund biodiversity conservation (Hutchins, 2024).

*Momentum and legitimacy*

The literature and expert findings indicate that the role of principle-based investors is important. Such investors (e.g., religious funds, NGOs) prepare the ground that mainstream investors can build on. The ultimate goal of any biodiversity engagement is to steer the transition to a net-positive world.

*Preparing the ground, building momentum, and legitimacy are key conditions for the success of engagement.*

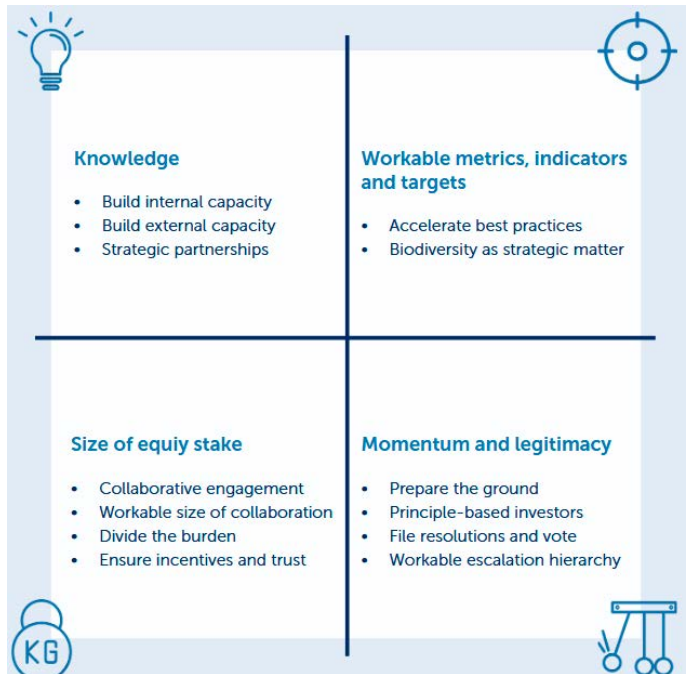
Frontrunners are much needed in this process, although they will not always see a causal effect from their efforts.

*Filing resolutions and voting helps, regardless of whether a resolution is accepted.*

Some findings in literature suggest that the public availability of resolutions can create positive momentum (Raghupathi et al., 2020). Furthermore, there are emerging initiatives that give more weight to a minority of shareholders on certain topics (Van der Elst & Lafarre, 2017). No literature was found on the effectiveness of rejected biodiversity-related resolutions. A full systemic overview of literature on shareholder resolutions is beyond the scope of this report.

*Having a workable escalation strategy can help for the investor's social legitimacy (walk the talk).*

Furthermore, it serves as a pressure tool for the effectiveness of the engagement process.



### Final suggestions

Having a clear idea on how to escalate the engagement process if it lacks positive results can help. In Table 4 we present a broad overview of the types of actions an investor can take. The framework, built on current literature and expert findings, is still broad. How to exactly define what is effective and what is not must be re-evaluated iteratively by the financial institution throughout the process. The debate on what type of engagement is effective and on whether it has true impact remains debatable according to the literature. This is partly due to the difficulties in linking actual impact to the engagement efforts – not in the least because most engagement takes place behind closed doors. We suggest that investors remain critical about the actual impact of engagement efforts and cautious not to overestimate the results.

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