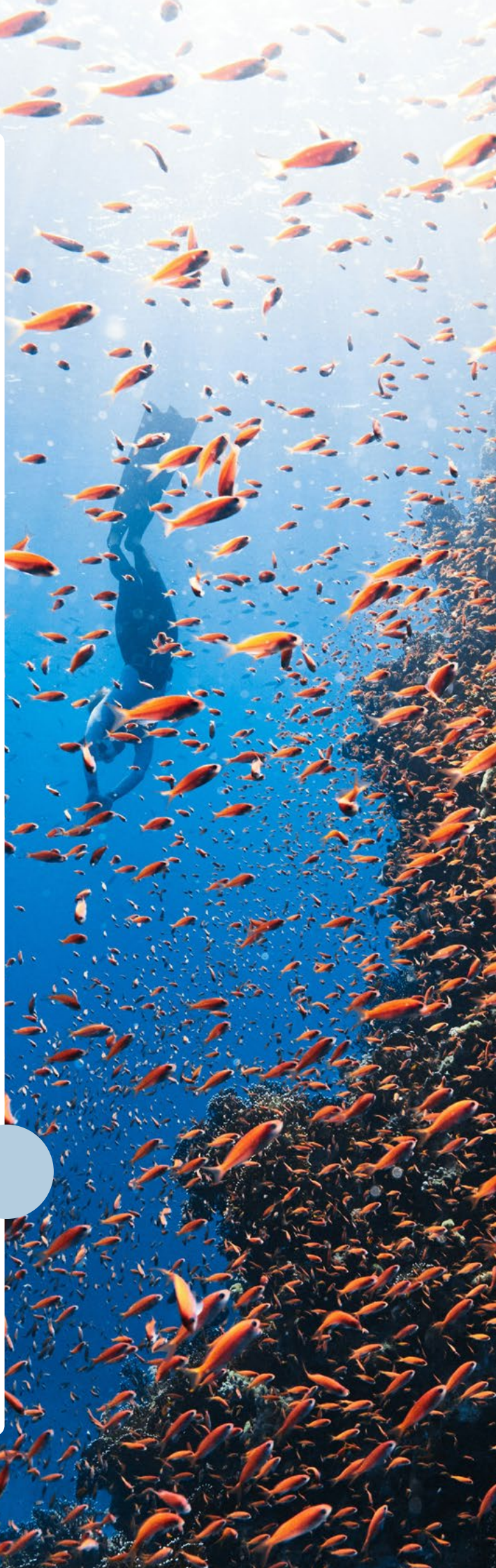
CANDRIAM
A NEW YORK LIFE INVESTMENTS COMPANY

Looking for a new symbiosis with nature

Our Biodiversity Strategy



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About the authors.

Elouan Heurard

ESG Analyst, Biodiversity

Elouan joined Candriam in 2022. He was previously a freelance consultant in LCA. Elouan holds a master's degree in chemistry from the Ecole Nationale Supérieure de Chimie de Lille, France.

Alix Chosson

Lead ESG Analyst – Environmental Research & Investments

Alix joined Candriam in 2020 as the Lead ESG Analyst for Environmental Research & Investments. Alix has fourteen years of experience as ESG Analyst in SRI research and portfolio management teams. She started her career at Amundi in 2010 and has more recently been sell-side ESG analyst at Natixis before joining in 2018 DNCA to contribute to the creation of the SRI team and range of funds. Alix holds a master's degree in economics and finance from Science Po, Lyon and a master's degree in portfolio management from the IAE Paris 12.


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Foreword: Attempting to capture the complexity of biodiversity.

We are living what scientists have called the 6th mass extinction of biodiversity. Our planet and the ecosystems that are the foundations of life are changing at an unprecedented pace, threatening all living organisms, including humans. Coupled and mutually reinforced by climate change, it creates an existential threat to our economies and societies, whose non-linear impacts are impossible to foresee.

We, humans, more specifically our resource-intensive economic models, have created this crisis. Our food systems in particular account for about half of the loss of ecosystem integrity due to change in land use and overexploitation of biodiversity in particular. At the same time, the same food systems are heavily dependent on biodiversity and so-called ecosystem services, and we won't be able to continue feeding the growing population without good soil quality, access to clean freshwater and pollinators. It is this feedback loop that can act either as a vicious or virtuous circle depending on how we act on it. This makes biodiversity a perfect case study to understand the concept of double materiality.

We need drastic changes in our relationship with nature. Nature has always been invisible in our economic models, bringing benefits that at best have been characterized as positive externalities, and at worst have been considered forever granted. Seeing nature and the living world as a resource has only led to its over-exploitation and ultimately its destruction. As citizens, we need to reset this broken relationship, starting by acknowledging the width and complexity of biodiversity, from genes to eco-systems, and the plurality of the benefits it brings to our lives. As companies, we need to put nature at the very heart of our economic model, starting by evaluating the impacts and dependencies that our activities have in relation to biodiversity. As investors, we need to start integrating this multi-faceted interconnected topic into the way we evaluate the resiliency and sustainable impacts of our investments.

The publication of this first Biodiversity Strategy is not the start of our journey with biodiversity as responsible investors, but **it is a decisive step in integrating this complex but vital issue at the heart of our investment strategies.** At the foundation of this strategy is our proprietary biodiversity model, that adds a third axis to our ESG approach, based on the "What" (Business Activity) and the "How" (Stakeholder): the "Where", with a location-based assessment, that is the most relevant dimension to assess biodiversity impacts. Adding this geographic lens to our analysis will greatly supplement our ESG assessment and our engagement efforts.

We launch this new strategy with conviction and ambition, but we will continue applying the utmost rigour and transparency in our ESG promise. We won't rush in trying to demonstrate our "net positive impact" on biodiversity as the top priority to stop biodiversity loss is to limit negative impacts, and thus to evaluate our biodiversity impacts and dependencies in the most comprehensive manner. Our main focus will be to limit the negative impacts of our investments, in strict alignment with the SBTn AR3T[1] approach that recommend to focus on avoiding and reducing before aiming to restore what cannot be avoided. In these efforts, there is currently no one single indicator that can fully assess the complexity and the width of interactions of all parts of biodiversity and the impact that human activity can have on it. We will thus continue to rely on a multitude of datasets that are necessary to understand our impacts in their most specific and granular levels, including when considering the inherent social implications of the biodiversity crisis.

Like many of the sustainability challenges, investors alone won't be able to reverse the current trend of biodiversity loss without government support and protective regulation. However, we cannot wait for regulation to materialise or for a potential perfect framework or simplified metric to emerge before we start addressing this issue. **The complexity and multifaceted nature of biodiversity should not be a deterrent for action, but a powerful drive for innovation.**

Part I - The dawn of the 6th extinction.

> **"The current extinction has its own novel cause: not an asteroid or a massive volcanic eruption but "one weedy species".**
>
> **– Elizabeth Kolbert, The Sixth Extinction: An Unnatural History**

Defining biodiversity: Complex but indispensable

What is biodiversity? More than a mere terminology to designate living organisms, the concept of biodiversity was introduced thirty years ago by the scientific community as a means to sound the alarm on one of the most critical issues facing our world, the intensification of the destruction of nature.

While biodiversity was initially defined at the 1992 Rio Summit as *the sum of all forms of life on various scales, from genes to ecosystems*, a more organic definition that incorporates the concept of interactions among these different parts is now preferred. Accordingly, Vincent Devictor[2] describes biodiversity as *"the living fabric of the planet, accompanied by the ecological and evolutionary processes that characterize it"*. Biodiversity, therefore, represents more than just the mere sum of its parts; it's the intricate complexity that makes nature what it is.

This complexity, however, makes assessing biodiversity challenging, especially given there are still today significant gaps in scientific knowledge in some areas. Biologists estimate that the total number of species on earth is around 10 million; however, to date, only about 2 million of these species have been identified and documented. Scientists are still debating most of the interconnections and relations within and between

species. Even some of the simplest biological reactions are yet to be understood in their full complexity. Take photosynthesis, for example, which is at the heart of plants' carbon sequestration power. It is still unclear how much is stored by aerial biomass, and how much is stored in the ground. Understanding the complexity of this phenomenon is crucial if we want to promote the best preservation and regeneration practices.

Defining biodiversity should not be seen as a mere semantic exercise. It is much more than that: The way we define biodiversity has direct implications on how we integrate biodiversity into our economic models, and thus our ability to protect and restore it.

Biodiversity is a dynamic balance

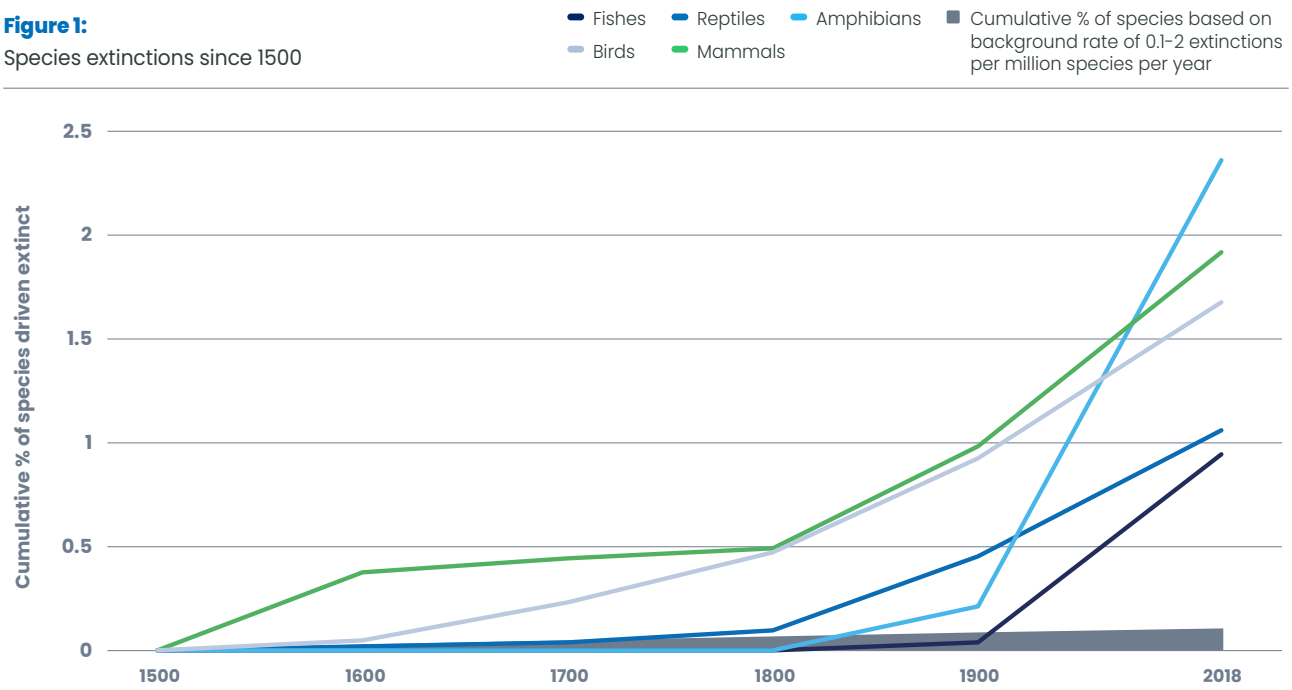
Biodiversity should not be viewed as a static entity that remains unchanged or declines in a linear manner. Instead, it's a dynamic balance, constantly shaped by the emergence, evolution, and disappearance of different life forms, including individual organisms, species, and populations.

The systemic nature of biodiversity: assessing unpredictability

Pierre-Henry Gouyon[3] offers an analogy to help understand this concept. He compares biodiversity to a satellite in orbit. For a satellite to stay in orbit, it must maintain a certain speed. If it slows down, it begins to fall and will eventually crash. Similarly, preserving biodiversity is a delicate balance, that must be considered in a systemic manner with non-linear dynamics at play. Ultimately, the decline of biodiversity is not just about counting the number of species that have disappeared but understanding how species disappearance is threatening ecosystem integrity and the very functioning of nature.

Because of the systemic nature of biodiversity and more specifically ecosystem integrity, the non-linear consequences of biodiversity loss cannot be reliably anticipated, with the occurrence of feedback loops (phenomena that intensify effects) that are by nature unpredictable. At first glance, the current rate of species extinction, between 1% and 2.5% of species driven to extinction depending on the taxonomic group since 1500, may not seem significant, especially when compared to past mass extinctions, where over 75% of species were lost[4]. However, what's concerning is the acceleration of this pace. The speed at which species are currently becoming extinct is similar to the early stages of previous mass extinctions. Recognizing the decline in biodiversity involves considering not just the loss of species, but the destabilization effect it has across ecosystems on a very short timeframe in the evolution history of nature on Earth, preventing any possibility for adaptation.

Figure 1:
Species extinctions since 1500



The background rate represent a standard state without human action

Source: IPBES report.

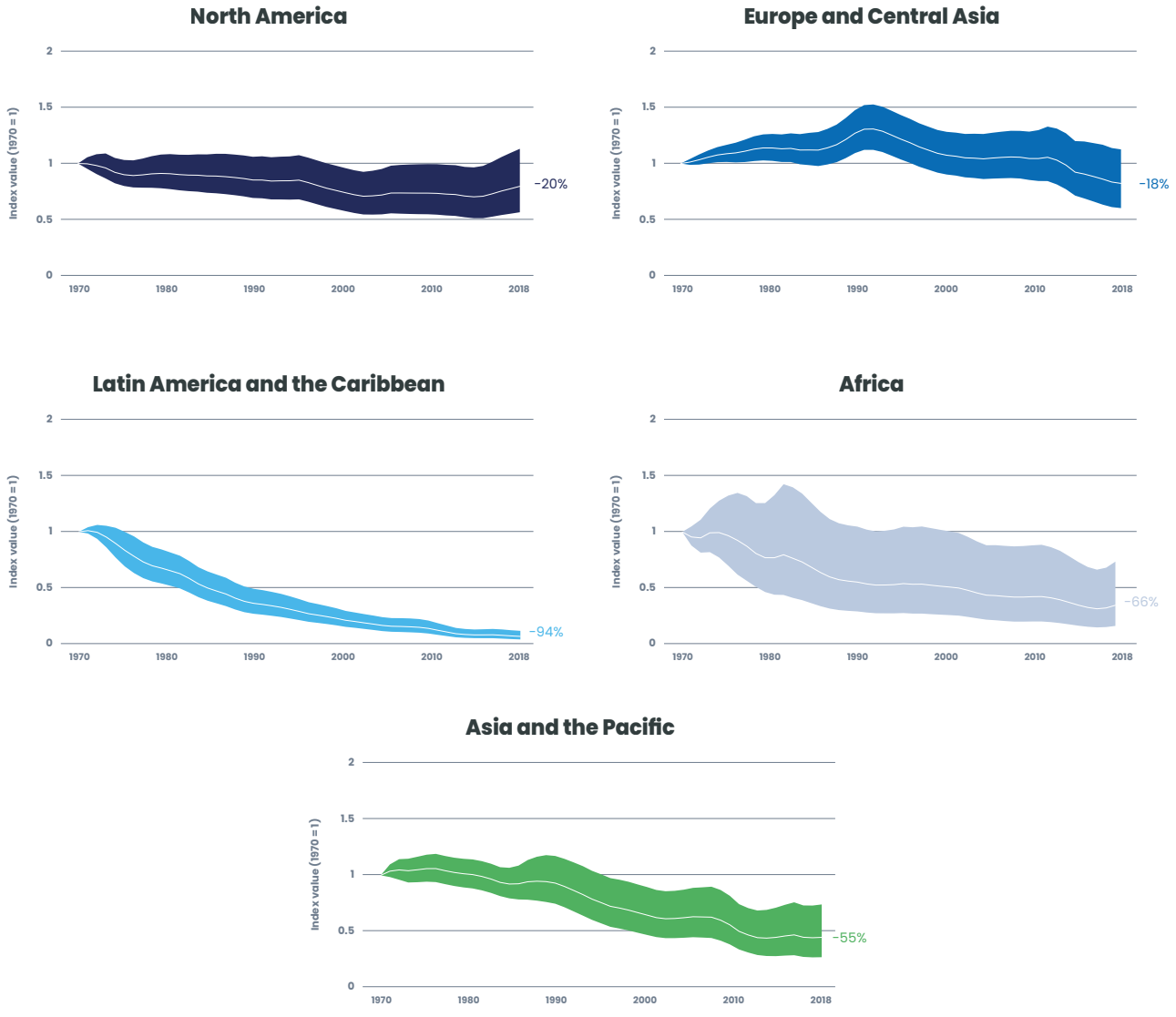
The “illusory” quest for a single indicator

Global warming is generally assessed through a single indicator: CO_2 kg-eq. For biodiversity, on the contrary, there is not one single rigorous comprehensive indicator. The scale and speed of the biodiversity crisis can only be read through a multitude of qualitative and quantitative indicators, at different spatial scales and locations, that are all pointing in the same direction. For example, we can see the biodiversity crisis in the decline of the mass of insects present in Germany's forests by 75% in 30 years[5], in the fact that the surface area urbanized and exploited by human has grown from 10% of the Earth’s surface in 1800 to 50% now[6], or in the fact that 66% of global food production relies on 9 species only[7]. In that sense the quest for a single indicator to evaluate biodiversity loss, let alone biodiversity richness, seems quite “illusory”, as pointed out by Chevassus-au-Louis as early as in 2009[8]. Therefore, assessing biodiversity impacts in a comprehensive manner is likely to require a myriad of indicators, on a wide array of topics and with different angles, in order to account for the systematic complexity of ecosystem integrity.

Location, location, location

The collapse of biodiversity is a global trend, and no ecosystem seems to be spared. However, while the trend is global, its intensity varies by region. In other words, **not all ecosystems are affected in the same way, nor with the same intensity.** The Living Planet indicator produced by the WWF clearly illustrates these regional inequalities. While the average population of different species worldwide has fallen by an average of 69%, this reduction is of 18% for Europe and 20% for North America, but of 55%, 66% and 94% for Asia, Africa and South America, respectively[9].

Figure 2:
Living planet index evolution per region since 1970



Source: WWF LPI

The North/South inequality in the decline of biodiversity that can be observed since the 1970s, is illustrated by many indicators, such as exposure to the impacts of climate change and deforestation. This phenomenon can be attributed to the transfer of the most environmentally damaging and impactful industrial activities from developed countries in the Global North to developing countries in the Global South. This strategic relocation is often motivated by the desire to take advantage of less stringent environmental regulations and lower labor costs in these regions. Consequently, while the Global North may experience a reduction in pollution levels and environmental degradation, the burden is disproportionately shifted to the Global South. This practice not only exacerbates environmental inequalities but also raises ethical concerns regarding the exploitation of vulnerable populations and ecosystems. There are many examples, such as palm oil in Indonesia, soy and cattle in South America, cocoa in West Africa and mining in Northwest China.

Another reason is that Northern countries had already experienced a significant decline in species populations prior to the first Living Planet Index survey in 1970, and thus started off on a lower base level of natural capital.

This underscores the **importance of studying biodiversity at a local scale**, specifically at the level of ecosystems. While some ecosystems span entire countries, like the Amazon rainforest, others are highly concentrated around specific areas. For example, coral reefs cover only 0.2% of the ocean's surface but are home to 25% of marine fish species[10]. These local specificities compel us to consistently contextualize our approach to biodiversity and to shift our perspective to different scales.

Different pressures, one root cause: human activity

The primary catalysts of biodiversity loss are deeply rooted in anthropogenic activities, which have seen a significant escalation in recent decades. In fact, there has been a pronounced escalation in the factors contributing to this loss. The increase in demand for energy, the exponential growth in plastic production, the surge in mass tourism, and the rapid pace of urbanization, among others, have all played pivotal roles. It is the synergy of these human-induced activities that has led to the unprecedented acceleration of biodiversity loss observed in the modern era.

The Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) identifies five major pressures and ranks them in order of importance.

- ***Land Use Change:*** for terrestrial and freshwater ecosystems, land-use change has had the largest relative negative impact on nature since 1970. Agricultural activities have expanded significantly, now covering over a third of Earth's terrestrial regions for farming and livestock raising. This surge, combined with urban areas doubling since 1992 and a remarkable growth in infrastructure due to rising population and consumption, has primarily affected forests (mainly ancient tropical forests), wetlands, and grasslands.
- ***Overexploitation:*** This involves the unsustainable harvesting of resources, exemplified by overfishing, which drastically reduces fish populations and disrupts marine ecosystems.
- ***Climate Change:*** Greenhouse gases emissions alters temperature and precipitation patterns, which in turn affect the distribution and behavior of various species, and can exacerbate other stressors on biodiversity.
- ***Pollution:*** The pervasive presence of pollutants such as pesticides and plastic contaminants pose severe threats to both terrestrial and aquatic life forms.
- ***Invasive Alien Species:*** The damage from invasive non-native species, both fauna and flora, can be catastrophic for ecosystems. This risk is accelerating with globalization, particularly through international freight and travel.

What adds to the complexity is the fact that these drivers are often interconnected, with one exacerbating the impacts of another, leading to a complex web of challenges for biodiversity conservation. In particular, scientists have assessed that at the current trend, climate change could become the first pressure on biodiversity loss by the end of this century. Addressing biodiversity loss requires a holistic understanding of these various pressures and of their origins and interconnections, and more fundamentally a systemic change of our economic models.

Part II – Why should biodiversity matter to investors?

The (financially) invisible foundation of our economies

Nature is everywhere, it is the vital link between all living organisms on this planet, but it is still almost invisible in our economic models. Why? Because nature has always been considered a positive externality, that is and will continue to be available for free. Incidentally, this concept of the positive externalities of biodiversity at large has been recently defined as "**ecosystem services**". While such a utilitarian approach can be criticized, it is one of the most credible attempts at trying to quantify in economic terms the value of biodiversity for our economies.

Biodiversity shows the necessity to consider double materiality

Biodiversity is a perfect case study of how the concept of double materiality is essential to improve the sustainability of our economic models.

The notion of double materiality expresses that our societies both depend on, and impact, biodiversity.

On one hand, **our economies rely on biodiversity** for resources and ecosystem services such as pollination, water purification, and climate regulation, among others. The World Economic Forum in 2020 underscored this dependency, noting that **half of the global GDP**, approximately $44 trillion, **is moderately or highly reliant on nature**. Our food systems are an obvious example of this, as 80% of crops require pollination, and all organisms depend on fertile soil and clean, ample water sources[11].

Simultaneously, the economic activities can potentially harm biodiversity through habitat destruction, pollution, resource over-exploitation, and by contributing to climate change or the spread of invasive species (IPBES). Notably, our food systems are responsible for 40-50% of these negative impacts, primarily through land use changes and excessive exploitation of natural resources[12]. Therefore, diminishing biodiversity presents escalating risks to the sectors that heavily depend on it, creating a detrimental cycle that lies at the heart of our economic relationship with nature.

For investors, this dynamic signifies a pivotal point: **the health of biodiversity directly impacts the value of issuers held in portfolios.** Failing to address biodiversity loss can lead to substantial economic repercussions, threatening the value of investments. Integrating strategically this interconnection in investment decisions means considering both the dependency and the impact on biodiversity. This is key to ensure investments' long-term economic sustainability and profitability.

The concept of double materiality in the financial sector also allows to break down risks associated with nature loss into two categories, that will be of no surprise to climate-conscious investors: physical risks (direct impacts from environmental events) and transition risks (risks associated with the shift towards a more sustainable economy).

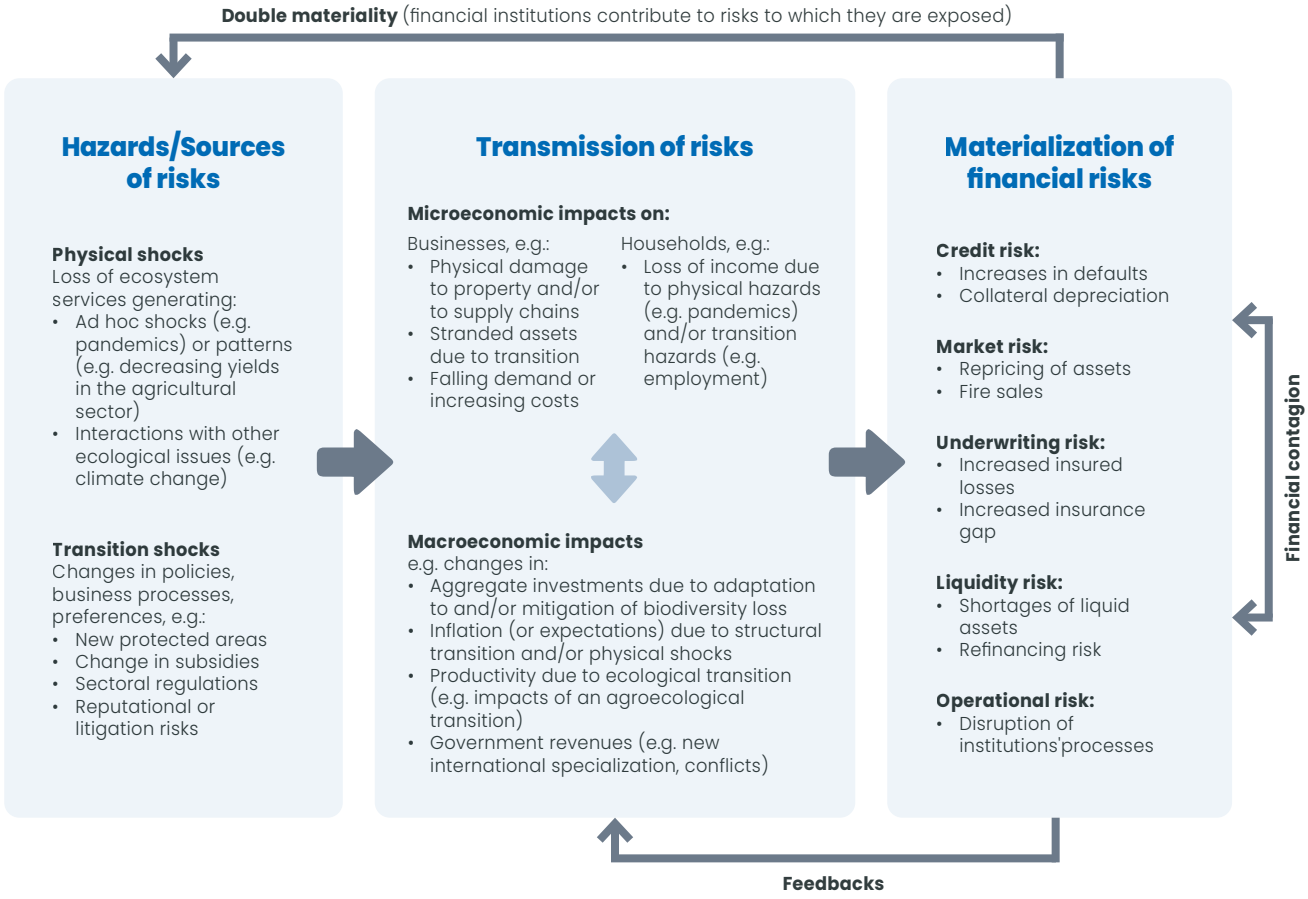
- **Physical risks:** Events like floods, wildfires, or droughts can damage assets or disrupt operations. For instance, a bank might have granted home loans in areas that later become flood-prone due to climate change. If homes are damaged or devalued, homeowners might default on their loans, putting the bank at risk. The 2022 floods in Australia have resulted in 4.3 billion US$ in remediation costs, according to the Insurance Council of Australia[13].
- **Transition risks:** As the world moves towards a greener, more sustainable economy, some businesses or assets might lose value or become obsolete. As regulations tighten and consumer preferences shift, some activities might face challenges or shut down, which could affect investors and banks that have stakes in them.

Government action is essential for biodiversity transition risk to emerge

Contrary to climate change for which both transition and physical risks have impacts on our economic models, it is fair to say that biodiversity risks have been so far concentrated on the physical dimension. Why? Because biodiversity-related regulation remains embryonic and very poorly implemented. But as physical impacts increase, it is very likely that government action will translate into increasing transition risks, both for companies and investors.

Recognising and addressing both physical and transitional risks require a longer-term perspective, challenging the prevailing *modus operandi* of many companies and financial institutions. But this paradigm change when it comes to the role and value of nature in our economies will not happen at the necessary pace and scale without decisive government action. As highlighted by the climate example, translating regulation into transition risks is often the most effective way to move up the needle in terms of corporate and investors' action. Unfortunately, given the history of the Aichi Targets[14], of which only a minority were achieved, there are doubts about the future effectiveness of the Global Biodiversity Framework emerging from the Kunming-Montreal agreement[15], which some consider to be the biodiversity equivalent of the Paris Agreement.

Figure 3:
Analytical framework to explore biodiversity-related financial risks



Source: Banque de France, A "Silent Spring" for the Financial System? Exploring Biodiversity-Related Financial Risks in France, R. Svartzman et al.

Biodiversity loss could also turn into a wide-ranging social crisis

While the global ecological system integrates all living beings and their relationships, every human being relies on the biosphere, yet to a different degree. Some populations are heavily reliant on specific ecosystems for their livelihoods, cultural practices, or basic needs, while others may have more indirect connections. This variation isn't just arbitrary; it stems from a complex interplay of historical, economic, and social factors.

The devastation of natural habitats doesn't affect populations uniformly. Disparities in the extent of this impact reflect deeper issues of social justice and historical power imbalances between developed and developing economies. Although the repercussions of climate change are global in nature, biodiversity loss often manifests more acutely at specific locales. Countries, and more specifically rural areas, that are more dependent on raw materials extraction or food commodities tend to suffer greater impacts from biodiversity loss and more severe related environmental and social consequences. The presence of native or indigenous populations near extraction sites or farming lands can further heighten the social impacts of biodiversity loss, as local communities tend to be more dependent on nature in their livelihoods and culture.

Considering the complex interplay between biodiversity and societal structures, it's imperative for investors, particularly those committed to sustainable practices, to recognize that effective biodiversity strategies must encompass both environmental and social dimensions. This holistic integration is crucial not only for a comprehensive assessment of biodiversity impacts and dependencies, but also for safeguarding the long-term value of their portfolio holdings. In the realm of investment, this means acknowledging that the social impacts linked to biodiversity loss can significantly affect the value of investments. For instance, many commercial activities have a concentration of their biodiversity impacts within their supply chains. These impacts, both direct and indirect, can lead to social repercussions such as community displacement, loss of livelihoods, and deterioration of health conditions, which in turn can trigger regulatory actions, reputational damage, and operational disruptions. Such scenarios can materially impact the value of investments. By proactively addressing biodiversity risks, sustainable investors not only contribute to preserving the natural environment, but also reduce social risks that can significantly impact the value of their portfolio holdings. This is why the mitigation of biodiversity risks should be a strategic priority for investors and regulators.

Part III – Integrating biodiversity into our investments.

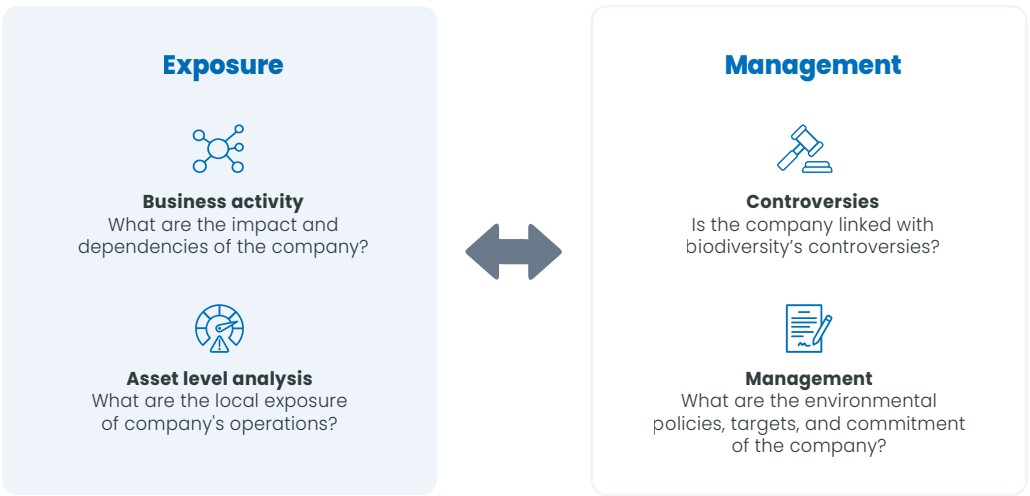
The pillars of our approach

As a crucial environmental issue, biodiversity has always been part of Candriam's ESG framework. In order to strengthen our analytical capabilities and systematise the integration of biodiversity in investment decisions, **we have developed a proprietary model** that aims at addressing the specificities and challenges associated with the evaluation of biodiversity.

Our biodiversity analysis relies on the evaluation of two dimensions:

1. **The company's exposure to biodiversity impacts and dependencies**, based on two complementary levels: the evaluation of the impacts that companies' activities have on biodiversity, and a localised asset-level assessment of the companies' exposure to key biodiversity issues.
2. **The company's management of biodiversity** based on the assessment of the company's strategy and performance and the potential controversies it has faced.

Figure 4:
The pillars of Candriam's biodiversity analysis



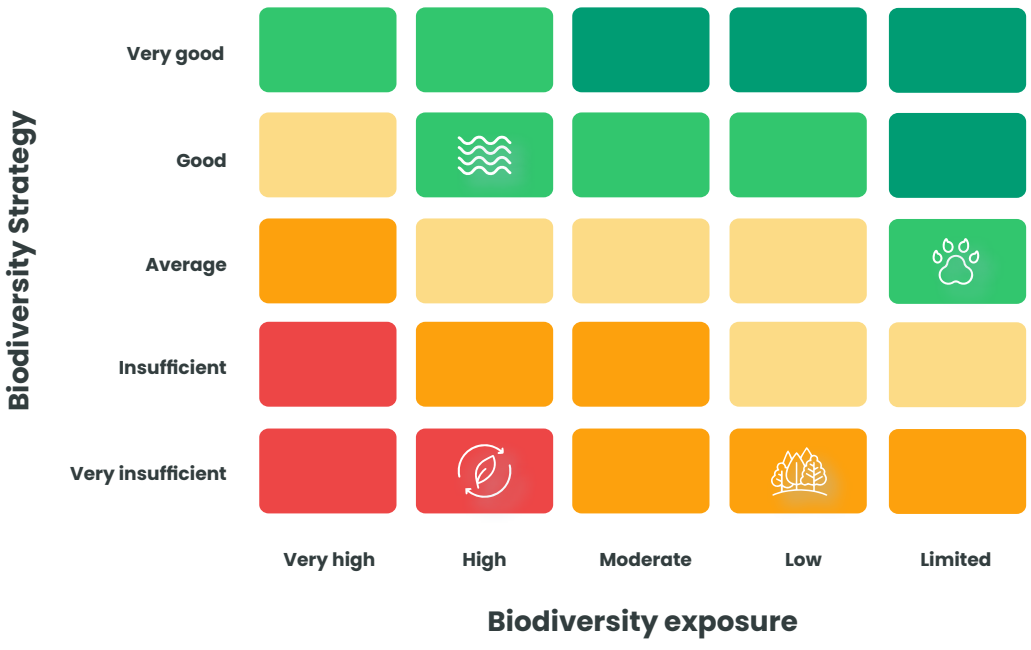
Source: Candriam

Based on this framework, we have built a biodiversity matrix aimed at assessing whether companies have put in place an adequate management of biodiversity based on their specific exposure to biodiversity risks and impacts. Our biodiversity assessment comprises nine key biodiversity sub topics:

1. Water
2. Protected areas
3. Wildlife
4. Local populations
5. Forest
6. Pollution
7. Governance
8. Strategy
9. Restoration

This matrix, besides facilitating the identification of the key biodiversity issues at risk for a given issuer, provides a guide for more accurate and specific engagement with companies which are the most at risk, ultimately leading to improved practices or the exclusion of the company from our sustainable investment universe.

Figure 5:
Candriam's biodiversity matrix



Source: Candriam

This framework allows us to treat biodiversity in a way that goes above and beyond traditional ESG analysis and offer investors a truly material, and thus meaningful, approach to biodiversity risks and impacts.

1. Assessing a company's exposure to biodiversity risks and impacts

a) Assessing the impacts linked to a company's business activities

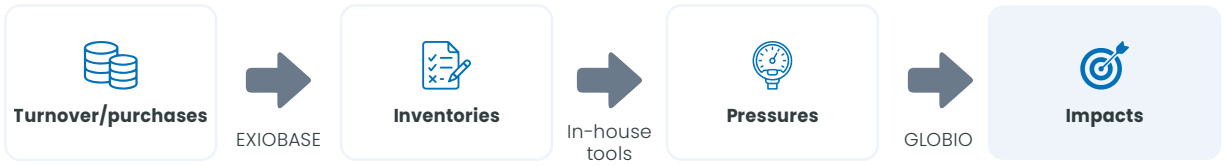
Assessing the impacts and dependencies of a company's activities on biodiversity requires dedicated, sophisticated models. To measure the biodiversity footprint of issuers, Candriam has partnered with the external data provider Carbon4 Finance. Carbon4 Finance, in collaboration with CDC Biodiversité, has developed the BIA-GBS framework[16], an innovative framework which assesses the **biodiversity footprint** of companies (Global Biodiversity ScoreTM) using the "**Mean Species Abundance**" **(MSA) metric**, measured in MSA.km² and MSAppb* (MSA parts per billion). The MSA metric is designed to gauge the extent of ecosystem integrity loss, essentially measuring how much primary ecosystems have been altered or transformed into areas with diminished biodiversity value. For instance, converting 1km² of untouched primary forest into a biodiversity-barren parking lot would result in a biodiversity loss quantified as 1 MSA.km².

The BIA-GBS framework is a top-down model that is based on an input-output methodology that derives biodiversity impacts from companies' breakdown of activities. More specifically, this model uses companies' revenues by activity and region, to derive commodity inventories and related environmental impacts that are ultimately aggregated into an estimate of a biodiversity "footprint" expressed in MSA.km², later converted into MSAppb*. As such, each company, through its activities, is attributed a certain level of ecosystem integrity loss. This number can then be aggregated at portfolio level.

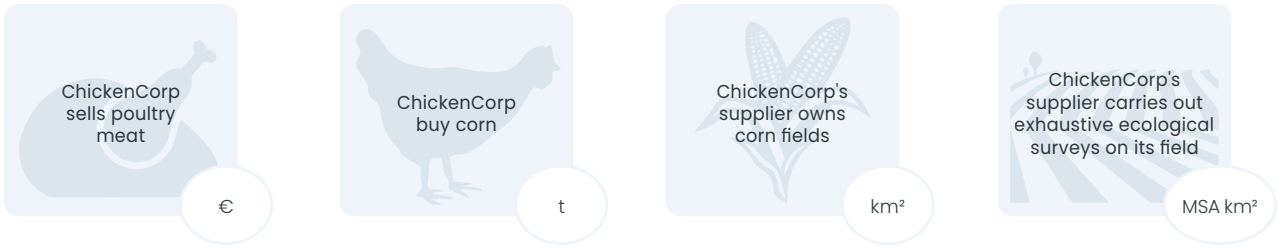
Figure 6:
What is the MSA (Means Species Abundance) metric ?

The unit used by the GBS integrates the MSA on the impacted surface

Biodiversity footprint assessment of a company



Example: Case of a poultry meat business: one of the impacts will relate to poultry feed production



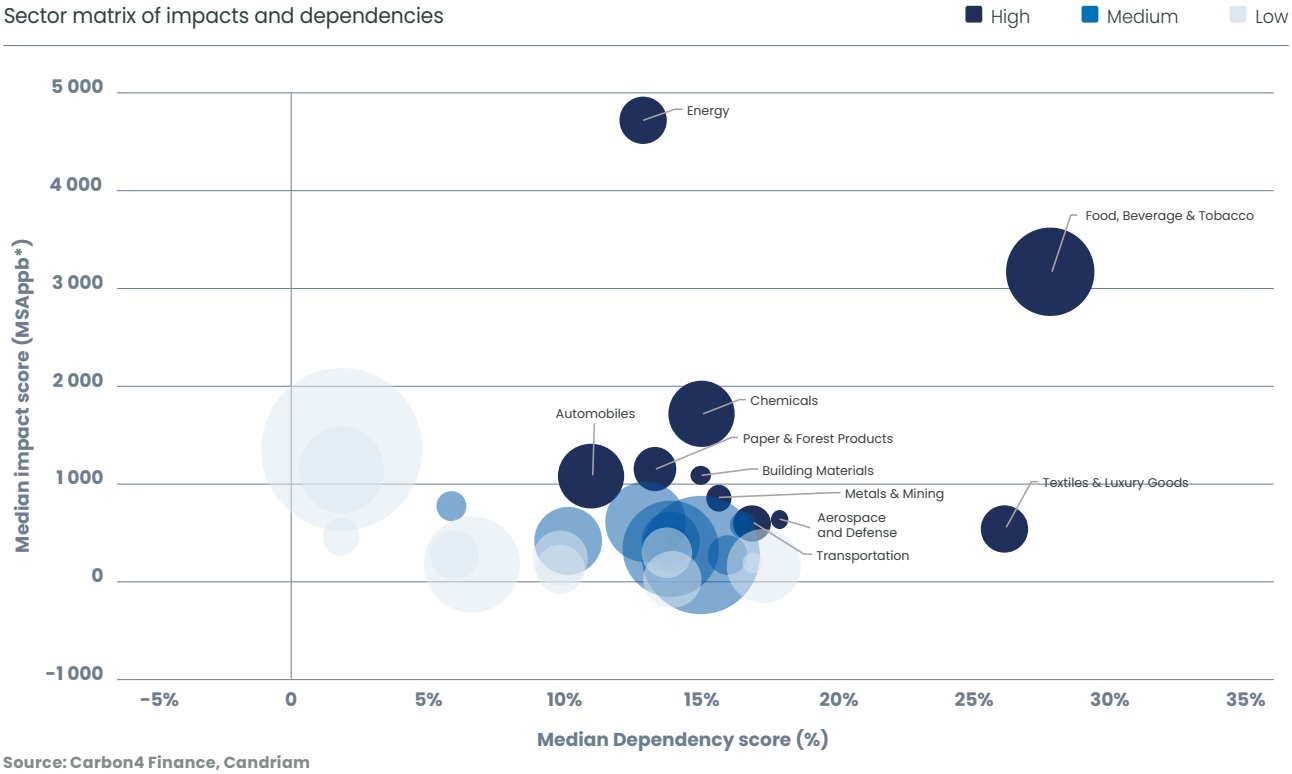
Source: Candriam, CDC, Carbon4 Finance

b) Assessing a company's dependencies on biodiversity

Just like we evaluate companies' impacts on biodiversity, we need to assess their dependencies, i.e. the natural resources and ecosystem services on which companies rely to function. Understanding these dependencies is key to understand the risks companies would face if these natural resources or ecosystem services declined or stopped. The model provides a **dependency table** on 21 ecosystem services, expressed as **a percentage from 0% (low dependency) to 100% (high dependency)**, based on the ENCORE methodology[17]. These two metrics (MSA and dependency) facilitate the creation of an impact/ dependency matrix for an issuer, based on the revenue associated with its business segment by region. Issuers can then be categorized into four groups: High Impact/ High Dependency, High Impact/ Low Dependency, Low Impact/ High Dependency, and Low Impact/ Low Dependency.

Based on this approach, we developed a sectorial matrix that emphasises the sectors of greatest importance according to our classification of companies we invest in. This matrix provides a clear perspective on which sectors should be prioritised in our biodiversity assessments, for model development and in our engagement efforts. The sectors are organised into high, medium, and low stakes based on their impact and dependency assessments.

Figure 7:
Sector matrix of impacts and dependencies



Source: Carbon4 Finance, Candriam

As shown in the matrix, among sectors with high stakes we find energy (with the highest impact score of nearly 5000 MSAppb* and a median dependency score around 13%). Food beverage and tobacco have a median impact score just above 3000 MSAppb* and a high dependency of 28%, while textile and luxury goods have a similar dependency (above 25%) but a low impact score (below 1000 MSAppb*). Chemical, automobiles, metals and mining have low impact scores relative to the sectors previously mentioned (below 2000 MSAppb*) and dependency scores ranging between 10% and 20%.

However, **like many models, the BIA-GBS model has limitations of which we are fully conscious.** As geographical exposure is based on revenue, not actual operations, the geographic data may not represent the real region of activity. For instance, if two companies generate identical turnover in the same commodity and country markets, they are likely to have comparable biodiversity

footprints, as the model does not consider specific locations and companies' practices. While this model provides an order of magnitude of biodiversity destruction linked to activities, it is not an accurate measure of the actual biodiversity impacts an activity has locally. To address these limitations, we complement the model by incorporating a geographic asset-level analysis for issuers with high impact and/or dependency.

c) Assessing companies' localized impacts and/or dependencies

Unlike for carbon, **analysing biodiversity requires a localised approach at the level of a company's assets.** Contrary to CO_2 which has the same warming power anywhere on this planet, biodiversity impacts are very much linked to where the company's operations take place. The construction of a new building won't have the same impacts on biodiversity whether in an urban, already artificialized area or in a biodiversity-rich location, relatively preserved from human activity. It is therefore essential to complement the activity-level footprint expressed in MSA.km², by a geographic model based on the specific location of companies' operating assets. This approach requires to compile the locations of an issuer's operations (mines, industrial sites, offices) with local biodiversity data (water stress, protected areas, species density)[18]. This asset-level approach provides a more nuanced and accurate picture of biodiversity impacts, crucial for making informed investment decisions in line with biodiversity conservation goals.

The data on a company's assets may encompass direct operations, obtained through specific databases such as Carbon Disclosure Project (CDP) or from the company's internal documents. Additionally, the composition of its supply chain may be included when relevant, as is the case in the food and beverage sector. These data are then overlaid on cartographic data produced by

Contrary to CO_2 which has the same warming power anywhere on this planet, biodiversity impacts are very much linked to where the company's operations take place.

research organizations or scientific publications. This overlay enables the extraction of indicators when assessing a condition (e.g., water stress, forest intactness) or a distance when evaluating proximity to a location (e.g., protected areas, indigenous populations).

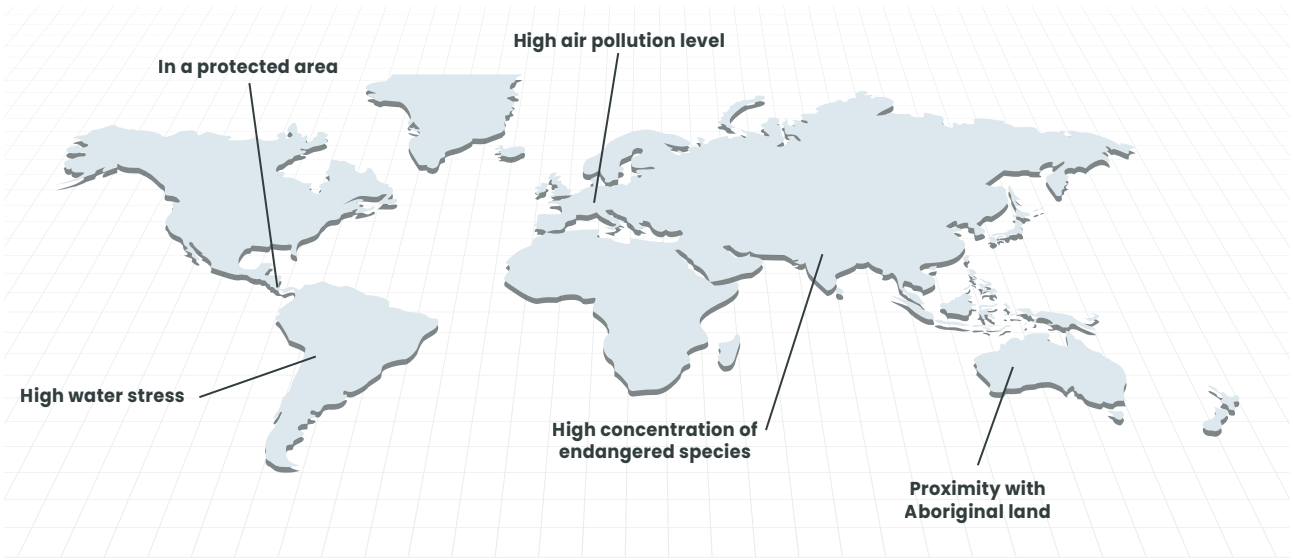
The geographical measurements obtained from this analysis can be classified into six different categories of exposure: exposure to water, protected areas, forest and deforestation risk, wildlife abundance and sensitivity, local population area and pollution within the area.

Figure 8:
The six categories of companies' exposure

Source: Candriam

Collecting this data provides a clear mapping of the biodiversity risks and impacts the company is most exposed to, relative to its business activities and for each operation. For instance, an issuer with high water usage can pinpoint sites located in water-stressed areas.

Figure 9:
Example: Geographical mapping of biodiversity issues



Source: Candriam

2. Assessing companies' biodiversity management

The second dimension of our biodiversity model evaluates how a company manages its biodiversity impacts and dependencies. This assessment is based on both an evaluation of the company's biodiversity strategy and an in-depth review of the controversies it has faced that serve as the best revelator of the potential shortcomings in the company's management of biodiversity-related issues.

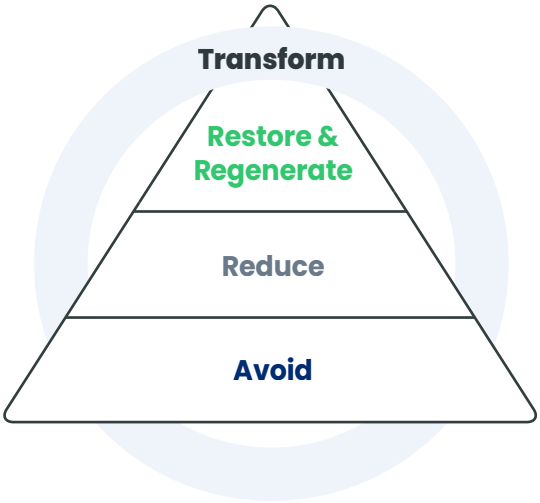
a) Assessing a company's biodiversity strategy

Based on detailed biodiversity data and metrics derived from exposure analysis, we can identify an issuer's exposure to various biodiversity aspects. We then analyse this exposure in the context of the issuer's management practices and policies to address these challenges. Our approach follows the AR3T methodology developed by the Science Based Targets network (SBTn), which organizes practices in a hierarchical manner:

- **Avoid** is the priority type of action a company should undertake when seeking to limit its impacts on biodiversity. Avoiding negative impacts on nature supposes intensive efforts in initial assessments and adequate anticipation and planning.

- **Reduce** considers the diminution of negative biodiversity impact in comparison with its baseline value. The difference between avoidance and reduction is often a matter of baseline assessment.
- **Restore (and Regenerate)** can be seen as « positive impacts », but restoration supposes that biodiversity loss has already happened. Although necessary, long-term outcomes of restoration can be uncertain. Restoration must be considered only after avoidance and reduction actions
- **Transform** defines the company's capacity to improve its environmental performance and transform its activity/business model in order to avoid/ reduce its impacts on biodiversity

Figure 10:
AR3T Action Framework



Source: SBTn

Based on this analytical framework, we have developed a set of criteria to define the level of biodiversity management in a company for each biodiversity-related theme. These criteria vary depending on the sector, and sometimes the specific industrial sub-sector of the analysed company. All the criteria within a category must be validated to progress to the next higher category. Consequently, environmental management cannot be considered good if even a single prerequisite is not met (such as the absence of controversy related to the analysed theme).

Figure 11:
Example: Assessment framework for the management of water risks and impacts

Management aspects	Criteria
Governance and Disclosure	Governance Structure (oversight and execution on water strategy) Incentives (objectives in remuneration) Water-related disclosure (completeness & relevance of metrics)
Water strategy and targets	Materiality assessment Water policy Resources allocated Targets and metrics (expecting localized approach at least on hotspots)
Risk assessment and Management	Water risk assessment Quantification of financial impact (including scenario where relevant)
Performance	Company progress on KPIs (expecting localized approach at least on hotspots)
Controversies	Violation of environmental laws Financial penalties Conflict with local populations

Source: Candriam

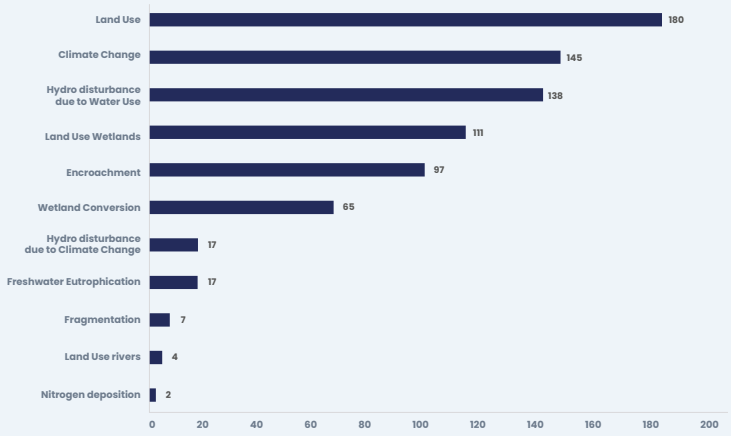
b) Evaluating biodiversity-related controversies

Given our current understanding of biodiversity and the intrinsic connections between its various elements and human beings, corporate publication levels are insufficient, either due to a lack of transparency or to a lack of standardised tools and methods. In this context, **analysing controversies remains one of the best methods to assess a company's environmental and social management,** taking into account the direct consequences of its actions.

"Controversies" here refer to the cases of pollution or environmental damages and the conflicts associated with local stakeholders. When a controversy is revealed or gains significant attention, it can be discussed with the company to evaluate its response strategies. Controversies can also lead to exclusion if they indicate a serious failure to respect nature and human rights. Our analysis also takes into account geographical exposure, as it often reveals a company's glaring oversight of risks despite operating in sensitive areas.

Case Study : Biodiversity footprint of a mining company

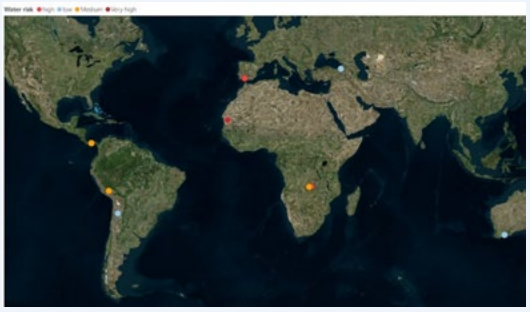
Figure 12:
Impact and dependencies



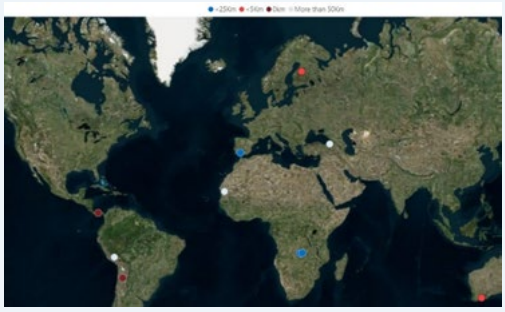
Source: GBS model

The analysis reveals that as a mining entity, the company has significant impact on land use, hydro disturbance, and climate change. Furthermore, it is heavily reliant on water resources and climate regulation. Using geographic analysis tools, it is possible to evaluate the water risk associated with each of the company's assets, as well as their proximity to protected areas. This approach enables a more granular understanding of the environmental impact of the company's operations, particularly in relation to water resources and ecological conservation.

Water risk map



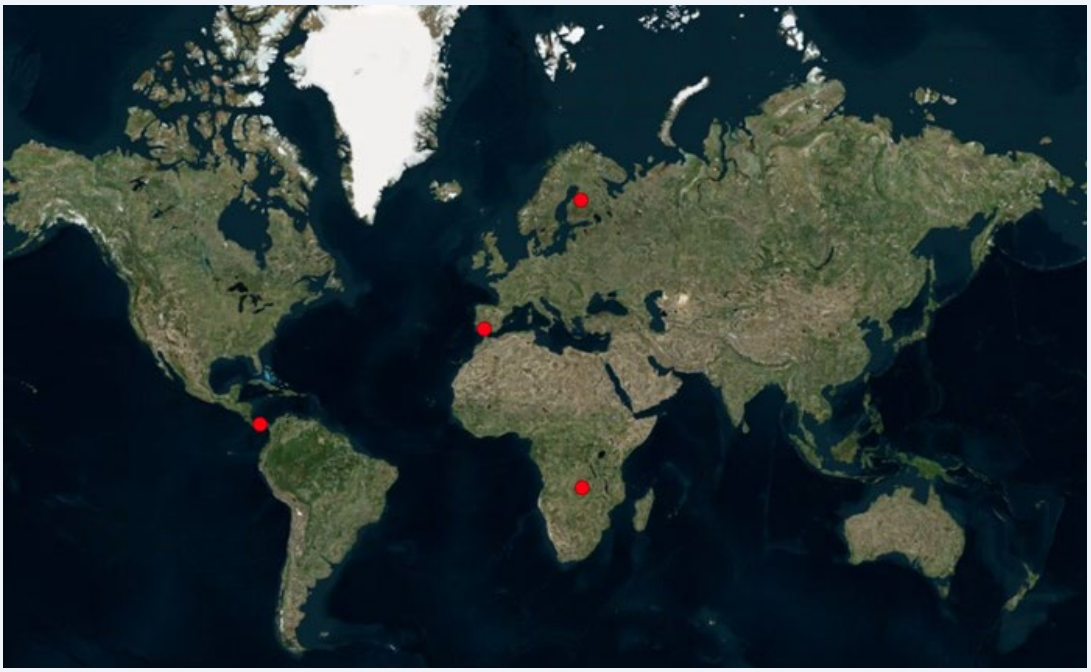
Protected areas proximity



Source: Candriam, WRI Aqueduc, OpenStreetMap

In this analysis, it is observed that certain assets of the firm are situated in regions characterised by high water risk, while others are located within protected zones. This knowledge facilitates engagement with the company to assess whether its environmental management strategies align with the identified risks. Upon evaluating the company's environmental management practices, it becomes apparent that its policies and disclosures regarding water usage are inadequate. Additionally, there are contentious issues surrounding operations in protected areas, potentially jeopardising the operational licenses for those specific mines.

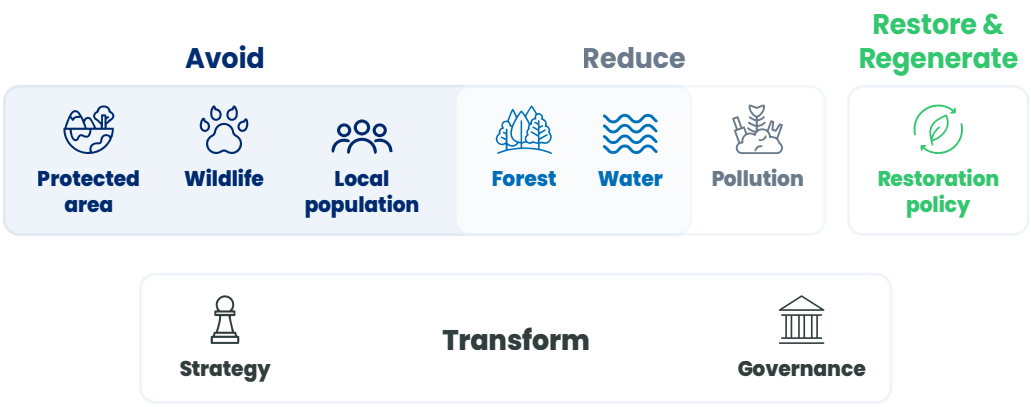
Assets where environmental or social controversies have been flagged by EJatlas NGO.

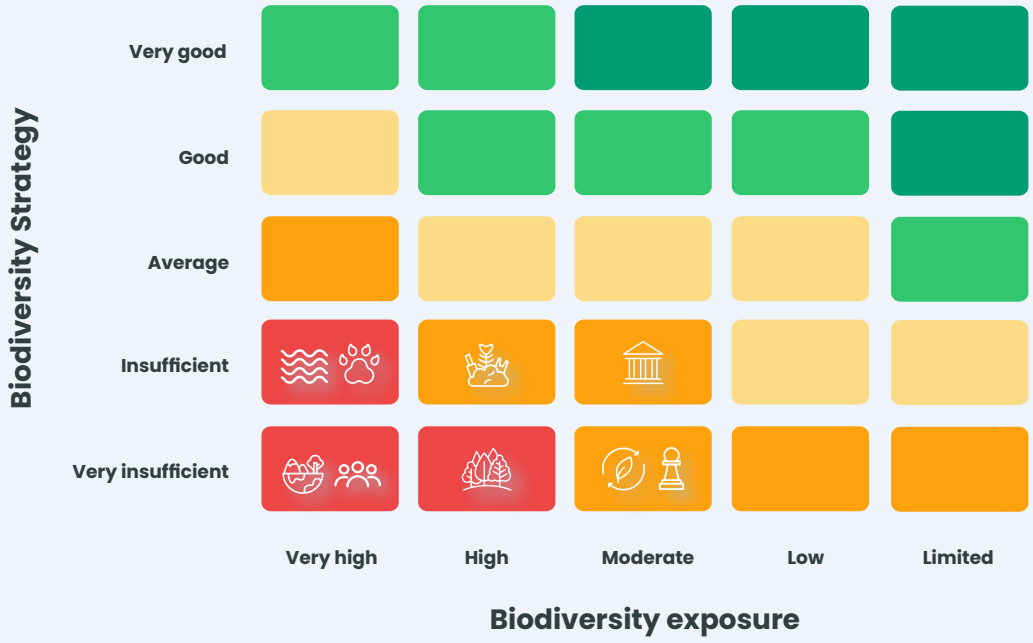


Source: EJ Atlas

Upon juxtaposing these two levels of information, it becomes clear that the company could not have been unaware of the sensitivity of the areas in which it operates. In that case, the prevalence of controversies suggests a deficiency in the company's environmental management and its engagement with local communities.

Following its analysis, Candriam engaged with the company regarding the measures and implementations of risk management within the company's policy. However, the engagement was unsuccessful, and Candriam deemed the company's biodiversity strategy insufficient given the risks involved. As a result, the company was excluded from Candriam's sustainable investment universe. One year later, the company's stock value dropped by 50% due to a controversy related to biodiversity.





Limits to our model: the challenge of covering all the blind spots

It is crucial to clarify the constraints of our approach. **In biodiversity analysis, the intrinsic nature of the topic demands specific assumptions and decisions that profoundly influence the final results.** With our geographic methodology, when combined with Carbon4 Finance's impact measurement, the challenge lies in the scope of the geographic model. As it stands, the C4F database covers 6,500 issuers, while the geographic approach accounts for only 600. Therefore, the limiting factor in the analysis is the collection of geographic data from companies and various data collection methods are necessary: carbon data, company annual reports, web scraping, etc. We anticipate that advances in transparency regulations and disclosure will simplify this issue, and we expect a significant increase in coverage in the coming years. However, it's essential to note that the geographic analysis might not be the most relevant for all sectors. For industries with an indirect impact on biodiversity, such as banking or media, the analysis will require a different approach, which we need to formalise.

Moreover, the model does not yet adequately incorporate the supply chain associated with each analysed company. Many companies in the agri-food sector have an incomplete analysis since much of the impact is in the supply chain, where geography can be crucial for issues like deforestation and human rights. The supply chain can be modelled at the commodity level for some very transparent large companies, but this remains an exception in the current state of the model.

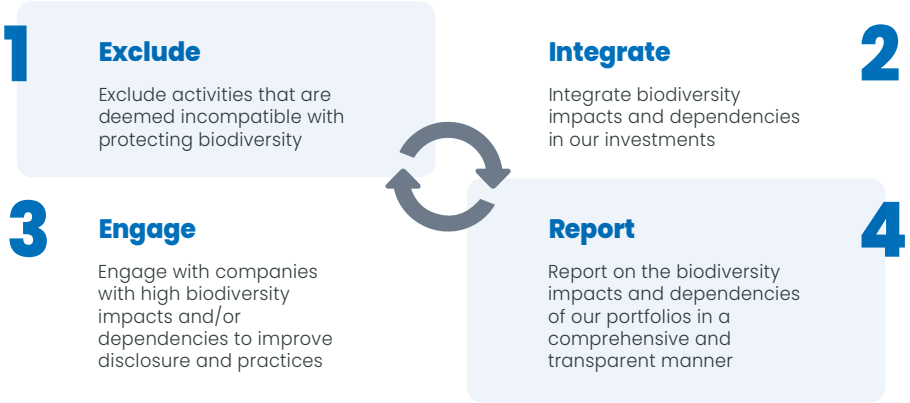
Finally, the evaluation of environmental management faces the existing limitations of corporate control, in terms of certification issuance or compliance, especially with international norms and standards. In many cases, it relies mainly on companies' internal controls, while independent third-party verifications can be rare or subject to conflicts of interest.

Part IV – Taking action: our Biodiversity Strategy.

The implementation of Candriam's biodiversity strategy is anchored in four fundamental steps integrated in our investment processes. These steps include:

1. excluding companies that are incompatible with biodiversity preservation,
2. integrating biodiversity analysis into our investment strategy via our dedicated model,
3. engaging with companies that represent the largest impacts, exposures, or controversies,
4. reporting and monitoring our impacts and dependencies across our investments.

Figure 13:
The four pillars of Candriam's Biodiversity Strategy



Source: Candriam

1. Excluding companies whose activities and/or practices are incompatible with biodiversity preservation

In relation with our biodiversity preservation commitment, we exclude from our sustainable strategies (article 9 funds), companies that are involved in activities of practices that are deemed incompatible with biodiversity protection.

a. Excluding companies' that are conducting harmful activities for biodiversity

Pesticides production: The global use of pesticides is increasingly implicated in a range of ecological disasters. Assessing the full extent of these impacts is challenging, yet the evidence points towards significant and non-negligible consequences. These include the potential role of pesticides in the mass extinction of insects in Europe over the past 30 years, detrimental effects on workers' health, deterioration of water quality, and adverse impacts on communities adjacent to agricultural areas and end consumers. Within the broader agenda of agricultural reform, prioritising the reduction of pesticide use and its associated risks is imperative. In alignment with this goal, Candriam excludes all producers of pesticides from its sustainable investment universe.

Exclusion criteria : 1% of revenue derived from pesticide production for the agro-chemical sector

GMO (Genetically Modified Organisms) production: The business models and practices associated with GMO production have resulted in the homogenisation of crops, creating a dependency on the providers of these genetically modified seeds. Moreover, the ecological impacts of this approach are significant and include the disruption of ecosystem dynamics, the promotion of monoculture practices, and adverse effects on species not targeted by the GMO traits. Similarly to pesticide production, issuers involved in the production of the GMO are excluded from our sustainable investment universe.

Exclusion criteria : 1% of revenue derived from GMO production

Deep sea mining: In the context of energy transition, there is an anticipated surge in the demand for metals. This prospect is driving some producers towards innovative, yet potentially harmful, extraction methods such as deep sea mining. Given the current understanding of the potential impacts of such activities, coupled with international opposition to these practices, Candriam has decided to exclude deep sea mining activities from its sustainable investment universe.

Exclusion criteria : any direct involvement in deep sea mining projects, exploration and operation

Riverine and aquatic tailings disposal: Aquatic tailings disposal, a process where mine waste is deposited into natural water bodies, results in the physical degradation of aquatic habitats. This practice disrupts the delicate balance of ecosystems, significantly impacting both plant and animal life that rely on these habitats for survival. Given the extensive environmental impacts of this technique, companies using aquatic tailings disposal are excluded from our sustainable investment universe.

Exclusion criteria : any involvement in riverine and aquatic tailing disposal practices

Deforestation-Linked Commodities: Our strategy is aligned with the most recent legislative developments in Europe, specifically the new law on imported deforestation (European Parliament, 2022). Each company exposed to commodities at risk of deforestation will be subject to an engagement campaign. Companies that do not meet the European regulatory requirements on imported deforestation, or if the engagement campaign yields a negative outcome, will be excluded from our sustainable investment universe. Similarly, companies not subject to this regulation but failing to meet transparency or practice standards regarding high-risk deforestation commodities will also be excluded from investment if the engagement campaign is unsuccessful. The concerned commodities include cattle, cocoa, coffee, palm oil, soy, wood, rubber, charcoal, and printed paper products.

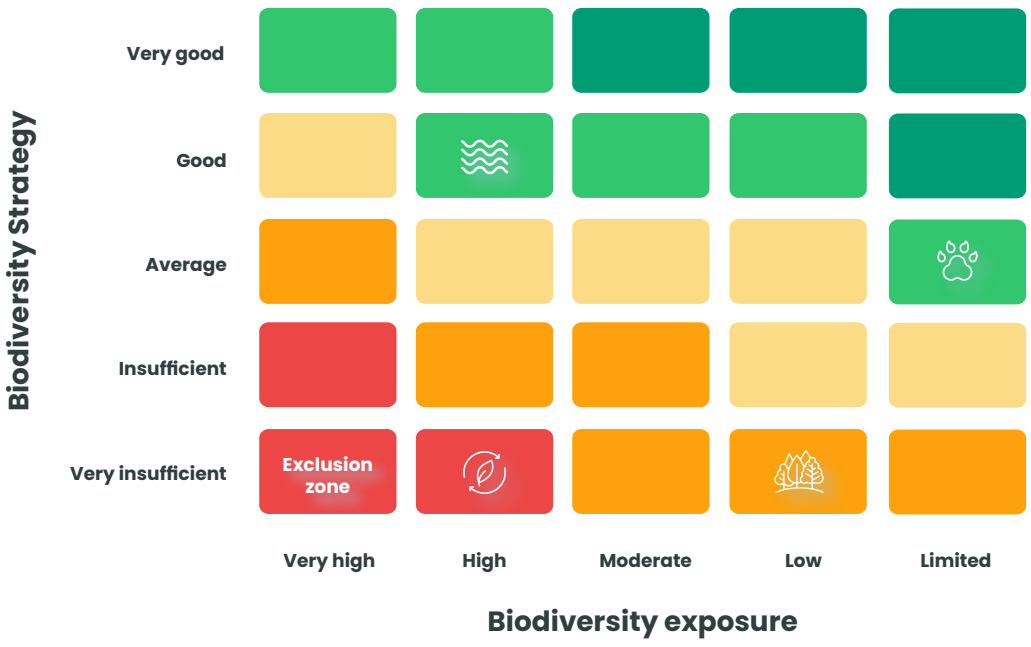
Exclusion criteria: Companies with high deforestation risk that have not been responsive to Candriam's engagement campaign.

b. Excluding companies' that have demonstrated harmful practices to biodiversity

Our biodiversity analysis model assesses the relevance of a company's biodiversity management in relation to the impact and dependencies of its business model on nature, as well as the local geographical context of its operations. If there is a deficiency in the company's management, or if the AR3T framework is not properly applied, or if environmental controversies indicate a manifest problem, then the company will be flagged as having demonstrated "very insufficient" management of biodiversity. In such cases, we will engage with the company on the relevant issues and support or submit environmental resolutions requiring better disclosure and management. If the engagement is not satisfactory, or if the biodiversity risk is too high, the issuer will be excluded from the sustainable investment universe (article 9 funds under SFDR classification).

Companies for which we have assessed topics in "very insufficient" and "very high" categories are excluded from our article 9 funds.

Figure 14:
Exclusion based on Candriam's biodiversity matrix



Source: Candriam

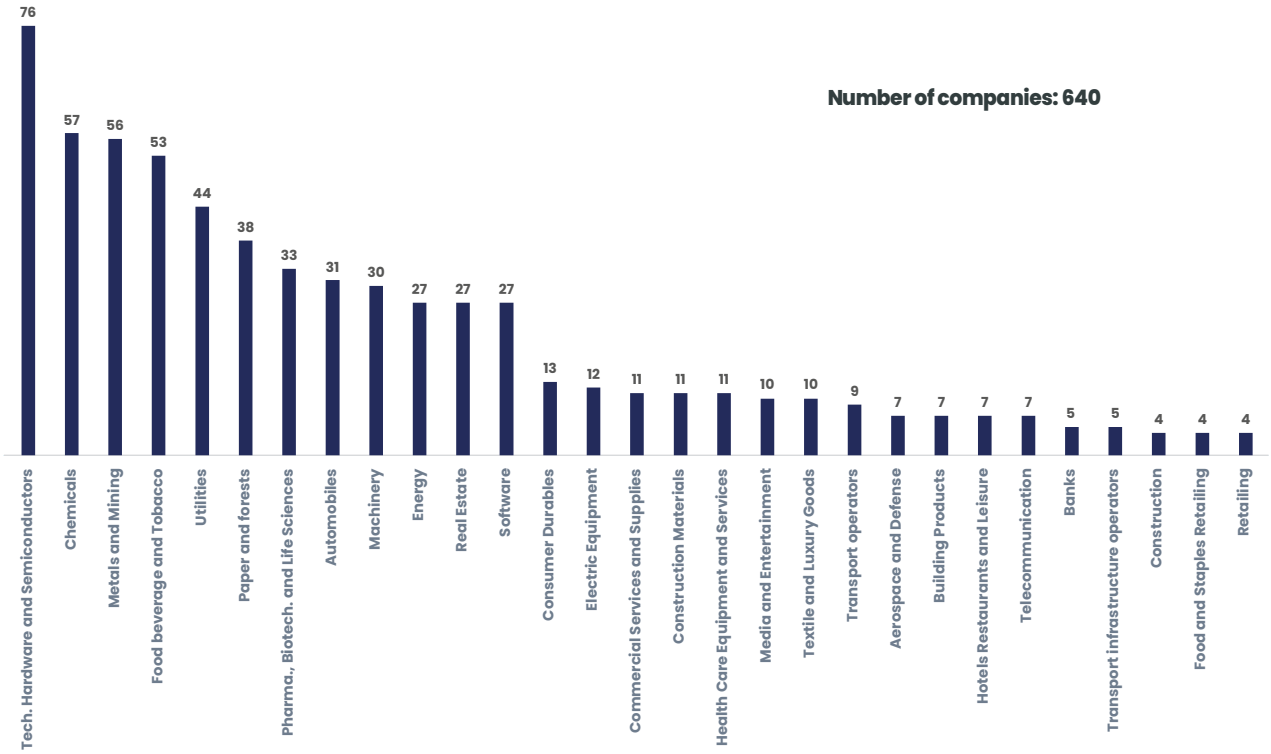
2. Integrating biodiversity in our ESG framework and investments

Our Biodiversity Model is integrated into the fundamental ESG analysis of companies on a sector dependent basis . This enables to select for each sector the most material biodiversity related topics and the management practices that we expect from companies.

All companies that are considered High stake from a biodiversity standpoint need to be covered by our specific biodiversity module, which assesses both biodiversity exposure and biodiversity management.

The weight given to biodiversity related criteria in our ESG assessment is based on our biodiversity exposure analysis, taking into account both impacts and dependencies.

Figure 15:
Coverage by the asset level framework by sector



Source: Candriam

Incorporating this new approach into our ESG framework involves overcoming numerous challenges. Carbon4 Finance BIA-GBS coverage include 80% of the positions in our sustainable strategies (article 9 funds). However, the asset-level analysis is a limiting factor, due to the complexity of collecting localised data for each company.

The collection of corporate asset data can indeed prove to be complicated. This task can be very time-consuming, as data collection sometimes needs to be conducted manually based on fragmented and dispersed information. This becomes even more challenging when dealing with the supply chains of companies. This difficulty explains the limited coverage of the geographic model compared to data derived from C4F, which is based on company revenues. Due to these challenges, the implementation will be gradual but will have clear objectives. As of the end of 2023, only 640 companies are covered with asset-level data. It's important to note that these data are relevant for the analysis of impacts and dependencies in sectors where geographic exposure has revealed high materiality. Service industry sectors are then minimally affected by this approach.

Objective: Conduct a full biodiversity assessment (including geographical) on all companies in high stake sectors within our sustainable strategies by 2025.

3. Engaging with companies that face biodiversity challenges

Direct dialogue with companies

Following our analysis using our biodiversity model, we are able to identify significant risk elements in sub-themes related to biodiversity, such as water resources, deforestation, pollution, etc. This analysis enables us to pinpoint priority targets for biodiversity engagement, as well as preferred engagement topics.

In this context, we will conduct thematic engagement campaigns on specific issues like water, deforestation, and disclosure. This engagement process involves several stages, beginning with an initial contact with the company to gather more information and ensure transparency on the pertinent issue. This is followed by a dialogue to assess whether the management's response to the identified risks is credible and appropriate. An escalation process is also feasible, including the possibility of impacting our vote at the Annual General

Meeting and proposing resolutions at these meetings to influence the company's biodiversity policies. In the event of a failed engagement or a lack of response from the company, Candriam may decide to exclude the company from its sustainable investment universe.

Objective: by end of 2025, having launched specific biodiversity engagement with the top 20 companies facing the highest level of biodiversity risks and impacts in our sustainable strategies

Taking part in collaborative initiatives

Integrating biodiversity into our investment strategy also means working with a wide range of players and stakeholders. With this in mind, Candriam joined a number of initiatives and working groups in 2023.

Candriam is a member of the **UNPRI Workshop on Nature Reference Group**. We have already showcased our methodology within this platform, aiming to disseminate knowledge and best practices to fellow investors. We firmly believe that collaborative efforts, particularly knowledge sharing, are crucial in addressing the pressing challenge of biodiversity loss, given its vast scope.

In September 2023, Candriam joined the **Nature Action 100 initiative (NA100)**, a collaborative effort orchestrated by Ceres and the Institutional Investors Group on Climate Change (IIGCC). This initiative coordinates engagement on biodiversity-related issues with a select group of 100 companies among the ones having the most significant impacts on ecosystems. Our aspiration is that this initiative will follow the same trajectory as CA100+ and will lead, for the involved companies, to greater ambitions, ambitious targets and a strict implementation of best practices.

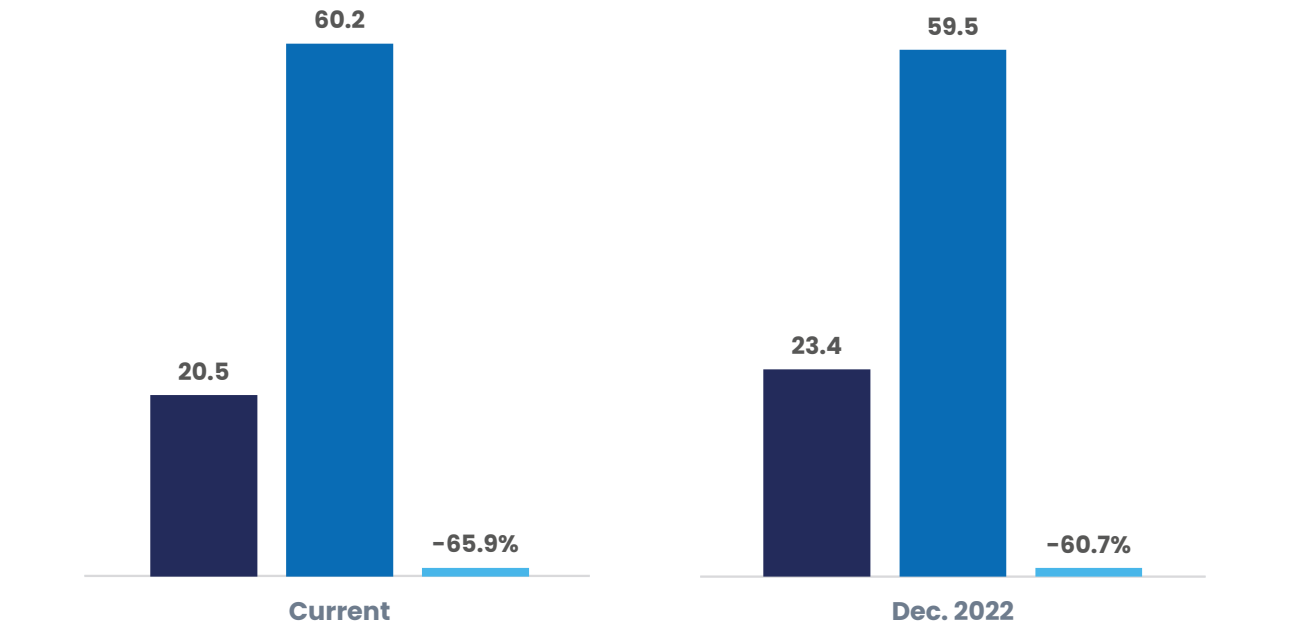
4. Reporting transparently on our biodiversity risks and impacts

As part of our biodiversity commitment, Candriam commits to reporting in the most transparent manner on our biodiversity impacts and risks Our objective is to report on the biodiversity footprint of every fund, starting with sustainability strategies. We have selected Terrestrial static impacts as the most relevant KPI to provide a first assessment of the overall impacts and allow for comparison with benchmark. We will publish this information with

the breakdown of impact sources (climate change, land use). The terrestrial static footprint, calculated using msa.km2 cannot be considered however as a performance indicator, and alike carbon footprint is very heavily biased by sectors.

We will thus progressively complement this indicator with additional relevant information from our biodiversity model, once coverage is sufficient, in order to provide a more performance than exposure view of biodiversity impacts.

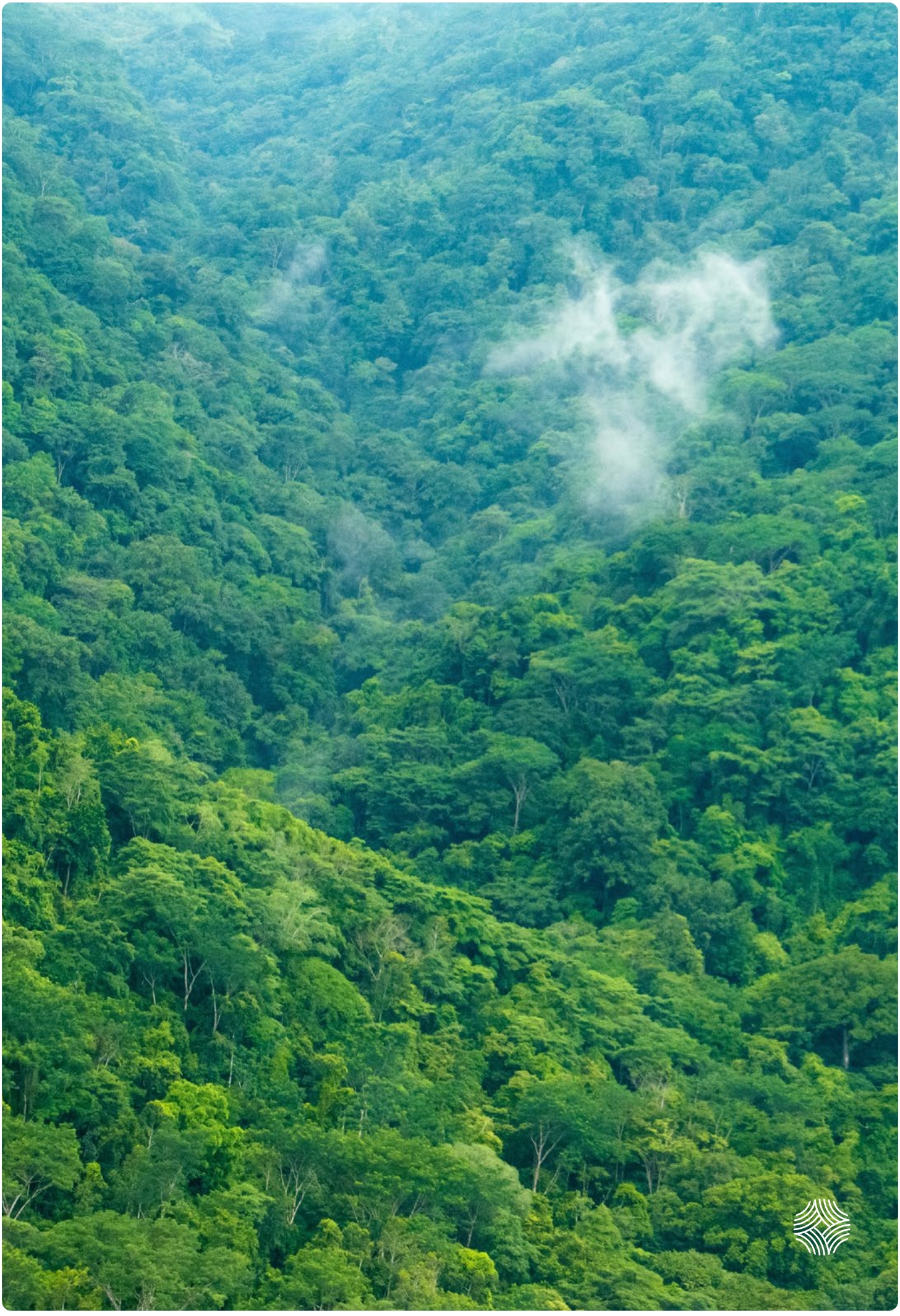
Figure 16:
Example of a portfolio's biodiversity footprint assessment vs benchmark



Source: Candriam, GBS model

Objective: by end of 2025, publishing the biodiversity "footprint" of each of our sustainable strategies in the regular fund reporting

In 2023, the Taskforce on Nature-related Financial Disclosures (TNFD) published its final framework for biodiversity reporting, and Candriam has become an "Early adopter". This framework is aimed at businesses and financial institutions, with the goals of standardizing biodiversity disclosures and promoting greater transparency in impact and dependency measures. **Candriam has committed to publishing a TNFD report by 2024** covering all its invested activities. This TNFD reporting framework will standardise financial reporting on biodiversity and nature, and demonstrate transparency across our entire approach.



Conclusion: On a path of progress.

Candriam's biodiversity policy is a testament to our commitment to transparency and action in addressing the urgent challenge of the sixth mass extinction. Recognising biodiversity as a critical consideration for investors, we acknowledge its double materiality: protecting the value of portfolios from biodiversity risks while simultaneously limiting the negative impact of investments on biodiversity, thereby helping to further mitigate these risks.

The need to redefine our relationship with nature is paramount, and for investors, this translates into integrating biodiversity considerations into investment strategies. However, the complexity of this issue cannot be understated. Biodiversity challenges are multifaceted, involving intricate ecological, geographical, and social dimensions. Current approaches, while valuable, often fall short in addressing these complexities due to their generic nature and lack of specificity.

We believe that the path forward requires transcending traditional methods and developing a dedicated model that addresses the unique aspects of biodiversity issues recognising that the right approach should be local and context-specific. In response to this need, Candriam has developed a proprietary biodiversity framework, designed to navigate the complexities of biodiversity in investment decision-making and allowing for a more nuanced and effective approach to biodiversity integration.

This biodiversity strategy represents a crucial step in integrating biodiversity in our investments. But it is far from the end of our journey and our biodiversity model will continue evolve to integrate a larger set of topics and indicators, when reliable data becomes available. We are certain it will constitute a key tool to anticipate biodiversity risks and limit our negative biodiversity impacts, hence contributing to deliver on our commitment to create sustainable value for our clients.

As part of our TNFD commitment, we will report annually on our progress in implementing our biodiversity strategy, and in the meantime, we welcome any question or feedback you may have.

Notes & References.

1 The AR3T approach (Avoid, Reduce, Restore & Regenerate, Transform) from the Science-Based Target network, see Part III

2 Philosopher, ecologist, CNRS

3 Professor Emeritus at Museum d'Histoire Naturelle, Paris, France

4 Natural History Museum. What is mass extinction and are we facing a sixth one?, nhm.ac.uk, https://www.nhm.ac.uk/discover/what-is-mass-extinction-and-are-we-facing-a-sixth-one.html

5 Hallmann, C. A. et al. More than 75 percent decline over 27 years in total flying insect biomass in protected areas. PLoS ONE

6 Anthromes working group

7 FAO, Biodiversity for Food and Agriculture report 2019

8 Chevassus-au-Louis, B., Salles, J.-M., Pujol, J.-L. et al., 2009. Approche économique de la biodiversité et des services liés aux écosystèmes : contribution à la décision publique.

9 Living Planet Report 2022, WWF/ZSL

10 UNEP, Status of coral reefs of the world 2020 report

11 IPBES (2019): Global assessment report on biodiversity and ecosystem services of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services. E. S. Brondizio, J. Settele, S. Díaz, and H. T. Ngo (editors). IPBES secretariat, Bonn, Germany.

ences.

12 IPBES

13 Insurance council of Australia, News release 3 May 2022, "Updated data shows 2022 flood was Australia's costliest"

14 Global warming is generally assessed through a single indicator: global temperature. For biodiversity, on the contrary, there is not one single rigorous comprehensive indicator. The scale and speed of the biodiversity crisis can only be read through a multitude of qualitative and quantitative indicators.

15 The Kunming-Montreal Global Diversity Framework, agreed at the 15th meeting of the Conference of Parties to the UN Convention on Biological Diversity, 2022

16 The Biodiversity Impact Analytics powered by the Global Biodiversity ScoreTM (BIA-GBS) allows to measure the biodiversity impact and dependencies of companies and sovereign entities.

17 ENCORE (Exploring Natural Capital Opportunities, Risks and Exposure) is a free, online tool that helps organisations explore their exposure to nature-related risk and take the first steps to understand their dependencies and impacts on nature. https://encorenature.org/en

18 All the geographic information and algorithms are compiled through QGIS software, an opensource software that allows the manipulation of cartographic and geographic data.

€149 B

AUM at end June 2024*

600

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+ 25 years

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*As of 31/12/2022, Candriam changed the Assets Under Management (AUM) calculation methodology, and AUM now includes certain assets, such as non-discretionary AUM, external fund selection, overlay services, including ESG screening services, [advisory consulting] services, white labeling services, and model portfolio delivery services that do not qualify as Regulatory Assets Under Management, as defined in the SEC's Form ADV. AUM is reported in USD. AUM not denominated in USD is converted at the spot rate as of 30/06/2024.

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