Nature as an asset: the relevance of biodiversity for investors

Many investors are starting to integrate nature and biodiversity risks and opportunities into their investment decision.[1] In this piece, we discuss the magnitude and sources of nature-related risks, and the reasons for greater investor awareness.

See box of definitions on page 6 for definitions of nature-related terms used throughout the document.

Introduction

Nature is a critical asset that underpins the functioning of many economic activities[2] and supports human activities. Ecosystem services such as clean water, fertile soil, pollination, and climate regulation are essential for the continuity and resilience of many business operations and supply chains. The Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) estimates that more than half of global gross domestic product—over $50 trillion of annual economic activity around the world[3]—is moderately to highly dependent on nature. As these natural ecosystems face increasing degradation, the risks to companies that are highly dependent on them could grow ever more prominent if left unmanaged.

Our investment thesis

Companies with high exposure to biodiversity loss or ecosystem disruption along their value chain may face operational, reputational, and supply chain risks that could be financially material. As a result, for some investors, this means that understanding such dependencies of their portfolio companies can be seen as a key component of managing financial risks in their portfolios.

The direct link between nature and business: our investment thesis explained

Nature degradation and biodiversity loss is happening at an accelerating rate.[4] When ecosystems fail to deliver the services on which a company relies, its dependency on nature could give rise to financial risks, such as increased costs, reduced production and disrupted supply chains. The financial materiality of nature dependencies for companies is driven not only by *which* ecosystem services they depend on, but also by *how much* they depend on these services, and by *where* those dependencies are located. These elements are aligned with locating, evaluating and assessing phases of the Taskforce for Nature-related Financial Disclosure (TNFD)'s LEAP (Locate, Evaluate, Assess and Prepare) approach.[5] When sufficiently material, such dependencies could potentially translate into risks not only to the company itself but also, by extension, to its investors.

Which ecosystems matter most for companies?

Nature dependencies are not uniform—some sectors are significantly more exposed than others. For example, sectors such as agriculture, forestry, fisheries, aquaculture, food and beverage, heat utilities, and construction are generally the most reliant on ecosystem services.[6]

These sectors draw directly from nature for their raw materials, and depend significantly on conditions such as healthy soil, clean water, and a stable climate to function productively. Consequently, if these ecosystems fail to provide the needed benefits, these sectors could be impacted. For example, the following industries have strong ecosystem dependencies:

- **Coffee:** 60% of coffee species are in danger of extinction due to climate change, human settlement, and deforestation.[7]
- **Crops:** Approximately 75% of crop species are partially dependent on pollinators. A decline in pollinator populations could reduce yields, raise prices across supply chains, contribute to inflation pressures, threaten food security, and put up to $577 billion in annual global crop production at risk.[8]
- **Pharma:** Dependencies on nature are also present in the pharmaceutical sector, where an estimated 25–30% of currently marketed drugs owe their origins to products from nature.[9]

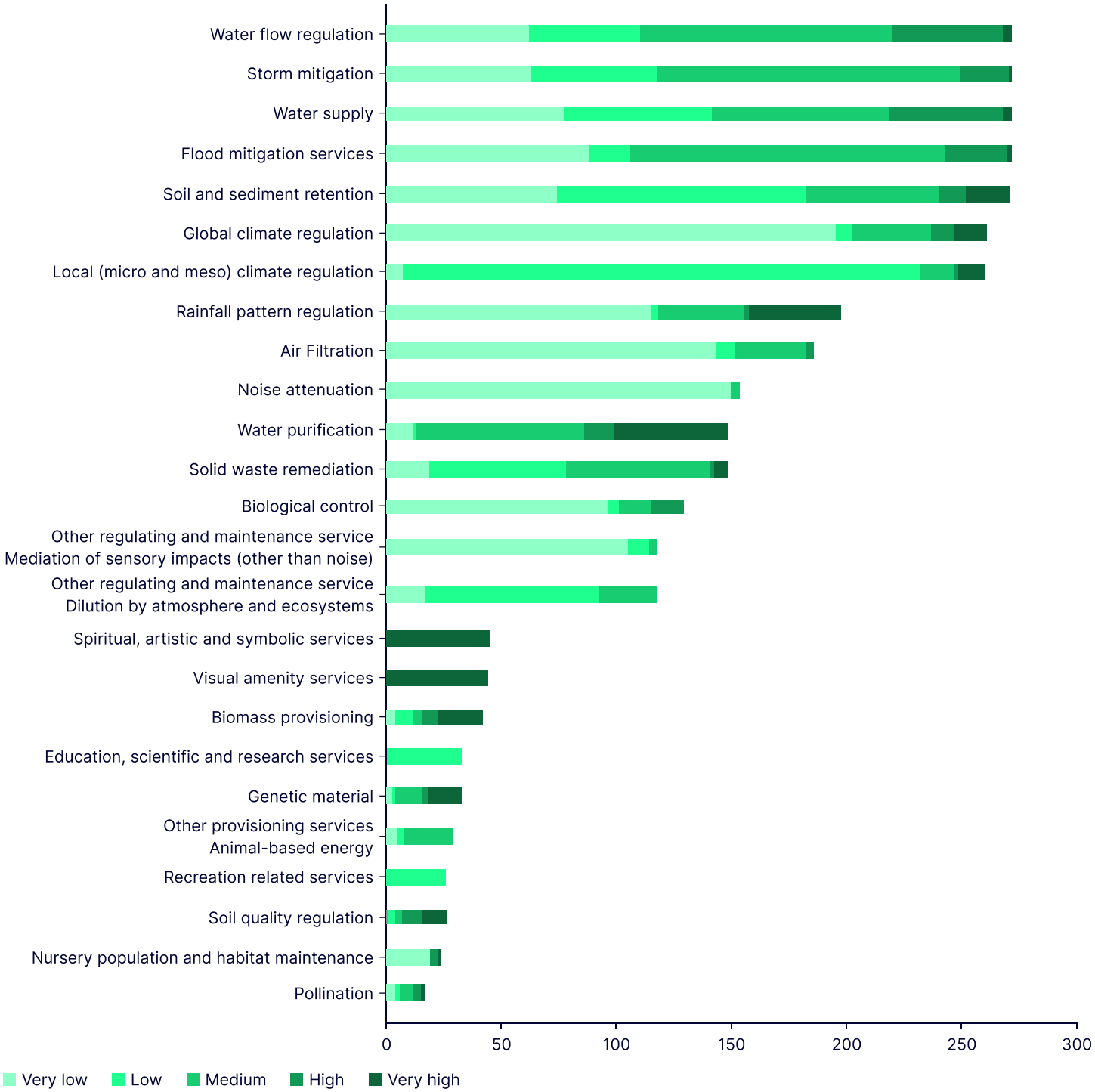
As outlined above, companies with business models highly dependent on ecosystem services could face financial risks arising from the dependencies of their business models on these services. As a result, portfolios' exposure to these sectors and companies may also be exposed to these risks, making them relevant to investors.

According to the ENCORE[10] database,[11] a widely used database for financial institutions to assess dependencies, and with a focus on the ecosystem services that are most frequently linked across 271 economic activities covered by the database, natural protection from floods & storms (flood mitigation, storm mitigation), and water (water flow regulation and water supply) are the ecosystem services that economic activities rely on most. However the extent of dependencies varies across sectors and economic activities (Figure 1).

How much do ecosystem services matter?

The extent of dependencies on nature also matters to the degree to which they are financially material to companies. For example, according to the ENCORE database, flood control is found to be very highly material to activities such as hydropower energy production to protect infrastructure from flooding, but it has very low materiality to other activities such as advertising or software publishing.[13] Based on the latest ENCORE update, the stability of water supply (water flow regulation) is the most material across the economy in aggregate,[14] but dependencies and materiality of this particular ecosystem service will vary by sector (Figure 2). In its latest review of evidence of financial effects of nature-related risks, the TNFD also identified water supply among the ecosystem services with the strongest evidence of financial materiality for companies.[15]

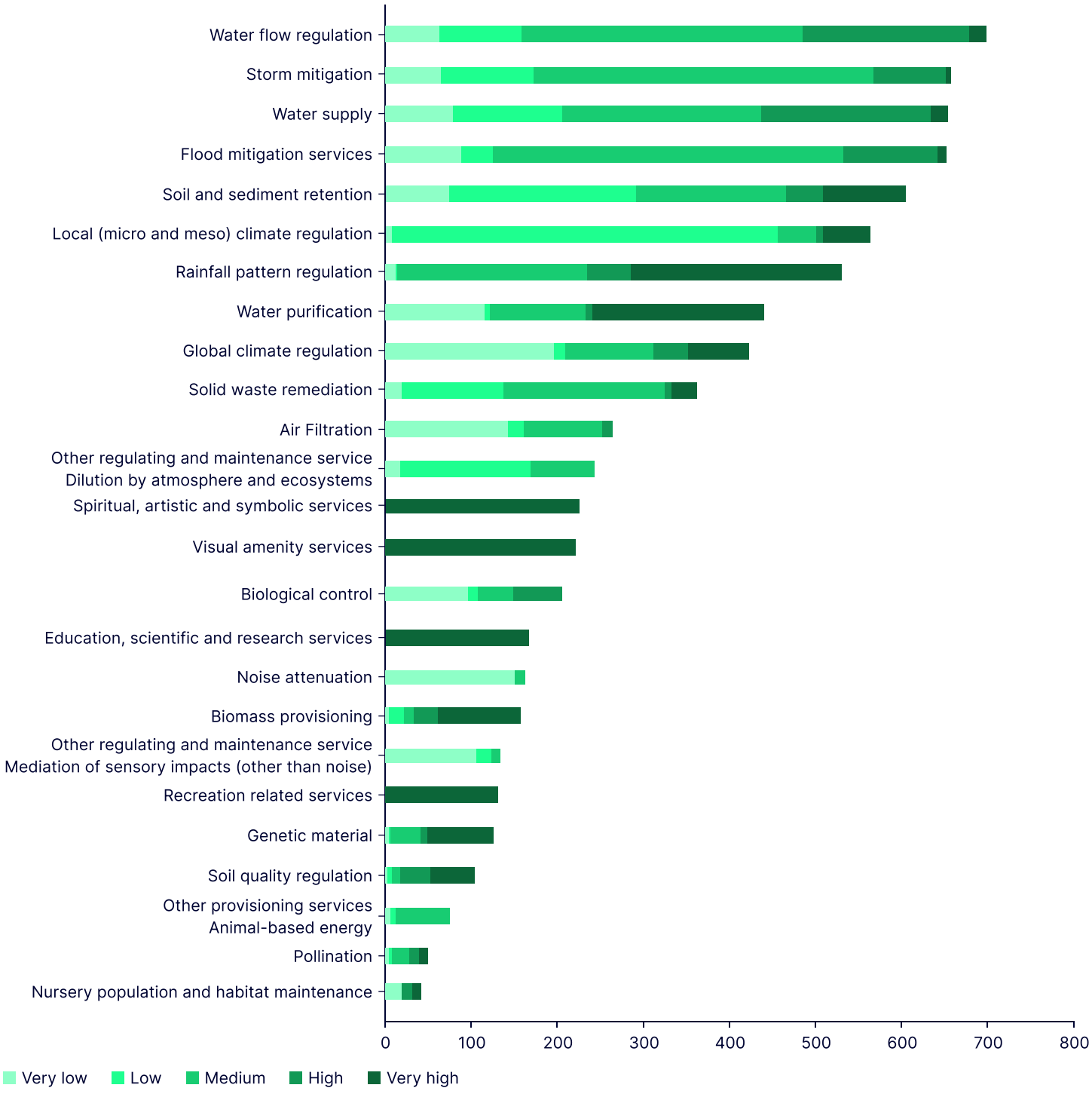
Figure 1: Economic activity relies on a wide range of ecosystem services



Source: ENCORE,[12] State Street Investment Management.

*ENCORE provides materiality ratings on 5 scales—Very Low (VL), Low (L), Medium (M), High (H), Very High (VH) are based on an assessment of two elements: 'How significant is the loss of functionality in the economic activity if the ecosystem service is disrupted' and 'What's the financial cost to the economic activity of adapting to the disruption of the ecosystem service?.' A rating of Very Low (VL) means that there is limited loss of functionality and low financial cost. Whilst a rating of Very High (VH) means there is severe loss of functionality and severe financial cost. This chart shows the count of economic activity where a dependency (no matter of materiality rating) has on each ecosystem service has been identified.

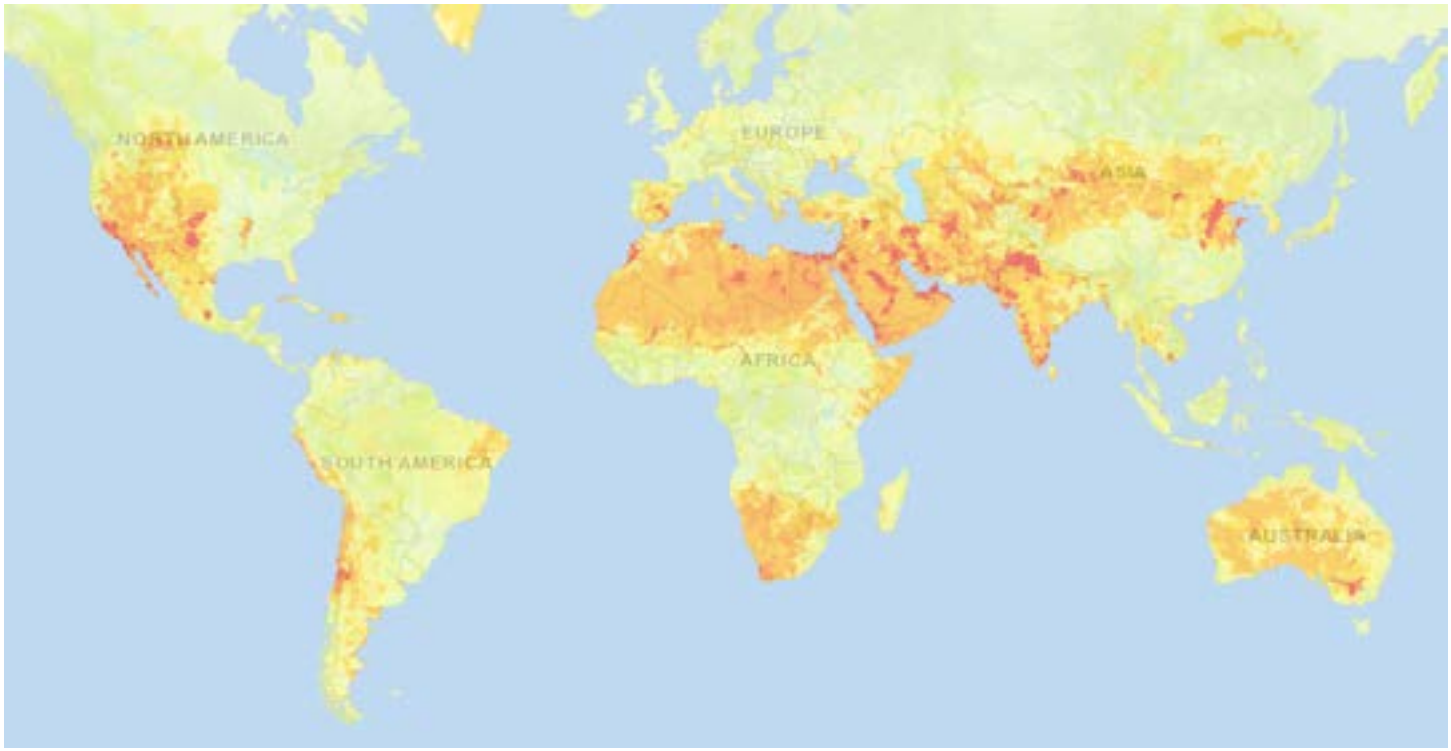
Figure 2: Water flow regulation is the most material to economic activity, in aggregate



Source: ENCORE,[16] State Street Investment Management.

∗For this analysis, we applied a score of 1–5 for materiality ratings VL to VH. These scores are then used to weigh each ecosystem service and added to provide a total weighted score.

Figure 3: Water availability risk varies widely



n/a very low risk very high risk

Source: WWF Biodiversity Risk Filter — Explore Maps.

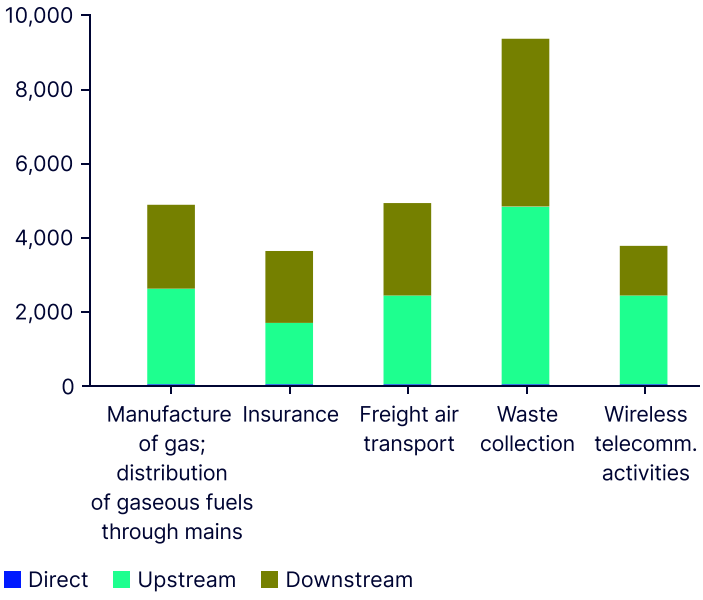
Where are the most significant nature-related risks?

One feature that is unique to assessing nature-related risks is that they are location-specific as ecosystem degradation tends to be localized. For example, the extent of risks related to water supply shortages will be very different where water is scarce versus where water supply is abundant. For example, cotton—a highly water-intensive crop—is largely cultivated in India, a country facing significant water scarcity risks. This exposure could disrupt production and supply chains, especially when compared to cotton grown in Brazil, another major producer with comparatively lower water stress,[17,18] (Figure 3). Emerging tools that integrate geospatial data with natural capital assessments are helping to pinpoint these risks.

Biodiversity in the supply chain

We believe it is also important to understand where the ecosystem dependencies are located in a company's value chain. Attention has traditionally focused on direct operations, where data is more readily available and where companies can better control their risks. However, there is growing recognition that the majority of nature dependencies lies within company supply chains.

Figure 4: Supply chain dependencies can be materially larger than direct operational dependencies



Source: ENCORE,[20] State Street Investment Management.

*Value chain includes 2 upstream and 2 downstream activities for each economic activity. Materiality ratings are weighted as explained in Figure 2 above. Please note that for the sectors shown in Figure 4 above, direct operations dependencies are too small relative to upstream and downstream dependencies to be visible on the chart.

Definitions

- **Nature:** The natural world encompassing the diversity of living organisms—including humans—and their complex interactions with each other and their environments. Nature is composed of four interconnected realms: land, ocean, freshwater, and atmosphere.[21]
- **Biodiversity:** 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.[22]
- **Ecosystem services:** An ecosystem is a dynamic complex of plant, animal and microorganism communities and the non-living environment that interacts as a functional unit.[23] An ecosystem service is the benefits people obtain from ecosystems.[24] There are four ecosystem services categories:
  - **Provisioning:** Material outputs from nature (e.g., seafood, water, fiber, genetic material).
  - **Regulating:** Indirect benefits from nature generated through regulation of ecosystem processes (e.g., mitigation of climate change through carbon sequestration, water filtration by wetlands, erosion control and protection from storm surges by vegetation, crop pollination by insects).
  - **Cultural:** Non-material benefits from nature (e.g., spiritual, aesthetic, recreational, and others).
  - **Supporting:** Fundamental ecological processes that support the delivery of other ecosystem services (e.g., nutrient cycling, primary production, soil formation).[25]
- **Nature-related physical risks:** The risk of economic costs and financial losses resulting from the degradation of nature and consequential loss of ecosystem services that economic activity depends upon. Physical risks can be chronic (e.g. a gradual decline of species diversity of pollinators resulting in reduced crop yields, deforestation, or water scarcity) or acute (e.g. an increased probability of new pandemics).[26]
- **Nature-related transition risks:** The risk of economic costs and financial losses resulting from the misalignment of economic actors with actions aimed at protecting, restoring, and/or reducing negative impacts on nature. Transition risks can be prompted, for example, by changes in regulation and policy, legal precedent, technology, or investor sentiment and consumer preferences.[27]

For some economic activities, there can be low nature dependencies in their direct operations, but dependency significantly differs once the value chain is incorporated[19] (Figure 4). This adds to the complexities in building an understanding of nature dependencies for companies.

Catalysts for growing investor focus

While nature-related dependencies represent a significant channel through which financial risks can emerge, they remain largely underexplored and insufficiently understood in both business strategy and investment analysis.[28] However, the tide is shifting; in our recent survey of EMEA-based asset owners, **more than three quarters** of survey respondents currently incorporate nature or biodiversity objectives within their investment processes.[29] We believe that two key factors are raising investors' awareness of nature-related dependencies among investors: (1) the interlinkages between nature loss and the physical impacts of climate change, and (2) recent policy developments seeking to protect and restore nature at both global and national levels.

The interlinkages between nature and climate

Climate change is one of the five key drivers of nature loss, along with land and sea use change, direct exploitation of resources, pollution, and invasive alien species (Figure 5).[30] Each of these drivers is reshaping ecosystems and threatening the services they provide.

Among these, climate change stands out as both a driver and a consequence of nature loss, creating a feedback loop that can amplify risks for businesses and investors alike in sectors with higher dependencies on nature. As the physical impacts of climate change intensify—through rising temperatures, prolonged droughts, and more frequent storms—ecosystem degradation intensifies as well.

Figure 5: Drivers of nature change

Source: IPBES Global Assessment.

At the same time, the decline of nature threatens the integrity of ecosystem services that are essential to cope with the physical impacts of a changing climate, such as flood and storm controls.[31]

For example, deforestation reduces the capacity to remain resilient in the face of rising flood risks from rising temperatures. When forests are cut down, the land loses its natural ability to filter and manage water. Without trees to hold the soil in place, the risk of erosion, floods, and landslides increases. In turn, soil erosion threatens key ecosystem services for the agricultural supply chain, where supply shocks could lead to higher commodity prices, compressed margins, and declining growth rates for food and beverage producers.[32] On coastlines, deforestation makes areas more vulnerable to storm damage, and it can also harm fish populations that depend on healthy coastal ecosystems,[33] creating potential shocks to food supply chains heavily reliant on seafood.

The interplay between climate change and biodiversity loss is sharpening investor awareness of physical risks tied to both themes. As highlighted in the previous section, ecosystem degradation can have financial consequences for businesses and potentially their investors. As investors deepen their understanding of climate-related physical risks and related portfolio implications, nature-related physical risks may become more relevant where they are closely intertwined with climate risks.

Nature-related policy development has increased investor focus

As evidence of nature degradation and the dependencies of businesses and economic activities become increasingly apparent, governments and policymakers have announced new commitments and policies that seek to address the accelerating loss of nature. Examples of these efforts are outlined in the shaded box below. Portfolio companies may consequently face new regulatory risks, potential litigation, and changing consumer preferences stemming from compliance with these emerging policies.

The impact of these policies on businesses has varied globally and there is some evidence of backsliding or delays by policymakers. However, lagging progress in addressing biodiversity loss now may lead to an acceleration of efforts in the future. The European Commission's Joint Research Centre recently found that the EU is off-track on 13 biodiversity sub-targets, with insufficient data to assess progress on 16 others.[40] Similarly, achieving the GBF's 30x30 target will require a near doubling of protected land and a tripling of protected ocean areas—an enormous undertaking.[41] As the physical impacts of nature loss intensify—from water stress and soil degradation to pollinator decline and supply chain disruptions—and as they are felt by businesses and consumers across the global economy, policy responses could accelerate.

Such policy risks could become material to certain companies and consequently to their investors. For this reason, we believe it is worthwhile for investors to monitor the evolving policy landscape to identify potentially material impacts on the horizon, assess portfolio exposure to nature-related regulations, and seek to avoid potential stranded asset risk or reputational damage.

Examples of global and national efforts to protect and restore nature

Global Frameworks: Setting the Direction

At the international level, the **Kunming-Montreal Global Biodiversity Framework ('GBF')** is the most ambitious global agreement to date, aiming to halt and reverse biodiversity loss by 2030. It sets out four long-term goals for 2050 and 23 targets for 2030, including the landmark **"30x30" target**—to protect 30% of the world's land and oceans by 2030. Target 19 also calls for mobilizing **$200 billion annually,** including **$30 billion through international finance,** to support biodiversity.[34]

National Policy Momentum: Europe Leading the Way

At the national and regional level, policy momentum is most visible in the EU and UK:

- The **EU Biodiversity Strategy for 2030** aims to provide a plan to protect nature and put Europe's biodiversity on a path to recovery by 2030.[35]
- The **Farm to Fork** strategy and recently published **Vision for Agriculture and Food** aim to promote competitiveness and growth of the agri-food sector, ensure food security and resilience and foster a fair, healthy and sustainable food systems, including plans to support EU's climate objectives and protect and restore the EU's biodiversity.[36,37]
- The **EU Deforestation Regulation** mandates that certain products entering the EU market must be deforestation-free, creating compliance obligations across global supply chains.[38]
- The **UK's Biodiversity Net Gain** policy requires new developments to deliver at least a 10% net gain in biodiversity, embedding nature-positive outcomes into land use planning.[39]

In line with momentum of the above policies, various disclosure frameworks have been developed or are in development, such as TNFD, CSRD and ISSB. We will cover them and their implications on data availability and quality in future thought leadership.

The bottom line

Investor understanding is growing about the role of nature as a critical asset underpinning the global economy. Nature-related risks to investors are driven by investee companies' dependencies on nature, which could negatively impact companies' revenues, costs, operations, and supply chains if ecosystem services they rely on are threatened. As a result, assessing portfolio company dependencies may be relevant for investors. This assessment involves an understanding of which sectors are most dependent on nature, including which ecosystem services are key dependencies for companies, the extent and location of the dependencies, and whether the ecosystems are at risk of degrading.

The interlinkages between nature and climate also call for a comprehensive approach that evaluates both climate-related and nature-related physical risks, and aims to address them in tandem. In addition, nature-related policies at the global and national levels can lead to transition risks for companies and potentially investors who invest in them. While we believe such policy risks may be less prominent today than the physical risks posed by the threats of nature loss, investors should continue to monitor policy developments to ensure they are prepared for any changes that could arise in the future.

Endnotes

1 In May 2025, State Street Investment Management, in partnership with FT Longitude, surveyed 330 senior investment decision-makers working at asset owners (including pension funds, insurance firms, endowments and sovereign wealth funds) across the EMEA region (Belgium, Denmark, Finland, Germany, Ireland, Italy, Kuwait, Luxembourg, the Netherlands, Norway, Qatar, Saudi Arabia, Sweden, Switzerland, the UAE, and the UK). The survey explored how these investors are approaching the challenges and opportunities of integrating nature and biodiversity objectives into their investment portfolios.

2 Final Report - The Economics of Biodiversity: The Dasgupta Review - GOV.UK

3 https://www.ipbes.net/nexus/media-release

4 Media Release: Nature's Dangerous Decline 'Unprecedented'; Species Extinction Rates 'Accelerating' | IPBES secretariat

5 Guidance on the identification and assessment of nature-related issues: the LEAP approach – TNFD

6 Managing nature risks: From understanding to action - PwC

7 Coffee crisis? 60% of wild species could go extinct, some within decades | Science | AAAS

8 Assessment Report on Pollinators, Pollination and Food Production | IPBES secretariat

9 Modern Natural Products Drug Discovery and its Relevance to Biodiversity Conservation - PMC

10 https://www.encorenature.org/en

11 ENCORE (Exploring Natural Capital Opportunities, Risks and Exposure) is an online, free tool developed by Global Canopy, UNEP FI and UNEP-WCMC and has become a widely-used reference for financial institutions seeking to understand their dependencies and impacts on nature. It covers 271 economic activities, organized into sub-sectors and sectors, and 25 ecosystem services. The tool provides assessments of two dimensions: dependency and impact, specifying the materiality of each dependency or impact of each economic activity ach ecosystem service. The materiality ratings use a five-point rating scale of Very High (VH), High (H), Medium (M), Low (L) and Very Low (VL). Each materiality rating is based on a set of quantitative or qualitative indicators.

12 ENCORE Partners (Global Canopy, UNEP FI, and UNEP-WCMC) (year). ENCORE: Exploring Natural Capital Opportunities, Risks and Exposure. [On-line], [2024 version], Cambridge, UK: the ENCORE Partners. Available at: https://encorenature.org. DOI: https://doi.org/10.34892/dz3x-y059

13 https://www.encorenature.org/en

14 When weighted by materiality across ecosystem services.

15 25-28225_Evidence-review-on-the-financial-effects-of-nature-related-risks_DIGITAL.pdf

16 ENCORE Partners (Global Canopy, UNEP FI, and UNEP-WCMC) (year). ENCORE: Exploring Natural Capital Opportunities, Risks and Exposure. [On-line], [2024 version], Cambridge, UK: the ENCORE Partners. Available at: https://encorenature.org. DOI: https://doi.org/10.34892/dz3x-y059.

17 Cotton | Markets and Trade | Food and Agriculture Organization of the United Nations

18 WWF Water Risk Filter

19 https://www.encorenature.org/en

20 ENCORE Partners (Global Canopy, UNEP FI, and UNEP-WCMC) (year). ENCORE: Exploring Natural Capital Opportunities, Risks and Exposure. [On-line], [2024 version], Cambridge, UK: the ENCORE Partners. Available at: https://encorenature.org. DOI: https://doi.org/10.34892/dz3x-y059.

21 The IPBES Conceptual Framework - connecting nature and people | IPBES secretariat

22 The Convention on Biological Diversity—Article 2—Use of terms—https://www.cbd.int/convention/articles/default.shtml?a=cbd-02

23 The Convention on Biological Diversity—Article 2—Use of terms—https://www.cbd.int/convention/articles/default.shtml?a=cbd-02

24 Millennium Ecosystem Assessment—Ecosystems and Human Well-being—Biodiversity Synthesis— https://millenniumassessment.org/documents/document.354.aspx.pdf

25 Millennium Ecosystem Assessment—Ecosystems and Human Well-being—Biodiversity Synthesis— https://millenniumassessment.org/documents/document.354.aspx.pdf

26 ngfs-conceptual-framework-nature-risks.pdf

27 ngfs-conceptual-framework-nature-risks.pdf

28 25-28225_Evidence-review-on-the-financial-effects-of-nature-related-risks_DIGITAL.pdf

29 In May 2025, State Street Investment Management, in partnership with FT Longitude, surveyed 330 senior investment decision-makers working at asset owners (including pension funds, insurance firms, endowments and sovereign wealth funds) across the EMEA region (Belgium, Denmark, Finland, Germany, Ireland, Italy, Kuwait, Luxembourg, the Netherlands, Norway, Qatar, Saudi Arabia, Sweden, Switzerland, the UAE, and the UK). The survey explored how these investors are approaching the challenges and opportunities of integrating nature and biodiversity objectives into their investment portfolios.

30 Global Assessment Report on Biodiversity and Ecosystem Services | IPBES secretariat

31 Biodiversity loss reduces global terrestrial carbon storage | US Forest Service Research and Development

32 How Food & Beverage Companies Managed Ingredient Price Volatility in 2024

33 Watershed Health | Effects of Deforestation & Climate Change | GFW

34 Kunming-Montreal Global Biodiversity Framework

35 Biodiversity strategy for 2030—European Commission

36 Farm to Fork Strategy—European Commission

37 Vision for Agriculture and Food—European Commission

38 Regulation on Deforestation-free products—European Commission

39 Understanding biodiversity net gain—GOV.UK

40 JRC Publications Repository—Assessing progress in monitoring and implementing the EU Biodiversity Strategy for 2030

41 Protected Planet Report 2024

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ID3125454-8314643.1.1.GBL.INST 0925 Exp. Date: 30/09/2026