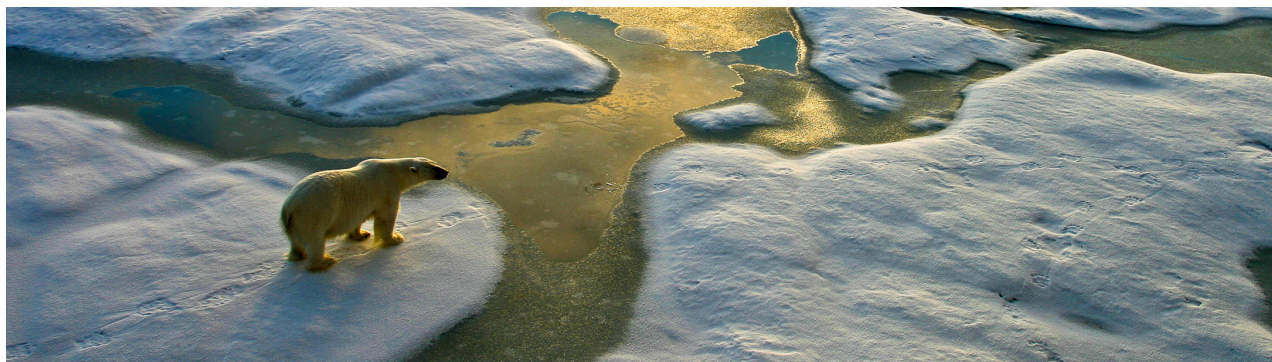


# BIODIVERSITY LOSS: THE OTHER SYSTEMIC CRISIS

In this new series of primers, Adrienn Sarandi, Head of ESG Strategy & Development, and Bhaskar Sastry, ESG Content Manager, examine key sustainability challenges that humanity is facing and will continue to face in coming decades. All the challenges discussed are significant in their own right, and how they interact with each other and impact on society and the environment highlights interconnected and complex systems in which we will play a part. Biodiversity loss is a crisis which we believe could have systemic impacts akin to climate change.



Biodiversity is defined as the variety of all plant and animal life on earth. In this piece, we discuss the unprecedented scale of biodiversity loss that will impact every area of our lives, including wealth creation and preservation. Nature's services play a critical role, underpinning our very survival and global economic activity. Yet, we are losing species at a rapid rate and therefore the means of securing our own long-term future.

We explore the scale of biodiversity loss and the emerging global response to it. While we are at the early stages in terms of corporate disclosure of nature-related risks, investors can still play a positive role. We outline considerations for investors seeking to incorporate biodiversity factors in their portfolios.

A glossary at the end defines key terms.

## Nature: a fine equilibrium

“ We are part of Nature, not separate from it.”

**The Economics of Biodiversity: The Dasgupta Review, 2021**

In his book “What Has Nature Ever Done For Us?”<sup>1</sup>, author Tony Juniper recounts a stark tale of unintended consequences. Thirty years ago in India, farmers and vets started to administer an anti-inflammatory drug to ailing farm animals. The treatment was successful, however, unbeknown to anyone, the drug remained active in the animals' bodies after they died.

<sup>1</sup> What Has Nature Ever Done For Us? How Money Really Does Grow On Trees, Tony Juniper, 2013

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In India, dead animals were commonly feasted on by India's numerous vultures, solving a huge ecological challenge. Yet, the drug-laced carcasses poisoned and killed the vultures feeding on them, leading to a massive decline in their populations. From 1992 to 2007 the population of Indian vultures declined by more than 97%. Furthermore, rotting carcasses that would have been consumed by vultures became breeding grounds for a host of dangerous bacteria. As wild dogs took on the role of scavengers, they passed on rabies and other dangerous diseases to humans through dog bites.

This story illustrates the concept of trophic cascades, in which side-effects occur when complex ecosystems are interfered with. The key message is that humanity is closely interconnected with nature and our actions can have powerful and system-wide impacts.



## A deepening disaster

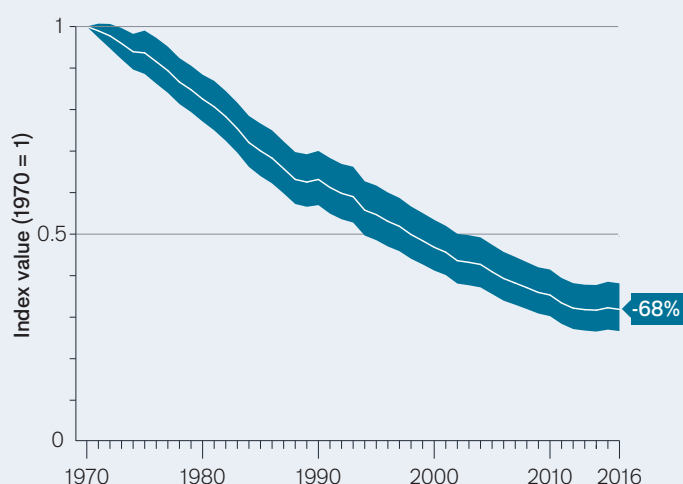
From centuries-old drawings of the extinct dodo to current day footage of polar bears navigating rapidly melting glaciers, the unfortunate plight of our fellow species has been seared into our consciousness. Yet somehow, we have become ignorant bystanders of a tragedy that is unfolding every day and whose root cause lies in the ever-expanding sphere of human activity.

Biodiversity is now declining faster than at any time in history<sup>2</sup>. Up to a million species could be facing extinction within decades<sup>3</sup>. Indeed, population sizes of mammals,

birds, fish, amphibians and reptiles have already fallen almost 70% since 1970 (see Figure 1)<sup>4</sup>. Marine and freshwater ecosystems are continually being degraded, while forests and other land ecosystems are increasingly being taken over in the interests of economic growth.

As a result, we are facing the possibility of a sixth mass extinction event on Earth. The difference is that the current anthropogenic rate of extinction is between 100 and 1,000 times higher than the pre-human rate of extinction<sup>5</sup>.

**Figure 1: The rate of vertebrate species decline**



### The Living Planet Index: 1970 to 2016

Average abundance of 20,811 populations representing 4,392 species monitored across the globe declined by 68%. The white line shows the index values and the shaded areas represent the statistical certainty surrounding the trend (range: -73% to -62%).

Source: WWF (2020) Living Planet Report 2020 - Bending the curve of biodiversity loss. Almond, R.E.A., Grooten M. and Petersen, T. (Eds). WWF, Gland, Switzerland. Notice for text and graphics: © 2020 WWF All rights reserved.

This rate of extinction is unprecedented and has been driven by five factors: changes in land use and sea use, species overexploitation, climate change, pollution and invasive alien species and disease<sup>6</sup>.

<sup>2</sup>The Economics of Biodiversity: The Dasgupta Review (UK Government, 2021)






<sup>3</sup>The Global Assessment Report on Biodiversity and Ecosystem Services (Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES), 2019)

<sup>4</sup>'Living Planet Report' (WWF, 2020)

<sup>5</sup>'What is mass extinction and are we facing a sixth one?' (Natural History Museum, 2021)

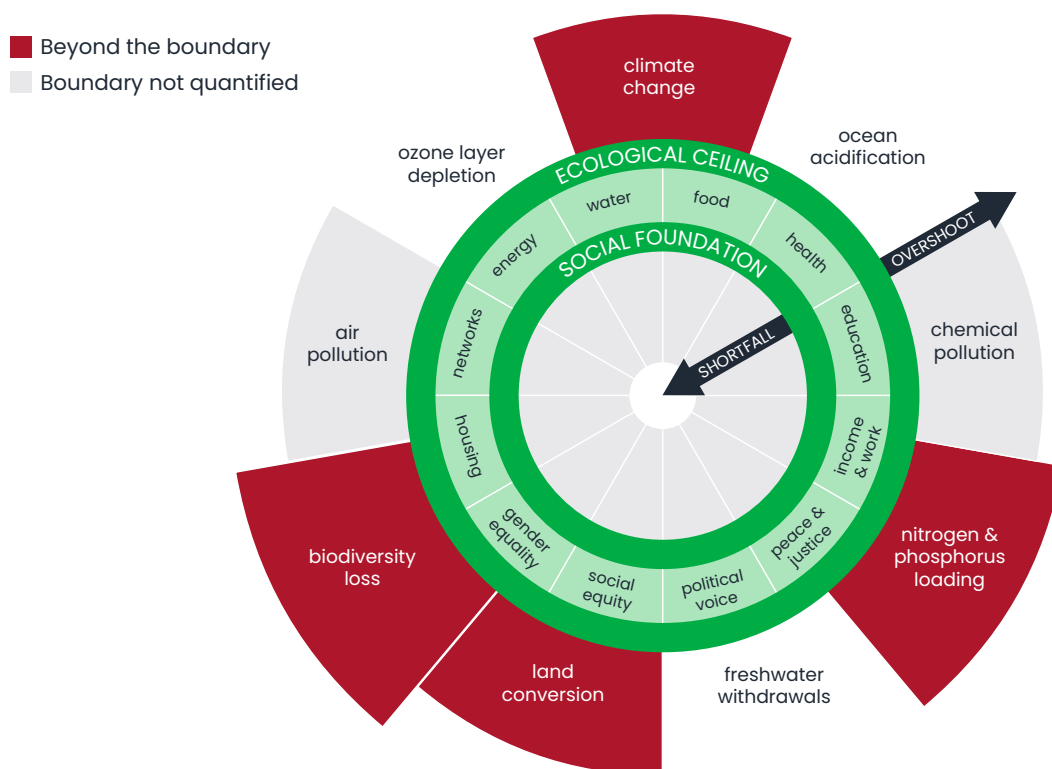
<sup>6</sup>'Living Planet Report' (WWF and ZSL, 2020)

Figure 2: Drivers of extinction

<b>Changes in land and sea use, including habitat loss and degradation</b>		Modification of the environment where a species lives, by complete removal, fragmentation or reduction in quality of key habitat. Common changes in use are caused by unsustainable agriculture, logging, transportation, residential or commercial development, energy production and mining. For freshwater habitats, fragmentation of rivers and streams and abstraction of water are common threats.
<b>Species overexploitation</b>		Direct overexploitation refers to unsustainable hunting and poaching or harvesting, whether for subsistence or for trade. Indirect overexploitation occurs when non-target species are killed unintentionally, for example as bycatch in fisheries.
<b>Invasive species and disease</b>		Invasive species can compete with native species for space, food and other resources, can turn out to be a predator for native species, or spread diseases that were not previously present in the environment. Humans also transport new diseases from one area to another.
<b>Pollution</b>		Pollution can directly affect a species by making the environment unsuitable for its survival (for example, an oil spill). It can also affect a species indirectly, by affecting food availability or reproductive performance, thus reducing population numbers over time.
<b>Climate change</b>		As temperatures change, some species will need to adapt by shifting their range to track a suitable climate. The effects of climate change on species are often indirect. Changes in temperature can confound the signals that trigger seasonal events such as migration and reproduction, causing these events to happen at the wrong time.

Source: 'WWF (2020) Living Planet Report 2020 - Bending the curve of biodiversity loss. Almond, R.E.A., Grooten M. and Petersen, T. (Eds). WWF, Gland, Switzerland. Notice for text and graphics: © 2020 WWF All rights reserved.

In the 'Doughnut Model', economist Kate Raworth argues that humanity must live in the 'safe and just' space between a minimum social foundation (fundamental human rights) and an outer ecological ceiling (nine environmental thresholds that should not be exceeded to avoid further natural degradation of the planet). In her model, Raworth cites biodiversity loss as one of the nine planetary boundaries that we have already overshot:

Figure 3: Breaching planetary boundaries<sup>7</sup>

<sup>7</sup> 'Doughnut Economics' (Kate Raworth, 2017)

## Why is biodiversity so important?

There are an estimated 8.7 million species of plants and animals in existence, the majority of which remain undiscovered<sup>8</sup>.

The value of biodiversity and ecosystems to our physical and mental wellbeing is inestimable. Yet, natural capital also provides critical 'ecosystem services' that provide us with huge economic benefits.

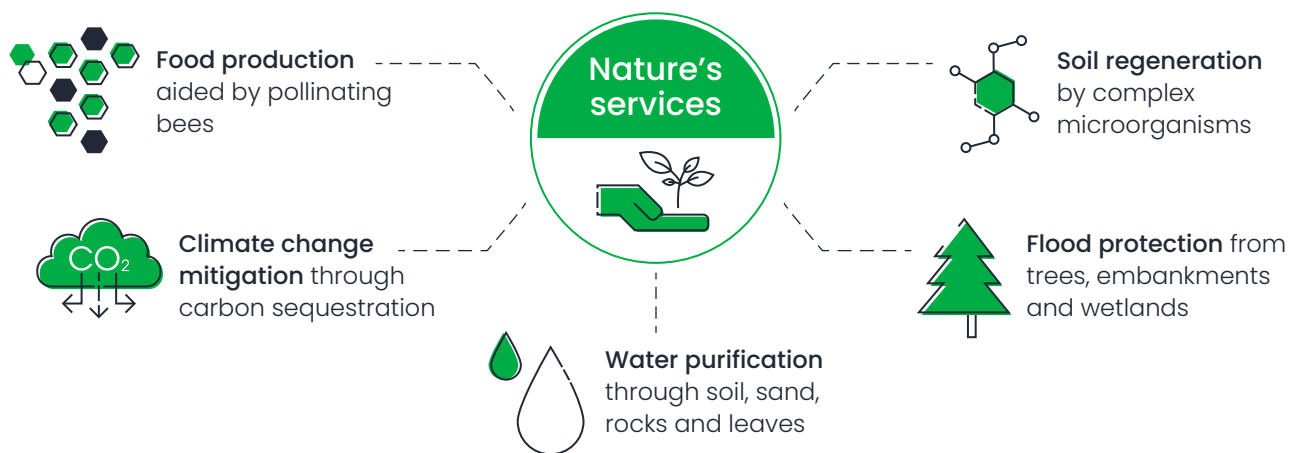
Some of these are shown in Figure 4 below.

### Death of the pollinators

More than 40% of invertebrate pollinator species face extinction due to intensive agriculture, habitat loss, pesticide use and climate change. Approximately 75% of the world's food crops depend at least partially on food pollination.

'Press Release: Pollinators Vital to Our Food Supply Under Threat' (The Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES), 2016).

**Figure 4: Nature's services**



Source: Janus Henderson Investors, 2022.

The total economic value that nature provides is estimated to be between a staggering US\$125 and \$140 trillion per year<sup>9</sup>. To put this figure in context, it is more than 1.5 times global GDP<sup>10</sup>. More than half of the world's total GDP, or US\$44 trillion, involves activities that are moderately or highly dependent on nature, according to the World Economic Forum<sup>11</sup>.

Ecological systems that are more biodiverse are more resilient to environmental stressors such as invasive species, severe weather events and pollution.

Biodiversity loss is inextricably linked to deforestation. The felling of trees due to logging, agricultural expansion, and human settlements acts to destroy habitats and shelter, reduce nutrients in the soil and increase water loss. Deforestation and biodiversity loss also exacerbate the systemic threat of climate change. Diverse ecosystems with

healthy biodiversity are essential for climate change adaptation and mitigation, increasing resilience to future climate impacts. The problem is particularly stark in the world's largest forests, which are home to some of the richest biodiversity on the planet.

Climate change, in turn, is acting to worsen biodiversity loss. For example, the Intergovernmental Panel on Climate Change estimates that in a 3°C global-warming scenario, up to 29% of terrestrial species are at high risk of extinction, and more than 80% of marine species across large parts of the tropical Indian and Pacific Ocean will experience potentially dangerous climate conditions<sup>12</sup>.

Biodiversity loss also increases the likelihood of the emergence of diseases that can pass from animals to humans, like COVID-19.

<sup>8</sup> 'How Many Species Are There on Earth and in the Ocean?' (Camilo Mora et al, PLoS Biology, 2011)

<sup>9, 10</sup> Nature4Climate.org (2020)

<sup>11</sup> 'Nature Risk Rising: Why the Crisis Engulfing Nature Matters for Business and the Economy' (WEF, 2020)

<sup>12</sup> 'Climate Change 2022: Impacts, Adaptation and Vulnerability' (IPCC, 2022)



## Taking action: policy, regulation and behaviour change

The World Economic Forum has cited biodiversity loss and ecosystem collapse as one of the top five risks in the next 10 years<sup>13</sup>. The OECD states that nature 'underpins all economic activities and human well-being' and is 'the world's most important asset'<sup>14</sup>.

After decades of inaction, governments, regulators, international bodies, companies and investors are starting to wake up to nature-related risks:

- ▶ The UK government's landmark Dasgupta Review examined the economics of biodiversity loss, concluding that we require wholesale institutional reform to ensure that demand for nature's resources does not outstrip supply, and that we must regenerate nature for the welfare of current and future generations.
- ▶ In light of increasing awareness, the Taskforce on Nature-related Financial Disclosures (TNFD) has been set up in the shape of the widely adopted Taskforce on Climate-related Financial Disclosures (TCFD) to encourage firms to disclose their risk management and exposure to nature-related financial risks. In March 2022, the TNFD released its first Nature-Related Risk & Opportunity Management and Disclosure Framework. The framework is expected to evolve in iterations planned to be released in June and October 2022, then February 2023, with the finalised framework expected in late 2023.
- ▶ The UN Biodiversity Conference (COP15), scheduled for August 2022 aims to galvanise efforts to 'implement action to transform society's relationship with biodiversity and ensure we can live in harmony with nature by 2050'.<sup>15</sup> After previous failed attempts to reach global consensus, the hope is that this could be a watershed moment in efforts to reduce biodiversity loss.
- ▶ The Convention on Biological Diversity (CBD) is an international treaty for the conservation of biodiversity signed by 196 countries with the 2050 vision of "living in harmony with nature". The CBD is working to create the Post-2020 Global Biodiversity framework, which will be presented at COP15.
- ▶ The European Commission has presented a 2030 Biodiversity Strategy, which seeks to protect at least 30% of land and seas, increase organic agriculture to 25% of the European Union total (from 9% in 2020<sup>16</sup>), and halve the use of the most hazardous pesticides. Countries are expected to agree on global goals for biodiversity in 2022 and, like the Paris Agreement for climate change, targets will be delivered by countries and companies.
- ▶ The European Union's Green New Deal cites preservation of biodiversity and ecosystems in its Taxonomy of sustainable activities. The recently introduced Sustainable Finance Disclosure Regulations (SFDR)<sup>17</sup> obliges companies to report on their biodiversity and ecosystem impact. SFDR requires investors to "comply or explain" the Principal Adverse Impacts (PAIs) of their investment decisions on biodiversity and land use<sup>18</sup>. We hope that such regulations will be adopted globally over time.



Genuine efforts to halt and reverse biodiversity loss could have a corresponding impact on climate change, setting off a virtuous circle in which improvements in one will lead to benefits in the other.

## Investor implications

Annual global finance flows for biodiversity conservation and sustainable use are five to six times lower than the finance flows that are potentially harmful to biodiversity, according to the OECD<sup>19</sup>. Therefore, it's clear that investors have great potential to improve the external impact of their investment portfolios on biodiversity and ecosystem preservation.

Below are some key considerations for investors to build sustainable and resilient portfolios:

We believe that investors must accept that biodiversity loss and ecosystem damage represent significant and financially material risks. In the same way that investors now generally accept that climate change poses a systemic threat to their

portfolios, we need the same acceptance for nature-related impacts. For example, the Brazilian government's failure to tackle deforestation of the Amazon rainforest, can be a 'systemic risk' with respect to climate change, supply chains, indigenous communities, and investors. At a corporate level, the Sustainability Accounting Standards Board (SASB) states that 'ecological impact' is likely to affect the financial condition or operating performance of companies<sup>20</sup>. In one study, ecological impacts had one of the highest signalling powers of future financial stability from a return on equity and risk management perspective for energy, industrials, materials, real estate and utilities companies<sup>21</sup>.

<sup>13</sup> 2020 Global Risks Report (WEF, 2020)

<sup>14</sup> 'Biodiversity, natural capital and the economy: A policy guide for finance, economic and environment ministers' (OECD, 2021)

<sup>15</sup> Convention on Biological Diversity (2021)

<sup>16</sup> Organic farming statistics - Statistics Explained (europa.eu) & EU Biodiversity Strategy Dashboard (2022).

<sup>17</sup> Sustainable Finance Disclosure Regulations

<sup>18</sup> The Biodiversity and Land Use indicator measures the severity of controversies related to a company's use or management of natural resources where there is an

alleged or anticipated negative impact on the environment, especially in ecologically sensitive areas. Topics covered under this indicator include issues such as species loss, reduction in biodiversity, habitat damage, depletion of or competition for natural resources, loss of economic value, as well as post-consumer waste issues.

<sup>19</sup> 'A Comprehensive Overview of Global Biodiversity Finance' (OECD, 2020)

<sup>20</sup> SASB Materiality Map (2021)

<sup>21</sup> 'After TCFD, comes TNFD – as nature loss accelerates with USD44trillion at risk' (Bank of America Securities, 2021)

The University of Cambridge Institute for Sustainability Leadership (CISL, 2021) has divided nature-related financial risks into three categories:

- Physical risks resulting from the degradation of ecosystem services by economic activity, for example, air quality, water security and food provision.
- Transition risks arising from shifting policy, legal, technology and consumer/market dynamics.
- Liability risks associated with emerging legal cases related to loss or damage from environmental change, including pay-outs, fines, insurance costs and reputational costs.

We believe investments should be evaluated with all three long-term risks in mind. The focus should be on institutions and sectors whose operations have the greatest detrimental impact on natural capital. The World Economic Forum (2020) finds that three systems are responsible for endangering 80% of threatened or near-threatened species<sup>21</sup>:

- Food, land and ocean use
- Infrastructure and the built environment
- Energy and extractives

We think that analysis should be conducted of companies and sectors that rely on natural capital to survive, and therefore those most exposed to ecosystem damage, particularly agriculture and food. Investors should understand how these companies are proactively adapting their strategy and operations in line with biodiversity risks. Impact investors have been utilising industry standards such as the Global Impact Investing Network to evaluate biodiversity and ecosystem impact.

Specifically, in our view, investors should identify those companies that acknowledge their impact and dependence on nature. This could mean understanding how biodiversity and ecosystem services are relevant to the business model through sourcing practices and supply chains, in the construction of new sites or through the ways the company's operations interact with surrounding ecosystems.

Depending on an investor's desired approach, biodiversity considerations can be integrated into an overall portfolio approach. Some approaches may focus on maximising risk-adjusted returns and assessing biodiversity from a risk management and opportunities perspective, while others may invest with the aim of achieving a positive impact alongside returns. Irrespective, we expect increasing policy

and regulatory pressure, and client demand to see more capital allocated to leading companies that are prioritising the preservation of nature and away from laggards that are failing to act. Implicit in this approach is the concept of double materiality, the principle that a company should report on sustainability issues that are financially material in influencing business value and those material to the environment, economy and society. As with climate change, investors can implement these views through positive and/or negative screening, environmental, social and governance (ESG) integration or impact investing – or a combination of approaches depending on their desired ESG profile, objectives and risk appetite.

Investors can also join coalitions and voluntary initiatives around the preservation and restoration of nature. Here, lessons can be learnt from collaborative efforts to tackle climate change, for example, Climate Action 100+ and the 'Net Zero' initiatives.

Awareness of the challenges of incorporating nature-based impacts is key, with measurement perhaps the biggest obstacle. The quality and quantity of ESG data relating to biodiversity is lacking and no common global standards exist. Therefore, assigning an accurate price on the value of natural capital is almost impossible. Investors must play an active role by demanding high-quality and consistent nature-related data from data providers and urging companies to align with the TNFD. As the Dasgupta Review states, even qualitative disclosure of the natural capital a company uses represents a step forward.

As active owners of capital and stewards of assets, investors can also use engagement to pressure companies to align with commonly agreed nature-based goals. This includes engaging with company boards and directors on governance and strategy of biodiversity and ecosystem impact, and disclosure of ecological risks across company operations and the value chain. Shareholders can also vote on proposals that align with standards such as the TNFD.

Implicit in all approaches is that investors should be guided by a systems-thinking mindset. The climate and biodiversity crises show that nature – on which our survival depends – works as a interconnected, dynamic system with feedback loops. The economic and societal impacts of investors' decisions are not narrow, short term and linear, but wide-ranging, long term and highly unpredictable. We believe investors must accept this paradigm if they are to contribute to solutions around biodiversity loss and ecosystem damage.

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<sup>21</sup> 'The Future Of Nature And Business' (World Economic Forum, 2020)

## Glossary

**Anthropogenic:** Activities relating to, or resulting from, humans and their impact on nature.

**Carbon sequestration:** The process of capturing and storing atmospheric carbon dioxide in plants, soils, geologic formations and the ocean.

**Convention on Biological Diversity (CBD):** The first global agreement to cover the conservation of biological diversity, the sustainable use of its components and the fair and equitable sharing of the benefits arising out of the utilisation of genetic resources.

**Dasgupta Review:** An independent review of the economics of biodiversity commissioned by the UK government. The Review calls for increasing the value of 'natural assets', adopting a model of national accounting that incorporate natural capital, and transforming our institutions and systems to enable the required changes and sustain them for future generations.

**Double materiality:** An extension of the concept of materiality (the relevance of an ESG factor to the future value of an investment). Double materiality states that it is not just ESG/climate-related impacts on a company that can be material, but also impacts of a company on the climate, environment, market or people.

**Ecosystem services:** The broad array of benefits that humanity derives from ecosystems (the system of living organisms, their physical environment and the interrelationships between them). The UN's Millennium Ecosystem Assessment categorises ecosystem services as:

- **Provisioning Services:** the provision of food, fresh water, fuel, fibre and other goods
- **Regulating Services:** including climate, water, and disease regulation, and pollination
- **Supporting Services:** soil formation and nutrient cycling
- **Cultural Services:** educational, aesthetic, and cultural heritage values, recreation and tourism.

**EU 2030 Biodiversity Strategy:** The European Union's long-term plan to protect nature and reverse the degradation of ecosystems, putting Europe's biodiversity on a path to recovery by 2030. The Strategy contains specific commitments and actions:

- **Establishing a larger EU-wide network of protected areas on land and at sea:** The EU will enlarge existing Natura 2000 areas, with strict protection for areas of very high biodiversity and climate value.
- **Launching an EU nature restoration plan:** Through concrete commitments and actions, the EU aims to restore degraded ecosystems by 2030 and manage them sustainably, addressing the key drivers of biodiversity loss.

- **Introducing measures to enable the necessary transformative change:** The strategy highlights unlocking funding for biodiversity, and setting in motion a new, strengthened governance framework to:

- ensure better implementation and track progress
- improve knowledge, financing and investments
- better respecting nature in public and business decision-making

- **Introducing measures to tackle the global biodiversity challenge.** In particular, working towards the successful adoption of an ambitious global biodiversity framework under the Convention on Biological Diversity.

**Exploitation of organisms:** How humanity has taken advantage of animals and plants for food and materials. This includes deforesting or hunting animals at a faster rate than they can be replenished. Perhaps the most prominent example is overfishing, which can reduce fish populations to unsustainable levels and have secondary impacts on the marine food web.

**Invasive alien species:** Animals and plants that are introduced accidentally or deliberately into a natural environment where they are not normally found, and which can pose a major threat to native plants and animals.

**Land use:** The human conversion of natural environments into land for economic and cultural activities, including for agricultural, residential, industrial, mining and recreational uses.

**Mass extinction:** The loss of more than 75% of species in a short period of time (around 2 million years).

**Natural assets/capital:** Features of the natural environment composed of geology, soil, air, water and all living things. Humanity's survival is reliant on the products of the Earth's ecosystems.

**Planetary boundary:** A concept defined by Earth and environmental scientists that defines the regions of global environment space that, if breached by human activities, would lead to unacceptably deleterious consequences for humanity. There are nine planetary boundaries, of which three have been breached (shown in Figure 3).

**Principal Adverse Impacts (PAIs):** Negative, material, or potentially material climate, environment-related and social effects, including those in the field of social and employee matters, respect for human rights, anti-corruption and anti-bribery matters that are directly related to investment choices or advice performed by a legal entity. Examples include greenhouse gas emissions and negative impacts on the natural environment.

**Sea use:** Seas and oceans are the source of life on Earth and are home to a vast array of diverse organisms. They are responsible for climate cycles and other global processes



that sustain life. Humanity is highly dependent on the seas, providing us with a means to trade and travel globally, thus supporting the tourism and recreation industries. Seas also provide food, minerals, power generation and novel chemicals for use in medicine.

**Systems thinking:** Systems thinking is a holistic approach to analysis that focuses on the way that a system's constituent parts interrelate and how systems work over time and within larger systems. System behaviour results from feedback loops. A reinforcing process leads to the increase of some system component and, if unchecked by a balancing process, will lead to collapse. In contrast, a balancing process maintains equilibrium in a particular system.

Systems thinking can be applied to biodiversity loss in the way that human activity influences the behaviour of complex ecosystems, potentially leading to instability or collapse.

#### Taskforce on Nature-related Financial Disclosures

**(TNFD):** The TNFD consists of up to 35 Taskforce Members, supported by the TNFD Forum, a consultative grouping of supporters from financial institutions. Its aim is to formulate "a risk management and disclosure framework for organisations to report and act on evolving nature-related risks, which aims to support a shift in global financial flows

away from nature-negative outcomes and toward nature-positive outcomes". The TNFD framework aims to promote worldwide consistency for nature-related reporting.

**Trophic cascades:** Indirect interactions that occur when predators limit the density and/or behaviour of their prey, thereby enhancing survival of the next lower trophic (feeding/nutrition) level, or the prey's prey. Such interactions can be complex, non-linear, and involve transitions, often over long time periods. The demise of India's vultures and the consequent emergence of rabies illustrates the concept of trophic cascades. Another example is the reintroduction of grey wolves to Yellowstone National Park. The wolves hunted elk, whose numbers declined, which reduced grazing pressure on certain plant species, thus transforming local riverbank ecosystems.

**UN Biodiversity Conference (COP15):** The 15th Conference of the Parties focussing on biodiversity (the equivalent to COP26 for climate change) is expected to take place in Kunming, China in August 2022. Representatives of countries that have ratified a treaty for the conservation of biological diversity will meet to review goals and adopt a global biodiversity framework to stabilise biodiversity loss by 2030 and create improvements by 2050.

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