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# The Case for Nature-related Financial Disclosures in Canada

April 2026

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The Smart Prosperity Institute is a policy think tank and global research network focused on the environment and the economy. We conduct leading-edge research to craft innovative policies and market tools that foster a greener, more competitive Canadian economy. Based at the University of Ottawa, we collaborate with partners across all levels of government, industry and civil society to put knowledge into action and shape effective policies and practices. Our work bridges environmental, social and economic goals—advancing prosperity, well-being and sustainability for all Canadians.

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## Executive summary

**Nature is not external to the global economy; it is the foundation of prosperity.** An estimated US\$58 trillion, equivalent to 55% of global GDP, is highly or moderately dependent on healthy and resilient ecosystems.<sup>1</sup>

### The case for action

**Canada's resource-dependent economy is particularly exposed to nature loss.** Recent modelling estimates that approximately US\$259 billion of economic value is at risk. Several highly nature-dependent sectors, including fishing and forestry, face losing up to 26% of their sector's economic value if current rates of nature loss are left unaddressed.<sup>2</sup> As these ecosystems and their services decline, so does the foundation of our economy.

**Failing to recognize the value of nature creates blind spots and leads to market failures that can pose material financial risks.** By not accounting for nature-related dependencies and impacts, businesses cannot effectively manage the associated risks, leaving them vulnerable to disruptions as ecosystems degrade. Without visibility into businesses' nature-related issues, financial market participants lack the necessary information to accurately factor nature into their decision-making, thus propagating risk throughout the system.

### The role of disclosures

**Nature-related financial disclosures (NFDs) are key informational tools that can help address market failures.** They allow firms to understand their dependencies and impacts on nature and to address associated risks, such as supply-chain disruptions due to, for instance, the decline of essential ecosystem services like pollination.

**Beyond risk management, proactively adopting NFDs helps organizations spot strategic opportunities and stay competitive.** Managing nature-related issues strategically can create opportunities such as greater operational efficiency, product innovation, reputational gains and improved access to capital. On a broader scale, the widespread use of NFDs can enhance financial system stability by providing investors, lenders and insurers with consistent, comparable information needed for sound capital decisions.

**Standardized disclosure frameworks help foster more resilient and informed markets.** Specifically, the Task Force on Nature-related Financial Disclosures' (TNFD) Recommendations provide a structured framework for organizations to evaluate and report on their nature-related issues. Despite Canada's considerable exposure to nature-related risks, only a small cohort of companies has emerged as early adopters of the TNFD Recommendations.

### The path forward

**Practical hurdles, including policy and regulatory uncertainty, underdeveloped data and measurement infrastructure, and limited internal capacity, are slowing widespread adoption.** Resolving these foundational constraints requires further research to understand the Canada-specific constraints faced by organizations. A credible path forward requires thoughtful sequencing of policy, regulatory and capacity-building interventions.

# 1. Introduction and background concepts

Nature is the foundational asset upon which human activity, societal well-being and economic prosperity are built. This relationship can be understood through the concept of *embeddedness*, which recognizes that society and the economy fundamentally depend on the natural world and the services it provides. *The Case for Nature-related Financial Disclosures in Canada* argues that NFDs are a crucial informational tool to make environmental embeddedness visible to corporates, financial institutions, policymakers and regulators. This can help strengthen Canada's economic resilience and financial system stability amid rapid environmental changes.

This report provides the foundational analysis of a broader research project. Drawing on the Smart Prosperity Institute's expertise in nature and sustainable finance, this research aims to inform Canadian public policy efforts that embed nature in economic decision-making, align policy and regulatory frameworks with emerging global standards and support the uptake of NFDs among Canadian corporates and financial institutions. Subsequent research will build on this work by analyzing the practical data and information requirements for effective, decision-useful NFDs, exploring sector-specific guidance and identifying key knowledge gaps to support capacity-building for companies of all sizes.

To build the case for NFDs in Canada, the report is structured as follows:

- Section 1 provides a high-level review of the state of nature's decline and important economic background concepts such as natural capital and ecosystem services. Readers who are already familiar with these concepts may wish to skip ahead to Section 2.
- [Section 2](#) assesses the firm-level and macroeconomic implications of nature loss.
- [Section 3](#) discusses the financial materiality of nature-related risks, and the opportunities arising from actions to address these risks, as well as the key external drivers compelling corporate adoption of NFDs.
- [Section 4](#) examines the emergence of standardized NFD frameworks, focusing on the Taskforce on Nature-related Financial Disclosures (TNFD). It makes the case for standardized reporting, describes the global momentum behind the TNFD Framework, and briefly identifies barriers to NFD uptake within the Canadian market.
- [Section 5](#) concludes with a discussion of what it would take to build a credible path forward. It emphasizes the importance of a pragmatically sequenced approach to building the policy, data and institutional foundations needed for broad-based uptake of NFDs in Canada.

## 1.1 Background concepts

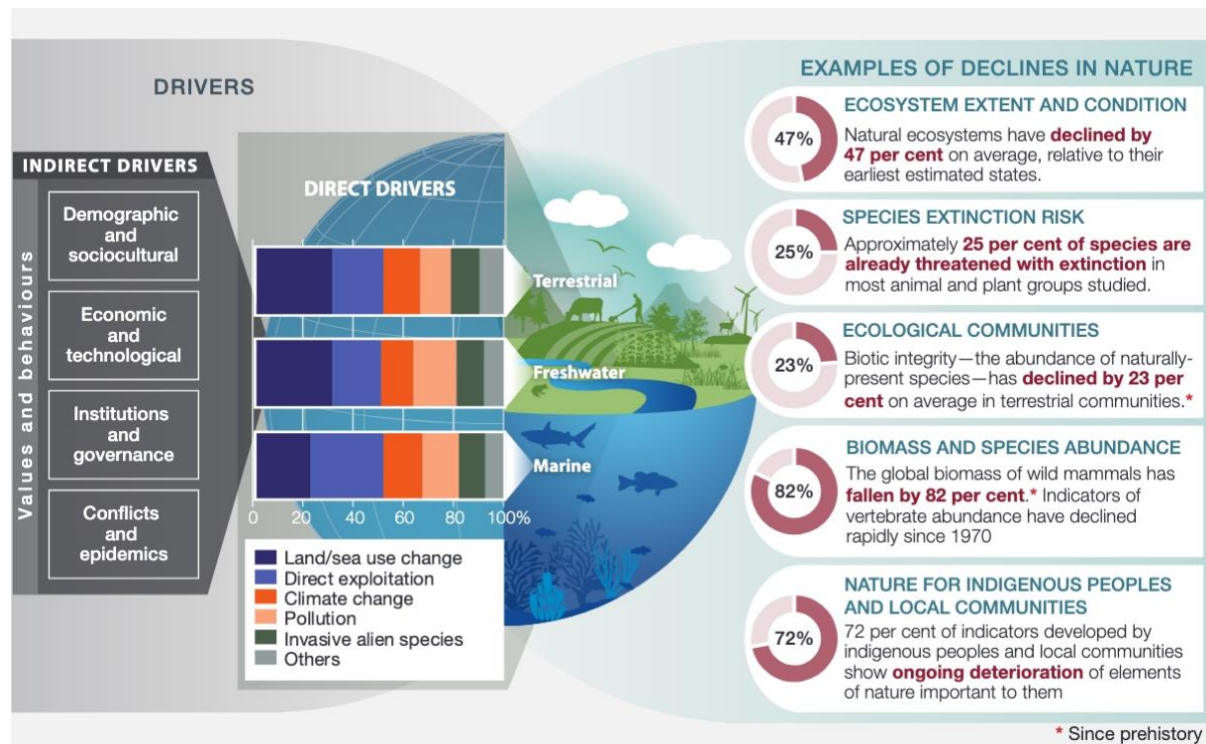
Viewing nature through an economic lens, alongside evidence of its ongoing decline, reveals a critical insight: nature loss is not just an environmental problem; it is a significant economic vulnerability. To ensure all readers can engage with this central argument regardless of their prior expertise, this background section provides a foundational basis by exploring two key areas. First, it documents the alarming scale of nature's decline, drawing on scientific

assessments to illustrate the severity of biodiversity loss globally and in Canada. Second, it introduces the key economic concepts of natural capital and ecosystem services, which provide a framework for understanding and valuing nature’s contributions to the economy. For readers seeking non-technical definitions of core terms such as “nature” and other related concepts, an overview is available in [Appendix A: Foundational Concepts](#).

### 1.1.1 Nature’s Decline Globally and in Canada

**The natural world is in rapid decline.** Biodiversity loss is occurring at an unprecedented rate. Human activities significantly impact 75% of the land surface and 66% of the ocean area globally, according to the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services’ (IPBES) most recent Global Assessment.<sup>3</sup> The rate of species extinction is estimated to be tens to hundreds of times higher than the background rate over the past 10 million years. Close to 1 million plant and animal species are at risk of extinction over the next few decades. This is nearly one-quarter of all assessed species groups, suggesting we are witnessing the sixth mass extinction event in Earth’s history, but the first driven by human activities.<sup>4</sup> Figure 1 spotlights several concerning trends identified in the IPBES Global Assessment.

*Figure 1. Examples of global declines in nature caused by direct and indirect drivers of change<sup>1</sup>*



**Today, human activity is the primary driver of nature’s decline.** Human economic systems, governance structures and social values result in five direct drivers of nature loss: land and sea

<sup>1</sup> Figure “SPM 2” from: IPBES. (2019). [Global assessment report on biodiversity and ecosystem services of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services](#)

use change, climate change, pollution, direct exploitation (resource use) and invasive species.<sup>5</sup> For instance, agricultural expansion accounts for nearly 90% of global deforestation.<sup>6</sup> More than a third of the world's land surface is devoted to agriculture<sup>7</sup> and nearly 70% of freshwater use goes to crop or livestock production.<sup>8</sup> Additionally, over 60% of species listed as threatened or near threatened by the International Union for Conservation of Nature are affected by agricultural activity.<sup>9</sup> The extractive sector, such as mining and oil and gas, drives biodiversity loss through land disturbance, habitat fragmentation and pollution. Mining potentially impacts up to 50 million km<sup>2</sup> of the Earth's land surface.<sup>10</sup>

The recently released IPBES Business and Biodiversity Assessment holds that the available evidence clearly establishes that agriculture, forestry and fishing, electricity, energy, mining and quarrying, construction, and transportation and storage have relatively high direct impacts on nature.<sup>11</sup> That said, the impacts of these primary sectors stem from their activities to meet downstream demand. For instance, extensive land-use changes driven by the agricultural sector are fundamentally driven by the downstream demand from other sectors for ingredients used in consumer products, like the food and beverage industries. Therefore, it is important to acknowledge that sectors with relatively low direct impacts on nature are, by extension, also significant contributors to nature loss.<sup>12</sup>

**Canada's natural environment has been significantly degraded or altered by human activity.**

For instance, converting large swaths of natural forest into managed forests harms biodiversity. This has led to the loss of old-growth forests, which are complex systems that support high levels of species richness, carbon storage and unique habitats.<sup>13</sup> Old-growth forests are irreplaceable on short timescales, taking at least 140–250 years (~two to three human lifespans) to regrow.<sup>14</sup>

Another example of human-driven change is in Canada's fisheries. Human overexploitation, combined with various stressors (e.g., temperature increases, decreased salinity and increased acidity), has led to declines in fish stocks across Canada's marine ecosystems in the Atlantic and Pacific oceans, and in Hudson Bay and James Bay.<sup>15</sup> As of 2022, only 66 of Canada's 195 key fish stocks (34%) were assessed as "healthy."<sup>16</sup> See Table 1 for more details on the state of selected Canadian landscapes, which are showcased here for their ecological significance to Canada.

*Table 1. Observed trends in select Canadian landscapes<sup>11</sup>*

Landscapes
<b>Forests</b>
In Canada, forests cover ~3.5 million km <sup>2</sup> , an area of land that is larger than Ontario, Quebec and British Columbia combined. This equates to 9% of the world's forests, including 25% of all remaining boreal forests on Earth. <sup>17</sup>

<sup>11</sup> For a detailed review of the state of Canadian landscapes, as well as observed trends, see Section 2: Unlocking the Value of NCS in Canada in the Smart Prosperity Institute's report, *Unlocking the Economic Power of Natural Climate Solutions*. <https://institute.smartprosperity.ca/unlocking-the-economic-power-of-natural-climate-solutions>

In 2021, 51,000 hectares (510 km<sup>2</sup>) of Canadian forests were converted to non-forest land uses.<sup>18</sup> While this figure is relatively small, Canada is experiencing a notable net loss of forest cover over time. Between 2000 and 2020, the change in Canada’s forest cover was a net loss of 8.2 million hectares, an area larger than New Brunswick.<sup>19</sup>

### **Wetlands**

In Canada, 1.5 million km<sup>2</sup> of freshwater wetlands account for 25% of all remaining wetlands on Earth. Around 130,000 km<sup>2</sup> of this total are designated as wetlands of international importance.<sup>20</sup>

Most of Canada’s wetlands are peatlands. These peatlands are a globally important carbon sink, storing an estimated 150 billion tonnes of carbon (550 billion tonnes of CO<sub>2</sub>e), representing 25% of the carbon stock held in peatlands globally.<sup>21</sup> The release of this carbon would be equivalent to approximately 800 years of Canada’s total annual greenhouse gas emissions at current levels.<sup>III</sup>

### **Grasslands**

Canada has 11–14 million hectares (110,000–140,000 km<sup>2</sup>) of intact temperate grasslands.<sup>22</sup>

Grassland ecosystems are among the most threatened in Canada. Over time, the vast majority (80%) of Canadian grasslands have been lost because of cropland conversion and urbanization. Today, the degradation of grasslands is ongoing, with an estimated loss in Canada of 0.1 to 0.25 million hectares (1,000–2,500 km<sup>2</sup>) per year.<sup>23</sup>

This section underscores that past and present human activity is driving nature’s decline. The failure of traditional economic thinking to recognize nature as a foundational asset has exacerbated this trend. The following section introduces key economic concepts that provide a framework for articulating the value of nature and integrating it into decision-making.

## **1.1.2 Accounting for nature’s value in decision-making**

Economists, particularly those specializing in resource and environmental economics, recognize that the failure to acknowledge nature as our most precious asset—our “natural capital”—has led to a dangerous imbalance between human demands and nature’s capacity to provide. Recognition of these failures has led to framing nature in economic terms.

The living and non-living elements of nature can be framed as **environmental assets**, such as a coastal wetland. They are defined as “the naturally occurring living and non-living components of the Earth, together constituting the biophysical environment, which may provide benefits to humanity” (p. 134).<sup>24</sup> The stock of environmental assets is called **natural capital**, such as the wetland’s plants and habitat for species. Natural capital extends the traditional economic

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<sup>III</sup> The estimated physical carbon stock of Canada’s peatlands (150 billion tonnes of carbon) is converted to CO<sub>2</sub>e using the IPCC standard conversion factor of 3.667, yielding approximately 550 billion tonnes of CO<sub>2</sub>e. This equates to roughly 800 years of Canada’s annual GHG emissions, based on [current \(2023\) GHG emission levels](#) of 694 mega tonnes (0.694 billion tonnes).

notion of capital to encompass the natural world, recognizing that nature provides essential inputs and services crucial for economic production and overall human well-being.<sup>25</sup> These are known as **ecosystem services**, which are defined as “the contributions of ecosystems to the benefits that are used in economic and other human activity” (p. 27).<sup>26</sup> For example, coastal wetlands—like salt marshes—provide natural buffers against storms, absorbing wave energy and stabilizing shorelines, which protects coastal communities and infrastructure.<sup>27</sup>

**Ecosystem services are a key concept to connect ecosystems to the economy.** Recognizing and valuing ecosystem services helps decision-makers grasp the potential costs of nature’s decline. These services can be divided into three major categories: provisioning, regulating and maintenance, and cultural services.

### Ecosystem services<sup>28</sup>

**Provisioning services:** ecosystem services that describe the material outputs from ecosystems. For example, crop provisioning, where the ecosystem’s contributions, such as fertile soil, enable the growth of plants harvested by people for consumption and other uses.

**Regulating and maintenance services:** ecosystem services resulting from the ability of ecosystems to regulate biological processes and to influence climate, hydrological and biochemical cycles, thereby maintaining environmental conditions beneficial to individuals and society. For example, air filtration, where the harmful effects of airborne pollutants are mitigated by the filtration of these pollutants by plants.

**Cultural services:** the experiential and intangible services related to the perceived or actual qualities of ecosystems whose existence and functioning contribute to a range of cultural benefits. For example, recreation, where the biophysical characteristics of an ecosystem enable the use and enjoyment of the environment by people.

Building on the concepts above, Figure 2 illustrates how natural capital **stocks** generate **flows** of ecosystem services, ultimately delivering **benefits** to businesses and society, thereby underpinning economic prosperity.

Figure 2. Nature as a form of capital<sup>IV</sup>



For example, consider a healthy river system and its associated riparian zone. In simple terms, a riparian zone is a ribbon of land directly alongside a river, stream or lake. It is a transitional area between fully aquatic and fully terrestrial regions. A healthy riparian zone is typically rich in biodiversity, containing stocks of natural capital such as:

- Nutrient-rich soils
- Diverse plant life, including trees, grasses and shrubs, and other forms of groundcover
- Abundant and diverse wildlife populations, including insects, fish, birds and mammals.

These stocks combine to yield flows of ecosystem services, which in turn provide significant value in the form of benefits to businesses and society. Some of these services and their subsequent benefits are detailed in Table 2.

Table 2: Ecosystem services and their benefits: A riparian zone example.

Ecosystem services (Flows)	Business & societal benefits (Value)
<b>Flood mitigation.</b> Soil and vegetation absorb and slow the flow of floodwaters.	Mitigation of damage to infrastructure caused by flooding in surrounding areas.
<b>Erosion control.</b> The vegetation’s root systems act as a glue that binds and holds soil in place.	Erosion and subsequent sediment loads into rivers and streams are reduced.
<b>Water quality regulation.</b> Vegetation and soil filter out pollutants and sediments from runoff before they enter the river.	Cleaner water provides recreational opportunities and potentially lower water treatment costs for downstream communities.

<sup>IV</sup> Figure adapted from: Capitals Coalition & Cambridge Conservation Initiative. (2020). [Integrating Biodiversity into Natural Capital Assessments](#).

### A note on ecosystem services and the diverse values of nature

The concept of ecosystem services has been instrumental in highlighting the value of nature, particularly following the Millennium Ecosystem Assessment (MEA), which helped popularize the concept globally.<sup>29</sup> However, it represents just one approach to understanding the complex relationship between nature and human well-being. The MEA and subsequent efforts framed ecosystems as natural capital providing benefits, which helped integrate ecological and economic perspectives into policy discussions.<sup>30</sup>

However, the ecosystem services framework faces critiques. For instance, representing nature's benefits primarily through stock-and-flow models (as seen in Figure 2) may oversimplify ecological complexity and uncertainty.<sup>31</sup> Others have noted that the approach can risk overlooking diverse worldviews, such as Indigenous and local knowledge systems that emphasize more relational understandings of human-nature connections.<sup>32</sup>

Moreover, similar concerns have been raised about the approach's insufficient attention to the human-nature relationship, including in relation to the ethics of care, reciprocity and responsibility.<sup>33</sup>

Recognizing these limitations, the IPBES uses the broader concept of nature's contributions to people (NCP). The NCP framework encompasses ecosystem services but also includes other perspectives on human-nature relationships, aiming to bridge diverse viewpoints and knowledge systems. While acknowledging the strengths of the ecosystem services concept for communication and promoting understanding, the NCP approach encourages consideration of diverse socio-ecological contexts, biocultural interactions and values like justice when addressing complex environmental challenges.<sup>34</sup> The IPBES identifies 18 NCPs across three broad groupings, as shown in Table 6 in the Appendix.

The concepts of natural capital and ecosystem services help articulate the value of nature. The failure to integrate them into decision-making has profound consequences. The ongoing decline of biodiversity and ecosystem health is not an abstract environmental issue; it translates directly into tangible impacts and dependencies for organizations, creating a landscape of financial risks that must be managed and opportunities that should be pursued. The following section will detail these financial risks, exploring the specific transmission channels through which nature loss becomes a material concern for businesses and the broader economy.

## 2. Financial and economic risks of nature loss

Canada’s resource-based economy faces considerable vulnerabilities as nature degrades at home and across the globe. For businesses, this decline materializes as two types of risks: those caused by environmental changes like pollinator loss or resource scarcity, and those arising from societal efforts to address nature loss, such as shifting consumer preferences or litigation. These risks may impact corporate performance through effects on revenues, costs and asset valuations. Importantly, the accumulation and interaction of these business-level financial consequences can have compounding and cascading effects that threaten the stability of the economy and the financial system.

### 2.1 Canada’s economic exposures to nature loss

Canada’s resource-based economy exemplifies the opportunities and vulnerabilities created by its dependency on nature. Natural resource sectors—forestry, fisheries, agriculture, mining and energy—have historically represented significant economic opportunities for Canada. Together, these nature-based sectors directly and indirectly contribute approximately 19% to Canada’s GDP and provide 1.7 million jobs.<sup>35</sup> This reliance creates exposure to nature-related risks that, if not appropriately managed, could undermine Canada’s long-term economic resilience. Beyond direct contributions to GDP, the monetary value of the ecosystem services that underpin the economy is substantial; for instance, across Canada’s terrestrial ecosystems, these services have an estimated annual value of US\$3.6 trillion, or approximately \$3,590/hectare and \$99,985 per capita.<sup>36</sup> Table 3 below provides estimates on the monetary value of Canada’s landscapes drawn from a review of the literature.

*Table 3. Estimated ecosystem service valuations<sup>v</sup>*

#### Selected ecosystem service values across various landscapes<sup>vi</sup>

##### Grasslands

Aggregated ecosystem service value of Prairie grasslands: \$651–\$1,001/hectare (ha)/year. This implies a yearly cost of grassland conversion to regional economies of ~\$65–\$250 million/year.<sup>37</sup>

##### Provisioning:<sup>38</sup>

- Forage production: \$306 /ha/yr.

##### Regulating:<sup>40</sup>

- Soil retention: \$19/ha/year

<sup>v</sup> The ecosystem service values reported in Table 3 are compiled from several studies. Units for ecosystem service values vary across studies. For more information, see [Appendix B: Methodological Note - Ecosystem Service Valuations](#).

<sup>vi</sup> For a detailed review of the valuation of ecosystem services in Canada, see:

Twigg, M., Richardson, O., Cecato, B., Awan, T., Daigle, E., Elgie, S., Tougas-Cooke, R., Heer, T., Kamba, G., & Sushant. (2024). Section 2: Unlocking the Value of NCS in Canada. In *Unlocking the Economic Power of Natural Climate Solutions*. Smart Prosperity Institute. <https://institute.smartprosperity.ca/unlocking-the-economic-power-of-natural-climate-solutions>

### Cultural:<sup>39</sup>

- Wildlife hunting: \$17/ha/year
- Wildlife viewing: \$7/ha/year
- Nitrogen fixing: \$114/ha/year
- Carbon storage: \$391/ha/year

### **Forests**

A global analysis estimates forests provide ecosystem services at a median value of \$2,727/ha/year.<sup>41</sup> Canadian-specific regional values:

- Boreal forests: ~\$1,274/ha/year.<sup>42</sup>
- Urban canopy cover: \$462 million in annual benefits across Toronto (\$104M), Halifax (\$40m), Montreal (\$31.3M), and Vancouver (\$286.8M).<sup>43</sup>

Regulating/Cultural services: ~\$5,277/ha/year in Ontario's greenbelt region.<sup>44</sup>

### **Wetlands**

Aggregated ecosystem service value of Canadian wetlands: ~\$32.7 billion/year.<sup>45</sup>

### **Agricultural landscapes**

#### Provisioning:

- Food production: generated \$36.3 billion of Canadian GDP in 2022.<sup>46</sup>
- Timber provisioning: \$181/ha/year from tree-based intercropping systems in Quebec.<sup>47</sup>

#### Regulating:

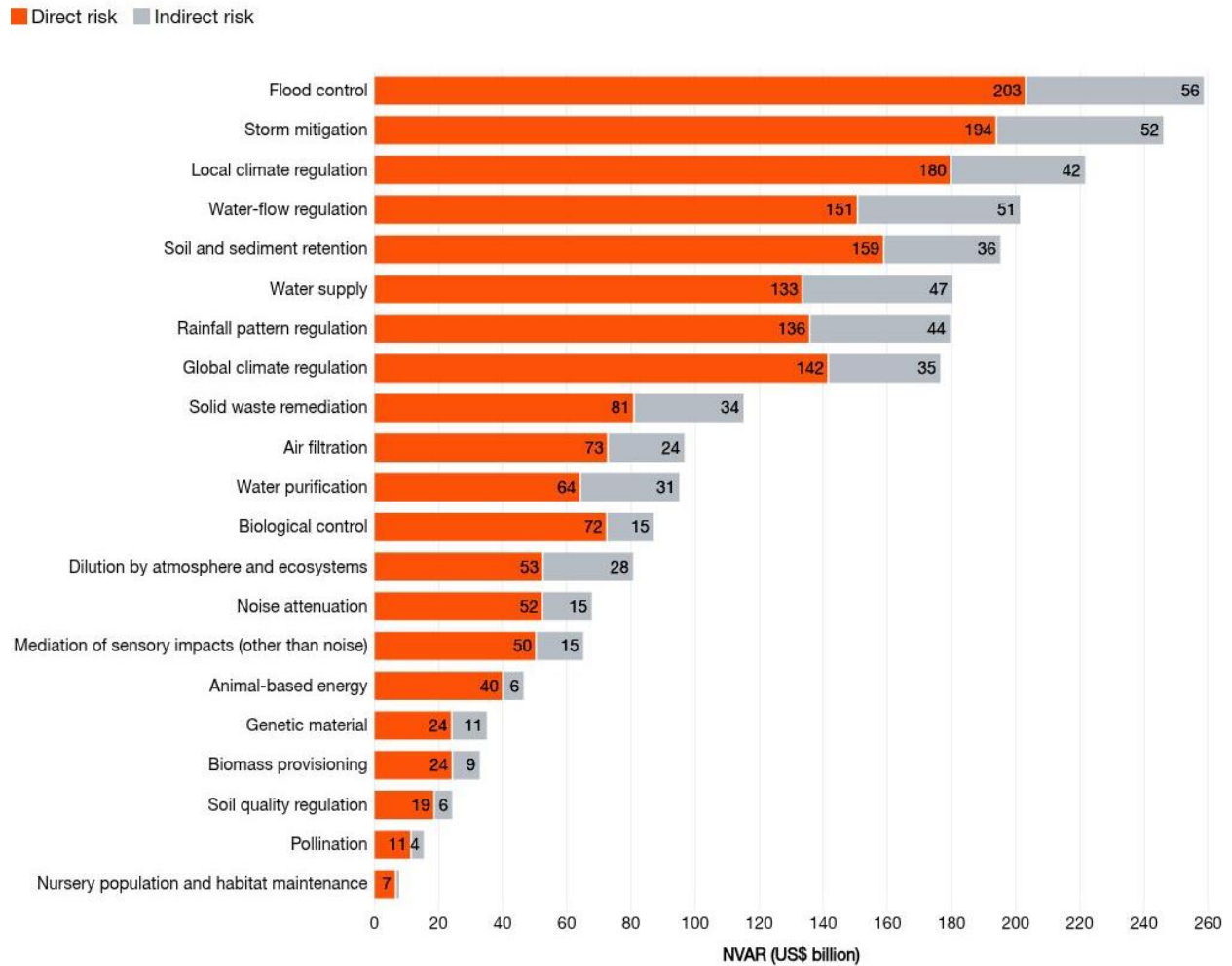
Soil retention: seedlings distributed between 1981 and 2001 in Prairie provinces and planted as shelterbelts provided an estimated \$15–97 million in soil retention benefits (large range due to regional variability of off-site costs).<sup>48</sup>

Valuing ecosystem services remains a complex and evolving process. Current valuations may not fully capture nature's benefits, particularly those related to cultural and regulating services.<sup>49</sup> However, they provide a method for understanding the potential costs associated with biodiversity loss and ecosystem degradation.

Nature-related dependencies are not uniformly distributed across the economy. A PwC analysis of industries and their supply chains found that 100% of the gross value added from the direct operations of five industries—agriculture, forestry, fishery and aquaculture, food, beverages, and tobacco, and construction—has a high dependence on nature.<sup>50</sup> Fifty percent or more of the economic value across each of these five industries' supply chains also exhibits a high dependence on nature.<sup>51</sup> Together, these industries account for US\$13 trillion in economic value, or approximately 12% of global GDP.<sup>52</sup> A further eleven industries, including energy, chemicals and materials, mining and metals, real estate and retail, exhibit moderate or high dependence on nature for at least 35% of the economic value generated by their direct operations and supply chains.<sup>53</sup> Drawing this distinction between upstream and direct operational dependencies is important for understanding the actual scope of nature-related economic exposures, as even sectors with limited direct reliance on nature, for instance,

through natural-resource extraction, may face material risks from ecosystem degradation further upstream in their supply chains. For Canada specifically, recent modelling estimates that approximately US\$259 billion of Canadian GDP is at risk from nature loss.<sup>54</sup> Notably, this same modelling exercise identified disproportionately higher at-risk GDP in several sectors, including fishing (26%) and forestry (25%).<sup>55</sup>

**Figure 3. Canadian economic value at risk from nature loss<sup>VII</sup>**



Three economically important Canadian sectors are discussed in further detail below.

**Forestry.** In 2019, Canada’s forest ecosystems supported the extraction of ~141 million tonnes of timber.<sup>56</sup> In Canada, the forestry sector accounts for approximately \$33 billion of GDP in 2022, \$45 billion in forest product exports and provides over 200,000 jobs.<sup>57</sup> This economically important sector is highly dependent on nature and faces significant nature-related risks. For example, the 1999–2015 mountain pine beetle outbreak in British Columbia impacted 18

<sup>VII</sup> Figure “Ecosystem services driving value at risk” from: Baber, L., Boulogne, C., Carmody, L., & Fang, E.-L. (2026). *Unearthing the nature risk in financial portfolios*. PwC. <https://www.pwc.com/gx/en/issues/how-we-fund-and-insure/nature-in-banking-2025.pdf>

million hectares of pine forests.<sup>58</sup> This outbreak dramatically impacted BC's timber supply, which, according to one estimate, led to a cumulative GDP loss of \$57 billion.<sup>59</sup>

**Agriculture.** In 2023, Canada's agri-food system (primary agriculture, food and beverage processors, food retailers and wholesalers, and food service providers) accounted for \$150 billion—or 7%—of Canada's GDP, and employed 2.3 million people.<sup>60</sup> The agricultural sector is highly dependent on nature. For example, globally, nearly \$600 billion worth of annual crop production is at risk from pollinator loss (2021 numbers).<sup>61</sup> According to 2016 estimates, honeybees provide pollination services to Canadian agriculture of around \$5.5 billion per year.

**Nature-based tourism.** On a global level, nature-based tourism is estimated to contribute approximately US\$600 billion in direct expenditures annually (2015 numbers).<sup>62</sup> While a similar estimate at a national level is not available for Canada, other statistics help illustrate the significance. A 2012 survey estimated adult Canadian males' expenditures on nature-based activities at CAD \$41.3 billion.<sup>63</sup> In terms of the value of ecosystem services, Canada's national parks and marine conservation areas provide an estimated value of CAD \$156–588 billion annually,<sup>64</sup> and Canada's national parks recorded over 15 million visitors in 2022.<sup>65</sup> The findings of the same 2012 survey, previously mentioned, indicate the importance of nature to Canadians' well-being. Among respondents, 89% of Canadian adults participated in various nature-based activities, 70% spent time outdoors specifically to experience nature and 47% have travelled to experience more nature.<sup>66</sup>

Ultimately, the sectoral illustrations above demonstrate the economic stakes tied directly to the health of Canada's ecosystems. While these economic impacts are most apparent in nature-based and natural resource sectors, it is crucial to recognize that all sectors—from manufacturing and retail to utilities and transport—benefit from and affect nature. These benefits and impacts may be either direct or indirect, through their physical infrastructure, land use, supply chains and the carbon footprint of their operations. To safeguard Canada's economic resilience and capitalize on opportunities, businesses must effectively manage nature-related risks, as explored in the following section.

## 2.2 Understanding nature-related risks

Managing nature-related risk begins with understanding the business-nature relationship—how an organization depends on nature and how its activities impact it—and the risks arising from this relationship. This section discusses nature-related risks, exploring how dependencies and impacts give rise to risks for individual organizations and the broader economy.

**Nature-related risks** are the “potential threats posed to an organization that arise from its and wider society's dependencies and impacts on nature” (p. 131).<sup>67</sup> In simpler terms, these are the dangers companies face due to corporate and societal impacts on nature and the resulting decline in the essential services nature provides. Dependencies and impacts refer to our interactions with nature.

**Dependencies** are “aspects of environmental assets and ecosystem services that a person or an organization relies on to function. A company's business model, for example, may be dependent on the ecosystem service of water quality regulation provided by a wetland and the

regulation of hazards like fires and floods; provision of suitable habitat for pollinators, who in turn provide a service directly to economies; and carbon sequestration” (p. 14).<sup>68</sup>

For instance, large-scale crop farms rely heavily on nature for productivity, including through:

- Pollination, where pollinators (e.g., bees) are essential for supporting crop production.
- Water supply, as most agriculture is highly reliant on fresh water for irrigation.
- Soil quality regulation is vital, as healthy soil is essential for high crop yields.

**Impacts:** “Changes in the state of nature (quality or quantity), which may result in changes to the capacity of nature to provide social and economic functions. Impacts can be positive or negative. They can result from an organization’s or another party’s actions and can be direct, indirect, or cumulative. A single impact driver, such as land-use changes, may be associated with multiple impacts” (p. 27).<sup>69</sup>

While farming relies heavily on nature, it can also harm nature through its operations. For instance, the impacts of crop production may include:

- Pesticide and fertilizer overuse, which leads to runoff that pollutes soil and water and can harm biodiversity, including pollinators,<sup>70</sup>
- Water withdrawal and consumption, where irrigation withdrawals compete with other human uses and, particularly in water-stressed regions, can deplete water resources,<sup>71</sup>
- Land use, particularly monoculture farming practices, can degrade habitats and reduce biodiversity, potentially diminishing soil quality over time.<sup>72</sup>

These examples of crop farming’s dependencies and impacts demonstrate the interconnectedness of these concepts. This interplay—relying on nature while simultaneously affecting its health and ability to deliver services—is the source from which nature-related risks arise.

## 2.3 Organizational-level risks and materiality

Businesses with high levels of dependence on nature and significant impacts on it are vulnerable to disruption from biodiversity loss and risk being left behind as other actors transition away from business models and practices that accelerate biodiversity loss. The degradation of nature creates direct threats to organizations, including businesses, through two primary channels: **physical risks** and **transition risks**.

These risks are not abstract or far-off threats. Instead, as a recent legal opinion authored by Canadian law firm Resilient LLP concludes, nature-related risks are “real risks that are known, well-documented, and reasonably foreseeable at this time in Canada” (p. 35).<sup>73</sup> Companies that understand these risks can reduce their exposure and identify new opportunities.

**Figure 4. Links between nature-related risks and opportunities, business performance and financial effects for an organization<sup>VIII</sup>**

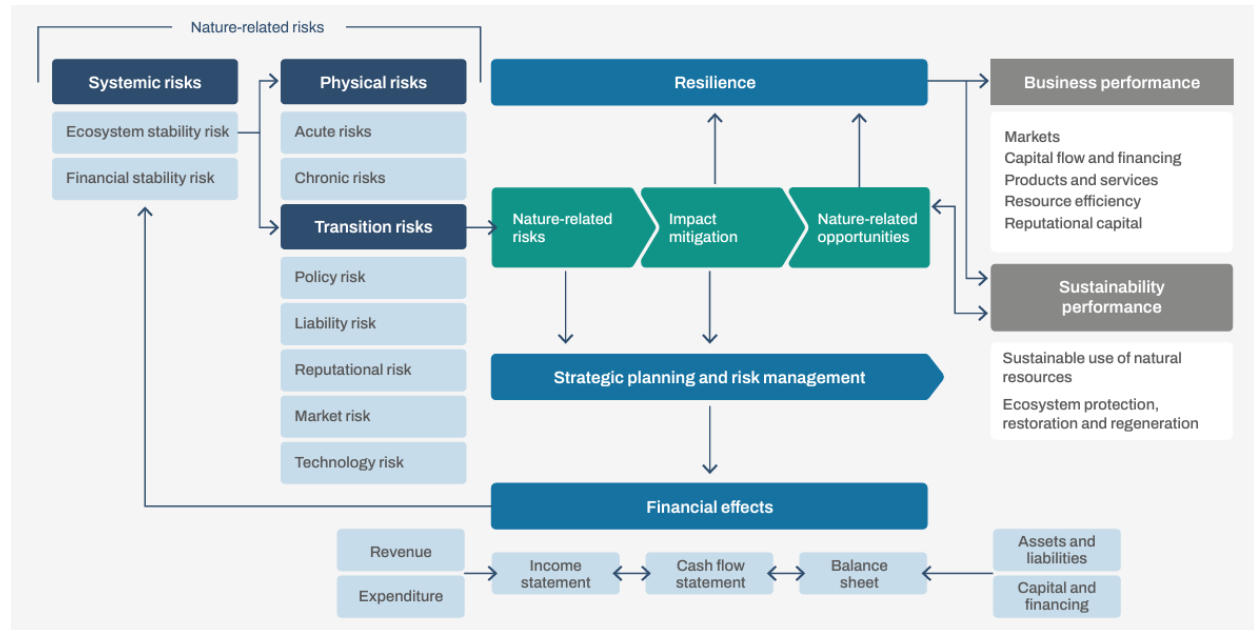


Figure 4 provides a visual overview of how a business’s dependencies and impacts on nature are transmitted through the business to have material financial impacts. Moving from left to right, the image highlights how the physical and transition risks arising from an organization’s relationship with nature do not stay contained. They can be transmitted throughout the business, affecting its performance and financial position, resulting in tangible financial effects such as changes in revenue, costs and asset values. Notably, the figure also shows that risk management can lead to nature-related opportunities, which are discussed in Section 3.2. It underscores the importance of understanding and managing this relationship.

### 2.3.1 Physical and transition risks

The concepts of physical and transition risks first arose in relation to the physical risks posed by climate change (e.g., extreme weather) and the need for businesses to adapt to a transition to a low-carbon economy. These concepts can also be applied to nature loss.

Physical risks arise directly from the degradation of nature and the loss of biodiversity and ecosystem services on which organizations and society depend. These can be acute or chronic risks. **Acute risks** are event-driven shocks that lead to sudden changes to the state of nature (e.g., wildfires, oil spills). **Chronic risks** are long-term, incremental changes to the state of nature that are often difficult or impossible to reverse (e.g., ocean acidification, pollinator decline).

<sup>VIII</sup> Figure: [Links between nature-related risks and opportunities, business performance and financial effects for an organization](#) by the [TNFD](#) (2023).

Acute and chronic physical risks pose a variety of direct and indirect costs to businesses, including:

- increased costs related to natural hazards,
- decreased revenue,
- increased costs from the disruption of direct operations, and
- the degradation of supply chains.

As awareness of nature-related risks grows, businesses face increasing pressure to adjust practices and business models. The World Economic Forum’s 2024–2025 Risk Perceptions Survey, which asked respondents to rank short- and long-term risks by likelihood and expected impact, identifies biodiversity risk and ecosystem collapse as the second-most significant global issues over the next decade.<sup>74</sup> For businesses, broader responses to the nature crisis create “transition risks”—the risk of being left behind as other actors transition away from business models and practices whose high levels of dependency and impact on nature make them vulnerable to disruption from biodiversity loss.

Transition risks emerge from the societal and economic shifts necessary to address nature loss and safeguard our economies.<sup>75</sup> For organizations, transition risks stem from misalignment between their practices and the evolving landscape of policy, technology and market expectations that emphasize actions to halt and reverse nature’s decline. There are several categories:

- **Policy and legal risks** arising from a changing regulatory and policy landscape in response to nature loss, including land-use restrictions, as well as the increasing threat of nature-related litigation,
- **Market risks** arise from changes in supply and demand dynamics (consumer preferences) and in access to capital (investor preferences).
- **Technological risks** are mitigated by replacing products and services with high nature-related impacts or ecosystem service dependencies with alternatives that have lower impacts or dependencies.
- **Reputational risks** arise from organizational actions out of step with consumer or investor expectations, leading to increased negative perceptions.

Physical and transition risks can be considered hazards that may materialize as financial consequences for households, organizations and companies (micro-level) and even destabilize the broader economy (macro-level).<sup>76</sup> Central banks and supervisory authorities worldwide are increasingly adopting the perspective that nature-related risks pose a threat to broader economic and financial stability. In a 2022 statement, the Network for Greening the Financial System (NGFS)—a membership body of 147 central banks and supervisory authorities that includes the Bank of Canada and Canada’s Office of the Superintendent of Financial Institutions—stated, “the NGFS is of the view that nature-related risks... could have significant macroeconomic implications, and the failure to account for, mitigate, and adapt to these implications is a source of risk for individual financial institutions as well as for financial stability” (p. 2).<sup>77</sup>

This recognition by central banks underscores that the effects of nature loss extend beyond individual organizations. The following section explores how micro-level risks can aggregate and pose broader systemic threats to ecosystem and financial stability.

## 2.4 Macroeconomic and systemic risks

While individual firms experience nature-related risks at the microeconomic level, these risks can compound and cascade, creating **systemic risks** characterized by the breakdown of an entire system. Systemic risks manifest in two interconnected ways: through the breakdown of natural systems (ecosystem stability risk) and the financial system (financial stability risk).

### 2.4.1 Ecosystem stability risk

**Ecosystem stability risk** arises when the cumulative impacts of many individual actors push a natural system beyond a critical threshold, leading to its collapse. For instance, while one company's water pollution might have a localized effect, the combined discharge from dozens of companies can degrade an entire watershed. This compromises the watershed's provisioning and regulating services for all businesses and communities in the region, illustrating how unmanaged micro-level impacts can trigger macro-level ecosystem instability.

#### The economic consequences of ecosystem collapse

By absorbing carbon dioxide (CO<sub>2</sub>) from the atmosphere, the world's oceans provide an important climate-regulating service. As atmospheric levels of CO<sub>2</sub> increase, oceans absorb more and more, leading to a decrease in their pH level. As the pH level decreases, the world's oceans become more acidic.

Corals and shellfish are particularly impacted by ocean acidification, as the increasing acidity limits their development. Over time, the loss of coral reefs poses physical risks due to decreased coastal protection for the ~500 million people living in tropical coastal zones.<sup>78</sup> By 2100, the economic damages per year due to coral reef loss are projected to be US\$500–870 billion.<sup>79</sup> Similarly, reduced shellfish availability could lead to economic costs of US\$6–10 billion per year.<sup>80</sup>

### 2.4.2 Financial stability risk

**Financial stability risk** arises when widespread, correlated financial losses from nature-related events cascade through the financial system. For example, a drought affecting an entire agricultural region could lead to correlated losses, posing a direct threat to financial institutions that lend to companies in the sector. The cumulative impact of nature-related risks can lead to broader macroeconomic deterioration with direct fiscal implications for governments.<sup>81</sup>

Figure 5. Nature-related risk framework: Illustrating potential risk transmission mechanisms<sup>IX</sup>

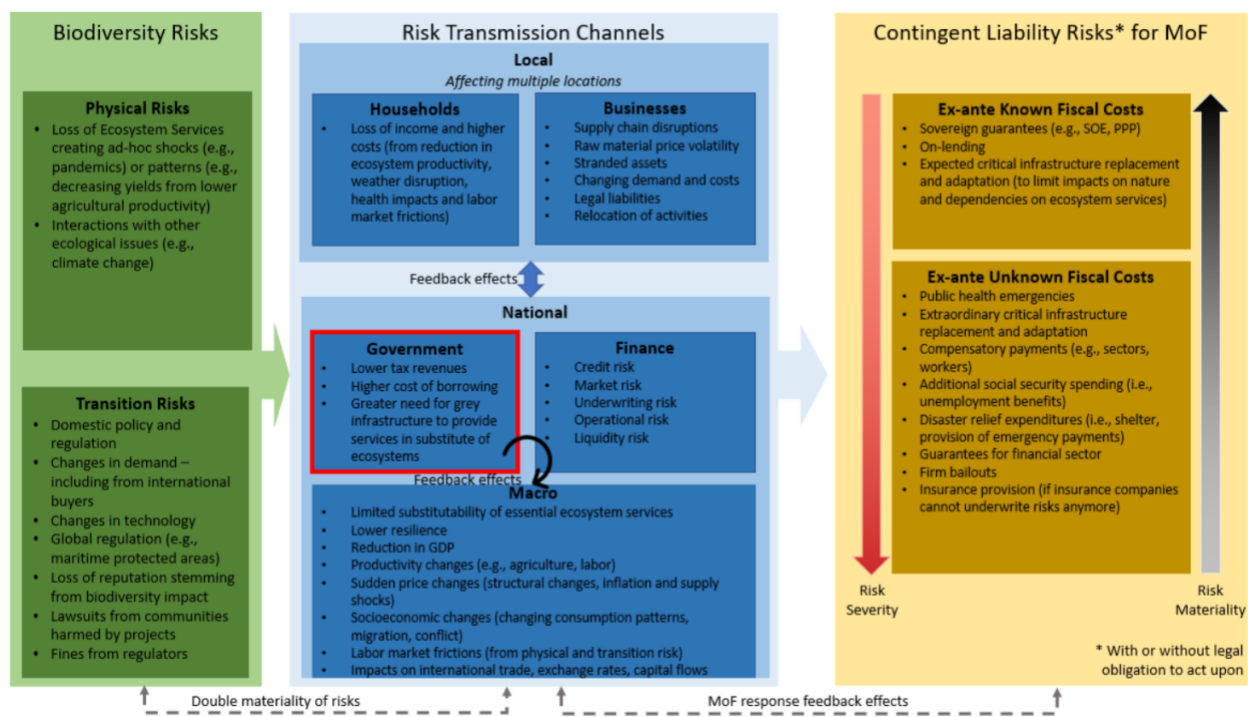


Figure 5 provides a detailed illustration of how nature-related physical and transition risks may be transmitted, with a particular focus on the implications for government (see the red box). It shows how many localized impacts affecting households and businesses can have macro-level consequences, such as reduced GDP and increased government borrowing costs.

The potential severity of economic disruption triggered by systemic risks becomes clear when considering the sheer scale of the economy’s reliance on natural capital. Although it varies by sector (as illustrated in the discussion above), all economic activity is dependent on nature to some degree. According to recent estimates, 55% of global GDP—US\$58 trillion of economic value—is generated by sectors that are moderately or highly dependent on nature.<sup>82</sup> Some links are less visible than others, such as in the pharmaceutical industry, where 70% of cancer drugs are derived from natural or bioinspired products.<sup>83</sup> Overall, healthy ecosystems provide critical services with immense monetary value, estimated globally at approximately US\$125 trillion per year.<sup>84</sup> When these services are degraded or lost, the result can be trillions of dollars in economic losses.

There is an emerging body of empirical research that has begun to quantify how these real-economy dependencies translate into financial system exposures. In one such study, De Nederlandsche Bank (Netherlands central bank) examined EUR 1.4 trillion in investments by Dutch financial institutions, finding that EUR 510 billion (36%) had a high or very high dependence on at least one ecosystem service.<sup>85</sup> A similar study by the Banque de France found

<sup>IX</sup> Figure: “Figure ES3: Nature-related risk framework.” From: Power, S., Dunz, N., & Gavryliuk, O. (2022). [An Overview of Nature-Related Risks and Potential Policy Actions for Ministries of Finance: Bending the Curve of Nature Loss](#). The Coalition of Finance Ministers for Climate Action.

that “42% of the market value of securities held by French financial institutions comes from issuers (non-financial corporations) that are highly or very highly dependent on at least one ecosystem service” (p. ii).<sup>86</sup> Notably, when also considering upstream (indirect) dependencies, the Banque de France study found that all issuers of securities exhibited some level of dependence on at least one ecosystem service.<sup>87</sup>

More recently, the European Central Bank (ECB) conducted a similar analysis across the full euro area, examining over 4.2 million non-financial corporates. The ECB found that 72% of these firms—or approximately three million companies—are critically dependent on at least one ecosystem service. Consequently, nearly 75% of all corporate loan exposures in the euro area are linked to borrowers that are critically dependent on at least one ecosystem service.<sup>88</sup> The most significant dependencies identified related to mass stabilization and erosion control, surface and groundwater supply, flood and storm protection, and carbon uptake and storage. Direct dependencies via supply chains were particularly significant for the agriculture, manufacturing, and wholesale and retail trade sectors.<sup>89</sup> These findings illustrate how the economy’s dependence on nature translates into exposure within financial portfolios, which, if left unmanaged, can transmit into broader instability in the financial system.

The immense economic value tied directly and indirectly to nature underscores why its degradation poses a profound risk to individual businesses and to the financial system. This interconnection between nature’s health and economic prosperity is becoming increasingly difficult to ignore, as a growing confluence of external pressures exists for organizations to manage their nature-related risks, including shifts in the policy and regulatory landscape, investors’ demands for transparency and action, and changing consumer values that favour sustainability.

However, the transition is not seamless. Businesses navigate these pressures alongside persistent economic challenges, varying regulatory speeds across jurisdictions, potential gaps between stated consumer preferences and actual purchasing behaviour, and numerous other factors. Against this backdrop, organizations need effective ways to understand and manage their interface with nature. The following section examines how disclosures serve as a key tool for integrating nature into strategic and financial decision-making.

### 3. Corporate disclosure of nature-related risks and opportunities

Nature-related risks become financially material when they are likely to impact an organization's cash flows, financial position or the cost of capital. Nature-related financial disclosures can provide decision-useful information to investors and other stakeholders about an organization's interface with nature, enabling more effective risk management and informed capital allocation decisions. For disclosing organizations, the process of identifying and assessing information for disclosure can also help uncover strategic opportunities, such as operational efficiencies, access to sustainable finance and enhanced brand reputation. The adoption of NFDs is increasingly driven by external pressures, including evolving international regulations, expanding directors' legal duties, explicit investor demands for transparency and growing consumer preferences for sustainable products and services.

The accumulation of physical and transition risks, compounded by growing societal pressure and Canada's significant economic dependence on nature, creates a landscape of uncertainty. The critical question, therefore, is how to effectively identify, manage and disclose these nature-related challenges and capitalize on the opportunities. The following section outlines how standardized and globally accepted frameworks for nature-related financial disclosures (NRFDs) serve as a key tool to meet this need.

In this context, "disclosure" refers specifically to the public reporting of information intended to inform the decisions of external stakeholders. While companies produce various reports (e.g., annual reports, sustainability reports, CSR reports) to communicate their sustainability initiatives, NFD frameworks are a set of science-based metrics and indicators that together illustrate how an organization's interactions with nature create risks and opportunities.

#### 3.1 Financial materiality of nature-related risks

The impacts of the physical and transition risks described above become financially material when they affect—or are likely to affect—an organization's financial performance and position.

**Operating performance.** Nature-related risks most immediately affect a company's ability to generate revenue and manage costs. Operational disruptions from physical risks can halt or slow production, reducing revenue. For example, water shortages cost thermal power utility companies in India more than US\$1.4 billion in potential revenue between 2013 and 2016, during which 14 of the country's 20 largest thermal power companies experienced at least one operational disruption.<sup>90</sup> Similarly, chronic risks such as pollinator decline and water scarcity reduce crop yields, directly affecting the top line of agricultural businesses. At the same time, these risks can drive up operating costs. For instance, water scarcity may require investment in expensive new technologies, while invasive species could create significant new expenses to manage their spread. The Carbon Disclosure Project's (CDP) research into the potential financial implications of water-related risks found that, of the over 1,100 companies disclosing on water through the CDP, 68% reported exposures to water-related risks with a potential financial

impact of US\$225 billion.<sup>91</sup> Meanwhile, the reported response costs totalled US\$119 billion. Such research demonstrates that, while proactive management involves costs, the costs of inaction may be substantially higher.

**Financial position.** Beyond the income statement, nature-related risks can directly affect the value of a company's assets and the scale of its liabilities. For instance, events such as floods and wildfires can cause significant damage to property, plants and equipment, leading to write-downs. Furthermore, transition risks can lead to asset stranding. As regulations or markets shift, assets whose operations depend on processes that drive nature loss can become economically unviable. Similarly, legal liabilities can arise from environmental damage. The financial consequences of litigation can be staggering, as exemplified by the 2010 BP oil spill, which is estimated to cost the company \$79 billion by 2032.<sup>92</sup> More recent events include a US\$10.3 billion settlement in 2024 between 3M and public water suppliers in the United States for PFAS remediation, and another PFAS-related settlement of US\$1.2 billion paid by DuPont, Chemours and Corteva.<sup>93 94</sup>

**Cost and access to capital.** Ultimately, an organization's management of nature-related risks influences its ability to secure financing. As investors and lenders integrate nature into their decision-making, companies with business models misaligned with sustainable practices may face higher costs of capital or more restrictive lending conditions. In some cases, access to capital may be cut off entirely, as seen when the Government Pension Fund of Norway divested from 33 palm oil companies due to deforestation risks.<sup>95</sup> This directly affects a company's ability to fund its operations and invest in future growth.

### 3.1.1 Materiality in nature-related financial disclosures

The concept of *materiality* is central to determining which information needs to be reported. Traditionally, in financial reporting, this refers to **financial materiality**: information is considered material if omitting or misstating it could reasonably influence the economic decisions of primary users—typically investors, lenders and other creditors. It focuses on how external factors, such as environmental degradation, affect the company's value. For instance, degradation of ecosystem services leads to increased costs.

A complementary perspective is **impact materiality**, which considers an organization's significant impacts on the external world—the environment (including nature) and people. Recognizing that these two perspectives are intertwined, many emerging sustainability standards, particularly in the European Union, now embrace **double materiality**, requiring companies to report on how nature affects their bottom line (financial materiality) and how their activities affect nature (impact materiality).

In this broad sustainability context, disclosure refers to the formal communication of information-deemed material. Nature disclosures, as discussed in this report and reflected in frameworks such as the TNFD, aim to provide investors and other capital providers with material information as a baseline. However, even within this financially focused scope, organizations often need to assess their significant impacts on nature to identify the material dependencies, risks and opportunities that may translate into financial consequences.

Currently, most dedicated NFD frameworks operate voluntarily, like the TNFD (discussed in [Section 4](#)). However, global policy drivers, such as the Global Biodiversity Framework (see [Section 4.1](#)), are increasing pressure for mandatory requirements in various jurisdictions. Whether voluntary or mandatory, the goal is to provide stakeholders with relevant insights into the complex relationship between business and nature.

## 3.2 From risk to opportunity: The benefits of nature-related financial disclosures

The preparatory work required for disclosure—including assessing impacts and dependencies and identifying risks—provides internal clarity and direction. This enhanced understanding not only enables proactive risk management but also creates the conditions for identifying opportunities related to nature.

This section outlines opportunities arising from this process, including improved resource efficiency, new market opportunities, enhanced access to capital and reputational benefits.

**Improved resource efficiency across business activities.** By identifying nature-related impacts and dependencies in its direct operations or along its value chain, an organization can take action to reduce or avoid them entirely, ultimately yielding co-benefits in the form of operational efficiency improvements and reduced costs.<sup>96</sup> This is a well-studied phenomenon that extends beyond nature: risk disclosure, in general, improves operational efficiency.<sup>97</sup> For example, research suggests that investments to improve crop yields on large farms (i.e., 2+ hectares) could, by 2030, unlock US\$145–180 billion in value annually.<sup>98</sup> This is because investing in new technologies and improved farming practices to increase crop yields on existing farmland would, over time, meet projected increases in food production, requiring an estimated 150–180 million fewer hectares of new farmland than a business-as-usual scenario.

**New market opportunities** will arise as consumer and business attitudes shift toward environmentally conscious products and services. This shift presents opportunities for firms that proactively address their nature-related impacts and dependencies. A 2019 report examining the sales performance of sustainability-marketed packaged goods across 36 product categories found that, between 2013 and 2018, the overall sales growth of sustainability-marketed products was 5.6 times that of their traditional counterparts (non-sustainability-marketed). Canadian companies in sectors such as agriculture and forestry could leverage expanding consumer preferences for biodiversity-friendly products ([Section 2.3.4](#)), thereby creating distinct competitive advantages domestically and internationally. Concurrently, increased environmental disclosures are correlated with increased corporate innovation.<sup>99</sup>

**New financing opportunities.** Proactive implementation of NFDs could create and preserve financing opportunities. The global emergence of various nature-focused investor groups (see next section) signals increasing demand for nature-related information. Consequently, companies that lead in NFD implementation may gain improved access to capital and potentially lower borrowing costs. Emerging evidence suggests that markets are beginning to price the financial implications of biodiversity loss; for instance, acute biodiversity events have been shown to trigger a widening of corporate bond spreads (an indicator of higher borrowing

costs) for companies perceived to have high negative impacts on nature.<sup>100</sup> This underscores how proactive disclosure and management of nature-related risks, facilitated in part by NFDs, can support organizations by mitigating adverse market reactions and maintaining favourable financing conditions. Furthermore, investments in projects with demonstrable net-positive benefits for nature create opportunities to use innovative global financial instruments, such as green bonds and sustainability-linked bonds/loans. These instruments are designed to raise capital that supports projects aligned with various sustainability objectives, including nature-specific themes like biodiversity conservation.<sup>x</sup>

**Improved reputation.** The perceptions of stakeholders and society more broadly may improve as an organization takes steps to address its nature-related impacts. Environmental and social information disclosures are frequently employed by businesses to maintain legitimacy and enhance their reputation.<sup>101</sup> Stand-alone corporate social responsibility disclosures have been found to positively influence professional stakeholders' perceptions of a firm's reputation.<sup>102</sup> Specifically, emerging evidence on nature-related disclosure suggests that proactive disclosure of nature-related information may mitigate litigation and reputational risks.<sup>103</sup> Additionally, a recent analysis by Bassen et al. of corporate biodiversity disclosures suggests a positive relationship between the quality of nature-related disclosures and stakeholder perceptions.<sup>104</sup>

Overall, implementing NFDs is not merely about managing risks but also about unlocking numerous strategic opportunities for sustainable business growth, innovation and resilience. Clearly highlighting these opportunities reinforces the business case for adoption and motivates timely action on nature disclosures.

These organizational benefits provide an internal rationale for adopting NFDs. However, external pressures also offer compelling reasons for organizations to increase their transparency regarding nature.

### 3.3 Drivers for nature-related financial disclosures

Several interconnected factors are driving the increasing demand for and adoption of NFDs globally and in Canada.

#### ***Driver 1: Investor demands for nature-related information***

Investor awareness of nature-related risks places demands on companies to disclose information about their nature-related dependencies and impacts, enabling financial institutions to meet their own disclosure obligations and commitments. Several investor initiatives are outlined in Table 4. This illustrates the scale and organized nature of this investor pressure: global initiatives collectively represent hundreds of institutions and tens of trillions of dollars in assets under management, actively pushing for corporate action and transparency on nature dependencies and impacts.

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<sup>x</sup> More information about sustainability-labelled financial instruments is available in the [Principles & Guidance](#) documents published by the International Capital Market Association.

**Table 4. Nature-related investor initiatives**

Nature-related investor initiatives	
<b>Nature Action 100</b>	A global investor engagement initiative that has 230 institutional investor participants representing over US\$30 trillion in assets under management. <sup>105</sup>
<b>Finance for Biodiversity</b>	194 signatories representing EUR 23 trillion in assets under management (including eight Canadian signatories). Signatories have pledged to assess and disclose on nature-related matters. <sup>106</sup>
<b>Spring</b>	An investor stewardship initiative for nature under the auspices of the Principles for Responsible Investment (PRI) that allows investors to join as either an endorser or a participant in engagements with companies. The initiative has 225 endorsing investors representing US\$16 trillion in assets under management. <sup>107</sup>

Public disclosure of nature-related risks and opportunities by organizations enables redirection of capital flows toward more sustainable activities. As investors, lenders and insurers gain visibility into companies’ nature-related performance, they may increasingly allocate capital to organizations with lower impacts and dependencies. This shift could reduce the cost of capital for companies that proactively implement disclosures and take action to address their nature-related impacts.

Global trends are reflected in the voting practices of influential Canadian institutional investors. For example, the Canada Pension Plan (CPP) Investment Board now explicitly includes “nature” in its voting principles, which are intended to guide companies on matters the CPP considers important and likely to influence how it will vote in its capacity as a shareholder. This change indicates that CPP will consider how nature-related dependencies may affect companies’ performance.<sup>108</sup> This direct investor pressure should motivate Canadian firms to enhance their disclosure and management of nature-related risks to maintain access to capital.<sup>109</sup>

Investor pressure is amplified by growing consumer demands. As public awareness of nature loss intensifies, shifting consumer preferences could create new market risks and opportunities for businesses that extend beyond their relationship with investors.

**Driver 2: Evolving international regulatory landscape**

Some of Canada’s important trading partners have begun to require companies to disclose information about nature dependencies. For example, the European Union’s Corporate Sustainability Reporting Directive and the European Sustainability Reporting Standards (ESRS) require companies to disclose information about their nature-related dependencies, impacts, risks and opportunities.<sup>110</sup> Despite the absence of mandatory nature-related disclosure rules in Canada, global regulatory momentum may continue to accelerate as the sustainability reporting landscape becomes increasingly standardized.

### ***Driver 3: Expanding legal duties of Canadian corporate directors***

A 2025 legal opinion by Resilient LLP, a Canadian law firm, contends that under the *Canada Business Corporations Act*, directors have a fiduciary duty and a duty of care that may require them to identify, consider and manage material nature-related risks to act in the best interest of the corporation.

According to the legal analysis, directors who are “unduly passive” toward these risks and fail to engage in a reasoned process to analyze them are unlikely to be protected by the “business judgment rule”. This potential lack of protection could personally expose directors to legal claims, including derivative actions brought by shareholders or oppression remedies sought by affected stakeholders. Consequently, the proactive management and disclosure of nature-related risks are becoming not only a matter of strategic priority but also an important component of corporate governance in Canada.<sup>111</sup>

This evolving policy and legal landscape sends clear signals to the market. As governments and courts begin to define the formal “rules of the game” for nature-related risk, they empower and motivate market actors to respond. Investors, in particular, are forward-looking; this regulatory momentum gives them the impetus to demand greater transparency and accountability.

### ***Driver 4: Shifting consumer preferences***

There is a rising consumer awareness of and concern for nature loss. A 2024 global consumer survey revealed growing awareness of biodiversity as a pressing issue, with 84% of respondents ranking biodiversity loss as either the first, second or third most important global environmental concern. In the same survey, 86% of respondents agreed that companies have a moral obligation to ensure a positive impact on biodiversity, and 82% want companies to inform them of their specific biodiversity-related actions.<sup>112</sup>

Additionally, consumers demonstrate an interest in purchasing eco-friendly products. More than 80% of respondents identified responsibly sourced ingredients, commitments to protecting biodiversity and wildlife-friendliness as important considerations when purchasing a product.<sup>113</sup> In a 2021 global survey by the Forest Stewardship Council, 86% of respondents reported trying to avoid products that harm biodiversity. For forestry products specifically, respondents indicated that biodiversity protection and sourcing from responsibly managed forests were their top two motivators when making purchasing decisions.<sup>114</sup> In Canada, 47% of respondents to the 2012 Canadian Nature Survey indicated that they choose to purchase products and services that are more environmentally friendly compared to alternatives.<sup>115</sup>

These combined pressures have spurred organizations to begin disclosing their dependencies and impacts on nature; however, the quality, consistency and decision-usefulness of disclosed information, particularly in the absence of standardized frameworks, have been questioned.

## 4. Emergence of standardized NFD frameworks

Without standardized approaches, voluntary NFDs may lack the comparability and consistency needed by investors and other important stakeholders. This can create opportunities for greenwashing that risk undermining market trust. To address a lack of standardized approaches, the TNFD has developed disclosure recommendations that offer a structured approach to NFDs. The TNFD Framework, which is closely aligned with the Taskforce on Climate-related Financial Disclosures Framework, is seeing increasing global uptake by businesses and financial institutions.

Given the potential financial and economic implications posed by nature-related risks, the accuracy, comparability and credibility of disclosures are of key importance for companies and decision-makers. Ensuring these outcomes requires transparent and standardized NFDs. The current NFD landscape is still evolving, with early disclosures often undertaken voluntarily and without common guidelines, making them difficult to assess for credibility and compare the performance of similar companies. Globally accepted NFD frameworks help to overcome information asymmetries, an important issue that can lead to market failures that hinder climate and broader environmental action.<sup>116</sup>

### 4.1 Limitations of non-standardized nature-related financial disclosures

The case for adopting NFDs is compelling from a risk-management and a strategic-opportunity perspective. However, what is disclosed and how it is measured matter; a lack of standardized frameworks creates hurdles to comparability and consistency across organizations and a heightened risk of greenwashing.

#### 4.1.1 Lack of comparability and consistency

A comprehensive literature review on corporate social responsibility (CSR) and sustainability disclosures conducted by U.S.-based researchers found that most sustainability information reported by companies is provided voluntarily and often lacks comparability and standardization due to significant heterogeneity in content and presentation.<sup>117</sup>

A related dimension of this challenge concerns the interoperability of emerging nature-related disclosure frameworks. As the NFD landscape matures, multiple frameworks and standards are developing in parallel. This includes the TNFD Recommendations, the European Sustainability Reporting Standards (which include biodiversity and ecosystem components), and the Global Reporting Initiative's Biodiversity Standard (GRI 101). Additionally, there is potential forthcoming standard-setting work by the International Sustainability Standards Board (ISSB) to ensure adequate integration of nature-related issues into global sustainability reporting standards. While these initiatives share common foundations and efforts to ensure alignment are ongoing, differences persist. For firms operating across jurisdictions or seeking to satisfy multiple stakeholder expectations, navigating this evolving landscape can impose additional complexity and reporting burden.

As the nature-related reporting landscape continues to take shape, heterogeneity in content and presentation makes it difficult to assess and compare sustainability performance across firms. Investors echo these concerns: a 2019 investor survey identified “inconsistency, incomparability, or lack of alignment in standards” as the primary shortcomings of existing sustainability reporting practices (p. 6).<sup>118</sup> Given the newness of reporting on nature-related dependencies and impacts, these challenges are magnified for NFDs. Investors, lenders and insurers require standardized information to accurately assess nature-related risks and opportunities across companies and sectors, enabling them to make informed capital allocation decisions and meet their reporting commitments. This ambiguity not only hinders informed decision-making but also creates an environment where misleading environmental claims can proliferate.

### 4.1.2 Greenwashing

A significant challenge facing all forms of sustainability reporting, including NFDs, is the risk of greenwashing. Greenwashing, defined as misleading claims about environmental or broader sustainability performance, can undermine investor trust, misdirect capital away from genuine sustainability-aligned activities and ultimately undermine meaningful progress on sustainability goals. This creates a risk for companies undertaking legitimate efforts to reduce their dependence and impact on nature.

The prevalence of this issue is evidenced by growing regulatory scrutiny of sustainability claims. For instance, amendments to Canada’s [Competition Act](#) clarify that unsupported environmental claims about businesses, business activities and products are deceptive marketing practices.<sup>XI119</sup> The rapidly growing number of [sustainable finance taxonomies](#) globally also demonstrates governments’ increasing efforts to address greenwashing risk.<sup>XII</sup>

Greenwashing may be a particularly acute problem for voluntary sustainability disclosures. This includes voluntary NFDs, particularly given that methodologies, frameworks and reporting standards continue to evolve. Without clear definitions, consistent metrics and robust verification or assurance processes, organizations might engage in selective or overly positive reporting that does not accurately reflect genuine commitment or meaningful action regarding biodiversity and ecosystem impacts.<sup>XIII 120</sup> Consequently, the credibility and effectiveness of NFDs hinge significantly on the development, adoption and enforcement of rigorous,

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<sup>XI</sup> In Budget 2025, the Government of Canada indicated an intention to update the greenwashing provisions “by removing the requirement for businesses to substantiate their environmental benefit claims based on internationally recognised methodology standards and the ability for third parties to bring cases directly to the Competition Tribunal for greenwashing complaints” (Annex 5, p. 16).

<sup>XII</sup> Further discussion about the role of sustainable finance taxonomies in combatting greenwashing can be found in: Kaiser, C., & Welch, C. (2024, December 19). Cracking down on greenwashing: Canada’s sustainable finance taxonomy could strengthen anti-greenwashing efforts. *Smart Prosperity Institute*. <https://institute.smartprosperity.ca/cracking-down-on-greenwashing>

<sup>XIII</sup> A detailed discussion of greenwashing and its forms can be found in (see in particular: ‘Claim Greenwashing’): De Freitas Netto, S. V., Sobral, M. F. F., Ribeiro, A. R. B., & Soares, G. R. D. L. (2020). Concepts and forms of greenwashing: A systematic review. *Environmental Sciences Europe*, 32(1), 19. <https://doi.org/10.1186/s12302-020-0300-3>

standardized frameworks, such as the TNFD Recommendations, coupled with reliable mechanisms for independent verification of disclosed information.<sup>121</sup>

There is limited academic literature on NFDs and the prevalence of greenwashing specifically; however, research on ESG-themed disclosures more broadly acknowledges that a lax or uncertain regulatory environment is a driver of greenwashing—often in the form of selective disclosures.<sup>122</sup> In contrast, evidence suggests that mandated ESG-related reporting requirements lead to a decline in greenwashing among firms. For instance, an analysis of the effects of mandatory carbon reporting in the United Kingdom found that the introduction of mandatory reporting led to a decline in greenwashing.<sup>123</sup>

Importantly, while standardized frameworks such as the TNFD directly address concerns about greenwashing and fragmented sustainability reporting, their effectiveness ultimately depends on the practical and institutional conditions that influence their uptake, as well as on whether disclosures are adopted consistently, implemented credibly and provide decision-useful information.

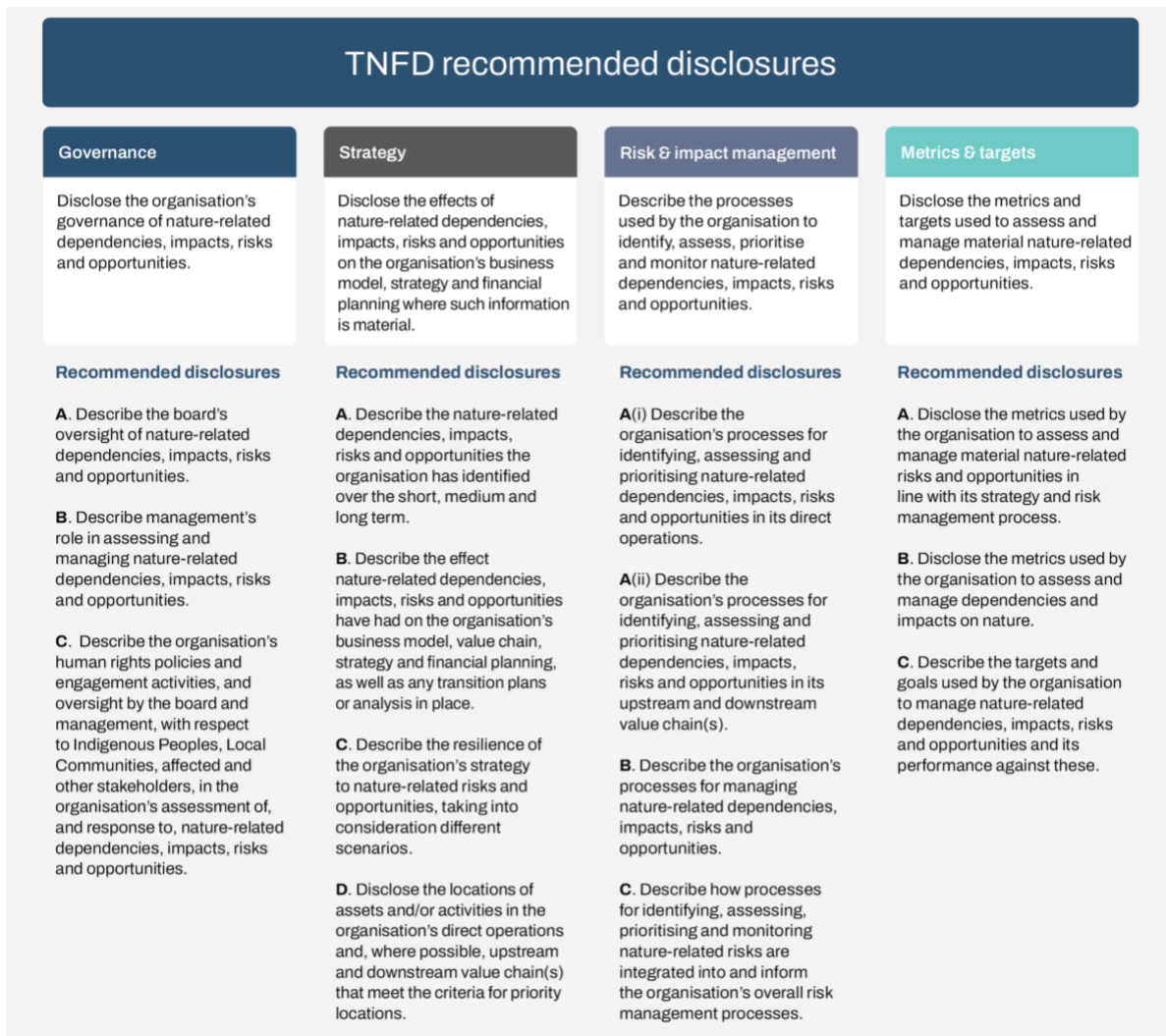
## 4.2 Taskforce for Nature-related Financial Disclosures

The most prominent NFD framework is the TNFD Recommendations. Launched in 2021, the TNFD, a global reporting initiative, released a set of recommendations for organizations to assess, manage and disclose their nature-related impacts, dependencies, risks and opportunities. Since their release, the TNFD Recommendations have gained rapid global support.<sup>XIV</sup> Hundreds of organizations worldwide, including major financial institutions and publicly listed companies, representing trillions in assets and market capitalization, have committed to adopting the Framework. Readers interested in the history of the TNFD's development and the rationale behind the effort are encouraged to read the [TNFD scoping paper](#).

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<sup>XIV</sup> It's important to distinguish between NFDs as a broad concept and the specific frameworks designed to implement them. NFDs encompass any disclosure providing information about an organization's relationship with nature. The TNFD Framework represents one specific (though currently the most prominent and globally recognized) set of recommendations and guidelines detailing how organizations can structure and report this information consistently. While TNFD provides a structured approach, the underlying need and concept of NFDs exist independently of any single framework.

Figure 6. TNFD's recommended disclosures<sup>xv</sup>



As shown in Figure 6, the TNFD framework outlines 14 recommended disclosures, built on four pillars that mirror the Task Force on Climate-related Financial Disclosures (TCFD) framework. The pillars include:

- Governance (how the board and management oversee nature-related issues),
- Strategy (how nature-related issues affect the business model and strategy),
- Risk and Impact Management (the process for identifying, assessing and managing nature-related issues), and
- Metrics and Targets (the metrics and targets used to assess and manage nature-related issues).<sup>124</sup>

Disclosures across these pillars aim to provide investors and other stakeholders with structured, comprehensive information about an organization's interface with nature.

<sup>xv</sup> Figure: [TNFD's recommended disclosures](#) by the [TNFD](#) (2023).

In the absence of mandatory nature-related reporting requirements, the TNFD's efforts to foster transparent and comparable NFDs, as well as potential future actions by the International Sustainability Standards Board to integrate nature-related considerations more deeply into global sustainability reporting standards, are crucial to building confidence in NFDs. In addition to improved standardization, verification and appropriate oversight will be essential to prevent superficial disclosures or overstated claims that may not only undermine trust in reporting entities but also weaken the perceived legitimacy and overall efficacy of the emerging nature-related disclosure regime.

### 4.3 Growing support for TNFD among businesses

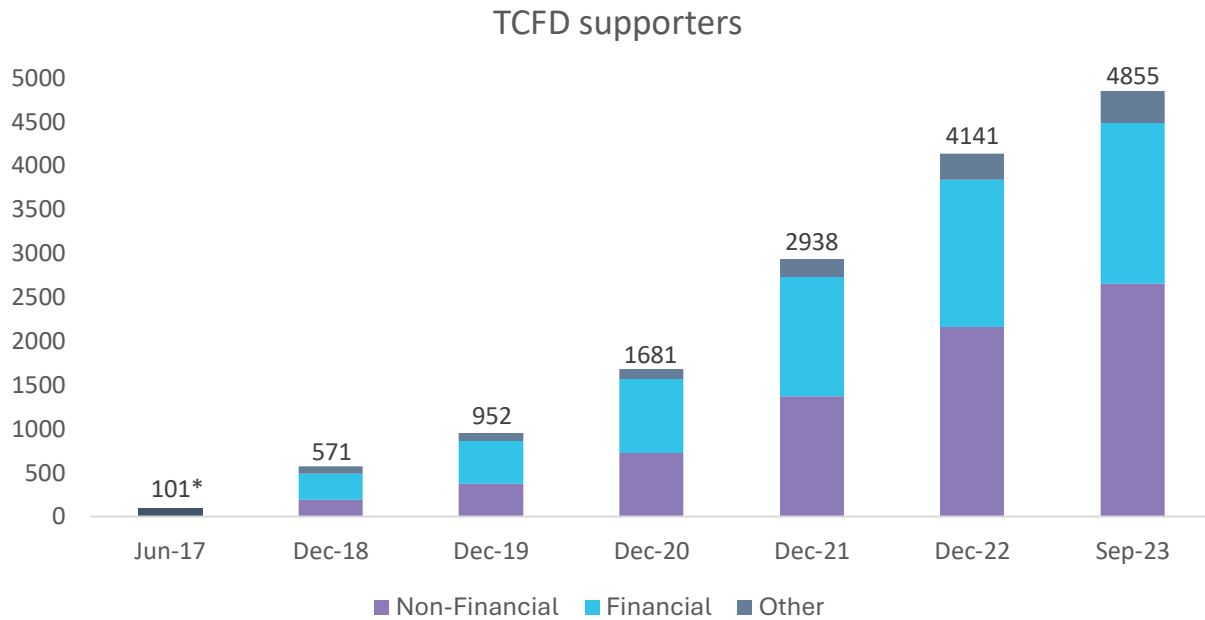
As of October 2024, more than 500 organizations globally have implemented or committed to implement TNFD-aligned disclosures. This includes 159 financial institutions with US\$17.7 trillion in assets under management. Publicly listed companies committed to TNFD-aligned implementation have a collective market capitalization of US\$6.5 trillion. Notably, between January and October 2024, the number of committed TNFD adopters increased by 57%.<sup>125</sup> Among these adopters are 10 Canadian organizations across 10 sectors (as classified by the Sustainability Accounting Standards Board's sector classification).<sup>126</sup>

Observing the trajectory of support for the TNFD alongside its climate-focused predecessor, the TCFD, provides valuable context for potential future trends. Support for the TCFD grew rapidly, from around 100 initial supporters in mid-2017 to nearly 5,000 by the end of 2023.<sup>XVI 127</sup> Much of the TCFD's later growth came as governments worldwide began mandating climate-related financial disclosures. The IFRS Foundation, which has integrated the TCFD recommendations into the ISSB's sustainability disclosure standards, reports that as of September 2024, 14 jurisdictions have TCFD-aligned disclosure requirements in place, while a further 16 jurisdictions are moving forward with ISSB-aligned disclosure requirements.<sup>128</sup>

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<sup>XVI</sup> TCFD "supporters" are organizations that have expressed support for the TCFD Recommendations. Not all TCFD supporters are adopters of the TCFD Recommendations.

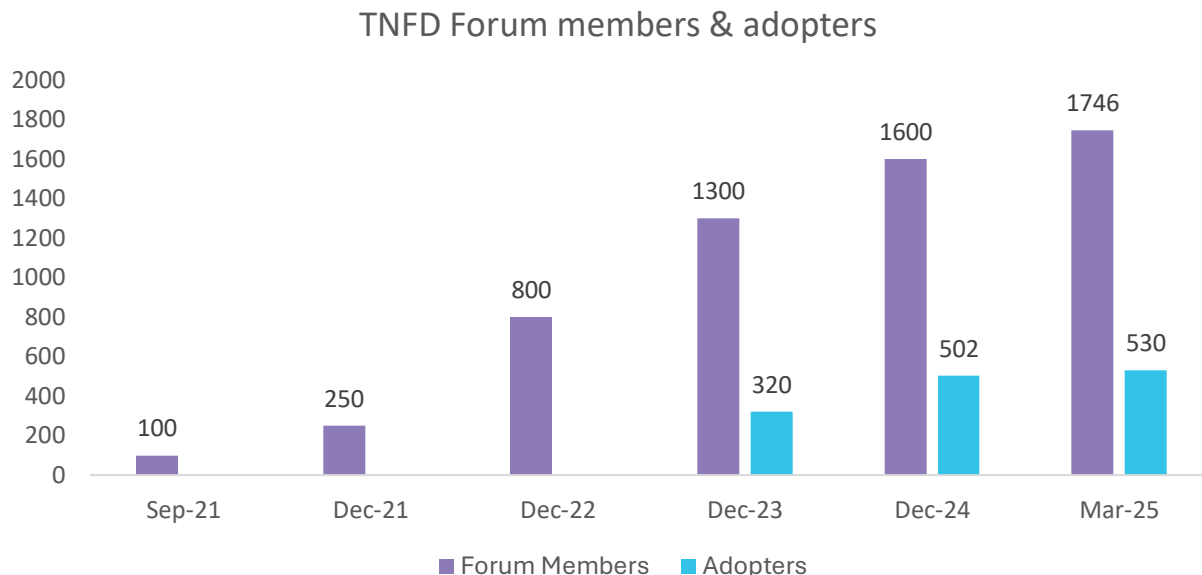
Figure 7. Growth of TCFD supporters over time<sup>xvii</sup>



Although nature-related issues are often perceived as far more complex than climate-related issues in public reporting, the TNFD is following a similar growth trajectory in terms of organizational engagement and support. The TNFD Forum, comprising organizations interested in the Framework’s development, has expanded rapidly from an initial 100 members in September 2021 to more than 1,700 by March 2025. This increase in support is nearly identical to that of the TCFD over a similar 3.5-year period, as shown in Figure 8.

<sup>xvii</sup> Figure: author’s creation. Figure data from: Task Force on Climate-related Financial Disclosures. (2023). *Task Force on Climate-related Financial Disclosures: 2023 Status Report*. <https://assets.bbhub.io/company/sites/60/2023/09/2023-Status-Report.pdf>

Figure 8. Growth of TNFD forum members & committed adopters over time<sup>xviii</sup>



The parallels between the growth trajectories of TCFD supporters and TNFD adopters/forum members suggest a similar evolution is underway for NFDs. This signals that a deeper, more comprehensive integration of NFDs into sustainability reporting may become a more standard business practice. Companies that fail to implement them may find themselves at a competitive disadvantage.

#### 4.4 Barriers to uptake in Canada

The emergence of standardized frameworks, such as the TNFD and their growing global support, signals that nature-related disclosure is becoming an increasingly integrated and meaningful part of sustainability-focused financial reporting. However, having a framework—and even witnessing growing support and adoption—does not ensure effective or widespread implementation of NFDs. This objective faces several hurdles in the Canadian context.

Firstly, the voluntary disclosure environment remains challenging without clearer policy and regulatory signals. Secondly, the technical data and measurement infrastructure to support nature-related assessments and disclosure are still developing. Organizations find it difficult to convert fragmented nature-related data into decision-useful information that investors and other NFD users expect. Lastly, a significant capacity gap exists in organizations, marked by a lack of the necessary “nature intelligence” among boards, senior executives and staff. This capacity gap is likely to hit small and medium-sized enterprises hardest.

<sup>xviii</sup> Figure: author’s creation. Figure data from: Taskforce on Nature-related Financial Disclosures. (2024, October 25). Over 500 organisations and \$17.7 trillion AUM now committed to TNFD-aligned risk management and corporate reporting. *TNFD*. <https://tnfd.global/over-500-organisations-and-17-7-trillion-aum-now-committed-to-tnfd-aligned-risk-management-and-corporate-reporting/>

Taken together, these factors create a systemic readiness gap across the Canadian economy. While *demand* for NFDs is accelerating—driven by international agreements, investor pressure and an increasingly standardized reporting landscape—corporate *capacity* to implement disclosures is lagging. This imbalance suggests that scaling NFD uptake depends in part on addressing underlying adoption constraints. Without progress to address these foundational hurdles, the adoption of NFDs may remain limited to a small group of market leaders, leaving the majority of Canada’s nature-related risks unmeasured and unmanaged.

## 5. The path forward: Addressing the readiness gap

Nature is the foundation of the Canadian economy, and its ongoing and unprecedented decline globally and within Canada is generating significant economic vulnerabilities. For a resource-dependent country like Canada—where forestry, fisheries, agriculture, mining and energy are of great economic importance—the deterioration of natural capital directly results in financial risks. Ignoring nature-related issues could leave organizations vulnerable to costly operational disruptions, stranded assets, misalignment with changing market preferences and limited access to capital, among other challenges.

Nature-related financial disclosures are an important informational tool for addressing these blind spots. Standardized frameworks, such as the TNFD Recommendations, offer a structured mechanism for organizations to assess and report on the business-nature interface. Integrating the information generated by this process can provide organizations with a basis for managing nature-related risks and identifying strategic opportunities, including improved resource efficiency, product innovation and reputational benefits.

There is increasing momentum for the adoption of NFDs. Institutional investors are explicitly demanding greater transparency regarding nature-related issues to inform their decision-making. Simultaneously, the international regulatory landscape is evolving, with key trading partners like the European Union introducing comprehensive sustainability reporting requirements. Domestically, recent legal analyses suggest that the fiduciary duties of corporate directors may increasingly require proactive identification and management of material nature-related risks. Furthermore, shifting consumer preferences toward environmentally conscious products continues to present new market risks and opportunities.

However, the widespread uptake of NFDs faces practical constraints. Organizations encounter a systemic readiness gap characterized by policy and regulatory uncertainty, an underdeveloped data and measurement infrastructure, and limited institutional capacity.

Addressing this gap requires a pragmatic, thoughtfully sequenced approach built on a well-evidenced understanding of real-world constraints in the Canadian context. A coherent and durable foundation for nature-related financial disclosure in Canada requires further targeted research to comprehensively understand these constraints and to identify the specific policy, regulatory and capacity-building interventions necessary to overcome them. Implementing research-informed interventions will facilitate the integration of nature-related issues into the heart of economic and financial decision-making—a shift that is ultimately required to protect Canada’s economic prosperity.

## Appendix A: Foundational concepts

**Nature**<sup>xix</sup> encompasses the entire physical, non-human world—including all living organisms, land and seascapes, weather systems and natural processes. It represents the backdrop against which all human activities occur and the source from which we derive our most fundamental resources.

A core component of nature is **biodiversity**, which refers to the rich variety of life on Earth.<sup>129</sup> The term biodiversity refers to the variability of life on three distinct levels:

- **Genetic** diversity within species.
- **Species** diversity (or richness): the number of different species within an area.
- **Ecosystem** diversity: the variety of different habitats and ecological communities within and across land- and seascapes.<sup>130</sup>

**Ecosystems** are the operational units of nature. An ecosystem is an integrated system of communities of living organisms and the interactions among them and their non-living environment. Biodiversity forms the foundation of healthy ecosystems, providing the variety of life that interacts to form a complex network of relationships necessary for these systems to function effectively. Consider, for example, a forest ecosystem. Trees capture solar energy through photosynthesis, producing food for themselves and releasing oxygen for other organisms. Fungi decompose fallen leaves, returning nutrients to the soil. Insects pollinate plants and serve as food for birds, which disperse seeds. Predators regulate herbivore populations, preventing overgrazing. Each component influences the others through these complex, non-linear relationships.

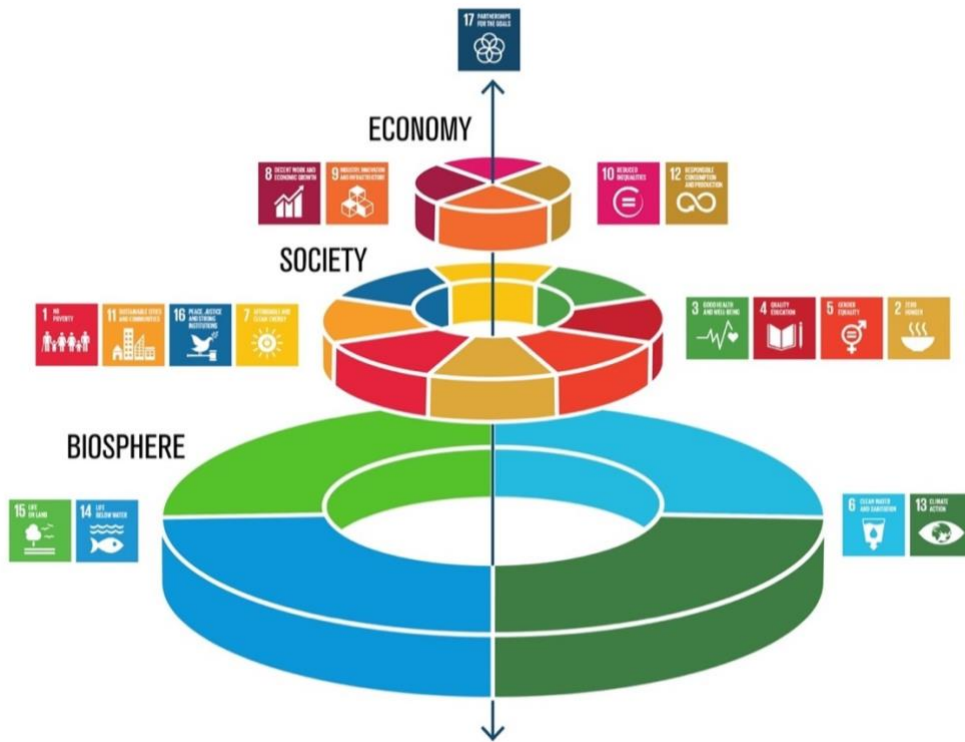
**Human society and the economy are deeply reliant on nature.** This can be understood through the concept of **embeddedness**, which highlights that every economic transaction, production process, and business model fundamentally depends on the functions of ecosystems and the biodiversity within them.<sup>131</sup> The Sustainable Development Goals (SDGs) Wedding Cake model (Figure 9) visually represents this embeddedness, showcasing how societal and economic systems are built upon the foundation of the natural world (or “biosphere”).

Despite this reliance, traditional economic thinking has failed to appropriately account for nature’s value. This oversight has contributed to unsustainable practices, resource depletion, and other drivers contributing to nature’s ongoing decline.

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<sup>xix</sup> “Nature” has no single definition but, for our purposes, can be understood to refer to “the nonhuman world, including coproduced features, with particular emphasis on living organisms, their diversity, their interactions among themselves and with their abiotic environment” (IPBES, p. 1046). As a scientific concept, nature can be broadly understood to encompass all living *and* non-living components of the natural world; however, the definition provided in this brief reflects a common framing of nature where emphasis is placed on “living nature”—i.e., living organisms and the systems in which they reside and interact.

Figure 9. The Sustainable Development Goals (SDGs) wedding cake<sup>xx</sup>



<sup>xx</sup> Figure: [The SDGs Wedding Cake](#) by Azote for Stockholm Resilience Centre, Stockholm University [CC BY-ND 3.0](#).

## Appendix B: Methodological note - Ecosystem service valuations

**Methodological note for ecosystem service values reported in Table 3.** The ecosystem service values reported in this table are derived from studies that have reported value estimates for various years, using different currencies and valuation methods. For this reason, all values in this table were standardized to 2024 Canadian dollars (CAD) using a two-step process (unless otherwise noted).

1. **Currency conversion.** Conversion was done in one of two ways: (1) Values derived from sources expressed in a local currency other than CAD were converted to CAD using the annual exchange rate for the specific year the value was reported. (2) Market exchange rates cannot be used to convert values from international dollars to local currency. Where authors standardized value estimates using international dollars, the PPP conversion factor for Canada for the year the value was reported for was used to convert to CAD.
2. **Adjusting for inflation.** Next, the resulting CAD values expressed in their respective base years were adjusted for inflation using the Bank of Canada's [online inflation calculator](#). The Bank's calculator uses monthly consumer price index (CPI) data—the 2024 CAD values in Table 3 were computed using the February CPI values for the base year and for 2024.

## Appendix C: Classifications of ecosystem services and nature’s contributions to people

This section provides supplementary reference materials that support the concepts discussed in the main body of this report. Table 5 is a standardized classification of ecosystem services developed as part of the United Nations’ *System of Environmental-Economic Accounting: Ecosystem Accounting* (UN SEEA-EA) *Framework*. The recording of ecosystem service flows to households, businesses, and governments—in both physical and monetary terms—is a central feature of ecosystem accounting.

**Table 5. UN SEEA–EA reference list of ecosystem services**

Ecosystem services	
<b>Provisioning services</b>	
<ul style="list-style-type: none"> <li>• Biomass provisioning</li> <li>• Genetic material</li> </ul>	<ul style="list-style-type: none"> <li>• Water supply</li> <li>• Other provisioning services</li> </ul>
<b>Regulating &amp; maintenance services</b>	
<ul style="list-style-type: none"> <li>• Global climate regulation</li> <li>• Local climate regulation</li> <li>• Rainfall pattern regulation</li> <li>• Air filtration</li> <li>• Soil quality regulation</li> <li>• Soil sediment and retention</li> <li>• Solid waste remediation</li> <li>• Water purification</li> </ul>	<ul style="list-style-type: none"> <li>• Water flow regulation</li> <li>• Flood control</li> <li>• Storm mitigation</li> <li>• Noise attenuation</li> <li>• Pollination</li> <li>• Biological control</li> <li>• Nursery population &amp; habitat maintenance</li> </ul>
<b>Cultural services</b>	
<ul style="list-style-type: none"> <li>• Recreation</li> <li>• Visual amenities</li> <li>• Education, scientific &amp; research services</li> </ul>	<ul style="list-style-type: none"> <li>• Spiritual, artistic and symbolic services</li> <li>• Other cultural services</li> </ul>
<p><i>Note:</i> A detailed reference list with descriptions of each ecosystem service is elaborated in the UN SEEA <a href="#">Ecosystem Accounting Framework</a> (Table 6.3, pgs. 131–134).</p>	

Table 6 presents a broader framework. As noted in the report, the “Nature’s Contributions to People” concept is used by IPBES to encompass the ecosystem services model while also intentionally including other perspectives, such as Indigenous and local knowledge systems. It is included here to offer a more holistic understanding of human-nature relationships beyond the more narrowly conceived ecosystem services concept.

**Table 6. IPBES classification of nature’s contributions to people**

Nature’s Contributions to People (NCPs) <sup>xxi</sup>	
<p><b>Regulating contributions</b> are the functional and structural aspects of organisms and ecosystems that modify environmental conditions experienced by people, and/or regulate the generation of material and non-material contributions (p.3).<sup>132</sup></p> <ul style="list-style-type: none"> <li>• Habitat creation &amp; maintenance</li> <li>• Pollination and dispersal of seeds &amp; other propagules</li> <li>• Regulation of air quality</li> <li>• Regulation of climate</li> <li>• Regulation of ocean acidification</li> <li>• Regulation of freshwater quantity, location and timing</li> <li>• Formation, protection and decontamination of soils and sediments</li> <li>• Regulation of natural hazards &amp; extreme events</li> <li>• Regulation of organisms detrimental to humans</li> </ul>	
<p><b>Material contributions</b> are substances, objects or other material elements from nature that sustain people’s physical existence and infrastructure (p.3).<sup>132</sup></p> <ul style="list-style-type: none"> <li>• Energy</li> <li>• Food and feed</li> <li>• Materials and assistance</li> <li>• Medicinal, biochemical and genetic resources</li> </ul>	
<p><b>Non-material contributions</b> are nature’s contributions to people’s subjective or psychological quality of life, individually and collectively (p.3).<sup>132</sup></p> <ul style="list-style-type: none"> <li>• Learning and inspiration</li> <li>• Physical and psychological experiences</li> <li>• Supporting identities</li> <li>• Maintenance of options (i.e., continued existence of species, populations, etc., to allow for future discovery)</li> </ul>	
<p><i>Note:</i> Further explanations and examples of each NCP are elaborated in the IPBES information note ‘<a href="#">IPBES/5/INF/24</a>’ (Table 1, pgs. 6–8).</p>	

<sup>xxi</sup> Regulating & maintenance ecosystem services largely fit within the regulating contributions NPC category. Provisioning ecosystem services largely fit within the material contributions NPC category.

# Endnotes

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- <sup>1</sup> Evison, W., Ping Low, L., & O'Brien, D. (2023). *Managing Nature Risks: From Understanding to Action* (Strategy+Business). PwC. <https://www.pwc.com/gx/en/strategy-and-business/content/sbpwc-2023-04-19-Managing-nature-risks-v2.pdf>
- <sup>2</sup> Baber, L., Boulogne, C., Carmody, L., & Fang, E.-L. (2026). *Unearthing the nature risk in financial portfolios*. PwC. <https://www.pwc.com/gx/en/issues/how-we-fund-and-insure/nature-in-banking-2025.pdf>
- <sup>3</sup> IPBES. (2019). *Global assessment report on biodiversity and ecosystem services of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services* (E. Brondizio, S. Diaz, J. Settele, & H. T. Ngo, Eds.; Version 1). Zenodo. <https://doi.org/10.5281/zenodo.6417333>
- <sup>4</sup> IPBES. (2019). "Global assessment report on biodiversity and ecosystem services"
- <sup>5</sup> IPBES. (2019). "Global assessment report on biodiversity and ecosystem services"
- <sup>6</sup> United Nations. (2022). *The Sustainable Development Goals Report 2022*. <https://unstats.un.org/sdgs/report/2022/The-Sustainable-Development-Goals-Report-2022.pdf>
- <sup>7</sup> IPBES. (2019). "Global assessment report on biodiversity and ecosystem services"
- <sup>8</sup> IPCC, 2019: Summary for Policymakers. In: *Climate Change and Land: an IPCC special report on climate change, desertification, land degradation, sustainable land management, food security, and greenhouse gas fluxes in terrestrial ecosystems* [P.R. Shukla, J. Skea, E. Calvo Buendia, V. Masson-Delmotte, H.- O. Pörtner, D. C. Roberts, P. Zhai, R. Slade, S. Connors, R. van Diemen, M. Ferrat, E. Haughey, S. Luz, S. Neogi, M. Pathak, J. Petzold, J. Portugal Pereira, P. Vyas, E. Huntley, K. Kissick, M. Belkacemi, J. Malley, (eds.)]. <https://doi.org/10.1017/9781009157988.001>
- <sup>9</sup> Maxwell, S. L., Fuller, R. A., Brooks, T. M., & Watson, J. E. M. (2016). Biodiversity: The ravages of guns, nets and bulldozers. *Nature*, 536(7615), 143–145. <https://doi.org/10.1038/536143a>
- <sup>10</sup> Sonter, L. J., Dade, M. C., Watson, J. E. M., & Valenta, R. K. (2020). Renewable energy production will exacerbate mining threats to biodiversity. *Nature Communications*, 11(1), 4174. <https://doi.org/10.1038/s41467-020-17928-5>
- <sup>11</sup> Jones, M., Polasky, S., Rueda, X., Brooks, S., Ingram, J. C., von Hase, A., Egoh, B., Kohsaka, R., Kulak, M., Leach, K., Loyola, R., Mandle, L., Rodriguez Osuna, V., Schaafsma, M., & Sonter, L. (2026). *IPBES Business and Biodiversity Assessment: Summary for Policymakers*. IPBES. <https://doi.org/10.5281/zenodo.18538597>
- <sup>12</sup> Jones, M., et al. (2026). "IPBES Business and Biodiversity Assessment: Summary for Policymakers"
- <sup>12</sup> McKenzie, E. J., Jones, M., Seega, N., Siikamäki, J., & Vijay, V. (2025). Science and technical priorities for private sector action to address biodiversity loss. *Philosophical Transactions of the Royal Society B: Biological Sciences*, 380(1917), 20230208. <https://doi.org/10.1098/rstb.2023.0208>
- <sup>13</sup> Statistics Canada Environment Accounts and Statistics Division. (2022). *Accounting for Ecosystem Change in Canada* (Human Activity and He Environment, p. 133). <https://www150.statcan.gc.ca/n1/en/catalogue/16-201-X2021001>; AND Lindenmayer, D. B., & Laurance, W. F. (2017). The ecology, distribution, conservation and management of large old trees. *Biological Reviews*, 92(3), 1434–1458. <https://doi.org/10.1111/brv.12290>
- <sup>14</sup> Government of British Columbia. (2024, May 21). Old growth definitions and values. Gov.Bc.Ca. <https://www2.gov.bc.ca/gov/content/industry/forestry/managing-our-forest-resources/old-growth-forests/old-growth-values>
- <sup>15</sup> Federal, Provincial and Territorial Governments of Canada. (2010). *Canadian Biodiversity: Ecosystem Status and Trends 2010* (p. 152). [publications.gc.ca/pub?id=9.693864&sl=0](https://publications.gc.ca/pub?id=9.693864&sl=0)

- 
- <sup>16</sup> Environment and Climate Change Canada. (2024). *Canadian Environmental Sustainability Indicators: Status of Key Fish Stocks* (Cat. No.: En4-144/33-2024E-PDF). <https://www.canada.ca/en/environment-climate-change/services/environmental-indicators/status-key-fish-stocks.html>
- <sup>17</sup> Forestry Canada. (2023). *The State of Canada's Forests: Annual Report 2023*. <https://publications.gc.ca/site/eng/9.505771/publication.html>
- <sup>18</sup> Forestry Canada. (2023). *The State of Canada's Forests: Annual Report 2023*. <https://publications.gc.ca/site/eng/9.505771/publication.html>
- <sup>19</sup> Potapov, P., Hansen, M. C., Pickens, A., Hernandez-Serna, A., Tyukavina, A., Turubanova, S., Zalles, V., Li, X., Khan, A., Stolle, F., Harris, N., Song, X.-P., Baggett, A., Kommareddy, I., & Kommareddy, A. (2022). The Global 2000-2020 Land Cover and Land Use Change Dataset Derived From the Landsat Archive: First Results. *Frontiers in Remote Sensing*, 3, 856903. <https://doi.org/10.3389/frsen.2022.856903>
- <sup>20</sup> Federal, Provincial and Territorial Governments of Canada. (2010). *Canadian Biodiversity: Ecosystem Status and Trends 2010* (p. 152). [publications.gc.ca/pub?id=9.693864&sl=0](https://publications.gc.ca/pub?id=9.693864&sl=0)
- <sup>21</sup> Harris, L. I., Richardson, K., Bona, K. A., Davidson, S. J., Finkelstein, S. A., Garneau, M., McLaughlin, J., Nwaishi, F., Olefeldt, D., Packalen, M., Roulet, N. T., Southee, F. M., Strack, M., Webster, K. L., Wilkinson, S. L., & Ray, J. C. (2022). The Essential Carbon Service Provided by Northern Peatlands. *Frontiers in Ecology and the Environment*, 20(4), 222–230. <https://doi.org/10.1002/fee.2437>
- <sup>22</sup> Twigg, M., Richardson, O., Cecato, B., Awan, T., Daigle, E., Elgie, S., Tougas-Cooke, R., Heer, T., Kamba, G., & Sushant. (2024). *Unlocking the Economic Power of Natural Climate Solutions*. Smart Prosperity Institute. <https://institute.smartprosperity.ca/unlocking-the-economic-power-of-natural-climate-solutions>
- <sup>23</sup> Twigg, M., et al. (2024). “Unlocking the Economic Power of Natural Climate Solutions”
- <sup>24</sup> United Nations, European Commission, Food and Agriculture Organization, International Monetary Fund, Organisation for Economic Co-operation and Development, & The World Bank Group. (2014). *System of Environmental-Economic Accounting 2012: Central Framework*. United Nations. <https://seea.un.org/content/seea-central-framework>
- <sup>25</sup> What is natural capital? (n.d.). *David Suzuki Foundation*. <https://david Suzuki.org/what-you-can-do/what-is-natural-capital/>
- <sup>26</sup> United Nations, European Commission, Food and Agriculture Organization, International Monetary Fund, Organisation for Economic Co-operation and Development, United Nations Environment Programme, & The World Bank Group. (2014). *System of Environmental-Economic Accounting: Ecosystem Accounting*. United Nations. <https://seea.un.org/ecosystem-accounting>
- <sup>27</sup> Shepard, C. C., Crain, C. M., & Beck, M. W. (2011). The Protective Role of Coastal Marshes: A Systematic Review and Meta-analysis. *PLoS ONE*, 6(11), e27374. <https://doi.org/10.1371/journal.pone.0027374>
- <sup>28</sup> United Nations, et al. (2014). “System of Environmental-Economic Accounting: Ecosystem Accounting”
- <sup>29</sup> Millenium Ecosystem Assessment. (2005). *Ecosystems and Human Well-being: Biodiversity Synthesis*. World Resources Institute. <https://www.millenniumassessment.org/documents/document.354.aspx.pdf>
- <sup>30</sup> IPBES. (2019). *Global assessment report on biodiversity and ecosystem services of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services* (E. Brondizio, S. Diaz, J. Settele, & H. T. Ngo, Eds.; Version 1). Zenodo. <https://doi.org/10.5281/zenodo.6417333>
- <sup>31</sup> Norgaard, R. B. (2010). Ecosystem services: From eye-opening metaphor to complexity blinder. *Ecological Economics*, 69(6), 1219–1227. <https://doi.org/10.1016/j.ecolecon.2009.11.009>
- <sup>32</sup> Díaz, S., Pascual, U., Stenseke, M., Martín-López, B., Watson, R. T., Molnár, Z., Hill, R., Chan, K. M. A., Baste, I. A., Brauman, K. A., Polasky, S., Church, A., Lonsdale, M., Larigauderie, A., Leadley, P. W., Van Oudenhoven, A. P. E., Van Der Plaats, F., Schröter, M., Lavorel, S., ... Shirayama, Y. (2018). Assessing nature's contributions to people. *Science*, 359(6373), 270–272. <https://doi.org/10.1126/science.aap8826>; AND Raymond, C. M., Singh, G. G.,

- 
- Benessaiah, K., Bernhardt, J. R., Levine, J., Nelson, H., Turner, N. J., Norton, B., Tam, J., & Chan, K. M. A. (2013). Ecosystem Services and Beyond: Using Multiple Metaphors to Understand Human–Environment Relationships. *BioScience*, 63(7), 536–546. <https://doi.org/10.1525/bio.2013.63.7.7>
- <sup>33</sup> Chan, K. M. A., Balvanera, P., Benessaiah, K., Chapman, M., Díaz, S., Gómez-Baggethun, E., Gould, R., Hannahs, N., Jax, K., Klain, S., Luck, G. W., Martín-López, B., Muraca, B., Norton, B., Ott, K., Pascual, U., Satterfield, T., Tadaki, M., Taggart, J., & Turner, N. (2016). Why protect nature? Rethinking values and the environment. *Proceedings of the National Academy of Sciences*, 113(6), 1462–1465. <https://doi.org/10.1073/pnas.1525002113>
- <sup>34</sup> IPBES Secretariat. (2017). *Update on the classification of nature’s contributions to people by the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services* (IPBES/5/INF/24). IPBES. <https://www.ipbes.net/ipbes5inf24-1>
- <sup>35</sup> Natural Resources Canada. (n.d.). *10 Key Facts on Canada’s Natural Resources—2023*. Government of Canada. <https://natural-resources.canada.ca/science-data/data-analysis/10-key-facts-canada-s-natural-resources-2023>
- <sup>36</sup> IPBES. (2018). *The IPBES regional assessment report on biodiversity and ecosystem services for the Americas* (J. Rice, C. S. Seixas, M. E. Zaccagnini, M. Bedoya-Gaitán, & N. Valderrama, Eds.). IPBES. <https://doi.org/10.5281/ZENODO.3236252>
- <sup>37</sup> Ranchers Stewardship Alliance Inc. (2013, October). *What are Native Prairie Grasslands Worth?* [https://www.pcap-sk.org/rsu\\_docs/documents/What\\_are\\_native\\_prairie\\_grasslands\\_worth\\_Oct\\_2013.pdf](https://www.pcap-sk.org/rsu_docs/documents/What_are_native_prairie_grasslands_worth_Oct_2013.pdf)
- <sup>38</sup> Kulshreshtha, S., Undi, M., Zhang, J., Ghorbani, M., Wittenberg, K., Stewart, A., Salvano, E., Kebreab, E., & Ominski, K. (2015). Challenges and Opportunities in Estimating the Value of Goods and Services in Temperate Grasslands—A Case Study of Prairie Grasslands in Manitoba, Canada. In V. Pilipavičius (Ed.), *Agroecology*. InTech. <https://doi.org/10.5772/59899>
- <sup>39</sup> Kulshreshtha, S., et al. (2015). “Challenges and Opportunities in Estimating the Value of Goods and Services in Temperate Grasslands”
- <sup>40</sup> Kulshreshtha, S., et al. (2015). “Challenges and Opportunities in Estimating the Value of Goods and Services in Temperate Grasslands”
- <sup>41</sup> Taye, F. A., Folkersen, M. V., Fleming, C. M., Buckwell, A., Mackey, B., Diwakar, K. C., Le, D., Hasan, S., & Ange, C. S. (2021). The economic values of global forest ecosystem services: A meta-analysis. *Ecological Economics*, 189, 107145. <https://doi.org/10.1016/j.ecolecon.2021.107145>
- <sup>42</sup> Anielski, M., & Wilson, S. (2009). *Counting Canada’s Natural Capital: Assessing the Real Value of Canada’s Boreal Ecosystems* (2009 Update of Original 2005 Study). Pembina Institute. <https://www.cbd.int/financial/values/canada-countcapital.pdf>
- <sup>43</sup> Alexander, C., & DePratto, B. (2014). *The Value of Urban Forests in Cities Across Canada* [Special Report]. TD Economics. <https://www.td.com/document/PDF/economics/special/UrbanForestsInCanadianCities.pdf>
- <sup>44</sup> Aziz, T., & Van Cappellen, P. (2019). Comparative valuation of potential and realized ecosystem services in Southern Ontario, Canada. *Environmental Science & Policy*, 100, 105–112. <https://doi.org/10.1016/j.envsci.2019.06.014>
- <sup>45</sup> Wilson, S., Griffiths, M., & Anielski, M. (2001). *The Alberta GPI Accounts: Wetlands and Peatlands* (23). Pembina Institute. [https://www.pembina.org/reports/23\\_wetlands\\_and\\_peatlands.pdf](https://www.pembina.org/reports/23_wetlands_and_peatlands.pdf); AND Ducks Unlimited Canada. (2006). *Natural Values: Linking the Environment to the Economy*. [https://www.ducks.ca/assets/2012/06/nv6\\_wet.pdf](https://www.ducks.ca/assets/2012/06/nv6_wet.pdf)
- <sup>46</sup> Government of Canada. (2021, November 5). *Overview of Canada’s agriculture and agri-food sector*. Canada.ca. <https://agriculture.canada.ca/en/sector/overview>
- <sup>47</sup> Alam, M., Olivier, A., Paquette, A., Dupras, J., Revéret, J.-P., & Messier, C. (2014). A general framework for the quantification and valuation of ecosystem services of tree-based intercropping systems. *Agroforestry Systems*, 88(4), 679–691. <https://doi.org/10.1007/s10457-014-9681-x>

- 
- <sup>48</sup> Kulshreshtha, S., & Kort, J. (2009). External economic benefits and social goods from prairie shelterbelts. *Agroforestry Systems*, 75(1), 39–47. <https://doi.org/10.1007/s10457-008-9126-5>
- <sup>49</sup> Brondizio, E. S., Gatzweiler, F. W., Zografos, C., & Kumar, M. (2012). The Socio-cultural Context of Ecosystem and Biodiversity Valuation. In P. Kumar (Ed.), *The Economics of Ecosystems and Biodiversity: Ecological and Economic Foundations*. Routledge. <https://doi.org/10.4324/9781849775489>; AND Chan, K. M. A., Satterfield, T., & Goldstein, J. (2012). Rethinking ecosystem services to better address and navigate cultural values. *Ecological Economics*, 74, 8–18. <https://doi.org/10.1016/j.ecolecon.2011.11.011>
- <sup>50</sup> Evison, W., Ping Low, L., & O'Brien, D. (2023). *Managing Nature Risks: From Understanding to Action* (Strategy+Business). PwC. <https://www.pwc.com/gx/en/strategy-and-business/content/sbpwc-2023-04-19-Managing-nature-risks-v2.pdf>
- <sup>51</sup> Evison, W, et al. (2023), "Managing Nature Risks"
- <sup>52</sup> Evison, W, et al. (2023), "Managing Nature Risks"
- <sup>53</sup> Evison, W, et al. (2023), "Managing Nature Risks"
- <sup>54</sup> Baber, L., Boulogne, C., Carmody, L., & Fang, E.-L. (2026). *Unearthing the nature risk in financial portfolios*. PwC. <https://www.pwc.com/gx/en/issues/how-we-fund-and-insure/nature-in-banking-2025.pdf>
- <sup>55</sup> Baber, et al. (2026), "Unearthing the nature risk in financial portfolios"
- <sup>56</sup> Statistics Canada Environment Accounts and Statistics Division. (2022). *Accounting for Ecosystem Change in Canada* (Human Activity and The Environment). <https://www150.statcan.gc.ca/n1/en/catalogue/16-201-X2021001>
- <sup>57</sup> Forestry Canada. (2023). *The State of Canada's Forests: Annual Report 2023*. <https://publications.gc.ca/site/eng/9.505771/publication.html>
- <sup>58</sup> Government of British Columbia. (n.d.). *1999-2015 Mountain Pine Beetle Outbreak*. Gov.bc.ca. <https://www2.gov.bc.ca/gov/content/industry/forestry/managing-our-forest-resources/forest-health/forest-pests/bark-beetles/mountain-pine-beetle/responding-to-the-1999-2015-outbreak>
- <sup>59</sup> Corbett, L. J., Withey, P., Lantz, V. A., & Ochuodho, T. O. (2016). The economic impact of the mountain pine beetle infestation in British Columbia: Provincial estimates from a CGE analysis. *Forestry: An International Journal of Forest Research*, 89(1), 100–105. <https://doi.org/10.1093/forestry/cpv042>
- <sup>60</sup> Government of Canada. (2021, November 5). *Overview of Canada's agriculture and agri-food sector*. Canada.ca. <https://agriculture.canada.ca/en/sector/overview>
- <sup>61</sup> Kurth, T., Wübbels, G., Portafax, A., Meyer zum Felde, A., & Zielcke, S. (2021). *The Biodiversity Crisis is a Business Crisis*. Boston Consulting Group. <https://web-assets.bcg.com/fb/5e/74af5531468e9c1d4dd5c9fc0bd7/bcg-the-biodiversity-crisis-is-a-business-crisis-mar-2021-rr.pdf>
- <sup>62</sup> Balmford, A., Green, J. M. H., Anderson, M., Beresford, J., Huang, C., Naidoo, R., Walpole, M., & Manica, A. (2015). Walk on the Wild Side: Estimating the Global Magnitude of Visits to Protected Areas. *PLOS Biology*, 13(2), e1002074. <https://doi.org/10.1371/journal.pbio.1002074>
- <sup>63</sup> Federal, Provincial and Territorial Governments of Canada. (2014). *2012 Canadian Nature Survey: Awareness, participation, and expenditures in nature-based recreation, conservation, and subsistence activities*. <https://www.biodivcanada.ca/reports/canadiannaturesurvey>
- <sup>64</sup> Mulrooney, D., & Jones, B. (2023). The value of natural capital in Canada's national parks and national marine conservation areas. *PARKS*, 29(2), 41–51. <https://doi.org/doi.org/10.2305/EKNN8645>
- <sup>65</sup> Parks Canada. (2022). *Parks Canada Agency Departmental Results Report, 2021-2022*. [https://publications.gc.ca/collections/collection\\_2023/pc/R61-108-2022-eng.pdf](https://publications.gc.ca/collections/collection_2023/pc/R61-108-2022-eng.pdf)
- <sup>66</sup> Federal, Provincial and Territorial Governments of Canada. (2014). *2012 Canadian Nature Survey: Awareness, participation, and expenditures in nature-based recreation, conservation, and subsistence activities*. <https://www.biodivcanada.ca/reports/canadiannaturesurvey>

- 
- <sup>67</sup> Taskforce on Nature-related Financial Disclosures. (2023). *Recommendations of the Taskforce on Nature-related Financial Disclosures* (Version V1.0 September 2023). <https://tnfd.global/publication/recommendations-of-the-taskforce-on-nature-related-financial-disclosures/>
- <sup>68</sup> Taskforce on Nature-related Financial Disclosures. (2023). Glossary (Version 1.0). [https://tnfd.global/wp-content/uploads/2023/09/Glossary\\_of\\_key\\_terms\\_v1.pdf?v=1695138274](https://tnfd.global/wp-content/uploads/2023/09/Glossary_of_key_terms_v1.pdf?v=1695138274)
- <sup>69</sup> Taskforce on Nature-related Financial Disclosures. (2023). “Glossary (Version 1.0)”
- <sup>70</sup> Goulson, D., Nicholls, E., Botías, C., & Rotheray, E. L. (2015). Bee declines driven by combined stress from parasites, pesticides, and lack of flowers. *Science*, 347(6229), 1255957. <https://doi.org/10.1126/science.1255957>
- <sup>71</sup> The Expert Panel on Sustainable Management of Water in the Agricultural Landscapes of Canada. (2013). *Water and agriculture in Canada: Towards sustainable management of water resources*. Council of Canadian Academies. <https://cca-reports.ca/wp-content/uploads/2022/11/Water-and-agriculture-in-Canada-Full-Report-EN.pdf>
- <sup>72</sup> Pérez-Guzmán, L., Phillips, L. A., Seuradge, B. J., Agomoh, I., Drury, C. F., & Acosta-Martínez, V. (2021). An evaluation of biological soil health indicators in four long-term continuous agroecosystems in Canada. *Agrosystems, Geosciences & Environment*, 4(2). <https://doi.org/10.1002/agg2.20164>
- <sup>73</sup> DeMarco, L., & Vollmer, D. (2025). Legal opinion: Nature-related risks and the duties of directors of Canadian corporations. Resilient LLP. <https://commonwealthclimatelaw.org/wp-content/uploads/2025/07/Canada-Legal-Opinion-Nature-Related-Risks-and-Directors-Duties-CCLI-July-2025.pdf>
- <sup>74</sup> World Economic Forum. (2025). *The Global Risks Report 2025* (Insight Report 20th Edition). <https://www.weforum.org/publications/global-risks-report-2025/>
- <sup>75</sup> Taskforce on Nature-related Financial Disclosures. (2023). *Recommendations of the Taskforce on Nature-related Financial Disclosures* (Version V1.0 September 2023). <https://tnfd.global/publication/recommendations-of-the-taskforce-on-nature-related-financial-disclosures/>
- <sup>76</sup> Svartzman, R., Espagne, E., Julien, G., Paul, H.-L., Mathilde, S., Allen, T., Berger, J., Calas, J., Godin, A., & Vallier, A. (2021). A “Silent Spring” for the Financial System? Exploring Biodiversity-Related Financial Risks in France (SSRN Scholarly Paper No. 4028442). Social Science Research Network. <https://doi.org/10.2139/ssrn.4028442>
- <sup>77</sup> Network for Greening the Financial System. (2022). Statement on Nature-Related Financial Risks. [https://www.ngfs.net/system/files/import/ngfs/medias/documents/statement\\_on\\_nature\\_related\\_financial\\_risks\\_-\\_final.pdf](https://www.ngfs.net/system/files/import/ngfs/medias/documents/statement_on_nature_related_financial_risks_-_final.pdf)
- <sup>78</sup> IPBES. (2019). *Global assessment report on biodiversity and ecosystem services of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services* (E. Brondizio, S. Diaz, J. Settele, & H. T. Ngo, Eds.; Version 1). Zenodo. <https://doi.org/10.5281/zenodo.6417333>
- <sup>79</sup> Brander, L. M., Rehdanz, K., Tol, R. S. J., & Van Beukering, P. J. H. (2012). The Economic Impact of Ocean Acidification on Coral Reefs. *Climate Change Economics*, 03(01), 1250002. <https://doi.org/10.1142/S2010007812500029>
- <sup>80</sup> Narita, D., Rehdanz, K., & Tol, R. S. J. (2012). Economic costs of ocean acidification: A look into the impacts on global shellfish production. *Climatic Change*, 113(3–4), 1049–1063. <https://doi.org/10.1007/s10584-011-0383-3>
- <sup>81</sup> Coalition of Finance Ministers: An Overview of Nature-Related Risks and Potential Policy Actions for Ministries of Finance [https://www.financeministersforclimate.org/sites/cape/files/inline-files/Bending%20the%20Curve%20of%20Nature%20Loss%20-%20Nature-Related%20Risks%20for%20MoFs\\_2.pdf](https://www.financeministersforclimate.org/sites/cape/files/inline-files/Bending%20the%20Curve%20of%20Nature%20Loss%20-%20Nature-Related%20Risks%20for%20MoFs_2.pdf)
- <sup>82</sup> Evison, W., Ping Low, L., & O’Brien, D. (2023). *Managing Nature Risks: From Understanding to Action* (Strategy+Business). PwC. <https://www.pwc.com/gx/en/strategy-and-business/content/sbpwc-2023-04-19-Managing-nature-risks-v2.pdf>
- <sup>83</sup> Lovejoy, T. E. (2019). Eden No More. *Science Advances*, 5(5). <https://doi.org/10.1126/sciadv.aax7492>

- 
- <sup>84</sup> Kurth, T., Wübbels, G., Portafaix, A., Meyer zum Felde, A., & Zielcke, S. (2021). *The Biodiversity Crisis is a Business Crisis*. Boston Consulting Group. <https://web-assets.bcg.com/fb/5e/74af5531468e9c1d4dd5c9fc0bd7/bcg-the-biodiversity-crisis-is-a-business-crisis-mar-2021-rr.pdf>
- <sup>85</sup> Toor, J., Danijela, P., Schellekens, G., van Oorschot, M., & Kok, M. (2020). *Indebted to nature: Exploring biodiversity risks for the Dutch financial sector*. De Nederlandsche Bank and PBL Netherlands Environmental Assessment Agency. <https://www.dnb.nl/en/general-news/news-2020/indebted-to-nature/>
- <sup>86</sup> Svartzman, R., Espagne, E., Julien, G., Paul, H.-L., Mathilde, S., Allen, T., Berger, J., Calas, J., Godin, A., & Vallier, A. (2021). *A “Silent Spring” for the Financial System? Exploring Biodiversity-Related Financial Risks in France* (SSRN Scholarly Paper No. 4028442). Social Science Research Network. <https://doi.org/10.2139/ssrn.4028442>
- <sup>87</sup> Svartzman, R., et al. (2021). *A “Silent Spring” for the Financial System? Exploring Biodiversity-Related Financial Risks in France* (SSRN Scholarly Paper No. 4028442). Social Science Research Network. <https://doi.org/10.2139/ssrn.4028442>
- <sup>88</sup> Boldrini, S., Ceglar, A., Lelli, C., Parisi, L., & Heemskerk, I. (2023). *Living in a World of Disappearing Nature: Physical Risk and the Implications for Financial Stability* (Occasional Paper Series No 333). ECB. <https://doi.org/10.2139/ssrn.4630721>
- <sup>89</sup> Boldrini, S., et al. (2023). “Living in a World of Disappearing Nature”
- <sup>90</sup> Dasgupta, P. (2021). *The Economics of Biodiversity: The Dasgupta Review*. HM Treasury. <https://www.gov.uk/government/publications/final-report-the-economics-of-biodiversity-the-dasgupta-review>
- <sup>91</sup> CDP & Planet Tracker. (2022, May). *High and Dry: How Water Issues are Stranding Assets*. [https://cdn.cdp.net/cdp-production/cms/reports/documents/000/006/321/original/High\\_and\\_Dry\\_Report\\_Final.pdf?1651652748](https://cdn.cdp.net/cdp-production/cms/reports/documents/000/006/321/original/High_and_Dry_Report_Final.pdf?1651652748)
- <sup>92</sup> Coalition of Finance Ministers: An Overview of Nature-Related Risks and Potential Policy Actions for Ministries of Finance [https://www.financeministersforclimate.org/sites/cape/files/inline-files/Bending%20the%20Curve%20of%20Nature%20Loss%20-%20Nature-Related%20Risks%20for%20MoFs\\_2.pdf](https://www.financeministersforclimate.org/sites/cape/files/inline-files/Bending%20the%20Curve%20of%20Nature%20Loss%20-%20Nature-Related%20Risks%20for%20MoFs_2.pdf)
- <sup>93</sup> 3M. (2024, April 1). *3M Settlement with Public Water Suppliers to Address PFAS in Drinking Water Receives Final Court Approval* [Press Release]. <https://investors.3m.com/news-events/press-releases/detail/1836/3m-settlement-with-public-water-suppliers-to-address-pfas>
- <sup>94</sup> Knauth, D. (2024, October 21). Carrier reaches \$730 mln settlement over fire protection unit PFAS claims. *Reuters*. <https://www.reuters.com/legal/litigation/carrier-reaches-730-mln-settlement-over-fire-protection-unit-pfas-claims-2024-10-21/>
- <sup>95</sup> Taylor, M. (2019, February 28). Norway’s wealth fund ditches 33 palm oil firms over deforestation. *Reuters*. <https://www.reuters.com/article/world/norways-wealth-fund-ditches-33-palm-oil-firms-over-deforestation-idUSKCN1QH1MQ/>
- <sup>96</sup> Taskforce on Nature-related Financial Disclosures. (2023). *Recommendations of the Taskforce on Nature-related Financial Disclosures* (Version V1.0 September 2023). <https://tnfd.global/publication/recommendations-of-the-taskforce-on-nature-related-financial-disclosures/>
- <sup>97</sup> Derouiche, I., Manita, R., & Muessig, A. (2021). Risk disclosure and firm operational efficiency. *Annals of Operations Research*, 297(1–2), 115–145. <https://doi.org/10.1007/s10479-020-03520-z>; AND Sulistyawati, S. N., & Suryani, A. W. (2022). Achieving Operational Efficiency through Risk Disclosure. *Asian Journal of Business and Accounting*, 15(1), 149–178. <https://doi.org/10.22452/ajba.vol15no1.5>; AND Tao, Y., Mat Daud, Z., & Johari, J. (2024). Research on Sustainable Operation Management in Highly Polluting Industries: How Environmental Information Disclosure Shapes Long-Term Corporate Value. *International Journal of Operations and Quantitative Management*, 30(2). <https://doi.org/10.46970/2024.30.2.07>
- <sup>98</sup> Business and Sustainable Development Commission & AlphaBeta. (2016). *Valuing the SDG Prize in Food and Agriculture: Unlocking Business Opportunities to Accelerate Sustainable and Inclusive Growth*. <https://s3.amazonaws.com/aws-bsdc/Valuing-SDG-Food-Ag-Prize-Paper.pdf>

- 
- <sup>99</sup> Luo, Y., Xiong, G., & Mardani, A. (2022). Environmental information disclosure and corporate innovation: The “Inverted U-shaped” regulating effect of media attention. *Journal of Business Research*, 146, 453–463. <https://doi.org/10.1016/j.jbusres.2022.03.089>; AND Ding, J., Lu, Z., & Yu, C.-H. (2022). Environmental information disclosure and firms’ green innovation: Evidence from China. *International Review of Economics & Finance*, 81, 147–159. <https://doi.org/10.1016/j.iref.2022.05.007>
- <sup>100</sup> Cherief, A., Sekine, T., & Stagnol, L. (2022). The Market Effect of Acute Biodiversity Risk: The Case of Corporate Bonds. *SSRN Electronic Journal*. <https://doi.org/10.2139/ssrn.4288552>
- <sup>101</sup> Bassen, A., Buchholz, D., Lopatta, K., & Rudolf, A. R. (2025). Assessing biodiversity-related disclosure: Drivers, outcomes, and financial impacts. *Journal of Industrial Ecology*, 29(1), 311–329. <https://doi.org/10.1111/jiec.13596>
- <sup>102</sup> Axjonow, A., Ernstberger, J., & Pott, C. (2018). The Impact of Corporate Social Responsibility Disclosure on Corporate Reputation: A Non-professional Stakeholder Perspective. *Journal of Business Ethics*, 151(2), 429–450. <https://doi.org/10.1007/s10551-016-3225-4>
- <sup>103</sup> Treepongkaruna, S. (2024). Corporate sustainability and biodiversity reporting: A proactive business strategy to mitigate litigation and reputational risks. *Business Strategy and the Environment*, 33(7), 6640–6651. <https://doi.org/10.1002/bse.3840>
- <sup>104</sup> Bassen, A., Buchholz, D., Lopatta, K., & Rudolf, A. R. (2025). Assessing biodiversity-related disclosure: Drivers, outcomes, and financial impacts. *Journal of Industrial Ecology*, 29(1), 311–329. <https://doi.org/10.1111/jiec.13596>
- <sup>105</sup> Nature Action 100. (2024, October). *Nature Action 100 Investor Participants*. Nature Action 100. <https://www.natureaction100.org/investors/>
- <sup>106</sup> Finance for Biodiversity Foundation. (n.d.). *Signatories*. Finance for Biodiversity. <https://www.financeforbiodiversity.org/signatories/>
- <sup>107</sup> Principles for Responsible Investment. (n.d.). *Spring—Investors*. PRI. <https://www.unpri.org/investment-tools/stewardship/spring/investors>
- <sup>108</sup> CPP Investments. (2023, October 19). CPP Investments Publishes 2023 Report on Sustainable Investing. <https://www.cppinvestments.com/newsroom/cpp-investments-publishes-2023-report-on-sustainable-investing/>
- <sup>109</sup> DeMarco, L., & Vollmer, D. (2025). Legal opinion: Nature-related risks and the duties of directors of Canadian corporations. Resilient LLP. <https://commonwealthclimatelaw.org/wp-content/uploads/2025/07/Canada-Legal-Opinion-Nature-Related-Risks-and-Directors-Duties-CCLI-July-2025.pdf>
- <sup>110</sup> European Financial Reporting Advisory Group. (2023). ERS S4 Biodiversity and Ecosystems. In *European Sustainability Reporting Standards (ESRS)—Commission Delegated Regulation (EU) 2023/2772*. <https://xbrl.efrag.org/e-esrs/esrs-set1-2023.html>
- <sup>111</sup> DeMarco, L., & Vollmer, D. (2025). *Legal opinion: Nature-related risks and the duties of directors of Canadian corporations*. Resilient LLP. <https://commonwealthclimatelaw.org/wp-content/uploads/2025/07/Canada-Legal-Opinion-Nature-Related-Risks-and-Directors-Duties-CCLI-July-2025.pdf>
- <sup>112</sup> Union for Ethical BioTrade. (2024). *UEBT Biodiversity Barometer: 2024 Summary* (UEBT Biodiversity Barometer). <https://www.biodiversitybarometer.org/s/UEBT-Biodiversity-Barometer-2024-Report-Summary.pdf>
- <sup>113</sup> Union for Ethical BioTrade. (2024). “UEBT Biodiversity Barometer: 2024 Summary”
- <sup>114</sup> Forestry Stewardship Council. (2021). *FSC Consumer Insights Survey 2021: Global Report*. [https://fsc.org/sites/default/files/2021-11/FSC\\_Consumer\\_Insights\\_External\\_deck\\_v6.pdf](https://fsc.org/sites/default/files/2021-11/FSC_Consumer_Insights_External_deck_v6.pdf)
- <sup>115</sup> Federal, Provincial and Territorial Governments of Canada. (2014). *2012 Canadian Nature Survey: Awareness, participation, and expenditures in nature-based recreation, conservation, and subsistence activities*. <https://www.biodivcanada.ca/reports/canadiannaturesurvey>
- <sup>116</sup> Stern, N., & Stiglitz, J. E. (2023). Climate change and growth. *Industrial and Corporate Change*, 32(2), 277–303. <https://doi.org/10.1093/icc/dtad008>

- 
- <sup>117</sup> Christensen, H. B., Hail, L., & Leuz, C. (2021). Mandatory CSR and sustainability reporting: Economic analysis and literature review. *Review of Accounting Studies*, 26(3), 1176–1248. <https://doi.org/10.1007/s11142-021-09609-5>
- <sup>118</sup> Bernow, S., Godsall, J., Klempner, B., & Merten, C. (2019). *More than values: The value-based sustainability reporting that investors want*. McKinsey & Company. <https://www.mckinsey.com/capabilities/sustainability/our-insights/more-than-values-the-value-based-sustainability-reporting-that-investors-want#/>
- <sup>119</sup> Competition Bureau, & Government of Canada. (2024, June 25). *Guide to the June 2024 amendments to the Competition Act*. Competition Bureau Canada. <https://competition-bureau.canada.ca/en/how-we-foster-competition/education-and-outreach/guide-june-2024-amendments-competition-act>
- <sup>120</sup> Zu Ermgassen, S. O. S. E., Howard, M., Bennun, L., Addison, P. F. E., Bull, J. W., Loveridge, R., Pollard, E., & Starkey, M. (2022). Are corporate biodiversity commitments consistent with delivering ‘nature-positive’ outcomes? A review of ‘nature-positive’ definitions, company progress and challenges. *Journal of Cleaner Production*, 379. <https://doi.org/10.1016/j.jclepro.2022.134798>
- <sup>121</sup> Zu Ermgassen, S. O. S. E., et al. (2022). “Are corporate biodiversity commitments consistent with delivering ‘nature-positive’ outcomes?”
- <sup>122</sup> Delmas, M. A., & Burbano, V. C. (2011). The Drivers of Greenwashing. *California Management Review*, 54(1), 64–87. <https://doi.org/10.1525/cmr.2011.54.1.64>
- <sup>123</sup> Grewal, J., Richardson, G. D., & Wang, J. (2022). The Effect of Mandatory Carbon Reporting on Greenwashing. *SSRN Electronic Journal*. <https://doi.org/10.2139/ssrn.4166184>
- <sup>124</sup> Taskforce on Nature-related Financial Disclosures. (2023). *Recommendations of the Taskforce on Nature-related Financial Disclosures* (Version V1.0 September 2023). <https://tnfd.global/publication/recommendations-of-the-taskforce-on-nature-related-financial-disclosures/>
- <sup>125</sup> Taskforce on Nature-related Financial Disclosures. (2024, October 25). Over 500 organisations and \$17.7 trillion AUM now committed to TNFD-aligned risk management and corporate reporting. *TNFD*. <https://tnfd.global/over-500-organisations-and-17-7-trillion-aum-now-committed-to-tnfd-aligned-risk-management-and-corporate-reporting/>
- <sup>126</sup> Taskforce on Nature-related Financial Disclosures. (n.d.). *List of Adopters*. TNFD. [https://tnfd.global/engage/tnfd-adopters-list/?\\_sfm\\_hq-country=Canada](https://tnfd.global/engage/tnfd-adopters-list/?_sfm_hq-country=Canada)
- <sup>127</sup> Task Force on Climate-related Financial Disclosures. (2023). *Task Force on Climate-related Financial Disclosures: 2023 Status Report*. <https://assets.bbhub.io/company/sites/60/2023/09/2023-Status-Report.pdf>
- <sup>128</sup> IFRS Foundation. (2024). *Progress on Corporate Climate-related Disclosures—2024 Report*. <https://www.ifrs.org/content/dam/ifrs/supporting-implementation/issb-standards/progress-climate-related-disclosures-2024.pdf>
- <sup>129</sup> United Nations. (1992). *Convention on Biological Diversity*. <https://www.cbd.int/doc/legal/cbd-en.pdf>
- <sup>130</sup> Freedman, B. (2018). Chapter 7: Biodiversity. In *Environmental Science: A Canadian Perspective*. Dalhousie University Libraries Digital Editions. <https://digitaleditions.library.dal.ca/environmentalscience/>
- <sup>131</sup> Dasgupta, P. (2021). *The Economics of Biodiversity: The Dasgupta Review*. HM Treasury. <https://www.gov.uk/government/publications/final-report-the-economics-of-biodiversity-the-dasgupta-review>
- <sup>132</sup> IPBES Secretariat. (2017). *Update on the classification of nature’s contributions to people by the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services* (IPBES/5/INF/24). Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services. <https://www.ipbes.net/ipbes5inf24-1>