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The Missing Line Item

Financial exposure hidden in environmental dependencies

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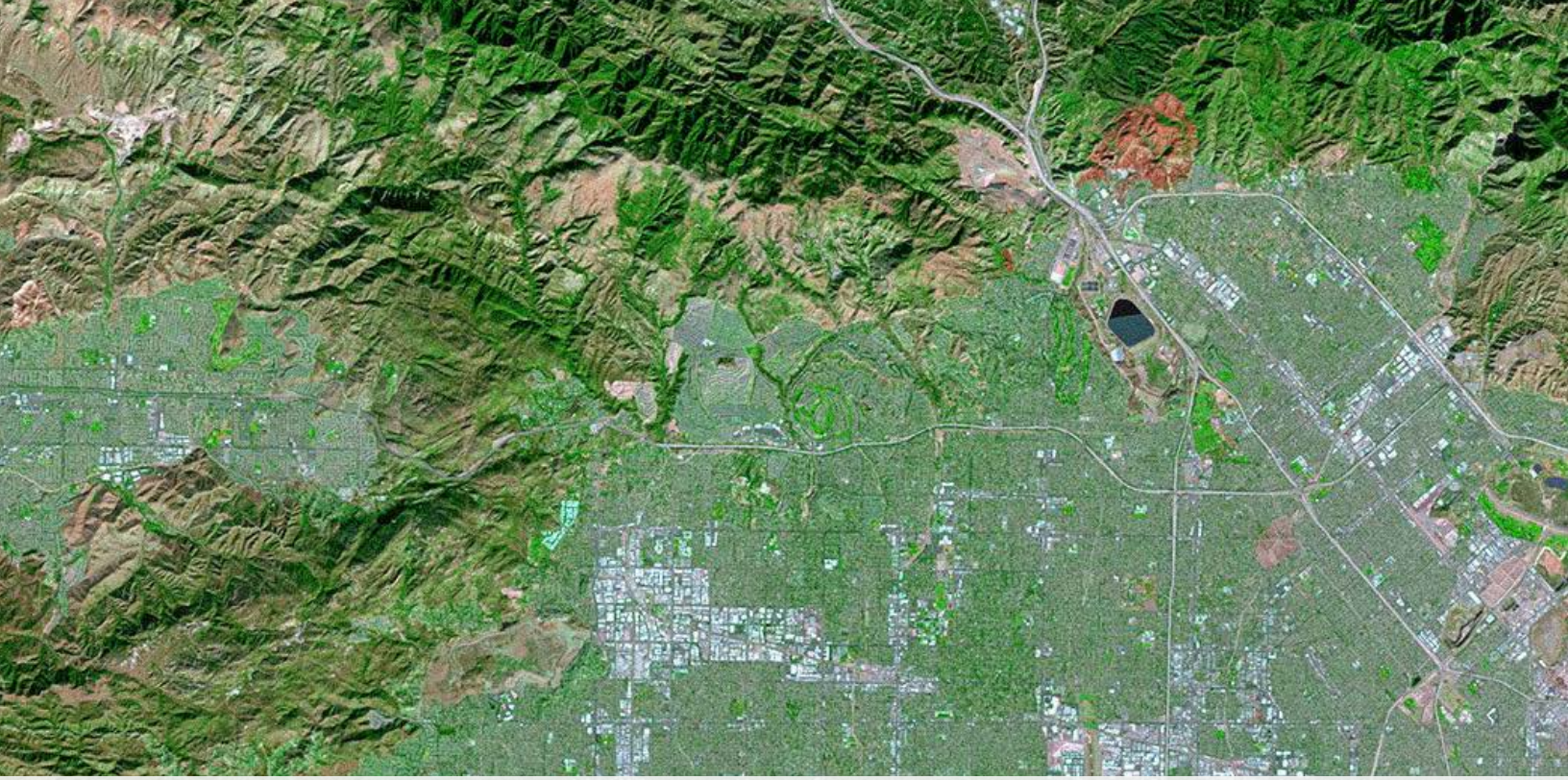

Many businesses carefully measure the factors that drive financial performance. Yet some of the most important business dependencies are often not included in that analysis.

This report explores the environmental resources and services that businesses depend on to support operations, supply chains and growth. These dependencies are often things we rarely think about: water being available in an office, bees pollinating crops, or businesses having reliable access to essential raw materials such as wood, cotton and food. When these resources and services deteriorate or become unavailable, they can create operational disruption and financial exposure.

Through a series of real-world case studies, we demonstrate how businesses can identify these dependencies and quantify their potential financial exposure. Using the financial metric 'Nature Value at Risk' (Nature VaR), which draws on concepts developed by leading financial institutions, central banks and international organizations, we translate dependencies into financial terms. This enables businesses to better understand potential exposure, where risks may be most material, and where resilience measures or capital planning activity may be most relevant.

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From environmental dependency to financial risk

Businesses routinely quantify the factors that directly influence revenue, costs and business value, including interest rates, commodity prices and customer demand. These inputs are tracked, managed and scrutinized because they drive financial performance across their organizations.

Yet despite many businesses depending on environmental resources and services, such as water availability, soil health and flood protection, they rarely appear in financial analysis.

These factors play a critical role in a range of areas: keeping facilities operating, production on schedule, supply chains resilient and customers served. Across every sector, they underpin economic activity and business performance.

As PwC notes in its 2023 analysis of global economic dependence on nature[1], every industry assessed has some degree of dependence on nature through its operations, supply chains, or both. More recently in its report, "Unearthing the Nature Risk in Financial Portfolios,"[2] PwC explored this further.

They estimated that, in Australia, Canada, New Zealand and Singapore, continued degradation of business-critical natural resources and services could erode 12-17% of GDP, 11-14% of overseas investments and 12-18% of stock exchange market value over the next 15 years. The analysis assessed 20 sectors across each economy.

Identifying dependencies is the first step; however, the existence of a dependency alone does not necessarily create risk. The more important question is whether the environmental resources or services on which the business relies are deteriorating, becoming less reliable, or at risk of future decline. When this occurs, a business dependency can become a material financial exposure through business interruption, damaged assets, higher operating costs, increased capital expenditure and lost revenue.

Historically, many of these dependencies, including water supplies, healthy soils, productive landscapes and other natural resources, have been widely available and highly reliable – often at little direct cost or free. As a result, many organizations have neither considered nor paid for the full value they provide. **They have largely been taken for granted.**

For many organizations, if these dependencies have been managed at all, this has been performed across sustainability, operations, procurement and risk functions – frequently through the lens of regulation, sourcing or compliance. They have not necessarily addressed the most relevant question to business and finance leaders: **what is the potential financial exposure if critical services provided by the environment deteriorate or are lost?**

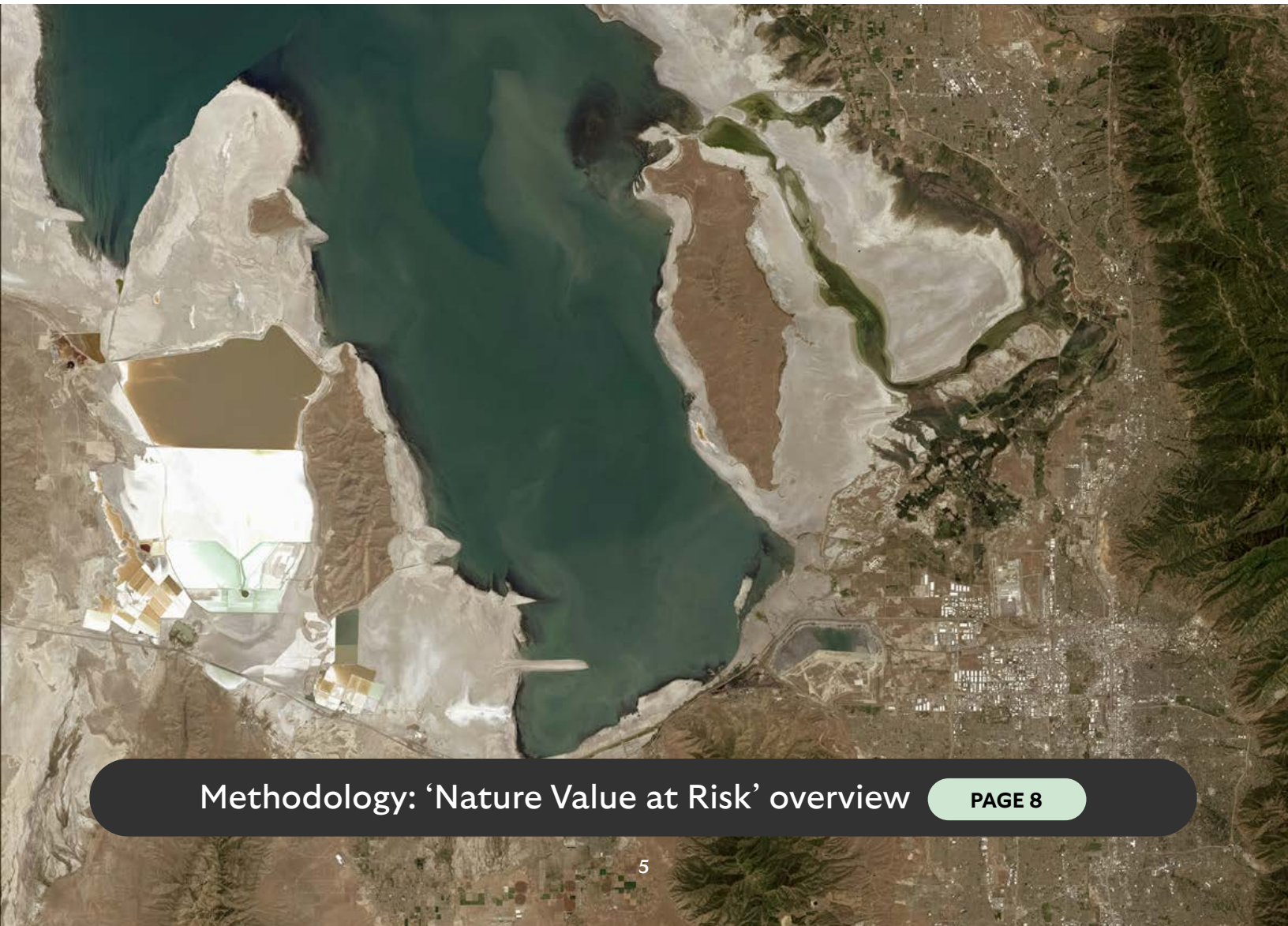
> ***Businesses regularly measure the factors that drive financial performance. Yet many still overlook the environmental resources and services that underpin their operations, supply chains and growth. Often, they are simply taken for granted.***
>
> ***The challenge is that businesses tend to notice these dependencies only when they come under pressure. Business leaders need to understand where those dependencies exist, how critical they are to their operations, and what could happen if resources become less reliable or unavailable.***
>
> **Jenny Pickett, Head of Sustainability, North America Lloyds**

Here are some recent examples that demonstrate these financial impacts:

In January 2025, Alico, one of Florida's largest citrus producers, announced it would cease investment in citrus production after years of declining yields. Despite continued expenditure on its orchards and disease management, citrus output had fallen significantly. This illustrates how declining productivity in natural assets can have material implications for costs, revenues and, ultimately, long-term business viability[3].

In 2023 and 2024, low water levels on the Mississippi River reduced barge capacity and disrupted the movement of agricultural commodities across the US. The resulting restrictions increased transportation costs, delayed shipments and created supply chain challenges for businesses dependent on inland waterways, demonstrating how changes in freshwater systems can have direct operational and financial consequences[6].

Studies of Hurricane Sandy (2012) in the northeastern US and Hurricane Irma (2017) in Florida found that coastal wetlands played an important role in reducing storm and flood-related damages. During Hurricane Sandy, wetlands were estimated to have avoided approximately $625 million in direct flood damages across the northeastern US.[4] During Hurricane Irma, wetland losses were estimated to have contributed around $430 million in additional property damage across affected Florida counties.[5]
These findings demonstrate how the degradation of environmental infrastructure can increase physical risk and financial losses associated with extreme weather events.



Methodology: 'Nature Value at Risk' overview PAGE 8

Recognizing that a business depends on these resources and services is the starting point. The next step is understanding which dependencies matter the most by considering questions like:

Which dependencies are most critical to the business?

Which assets, operations and suppliers are most exposed?

What could the deterioration of these services mean for revenues, costs, investments, asset values and future growth?

Where should future action and investment be prioritized?

These are the same types of questions increasingly being raised by investors, regulators and frameworks, such as the Taskforce on Nature-related Financial Disclosures (TNFD). In fact, in its recent guidance for CFOs, the TNFD encourages finance leaders to understand how nature-related dependencies and risks could affect business performance, capital allocation and long-term value creation[7].

To date, however, these questions have been difficult to answer. Many organizations have lacked the data, analytical tools and methodologies needed to assess their environmental dependencies consistently and at scale. Furthermore, their financial significance has often only become visible when the resource or service has been lost or has deteriorated.

Innovations in technology, data availability and risk modeling are now making this financial analysis possible. Advanced analytical platforms are combining operational and financial information with satellite imagery and environmental datasets. This can help businesses understand and assess the financial significance of their environmental dependencies across their individual sites and supply chains.

To translate these dependency-related risks into financial terms, Nature Value at Risk (Nature VaR) has been developed as a financial metric. It draws on concepts developed by leading financial institutions, central banks and international organizations working on nature-related financial risk assessment. These include the European Central Bank (ECB)[8], the Network for Greening the Financial System (NGFS), the World Bank and the World Economic Forum (WEF).

Nature VaR is an estimate of the percentage of value (for example, the annual revenue generated at a site) potentially at risk if the natural resources and services that support it deteriorate or are lost.

For this study, Nature VaR is assessed using a 1-in-20 annual scenario (5% annual probability).

By quantifying these exposures, organizations can better understand the potential financial significance of environmental risks, compare them alongside other business priorities and identify where potential financial exposure is greatest. This enables these issues to be considered alongside other strategic and financial risks within the business, supporting risk assessment, resilience planning and corporate capital planning decisions. Nature VaR is intended to provide directional insight into potential exposure rather than predict future financial performance or actual financial losses.

“

Businesses are starting to see that environmental issues aren't just sustainability concerns. They can have a real impact on operating costs, supply chains, asset values and, ultimately, long-term growth.

The challenge is understanding where those exposures sit within the business and assessing whether they could become financially significant over time.

Farhad Merali, Head of Coverage, North America Lloyds

Quantifying dependencies

Working with Earth Blox[9], a geospatial analytics platform that uses satellite and environmental data to quantify nature-related risks, we assessed a range of locations across three different companies. The aim was to identify their environmental dependencies and estimate the potential Nature VaR. The three case studies are:

Two paper mills and a timber sourcing region for International Paper

Three manufacturing sites in the US operated by a large US diversified industrial company

Two data centers in the US belonging to a large US global technology services company

Our financial analysis focuses on three key areas. It shows which dependencies are most material at the locations assessed, the environmental health and conditions at these locations, and what the potential Nature VaR could be should they deteriorate. It highlights where financial exposure is potentially greatest.

These analyses help organizations identify where dependencies may be most critical, where environmental conditions may be creating financial exposure, and which risks may warrant further investigation. This allows businesses to prioritize interventions across sites and supply chains, focus resilience measures where they have the potential to make the greatest impact and look to manage potential emerging risks before they affect operational or financial performance. Ultimately, they provide an additional input into capital allocation, risk management and long-term strategic decision making.

When an environmental dependency can affect revenues, costs or business value, it becomes a business risk, not just a sustainability issue.

Methodology: 'Nature Value at Risk' overview

Nature VaR is a financial metric designed to quantify potential business exposure arising from dependencies on natural resources and services. It translates these environmental dependencies into financial terms.

This is done by estimating the proportion of economic value that could be at risk or lost if the natural resources and services supporting a site, asset or supply chain become degraded or unavailable. Depending on the context, **this economic value may represent revenue generated at a site, the value of an asset, or the production value within a sourcing region.**

Nature VaR is assessed using a severe but plausible 1-in-20-year scenario, equivalent to a 5% annual probability. The metric is calculated separately for each relevant resource or service.

Nature VaR focuses specifically on dependency-related risks. It does not assess other risk categories, including market risk, geopolitical risk or nature-related transition risks, such as changes in regulation.

The Nature VaR methodology draws on concepts discussed by the Network for Greening the Financial System in its paper "The Green Scorpion: The Macro-Criticality of Nature for Finance"[10], as well as work by other leading financial institutions, central banks and international organizations. These include the European Central Bank[11], the World Bank and the World Economic Forum.

To calculate Nature VaR for these case studies, Earth Blox combined company-provided operational, financial and site-level location data with geospatial environmental datasets. It assessed both the condition and availability of the environmental resources and services at each location, alongside the degree to which business performance and output depends on them. The resulting figures are scenario-based estimates intended to provide directional insight into potential financial exposure and should not be interpreted as forecasts, expected losses or measures of actual future financial performance.

> ***Nature risk is business risk, and it's local. Two sites can look identical on paper and carry completely different financial exposures - quantifying those risks at the site level is what makes the difference visible.***
>
> **Ben Matthews, Director of Nature & Climate, Earth Blox**

CASE STUDY

Environmental analysis of paper mill sites and a fiber sourcing region in the southern US

International Paper is one of the world's largest producers of fiber-based packaging. At the heart of the business is wood fiber, sourced from its supply chain and converted into paper and packaging products at its mill sites.

Given the type of business it operates, International Paper relies on a number of environmental services across the forests from where fiber is sourced and its mill operations.

Healthy and productive forests are vital to its supply chain, helping to regulate water availability, protect soils, and support long-term fiber growth. Its mills also depend on a consistent supply of water and the protection that surrounding forests and wetlands can provide against extreme weather. To better understand the potential financial significance of these dependencies, we have estimated the Nature VaR, which shows where potential financial exposure is greatest.

> ***Our entire business model depends upon the sustainability of forests. Forests sustain biodiversity, regulate water cycles and maintain our planet's ecological balance. International Paper is committed to responsible sourcing of forest fiber, balancing risk assessment and due diligence, sourcing controls and supplier engagement to protect these essential global ecosystems.***
>
> **Sophie Beckham, Chief Sustainability Officer, International Paper**

‘Nature Value at Risk’ analysis: **Mill sites**

Scope

Two paper mills located in the southeastern US.

Results

The analysis identified **water supply** and **storm mitigation** as the most material dependencies at both sites. While these services are rarely visible in day-to-day operations, they create the conditions needed for production to run reliably and at scale. In this case study, we explore storm mitigation in more detail.

Storm mitigation

Forests and wetlands can act as a form of protective infrastructure by helping to lessen the impact of severe storms on operations. Both mills are located in areas that are exposed to tropical storms and hurricanes, although the level of exposure varies across the region. Risk is greatest nearer the coast, where wind speeds are higher and vegetation tends to be sparser, providing less protection from storm impacts. Further inland, denser vegetation and lower wind speeds contribute to comparatively lower exposure. As a result, the two mills have different levels of potential operational and financial exposure.

Potential financial impacts

Severe storms may suspend production, disrupt transportation routes and affect critical infrastructure, such as power and water supplies. This can result in revenue losses during outages, capital expenditure for site and equipment repairs, and additional investment in protective infrastructure.

Estimated Nature VaR for the mills ranges from 5.5% to 6.3% for storm mitigation in a severe but plausible year

This variation reflects differences in the condition of the surrounding forests and wetlands, which can help reduce the impacts of storms, as well as the risk of high winds at the location.

Assessing risks beyond direct operations: Mill sites

Dependency	What degradation looks like	How it reaches the P&L
Water supply	Reliable water becomes less available for operations	Production interruptions, higher operating costs and potential lost revenue
Storm mitigation	Reduced natural protection leaves sites more exposed to severe storms	Asset impairment, reduced asset values, repair costs, operational downtime and potential revenue losses

Storm mitigation across the southeastern US

EARTH BLOX

Green areas indicate comparatively lower risk, associated with denser vegetation and lower wind speeds, while yellow and orange areas indicate higher risk. Created using Earth Blox.

‘Nature Value at Risk’ analysis: **Fiber sourcing region**

Scope

Fiber sourcing region for Southeastern US containerboard mills.

Results

Every box, package and paper product starts with a supply of fiber from surrounding forests. Maintaining that supply depends on the health and productivity of the forests that support long-term timber growth. The analysis identified several material dependencies across the sourcing region, including **pest and disease control**, **landslide and erosion prevention**, **water supply** and **storm mitigation**. This case study explores pest and disease control in more detail.

Pest and disease control

Pest and disease control refers to the ability of healthy, diverse and well-connected forests to limit the spread and severity of these threats. Forests across the southeastern US face ongoing pressure from pests and diseases that can reduce timber productivity, fiber availability and wood quality.

One example is the Southern Pine Beetle, a destructive pest that can damage large areas of forest by burrowing beneath tree bark and disrupting the flow of water and nutrients. Drought, urban expansion and overly dense tree cover can place additional stress on forests, weakening trees’ natural defenses and increasing their vulnerability to pest outbreaks.

Potential financial impacts

Pest outbreaks can cause timber productivity to decline, increasing pressure on fiber availability. This may require additional investment in forest management or alternative sourcing arrangements. Where fiber shortages constrain production, this could also result in lost revenue.

Estimated Nature VaR varied considerably across the sourcing region

The estimated Nature VaR was 13.3% for pest and disease control, indicating that in a severe but plausible year, 13.3% of the expected annual fiber growth within the sourcing regions supplying these mills could be lost due to pest and disease outbreaks.

A shortfall of this scale could tighten regional wood supply, increasing fiber costs and potentially requiring International Paper to source fiber from additional locations.

The results varied considerably across the sourcing locations sampled, ranging from an estimated 10.2% to an estimated maximum of 19.6%. This highlights meaningful variation in potential financial exposure across the sourcing region, reflecting differences in forest health, water availability, pest pressures and other local conditions that influence forest resilience and productivity.

The chart on page 12 shows that potential financial exposure also arises from several other dependencies across the sourcing region, not solely from pest and disease control.

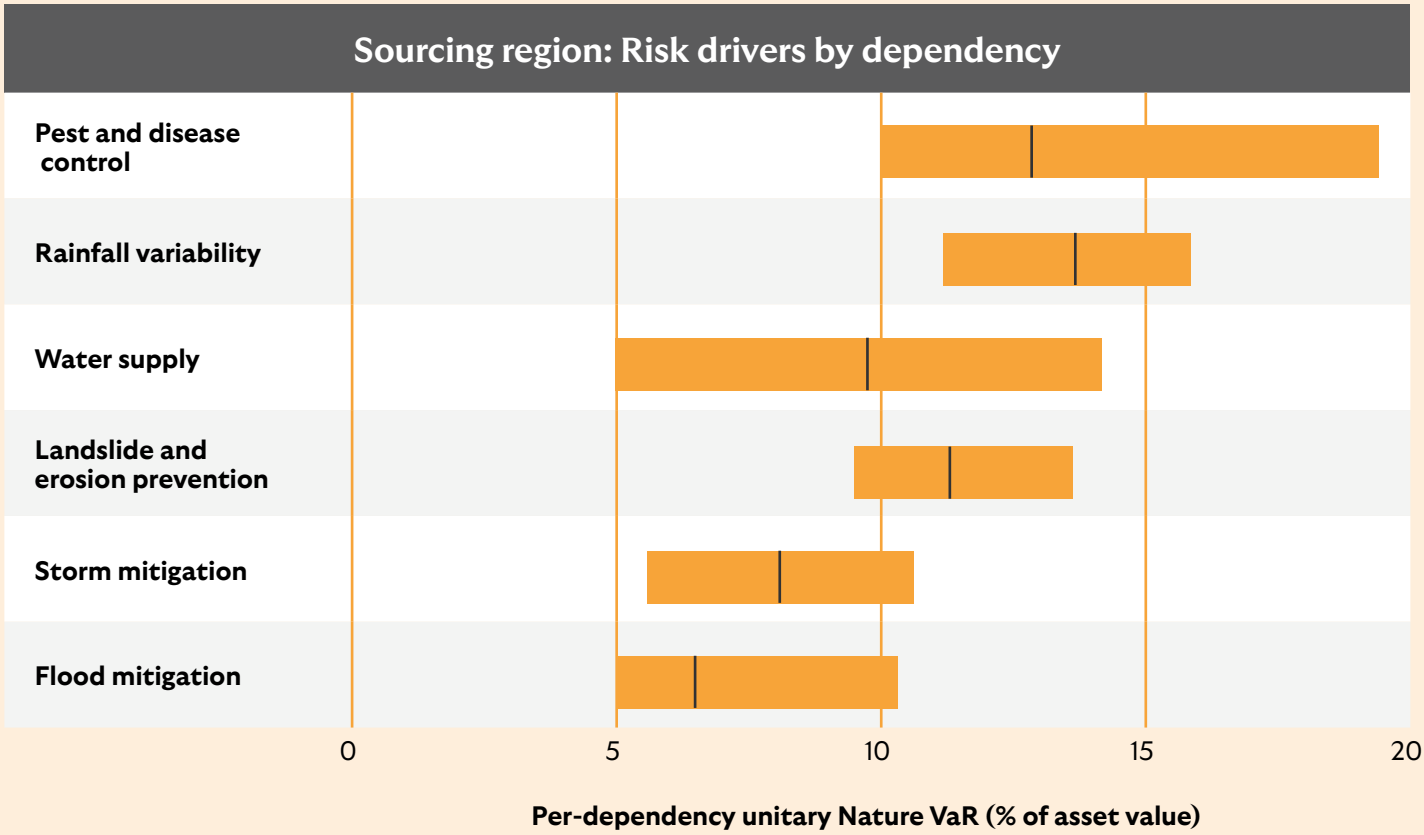


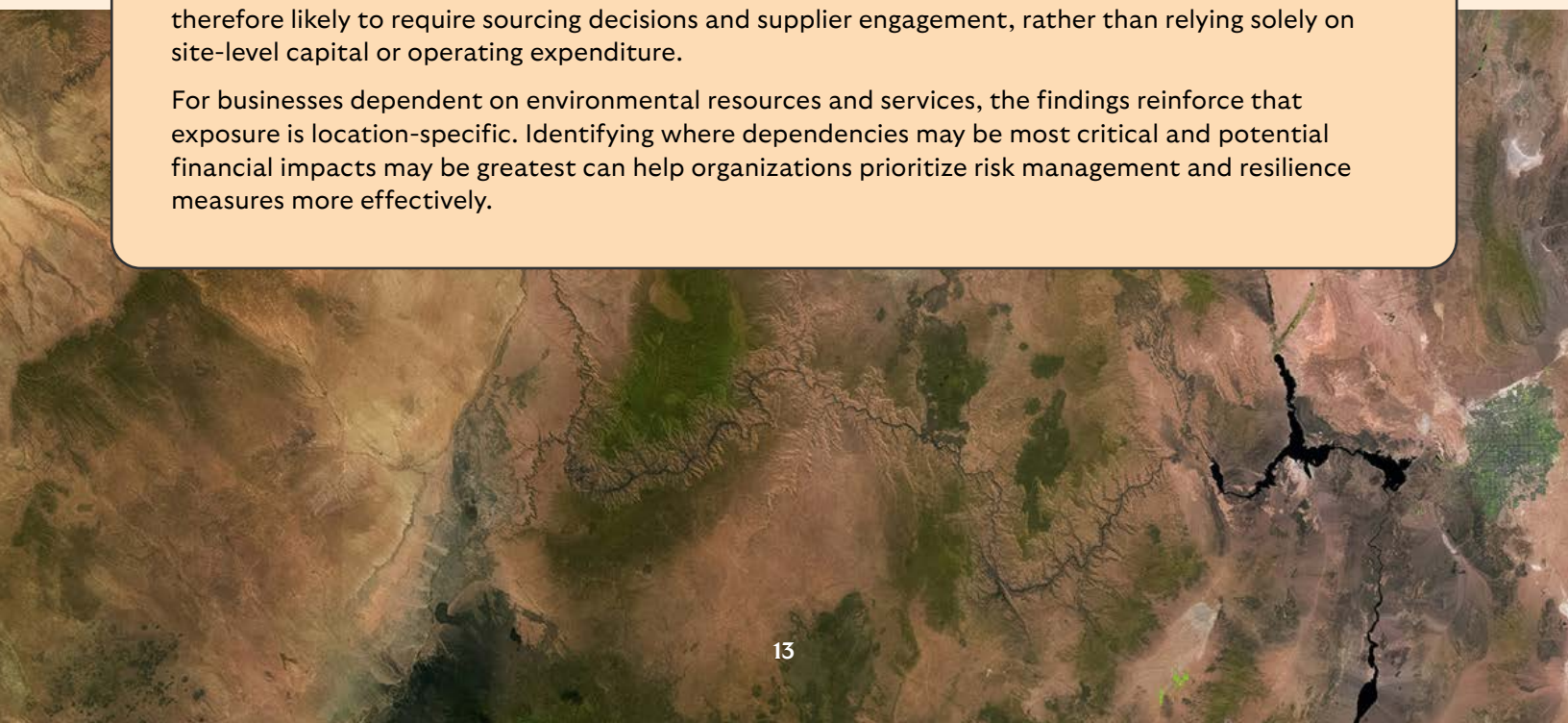
Table showing the ranges in estimated Nature VaR by environmental dependency for the sourcing region. The line in the middle of each bar represents the mean value.

Assessing risks beyond direct operations: Sourcing region		
Dependency	**What degradation looks like**	**How it reaches the P&L**
Pest and disease control	Forests become more vulnerable to pest and disease outbreaks	Reduced fiber availability, higher procurement costs and potential supply shortages
Rainfall variability	Changes in rainfall patterns affect forest health and productivity	Reduced forest productivity, lower fiber supply and higher sourcing costs
Water supply	Water stress reduces forest growth and productivity	Lower yields, reduced fiber availability and increased input costs
Landslide and erosion prevention	Erosion damages forests, roads and access routes	Supply disruption, delayed deliveries and higher operating costs
Storm mitigation	Severe storms damage forests (that are providing the fiber) and supporting infrastructure	Reduced timber availability, increased raw material costs and pressure on margins
Flood mitigation	Flooding damages forests and limits access to sourcing regions	Supply disruption, higher operating costs and reduced future fiber availability

Key takeaways

The results emphasize the importance of assessing financial exposure across the full value chain, not only within direct operations. The highest estimated exposure in this sample of International Paper's value chain sits on land which the company does not own or operate. Managing this exposure is therefore likely to require sourcing decisions and supplier engagement, rather than relying solely on site-level capital or operating expenditure.

For businesses dependent on environmental resources and services, the findings reinforce that exposure is location-specific. Identifying where dependencies may be most critical and potential financial impacts may be greatest can help organizations prioritize risk management and resilience measures more effectively.



CASE STUDY

Environmental analysis of three manufacturing facilities in the US

This case study examines three manufacturing facilities operated by a diversified industrial company with operations across the US. The company has chosen to remain anonymous for the purposes of this report. The analysis demonstrates how environmental dependencies and local conditions can influence financial exposure across facilities within the same organization.

All three facilities depend on a stable water supply to support manufacturing operations, but each is also exposed to a different combination of environmental pressures, resulting in distinct risk profiles. The results show how potential financial exposure can vary significantly across facilities within the same corporate group. This highlights the importance of site-level analysis that assesses a range of environmental risk factors to understand operational resilience and potential financial impacts.

To better understand these dependencies and their financial significance, we estimated the Nature VaR at the three sites.

> ***Incorporating the dependencies that businesses have on environmental resources into financial analysis can help turn an invisible risk into something that can be actively managed, helping businesses to prioritize action and investment where it may matter most.***
>
> ***Nature VaR translates environmental dependencies into financial terms, allowing businesses to compare potential exposure across sites. This helps identify where financial exposure may be greatest and where investment and resilience measures are likely to be most effective.***
>
> **Hannah Simons, Head of Sustainable Finance & Transition, Lloyds Corporate & Institutional**

‘Nature Value at Risk’ analysis: **Manufacturing facilities**

Scope

Three manufacturing facilities:

Site A: Located in the western US
Site B: Located in the eastern US
Site C: Located in the central US

Results

Water supply was the most material dependency at all three facilities, with estimated Nature VaR values ranging from approximately 9% to 12% across the sites. These percentages estimate the potential revenue at risk in a severe but plausible year if the surrounding water supply is significantly disrupted.

Soil and sediment retention, which helps reduce erosion and landslide risks, showed the greatest variation across the three sites due to differences in local environmental conditions. Where erosion and landslide risks are elevated, the potential impacts can extend beyond the site itself, including damage to roads and transport networks, disruption to incoming supplies and product distribution, and impacts to utilities and water infrastructure, such as pipelines, reservoirs and treatment facilities. Together, these factors can compound water-related risks, increasing the potential for operational disruption across the sites and their supply chains, and ultimately contributing to financial loss. This case study explores soil and sediment retention in more detail.

Potential financial impacts

Landslides and erosion can disrupt operations and supply chains, resulting in lost revenue during periods of suspended production, repair costs for damaged infrastructure, higher logistics costs, delayed deliveries and, where hazardous materials are handled, clean-up costs, regulatory penalties and potential legal liabilities associated with accidental chemical releases into the surrounding area.

Estimated Nature VaR for soil and sediment retention ranged from approximately 3% to 5% across the three facilities, with Site B showing the greatest potential financial exposure

Site C did not exhibit the highest estimated water supply or soil and sediment retention dependency among the facilities assessed, and therefore this case study focuses on Site A and Site B.

Site A: Interconnected environmental risks

Site A demonstrates why environmental dependencies should not be considered in isolation. It has the highest estimated exposure to water supply risk of the three facilities, with an estimated Nature VaR of 11.8%, which is the percentage of annual revenue that could be at risk in a severe but plausible year if water availability in the surrounding area were significantly reduced or disrupted. The site is also more exposed to erosion and landslide risk than the other facilities because the surrounding landscape has less plant cover to stabilize soils and reduce erosion.

Wildfire can create an additional risk in areas where upstream landscapes support local water supplies. When wildfires remove natural plant cover from steep slopes, soils become more vulnerable to erosion. Subsequent rainfall can then wash large volumes of ash, soil and debris into rivers and reservoirs, affecting both water quality and water availability.

The analysis showed how damage to vegetation in the wider landscape could increase erosion and sediment run-off, creating additional pressure on the water systems on which a manufacturing site depends.

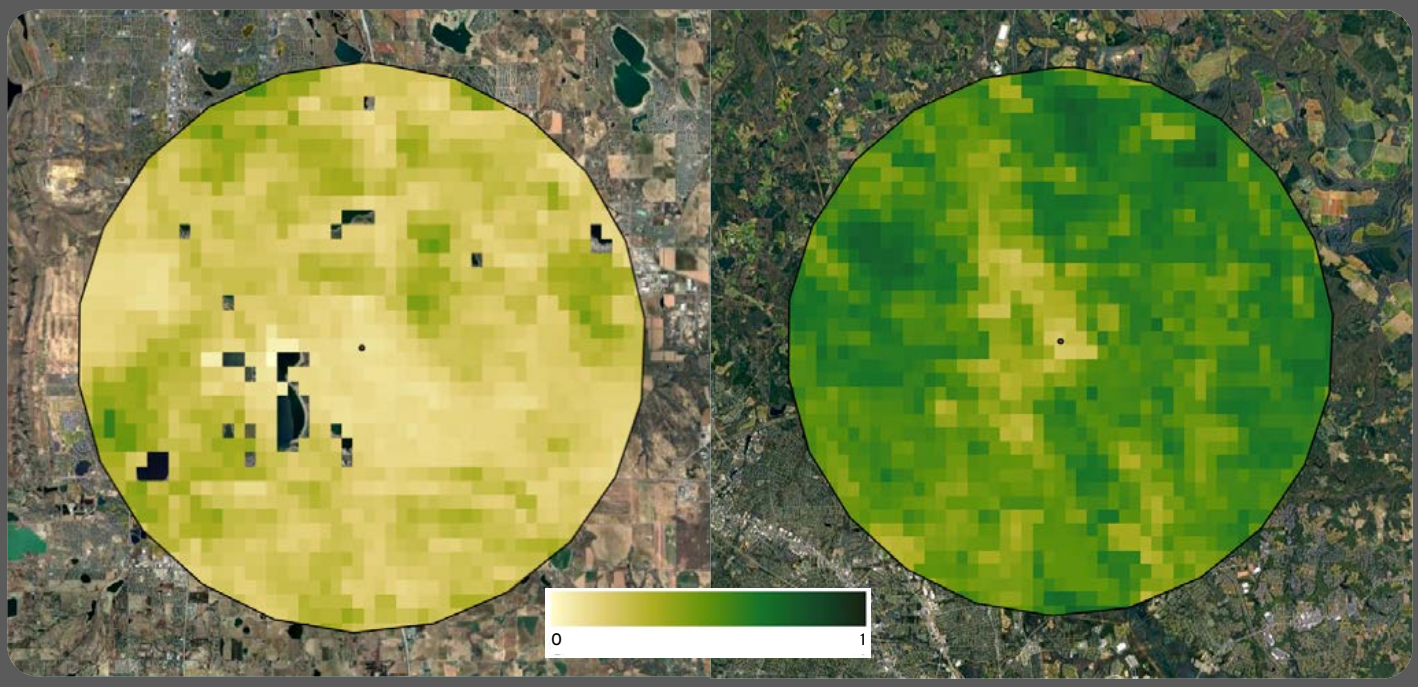
This demonstrates how one environmental risk can interact and amplify another, creating greater financial exposure than would be identified by assessing each dependency separately. As risks reinforce one another, the likelihood and severity of operational disruption and the resulting financial exposure can increase.

Site B: The value of healthy surrounding landscapes

Site B has the highest estimated Nature VaR for soil and sediment retention for two reasons. First, its manufacturing activities made the facility more dependent on stable ground conditions than the other sites. Erosion or landslides affecting critical production, storage or supporting infrastructure could lead to operational disruption, clean-up costs and potential legal or regulatory consequences.

Second, the surrounding area is more susceptible to erosion and landslide risks. However, the assessment also shows more extensive and healthier plant cover that helps reduce these risks, which could otherwise be significantly higher.

The combination of the higher dependency and the elevated local hazard levels, however, still results in Site B having the highest estimated Nature VaR for soil and sediment retention out of the three sites. This analysis highlights how surrounding environmental conditions can influence financial exposure. Although erosion and landslide risks cannot be eliminated, extensive plant cover helps reduce their potential impact, demonstrating how investments in the surrounding landscape can complement traditional risk management measures and contribute to operational resilience and long-term business value.



Comparison of relative erosion and landslide exposure around two anonymized manufacturing facilities

EARTH BLOX

Darker green indicates landscapes providing greater protection against erosion, while pale yellow indicates higher relative exposure. Site locations and geographic details have been removed to preserve confidentiality. Created using Earth Blox.

Key takeaways

Although these facilities operate within the same corporate group, the analysis reveals materially different sources and levels of potential financial exposure.

The analysis demonstrates that environmental risks do not operate in isolation. At Site A, wildfire, erosion and water availability are interconnected, meaning that one risk can amplify another and increase the likelihood and severity of operational disruption. At Site B, healthy surrounding landscapes help reduce erosion risk, highlighting how environmental conditions can influence financial exposure and support operational resilience.

These insights would not be visible through a high-level sector assessment alone. By understanding how environmental conditions vary across sites and how different risks interact, businesses can identify where financial exposure may be greatest, prioritize resilience measures more effectively and make more informed decisions about future capital planning and risk management.

CASE STUDY

Environmental analysis of two data center sites in the US

Data centers are an increasingly critical part of the digital economy. They require significant resources to operate, particularly energy and water. As of August 2026, the US was estimated to host more than 4,700 data centers, around 39% of the global total[12], and the sector continues to expand rapidly.

Water can be essential to maintaining some data center operations. The equipment can generate substantial heat, and many facilities use water-based systems to provide cooling and prevent overheating.

While cooling technologies vary, facilities designed around water-based cooling systems depend on reliable access to sufficient water to operate at full capacity. Some systems recycle water within the facility, while others require a continuous supply.

This case study examines two data centers operated by a large US global technology services company.

Both facilities use water-based cooling systems that require a continuous supply of water. This makes reliable access to water a critical operational dependency. Unlike many other business inputs, there are limited alternatives if water supply becomes constrained. A significant reduction or disruption in supply could therefore reduce cooling capacity, restrict operations and, in severe circumstances, force a temporary suspension of activity altogether.

To better understand the financial significance of this dependency, we estimated the Nature VaR at both sites.

> ***As data center demand expands rapidly, water availability has become a critical operational dependency. This study estimates the potential revenue exposure at each site, supporting capital planning and resilience-related decision-making.***
>
> **Sam Fleming, Co-founder, Earth Blox**

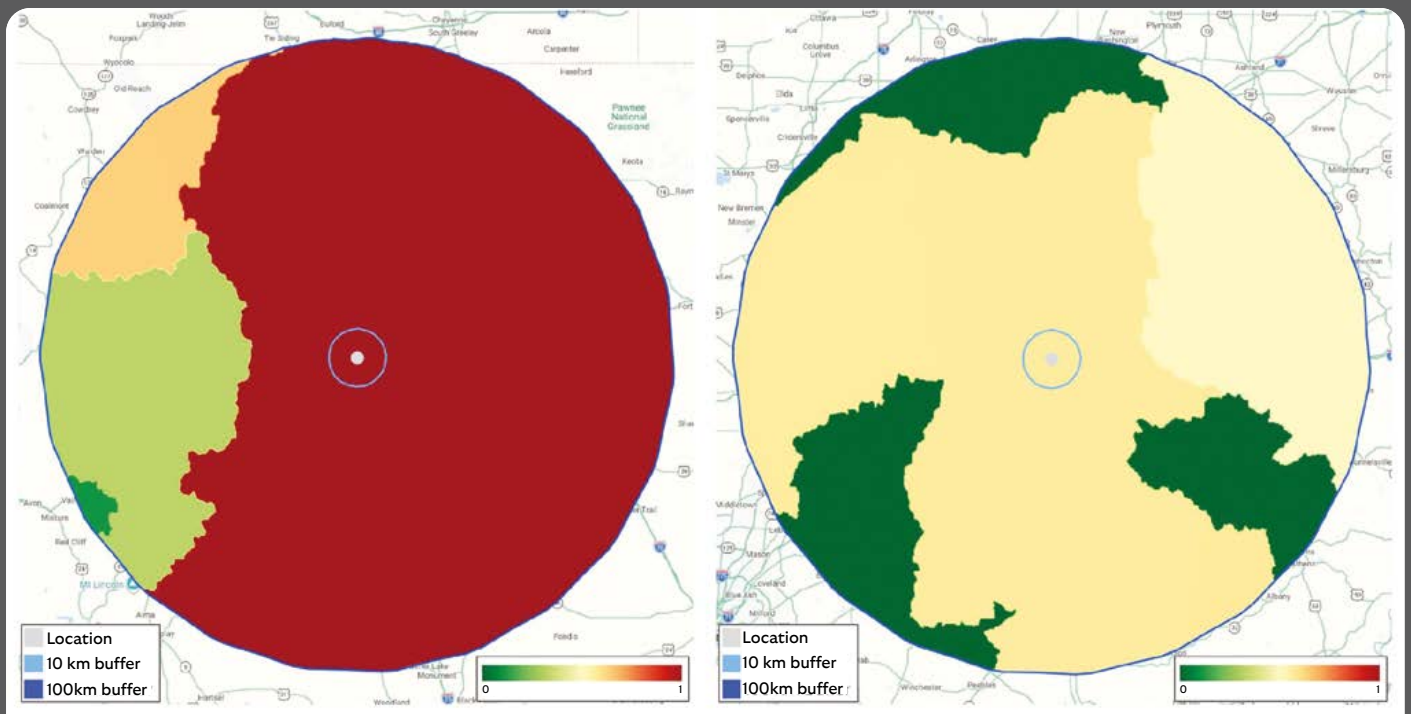
‘Nature Value at Risk’ analysis: **Data center operations**

Scope

Two data centers with water-based cooling, located in Boulder, Colorado, and Columbus, Ohio.

Results

Across all dependencies assessed, **water supply** was the dominant risk at both sites, with its Nature VaR three to four times higher than any other dependency. This creates a highly concentrated risk profile.



Boulder, Colorado **Columbus, Ohio**

Contrasting water stress for two US data centers

EARTH BLOX

Baseline Water Stress (WRI Aqueduct): the ratio of total water demand to total renewable water supply, shown across 10 km and 100 km buffers around each site. Green areas are low risk, yellow and orange areas are higher risk and dark red indicates maximum risk. Specific site locations and geographic details have been removed to preserve confidentiality. Created using Earth Blox.

Water supply

The analysis identified a material difference in exposure between the two locations: Boulder exhibited a significantly higher estimated Nature VaR than Columbus. Understanding what drives this difference provides valuable insight into how the location of a facility can influence financial risk.

Potential financial impacts

If sufficient water is unavailable, the site may be unable to operate at full capacity. In extreme circumstances, it may also be forced to suspend operations altogether. The resulting impacts could include lost revenue, contractual penalties, customer losses and constraints on future growth.

Estimated Nature VaR:
13.1% at Boulder
and 8.8% at Columbus

This indicates that, in a severe but plausible year, an estimated 13.1% of revenue generated at Boulder and 8.8% at Columbus could potentially be at risk if water supply were reduced or disrupted.

Why Boulder is more exposed

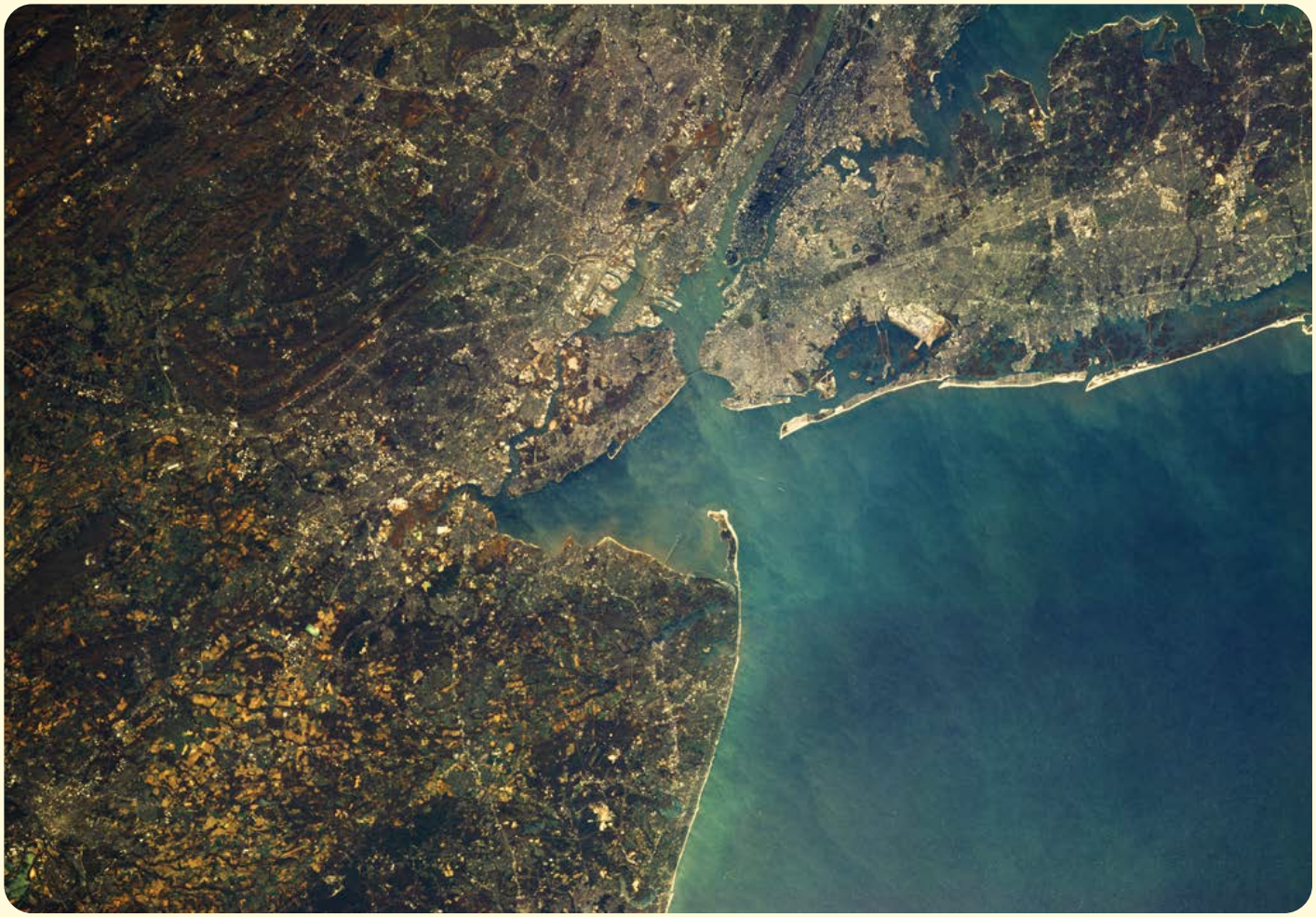
Boulder exhibited the highest estimated Nature VaR of the two sites at 13.1%. This is largely because of its greater dependence on a water supply that is sensitive to snowfall conditions. This snow in the surrounding mountains acts as a natural reservoir, gradually releasing water throughout the year. When winter snowfall is lower than expected, less water is available during the warmer months. This increases both operational and financial exposure should water availability deteriorate.

Recent conditions highlight this vulnerability. In early 2026, Colorado recorded its lowest winter snowpack in 40 years, leading Boulder to enter 'Drought Watch' for the first time since 2012[13].

Why Columbus is less exposed

The Nature VaR at Columbus was lower at 8.8%. Unlike Boulder, the site benefits from a more diversified water supply, with multiple sources to draw on should local availability become constrained. This provides greater resilience and helps explain the lower level of financial exposure identified in the analysis.

However, lower exposure does not eliminate risk. In 2024, during the region's most severe drought in 25 years, Columbus was able to maintain water supplies by drawing on reserve capacity and supplemental water infrastructure[14].



Key takeaways

The analysis reflects current water-related risks. Future conditions may further increase pressure on water availability and widen the difference between these two sites.

Climate projections indicate increasingly severe drought conditions over time at both locations, with more extreme conditions expected at Boulder. Adapting existing facilities may be difficult and costly. Cooling infrastructure is typically replaced over approximately 15-year investment cycles, so facilities designed around a particular cooling technology may require substantial modification to adopt alternative methods. Consequently, decisions made today can shape water dependency and operational resilience for many years, well into the middle of the century and beyond.

Meanwhile, annual direct water consumption in the US is projected to increase from 17 billion gallons in 2023 to between 38 and 73 billion gallons by 2028[15]. As more facilities draw on shared local supplies, water availability may increasingly influence which locations are best placed to support expansion and long-term growth.

Nature VaR makes this exposure visible in financial terms. Applied across a portfolio, it can help businesses distinguish between sites that appear operationally similar but face very different underlying risks. It can also support more informed decisions about capital investment, resilience measures and where future growth can be sustained.

Final thoughts

Businesses have always depended on environmental resources and services. Whether it is water being available at a manufacturing site or data center, or forests supplying raw materials, these resources and services underpin operations, supply chains and growth.

The case studies in this report help to demonstrate that these dependencies can create material financial exposure across a range of sectors and business models. They also highlight that exposure is often highly location-specific. Two sites may appear operationally similar on paper, yet face very different levels of risk depending on the condition and availability of the resources and services on which they depend.

For business leaders, the challenge is not simply recognizing that these dependencies exist. It is understanding which dependencies matter most, where exposure is greatest and how those risks could affect future performance. Identifying dependencies is the first step. Understanding their potential financial significance is the second. Taking action to improve resilience and manage potential exposure is the third.

As data, technology and analytical tools continue to evolve, businesses have an opportunity to bring these dependencies into mainstream financial analysis and decision-making. By doing so, they can make more informed decisions about risk, investment and long-term value creation. The businesses that understand these exposures may be better positioned to improve resilience, adapt to change and support long-term business performance.

"The recent Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) Business and Biodiversity Assessment[16] shows that all businesses impact and depend on nature. It also identified more than 100 actions businesses, governments, financial actors and civil society can take to understand, measure and respond to these.

By making nature-related dependencies visible, the approach explored in this report can help organizations focus their efforts where they matter most, strengthening potential long-term business value and the ecosystem services that underpin it.

Katie Leach, Head of Nature, Lloyds Banking Group

Important considerations

Nature VaR is a modeled estimate of potential financial exposure under a severe but plausible scenario. It is designed to provide directional insight into the potential scale and location of exposure and to support comparison and prioritization across sites, assets and supply chains.

The analysis draws on a combination of operational, financial and geospatial environmental data. For the purposes of this study, each participating company provided financial, operational and site-level location data to support the analysis, which was combined with additional data sources.

Results are scenario-based estimates derived from the methodology, assumptions and data available at the time of analysis. They should not be interpreted as forecasts, expected losses or measures of actual future financial performance. Findings may change over time as data availability, accuracy, methodologies, environmental conditions and business operations evolve.

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