Nature, Nurture and Numbers:
Nature-Related Impacts on S&P World Index Performance

Contributor

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Executive Summary

Most of the world's largest companies are significantly dependent on nature in their operations, even as the biodiversity and ecosystems underpinning those resources are declining due to overexploitation and climate change. This paper uses the S&P Global Energy Horizons Nature & Biodiversity Risk dataset[1] to assess nature-related impacts and dependency risks across the S&P World Index over the two-year period ending on July 30, 2025.

Nature dependency risk: Our analysis indicates that companies with the lowest nature dependency risk in their operations outperformed the S&P World Index by a cumulative 13.8% over the past two years.

Nature impact: Companies with a median impact on nature outperformed the S&P World Index by a cumulative 18.6%.

Sector trends: Information Technology was the leading contributor to the cumulative return of companies in the S&P World Index and was also the sector with the lowest nature dependency risk. Most of the companies in the S&P World Index with the largest impact on nature were in the Utilities, Industrials and Energy sectors, yet they

[1] Whieldon, Esther, et al. "How the World's Largest Companies Depend on Nature and Biodiversity." S&P Global Energy Horizons. May 10, 2023.

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contributed the least to performance. The Information Technology and Financials sectors, despite their small weights in the index, made the greatest contribution to performance.

In December 2022, a significant diplomatic endeavor gathered representatives from nations worldwide to forge an influential accord[2] aimed at confronting the pressing issues of biodiversity loss and ecological decline.[3] Recognized increasingly as critical factors in intensifying climate change, these environmental challenges pose severe economic threats to numerous industries and communities. The creation of the Kunming-Montreal Global Biodiversity Framework (GBF) marked a transformative moment in this struggle, drawing parallels to the Paris Agreement on climate change and illustrating a renewed commitment to international solidarity in the preservation of our natural world.[3]

As the years unfolded, the role of addressing nature-related risks became increasingly prominent on corporate agendas.[3] Initiatives such as the establishment of the Taskforce on Nature-related Financial Disclosures (TNFD) and the launch of a research initiative by the International Sustainability Standards Board aimed at biodiversity and ecosystems[4] have shifted the corporate narrative around sustainability.[3] Companies are now urged to take into account their impacts and dependencies on nature and ecosystem services. By early 2025, Australia introduced a compulsory framework[5] for climate-related disclosures, representing a significant milestone in corporate accountability that recognizes the deep connections between climate change and biodiversity deterioration.

Furthermore, awareness is growing in several markets regarding the fundamental importance of nature to business operations.[3] The World Economic Forum reports that around USD 44 trillion in global economic output—representing more than half of the world's GDP in 2019—is significantly dependent on natural resources and ecosystem services.[6] Additionally, ecosystems play a crucial role in addressing climate change, having absorbed roughly 56% of human-induced CO_2 emissions over the past 60 years, according to the Intergovernmental Panel on Climate Change (IPCC) in its Sixth Assessment Report.[7] The degradation of these critical ecosystems threatens to destabilize the safeguards against severe climate change, leading to heightened impacts of global warming.[3]

Against this backdrop, we examined the nature-related risks and impacts of companies in the S&P World Index alongside the index's cumulative return performance over a two-year period concluding on July 30, 2025.

[2] "COP15 ends with landmark biodiversity agreement." UNEP. Dec. 20, 2022.

[3] MacFarland, Matt et al. "Ahead of COP 16, Corporate Nature Commitments Remain Rare." S&P Global Energy Horizons. Oct. 17, 2024.

[4] "ISSB to commence research projects about risks and opportunities related to nature and human capital." IFRS. April 23, 2024.

[5] "A director's guide to mandatory climate reporting." Climate Governance Initiative Australia. September 2024.

[6] "Nature Risk Rising: Why the Crisis Engulfing Nature Matters for Business and the Economy." World Economic Forum. January 2020.

[7] "Climate Change 2023 Synthesis Report." IPCC. 2023.

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The S&P Global Energy Horizons Nature & Biodiversity Risk dataset assesses nature-related impacts and dependency risks across a company's direct operations that can be applied at the asset, company and portfolio levels. The dataset applies the Nature Risk Profile for analyzing companies' impacts and dependencies on nature, launched by S&P Global Energy Horizons and the UN Environment Programme World Conservation Monitoring Centre (UNEP-WCMC) in January 2023.

Dispelling Confusion: Nature versus Biodiversity

The expressions "nature" and "biodiversity" are frequently regarded as equivalent. In this paper, we adopt the methodology established in the prior work of Whieldon, Esther, et al.[8] and adhere to the guidelines provided by the TNFD and the Intergovernmental Platform on Biodiversity and Ecosystem Services (IPBES). We characterize nature as the physical realm, with a particular emphasis on the vast array of living organisms and their relationships with one another and their surroundings. This characterization includes various elements such as biodiversity, ecosystems, their structure and functionality, as well as the biosphere and natural resources.[9]

Biodiversity is defined as the variability present among living organisms from different origins, which includes terrestrial, marine and other aquatic ecosystems, alongside their ecological dynamics.[8] This encompasses the variation found within species, between species and among various ecosystems, making biodiversity an integral part of nature.[10]

The metrics utilized in the analysis presented in this paper are based on a framework that emphasizes the significance of nature and terrestrial ecosystems, which are predominantly impacted by human activities. We assess these metrics utilizing a double-materiality perspective.[8]

How Companies Depend on Nature

Numerous aspects of the economy depend on the services delivered by ecosystems.[1] For instance, these services supply timber for construction, freshwater for drinking, cooling power stations and agricultural irrigation, as well as various fibers from animals and plants used in textiles or fertilizers. Furthermore, nature contributes to ecosystem services by influencing climate conditions and regulating hydrological, ecological and soil dynamics. Noteworthy

[8] Whieldon, Esther, et al. "Companies Around the World Face Risks from Their Reliance on Nature." S&P Global Energy Horizons. Nov. 4, 2025.

[9] Díaz, Sandra, et al. "The IPBES Conceptual Framework—connecting nature and people." Current Opinion in Environmental Sustainability. Volume 14. pp. 1-16. June 2015

[10] "Convention on Biological Diversity." Convention on Biological Diversity. May 1992.

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examples of such services are pollination, carbon capture, soil erosion prevention, protection from floods and storms, disease management and the maintenance of soil health.[1]

Understanding Companies' Nature Dependency Risks

For a company's dependency on an ecosystem service to pose a significant financial threat, this dependency must occur in an area where the service itself faces the possibility of interruption.[8] Take water dependency as an example: it becomes a risk only if access to water in a specific region is compromised due to water scarcity. To assess these material dependency risks quantitatively, our analysis utilizes S&P Global Energy Horizons' nature dependency risk score. This score evaluates how much a business depends on 21 distinct ecosystem services, reflecting both the level of dependency (or exposure) to risk and the expected resilience risk of the ecosystems delivering these services in the business' operational regions worldwide (indicating the likelihood of facing such risks). The indicators for these risks draw on information specific to both sectors and individual companies, along with data related to their geographical locations, to estimate the threats posed directly to their operations.[8] Companies are deemed to have considerable dependency risk if their nature **dependency risk score** exceeds 0.6, with a score of 0 indicating no dependency risk and 1.0 indicating a very high dependency risk.

Understanding a Company's Impact on Nature

Companies can affect nature in various ways: for instance, they might occupy a significant amount of land, adversely influence an ecosystem's integrity or engage in operations within areas of substantial environmental importance—regions crucial for biodiversity preservation and the ecosystem services that benefit communities at both local and global levels.[8]

Given that the impacts of companies are often complex and multifaceted, we center our evaluation of a company's environmental impact on the primary indicator provided by S&P Global Energy Horizons —the Ecosystem Footprint.[8] This metric, which is both significance-weighted and condition-adjusted, measures the land footprint of an entity's operations while accounting for three dimensions of impact. It serves as a useful tool for decision-making, allowing comparisons of business operations across various locations and calculating an impact expressed in hectares-equivalent of the most pristine and significant areas (denominated as hectares of Highest Significant Area equivalent, or ha HSA eq). This method enables the expression of environmental impacts across any ecosystem worldwide in a unified metric, similar to how different greenhouse gases can be represented as CO_2-equivalent for aggregation and comparison among various assets, companies or regions.[8] For simplicity, in this paper we refer to this metric as a company's **impact on nature**.

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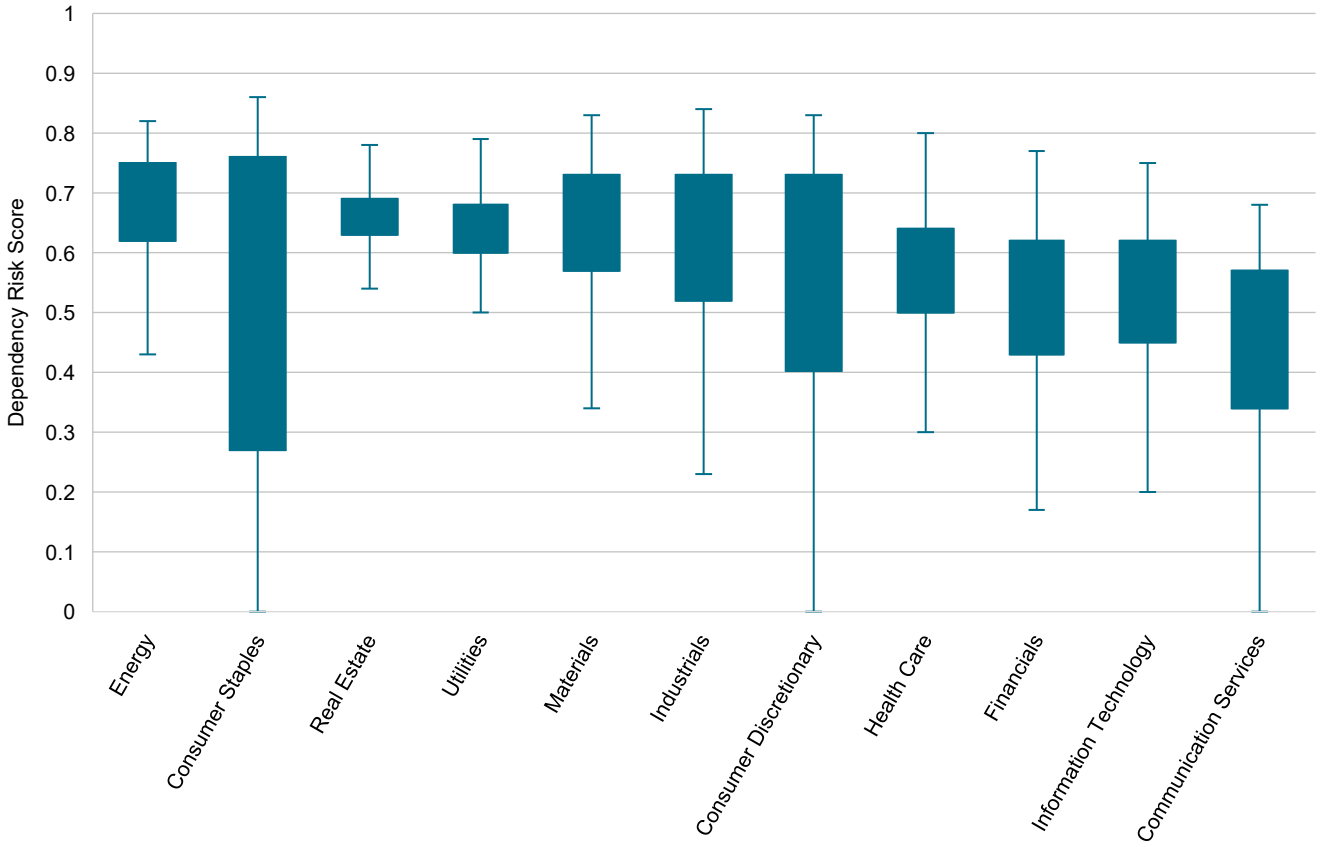
Exhibit 1 summarizes the sectoral breakdown of S&P World Index companies' nature dependency risk profiles. The Energy, Consumer Staples, Industrials, Utilities and Real Estate sectors have some of the highest median nature dependency risk scores. Due to the diversity of some of these sectors, however, significant variations can be observed, pointing to possible opportunities for intra-sector weighting optimization.

Exhibit 1: Sectoral Breakdown of S&P World Index Companies' Nature Dependency Risk Profiles



Source: S&P Dow Jones Indices LLC, S&P Global Energy Horizons. Data as of July 31, 2025. Chart is provided for illustrative purposes.

Exhibit 2 provides a summary of the absolute nature impact of the index constituent companies, per sector, along with relative ecosystem footprint intensities per USD 1 million of revenue generated to normalize for actual size and output of companies based on the S&P Global Energy Horizons' scores. The Industrials, Materials and Energy sectors clearly stand out, although with low intensities on average for Industrials sector companies.

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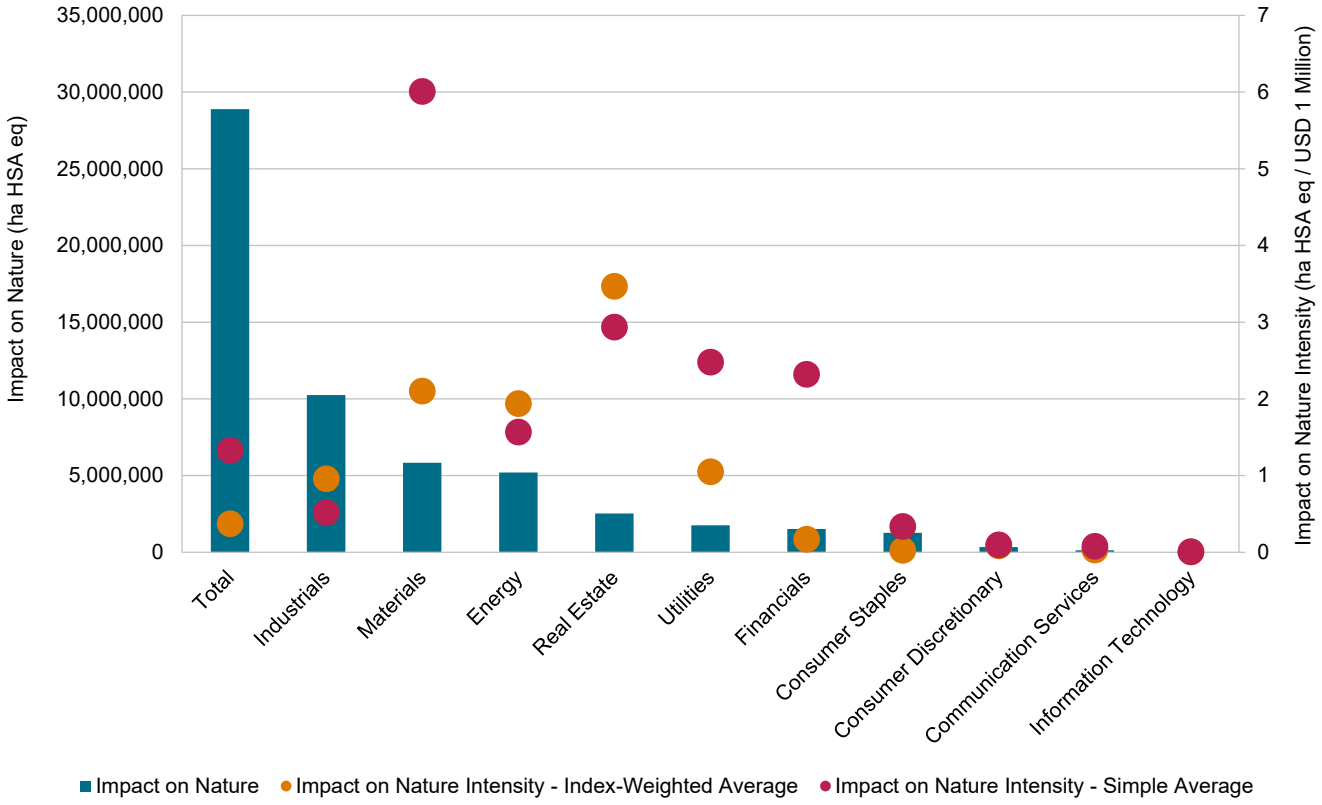
Exhibit 2: Sectoral Breakdown of S&P World Index Companies' Impact on Nature and Intensity Profiles Based on S&P Global Energy Horizon Scores



Source: S&P Dow Jones Indices LLC, S&P Global Energy Horizons. Data as of July 31, 2025. Chart is provided for illustrative purposes.

Examining Nature Dependency Risk and Impact Metrics Alongside the S&P World Index's Cumulative Index Performance

To understand nature dependency risk and impact metrics alongside index returns, we created five hypothetical compositions, each containing the same number of companies. Every year, we ranked the companies in the S&P World Index based on their nature dependency risk and impact scores, placing them in one of the five compositions, from the highest to the lowest scores. We then calculated the back-tested overall performance of these hypothetical compositions and compared it to the actual performance of the S&P World Index.

The findings concerning the nature dependency risk metric, summarized in Exhibit 3, reveal that companies with the lowest nature dependency risk as measured by the scores outperformed the S&P World Index by a cumulative 13.8%, while those with the highest nature dependency risk underperformed by 24.9% for the period July 1, 2023, through July 1, 2025.

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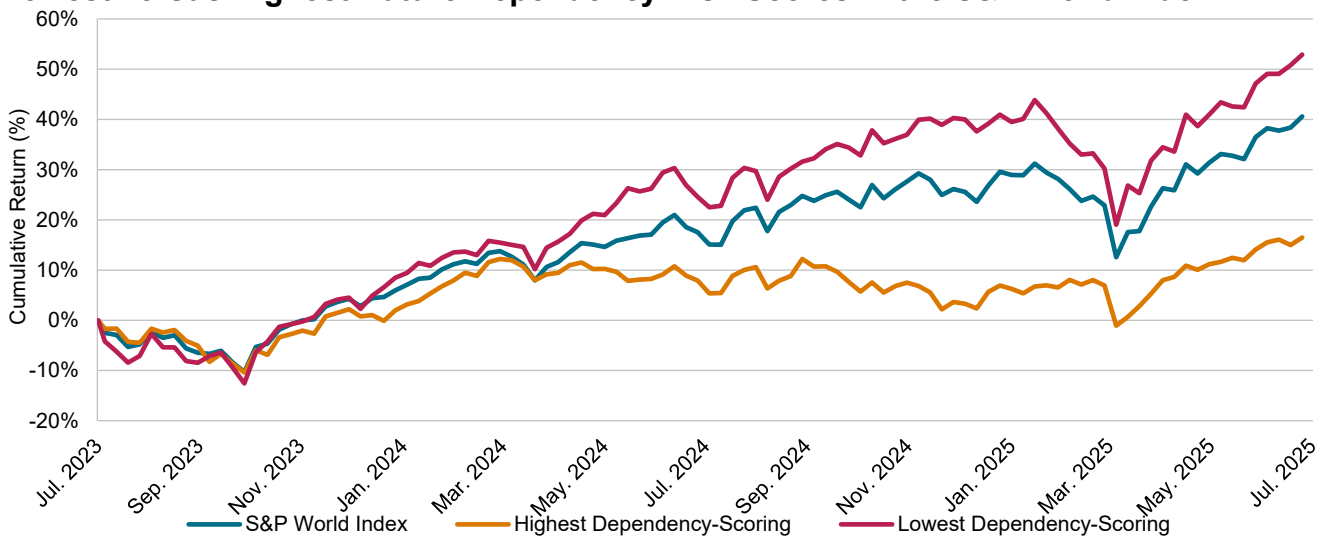
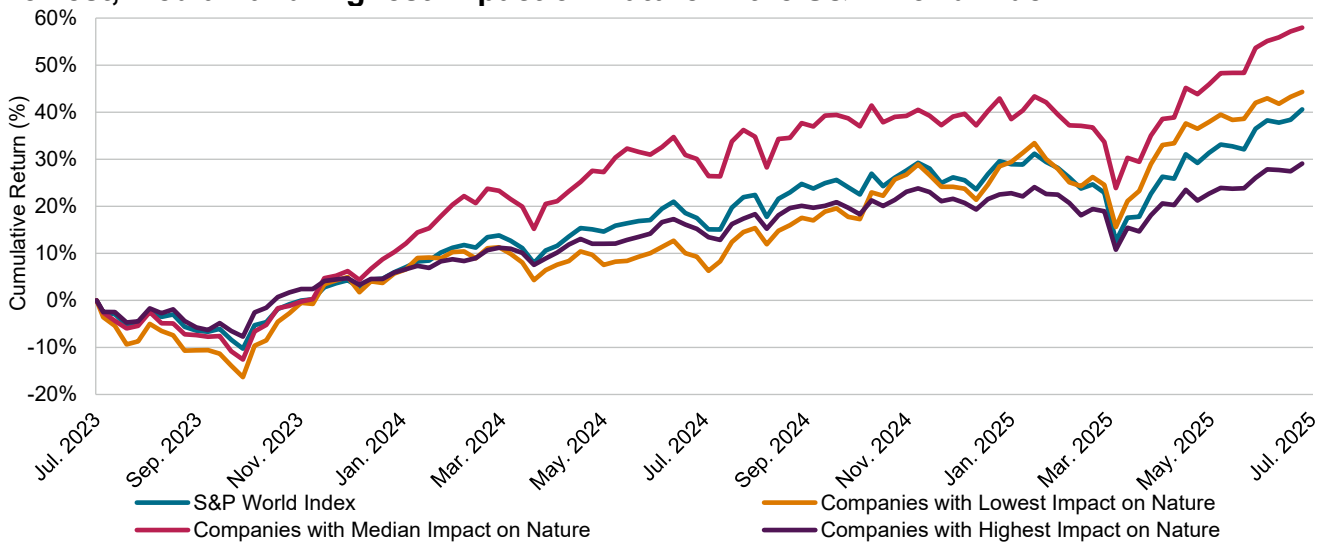
Exhibit 3: Back-Tested Cumulative Performance Comparison of Companies with the Lowest versus Highest Nature Dependency Risk Scores in the S&P World Index



Compositions showing nature dependency risk are hypothetical.
Source: S&P Dow Jones Indices LLC, S&P Global Energy Horizons. Analysis carried out using S&P Capital IQ Pro. Back-tested data from July 31, 2023, to July 31, 2025. Past performance is no guarantee of future results. Chart is provided for illustrative purposes and reflects hypothetical historical performance. Please see the Performance Disclosure at the end of this document for more information regarding the inherent limitations associated with back-tested performance.

Exhibit 4 presents the back-tested results for the nature impact metric. Companies with a median impact on nature as measured by the scores outperformed the S&P World Index by a cumulative 18.6%, whereas those with the highest impact underperformed by 4.1% for the same period.

Exhibit 4: Back-Tested Cumulative Performance Comparison of Companies with Lowest, Median and Highest Impact on Nature in the S&P World Index



Compositions showing impact on nature are hypothetical.
Source: S&P Dow Jones Indices LLC, S&P Global Energy Horizons. Analysis carried out using S&P Capital IQ Pro. Back-tested data from July 31, 2023, to July 31, 2025. Past performance is no guarantee of future results. Chart is provided for illustrative purposes and reflects hypothetical historical performance. Please see the Performance Disclosure at the end of this document for more information regarding the inherent limitations associated with back-tested performance.

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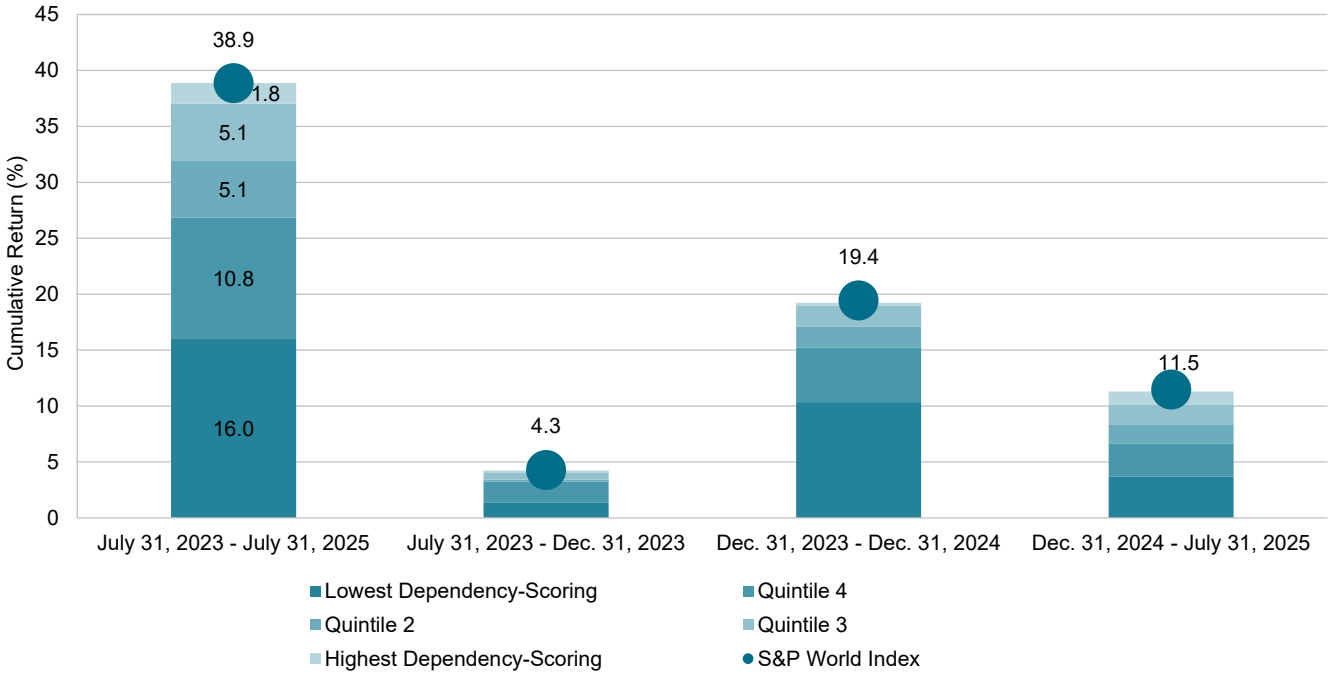
Contributions to the S&P World Index's Performance by Calendar Year

Next, we delved into the contributions of the nature dependency risk and impact metrics quintiles to the S&P World Index's performance, both by calendar year and over the entire two-year analysis period.

As shown in Exhibit 5, the S&P World Index had a cumulative performance of 38.9% over the two-year period, with 16.0% of this performance originating from companies that demonstrated the lowest nature dependency risk.

Exhibit 5: Contributions to Cumulative Performance by Nature Dependency Risk



Quintiles showing nature dependency risk are hypothetical.
Source: S&P Dow Jones Indices LLC, S&P Global Energy Horizons. Analysis carried out using S&P Capital IQ Pro. Data from July 31, 2023, to July 31, 2025. Past performance is no guarantee of future results. Chart is provided for illustrative purposes and reflects hypothetical historical performance. Please see the Performance Disclosure at the end of this document for more information regarding the inherent limitations associated with back-tested performance.

Exhibit 6 provides an overview of the results concerning the nature impact metric. Companies with a median nature impact metric contributed the most to the S&P World Index's total return of 38.9%, accounting for 12.9% over the two-year analysis period.

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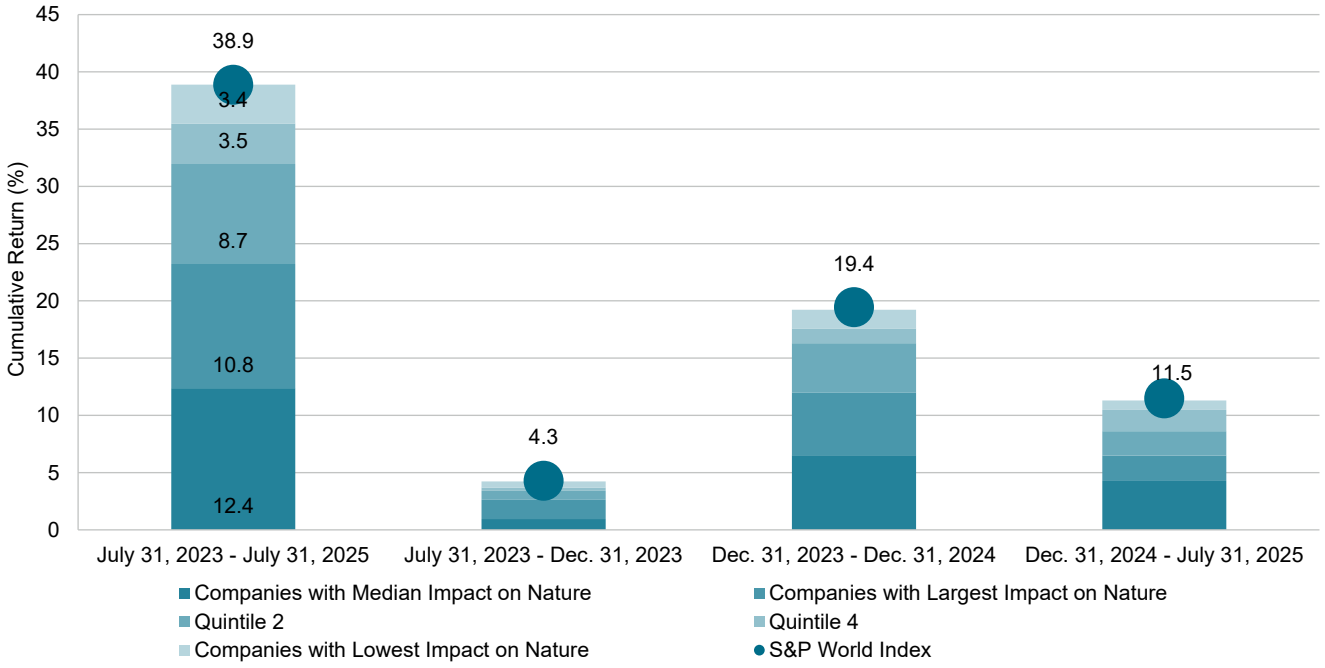
Exhibit 6: Contributions to Cumulative Performance by Impact on Nature



Quintiles showing impact on nature are hypothetical.
Source: S&P Dow Jones Indices LLC, S&P Global Energy Horizons. Analysis carried out using S&P Capital IQ Pro. Back-tested data from July 31, 2023, to July 31, 2025. Past performance is no guarantee of future results. Chart is provided for illustrative purposes and reflects hypothetical historical performance. Please see the Performance Disclosure at the end of this document for more information regarding the inherent limitations associated with back-tested performance.

Sectoral Perspectives

We also explored the contributions of different sectors to the cumulative performance of the S&P World Index, alongside their nature dependency risk and impact metrics. This analysis highlights a contrast by evaluating the sectoral breakdowns for companies exhibiting the lowest nature dependency risk versus those demonstrating the largest impact on nature, as detailed in Exhibits 7 and 8.

The constituent companies within the S&P World Index that had the lowest dependency risk on nature had a cumulative performance of 16.0% over the two-year analysis period. The Information Technology sector emerged as the leading contributor, accounting for 10.0% of this performance, which represented 19.3% of the sector composition, making it the second highest after the Financials sector (see Exhibit 7).

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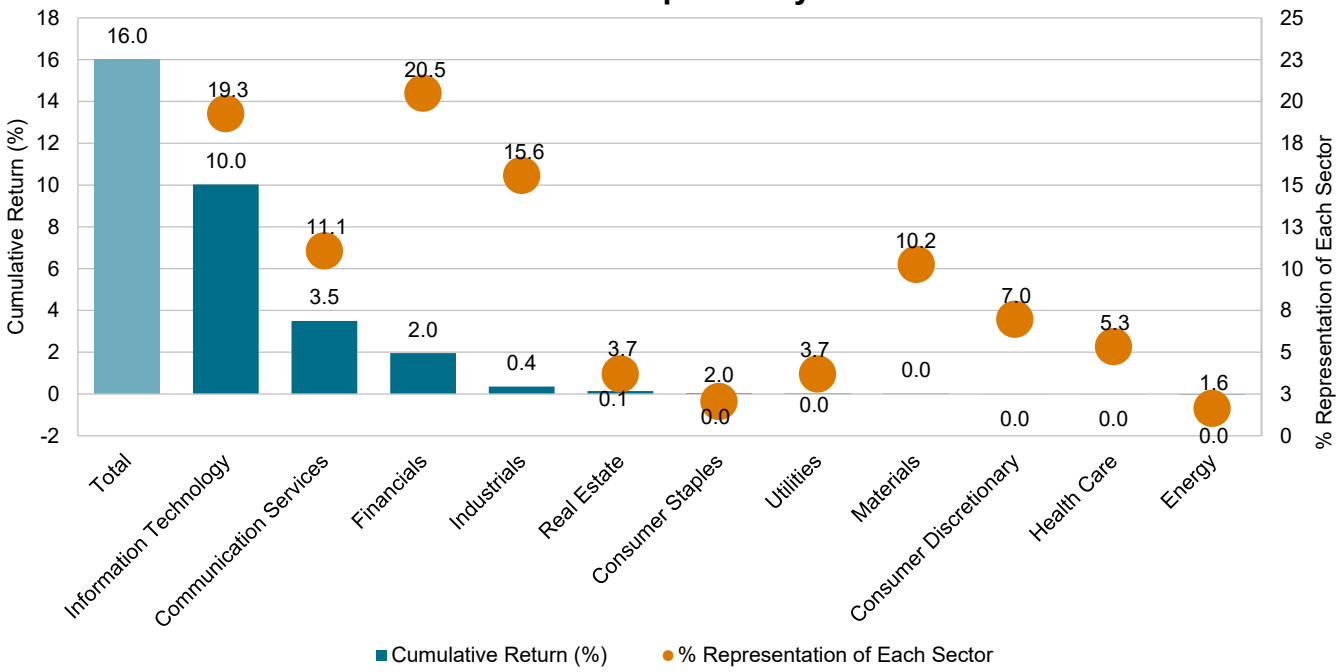
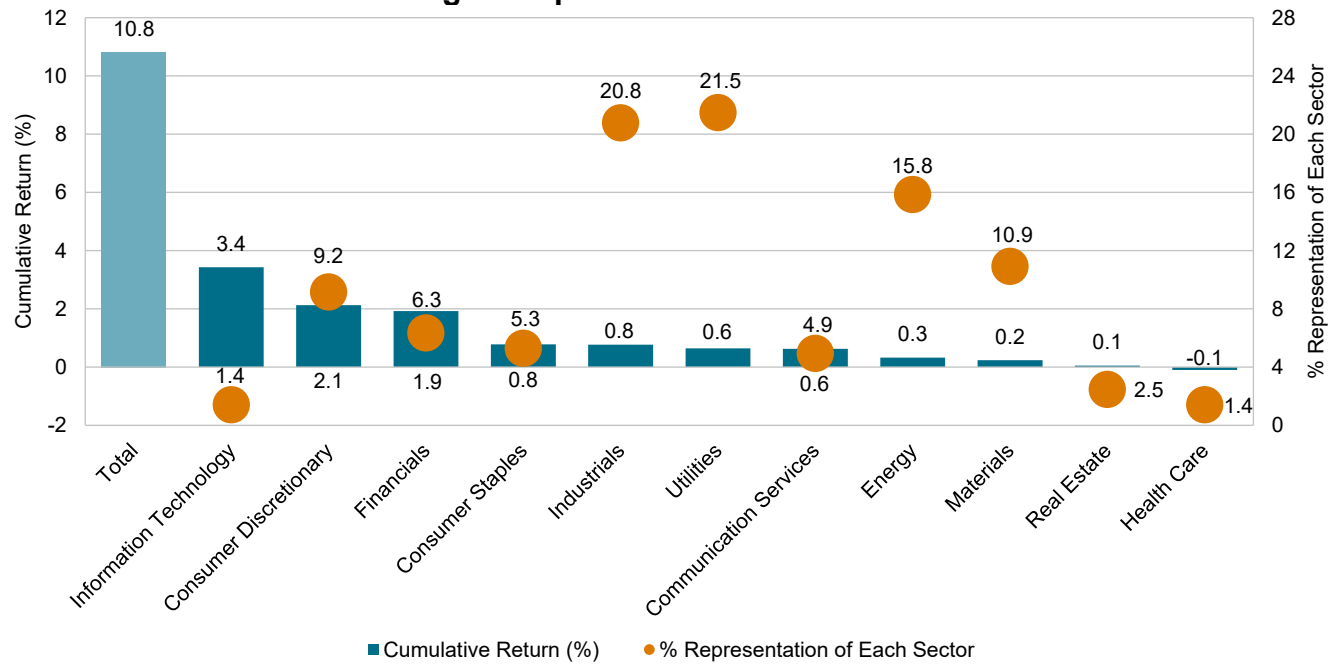
Exhibit 7: Sectoral Contributions to the Cumulative Performance of Companies in the S&P World Index with the Lowest Nature Dependency Risk



Source: S&P Dow Jones Indices LLC, S&P Global Energy Horizons. Analysis carried out using S&P Capital IQ Pro. Back-tested data from July 31, 2023, to July 31, 2025. Past performance is no guarantee of future results. Chart is provided for illustrative purposes and reflects hypothetical historical performance. Please see the Performance Disclosure at the end of this document for more information regarding the inherent limitations associated with back-tested performance.

Exhibit 8: Sectoral Contributions to the Cumulative Performance of Companies in the S&P World Index with the Largest Impact on Nature



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In contrast, as shown in Exhibit 8, the majority of companies in the S&P World Index with the most significant impact on nature as measured by the scores belonged to sectors such as Utilities, Industrials and Energy. These sectors contributed the least to the cumulative performance of the S&P World Index. The Information Technology and Consumer Discretionary sectors made the largest contributions to performance, at 3.4% and 2.1%, respectively, despite their relatively modest sector compositions of 1.4% and 9.2%, respectively.

Looking Forward

This analysis explores the performance of the S&P World Index alongside the constituent companies' nature impacts and dependencies. The observations indicate that the companies in the S&P World Index with the lowest nature dependency risk outperformed the index by 13.8%, while those with a median impact on nature outperformed it by 18.6%, cumulatively, for the relevant period. In terms of sectors, companies with the lowest nature dependency risk were mainly found in Information Technology and Financials, whereas those with the largest nature impacts were concentrated in Utilities, Industrials and Energy. Looking ahead, we hope these insights will be useful for examining the interplay between dependency and impact on nature and index performance—a topic that may be of increasing interest as understanding grows about the links between climate change and biodiversity loss, and as more nature-related regulations and standards emerge around the globe.

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All information presented prior to an index's Launch Date is hypothetical (back-tested), not actual performance. The back-test calculations are based on the same methodology that was in effect on the index Launch Date. However, when creating back-tested history for periods of market anomalies or other periods that do not reflect the general current market environment, index methodology rules may be relaxed to capture a large enough universe of securities to simulate the target market the index is designed to measure or strategy the index is designed to capture. For example, market capitalization and liquidity thresholds may be reduced. Complete index methodology details are available at www.spglobal.com/spdji. Past performance of the Index is not an indication of future results. Back-tested performance reflects application of an index methodology and selection of index constituents with the benefit of hindsight and knowledge of factors that may have positively affected its performance, cannot account for all financial risk that may affect results and may be considered to reflect survivor/look ahead bias. Actual returns may differ significantly from, and be lower than, back-tested returns. Past performance is not an indication or guarantee of future results. Please refer to the methodology for the Index for more details about the index, including the manner in which it is rebalanced, the timing of such rebalancing, criteria for additions and deletions, as well as all index calculations. Back-tested performance is for use with institutions only; not for use with retail investors.

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