Sustainable1

Nature Risk Platform

Methodology

Sustainable 1 – November 2024

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Terms and Definitions

A detailed description of all Nature Risk methodology terms and definitions can be found in the main S&P Global Sustainable 1 Nature & Biodiversity Risk methodology available on S&P Global Sustainable1 website.

Introduction and Context:

The methodology presented in this document underpins S&P Global Sustainable1's Nature Risk Platform, a tool that helps companies and financial institutions profile nature-related risks associated with location-specific business activities. It draws heavily on the principles outlined by the Taskforce on Nature-related Financial Disclosures (TNFD), and the Nature Risk Profile methodology launched by S&P Global Sustainable1 and UNEP in January 2023. It allows reporting entities to respond to the recommendations of the TNFD by supporting implementation of its framework. The methodology rests on two core building blocks for profiling nature-related risks: dependencies on nature and impacts on nature. These are broken down into key indicators that are assessed using user-specific data and global nature-related datasets. The methodology can be applied at the asset, company, and portfolio level.

A note on double materiality:

There is a need to fully consider the materiality of business impacts from different perspectives. This is often referred to as double materiality. In the context of nature, double materiality refers to how nature may impact an organization's immediate financial performance (outside-in) and how an organization impacts nature, and the consequences for both business and society (inside out). In other words, businesses need to consider how nature loss, due to their own activities or those of others, may not only negatively affect their own business performance, but also affect the activities of others in society, particularly vulnerable groups including women and girls, youth and Indigenous Peoples and local communities (UN Women 2018; World Economic Forum and PwC 2020).

Key features

Robust, science-based, and open-source nature risk assessment methodology, developed in partnership with the UNEP World Conservation Monitoring Centre (UNEP-WCMC)

- Coverage of impacts to terrestrial ecosystems using best-available geospatial metrics and datasets
- Coverage of dependency risks across 21 ecosystem services, leveraging location-specific assessments

Coverage of overlap with Protected Areas and Key Biodiversity Areas, in line with regulatory requirements and voluntary guidelines

Data Sources and Collection

Nature risk data sources used to assess the nature risk metrics can be found in the underlying S&P Global Sustainable 1 Nature & Biodiversity Risk methodology available on S&P Global Sustainable1 website.

Asset data used in the Nature Platform is collected from customers using an input data template. Key columns and their specific requirements are described below:

Column Name	Explanation	Data Type
Asset Number	Mandatory; must be unique for each asset	Numeric
Asset Type	Should be one of the listed Asset Type values provided in the template file	String
Asset Sub-type	Should be one of the listed Asset Subtype values provided in the template file	String
Latitude and Longitude	Must be provided if Geometry is not being provided. Numbers for latitude and longitude should be provided in full (not truncated) and in the EPSG:4326 coordinate reference system.	Numeric
Total Site Area	Must be provided if Latitude and Longitude are provided and Geometry is not being provided	Numeric
Asset Revenue	If Water Withdrawal - Total is provided, Asset Revenue must also be provided to enable calculation of asset-level water materiality. If Asset Revenue is not provided, water materiality will be estimated based on available company or sector information.	Numeric

Water Withdrawal – Total	If Asset Revenue is provided, Water Withdrawal – Total must also be provided to enable calculation of asset-level water materiality. If Water Withdrawal – Total is not provided, water materiality will be estimated based on available company or sector information.	Numeric

Methodology Overview

Sustainable1's approach to quantifying nature risks is based on the S&P Global Sustainable1– UNEP Nature Risk Profile Methodology, which draws on the principles of the TNFD framework. Its main purpose is assisting organizations in measuring the nature impact and dependency risks of their operations and portfolios, mitigating risks, and advancing nature-positive outcomes to build resilience. The approach combines asset-level data (including asset location, asset type, and land footprint) provided by users, with proprietary datasets and models, and spatial as well as non-spatial data on the state or characteristics of ecosystems (such as biodiversity richness and threat level, ecosystem services, and natural capital).

The Nature Risk Platform applies the S&P Global Sustainable 1 Nature & Biodiversity Risk methodology to customer-provided asset data. It relies on user-specific company data, and data/analyses from established international organizations and other relevant third parties. This provides a comprehensive, scalable, modular, and consistent solution which quantifies:

- Risks arising from a company's assets' impact on nature: This dimension evaluates the potential negative impacts a company's operations might have on ecosystems. By assessing factors such as land use, ecosystem integrity and the significance of the location, the model estimates the magnitude and ecological importance of these impacts. It also calculate each asset's area overlapping with Protected Areas (PAs) and Key Biodiversity Areas (KBAs) as a part of this impact analysis.

- Risks arising from a company's assets' dependencies on nature: Recognizing that businesses rely on nature in multiple ways, this analysis identifies and quantifies the extent to which a company's operations are dependent on ecosystem services, and to which these services might be at risk of disruption. This covers both regulating and maintenance services such as flood protection, and provisioning services such as water supply.

Nature Risk Core Metrics

Impact Risk Analysis Overview

Impacts on nature refer to the ways a company's activities and operations may have positive or negative impacts on natural resources or ecosystem services. Companies that have significant impacts on nature may be more susceptible to market, regulatory or reputational risks. The Impact Analysis is built on two key building blocks: Magnitude and Significance and it is designed to compute relevant metrics that provide insights into a company's interaction with nature. Specifically, it calculates:

- **Land Use Footprint:** Represents the spatial extent of the company's operational presence. It is the total, unadjusted area in hectares occupied by the assets assessed, calculated as the sum of the built area or the surface area of those assets.

  Calculation:

  In the Nature Platform implementation, the asset geometry is first created from the customer-provided data: If Site Area, Latitude and Longitude have been provided, the asset geometry is created as a circle centered on the provided Latitude and Longitude coordinates, with the circle's radius calculated such that the area of the circle is equal to the provided Site Area. Land Use Footprint is calculated as the area of the asset geometry using a metric coordinate reference system.

- **Ecosystem Integrity Footprint (Condition adjusted area in ha equivalent):** The magnitude of impacts, which is defined as the Ecosystem Integrity Footprint is the degree to which business operations apply pressures and cause a footprint on the state of nature based upon both:

- The area occupied (land use footprint), and
- The ecosystem integrity degradation (Ecosystem Integrity Impact Index)

Calculation:

The Ecosystem Integrity Footprint is calculated as the product of the area occupied (land use footprint) and the Ecosystem Integrity Impact Index average value over the area occupied by a given asset.

$$Ecosystem\ integrity\ footprint$$

$$(Condition\ adjusted\ area\ in\ ha\ equivalent)$$

$$= Land\ Use\ (ha) * Ecosystem\ Integrity\ Impact\ Index$$

$$= Land\ Use\ (ha) * [\ 1 - Ecosystem\ Integrity\ Index\ ]$$

- **Ecosystem Footprint:** To account for both the magnitude of impact and the significance of the areas impacted, S&P Global Sustainable1 and UNEP Nature Risk Profile introduce a headline metric, the Ecosystem Footprint. Like the Ecosystem Integrity Footprint, this metric is a condition-adjusted footprint in hectares equivalent of a pristine ecosystem, but it additionally weights each location impacted by its relative significance, using the Significance Index. This metric allows any impact in a single metric that is condition-adjusted and significance-weighted. The result is a footprint expressed in hectares equivalent of the most pristine and significant areas globally. It is equivalent to expressing any business impact in hectares equivalent of the most pristine and biodiverse areas of the Amazon or Borneo rainforests, for example.

  Calculation:

  The Ecosystem Footprint is calculated as the product of the area occupied by a given asset (land use footprint) and the significance-weighted Ecosystem Integrity Impact Index average value over the area occupied.

  In addition to the impact metrics above, S&P Global Sustainable1‘s Nature Risk Platform contains additional significance flags, which provide additional binary flags on the significance of the location of the assets.

- **Overlap with Key Biodiversity Areas (KBAs):** Key Biodiversity Areas (KBAs) are sites contributing significantly to the global persistence of biodiversity. KBAs are identified at the national, sub-national or regional level by local stakeholders based on standardized scientific criteria and thresholds. Operating within KBAs may pose a potential transition risk for businesses, particularly reputational risk. KBAs are also featured in major standards such the International Finance Corporation’s Performance Standard 6 on Biodiversity Conservation and Sustainable Management of Living Natural Resources. The World Database of Key Biodiversity

Areas, curated by BirdLife International on behalf of the KBA partnership and made available for commercial use via the Integrated Biodiversity Assessment Tool (IBAT), is used as the source for identifying the location and extent of such KBAs.

Calculation:

Each asset is assessed for a potential overlap with a KBA, by overlaying the asset polygon geometry on top of the KBA polygon geometry. When an overlap is found, the overlap flag is set accordingly and an estimate of the overlapping area in hectares is also provided.

- **Overlap with Protected Areas (PAs):**
  A protected area is "a clearly defined geographical space, recognized, dedicated and managed through legal or other effective means to achieve the long-term conservation of nature with associated ecosystem services and cultural values". Protected areas are the cornerstones of in-situ conservation. They are also featured in major standards, including the Global Reporting Initiative Standards (GRI 304) and the International Finance Corporation Performance Standard. Certain types of protected areas allow economic production to occur within their boundaries, however, they should always be approached with caution and any negative impacts on these areas should be avoided.

  Calculation:

  Each asset is assessed for a potential overlap with a PA, by overlaying the asset polygon geometry on top of the PA polygon geometry). When an overlap is found, the overlap flag is set accordingly and an estimate of the overlapping area in hectares is also provided.

Dependency Risk Analysis Overview:

Dependency risk refers to how a company depends on natural resources and ecosystem services to operate. It measures the degree to which a company's operations are dependent on natural resources and ecosystem services, and to what extent its operations may be exposed to such ecosystem services being negatively impaired.

Companies that rely on these may be more vulnerable to risks associated with nature's availability and quality. The Dependency Risk Analysis is built on two key building blocks: Reliance and Resilience risk.

- **Materiality Score**: The concept of materiality describes the degree to which a business activity or production process depends on the benefits provided by ecosystem services. In this methodology, ecosystem services follow the ENCORE knowledge base classification, which was built according to the Common International Classification of Ecosystem Services (CICES). Cultural ecosystem services are not included in this methodology as they are not considered direct inputs or to enable production processes.

  Calculation:

  Each asset's type and subtype, as provided via the input data template, is mapped to an ENCORE business process. This allows calculating the asset-level materiality score for each ecosystem service. Water-related materiality scores such as ground and surface water are estimated using the water usage data provided by the user. If the water usage data is not provided, the methodology reverts to using modelled, sector-specific scores to calculate the materiality scores.

- **Relevance Score:** The potential for benefits to be gained from several regulating services is unevenly distributed spatially and depends on the degree to which a given location is at risk from disruptions, like natural hazards, that the ecosystem service helps to regulate. For example, the potential for a benefit to be gained from flood protection services will be highest in areas of high flood risk. Where the potential benefit of the ecosystem service is low or negligible, the relevance of the ecosystem service will also tend to be low despite a potentially high materiality score estimated at the sector or business activity level. Consequently, for certain ecosystem services, materiality scores should be adjusted, or tilted, for the potential location-specific benefit, which may be higher or lower than the average of the activity. This is done using the Relevance Score.

Calculation:

For ecosystem services where a relevance adjustment is required, the relative benefit of each service is assessed based on the applicable geospatial layer by estimating the relative exposure at a given asset location. Layers are normalized into a score from 0 to 1, and the normalized value from each layer at any given asset location is used as the relevance score for that asset.

- **Reliance Score:** A given business or asset's reliance score on each of the 21 ecosystem services is calculated as the geometric mean of the materiality and the relevance scores (where applicable). When a relevance score is not applicable for a given ecosystem service, the reliance score is equal to the materiality score. Reliance scores therefore range from 0 (no reliance) to 1 (very high reliance).

- **Resilience Risk Score:** The likelihood that dependency-related risks materialize depends on the capacity of ecosystems to continue to provide the necessary ecosystem services. Declines in the state of nature often reduce the resilience of ecosystems and therefore their capacity for providing ecosystem services. Understanding this capacity for a continued flow of ecosystem services requires characterization of the ecosystem types and the condition of these ecosystems at asset locations. The resilience risk score, therefore, quantifies the risk of resilience of a specific ecosystem service in each location.

  Calculation:

  For the relevant ecosystem services, the resilience risk is estimated based on the applicable proxy's geospatial layer maximum value over the asset area. Layers are normalized into a score from 0 (no resilience risk) to 1 (very high resilience risk), and the maximum normalized value from each layer at any given asset location is used as the resilience score for that asset. The maximum value characterizes the riskiest area of any given asset, and therefore is considered a conservative approach to characterize the risk of the asset itself. This is particularly relevant for linear assets such as pipelines and transmission lines.

- **Composite Score:** The composite dependency scores of each ecosystem service are a function of:

  - Reliance Score: Risk exposure, calculated from the asset materiality rating and the location-specific relevance assessment. The reliance score is the

geometric mean of the materiality score and the relevance score as described above.

- Resilience Risk Score: Risk likelihood, or the location-specific assessment of capacity to deliver ecosystem services.

Calculation:

The composite dependency score is the geometric mean of the reliance score and the resilience score. Composite dependency scores therefore range from 0 (no dependency risk) to 1 (very high dependency risk). When a resilience score is not applicable for a given ecosystem service, the dependency composite score is equal to the reliance score.

Monitoring and Review

The methodology will be reviewed annually as part of the annual update cycle. All changes will be brought to the Sustainable1 Methodology & Model Governance Committee for materiality testing. Any material changes between S1 Methodology & Model Governance Committee assessment/review/approval requires review and approval by a designated Peer Review Sub Committees and S1 Methodology & Model Governance Committee.

Assumptions and Limitations

- As the Sustainable1 Nature Risk Platform relies on user-specific company data, and data/analyses from established international organizations and other relevant third parties, any changes in the underlying assumptions or data could materially impact the results of the analysis.
- The interactions between the assets provided by users, and ecosystem services are complex and subject to many factors, including climate hazards and land use change. As such they may deteriorate rapidly and without warning, leading to negative impacts.
- The conditions and scores presented in this report reflect the best available information at the time of analysis but should not be interpreted as definitive or predictive of future outcomes.
- The Sustainable1 Nature Risk Platform is only a high-level assessment in accordance with the recommendations of the TNFD.

Maintenance and Updates

The methodology will be reviewed annually as part of the annual update cycle. All changes will be brought to the Sustainable1 Methodology & Model Governance Committee for materiality testing. Any material changes between S1 Methodology & Model Governance Committee assessment/review/approval requires review and approval by a designated Peer Review Sub Committees and S1 Methodology & Model Governance Committee.

References

UNEP-S&P Global Nature Risk Profile

S&P Global Sustainable1 Nature & Biodiversity Risk Methodology

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