Overcoming limitations in selection guidelines for state-of-nature metrics in corporate assessments

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Abstract

The development and adoption of frameworks to help organisations understand, monitor, and disclose their biodiversity risks and impacts have accelerated due to Target 15 of the Kunming-Montreal Global Biodiversity Framework. Organisations are increasingly expected not only to measure their biodiversity pressures and responses, but also to demonstrate whether their actions lead to negative or positive outcomes in the state-of-nature (SON). Recent frameworks, such as the Nature Positive Initiative, have begun to standardise the aspects of the SON that companies are expected to measure. However, an open question remains on how an organisation should select the specific metrics to measure these aspects in their ecological, geographical, and operational contexts.

In this essay, we review eight frameworks and tools supporting corporate SON metric selection and identify three problems that limit their effectiveness in directing users to named metrics suited to their SON assessments. First, criteria for evaluating metrics' applicability and quality are inconsistently defined and poorly harmonised across frameworks, leaving users uncertain about which metrics are suitable for their context. Second, insufficient evidence has been generated and collated to assess metrics' alignment with and performance against these criteria. Third, existing selection guidelines lack sufficient stepwise structure to guide users to high-quality metrics that are suitable for their context.

We argue that more effective guidelines for SON metrics selection require three corresponding improvements: harmonised definition of applicability and quality criteria, derived from existing frameworks; scaled-up data-gathering on how metrics align with and perform against applicability and quality criteria; and structured pathways to assess metrics' applicability and quality to progressively filter candidate metrics down to a recommended set. In resolving these issues, guidelines' contextual flexibility can be balanced with rigour in metric selection, allowing guidance frameworks to support wider and more robust disclosures of SON metrics, contributing towards achieving Target 15 by 2030.

Introduction

Target 15 of the Kunming-Montreal Global Biodiversity Framework (GBF) has driven the rapid development and adoption of voluntary reporting frameworks for nature-related corporate risks, impacts, and dependencies. Such frameworks, like the Global Reporting Initiative (GRI), Taskforce on Nature-related Financial Disclosures (TNFD), and Science Based Targets Network (SBTN), provide standardisation and guidance on how organisations should assess their interactions with nature, typically adopting a Pressure-State-Response formulation (OECD, 1993). Uptake has been swift; for example, more than 600 organisations from over 50 countries have adopted the TNFD alone (e.g., AXA, Bank of America, Coca-Cola FEMSA) (TNFD, 2025).

The guidelines of these frameworks for nature-related assessments and disclosures have made substantial progress in standardising metrics for pressures on nature and organisational responses. The TNFD, for example, provides a detailed list of core global disclosure metrics for pressures and responses (TNFD, 2023a, 2023b), and GRI's Biodiversity Standards include disclosure requirements with clear measurements for direct drivers of biodiversity loss and actions to manage biodiversity impacts.

Guidance for the state-of-nature (SON) measurement, however, is less developed than for other, less direct measurements of biodiversity actions (e.g., pressure or response metrics). This is despite SON assessments being key for companies to produce defensible disclosures of the effects of their operations on local biodiversity, align with global biodiversity targets and develop risk management frameworks. Guidelines for SON measurement developed by different organisations are diverse and remain unstandardised, in some cases even showing a variation in the definition of 'metric'. In this essay, we define “metric” as “a measurement approach with a defined or published methodology that produces a standard, unitised output or index” (e.g. Simpson Diversity Index (Simpson, 1949), Mean Species Abundance/GLOBIO (Alkemade et al., 2009), Biodiversity Intactness Index (Scholes & Biggs, 2005); see Table 1 in Supplementary material for comparison of definitions used across different frameworks).

Available guidelines or resources for SON measurement have made clear progress in defining *what* SON metrics should measure (NPI, 2026; TNFD, 2023a, 2023b; UNEP-WCMC et al., 2022) (Figures 1 and 2A). Frameworks are converging on a set of key components of SON, for example, with TNFD listing species extinction risk and ecosystem condition as placeholder indicators (TNFD, 2023a, 2023b). The Nature Positive Initiative (NPI) has developed this further, defining four indicators – ecosystem extent, ecosystem condition, species extinction risk, and species populations – and site- and landscape-level standardised measurements for them (e.g., “Area and change by condition class” as a measurement for site-level ecosystem condition). To date, TNFD, GRI, and SBTN are discussing the embedding of NPI's standardised SON measurements within their frameworks, for example, with TNFD proposing to use the NPI measurements for ecosystem extent, ecosystem condition and species extinction risk as core disclosure metrics (TNFD, 2026).

NPI's SON measurement framework and other guidance outlining core biodiversity elements for impact and dependencies assessments are a strong foundation for standardising a minimum set of nature components and measurement specifications for consistent adoption across corporate SON assessments. Measuring SON, therefore, requires the use of several metrics, each related to a given nature component. Nevertheless, guidelines and tools for selection of SON metrics fall short in guiding users on *how* to select a specific SON metric for each component, given their operational and ecological context (Figure 1 and Figure 2A). At present, these resources for SON metric selection provide some important support: listing examples of potentially useful metrics, identifying the desirable qualities of metrics, and outlining broad principles for selection (De Ryck et al., 2024; TNFD, 2023a, 2023b; UNEP-WCMC, 2026; UNEP-WCMC et al., 2022; WBCSD, 2026). However, none of this support includes recommended named metrics that are linked to standardised SON indicators (e.g. ecosystem condition), and the particular business and ecological contexts to which they can be applied. Instead, users or supporting specialists are expected to select suitable metrics from a large and growing pool of candidates (Burgess et al., 2024), based on generalised guidance and criteria.

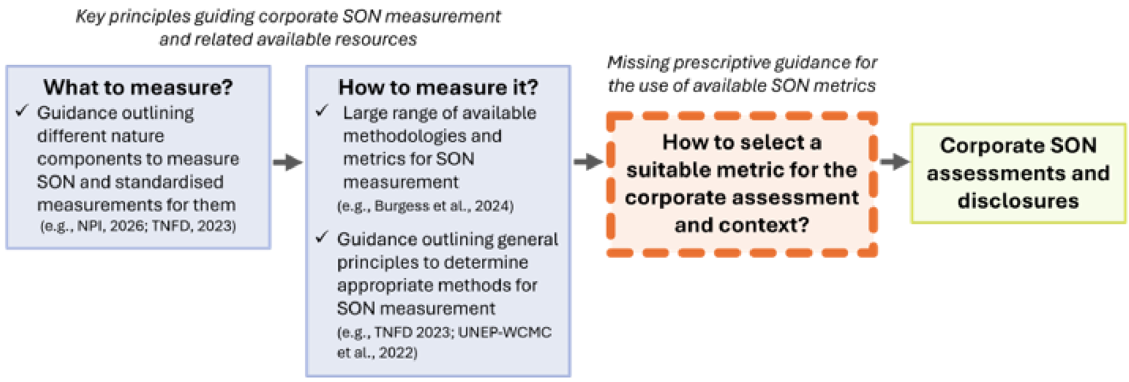

Figure 1. Reporting frameworks and selection guidelines have made excellent developments in identifying what ought to be measured in SON assessments and collating the wide range of metrics that can be used to measure nature components. However, these frameworks and guidelines are missing adequate development in guidance on how to choose a named metric for SON assessments, given a company's operational and ecological context.

This gap in guidance to select suitable metrics for different corporate contexts has practical consequences. For example, the lack of prescriptive guidance may partly explain the low frequency of quantitative SON disclosures (Maroun & Ecim, 2024) or measurable biodiversity targets (Hawkins et al., 2026). Where SON metrics are used, their selection may be driven by the prominence of the metric, rather than its suitability for the user: a small number of metrics appear frequently in illustrative guidelines (e.g., Species Threat Abatement and Restoration (STAR) metric; Potentially Disappeared Fraction (PDF) of species, Mean Species Abundance (MSA) — (Arcadis et al., 2023; TNFD, 2023a, 2026), which can give these metrics disproportionate visibility to users, regardless of whether they are most appropriate for a given assessment (White et al., 2023; zu Ermgassen et al., 2022). Organisations may also use the lack of clarity in metrics selection guidance to cherry-pick metrics that show favourable trends in SON outcomes (Mair et al., 2024) or, from finding the process too confusing, avoid SON disclosures entirely. These consequences, in reducing the number and accuracy of SON disclosures, undermine the purpose of SON disclosures: to provide assessments of the outcomes for nature of business practices that pressure and response metrics do not capture.

In this essay, we review eight high-profile frameworks and tools supporting the use of metrics to assess and disclose organisations' biodiversity performance (Figure 2; Appendix 1). After identifying those with structured guidelines for SON metric selection, we outline three problems: (1) criteria for evaluating metrics' applicability and quality are inconsistently defined and poorly harmonised across frameworks; (2) insufficient evidence has been generated and collated to evaluate metrics' alignment with and performance against those criteria; and (3) existing selection guidelines lack a stepwise filtering process that uses applicability and quality criteria to progressively narrow down candidate SON metrics to a final recommended set. We discuss potential ways to resolve these problems that future selection frameworks and guidelines could employ to provide users with the most applicable and highest quality metrics for their SON assessment context.

Our discussion focuses on site-level SON assessments: those aiming to identify ecologically sensitive locations interfacing with organisations' activities and quantify organisations' positive and negative impacts on biodiversity — as recommended within TNFD's Locate, Evaluate, Assess and Prepare (LEAP) framework (TNFD, 2023a).

Limitations in guidelines for the selection of SON metrics in corporate assessments

The following leading frameworks and tools supporting assessments and disclosures of corporate biodiversity performance were chosen for review: GRI, SBTN, TNFD, NPI's State of Nature metrics framework, the Assessment of Biodiversity Measurement Approaches for Businesses and Financial Institutions by the European Business and Biodiversity Platform (EU B&B), the Recommendations for corporate biodiversity measurement by the project Aligning accounting approaches for nature (Align), the Nature Tools Compass by the project Strengthening Understanding and Strategies of Business to Assess and Integrate Nature (SUSTAIN), and the Nature Action Portal by the World Business Council for Sustainable Development (WBCSD) (Appendix 1).

All these frameworks and tools include some supporting information or guidelines for SON measurement. Most of these outline nature components for SON measurement, provide generalised lists of named metrics potentially suitable for different SON assessments, or recommend named SON metrics for a few illustrative contexts (Figure 2, Appendix 1). However, only three frameworks include more structured guidelines to select SON metrics (TNFD, Align, and EU B&B metrics selection frameworks), ranging from universal recommendations (e.g., consideration of feasibility and granularity of method) to the use of criteria related to business context (e.g., sector and maturity) (Appendix 1).

1. Criteria to assess metrics are inconsistently defined and poorly harmonised

One reason why current guidelines or tools for SON measurement cannot make specific, context-dependent SON metric recommendations is a problem in the design of the criteria used to assess metrics' suitability. Criteria-based selection, in which a range of informative categories are used to investigate the specific strengths and weaknesses of a metric, has been the norm in metric selection frameworks for other uses (Bundy et al., 2019; Burgess et al., 2024; Czúcz et al., 2021; Jones et al., 2011; Niemeijer & de Groot, 2008; Sparks et al., 2011), and is used in leading guidelines for SON measurement and metric selection (NPI, 2026; TNFD, 2023a). However, corporate disclosure frameworks lack standardised criteria that account for two key features of scientifically robust metrics: the **applicability** of the metric to the assessment's context (i.e., the metric's suitability for the assessment type and organisational context) and the **quality** of the metric in measuring SON (i.e., the metric's scientific and ecological basis and ability to provide accurate, precise, and transparent information).

This presents a design problem with current SON measurement guidelines that hinders the provision of clear principles for the assessment of metrics and the selection of context-dependent and standardised metrics. Developing a standardised framework to evaluate SON metrics based on applicability and quality criteria would help to overcome the current lack of clarity on SON metrics' scope, utility in different contexts, ecological foundations and reliability (Burgess et al., 2024; Hickman et al., 2025; Stephenson & Walls, 2022). Such an approach would contribute to raising the profile of metrics that are not currently popular for SON corporate assessments but might be useful for certain contexts. Moreover, by establishing a minimum requirement of knowledge about metric applicability and quality, the useful contextual flexibility that many metric selection frameworks possess (e.g., based on user's needs and priorities — (De Ryck et al., 2024) can be balanced with greater ecological robustness in metric selection.

1.1 Lack of defined criteria for the applicability of a metric to a context

At present, guidelines for metric selection are missing refined and comprehensive criteria to assess whether a metric is applicable to the objectives of an SON assessment and a company's context and goals (Addison et al., 2020;) Figure 2B; Appendix 1).

To evaluate applicability, users should first determine how well the type of information provided by the metric aligns with what is needed for the SON assessment (Figure 2B, 1a-b). This means confirming that a purported SON metric does, in fact, provide a direct measure of the SON instead of pressures or responses. For example, an estimate of average pressure effect or potential contributions to conservation would not directly measure SON (e.g., the STAR metric measuring potential contributions to reducing species' extinction risk). This should be complemented with an understanding of how a proposed metric measures the SON (e.g., directly, through on-the-ground or remote sensing; inferring it, through modelling; or indirectly, estimating it using proxies). Different approaches place limits on the suitability of metrics for particular SON assessments (Figure 2B, 1c). For example, a metric built on a global model can generate maps with local estimates of the SON based on human pressures in different areas, facilitating large-scale identification of potential ecologically sensitive locations. However, such metrics provide lower confidence in the precision of a SON assessment than that derived from a metric that directly measures SON at the corporate site.

Second, the extent of alignment of the metric with the organisation's operational context must be assessed to ensure that the proposed metric is informative for the type of economic activity the organisation is performing (including which pressures it produces), its geographic location and scale, and the time period over which the SON assessment is being undertaken (Figure 2B, 2a-c). Awareness of which pressures a metric addresses is particularly important if the SON assessment is attempting to attribute the impact of the organisation on nature (Stimpson et al., 2026) or if a metric infers SON by modelling responses to a few specific pressures. Similarly, using a metric that is not suited to a firm's location or to the spatial resolution and temporal scope required for the analysis is unlikely to produce accurate or informative results.

Finally, the extent to which the metric is ecologically well-founded and applicable to the SON assessment's ecological context must be identified. Criteria to assess this could focus on whether the metric's data captures the actual biomes or ecosystems with which the organisation is interfacing, and focal taxonomic groups, if relevant (Figure 2B, 3a-b). To ensure the ecological foundations of the metric, it may be useful to have a specific applicability criterion that links the metric back to a well-defined aspect of nature (Figure 2B, 3c). For example, since leading frameworks for SON measurement in corporate reporting currently focus on the ecosystem and species level (e.g., NPI, 2026; TNFD, 2023a), disclosures following these guidelines should include SON metrics that explicitly reflect components like ecosystem condition and extent and the state of species populations. Such terms, however, while widely used, have debated definitions (Karr et al., 2022; Rohwer & Marris, 2021). Linking metrics to a more standardised categorisation of biodiversity — e.g. the Essential Biodiversity Variables (EBVs) (Pereira et al., 2013) — could be useful, therefore, to ensure a clear definition of what a metric measures and to which assessment contexts it is applicable. Clarity on coverage and biases in global datasets can also support more transparent disclosure of ecosystem and taxa data limitations (Collen et al., 2008; Lawson et al., 2025; Troudet et al., 2017).

Figure 2B shows an example of a minimum set of guiding questions, derived and extended from current SON metric selection guidelines, that can help define a metric's applicability for a specific site-level SON corporate assessment, and whether these criteria are considered and rationalised by current guidelines for SON metrics selection. We found that none of the reviewed guidelines for SON metrics selection addressed all criteria, suggesting that current evaluations of metrics' alignment with the objectives of an assessment and organisations' contexts might be limited (Figure 2B; Appendix 1). However, guidelines provide clear recommendations to ground metrics selection in the purpose or type of an assessment, focal impact pressures and relevant biodiversity components. Remaining applicability criteria were mostly missed or partially covered by guidelines (i.e., briefly addressed but without definition of how to assess metric alignment with them — Appendix 1). The criteria that received less attention were metrics' taxonomic and temporal scope and the type of information that metrics can provide based on their value and unit, with the latter missing from guidelines — suggesting metrics selection practices might not include confirmation that a metric provides a direct measure of SON that would characterise SON assessments and disclosures.

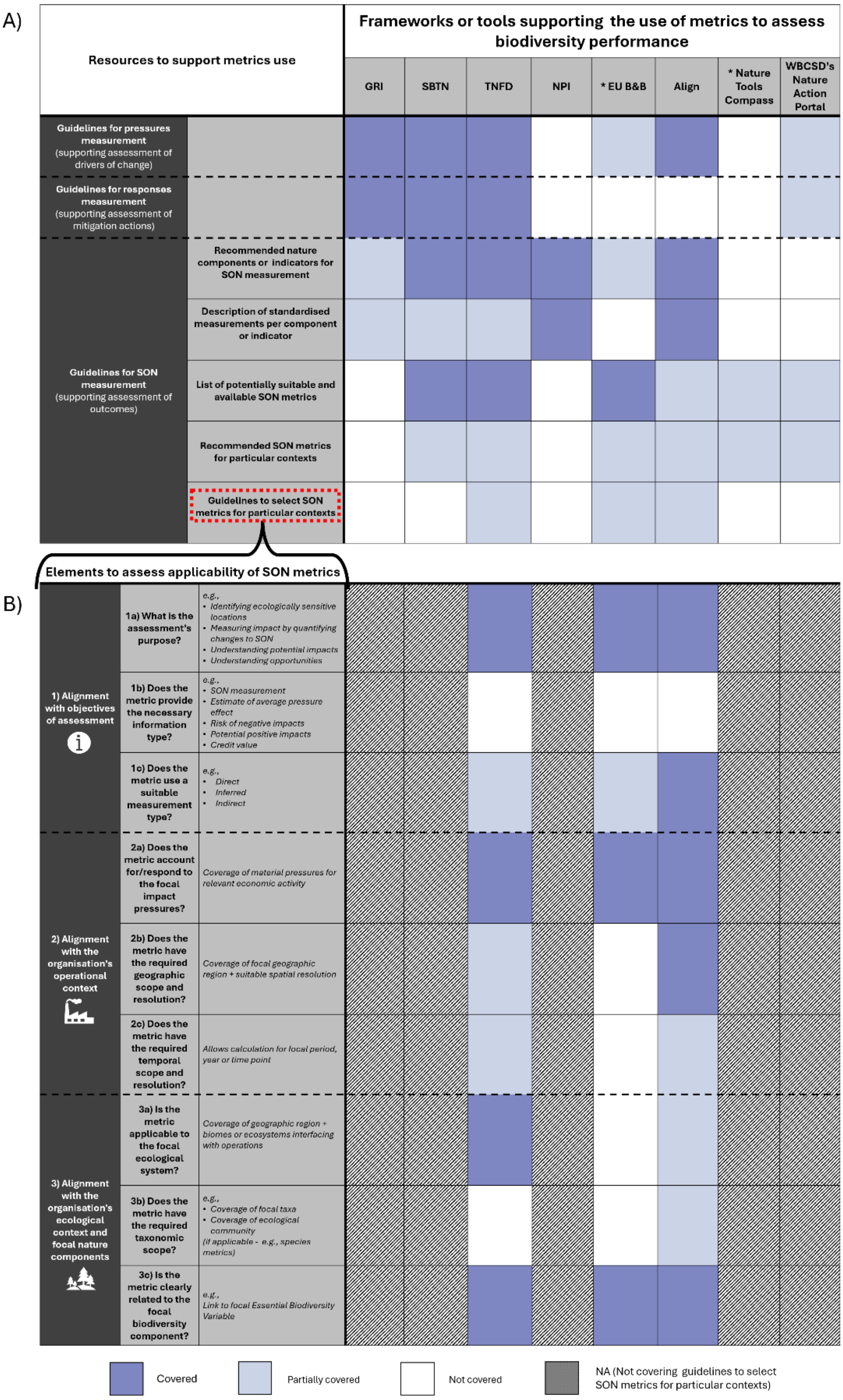

Figure 2. Frameworks or tools supporting the use of metrics to assess biodiversity performance and their coverage of key resources or guidelines. *Although the EU B&B platform and the Nature Tools Compass focus on tools and approaches to support corporate SON assessments, they also list potentially suitable metrics for different assessments. **A) Coverage of guidelines for the use of metrics to measure pressures, responses or SON. B) Coverage of applicability criteria in guidelines to select SON metrics for particular contexts.** For each guiding question supporting the assessment of the applicability of metrics, the table also displays examples of key information or categories for consideration when interrogating a metric. For an element to be classified as "covered", available documentation for corporate decision-making needed to include comprehensive and detailed information, instead of briefly addressing the topic. Full description of the conditions used to define coverage can be found in Appendix 1.

1.2 Lack of harmonised criteria to account for metrics' quality

Across the reviewed frameworks/tools with available guidelines for SON metrics selection, only TNFD listed a set of criteria defined in relation to metric quality (i.e. criteria that make SON metrics 'reliable') (TNFD, 2023a). Therefore, to identify common criteria used to define the 'quality' of SON metrics we also reviewed NPI's SON metrics design criteria (NPI, 2025, 2026) and criteria from two leading frameworks for the development and application of biodiversity indicators (Biodiversity Indicators Partnership (BIP) and GBF) (Brooks & Bubb, 2014; CBD, 2022) (Figure 3, Appendix 2).

We found that criteria to define successful or reliable indicators or metrics are heterogeneously covered (Figure 3) and unharmonised across frameworks. Some criteria are common to all frameworks, such as 'Credible and Science-based', indicating a consensus view that these are important determinants of quality. Others are framework-specific, since the reviewed frameworks and their criteria lists have different objectives (e.g. focusing on indicators for the GBF monitoring framework, successful biodiversity indicators as defined by BIP, or reliable metrics for corporate assessments— see Appendix 2). From the review, we also found consistent features of criteria that could be overcome by harmonisation.

First, our review (Appendix 2) suggests that criteria are often vague and difficult to quantify, with conceptually awkward collections of sub-criteria underneath them. For example, we found imprecise criteria without complete descriptions (e.g., NPI's metric design criteria such as "Responsive"), or many ambiguous sub-criteria (e.g., "Responds measurably, reliably and predictably to change", with no definition of the adverbs, in the TNFD criteria list). Many sub-criteria also lack fulfilment conditions, with criteria that can easily be described as true or false (e.g., related to documentation publication and accessibility and maintenance of metrics) as the main exceptions.

Second, some criteria in frameworks have tenuous relationships to quality or are more descriptive than analytical. For example, flexibility of a metric (e.g., adaptability to different methods and data, and applicability to different locations) is often defined as a feature of a high-quality metric (Appendix 2; e.g. appearing within the NPI and TNFD criteria lists). But, having separated out the concept of applicability, it is not clear to us that a flexible metric is of higher quality than a less flexible metric if it is applied to the right problem. Also, some sets of criteria apply differential importance to criteria. For example, TNFD assigns criteria to the categories "essential", "important", "desirable", but states that the weight put on each criterion will vary according to "the individual organisation's circumstances" (TNFD, 2023a) – making the categories difficult to consistently interpret and complicating the way they would drive metric selection.

Finally, many sub-criteria overlap in describing the same feature of a metric, even though they are categorised under different criteria. For example, the TNFD list of sub-criteria includes "well-documented relationships between impact drivers and values of the metrics" under the "Relevant" category, and "responds to realistic changes in pressures" under the "Responsive" category. Drivers and pressures, however, are different framings of the same thing, and these two criteria could be addressed by a single criterion focusing on the documentation of metrics' responsiveness to different pressures. The current use of such redundant criteria is likely to cause confusion for users of these selection guidelines.

To overcome these issues and produce unambiguous, succinct, and robust guidance, we propose five harmonised quality criteria (Figure 3) that attempt to capture the consensus across guidance frameworks: i) '**Adaptable to improvements**', capturing criteria associated with a metric's ability to be maintained, improved, and incorporate new data; ii) '**Accessible**', capturing the ease with which companies can use and understand the metric, including its affordability and the clarity of any output; iii) ‘**Credible and science-based**’, a broad category that can capture the acceptance of the metric in peer-reviewed scientific literature, how well the metric handles uncertainties, and the results of verification and performance-testing studies; iv) ‘**Informative**’, capturing the metric’s ability to provide useful and sufficiently granular information for objectives like measuring progress towards targets, detecting trends and thresholds, raising awareness and incorporating social elements (e.g., through link to ecosystem services) ; and v) ‘**Responsive**’, capturing the metric’s ability to respond to SON changes driven by pressures. These five categories can be the nucleus of a harmonised approach to assessing metric quality. In this process, consideration should be given to whether some categories could carry more weight and defining the specific sub-criteria against which metrics can be judged, with clear conditions for fulfilment.

A)

TNFD criteria categories	TNFD	NPI	GBF	BIP
Accessible	1	1	1	
Aligned	1	1	2	
Credible and science-based	6	1	1	1
Ecologically connected	2			
Ecosystem-explicit	1			
Flexible	3	1		
Forward-looking	1			
Relevant	3			2
Responsive	4	1		1
Socially connected	1			
Timely	3		2	2
Understandable	1			1
Verifiable	1	1		1

Number of criteria/sub-criteria per category

1-2

3-4

5-6

B)

Harmonised quality criteria categories	TNFD	NPI	GBF	BIP
Adaptable to Improvements	2	1	1	1
Accessible	2	1	1	1
Credible and science-based	10	3	2	2
Informative	3		1	1
Responsive	5	1		1
Unrelated to harmonised categories	6		1	2

Figure 3. A) Number of criteria or sub-criteria used to define a “successful” or “reliable” SON metric or biodiversity indicator across frameworks. For consistency, all criteria from different frameworks were classified using TNFD’s categories for essential, important and desirable criteria for ecosystem condition metrics (TNFD, 2023a) (Appendix 2). However, there is no expectation for the criteria of all frameworks to cover all TNFD categories, since the reviewed frameworks and their criteria lists have different objectives (e.g., “Ecosystem explicit” is clearly an important criterion for ecosystem condition metrics but might be irrelevant for other types of SON metrics). **B) Number of criteria or sub-criteria from different frameworks classified under the proposed harmonised quality criteria categories.** The last row shows the number of criteria/sub-criteria that couldn’t be classified under the proposed categories (i.e., criteria with a weak relationship to quality and linked to applicability, such as “Ecosystem-explicit” or “Flexible”, and criteria not easily fitting into a single harmonised criterion, such as “Can readily be recomputed to track change over time” which captures both a metric’s adaptability to improvements and its informativeness).

2. Insufficient evidence to evaluate metrics against criteria

A second problem that metric selection guidance frameworks must overcome is the lack of sufficient information on SON metrics’ traits to enable them to be evaluated against established applicability and quality criteria. To the best of our knowledge, no frameworks with guidance for SON measurement or metric selection have themselves collated evidence for named SON metrics or funded independent evaluation against the criteria they have set. Again, the expectation has implicitly been that users in business and financial institutions, or their supporting specialists, will perform this evidence collation and evaluation themselves; potentially without sufficient technical or ecological knowledge (e.g. for tasks such as defining a metric's responsiveness or link to biodiversity components) or access to scientific resources (e.g. literature on a metric's verification on the ground). Indeed, as discussed above, many frameworks do not provide a sufficient definition of criteria fulfilment to even allow for evaluation. For those companies and their consultants without access to sufficient technical knowledge for evaluation of metrics, guidance frameworks and their criteria may not be useful in their current form.

Open-source and centralised information on named SON metrics is therefore needed, providing transparent evaluation of their applicability and quality. Such standardised and verified data would reduce the reliance in metric selection on users' individual assessments and act as a reliable source to support non-experts and specialists in their evaluations of SON metrics. For evaluation of metrics against applicability criteria, most evidence that is required is descriptive, such as the focal geographic area or what the metric is measuring. A key barrier is that metrics often lack sufficient transparency for assessment (Hickman et al., 2025). For example, public documentation lacks clear explanations of the underlying data, methods and assumptions, hindering interpretation and understanding of metrics. However, if established guidance frameworks begin to incorporate metric profiling and evaluation as an essential part of their process, metric developers will be incentivised to increase transparency in order to be included in the recommendations of guidelines. In this process, a balance must be identified between the need for transparency and protection of commercial intellectual property, which drives desirable innovation in metrics. A useful corollary is in the field of financial economics, in which commercial datasets are used by researchers in collaboration with data providers (e.g. Garel et al., 2024). In such collaborations, verification analyses of such datasets can provide an attractive opportunity for independent ratification that data providers can reference when marketing their products.

For the evaluation of metrics against quality criteria that requires more extended testing (e.g., involving verification and performance studies), evidence can be generated through ecological and conservation science research g. (e.g. Dove et al., 2023; Jung et al., 2017; Lamb et al., 2009; Martin et al., 2019; Rowland et al., 2020). For example, metric outputs can be verified with field data collected from real businesses. A key barrier to this process is the long time-series needed to develop valid inferences of metric quality. This could be overcome by space-for-time studies in which studies at multiple distinct sites proxy for changing ecological conditions over time (Purvis et al., 2018) and through virtual ecologist approaches (Zurell et al., 2010), where standardised simulated data can be used to assess different metrics' responsiveness to patchy data and behaviour over time.

These practical barriers to gathering these data are not trivial but there is clear value in generating such evidence. Whether the cost should be borne by individual companies, by data-providers themselves, by industry-level or sectoral organisations, or be publicly funded is a question for the users of SON metrics. Publicly-funded evaluation may be appropriate where the resulting evidence has broad usefulness and can support metric selection across many organisations. The evaluation of SON metrics by publicly-funded scientists already has some history in conservation science, including evaluation of metrics against criteria in marine (Fulton et al., 2005), freshwater (e.g. Diamond et al., 2012; Gallardo et al., 2011; Herbst & Silldorff, 2006), and terrestrial realms (e.g. Bell & Malerba, 2025; Rowland et al., 2020; Santini et al., 2017; Stevenson et al., 2024). A recent example of how evaluation and scoring can underpin clear recommendations on which metrics to use in a business-like context can be found in Bank et al.'s (2025) work on agroecosystem condition metrics.

3. Selection guidelines lack sufficient stepwise structure

The final problem identified in current metric selection guidelines is poor structuring of the criteria that users apply to filter and select the most applicable and high-quality SON metric for their aims and context. Bringing together an established framework for defining a metric's applicability and quality, with evidence on how the metric performs against defined criteria, would lay the groundwork for improved metric selection guidance. Alone, however, these elements would not intuitively help a user decide which metric to use for their specific context.

To enable the metric filtering process, we envisage metric selection guidance that defines sequential selection pathways. In Figure 4, we show how a stepwise selection pathway rooted in applicability and quality assessments could guide the evaluation of candidate metrics for a specific SON assessment and business context. A standardised and informed process such as this can lead to the selection of the most suitable available SON metrics (Figure 4, green pathway) and avoid unjustified metrics selection, based on individual interpretations of general selection guidelines (Figure 4, purple pathway).

In our proposed selection pathway, as a first step, information about a user's context should be used to filter out metrics that are not applicable to a chosen SON assessment. This initial filtering process would use evidence from the collation of the characteristics of candidate metrics, as discussed above, to define a set of metrics that are appropriate for the user's context. The applicability assessment section in Figure 4 shows a potential approach to evaluate recommended candidate metrics for a hypothetical corporate SON assessment and filter them based on applicability criteria (from Figure 2B) by a) identifying the characteristics of an "ideal" metric for the focal assessment and b) filtering out candidate metrics with incompatible traits. Following this initial filtering, the applicable metrics can then be compared in terms of their quality. As a visual example, the quality assessment section in Figure 4 shows an approach to transforming the results of the quality assessment into quantitative scores that would allow ranking of metrics (e.g., by calculating average scores for each quality category based on scores of sub-criteria).

These examples show how the structuring of selection processes can help guidance frameworks move away from generic metric recommendations (e.g., based on SON assessment type without considering the business context) towards tailored and robust metric selections. The illustrative applicability assessment shown in Figure 4 exemplifies a potential case where a candidate metric is found to be suitable for the given corporate assessment and context. However, cases where all available candidate metrics might be defined as unsuitable demonstrate the difficulty of finding a metric that "ticks all boxes". However, even in these cases, the procedure suggested here can bring clarity on how particular metrics can or cannot be used in disclosures. For example, results from SON assessments using somewhat unapplicable metrics would need to be reported in a way that reflects the metrics' scope and limitations, instead of reporting results without awareness or justification of their suitability for an assessment. The assessment of gaps in existing metrics' suitability for different SON assessments and business contexts can also help identify priorities for improvements or development of SON metrics.

Hypothetical corporate SON assessment: A company following TNFD's LEAP framework to assess and disclose its impacts on nature aims to identify which of its direct operations are in ecologically sensitive locations (assessment included in the 'Locate' phase of the LEAP framework). This initial step will define the priority locations where the severity of negative impacts on nature (e.g., changes in SON) will be evaluated in detail to feed into the company's nature-related disclosures.

The company grows crops across farms in Southwest Australia (average farm size ~80 hectares) in areas dominated by shrubland and is running its assessment in 2024. They aim to use a metric that provides clear SON measurements to help them identify areas important for biodiversity or species, or that have high or declining ecosystem integrity, and assess whether any of their farms are within such areas. Their objective is to use a metric with underlying data that includes (or is relevant for) a diverse set of taxonomic groups and that accounts for the effects of land-use change, which has been identified as a pressure linked to their activities with potential high impacts on nature.
To find an initial set of candidate metrics, the company consults the TNFD's LEAP approach guidance (TNFD, 2023a) and online Tool Catalogue, plus the Nature Tools Compass (UNEP-WCMC, 2026), since these sources recommend named metrics for different phases within the TNFD LEAP Framework. Confused by the number of metrics recommended by these sources for the focal LEAP assessment, they choose three candidate metrics for their high profile, accessibility, and global coverage of available spatial data: the Species Threat Abatement and Restoration metric (STAR) (IBAT, 2026; Mair et al., 2023), the Biodiversity Intactness Index (BII) (De Palma et al., 2024, 2025) and the Ecosystem Integrity Index (EII) (Hill et al., 2022; Leutner, 2025). The company must now conduct their own assessments to determine whether these metrics are suitable for the focal SON assessment and the company's economic and ecological context. In this hypothetical scenario, we exemplify potential outcomes of the evaluation and selection of candidate metrics through two processes: one based on available guidance for SON metrics selection, and another grounded in the proposed standardised selection process based on applicability and quality criteria (outlined in Figures 2B and 3B) to filter out metrics that are not suitable for the organisational context.

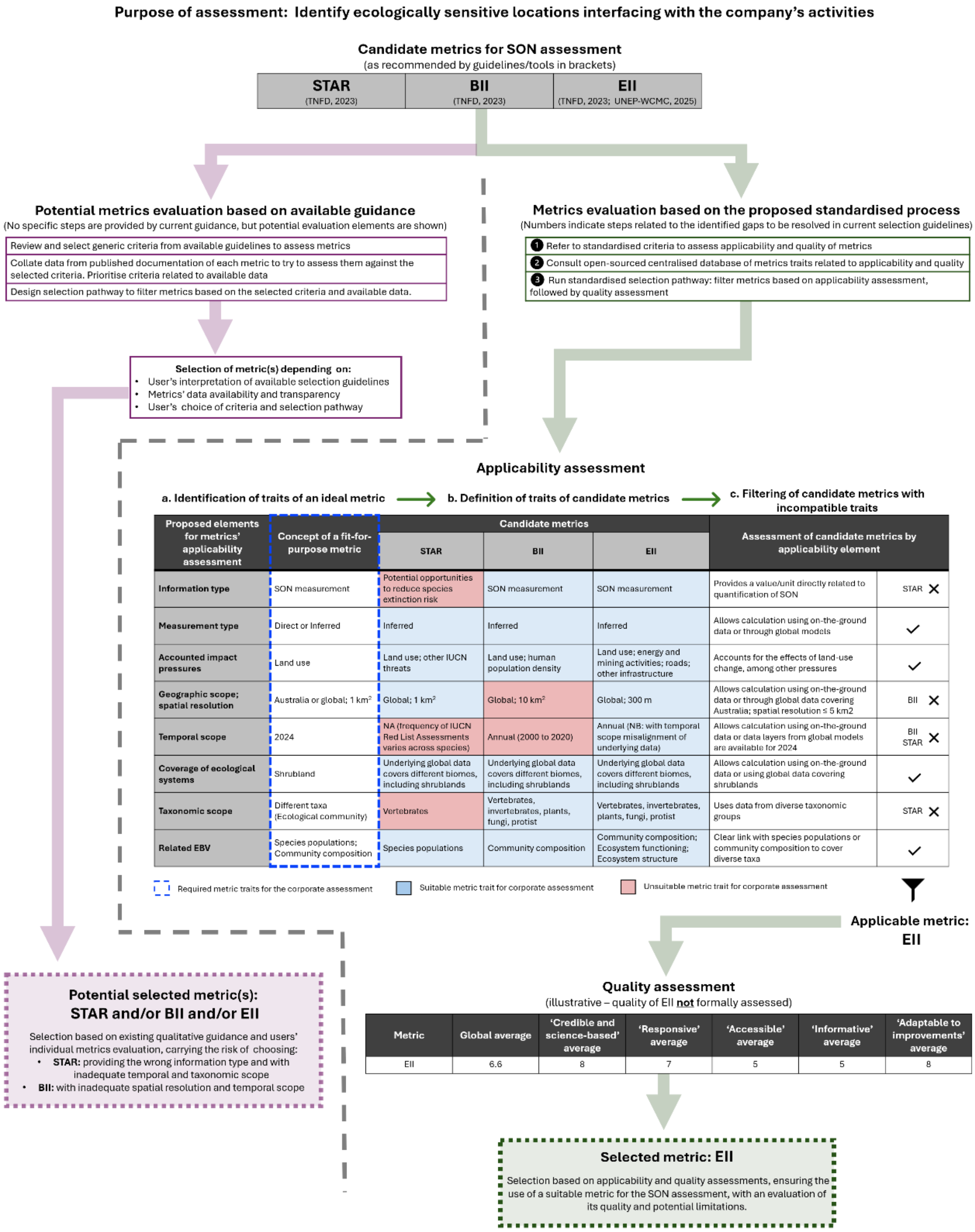

Figure 4. An example of a potential evaluation of candidate SON metrics for a hypothetical corporate assessment. The figure shows the potential outcomes of the evaluation of candidate metrics when based on available guidance (purple pathway) and the proposed standardised process (green pathway) for SON metrics selection. The three chosen candidate metrics are used for illustrative purposes; we did not consider all metrics recommended by current guidelines for similar SON corporate assessments. The traits shown for candidate metrics are based on available datasets (see references in top blue box) and not on the metrics' potential.

Conclusion

Existing frameworks for corporate SON measurement and disclosure have emphasised the importance of using multiple metrics to measure a key set of nature components. However, we have highlighted the need to improve associated guidelines that help corporate users select these metrics based on their contexts. By identifying problems with current SON metric selection guidance, we have argued that there are three key places for improvement. First, by overcoming the problem of unclear and unharmonised criteria for quality and applicability across frameworks, guidance framework designers could set up a meaningful framework that defines the attributes of metrics that should influence user choice, given their context. Second, by overcoming the lack of evidence for evaluating metrics' alignment with and performance against established criteria, framework developers can consolidate and disseminate evidence by researchers that would allow a clear definition of a metric's applicability and quality. Finally, by overcoming the lack of a stepwise structure to progressively filter metrics that are relevant and useful for a user's SON problem, developers can create frameworks that guide users to specific metrics. This improvement in guidelines would align with work to identify the comparability of SON metrics (Stimpson et al., 2026) to produce a system of corporate disclosures that are both ecologically robust and useful for users of disclosures, such as financial institutions and researchers. Importantly, resolving these limitations can help overcome the confusion created by the rapid increase in available SON metrics and the complexity in reporting on SON. This can increase the uptake, effectiveness, and utility of corporate SON reporting and disclosure and, in turn, contribute to achieving Target 15 by 2030. Failure to address these issues, on the other hand, risks the avoidance or misuse of SON measurements in corporate nature-related assessments, reinforcing a disconnect between organisational biodiversity reporting and the ecological outcomes that such reporting is intended to support.

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