

Alignment of the State of Nature Metrics with the monitoring framework of the Kunming-Montreal Global Biodiversity Framework

Authorship:

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Document Purpose

The Kunming-Montreal Global Biodiversity Framework (GBF) was adopted by the Conference of the Parties to the UN Convention on Biological Diversity in 2022, with a 2030 mission to “*take urgent action to halt and reverse biodiversity loss to put nature on a path to recovery for the benefit of people and planet*”. The GBF comprises four goals – to conserve and restore nature (Goal A) and its benefits (B), share benefits fairly (C), and invest and collaborate (D) – and 23 targets for actions needed to meet the goals (1), including restoring (Target 2), protecting (Target 3) and mainstreaming biodiversity (Target 14). The role of the private sector is recognised in Target 15, which calls for businesses to monitor, assess and disclose their risks, dependencies and impacts on biodiversity, to reduce negative impacts and increase positive impacts. The GBF also includes a **monitoring framework**, developed by consensus alongside the Framework, which includes an agreed set of 27 headline indicators that all Parties should use in their national reports, to enable consistent reporting (2, 3). Parties can also report using optional indicators in the monitoring framework (referred to as component and complementary indicators) and national indicators.

The definition of nature positive – to halt and reverse nature loss – aligns with the GBF mission (4, 5). During 2024-2026, the **Nature Positive Initiative (NPI)** undertook a consultation process and pilot testing to develop a set of **State of Nature (SoN) metrics** to measure declines and recovery in nature. The SoN metrics are intended to be grounded in science and practical to implement by all actors, in particular the private sector. They will support a range of use cases, such as voluntary assessment and disclosure, regulatory compliance, identifying risks and opportunities, and managing nature-related impacts and dependencies. Interest from the private sector in these use cases is growing, through voluntary approaches such as the Taskforce on Nature-related Financial Disclosure (TNFD), Global Reporting Initiative (GRI), the Science-Based Targets Network (SBTN), and the potential for future disclosure requirements of the International Sustainability Standards Board (ISSB). The SoN metrics were developed with these use cases in mind and for embedding within these frameworks. Through these initiatives, the metrics should help accelerate implementation of Target 15 and support private sector contributions to all 23 targets and the mission of the GBF.

Biodiversity monitoring systems and on-ground outcomes will be best served if the GBF monitoring framework, especially its headline indicators, and SoN metrics used by the private sector are aligned. The purpose, use and scale of SoN metrics and GBF monitoring framework differ: the purpose of the GBF monitoring framework is national-level monitoring, while the purpose of the SoN metrics is site-and landscape-level, cross-sector, and especially private sector monitoring. Bridging these scales, sectors and purposes requires that the same definitions, standards and foundational data to be used in the frameworks.

The purpose of this document is to first assess alignment between the SoN metrics and GBF monitoring framework, and then to provide recommendations, in order to: 1) align underlying data of the SoN metrics sufficiently with underlying data for the GBF headline indicators, in terms of data sources and data generated, to maximise opportunities for investment in monitoring by all actors; and 2) align on-ground outcomes for biodiversity across scales and uses, so that actions using SoN metrics contribute to broader societal goals and targets in the GBF. The assessment focuses on the GBF headline indicators, but where

relevant, also considers optional component indicators in the GBF monitoring framework. This paper has been prepared as an information (INF) document alongside the 28th meeting of the Subsidiary Body on Scientific, Technical and Technological Advice (SBSTTA-28). It provides background and technical information on the alignment of the Global Biodiversity Framework (GBF) indicators and the State of Nature (SoN) metrics, identifies opportunities to strengthen this alignment, and is intended to support implementation of Target 15 through improved coherence between the frameworks.

Executive Summary

The Nature Positive Initiative (NPI) State of Nature (SoN) metrics cover indicators of ecosystem extent, ecosystem condition, species extinction risk, and species populations. The metrics can be assessed with varying levels of detail, termed ‘granularity’, which allow actors to start with simpler measures while progressing towards more ecologically meaningful or technically advanced measures through time. For more information on the process for developing and consensus-building of these metrics, see **Background**.

The assessment focused primarily on alignment with GBF Goal A, which focuses on outcomes for nature, and GBF headline indicators that measure the state of nature, rather than threats (e.g. pollution), actions (e.g. restoration) or benefits (e.g. ecosystem services). Optional indicators in the GBF monitoring framework (complementary and component indicators) were also considered where relevant, noting that these were rarely used by parties in their 7th National Reports (6). The Executive Summary focuses on the most closely aligned indicators, but additional relationships between SoN metrics and the GBF monitoring framework, such as potential for methodological alignment with other indicators, are discussed in the technical assessment below.

Alignment between the SoN metrics and GBF headline indicators was assessed on conceptual and operational dimensions, based on the indicator methodologies described in the GBF indicator metadata (7) and SoN draft guidance (8). The combination of these two dimensions provides four categories of alignment, shown in Table 1, along with a summary of key findings. This report provides recommendations for strengthening alignment – for example where alignment is only at high granularity, we provide recommendations to strengthen alignment across medium and low granularity levels.

<i>Dimension</i>	<i>Key Question</i>	<i>What is checked</i>
Conceptual	<i>Are they measuring the same aspects of nature?</i>	<i>Intent or purpose, core concepts, definitions</i>
Operational	<i>Are they measured the same way?</i>	<i>Data, methods, scale, units, disaggregation, baselines, at different granularity levels</i>

Table 1. Combination of conceptual and operational dimensions gave four levels of alignment, which rank from highest (top) to lowest (bottom). The righthand column shows the examples from the key results for pairs of SoN Metrics and GBF indicators, with the SoN granularity level in brackets.

Alignment level	Conceptual alignment	Operational alignment	Use in practice	SoN – GBF (granularity level)
Fully aligned	Same intent, definitions, concepts	Same methods, data, outputs	Interchangeable, as essentially the same metric	Ecosystem extent & A.2 (all)
Substantively aligned	Similar intent and core concepts	Some differences in method, scope, or scale	Measuring the same aspect of nature, with minor differences; comparable with interpretation	Extinction risk & A.3 (all)
Methodologically aligned	Different intent, core concepts or definitions	Some shared data or methods	Similar methods but different purpose, so not directly comparable	Ecosystem condition & A.1 (high)

Potential for alignment	Some conceptual links across intent or definitions	Potential for shared data or methods with further clarification or development	With adjustment would align across methods or data	Species abundance & A.3 (med-high), A.4 (high), LPI (med-high), Ecosystem condition & A.1 (med)
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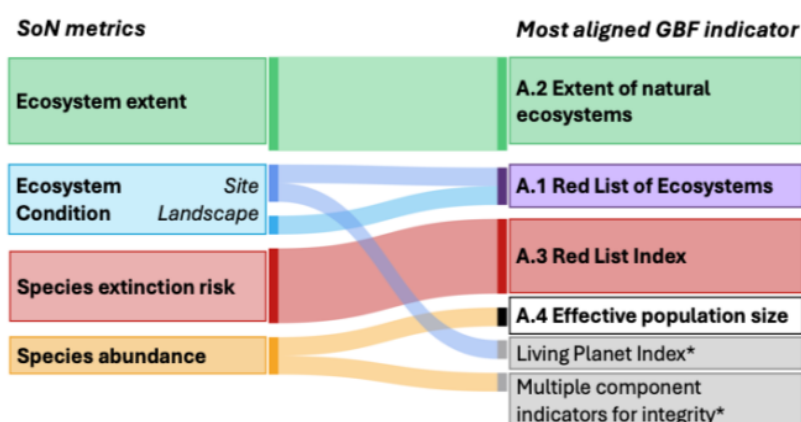


Figure 1. Alignment of NPI SoN metrics with GBF headline indicators, showing the most aligned indicator, with component indicators marked in grey and with an asterisk; weight indicates levels of alignment from Table 1 (thick = full or substantive alignment, thin = methodological or potential for methodological alignment); alignment across all GBF indicators is shown in Figure 2, and with GBF goal elements in Figure 3.

Key findings

Full or substantive alignment: Two SoN metrics align either fully or substantively with GBF headline indicators (Table 1, Figure 1), enabling streamlined analysis, monitoring and reporting on biodiversity for ecosystem extent and species extinction risk across use cases.

- **Ecosystem extent** is fully aligned in terms of intent, key concepts and methodologically with GBF indicator A.2 extent of natural ecosystems.
- **Species extinction risk** is substantively aligned with GBF indicator A.3 Red List Index. The intent and key concepts of both are highly related – to reduce extinction risk – and they use similar datasets and methods in their measurement.

Methodological alignment: the SoN metrics for ecosystem condition are methodologically aligned to GBF indicators. They do not fully align with any GBF headline indicator (Table 1, Figure 1). The GBF monitoring framework lacks a headline indicator for ecosystem condition because Parties judged that there was not an agreed, established method for an indicator; however, some optional indicators (9) address related concepts, which align to varying degrees with SoN metrics.

- **SoN metrics for ecosystem condition** at high granularity are methodologically aligned with GBF headline indicator A.1 Red List of Ecosystems (an indicator of ecosystem collapse risk). Although their intent differs, they use similar standards and approaches at high granularity, allowing the SoN metrics to contribute to *underlying data* for the GBF indicator. The SoN metric at medium granularity is potentially aligned. Alignment at high and medium granularity can be strengthened by following best practice in Red List of Ecosystem Guidelines (16) for selecting condition variables and defining condition classes, and by drawing on existing Red List of Ecosystem assessments.
- **SoN metrics for ecosystem condition** at preparatory granularity are fully aligned with several of the optional (component and complementary) indicators for ecosystem integrity listed in the GBF monitoring framework that use pressures, such as land-use, as proxies for condition; such indicators can be used at preparatory levels only, as the SoN metrics are intended to measure state rather than pressures, given pressure metrics are in the frameworks in which they are to be embedded.

Potential for alignment: The GBF monitoring framework lacks a headline indicator for species populations, but the SoN metric for species populations is potentially aligned with several GBF headline and component indicators:

- **A.1 Red List of Ecosystems**, through data on change in key biota for specific ecosystem types
- **A.3 Red List Index**, through data on change in abundance or absolute abundance of species

- A.4 Proportion of populations within species with an effective population size greater than 500 (an indicator of genetic diversity), through data on absolute abundance of populations
- Component indicators, *Living Planet Index* and *Wild Bird Index* through data on change in population size
- In all cases, the guidance for the SoN metric requires further development to align with data standards, science and best practice for each of these indicators, which could allow it to become methodologically or even fully aligned.

Opportunities, gaps and ways forward

The SoN metrics for ecosystem extent and species extinction risk align with GBF headline indicators in ways that can support decision-making across scales, enabling data generated by private sector actors at site level to feed into broader global and national reporting. Four principal **alignment gaps** between the SoN metrics and GBF indicators remain:

1. The lack of a SoN metric equivalent to A.1 Red List of Ecosystems, which captures concepts of ecosystem risk, resilience and threatened ecosystems. Its inclusion in the NPI metrics and guidance and/or the prioritisation steps of embedding frameworks and standards (such as TNFD and GRI) would increase alignment with the GBF, and guide priorities for action and monitoring for threatened ecosystems, similar to the way that extinction risk guides priorities for species. While data availability is limited for the Red List of Ecosystems (~60 countries), coverage is increasingly rapidly (6).
2. The lack of GBF headline indicators for condition and species abundance, which presents opportunities for strengthening methods and data for measuring change (see below).
3. Differences in baseline for measuring change between the GBF (2011-2020 for the framework as a whole, and varying baselines for specific GBF indicators) and the NPI framework (from 2020, with flexibility to nominate a different year).
4. Differences in scope, scale and purpose of the frameworks, which presents opportunities for develop methods for bridging this gap for effective monitoring across use cases.

Opportunities: The GBF monitoring framework lacks headline indicators for ecosystem condition and species populations (9), providing opportunities to develop standards, databases and data streams from SoN metrics that could underpin future headline indicators to fill this gap. SoN metrics that are methodologically aligned with GBF headline indicators could provide additional data to support their ongoing implementation, if their alignment is strengthened; for example, SoN condition metrics at higher granularity could improve data availability for A.1 Red List of Ecosystems. They could also provide the foundations for new indicators for condition. Further opportunities include increasing available data on actions such as restoration (Target 2), private protected areas (Target 3), and for other biodiversity data platforms (e.g. GBIF).

Principal recommendations for strengthening alignment of SoN metrics with the GBF monitoring framework:

1. **Baseline:** adopt wording and concepts in the GBF for the reference period 2011–2020, rather than 2020, taking into account historical trends on the natural state; provide additional guidance on the justification of choice of baseline rather than adopting a fixed baseline.
2. **Ecosystem collapse risk and threatened ecosystems:** include ecosystem risk in the NPI metric set, and/or in prioritisation or screening steps in the embedding frameworks and standards, to help prioritise monitoring and action for threatened ecosystems, increase data availability and improve on-ground biodiversity outcomes aligned with Goal A.
3. **Extent:** apply high granularity approaches where possible, to capture important biodiversity patterns, including rare, narrowly distributed or patchy ecosystems that are often poorly mapped, by using local knowledge, ecosystem distribution maps and/or field work; draw on existing Red List of Ecosystem assessments for ecosystem maps and descriptions, and to prioritise monitoring and action.
4. **Condition:** align guidance for condition metrics with best practice in Red List of Ecosystem Guidelines (16) for selecting appropriate variables for measuring condition and combining variables into condition classes; draw on existing Red List of Ecosystem assessments for data and information on ecosystem maps, descriptions and condition measures, and to prioritise monitoring and action.
5. **Species populations:** specify standards for data collection and analysis that adhere to guidelines and best practice in the Red List of Threatened Species guidelines that underpin GBF headline indicators A.3 Red List Index and A.4 effective population size, and component indicator *Living Planet Index*.

- 174 6. **Align with other data standards for biodiversity and action:** including standards for GBF indicators for
175 restoration and protection, and biodiversity data platforms such GBIF, to capitalise on data gathered
176 when applying NPI SoN metrics.
- 177 7. **Share data:** to build global monitoring capability, making data available on open access platforms.
178

179 Capitalising on the existing alignment between the SoN metrics and GBF, strengthening methodological
180 alignment where it is weaker (e.g. condition and species abundance) to build on scientific research and best
181 practice, and addressing opportunities and gaps, will strengthen the overall consistency and coherence of
182 private and public sector monitoring frameworks, and the contribution of the SoN metrics to national and
183 global monitoring efforts and publicly available biodiversity data and knowledge.
184

185 186 **1 Background**

187 188 **1.1 Nature Positive Initiative's State of Nature (SoN) Metrics**

189
190 **What is Nature Positive?** Nature Positive is a global societal goal defined as “Halt and Reverse Nature Loss
191 by 2030 on a 2020 baseline, and achieve full recovery by 2050” (4), by increasing the abundance, diversity,
192 integrity and resilience of species, ecosystems and natural processes. More simply, it means ensuring more
193 nature in the world in 2030 than in 2020 and continued recovery after that.
194

195 The **Nature Positive Initiative** (NPI) is a coalition of many of the world's largest conservation organisations,
196 business and finance coalitions, disclosure and target setting frameworks, and organisations representing
197 Indigenous knowledge, local government, and scientific institutes. It focuses on promoting nature positive as
198 a global goal for nature as well as providing practical guidance to ensure it is a measurable goal.
199

200 **Why focus on State of Nature metrics?** State of Nature (SoN) metrics are essential for monitoring whether
201 efforts are contributing to nature's recovery, a fundamental aspect of any comprehensive nature strategy.
202 Pressure and response metrics are already relatively well-established, but a gap exists around measuring the
203 state of nature. It is important to note that state of nature metrics are not intended to replace pressure and
204 response metrics, but rather to complement them. The goal was to reach broad agreement through a
205 consensus-building process on a set of measurable indicators and metrics that capture the effectiveness of
206 efforts to halt nature loss and set it on a path to recovery, thereby delivering nature-positive outcomes.
207

208 The following metric design criteria were used to select metrics: (i) credible and science-based; (ii)
209 responsive; (iii) to be able to incorporate new data and techniques; (iv) aligned with existing standards and
210 frameworks; (v) accessible and affordable; and (vi) auditable. These largely align with the criteria for
211 selecting the GBF indicators (3). The main objective was to design a minimum set of universal state of nature
212 metrics for broad and consistent adoption, focusing on the biotic elements of nature. This means ensuring
213 that the metrics can be used across a variety of use cases, by stakeholders of varying capacity, and across
214 different environmental and social contexts. These metrics are designed to measure the state of nature and
215 support a range of potential use cases including voluntary assessment and disclosure, regulatory compliance,
216 and the development, implementation and tracking of corporate nature-positive strategies and targets.
217 While corporates and financial institutions are the initial focal users, sustained nature-positive outcomes will
218 require collaboration across a wide range of user types, e.g. national and sub-national governments,
219 landowners and land stewards, and thus metrics are designed such that they are not only applicable to the
220 focal users. Metrics should be measured at the scale and granularity level appropriate for the decision-
221 making for the particular use case.
222

223 **Consensus-building process:** Launched in May 2024 with the aim of rapidly building agreement on a set of
224 state of nature metrics, the framework development process will complete in 2026. In 2024, a consultation
225 was launched on the initial draft state of nature metrics (130+ organizational responses). A Piloting
226 Programme ran from May-October 2025 and focussed on corporate and financial institution application of

metrics across 29 companies, 50 sites, and 23 countries. Participants were selected to cover a broad range of sectors (mining & quarrying, energy & fuel, finance, forestry & agriculture, manufacturing & chemicals, and infrastructure) and geographies. Each participant had a piloting partner from one of six core NPI organisations, to help guide their approach. Feedback from piloting companies, and a final consultation process (111 responses) have led to the emergence of a final metrics set for adoption and embedding into disclosure and target-setting frameworks and standards (8, 10).

The result of this final consultation process was a set of four indicators, measured at site and landscape scales (providing essential additional context) (Figure 2) (8, 10). For most metrics, the metrics are measured in the same way for site and landscape scales, with the exception of ecosystem condition. Site ecosystem condition focuses on compositional and structural attributes of the ecosystem, while landscape condition focuses on connectivity, which can only be measured at broader scale, beyond the site, to contextualize site-based metrics.

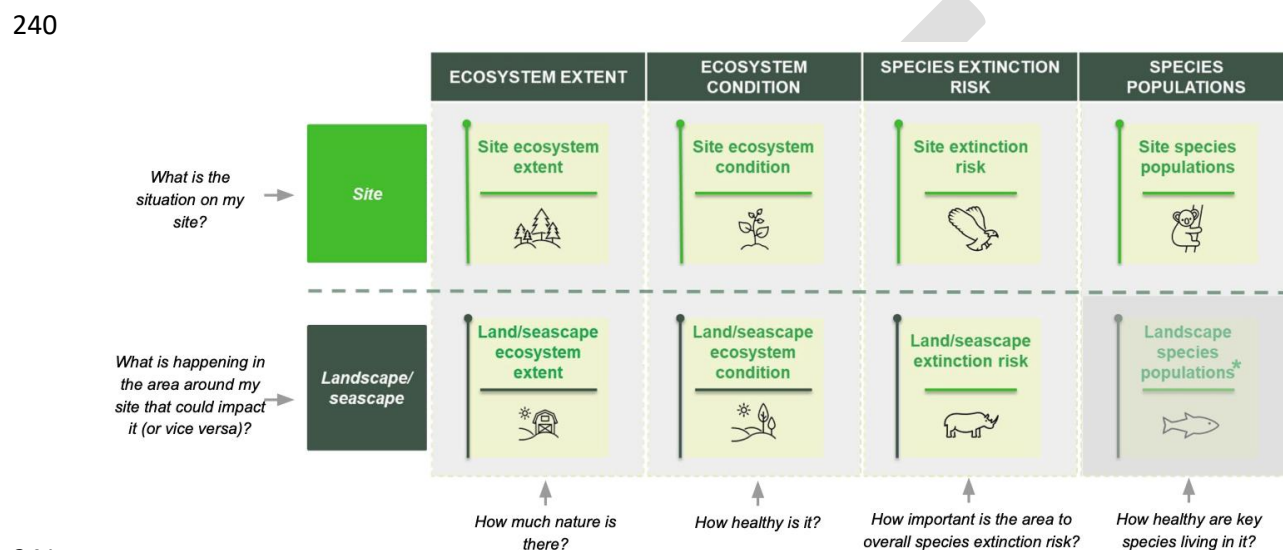


Figure 2. SoN indicator and metric set, the aspects of the state of nature measured (*species populations at the landscape level is optional (8, 10)).

The metrics can be assessed with varying levels of detail, termed ‘granularity’. This allows for differing levels of capacity and data availability. It allows actors to start with simpler measures while progressing towards more ecologically meaningful or technically advanced measures through time. There are three levels of granularity: ‘preparatory’, medium and high, which increase in spatial and classification resolution, data needs, ecological complexity, and/or include ground-truthing.

Table 2. SoN metric descriptors: broad approach and units of measurement

	Ecosystem extent	Ecosystem condition	Species extinction risk	Species populations
Site	Area (absolute and percentage) of loss, gain and net change in extent of natural ecosystems (ha, %)	Area and change by condition class (ha, %)	Species extinction risk measurement showing the contributions of the site to global extinction risk	Number and proportion of priority species with populations that are 1) declining, 2) slowing in decline, 3) stable, and 4) increasing.
Landscape/seascape	Area (absolute and percentage) of loss, gain and net change in extent of natural ecosystems (ha, %)	Values and change in structural and functional connectivity between natural ecosystems	Species extinction risk measurement showing the contributions of the landscape/seascape to global extinction risk	Number and proportion of priority species with populations that are 1) declining, 2) slowing in decline, 3) stable, and 4) increasing.*

*Important note: To be measured where possible, however it is recognised that further work on data availability needs to be undertaken to make measurement more feasible.

1.2 Kunming-Montreal Global Biodiversity Framework (GBF) and its indicators

In December 2022, the Conference of the Parties to the UN Convention on Biological Diversity adopted the Kunming Montreal Global Biodiversity Framework (GBF) – a transformative framework intended to halt and reverse biodiversity loss. The GBF comprises four goals to 2050, 23 targets for 2030 outlining the actions needed to achieve the goals, and a set of cross-cutting principles (outlined in section C) that apply across the framework as a whole (1). The framework is supported by a monitoring framework, comprising 27 headline indicators, a minimum set of high-level indicators that capture the overall scope of the GBF goals and targets, which all 196 parties agreed to use to report on progress (2, 3) – these are the main focus of this alignment assessment. The monitoring framework also includes binary indicators, which fill gaps in the headline indicator set (11). Parties can also report using national indicators, or with the optional indicators listed in the monitoring framework (termed component and complementary indicators) that cover other aspects of the targets and goals (11). The headline indicators for each goal and target can be found in key GBF documents (1, 2, 7), and the GBF website, <https://www.cbd.int/gbf>.

The assessment focused primarily on alignment with GBF Goal A and GBF headline indicators that measure the state of nature:

***GBF Goal A:** The integrity, connectivity and resilience of all ecosystems are maintained, enhanced, or restored, substantially increasing the area of natural ecosystems by 2050; Human induced extinction of known threatened species is halted, and, by 2050, the extinction rate and risk of all species are reduced tenfold and the abundance of native wild species is increased to healthy and resilient levels; The genetic diversity within populations of wild and domesticated species, is maintained, safeguarding their adaptive potential.*

We did not assess in detail alignment with GBF headline indicators related to threats (e.g. pollution, target 7), benefits from ecosystems (e.g. ecosystem services, headline indicator B.1), or actions (e.g. spatial planning), because these were considered out of scope for the SoN metrics (10). However, we secondarily considered relationships between the SoN metrics with GBF targets and associated headline indicators (e.g. Target 2 on restoration and indicator 2.1 *Area under restoration*, and protection, headline indicator 3.1), and relevant component indicators, particularly where actions by businesses and other actors could contribute to achieving these targets or where data collected in monitoring nature-positive outcomes could contribute to data-streams that support national reporting.

The focal GBF headline indicators:

This section gives an overview of the GBF headline indicators being assessed, their methods and their data requirements; their associated Goal A elements are shown in the Annex.

- **A.1 Red List of Ecosystems** is an indicator of ecosystem collapse risk (7), that summarises the proportion of ecosystem types in each risk category (e.g. Endangered). The indicator data is underpinned by assessments using the IUCN Red List of Ecosystems criteria, which identify ecosystems most at risk based on change in ecosystem area and integrity. The indicator can be reported at national or global levels, and by ecosystem group, using the Global Ecosystem Typology (12). Indicator A.1 addresses multiple elements of Goal A by assessing how change in area, integrity and connectivity affect ecosystem risk status, which is related to ecosystem resilience (table 4). Along with A.2, this is also a headline indicator for Target 1, to plan and manage all areas to reduce biodiversity loss.
- **A.2 extent of natural ecosystems** is an indicator of the extent of natural ecosystems vs anthropogenic ecosystems as a proportion of overall area, and to track changes in this proportion over time (7). “Natural ecosystems” are ecosystem types where the impact of humans on composition, structure and function are low compared to natural factors; in contrast, anthropogenic ecosystem types are those created and largely maintained by people (12). The indicator can be disaggregated by ecosystem group using the Global Ecosystem Typology (12). UN SEEA Ecosystem Accounting (13), the international statistical standard for natural capital accounting, provides the conceptual framework and methodology for the compilation of this indicator, but the indicator can be calculated using other data sources, such as from national, regional or global ecosystem maps. Indicator A.1 addresses elements of Goal A to increase the “area of natural ecosystems by 2050”. Along with A.1, this is also a headline indicator for Target 1.

- **A.3 Red List Index** is an indicator of species' extinction risk (7). It measures the overall level of global extinction risk of sets of species (i.e. how threatened they are on average), and the rate at which this risk changes over time. It is calculated in the same way as GBF indicator A.1 Red List of Ecosystems, and provides a complementary assessment of the state and trajectory of biodiversity. The indicator data comes from the IUCN Red List of Threatened Species Categories and Criteria (14), and is compiled from data on changes over time in the Red List category for each species, excluding any changes driven by improved knowledge or revised taxonomy. A species risk status (e.g. Endangered) is determined by the Red List criteria, which include its distribution or population size or magnitude of declines in distribution and population size. A.3 is also a headline indicator for Target 4 to halt species extinction, protect genetic diversity, and manage human-wildlife conflicts.
- **A.4, Proportion of populations within species with an effective population size greater than 500**, is an indicator of genetic diversity (7). Effective population size (N_e) is a measure of the rate of loss of genetic diversity within populations of wild species. A population size above 500 will maintain genetic diversity within populations, while smaller populations are susceptible to rapid loss of genetic diversity and extinction due to genetic threats. The indicator requires defined population boundaries and census data for each population for each species being included in the indicator. A.4 is also a headline indicator for Target 4 to halt species extinction, protect genetic diversity, and manage human-wildlife conflicts.

We also consider, where relevant, some of the recommended disaggregations for the GBF indicators (2) – these are standardised methods for presenting the GBF indicators in greater detail; for example, A.2 Extent of natural ecosystems can be presented as an overall aggregate measure (proportion of natural vs anthropogenic ecosystem extent), or disaggregated by biome or ecosystem functional group using the Global Ecosystem Typology (12) (e.g. mangroves, coral reefs, lowland tropical rainforest), for insights into the relative abundance or scarcity of different natural ecosystem types and their change over time.

The **Global Ecosystem Typology** is a hierarchical ecosystem classification framework (<https://global-ecosystems.org>) and is used by both the SoN metrics framework and recommended in the GBF monitoring framework for globally consistent disaggregation of all ecosystem-related indicators (2, 7); it is also recommended to support ecosystem accounting and the Red List of Ecosystems. The three upper levels of the typology – realms, biomes and ecosystem functional groups – classify ecosystems based on their functional characteristics, rather than based on which species live in them. In the monitoring framework, a GET level-3 disaggregation is proposed for all geospatial headline indicators (e.g. headline indicators for restoration and protected areas), not only the headline indicators presented in this document. The three lower levels of classification differentiate ecosystems by composition: regional ecosystem subgroups (level 4), global ecosystem types (level 5) and local ecosystem types (level 6, e.g. different types of deciduous temperate forest in Finland (15), such as heath forests with deciduous trees, and herb-rich ash forests). Levels 5-6 (e.g. national ecosystem maps) are often already developed and used in policy and management and can be linked to the upper levels in the hierarchy through level 3 ecosystem functional groups. Ecosystem accounting and Red List of Ecosystems assessments are typically applied at level 5-6.

1.3 Approach to assessing alignment with the GBF

We assessed *conceptual* and *operational* alignment between SoN metrics and the GBF headline indicators, using definition and descriptions in SoN documents (8, 10), and the metadata for the GBF indicators (7), as well as scientific publications for relevant indicators, standards and datasets (e.g., 12-14, 16). It should be noted that the SoN guidance is meant to be iterative and updated as new methodologies emerge, while the metrics stay consistent. The version currently assessed for the SoN metrics is from February 2026 for the public consultation.

- To assess conceptual alignment, we reviewed metric or indicator intent or purpose, including the focal aspects of biodiversity, core concepts, and key terms and definitions (from refs 3, 7, 8, 10).
- To assess operational alignment, we examined the data and methods used to estimate the indicator/metric, the scale and units of measurement, across different levels of granularity for SoN metrics, or recommended disaggregations for GBF indicators (e.g. by ecosystem type for A.2). This included considering how metrics operate across different spatial scales, including site-level applications

versus broader ecosystem or landscape-level assessments. This includes the capacity for data to be shared between indicators. We also compared baselines for measuring change.

- The two dimensions were combined to develop an alignment scale (from highest at the top to lower at the bottom in Table 3). We assessed alignment for each SoN metric with the most related GBF indicators individually, and then the sets as a whole to evaluate gaps and opportunities. For all SoN metrics except *ecosystem condition*, site and landscape metrics are calculated in the same way, using the same data sources, so were evaluated together. For *ecosystem condition*, we evaluated site and landscape metrics separately, as they are conceptually different, aiming to measure different aspects of condition at different scales, and are measured using different approaches and data.

Table 3. The combination of conceptual and operational assessment provided four categories of alignment, which rank from highest (top) to lowest (bottom) alignment. The righthand column shows the key results of the analysis for pairs of SoN Metrics and GBF indicators, with the SoN granularity level in brackets.

Alignment level	Conceptual alignment	Operational alignment	Use in practice	SoN – GBF (granularity level)
Fully aligned	Same intent, definitions, concepts	Same methods, data, outputs	Interchangeable, as essentially the same metric	Ecosystem extent & A.2 (all)
Substantively aligned	Similar intent & core concepts	Some differences in method, scope, or scale	Measuring the same aspect of nature, with minor differences; comparable with interpretation	Extinction risk & A.3 (all)
Methodologically aligned	Different intent, core concepts or definitions	Some shared data or methods	Similar methods but different purpose, so not directly comparable	Ecosystem condition & A.1 (High) Ecosystem extent & A.1 (High)
Potential for alignment	Some conceptual links across intent or definitions	Potential for shared data or methods with further clarification or development	With adjustment would align across methods or data	Species abundance & A.3 (med-high), A.4 (high), Living Planet Index (Med-high), Ecosystem condition & A.1 (med)

2 Technical assessment of indicator alignment

2.1 Results summary

We found that two SoN metrics had full or substantive alignment with GBF headline indicators (Table 3 and Figure 3), enabling streamlined analysis, monitoring and reporting on biodiversity for ecosystem extent and species extinction risk. The SoN metrics for ecosystem condition and species populations do not align directly with any GBF headline indicator but are methodologically aligned or have potential for methodological alignment to GBF headline, component and complementary indicators. The GBF monitoring framework lacks headline indicators for ecosystem condition and species populations, although the concepts are covered by some component and complementary indicators (9), which were rarely used by parties in their 7th National Reports (6). Below we report on alignment by SoN metric.

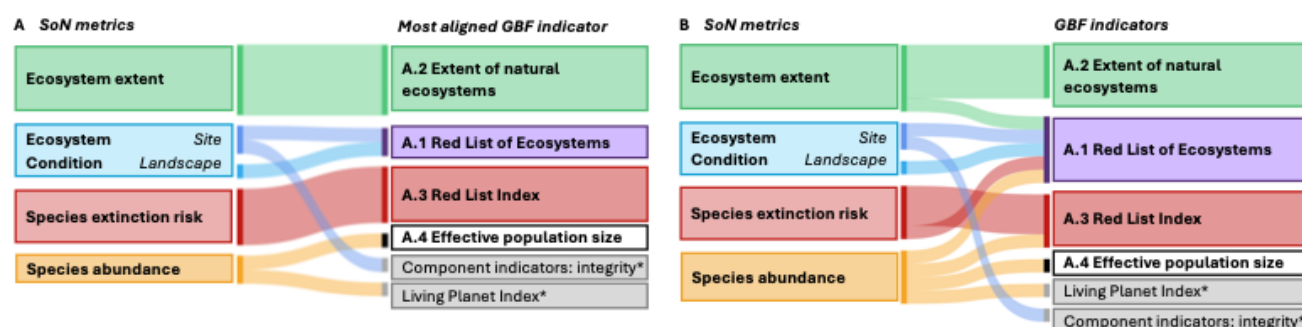


Figure 3. Alignment of NPI SoN metrics with (A) the most aligned GBF headline and component indicators, and (B) all aligned or potentially aligned headline and component indicators, with component indicators marked in grey and with an asterisk; weight indicates levels of alignment from Table 3 (thick = full or substantive alignment, thin = methodological or potential for methodological alignment).

2.2 Ecosystem extent

The SoN metric *ecosystem extent* is fully aligned with **GBF headline indicator A.2 extent of natural ecosystems**, used for GBF Goal A and Target 1, and with elements of Goal A. It aligns strongly both conceptually and operationally, across all granularity levels. The same data sources could be applied interchangeably between the SoN metric and GBF indicator. Notably the GBF headline indicator covers the associated elements in Goal A (9) (Annex), making the SoN metric alignment strongly aligned with Goal A and the GBF indicator.

The SoN metric has full conceptual alignment with the GBF goals, target and indicators. The intent of both is to measure change in the extent (also referred to as distribution or area) of different types of ecosystems, including both increases and decreases. The implied NPI definitions of ecosystem extent, ecosystem type (8, 10), natural ecosystems and anthropogenic ecosystems, based on the Global Ecosystem Typology, align with those specified in the GBF glossary, and used in the GBF metadata for indicator A.2 (7).

The SoN metric *ecosystem extent* is fully aligned methodologically with GBF indicator A.2 across granularity levels. The metadata for GBF indicator A.2 recommends using an ecosystem accounting approach to estimate gains and losses in extent, as does the SoN metric. At the preparatory level, the SoN metric aligns only with the basic form of the GBF indicator A.2, reported as percentage natural vs anthropogenic, with no further disaggregation by ecosystem group or biome. This is the least informative version of both the SoN metric and GBF indicator in terms of biodiversity change. At medium granularity, the SoN metric has the same recommended level of the Global Ecosystem Typology (level 3 – ecosystem functional group). At high granularity the SoN has finer ecosystem resolution than the GBF indicator, at levels 5-6 of the Typology). However, this is the same level of detail recommended for ecosystem accounting and Red List of Ecosystems, thus aligning the SoN metric with the underlying data of GBF headline indicators A.2 and A.1 at high granularity. Using on existing Red List of Ecosystems assessments for data and information on ecosystem maps and descriptions can support at high granularity assessment.

A benefit of applying the high granularity approach described in the SoN metric guidance is its capacity to capture important biodiversity patterns, including rare, narrowly distributed or patchy ecosystems that are often poorly mapped. These include streams, small wetlands or snowpatches (29). Box 2 on page 8 of the NPI guidance addresses the issue by requiring higher granularity approaches for smaller sites. A combination of ecosystem maps, local expert knowledge, inference from indicative maps (such as the Global Ecosystem Typology) and/or fieldwork may be needed to ensure that such ecosystems are included in assessments, particularly when using lower resolution ecosystem maps (e.g. 100m). Ground truthing is required at medium and high for site-level SoN metrics.

SoN metric *ecosystem extent* is also *methodologically aligned* with **GBF indicator A.1 Red List of Ecosystems**, for high granularity and potentially medium granularity (depending on the ecosystem classification used). Red List of Ecosystems assessments underpin GBF indicator A.1 and include data on change in ecosystem distribution or extent to assess collapse risk. High granularity guidelines for the SoN metric apply level 5-6 of the Typology, while medium granularity uses levels 3 or 4. Level 4 (regional ecosystem subgroups) is the 'coarsest' level recommended for Red List of Ecosystem assessments, based on proxies for compositional differences of ecosystems (e.g. ecoregions). Level 4 is typically only applied for global assessments rather than national biodiversity assessments, where levels 5-6 (global or local ecosystem types) are preferred. The methods for calculating change are largely similar, although the timeframes differ: the Red List of Ecosystems assesses change over set time periods (e.g. 50 years) to allow a comparable estimate of risk between ecosystem assessments.

2.3 Ecosystem condition

No GBF headline indicator directly measures condition (or the related concept of integrity used in the GBF) and connectivity. The GBF monitoring framework did not include a dedicated measure for condition because many Parties felt this area needed further methodological work before an indicator could be adopted. The most closely aligned GBF headline indicator is **GBF indicator A.1 Red List of Ecosystems**, which includes change in condition in the ecosystem risk assessments that underpin the indicator. We therefore evaluated SoN metrics for ecosystem condition at site and landscape levels for alignment with underlying data needs for GBF indicator A.1, noting that none of the SoN metrics align fully or substantively with GBF indicator A.1. Several optional (component or complementary) indicators listed in the GBF monitoring framework relate to condition and connectivity, which we discuss below.

The overall intent of the SoN condition metrics and GBF indicator A.1 Red List of Ecosystems differ. A.1 is an indicator of collapse risk. While collapse risk is a function of change in ecosystem extent and condition, it places both in the context of how close the ecosystem type is to collapse. The SoN metrics for ecosystem extent and condition focus at site to landscape scales, and without context about how threatened the ecosystem type is, its proximity to collapse or priorities for actions to reduce risk; this would require additional guidance or elements to be captured in framework and standard prioritization steps.

The SoN condition metrics at site and landscape level are *methodologically aligned* with **GBF indicator A.1 Red List of Ecosystems** at high granularity, and potentially medium granularity. This is due to ecosystem classification levels, and recommended methods for the condition metric, which we analyse separately in the next sections. For both condition metrics, methodological alignment is limited by recommended ecosystem classification levels. As stated above (see ecosystem extent), the Red List of Ecosystems is applied at levels 4-6 of the Typology, preferably at levels 5-6 (global or sub-global ecosystem types). Level 4 (regional ecosystem subgroups) are derived by subdividing Level 3 ecosystem groups using proxies for compositional differences of ecosystems, such as ecoregions. Levels 5-6 of the Typology are used in high granularity assessments of condition metrics, whereas levels 3-4 of the Typology are used in medium granularity assessments. Preparatory granularity does not differentiate for ecosystem type or group, only natural/anthropogenic classes. Level 3 and 4 are unlikely to differ at the site or even landscape scale, unless crossing ecoregional boundaries. Thus, all tropical lowland rainforests, for example, would be treated the same, rather than differentiated by ecosystem type, along with compositional differences. This would be important when considering compositional and functional changes in different ecosystem types, particularly at the site level.

2.3.1 Ecosystem condition (site)

Ecosystem integrity, condition and degradation – broadly analogous concepts in the context of the GBF and SoN metrics – form a core concept across the GBF. Integrity and degradation are highlighted in Goal A of the GBF, Target 1 (plan and manage all areas to reduce biodiversity loss, including areas of high ecological integrity), Target 2 (restore 30% of degraded ecosystems) and Target 3 (protect 30% of land, water and seas). Definitions of condition (in the NPI documents and in SEEA EA), and integrity and degradation (terms used by the GBF and the Red List of Ecosystems) are well aligned across the SoN metrics for site condition, GBF and GBF indicator A.1 Red List of Ecosystems guidelines (IUCN 2024).

SoN metric *ecosystem condition* is *methodologically aligned* with **GBF indicator A.1 Red List of Ecosystems**, at high granularity, and potentially medium granularity (depending on the ecosystem classification and condition method used). This is due to ecosystem classification levels (see above), and recommended methods for the condition metric. Broadly, the approach to measuring change in condition (change in area of ecosystems per condition class) is similar to the approach used in Red List of Ecosystems assessments. Red List of Ecosystems assessments measure change in condition across two dimensions: relative severity of change, and extent of the ecosystem type affected, similar to the condition class approach proposed for the SoN metric. However, RLE does this across the whole distribution of the ecosystem type, rather than the at a site level, and measures change over fixed timeframes (historical change, the last 50 years or up to 50 years into the future).

High granularity specifications suggest using methods that draw on Red List of Ecosystems Guidelines (16) and UN SEEA Ecosystem Accounting guidance (13), which is largely compatible with the Red List of Ecosystems (17). For example, the Red List of Ecosystems guidelines provide principles for indicator selection, as well as practical examples (see table 11 in 16), while the SEEA EA guidance includes principles and a typology of condition indicators to guide selection (13, 18). These include that condition measures should generally be based on the simplest, most informative and direct variable; that any combination of two or more interdependent variables should be ecologically and mathematically justified, and based on robust, transparent rules; and that the use of additive composite indices to combine condition variables is discouraged, because they can mask important ecological changes.

Several aspects of the current NPI guidance (8) for medium granularity measurement of site condition suggest that methods for site condition metrics may align with needs of the Red List of Ecosystems or has potential for methodological alignment. Pressure-based methods are excluded from use, but potential datasets include composite indices; the former aligns with Red List approaches, but the latter would not, depending on the composite index method (17). Applying best practice described in the Red List of Ecosystems guidelines to medium granularity metrics, methods and datasets would strengthen alignment with the GBF monitoring framework, as would drawing on existing Red List of Ecosystems assessments for ecosystem descriptions, maps, and appropriate condition variables. The guidelines and existing Red List of Ecosystems assessments provide example indicators that could be applied in these contexts.

Several proposed methods for this metric at the preparatory granularity levels are also listed as GBF component and complementary indicators (2), which are optional for Parties to use, though few have made use of them (6). These include the Ecosystem Integrity Index and Mean Species Abundance. Because they use pressures (e.g. land-use or human modification indices) as proxies for condition, they are not recommended for medium or high granularity levels but are fully aligned with GBF optional indicators at preparatory granularity.

2.3.2 Ecosystem condition (landscape)

Ecosystem condition at the landscape level has a different intent from the site level and is measured using different metrics and methods. Landscape condition metrics focus on structural and functional connectivity between natural ecosystems across the landscape, including the site. Connectivity is a core concept in Goal A of the GBF and Target 3 (protect 30% of land, water and seas, including specifying that they are “well-connected”). The definitions of connectivity in the GBF and NPI documents are comparable. There is no GBF headline indicator for connectivity, although the GBF monitoring framework includes several connectivity-based indicators as optional component or complementary indicators (2). However, none of these is currently listed as potential methods for estimating the SoN metric ecosystem condition at landscape scales (8). Connectivity, or conversely fragmentation measures, can be included in the Red List of Ecosystems assessments (16), which underpin GBF indicator A.1 Red List of Ecosystems.

The SoN metric for landscape *condition* is *methodologically aligned* with **GBF indicator A.1 Red List of Ecosystems**, at high granularity, and potentially medium granularity. This is due to ecosystem classification levels (see above), and recommended methods for the connectivity metric. The Red List of Ecosystems guidelines (16) suggest a range of connectivity metrics with justification for how and why they are ecologically meaningful. These differ from those listed as example measures, but in principle could be used to guide selection of measures to estimate the landscape condition metric. Generally, following the Red List of Ecosystems guidelines would strengthen alignment and scientific robustness of this metric, and would provide consistency with the high granularity guidance for the site condition metric.

2.4 Species extinction risk

The SoN metric *species extinction risk* is **substantively aligned** with **GBF indicator A.3 Red List index**, due to alignment of intent, concepts and definitions, and application of similar or the same data in measurement. The metrics at site or landscape scale are largely the same so are discussed together, though see some minor differences listed below.

Goal A of the GBF seeks to reduce extinction risk and rate. The intent of GBF indicator A.3 *Red List Index* is to measure the overall level of global extinction risk of sets of species (i.e. how threatened they are on average), and in the rate at which this risk changes over time. The SoN metric species extinction risk seeks to measure the *contributions* of a site or landscape to the global extinction risk, and changing the trajectory of average extinction risk as measured by GBF indicator A.3. The key concepts of extinction risk are the same.

The underlying methodology and examples measures are also methodologically aligned, drawing on the same or similar datasets, in particular STAR, the Species Threat Abatement and Restoration metric, both estimated and calibrated (19), and LIFE, Land-cover change Impacts on Future Extinctions (16). They rely on similar or the same sets of species and data, in particular species comprehensively assessed in the IUCN Red list of Threatened Species (terrestrial vertebrates). All three use the same or similar species habitat maps (referred to as Area of Habitat maps), linked with landcover classifications and species associated with the IUCN habitats classification scheme¹, drawing on the IUCN Red List of Threatened Species database. Both A.1 Red List Index and STAR also use species risk categories from the IUCN Red List of Threatened Species database, while STAR also uses information from the same database on threats affecting listed species.

Data on threatened species (e.g. from the IUCN Red List of Threatened Species database) have been used in Red List of Ecosystems assessments (e.g. in South Africa (20)), providing a potential pathway to methodological alignment between the SoN metric for species extinction risk and GBF indicator A.1, but this remains under-explored. They may be considered at least conceptually related.

Relatively minor differences can be found in the guidance for site vs landscape extinction risk metrics, all having more demanding requirements for site vs landscape extinction metrics:

- 1) Spatial resolution of data (finer for the site metric)
- 2) The need to ground truth at medium granularity (not required for the landscape metric, except for high granularity)
- 3) Example measures: calibrated vs estimated STAR (for medium), and using species area of habitat or range maps for site

2.5 Species populations

The SoN metric species populations at site and landscape level are the same conceptually and follow similar approaches (with more demanding requirements for site vs landscape level), so are discussed together. This metric reports on the number and proportion of priority species with populations that are declining, slowing in decline, stable and increasing, and is intended to report on the health of populations of priority species.

The SoN metric species populations has potential for aligns conceptually with elements of GBF Goal A (“the abundance of native wild species is increased to healthy and resilient levels”). No GBF headline indicator that directly measures abundance, although it is address by component indicators. The SoN metric species populations has **potential for alignment** with several GBF headline indicators and component indicators. These include:

- *A.1 Red List of Ecosystems*, through data on change in key biota that play important functional roles in specific ecosystem types;
- *A.3 Red List Index*, through data on change in abundance or absolute abundance of species
- *A.4 Proportion of populations within species with an effective population size greater than 500* (an indicator of genetic diversity), through data on absolute abundance of species. Although genetic diversity was considered out of scope for the SoN metric set, A.4 relies on the proxy of population size to estimate the rate of loss of genetic diversity within populations.
- Component indicator, *A.CT.10 Living Planet Index*, which measures average trends in abundance in monitored populations globally, and the related component indicator *A.CT.11 Wild Bird Index*.

¹ Note that the IUCN Habitat Classification scheme differs from the Global Ecosystem Typology; the latter is a function-based classification, with meta-data including descriptions, conceptual assembly models and indicative spatial maps, which are lacking for the former.

In all cases, the guidance for the SoN metric requires further development and specification to align with data standards and best practice for each of these indicators, to become methodologically or even fully aligned. For example, the Living Planet index requires a population to be consistently monitored using the same technique for 3 or more years to be included in the database; thus the metric may align with the indicator at medium and high granularity levels (using relative abundance measures), and data collected through applying this metric could be contributed to the Living Planet Index database, if it complies with the accepted approaches. Similarly, trends in population size, and estimates of absolute population size, contribute to IUCN Red List of Threatened Species assessments that underpin GBF indicator A.3 *Red List Index*. This metric could potentially align methodologically with A.3 at medium and high granularity, if standards set out in the Red List guidelines (14) are adhered to, for example on defining populations and individuals, and accounting for sampling effort and detectability in monitoring. The Red list guidelines are also used in GBF headline indicator A.4 on effective population size.

The selection of priority species for monitoring for population trends is guided by a prioritisation process, outlined in the draft guidance (p12-14, 8). This relies in several places on the IUCN Red List of Threatened Species (which underpins GBF indicator A.3 Red List Index, and suggested methods for measuring SoN metric extinction risk), including risk status, species range maps and threats. The impacts of these dependencies on outcomes should be explored, such as dependence on a narrow set of data sources that can bias indicator outcomes (21), at the expense of local knowledge or other priority species (e.g. national, local or Indigenous).

3 Gaps, opportunities and ways forward

The analysis in this report shows areas of strong alignment, in particular relating to measurement of ecosystem extent and species extinction, but also reveals four key areas of difference between the NPI SoN metrics and the GBF monitoring framework (Figure 4): 1) inclusion of ecosystem risk or threatened ecosystems; 2) specified baselines, and 3) scope and spatial scale due to differences in use-case; and 4) the lack of GBF headline indicators for ecosystem integrity and population abundance. These gaps present opportunities, many of which will be considered after the peer-review process for SoN guidance updates. By adopting data standards and sharing standardised data generated from private sector assessments using the SoN metrics, the NPI SoN could greatly expand the amount and quality of standardised data available for existing indicators and potentially new indicators to fill those gaps, as well as improving alignment. This section discusses these gaps and opportunities and provides recommendations for increasing alignment.

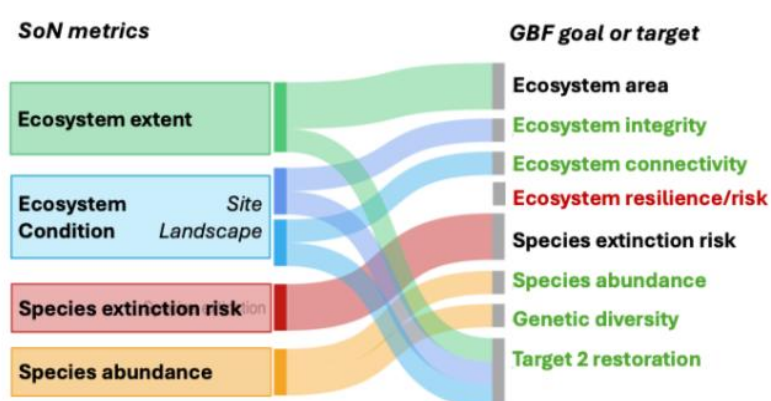


Figure 3. Alignment between NPI SoN metrics and goal elements of the GBF, where black shows coverage by GBF headline indicators represented by either GBF indicators or SoN metrics, showing aligned elements (black), opportunities (green) and gaps (red).

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3.1 Gaps in alignment with the GBF

Ecosystem collapse risk and threatened ecosystems: None of the SoN metrics aligns fully with GBF indicator A.1 Red List of Ecosystems, although ecosystem extent and condition are methodologically related at high (and potentially medium) granularity. A.1 Red List of Ecosystems is an integrative indicator that places degree change in extent and condition in the context of risk of ecosystem collapse. This is similar to the way in which changes in species abundance and distribution are criteria for assessing species extinction risk in the

Red List of Threatened Species, underpinned by ecological theory (25). The definition of nature positive (4, 5) includes resilience of ecosystems, similar to Goal A of the GBF (see Annex). Risk and resilience are “two sides of the same coin; collapse occurs when resilience is lost, and resilient systems are less likely to collapse” (26). Threatened ecosystems are also included in legal mechanisms in many countries, e.g. off-sets, spatial planning and regulation, so relate to transition risks, as well as dependency-related physical or systematic risks associated with collapse risk (27).

→ **Recommendation:** The inclusion of ecosystem risk in the NPI metric set, or the frameworks and standards in which they are intended to be embedded, would increase alignment with the GBF monitoring framework, and support prioritisation of action and monitoring for threatened ecosystems, in the way that extinction risk guides priorities for monitoring and action for threatened species.

Baseline: NPI guidance suggests a baseline of 2020 (8, 10), ostensibly to align with the GBF. However, the baseline for the GBF is the period prior to the adoption of the GBF, to allow impact of the GBF to be evaluated. The GBF defines “the period from 2011–2020, where data is available, as the reference period ... for reporting and monitoring progress in the implementation of the Kunming-Montreal Global Biodiversity Framework, while noting that baselines, conditions and periods used to express desirable states or levels of ambition in goals and targets should, where relevant, take into account historical trends, current status, future scenarios of biodiversity and available information on the natural state” (1). Countries are encouraged to report time-series going back as far as possible, and at minimum within the 2011-2020 window (the time-period under the Aichi Targets of the Strategic Plan for Biodiversity). The issue of baselines is further complicated by different timeframes for assessing change in specific GBF indicators, which typically take a longer-term view of biodiversity change, both past and future: the Red List of Ecosystems measures change over multiple timeframes (e.g. 50 years, and since industrialisation, ca. 1750 (16)), and the Red List of Threatened Species based on species biology (14, 25).

→ **Recommendation:** To strengthen alignment, the SoN metrics could adopt a baseline window similar to the GBF or use a pre-impact baseline (as per p8, 8) rather than a fixed arbitrary baseline to assess impact of actions to halt and reverse biodiversity loss. All choices of baselines should be justified, as stated in the NPI guidance: “there should be transparency regarding the rationale for its selection”.

Use case differentiation – scope and spatial scale: The SoN metrics are primarily designed for application at site to landscape scales, supporting decision-making by private sector actors and local managers. In contrast, GBF headline indicators are intended to operate at broader spatial scales, including across entire ecosystem types, species’ full ranges, and at national to global levels. These differences in use-case are reflected in spatial resolution requirements. The SoN metrics apply more stringent and explicit guidance on spatial resolution (e.g. ~10 m for ecosystem extent and condition), enabling fine-scale, decision-relevant insights. In comparison, GBF indicators do not prescribe specific spatial resolutions, reflecting their focus on aggregated, multi-source datasets compiled for national and global reporting. While the species extinction risk metrics bridge site and global scales —by estimating site-level contributions to overall extinction risk using approaches such as STAR or LIFE (4, 19) — these rely on assumptions about contributions of different sites, actions and actors. Equivalent approaches are not yet well established for ecosystem-level data (e.g. from Red List of Ecosystems or ecosystem accounts), limiting the ability to consistently translate site-level condition or population data into national or global indicators.

→ **Recommendation:** Different scopes and scales of measurement are appropriate for different decision-making contexts. This highlights both a key strength of the SoN metrics in providing granular data, and a gap in methodologies needed to systematically scale these insights to align with GBF reporting frameworks. The recommendations in this report on strengthening and showcasing alignment across these scales will help fill this gap.

3.2 Opportunities for filling data and indicator gaps in the GBF

The NPI SoN metrics cover two elements that are important in the GBF goals and targets – trends in species populations and ecosystem condition – but not directly represented in the GBF headline indicators. These are recognised gaps in the headline indicators of the GBF monitoring framework (9), which sought to balance a practical and manageable number of headline indicators with coverage of key aspects of the GBF, as well

as feasibility in terms of established methods and available data. In particular, the SoN metric specifications at high granularity have the potential to build improved methods and investment in ecosystem-specific approaches for measuring ecosystem condition, which could help to develop standardised databases that support local, national and global monitoring. Similarly, increased investment in monitoring of species abundance could fill gaps that hinder the Living Planet Index (22) and related national indicators (e.g., 23, 24). This requires guidance that aligns with existing standards, such as the Red List of Ecosystems (16), UN SEEA Ecosystem Accounting (13), the Red List of Threatened Species, the Living Planet Index and other established biodiversity data platforms, such as GBIF (the Global Biodiversity Information Facility, <https://www.gbif.org/>), as well as development of data infrastructure to compile, house and present data. Such efforts could support uptake of the Red List of Ecosystems and SEEA Ecosystem accounting; although these underpin GBF headline indicators, they are relatively new frameworks and used in less than a third of 7th National Reports (6).

→ **Recommendation:** Align guidance with existing standards and scientific best practice for measuring ecosystem condition and species abundance that underpin headline indicators, and other established platforms for biodiversity data.

Second, many actors applying the NPI SoN metrics will undertake actions seeking to contribute to nature-positive outcomes. As well as contributing to achieving the goals and targets of the GBF, these projects could contribute data to indicators and databases that measure progress. This is particularly the case for Target 2 on restoration, which covers a wide range of actions from reducing threats (e.g. reducing invasive species or pollution) or restoring processes (such as tidal flows) to improve the condition of degraded natural ecosystems, and restoring ecosystems where they have been transformed. Actors can contribute to global databases, such as the FAO's FERM registry (<https://ferm.fao.org/>), and/or national databases, to support national and global reporting on GBF indicator 2.1 for Target 2. Actions to reduce pollution and impacts and spread of invasive species also contribute to Targets 7 and 6 respectively, though not their indicators, which address only narrow aspects of the targets (9). Actions may include other effective area-based conservation measures (OECMs), which form part of GBF headline indicator 3.1 on protected and conserved areas (7). OECMs are defined as areas '*governed and managed in ways that achieve positive and sustained long-term outcomes for the in situ conservation of biodiversity*', and can include private protected areas and related mechanisms (28).

→ **Recommendation:** Align guidance with existing standards and scientific best practice for reporting on actions for biodiversity.

Finally, the potential for data collected by actors as they apply the SoN metrics and underlying standards can only be reached if these data are shared openly, with governments, national and global data infrastructure (e.g. GBIF), and, where relevant, Indigenous traditional owners.

→ **Recommendation:** These are outlined in the NPI draft guidance, with link to associated guidelines developed by TNFD and others. Ensuring this guidance is followed will help strengthen global monitoring capability, data availability and on-ground outcomes.

3.3 Summary of recommendations to strengthen alignment

This analysis provides the following recommendations for strengthening alignment of the SoN metrics with the GBF indicators:

1. **Baseline:** adopt wording and concepts in the GBF for the reference period 2011–2020, rather than 2020, taking into account historical trends on the natural state; provide additional guidance on the justification of choice of baseline rather than adopting a fixed baseline.
2. **Ecosystem collapse risk and threatened ecosystems:** include ecosystem risk in the NPI metric set, and/or in the prioritisation or screening steps in the frameworks and standards in which they are intended to be embedded. This would help prioritise monitoring and action for threatened ecosystems, increase data availability and improve on-ground biodiversity outcomes aligned with Goal A.
3. **Extent:** apply high granularity approaches where possible, to capture important biodiversity patterns, including rare, narrowly distributed or patchy ecosystems that are often poorly mapped, by using local knowledge, indicative distribution maps (e.g. the Global Ecosystem Typology) and/or field work in

conjunction with ecosystem maps (as recommended at medium and high granularity level); draw on existing Red List of Ecosystem assessments for ecosystem maps and descriptions, and to prioritise monitoring and action.

4. **Condition:** align guidance for condition metrics with best practice in Red List of Ecosystem Guidelines (16) for selecting appropriate variables for measuring condition and combining variables into condition scores or classes; draw on existing Red List of Ecosystem assessments for data and information on ecosystem maps, descriptions and condition measures, and to prioritise monitoring and action.
5. **Species populations:** specify standards for data collection and analysis that adhere with guidelines and best practice in the Red List of Threatened Species guidelines that underpin GBF headline indicators A.3 Red List Index and A.4 effective population size, and component indicator *Living Planet Index*.
6. **Align with other data standards for biodiversity and action,** including standards for GBF indicators for restoration and protection, and biodiversity data platforms such GBIF, to capitalise on data gathered when applying NPI SoN metrics.
7. **Share data** to build global monitoring capability, making data available on open access platforms.

4 Conclusion

Overall, two core indicators of the SoN metrics – ecosystem extent and species extinction – have strong alignment with the GBF monitoring framework; with guidance updates, alignment for ecosystem condition and species populations could be strengthened to support monitoring across scales and use-cases, from site-level assessments relevant to corporate decision-making, to broader ecosystem-level insights that support national and global reporting. This could help fill important gaps in the GBF monitoring framework, particularly by providing fine-scale data that can complement and potentially contribute to headline indicators, provided these are collected using standards comparable with those that underpin GBF indicators. Data collected using SoN metrics could also contribute to new indicators for ecosystem condition, filling a recognised gap in the GBF monitoring framework. However, a key gap remains in the absence of an equivalent metric for ecosystem collapse risk, limiting full alignment with GBF indicator A.1 and constraining the ability to comprehensively assess ecosystem resilience and risk.

If the recommendations to strengthen alignment are applied, the SoN metrics could create a bridge between private and public sector reporting: company-level disclosures on impacts and dependencies can feed into national monitoring efforts, and supporting coherence with GBF Target 15 on business reporting. In particular, drawing on existing standards and best practice for monitoring biodiversity, such as the Red List of Threatened Species Guidelines (14), Red List of Ecosystems Guidelines (16) and UN SEEA Ecosystem Accounting standards (13), will allow the SoN metrics to build on decades of scientific research and practice, as well as contribute to ongoing monitoring efforts and publicly available biodiversity data and knowledge. Capitalising on the overall broad alignment between the SoN metrics and GBF monitoring framework, while addressing opportunities and gaps, will strengthen the overall consistency and coherence between private and public sector monitoring frameworks, and the contribution of the SoN metrics to national and global reporting on biodiversity.

5 Acknowledgements

Contributors: Rachel Martin (Nature Positive Initiative, University of Oxford), Gavin Edwards and Emma Marsden (Nature Positive Initiative), Jillian Campbell (CBD Secretariat).

The author thanks the following for discussion: Tony Chi, Tina Parkhurst, Brendan Wintle, Billy Geary, James Nolan (The University of Melbourne), EJ Milner-Gulland (University of Oxford).

6 Annexes

Annex 1. Elements of Goal A and associated GBF headline indicators and SoN metrics

Association between each of the elements of Goal A, simplified from Affinito et al. 2025 (9), and most closely related GBF headline indicator and SoN metric. GBF indicators marked with an asterisk were considered to provide only partial coverage the element (9).

Goal A element	GBF headline indicator	SoN metric
The integrity of all ecosystems is maintained, enhanced, or restored	A.1 Red List of Ecosystems*	Ecosystem condition (site)
The connectivity of all ecosystems is maintained, enhanced, or restored	A.1 Red List of Ecosystems*	Ecosystem condition (landscape)
The resilience of all ecosystems is maintained, enhanced, or restored	A.1 Red List of Ecosystems	—
The area of natural ecosystems is substantially increased by 2050	A.2 Extent of natural ecosystems	Ecosystem extent
Human induced extinction of known threatened species is halted, and, by 2050, the extinction rate and risk of all species are reduced tenfold	A.3 Red List Index	Species extinction risk
By 2050, the abundance of native wild species is increased to healthy and resilient levels	—	Species populations

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