# Measuring Nature-Positive

Setting and implementing verified, robust targets for species and ecosystems

Technical Source document

## Consultation Draft

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## About this document

This document presents IUCN's proposed contribution to the process by which society, in particular companies, can contribute to species and ecosystem goals comprised in the Kunming-Montreal Global Biodiversity Framework (KMGBF) and the Sustainable Development Goals. It builds from a previous Working Paper presented at the IUCN Leaders Forum in Jeju, South Korea in October 2022. The purpose of this document is to enable consultation by IUCN membership, Commissions and the private sector, with the intent that a final version will be presented to the Union during the World Conservation Congress in 2025. Components of the document will also be accessible as specific technical contributions to biodiversity risk and opportunity disclosure, target setting and investment mechanisms under development following the KMGBF agreement.

Several key components are ready to be piloted and tested, others require further development and consultation. IUCN Members, private sector partners and government agencies interested to collaborate in the further refinement of this approach are urged to contact the IUCN secretariat.

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# Contents

# 0. Executive summary

The purpose of IUCN's Measuring Nature-Positive approach is **to support and enable effective delivery of societal goals for** species and ecosystems to the Kunming-Montreal Global Biodiversity Framework (KMGBF) and the Sustainable Development Goals (SDGs). These contributions will be made through the collective efforts of governments, civil society and companies**.**

**This paper is focused on a segment of the approach that will allow companies to identify, register and report on** measurable, verifiable Nature-Positive outcomes, for species and ecosystems, **in a practical, verifiable and consistent manner**. This will **support the broader goal of Nature-Positive as stated in the Global Goal for Nature**, which covers a wide range of additional components of nature and their associated processes. It also describes how the approach is useful for government and civil society.

IUCN's **approach** focuses on two key and complementary elements of the KMGBF:

- Contributions to **stemming biodiversity loss through reducing species extinction risk**, measured using the Species Threat Abatement and Restoration (STAR) metric. STAR combines species diversity, range restriction and threat status data taken from the IUCN Red List of Threatened Species™ to highlight where the opportunities for interventions to reduce species extinction risk are greatest.
- Contributions to **biodiversity recovery through ecosystem conservation and restoration** will be measured using an ecosystem extent and condition metric.

**Key elements** of IUCN's Measuring Nature-Positive approach include:

- Ambition commensurate with global goals
- Metrics that allow aggregation across investment portfolios, company divisions, geographic scales, sectors, trade flows and value chains
- Scope that encompasses the whole value chain and an extended mitigation hierarchy (ensuring that business impacts are avoided, mitigated, and compensated), including systemic transformation of companies' relationship to nature
- A fixed and measured baseline
- Measurable steps towards defined targets, with timeframe, and regular monitoring and verification
- Mainstreaming considerations of nature across companies' structures and processes
- Compatibility and complementarity with existing and planned corporate disclosure, reporting and compliance processes
- Integration with the broader Nature-Positive approach across the living and non-living components of nature, climate and social justice

In developing this approach, IUCN has built on **Resolutions and Recommendations** from its membership, from prior experience supporting companies to improve management of biodiversity, and thought leadership from IUCN Commissions, academia and civil society organisations such as **Science Based Targets Network** (SBTN), business-civil society coalitions such as the **Taskforce on Nature-related Financial Disclosures** (TNFD) and business groups such as **Business for Nature** (B4N) and the **World Business Council on Sustainable Development** (WBCSD).

The approach seeks to embed consideration of **social equity**, and is fully aligned with key IUCN principles and resolutions relating to rights and equity, such as the **Nature-based Solutions (NbS) Standard**. The approach is also aligned with the IUCN Commission on Ecosystem Management's

Impact Mitigation and Ecological Compensation Thematic Group (IMEC) Technical Paper on Nature-Positive. The approach recognises the **fundamental importance of the mitigation hierarchy, and is aligned with principles for Net Positive Impact,** where company actions go beyond delivery of the mitigation hierarchy and deliver supplementary positive impacts on biodiversity.

The definition of Nature-Positive used here is taken from the Nature Positive Initiative Partnership (NPIP) and the approach is consistent with the principles developed by NPIP.

IUCN's Measuring Nature-Positive approach is consistent with the **methods for assessment and target setting for biodiversity** currently being developed by the Science Based Targets Network, and both the species and ecosystem metrics proposed or under development described in the approach are consistent with the species extinction and ecosystem core metrics in the TNFD framework. The approach could also provide a means of measuring outcomes from innovative financial mechanisms such as **biodiversity credits, sovereign debt restructuring instruments and impact bonds**.

The approach presents a summary of actions for **three categories of company:**

A. **Companies with opportunities to affect land-use decisions through their own management authority. For these companies, biodiversity is within their direct sphere of control.**
B. **Companies with value chain connections to land holdings but for which the company does not have direct authority over land-use decisions.**
C. **Finance companies with portfolios that contain combinations of Categories A and B.**

**The recommended sets of actions – or 'pathways' – for delivery of Nature-Positive contributions for these categories of companies are presented in draft form in the paper. They will be further developed, through piloting collaborations, to allow companies to:**

1) Register and publicly commit contributions to the KMGBF, and identify and 'score' where on the pathway they are;
2) Screen their value chains and investments, including operations, land holdings, commodity sourcing, downstream impacts and portfolios for opportunities to align better with Nature-Positive;
3) Estimate a biodiversity baseline, which includes both historical and ongoing impacts;
4) Define SMART objectives and, using the approach described here, assess performance measures or KPIs to drive actions that will improve positive and reduce negative impacts;
5) Decide on, design and deliver interventions (informed by data provided and building upon the activities already identified as Biodiversity Finance Eligible Activities by the International Finance Corporation);
6) Ensure regular monitoring, verification and disclosure of progress; and
7) Allow the assessment and reporting of contributions made by companies, compared to a baseline, to societal goals, disclosure frameworks and target-setting protocols, and to Nature-Positive.

**Consultation and review process**

The first stage of the consultation process was through a restricted circulation of the working paper (v 0.1) to partner institutions in August and September 2022 ahead of the IUCN Leaders Forum meeting in October. This resulted in over 350 separate comments including from: Convention on Biological Diversity Secretariat, IUCN Secretariat, Commission on Ecosystem Management's Impact Mitigation and Ecological Compensation (CEM IMEC) Group, SBTN, WBCSD, Business for Nature, and WWF International.

The revised version of this paper was presented at the IUCN Leaders Forum held in October 2022, Jeju, Republic of Korea (Table 3). Additional edits were made based on the comments received through the restricted circulation, and discussions held at the IUCN Leaders Forum.

Over the last six months, further commentary from IUCN Council and Commissions, and from the Nature Positive Initiative Partnership have been incorporated. The present version will be available for review by the wider IUCN membership from November 2023.

# 1. Background and purpose

The term 'Nature-Positive' is increasingly gaining traction within discourse on policy and private sector commitments to biodiversity conservation (e.g. Milner-Gulland, 2022; S. zu Ermgassen et al., 2022). Many businesses (including State-Owned Enterprises)[1] and non-state actors[2] have expressed interest in becoming Nature-Positive, and governments[3] and multilateral organisations[4] are increasingly using the term.

Originating from civil society, the wider Nature-Positive approach represents an aspirational, inclusive and intuitive summary of societal goals for nature, including the Convention on Biological Diversity (CBD)'s Kunming-Montreal Global Biodiversity Framework (KMGBF). It can be used by companies, government and civil society to mainstream and progress commitments. The growing enthusiasm for the Nature-Positive concept represents a promising opportunity, a means to accelerate and scale up the actions that are urgently needed to halt and reverse the loss of nature. However, without a clear definition and methods for operationalisation and monitoring, the term risks not being translated into concrete measurable actions and accordingly becoming diluted and used (intentionally or not) to enable 'greenwashing'.

Recognising this need and opportunity, and the timely context of the KMGBF and emerging regulations such as the EU Corporate Sustainability Reporting Directive, this document sets out a proposed approach by which IUCN can deploy its expertise, standards and data sets to support the delivery of measurable, verifiable Nature-Positive outcomes, for species and ecosystems. We anticipate that the approach will be used by companies to formulate and deliver robust, verifiable contributions to the KMGBF, and are working with corporate partners to refine the way in which they can most effectively apply the approach.

# 2. The biodiversity crisis and the Nature-Positive response

There is overwhelming evidence that human actions have caused and continue to cause pervasive declines in life on Earth (Díaz et al., 2019). Over the past half century, a growing human population coupled with rising per capita consumption (particularly in wealthy and middle-income nations) has placed ever more pressure on our finite natural resources. This has caused unprecedented declines

[1] See e.g. https://getnaturepositive.com/, https://www.wbcsd.org/Programs/Food-and-Nature/Nature/Nature-Positive

[2] See e.g. the Call to Action at https://www.naturepositive.org/naturecalltoaction

[3] See e.g. https://www.gov.uk/government/news/government-commits-to-nature-positive-future-in-response-to-dasgupta-review, https://www.consilium.europa.eu/media/50363/g7-2030-nature-compact-pdf-120kb-4-pages-1.pdf, https://www.leaderspledgefornature.org/

[4] See e.g. https://www.ebrd.com/news/2021/multilateral-development-banks-to-step-up-protection-of-nature.html#:~:text=Under%20the%20concept%20of%20%E2%80%9Cnature,and%20its%20services%20to%20people%E2%80%9D.

in biodiversity, degrading both nature and its contributions to people, and thus endangering the global economy, the welfare of future generations, and the health of our entire planetary system (IPBES, 2022; WEF, 2021; WWF, 2020). There is clear evidence that industrial economic activities, particularly animal agriculture and associated land-use change, are key drivers of biodiversity loss, and that the cost of this loss is not currently borne by the most damaging industries and their investors (Dasgupta, 2021; IPBES, 2019; Maxwell et al., 2016). In parallel, there is a gap of over US$ 700 billion in global biodiversity financing, while public money continues to be spent on perverse subsidies that degrade nature (Deutz et al., 2020).

This worsening crisis has prompted calls for 'transformative change' and 'integrated strategies' to 'bend the curve' on global biodiversity loss (Díaz et al., 2019; Leclère et al., 2020; WWF, 2020). These calls have found outlets in societal goals such as the Kunming-Montreal Global Biodiversity Framework (KMGBF) and the Sustainable Development Goals (SDGs).

The vision of the KMGBF is a world living in harmony with nature where "*by 2050, biodiversity is valued, conserved, restored and wisely used, maintaining ecosystem services, sustaining a healthy planet and delivering benefits essential for all people*." (CBD, 2021). In IUCN's view, this vision of the KMGBF should "*serve as a universal framework for action on biodiversity, [and] promote coherent action and synergies with related processes*." (IUCN, 2019).

Strategies to deliver the goals and targets of these global agreements must address the root socio-economic drivers of the crisis – in particular, through a transformational shift in markets and economic systems – whilst accounting for complex issues of equity and potentially competing development goals.

Momentum is building around net positive outcome goals for the KMGBF. These 'net' goals acknowledge that some nature will continue to be lost to generate necessary improvements in human welfare locally (e.g. through food systems and infrastructure), but that losses must be balanced by equal and additional gains (Maron et al., 2021; Milner-Gulland et al., 2021). This provides both the conceptual and policy basis for a clear, agreed, operational definition of 'Nature-Positive'.

Many governments already have in place biodiversity No Net Loss and Net Gain policies for particular sectors and circumstances (zu Ermgassen et al., 2019). With need for governments to deliver national contributions towards the KMGBF, demonstrating progress towards Nature-Positive may soon become a general regulatory requirement. In the interim, risk and reporting frameworks for corporates and financial institutions (e.g. the EU Corporate Sustainability Reporting Directive (CSRD) (particularly European Sustainability Reporting Standard Environment #4 on Biodiversity and Ecosystems (ESRS E4), the EU Taxonomy, the Global Reporting Initiative, the Sustainability Accounting Standards Board, the Principles for Responsible Banking, the EU Sustainable Finance Disclosure Regulation) are increasingly requiring measurement and disclosure of biodiversity footprints. The Taskforce on Nature-related Financial Disclosures (TNFD) is developing standards for companies that will recommend the use of existing spatially-explicit methods.

Nature-Positive approaches are an opportunity for companies, including the finance sector, to address the growing physical, transition and systemic risks (van Toor et al., 2020) from biodiversity loss. Transparency and advocacy initiatives raising consumer or investor awareness of companies' environmental impacts can create reputational risk for companies perceived as lagging on these issues, and an incentive for voluntary adoption (Lyon & Maxwell, 2007; Segerson, 2013; Suter et al., 2010). For example, NGO public campaigns surrounding the biodiversity impacts of palm oil have

played a role in establishing voluntary standards under the Roundtable on Sustainable Palm Oil (Khor, 2011; Ruysschaert & Salles, 2018). Just as investors and consumers are demanding 'deforestation-free' supply chains (CDP, 2014; Rothrock et al., 2019), the same may soon be expected for other types of environmental externalities such as waste and bycatch (Booth et al., 2021; Veleva & Bodkin, 2018). Nature-Positive commitments potentially create opportunities for improved access to investors, market share and prices, and thus positive incentives for voluntary commitments (Krause et al., 2021). Companies also have the potential to lead systemic improvements, for example through companies with large market power demanding higher standards from suppliers and partners, and those with leading environmental practice lobbying governments for regulatory reforms (Lambin et al., 2018, 2020; Österblom et al., 2022).

IUCN's own Commission on Ecosystem Management, through the Impact Mitigation and Ecological Compensation Thematic Group (IMEC) is producing a Technical Paper (Baggaley et al., 2023 *Nature-positive for business: Developing a common approach*) which lists principles, definitions and recommended actions for use in decision making by companies, governments and civil society. The IMEC approach considers all aspects of nature, and also humanity and the corporate world's dependencies on nature. The IMEC technical paper provides the framing for the use of this document, which then goes further in describing the approach and metrics that companies, including the finance sector, and governments can use to identify, prioritise, set targets for verifiable inputs to the KMGBF.

## 2.1. Definition of Nature-Positive

The Nature-Positive definition framed in the Global Goal for Nature paper (Locke et al., 2021), and expressed by NPI is:

> **Halt and Reverse Nature Loss by 2030 on a 2020 baseline, and achieve full recovery by 2050**
>
> Delivering the Nature Positive goal requires measurable net-positive biodiversity outcomes through the improvement in the abundance, diversity, integrity and resilience of species, ecosystems and natural processes.

The two components above are integral parts of this definition.

The definition of 'Nature-Positive' is informed by science, but delivery is a "whole of society" effort, with crucial contributions coming from companies, including the finance sector, civil society, including Indigenous peoples and local communities (IPLCs), and governments, including sub-national and local governance structures.

Given the recommendation of Milner-Gulland (2022), that we not dilute the concept of Nature-Positive, we recommend retaining this definition.

Underpinning this definition, and following Maron et al. (2021), Milner-Gulland (2022), and zu Ermgassen et al. (2022), several critical features of the wider Nature-Positive approach require emphasis:

## 2.2. Ambition

Overall, the wider Nature-Positive framing requires that there will be more nature a decade in the future than there is now (Figure 1). Human activities will continue to have some unavoidable negative impacts on nature, but these must be prevented and reduced as far as possible, and then appropriately compensated for to ensure overall gains.

## 2.3. Scope of impacts and actions

Progressing towards Nature-Positive requires a concerted effort across society to address the drivers of biodiversity loss. This necessitates that companies broaden their scope of action in two dimensions (zu Ermgassen et al., 2022).

First – the vertical scope – to think and act beyond their direct operational footprint, encompassing supply chain and end-of-life impacts. Second – the horizontal scope – to engage in sector-wide efforts to increase industry sustainability, working with other stakeholders and with government to improve regulatory frameworks and reform economic structures and incentives.

For example, the Science Based Targets Network Action Framework (SBTN, 2020) and the Mitigation and Conservation Hierarchy (Milner-Gulland et al., 2021) (Figure 1) both go beyond the traditional mitigation hierarchy (hitherto typically used for direct operational impacts), emphasising the need to consider the full value chain, and including additional steps to renew nature and transform systems, so as to drive sector-wide improvements that are greater than the sum of their parts.

## 2.4. A fixed and measured baseline

This ambition implies increases in nature relative to a static baseline, rather than the declining counterfactual that is often embedded in biodiversity compensation frameworks (Simmonds et al., 2022).

Delivery of verified contributions to Nature-Positive requires clear steps towards defined targets, with timeframes attached, and regular monitoring and verification. This ambition requires that the approach is founded on measurable gains, to avoid the risk that 'Nature-Positive contribution' simply comes to refer to any action that supports biodiversity (Milner-Gulland et al., 2022). While all such actions are to be encouraged, a much more robust and systematic approach is needed to ensure that global goals are met. Nature-Positive contributions should not apply to partial and inadequate compensation, which would run the risk of greenwashing.

To support this, robust metrics are needed which relate to the state of biodiversity and both positive and negative changes in that state, are spatially explicit, and can be attributed to an institution's actions.

The 'global goal for nature' (Locke et al., 2021), supported by many non-state actors, as well as SBTN's interim targets (SBTN, 2021), proposes 2020 as a baseline year, and that measurable progress in 'bending the curve' should be visible by 2030. This is in line with dates in the KMGBF.

Achieving ambitious Nature-Positive goals will require disaggregation of targets into tractable components that can be targeted by clear sets of cost-effective actions. In parallel, there is a need to assess how actions will add up to deliver gains at multiple scales (i.e. at institutional and societal levels).

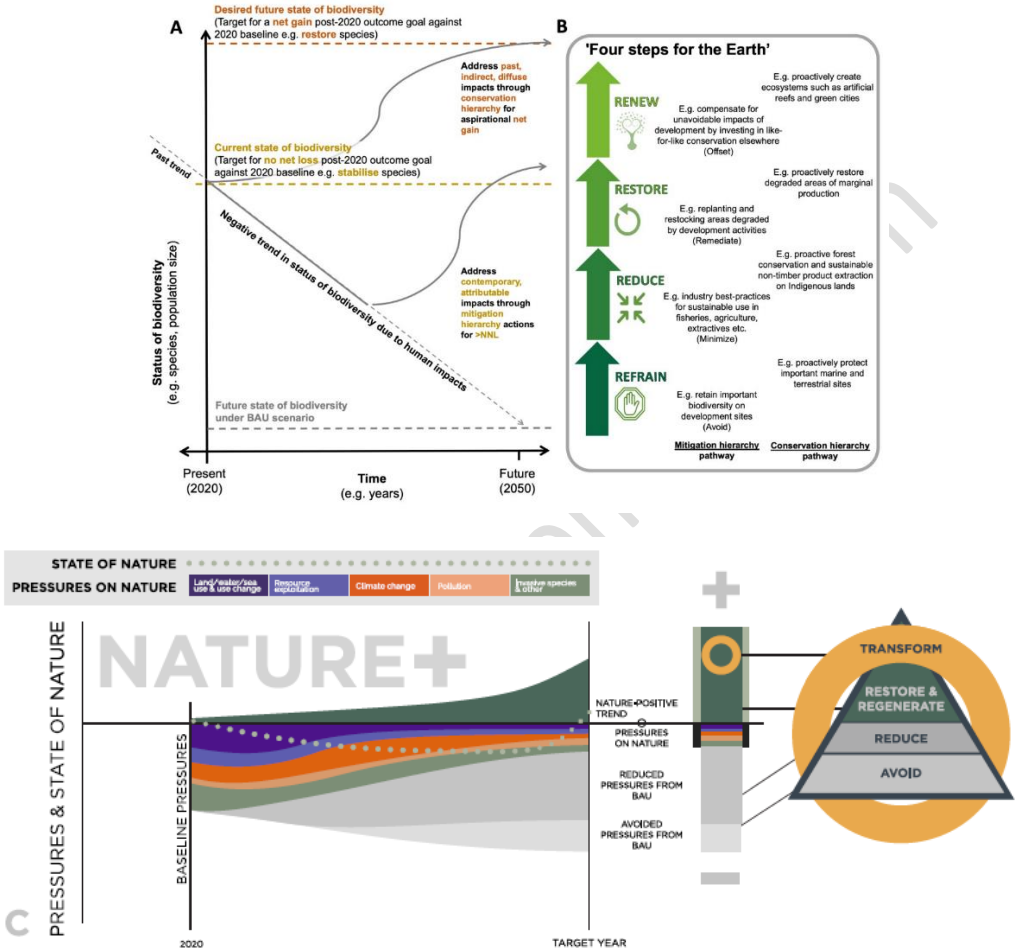


*Figure 1. 'Nature-Positive' requires that there will overall be more nature in the near future than there is at present. A and B (from (Milner-Gulland et al., 2021), the Mitigation and Conservation Hierarchy, offer a framework for mainstreaming and delivery of this goal, where the scope of commitments and actions goes beyond the traditional Mitigation Hierarchy for operational or site-based impacts and includes additional pro-active actions to renew nature and systems. C (from SBTN, 2020) shows a Nature-Positive scenario where the state of nature is net positive in that target year relative to 2020. This occurs when pressures on nature are rapidly avoided and reduced, restoration and regeneration begin to scale, and systems begin to transform to reduce drivers of nature loss. These actions form the basis for the SBTN Action Framework, shown at right.*

Parties to the CBD are expected to formulate national level targets (equivalent to Nationally Determined Contributions for climate (Convention on Biological Diversity, 2020)) that will collectively achieve the global target. Similarly, appropriate responsibilities need to be determined for companies across sectors and companies, in line with and contributing to achieving these national goals. This is not a straightforward task for climate, and still more challenging for biodiversity, but frameworks exist that can help to structure the approach. In addition to the Science-based Targets for Nature Initial Guidance for Business (Figure 1, SBTN (2020)), the Mitigation and Conservation Hierarchy (Figure 1, Milner-Gulland et al. (2021)) is applicable at all scales and by all actors for coordinating, prioritising and tracking the numerous actions that collectively contribute to Nature-Positive goals (Milner-Gulland et al., 2021).

### 2.5. Mainstreaming

For companies, including the finance sector, Nature-Positive alignment requires nature to be mainstreamed across all business processes, not considered as an add-on consideration after key decisions have been made. This requires embedding nature in organisational decision making via governance, strategy, risk management, metrics and targets (TNFD, 2022).

### 2.6. Integration across other components of nature, climate and social justice

To deliver the KMGBF's overarching vision of 'living in harmony with nature' (which implicitly acknowledges our inter-linked social and ecological systems), and avoid perverse consequences, Nature-Positive necessitates an integrated approach across relevant dimensions of nature and climate, as well as an equitable approach to achieve social justice. An integrated Nature-Positive approach means aligning with societal goals for *each* dimension of nature; it does not mean that different dimensions are substitutable.

In line with existing definitions, corporate Nature-Positive commitments should capture all key elements of biodiversity, and integrate across all relevant dimensions of natural and social systems, to promote synergies and minimise trade-offs (Milner-Gulland, 2022; S. zu Ermgassen et al., 2022). For example, a key component of this integrated approach is ensuring synergies with emissions reduction targets. Many actions companies should already take as part of their science-based climate strategies can also contribute significantly to halting and recovering biodiversity, particularly for companies with, or connected to, significant land-based footprints. Such companies should already be following the SBTi Forest Land Use and Agriculture (FLAG) guidance for estimating land-use impacts. For this reason, an integrated approach between Net Zero and Nature-Positive is at the heart of the approach (see Section 4.7).

IUCN's Global Standard for Nature-based Solutions (NbS) includes criteria relevant to ensuring that site-based actions also deliver positive outcomes for human well-being, while good practice principles are also available for ensuring no net loss for people as well as nature as part of biodiversity net gain activities (Bull et al., 2018; Jones et al., 2019), but further guidance is required for integrating equity at the scale of corporate targets and commitments (see Section 5.8). While other criteria within the NbS Standard are amenable to scaling, policy analysis and for target setting and delivery of societal goals, in particular KMGBF Targets 8 and 11, Criterion 3 (Net Gain for Biodiversity and ecosystem integrity) is clearly completely aligned with this approach. Further discussion of the alignment of the approach with NbS is in Section 4.6.

# 3. IUCN's role in delivering a Nature-Positive future

What does 'Nature-Positive' therefore mean for IUCN? The convergence of these opportunities and risks means it is timely for IUCN to develop a proposed approach by which to deploy its expertise, standards and data sets to support the delivery of Nature-Positive outcomes.

## 3.1. IUCN mandate and resources

IUCN is the only institution that brings governments and civil society together with one purpose: to advance sustainable development and create a just world that values and conserves nature. The Union's diversity, depth and reach give its decisions a powerful mandate and its actions profound impact. IUCN's over 1,400 Member organisations include States and government agencies at the national and sub-national levels, NGOs large and small, Indigenous Peoples' Organisations, scientific and academic institutions, and business associations. IUCN's expert Commissions are broad and active networks of 15,000+ scientists and experts providing IUCN and its Members with sound know-how and policy advice to drive conservation and sustainable development.

The approach is grounded in a series of Resolutions, Recommendations and Decisions from IUCN's Member organisations that establish the mandate and set the 'ground rules' for engaging with the business and finance sectors on nature. These include, among others:

- WCC 2016 Res 059 – IUCN Policy on Biodiversity Offsets
- WCC 2016 Res 066 – Strengthening corporate biodiversity measurement, valuation and reporting
- WCC 2016 Res 067 – Best practice for industrial-scale development projects
- WCC 2016 Rec 102 – Protected areas and other areas important for biodiversity in relation to environmentally damaging industrial activities and infrastructure development
- WCC 2016 Rec 110 – Strengthening business engagement in biodiversity preservation
- WCC 2012 Res 108 – The green economy and corporate, social and environmental responsibility
- WCC 2008 RES 056 – Rights-based approaches to conservation

More recently, the World Conservation Congress in Marseille passed WCC-2020-Res-116 which called for a strong commitment for a Nature-Positive outcome from the CBD post-2020 global biodiversity framework, with among other requirements, *"…. contains specific, measurable, achievable, realistic and time-bound targets and milestones for 2030 to halt and reverse the unprecedented loss of biodiversity and take urgent and transformative action to restore and conserve biodiversity for the survival and benefit of nature, people and planet."* This resolution also contains many other specific requirements, including mainstreaming of conservation contributions by the private and finance sector, that expressly linked with the overall Nature-Positive goal, the subsequent framing of the KMGBF and the desired outcome of the approach as described here.

IUCN's standards and data, and the tools and guidance based on these, already contribute significantly to improved decision making and positive outcomes for biodiversity, as evidenced by extensive use throughout the conservation community, a vast array of scientific papers, and the embedding of data products based on IUCN standards in key indicators including those for the SDGs and KMGBF. The key drivers for this are the quality, legitimacy and global coverage of key data products. The approach set out in this document draws on IUCN's standards and data products, notably the IUCN Global Standard for Nature-based Solutions, IUCN Natural Resource Governance Framework, The IUCN Red List of Threatened Species™, IUCN Green Status of Species, IUCN Red List of Ecosystems, World Database on Key Biodiversity Areas and World Database on Protected Areas –

and the metrics (e.g. Species Threat Abatement & Restoration metric), indicators (e.g. Red List Index) and tools (e.g. Integrated Biodiversity Assessment Tool - IBAT) derived from these. Other tools – such as PANORAMA – Solutions for a Healthy Planet and IUCN's Conservation Planning – may support future implementation.

The approach also draws on IUCN's experience with biodiversity net gain, or Net Positive Impact (NPI) on biodiversity, a target for project outcomes in which potential impacts on biodiversity caused by the project are outweighed by the actions taken to avoid and reduce such impacts, restore affected species and ecosystems, and offset any residual impacts. NPI was the subject of a considerable body of work through the NPI Alliance which ran until 2015, with lessons learned incorporated in WCC 2016 Res 059.

*Table 1. IUCN standards and data sources which have informed and will support the approach*

| Existing IUCN Resource | Brief description | Relevance to Nature-Positive |
|---|---|---|
| **The IUCN Red List of Threatened Species and STAR metric** | The world's most comprehensive information source on the global conservation status of animal, fungi and plant species; and the contribution that spatially-explicit conservation investments can make to reducing species extinction risk. | Provide underlying data for risk screening, footprinting and potential gains from interventions |
| **IUCN Red List of Ecosystems, and underlying Global Ecosystem Typology** | A typology for the world's ecosystems and a set of categories and criteria for assessing the risks to those ecosystems, and to focus attention on where ecosystems are threatened. | Provide the basis for ecosystem-based metrics |
| **IUCN Global Standard for Nature-based Solutions** | Self-assessment that consists of eight criteria and associated indicators, which address the pillars of sustainable development (biodiversity, economy and society) and resilient project management. | Provides foundational principles for high integrity projects |
| **IUCN Environmental and Social Management System (ESMS)** | A systematic procedure to check IUCN projects for potential adverse environmental and social impacts. Its purpose is to ensure that negative impacts are avoided or minimised to the extent possible, while positive impacts are promoted. | Provides tools and procedures to check for high integrity projects |
| **IUCN Green Status of Species** | The main objectives are: to provide a standardised framework for measuring species recovery; to recognise conservation achievements; to highlight species whose current conservation status is dependent on continued conservation actions; to forecast the expected conservation impact of planned conservation action; and to elevate levels of ambition for long-term species recovery. | Provides a complementary metric to STAR, with a robust method to set aspirational targets for species recovery for Nature-Positive at the appropriate spatial unit scale. A version of the GSS to support analysis of programmes to species recovery is under development. |
| **IUCN Natural Resource Governance Framework** | Created to provide a robust, inclusive and credible approach to assessing and improving natural resource governance | Provides tools and approaches for high integrity projects (particularly to enable process justice through good governance) |

| Existing IUCN Resource | Brief description | Relevance to Nature-Positive |
|---|---|---|
| | at multiple levels and in diverse contexts. | |
| **World Database of Key Biodiversity Areas, IUCN standard for the identification of Key Biodiversity Areas, and guidelines on business and KBAs** | *Guidelines on business and KBAs* have been developed by the KBA Partners to support companies in managing risk to biodiversity. They will be of use to business and certification scheme operators, financial institutions, civil society organisations and public authorities. They are applicable to companies' entire area of influence, as well as throughout the life cycle of the operation, from pre-feasibility to closure (and, where relevant, site rehabilitation). The Guidelines can also be integrated into responsible sourcing policies for goods and services, the production of which could have direct, indirect and cumulative impacts on KBAs. | Provide a key data layer for supporting understanding of business' biodiversity risks and opportunities |
| **PANORAMA – Solutions for a Healthy Planet** | Identifies and promotes examples of tested and replicable solutions in biodiversity conservation and broader sustainability issues. | Can support companies in planning and investing in interventions |
| **Conservation Planning Project Inventory** | A compilation of planning projects conducted or enabled by IUCN Species Survival Commission Specialist Groups. | Can support companies in planning and investing in interventions |
| **Restoration barometer, associated guide for governments, and IUCN Restoration Intervention Typology for Terrestrial Ecosystems** | Used by governments to track the progress of restoration targets across terrestrial ecosystems. | Underlying data and methods can support companies and other stakeholders to measure successful implementation of restoration-based interventions |
| **IUCN Green List of Protected and Conserved Areas, and associated Green List Sustainability Standard** | A protected or conserved area that reaches the IUCN Green List Standard is certified and recognised as achieving ongoing results for people and nature in a fair and effective way. Any site can join, and work its way towards achieving verified success, and then maintain the Standard or further improve. | Provide foundational data and methods for measuring conservation success (e.g. to support step 7 in the Nature-Positive pathway) |
| **IUCN Environmental Impact Classification of Alien Taxa** | A set of categories and criteria for assessing the magnitude of impacts to the environment from invasive alien species. Supports the identification of priority invasive species, and assesses results of management actions. | Can support companies in identifying priority invasive alien species within their operations and at sites that may require management measures to prevent their spread and impacts. It can also be used to assess the results of management actions. |
| **Ecolex database** | Database on environmental and natural resource management law. | Can support companies and NGOs to understand relevant environmental laws and company compliance with those laws to ensure high integrity |

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Table 1 demonstrates that IUCN has a range of established resources that are the building blocks of the approach. In order to deliver the same degree of functionality for identification of risks and opportunities, target setting and contribution delivery for biodiversity, other initiatives will have to create all these things from scratch, and hence will have a much less robust foundation and interoperability.

### 3.2. IUCN and measuring Nature-Positive

'Nature' is often used as a shorthand for biodiversity, but it is a broader concept that can encompass non-living components such as living natural resources (extractive resources), mineral and fossil resources, the physical and chemical attributes of water, soil and air, and can also be inclusive (or not) of humans and/or spiritual components (Coscieme et al., 2020). The definition of Nature is also highly variable across contexts and cultures. Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) defines Nature as 'the natural world with an emphasis on its living components… [including] categories such as biodiversity and ecosystems' and that the physical attributes of (e.g. soil, water) are often included within ecosystem classification (and therefore nature.)

Improvements in the condition of nature's non-living components, such as soil, water and air, and their associated natural processes will be required to underpin improvements in biodiversity – and *vice versa*. The non-living components of nature and their associated processes are not treated separately from the living components in the approach presented here, as IUCN's standards and data do not permit the development of metrics and targets for these components independently of the living components. The approach described here therefore aims to deliver a subset of possible Nature-Positive outcomes, in particular those for which IUCN data and standards are applicable. The IUCN approach presents metrics related to the change in status of species and ecosystems, and given that a major component of the approach focuses on ecosystems, impacts on ecosystems will include their non-living components in addition to the living components.

> Targets, monitoring and verification are key areas of contribution for IUCN, wherein IUCN's global data and metrics can provide a means of measuring and verifying contributions towards mitigating threats to species and ecosystems.

The approach presented here therefore focuses specifically on species and ecosystems as the components that must show measurable improvement. Given the limitations in both data and methods, it is not yet possible to incorporate biodiversity at genetic levels into the approach. Current innovations in this field (notably through the IUCN Species Survival Commission (SSC) Conservation Genetics Specialist Group) will likely allow expansion of the approach over coming years to incorporate genetic dimensions of biodiversity.

# 4. Vision, scope and planned outcomes for the approach

## 4.1. Vision

The approach presented here (referred to hereon as "the IUCN approach") aspires to deliver the following vision:

*Companies deliver significant, measurable and verified contributions to the KMGBF and the Nature-Positive Global Goal, specifically in reducing species extinction risk and risk of ecosystem collapse, in line with national commitments and with active participation from and benefit to governments and civil society.*

The proposed outputs, intermediate outcomes and long-term outcome of the approach are presented in Figure 2 below.

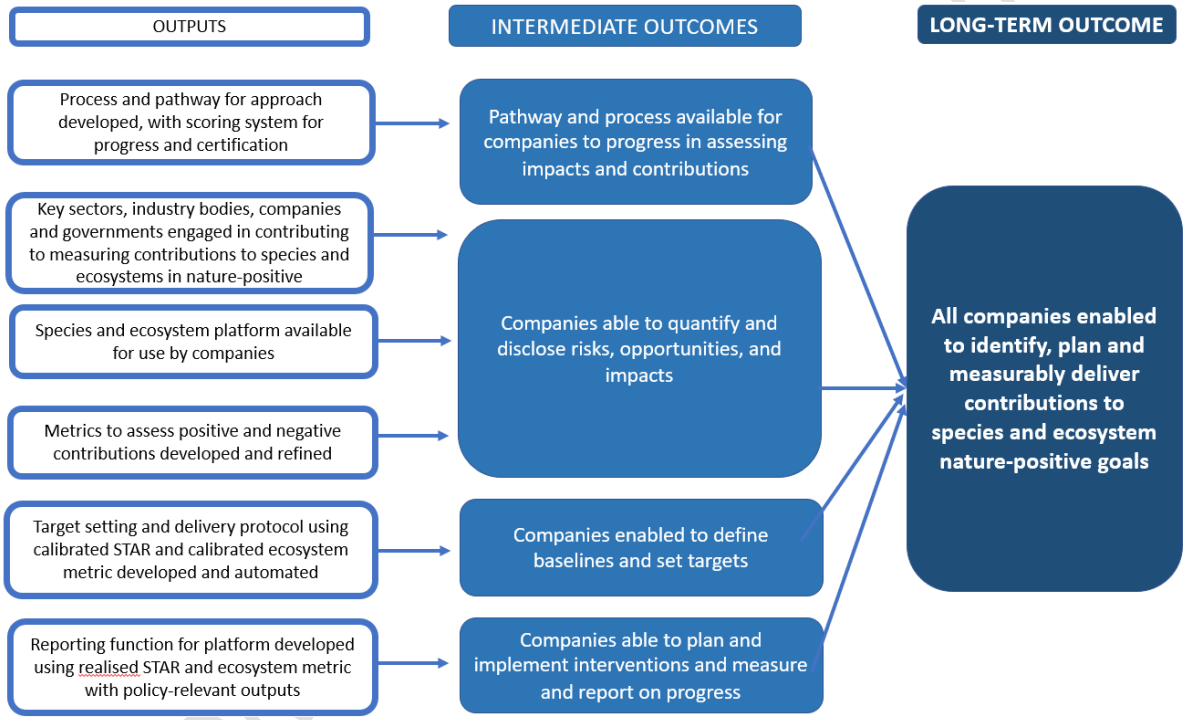



*Figure 2. Summary outputs, intermediate outcomes and long-term outcome for the approach.*

The aim is to ensure a process with **high integrity** (Section 5.6) that is founded on **strong avoidance and measurable biodiversity net gain** (Milner-Gulland et al., 2021).

## 4.2. Alignment with societal goals

The approach is intended to support and enable effective delivery of societal goals for species and ecosystems, through the collective efforts of governments, civil society and companies. This vision is intended to align with the KMGBF and other relevant targets under the SDGs.

The long-term vision of the Global Biodiversity Framework is "*Living in harmony with nature by 2050*". The desired impact of IUCN's approach is that the Global Biodiversity Framework is effectively delivered through the collective efforts of governments, civil society and companies.

Delivering societal goals for nature must involve non-state actors, and the business and finance sectors have a key role to play (Section 6). Quantitative contributions to the KMGBF goals and targets, including those for reducing species extinction risk and increasing the area and integrity of ecosystems, can be made by companies and financial institutions, working with local communities, NGOs and governments. Assessed outcomes can be calculated and aggregated as needed across geographical areas, investment sectors, spatial footprints and value chains. This document therefore focuses on the contribution that can be made by companies (for the sake of clarity, we include the finance sector as a subset of "companies" in this document). The consultation process for the approach will we hope enable our Members, including governments and civil society, to see how they can support, amplify and enable companies to deliver these contributions, and make their own very substantial contributions in complement to those of companies.

549 *Table 2. Policy goals regarding species and ecosystems which will be supported by the approach*

| Policy framework | Relevant goals |
|---|---|
| **KMGBF** | 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 |
| **SDGs** | Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss (SDG 15) (including specific targeting of preventing extinctions (Target 15.5)) |
| | Conserve and sustainably use the oceans, seas and marine resources for sustainable development (SDG 14) *(metrics for the approach initially cover the terrestrial realm, but are being further developed to encompass marine application)* |

550

551 Accompanying goals and targets included in the KMGBF relate to mechanisms to enable these
552 biodiversity-related goals to be delivered. Of particular relevance to the approach described here are
553 the following goals and targets, in that the approach described here provides a means to quantify
554 and track contributions to them. They include:

555 Goal D, calling for alignment of financial flows with the KMGBF,

556 Target 1, to reduce the loss of areas of high biodiversity importance,

557 Target 2, to promote effective restoration,

558 Target 3, to promote the effective conservation and management of areas of particular
559 importance for biodiversity, and the integration of this into wider landscapes,

560 Target 6, to reduce the impact of alien invasive species,

561 Target 7, to reduce the impacts of pollution,

562 Target 10, to sustainably manage agriculture, aquaculture, fisheries and forestry, where
563 business plays a very significant role,

564 Target 15, to encourage businesses to regularly monitor their impact on biodiversity,

565 Target 18, to reduce incentives and subsidies harmful to nature, and

566 Target 19, to increase financial resources for the delivery of the goals and targets.

567 ### 4.3. Scope and novel contributions

568 Section 3 above presents how IUCN's global standards and data can contribute to enabling
569 governments, civil society and companies to understand their connections to the living components
570 of nature (specifically species and ecosystems), and to be sure that the actions they undertake have
571 tangible positive outcomes. The IUCN approach is intended to support the many significant and
572 complementary actions mobilised by the wider Nature-Positive community, around companies and
573 finance target setting and reporting on nature as whole. Several existing Nature-Positive initiatives
574 already aim to help companies and finance institutions contribute to the KMGBF. These initiatives
575 help companies to identify starting points by providing principles and guidelines on integrating

biodiversity into corporate decision making, with consistent references to analysis of corporate impacts and dependencies, and target setting.

However, methods to measure, register and report on quantifiable, verifiable changes in the status of underlying biodiversity (and therefore contributions to the KMGBF), in a practical and consistent manner, are not yet available in forms that companies can use. The approach presented here is therefore complementary and additive to other Nature-Positive approaches in that it:

- Focuses on **species and ecosystems**, as these are components of biodiversity that are immediately accessible for measurement and quantification (see Section 3.2);
- Enables companies to assess **exposure to biodiversity impact risk**, and thereby identify ways to mitigate this risk;
- Enables companies to **quantify negative and positive contributions to societal goals**, using science-based metrics for species and ecosystems, thereby allowing assessments of **potential and delivered impacts across the globe**, and for those contributions to be compared with each other and aggregated at higher levels, for instance at country or sector level;
- Supports the delivery of contributions made through increase or reduction of threats to biodiversity across the realm of contexts where biodiversity occurs: land, freshwater and marine; pristine environments, protected areas, managed landscapes or urban and production areas;
- Builds on, yet goes beyond, the **mitigation hierarchy**, which provides an evidence-based and widely used framework for action that is already mainstreamed into environmental impact assessments for many sectors;
- Focuses on **quantifying positive and negative impacts to species and ecosystems, not on dependencies on nature**, which are generated from ecosystem services and are best measured by existing and complementary approaches;
- Enables companies (and their investors) to **assess where they are on the journey to Nature-Positive contributions with respect to species and ecosystems, and to register and track contributions** to global policy goals.

The assessment framework focuses on two key and complementary elements of the global goals:

- Stemming biodiversity loss through reducing species extinction risk; and
- Biodiversity recovery through ecosystem conservation and restoration.

The approach will provide practical, verifiable and comparable metrics, which can help to operationalise other existing pledges, processes and frameworks.

For companies, this means the approach builds on, but goes beyond, previous approaches such as biodiversity net gain. Key elements of the approach include:

- Ambition commensurate with global goals;
- Scope that encompasses the whole value chain and an extended mitigation hierarchy, including systemic transformation of companies' relationship to nature;
- A fixed and measured baseline;
- Measurable steps towards defined targets, with timeframe, and regular monitoring and verification;
- Mainstreaming of nature considerations across companies' structures and processes;

- Integration across the living and non-living components of nature, climate and social justice, the approach aiming to produce practical, verifiable, comparable and additive biodiversity-specific metrics, along with a registration and tracking platform; and
- Compatibility and complementarity with existing and planned corporate disclosure, reporting and compliance processes.

The current approach will enable companies to assess **contributions to global policy goals**, such as the proposed goals and targets of the Kunming-Montreal Global Biodiversity Framework (KMGBF). The fact that the contributions can be aggregated (for instance across corporate footprints, administrative units or portfolios) will enable the business community to engage with governments that are responsible for coordinating efforts to deliver these goals, using metrics that the governments and their policy instruments use. It **does not provide a means to audit or certify such contributions**; this functionality may be developed in the future. In addition, it is still under debate whether an individual company can claim to be "Nature-Positive" on its own, through some kind of comprehensive accounting process that has yet to be developed. For the moment, companies can contribute to a global Nature-Positive goal by demonstrating:

- that they have delivered verifiable Nature-Positive contributions across their measurable, attributable, contemporary sphere of influence (i.e. new and ongoing impacts within value chain; see Section 7 below) by adherence to the mitigation hierarchy;
- a proportional positive contribution to addressing historic, indirect and diffuse impacts and driving systemic change (i.e. beyond value chain investments, driving land/seascape and sector-wide transformations).

### 4.4. Alignment with existing regulatory, disclosure and guidance frameworks around Nature-Positive

Within this scope the approach will directly inform initiatives such as the Taskforce on Nature-related Financial Disclosures (TNFD) and the Science Based Targets Network (SBTN), regarding species and ecosystems (see Sections 3.2 and 4.4.1), while complementing other frameworks that enable stakeholders to assess their impacts on abiotic nature, such as the Taskforce for Climate-related Financial Disclosures and the Science Based Targets Initiative for climate (SBTi). The overall interaction between a given institution and species and ecosystems involves both impacts and dependencies, and tracking and managing risk associated with dependency on nature (via nature's contributions to people) is undoubtedly important. However, this is challenging and not currently within IUCN's core capacities, while other tools are already available to support this[5].

The approach will also build on and integrate a range of IUCN experience, methodologies and standards, as outlined in Section 4.6. This includes the ongoing, closely related work of the IUCN Commission on Ecosystem Management Impact Mitigation and Ecological Compensation Thematic Group, in particular its Nature-Positive Working Group.



[5] e.g. TESSA, InVEST, ARIES

655 *Table 3. Existing initiatives relevant to Nature-Positive alignment by companies, and how the approach can support or complement*

| Existing initiative | Description | How the approach can support or complement |
|---|---|---|
| Biological Diversity Protocol | A practical tool that contains guidance on setting boundaries for impacts, guidance on impact measurement, and accounting and validation. | The approach offers a simple framework for measuring and validating impacts that can provide inputs to biodiversity accounting using the Biological Diversity Protocol. |
| Business For Nature (BfN) | BfN provides companies with the key actions they can take to signal they are making meaningful contributions to help reverse nature loss and contribute to an equitable, Nature-Positive world, where positive impacts outweigh negative ones. The high-level actions include actions to assess, commit, transform and disclose. | The approach can provide a means of operationalising Business for Nature targets. |
| Capitals Coalition | Produced process-based guidance for companies to integrate natural capital inputs and impacts into corporate risk assessments, procurement, operational delivery plans and board guidance. Suggests commissioning research into which metrics might fit best with the specific business case. | The approach can provide metrics for measuring and valuing impacts. |
| Finance for Biodiversity (F4B) | A signup pledge platform to "reverse nature loss in this decade", including a component on target setting to "increase significant positive and reduce significant negative impacts on biodiversity". | The approach can provide a means of operationalising F4B targets. |
| Global Reporting Initiative Biodiversity Standard | New sustainability reporting standard to be published early 2024 containing disclosures for organisations to report information about their biodiversity-related positive and negative impacts (including Nature-Positive), and how they manage these impacts. | The approach can provide companies with a pathway to delivering disclosures under GRI. Public disclosure of positive and negative impacts on biodiversity (including Nature-Positive) through globally-accepted GRI reporting Standards, to accelerate scaling up and change of corporate governance and help organisations and stakeholders to drive society-wide change to Nature-Positive. The Standard offers the reporting requirements for organisations reporting their impact on biodiversity including guidance on selecting indicators, methods and frameworks. |
| NaturePositive.org | A coalition of NGOs and companies campaigning for a Global Goal for Nature, as a more ambitious and specific manifestation of the KMGBF mission statement. | The approach can help to make the Global Goal operational and scale up implementation. |

| | | |
|---|---|---|
| **Science Based Targets Network** | A collaboration of leading global non-profits and mission-driven organisations working together to equip companies as well as cities with the guidance to set science-based targets for all of Earth's systems. This will help them define a clear pathway to ensure they are doing enough across their value chain to address their impacts and dependencies on nature. | The first release of science-based targets for nature in 2023 directly supports biodiversity by addressing some of the dominant drivers of biodiversity loss. The coverage of biodiversity in the first methods release was described in a technical paper that presents high-level approaches to address gaps. The IUCN approach provides a detailed mechanism to complement the first release targets. A more detailed biodiversity coverage paper is in production. |
| **Taskforce on Nature-related Financial Disclosures** | A risk management and disclosure framework (in development) for organisations to report and act on evolving nature-related risks. | TNFD notes there is demand for standardised measurement and offers guidance on selecting indicators and metrics. The approach could offer standardised metrics to meet this need. |
| **World Business Council for Sustainable Development** | A process/set of 'building blocks' (assessment and prioritisation, setting baselines, measuring and valuing, acting and transforming), where the measuring and valuing component uses the Pressure-State-Benefit-Response model. | The proposed building blocks are good guidance for companies, and the approach can fill the specific gap on metrics for process and results. |

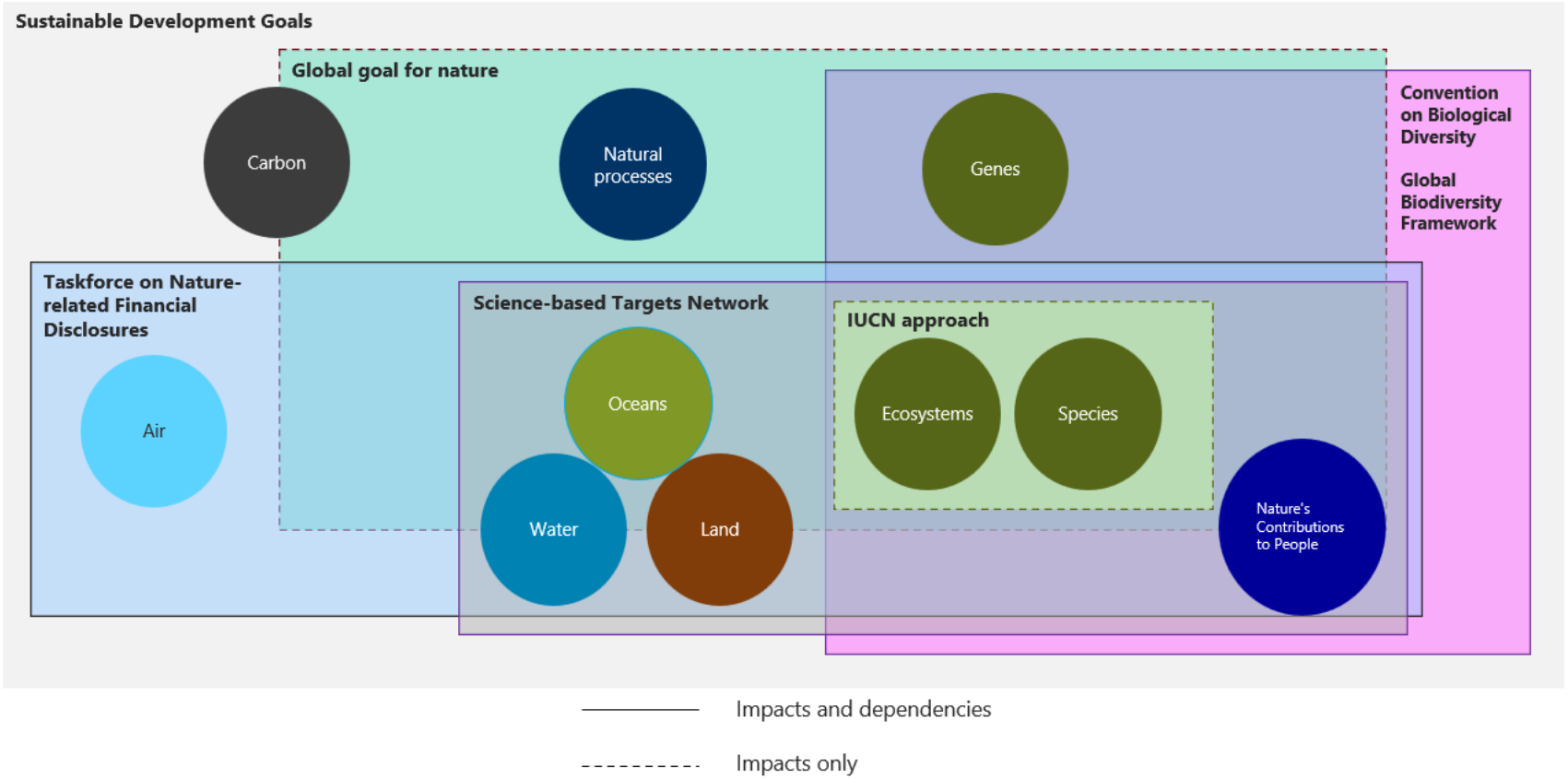



*Figure 3. The scope of the approach (focused on impacts to species and ecosystems) and how this relates to other relevant initiatives.*

### 4.4.0 Alignment with Nature Positive Initiative Partnership (NPIP)

A particularly important initiative to align efforts around Nature-Positive is the Nature Positive Initiative Partnership (NPIP), in particular in the definition of the components and metrics around Nature-Positive. The approach presented here is consistent with the NPIP Measurable Nature-Positive Goal for the CBD mission, by proposing pathways, metrics and mechanisms for setting and delivering targets on two aspects of the Nature-Positive global goal: extent and ecological integrity of habitats, and extinction risk of species. For the moment, it is very difficult to measure the other components of biodiversity proposed by the Nature-Positive global goal (function of species in their ecosystems, extent and abundance of species and genetic diversity) in a way that companies can use to formulate and deliver contributions.

### 4.4.1 Position of approach in relation to public disclosure and target setting

Public disclosure of impacts on biodiversity and progress towards Nature-Positive goals, through voluntary initiatives such as the Taskforce on Nature-related Financial Disclosures (TNFD) and the Science Based Targets Network (SBTN), or through regulatory pressure, such as the EU Corporate Sustainability Reporting Directive (CSRD), which obliges companies to report according to the European Sustainability Reporting Standards (ESRS), can help to reform corporate governance and increase the capacity for external stakeholders (including investors and consumers) to drive society-wide change to Nature-Positive. The ESRS E4 is to a large extent built upon and aligned with the GRI sustainability reporting Standards. GRI is working closely with TNFD to ensure the same high level of alignment between the voluntary reporting standard(s) and the TNFD Framework.

The approach presented here builds upon existing guidance for business, including the Partnership for Biodiversity Accounting Financials (PBAF) standards on impact assessment and footprinting and guidance documents from the United Nations Environment Programme Finance Initiative (UNEP-FI), to provide a framework that helps companies make targeted contributions to the KMGBF, using the best available metrics for assessing positive and negative impacts through their contributions to species extinction risk and ecosystem collapse.

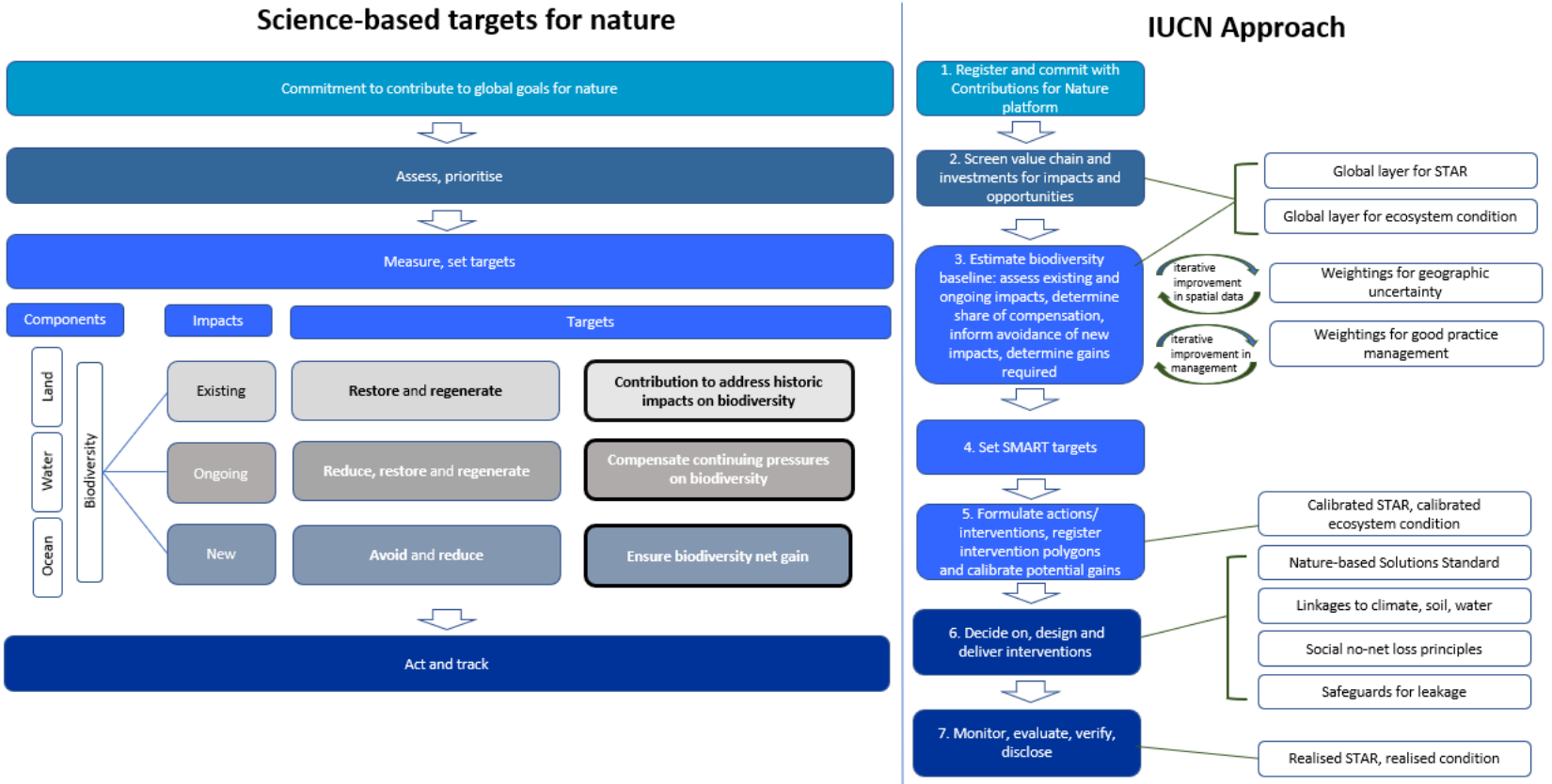



*Figure 4. A conceptual diagram showing the Nature-Positive pathway (right) (generalised for Category A companies with clear spatial footprints, Categories B and C may have more complicated pathways), and how it corresponds to and supports the draft Science Based Targets Network biodiversity hub process (left). Boxes at far right (unshaded) show key technical elements available or in development by IUCN. Points could be awarded to institutions as they proceed down the pathway, so at any point an institution will have a cumulative score based on the fraction of the pathway it has covered.*

Figure 4 shows how the assessment framework presented in Section 5 draws in part on materials in development for the SBTN Biodiversity Hub's draft guidance on target setting. Version 1 of SBTN includes targets for land and freshwater realms. For the land realm the three target mechanisms identified relate to no conversion of natural ecosystems by 2025, as defined by the Natural Ecosystem map, the Land Footprint reduction target, relating to restoration of previously occupied agricultural land, and a target relating to engagement in ecological improvement plans at landscape scale. The Water realm target-setting process relates to delivery of water, especially in water-stressed areas, and pollution.

SBTN is developing a biodiversity coverage analysis that identify ways in which the current set of targets can be completed by further metrics and target-setting processes, in particular relating to species and threats that are not covered by the current target set (e.g. invasive species, and overexploitation). The approach presented here is designed to deliver this extra target-setting capability and is thus complementary to the existing and proposed SBTN approach. SBTN propose that updated methods of land targets will be presented in early 2024, and stronger place-based justification and science supporting revised land targets in 2025. We anticipate that the approach presented here will be integrated into these updates as appropriate.

### 4.5. Link between the approach and innovative financial mechanisms

The process of delivery of positive contributions beyond the mitigation hierarchy offers the potential for the approach to form the framework for innovative financial mechanisms such as biodiversity credits. The approach could also provide a means of measuring outcomes from other innovative financial mechanisms such as sovereign debt restructuring instruments and impact bonds. Proposed approaches to crediting emphasise quantified positive impacts that can be measured using metrics derived at the ecosystem level, which may then be hard to relate directly to delivery of KMGBF goals and targets. Nature-Positive contributions, as described here, could add to the roster of crediting frameworks and give investors a means to connect their investments to global policy goals, as well as providing a means to validate credit yield in a standardised manner. IUCN will work with the various initiatives developing biodiversity credit assessment frameworks and constituency networks (Verra, Biodiversity Credit Alliance, Coalition for Private Investment in Conservation, others) to ensure alignment with the approach, relate any contribution to the mitigation hierarchy (credits should only be additional to the MCH) and ensure that key stakeholders such as youth/children, IPLCs and women are fully involved in the development of standards and benefit-sharing mechanisms.

An additional possible source of increased corporate involvement in delivery of KMGBF goals and targets could be delivered through reorientation of incentives and subsidies under Target 18. Work by BfN and the B team has gone some way to exploring these opportunities. Companies could thereby be motivated to implement Nature-Positive business practices more quickly and obtain support from subsidies, for instance to cover the costs of associated monitoring.

### 4.6. Relationship to Nature-based Solutions (NbS) Standard

Goals for living nature are interdependent with, and must be achieved alongside, other global goals such as the Paris Agreement for climate and the Sustainable Development Goals to promote synergies and minimise trade-offs. NbS are actions to protect, sustainably manage and restore natural and modified ecosystems in ways that address societal challenges effectively and adaptively, to provide both human well-being and biodiversity benefits (IUCN, 2016). NbS therefore play a central role in delivering a just and sustainable Nature-Positive future.

Within this context the IUCN Global Standard for Nature-based Solutions offers existing guidance and standards on how efforts to protect and restore nature can also deliver outcomes for human well-being and therefore support social equity. Of particular importance are NbS Criteria 3, 4, 5 and 6 (Table 4) which relate to the impacts that Nature-Positive contributions may have on IPLCs. In general, Nature-Positive interventions should strive for social justice, such that affected groups perceive social and ecological outcomes, and the process to deliver them, to be fair and equitable (Bull et al., 2018). Since Nature-Positive interventions are likely to entail some costs in the short term (such as the opportunity costs of reduced economic activity or access to natural resources), it is important to ensure these costs are equitably distributed, and not primarily borne by IPLCs as has often been the case in historic conservation efforts (Balmford & Whitten, 2003).

*Table 4. Nature-based Solutions criteria which relate to the impacts that Nature-Positive contributions may have to Indigenous peoples and local communities*

| Criterion | Indicators |
|---|---|
| **Criterion 3: NbS result is a net gain to biodiversity and ecosystem integrity** | 3.1 The NbS actions directly respond to evidence-based assessment of the current state of the ecosystem and prevailing drivers of degradation and loss;<br>3.2 Clear and measurable biodiversity conservation outcomes are identified, benchmarked and periodically assessed;<br>3.3 Monitoring includes periodic assessments of unintended adverse consequences on nature arising from the NbS;<br>3.4 Opportunities to enhance ecosystem integrity and connectivity are identified and incorporated into the NbS strategy. |
| **Criterion 4: NbS are economically viable** | 4.1 The direct and indirect benefits and costs associated with the NbS, who pays and who benefits, are identified and documented;<br>4.2 A cost-effectiveness study is provided to support the choice of NbS including the likely impact of any relevant regulations and subsidies;<br>4.3 The effectiveness of the NbS design is justified against available alternative solutions, taking into account any associated externalities;<br>4.4 NbS design considers a portfolio of resourcing options such as market-based, public sector, voluntary commitments, and actions to support regulatory compliance. |
| **Criterion 5: NbS are based on inclusive, transparent and empowering governance processes** | 5.1 A defined and fully agreed upon feedback and grievance resolution mechanism is available to all stakeholders before an NbS intervention is initiated;<br>5.2 Participation is based on mutual respect and equality, regardless of gender, age or social status, and upholds the right of Indigenous peoples to free, prior and informed consent (FPIC);<br>5.3 Stakeholders who are directly and indirectly affected by the NbS have been identified and involved in all processes of the NbS intervention;<br>5.4 Decision-making processes document and respond to the rights and interests of all participating and affected stakeholders;<br>5.5 Where the scale of the NbS extends beyond jurisdictional boundaries, mechanisms are established to enable joint decision making of the stakeholders in the affected jurisdictions. |
| **Criterion 6: NbS equitably balance trade-offs between achievement of their primary goal(s) and the continued provision of multiple benefits** | 6.1 The potential costs and benefits of associated trade-offs of the NbS intervention are explicitly acknowledged and inform safeguards and any appropriate corrective actions;<br>6.2 The rights, usage of and access to land and resources, along with the responsibilities of different stakeholders, are acknowledged and respected;<br>6.3 The established safeguards are periodically reviewed to ensure that mutually-agreed trade-off limits are respected and do not destabilise the entire NbS. |

## 4.7. Synergies with emissions reductions

The effects of climate change on biodiversity are already visible at 1.3 degrees of warming. Warming beyond 1.5 degrees will have profound effects on species and ecosystems: for example, the Intergovernmental Panel on Climate Change estimates with *high confidence* that 13% of all species could become Critically Endangered at 4 degrees of warming, and entire functional types of ecosystem, such as tropical rainforests and shallow water coral reefs may experience critical and irreversible tipping points.

As a priority, companies can contribute to reducing these risks by rapidly reducing absolute greenhouse gas (GHG) emissions across their value chain in line with science-based targets. However, there are many pressures on biodiversity that are not related to climate, and which may operate over shorter timescales. Addressing these will require actions above and beyond the challenging changes required to decarbonise companies' business practices.

Fortunately, many actions that companies are already taking as part of their science-based climate strategies can also contribute significantly to halting and recovering biodiversity, particularly for companies with, or connected to, significant land-based footprints. For this reason, an integrated approach to Nature-Positive is crucial. Actions that make positive contributions for both biodiversity and climate goals could be the first focus for companies, with companies building on land-use based net-zero emissions reduction actions. These include:

1) Focusing strongly on avoiding any further conversion of natural habitats;
2) Implementing natural climate solutions within companies' operational land-holdings that are focused on protecting and restoring natural habitats;
3) Driving transformational change to reduce land-use requirements, for example by increasing yields or moving to plant-based alternatives to meat and dairy; and
4) After engaging actions to reduce GHG emissions in line with science-based targets, implementing additional beyond value chain mitigation focusing on protecting and restoring natural habitats.

Such actions for climate will help companies make positive contributions for biodiversity but will not be sufficient. Using the methods set out in this document, based on STAR and ecosystem metrics (see Section 6), can help companies optimise the biodiversity benefits of their climate actions, as well as identify and plan for additional actions for biodiversity. These actions will also require additional safeguards to protect against indirect land-use change.

We recognise that there may be important trade-offs between achieving net-zero commitments and contributing to the KMGBF. This may be the case for instance for wind and solar power installations which might require conversion of natural habitats. In these cases there are already strong industry recommendations about minimising impacts on biodiversity (for instance IUCN's paper on Considering Biodiversity for Solar and Wind Energy Investments).

To ensure that companies do also take appropriate measures to deliver on societal climate goals, which are not covered by the approach proposed here, IUCN will consider whether setting robust climate targets (e.g. via SBTi or similarly robust standards) should be a precondition for registering on an appropriate contributions platform.

## 4.8. Concerted efforts and transformative change

The approach within its current scope is one component of what is required for effective implementation of the KMGBF, but many other actions are needed to deliver a Nature-Positive future. Enabling transformative change to reduce drivers of biodiversity loss will require a broader, concerted effort across IUCN's constituency and society as a whole, including the efforts of governments, researchers and civil society as well as finance and companies (Figure 3).

IUCN will also work with its Members, corporates and other partners to catalyse transformative change in economic systems and within priority sectors. IUCN may in future develop guidance for corporates on the 'transform' element of the extended mitigation hierarchy.

## 4.9. How the approach relates to government and civil society actions

### 4.9.0 Governments

Overall implementation of the KMGBF will be based on National Biodiversity Strategy and Action Plans (NBSAPs), yet contributions by companies will be essential to delivery of KMGBF goals and targets, with a need for mainstreaming and proportional contributions across different sectors of society. This mainstreaming process is critical, since key challenges in delivering the CBD's former Strategic Plan for Biodiversity for 2011–2020 related to insufficient progress on incorporating local and non-state perspectives and accounting for their contributions to NBSAPs, and shortcomings in integrating NBSAPs into broader economic and development processes (Forest Peoples Programme, 2022; Milner-Gulland et al., 2021; Whitehorn et al., 2019). The approach proposed here can support this mainstreaming process by offering metrics for biodiversity losses and gains that can be disaggregated and attributed to different sectors' institutions for sub-national target setting at multiple scales, and later aggregated to track progress towards sectoral, national and global targets, while staying within the KMGBF monitoring framework. The approach described here aligns with the KMGBF monitoring framework in satisfying the indicator criteria:

a) Data and metadata related to the indicator are publicly available;

b) Methodology underpinning the indicator is either published in a peer reviewed academic journal or has gone through a scientific peer review process and validated for national use;

c) Data sources and indicators are compiled and regularly updated with a time lag of less than five years between updates, if possible;

d) Mechanism exists for maintaining the indicator methodology and/or data generation, including providing nationally applicable guidance on the use of the indicator;

e) Indicators should be able to detect trends relevant to the components of the goals and targets of the KMGBF;

f) When possible, indicators are aligned with existing intergovernmental processes.

STAR is identified as a Complementary Indicator for the number of companies reporting on risks, dependencies and impacts on biodiversity (Target 15).

National contributions to global goals and targets under the KMGBF will be determined according to national circumstances, priorities and capabilities through the updated NBSAPs. These will result in country-level targets, to which country governments will be accountable. However, country-level targets also need to be disaggregated at sub-national levels. Based on this, national governments may divide their biodiversity contributions into sector- and/or geography-specific targets, with sub-

targets, e.g. for agriculture, energy, etc. Such sub-targets will cover both private and public sector contributions within those sectors; and national and sub-national governments will need to monitor and aggregate positive and negative contributions from each sector to confirm they are in line with sectoral and national targets. Importantly, national and sub-national goals and targets need to sit within an overarching united framework that includes both specific impact mitigation measures and the broader actions needed to achieve Nature-Positive at the societal level, and enables contributions to be aggregated across sectors and geographies to track overall process. The Mitigation and Conservation Hierarchy (MCH) offers a potential mainstreaming framework, which can be used to scale down overarching goals and targets into specific targets for different sectors, locations and actors; and also scale up mitigation and conservation contributions, if it is paired with suitable metrics (Milner-Gulland et al., 2021) (Figure 5).

There is a significant additional opportunity for regional cooperation among governments to develop policies to support business action for biodiversity. The European Union has various mandates on farm practices and protection of biodiversity (e.g. Natura 2000) that have had major positive impacts, and these initiatives merit expansion into other regional government bodies.

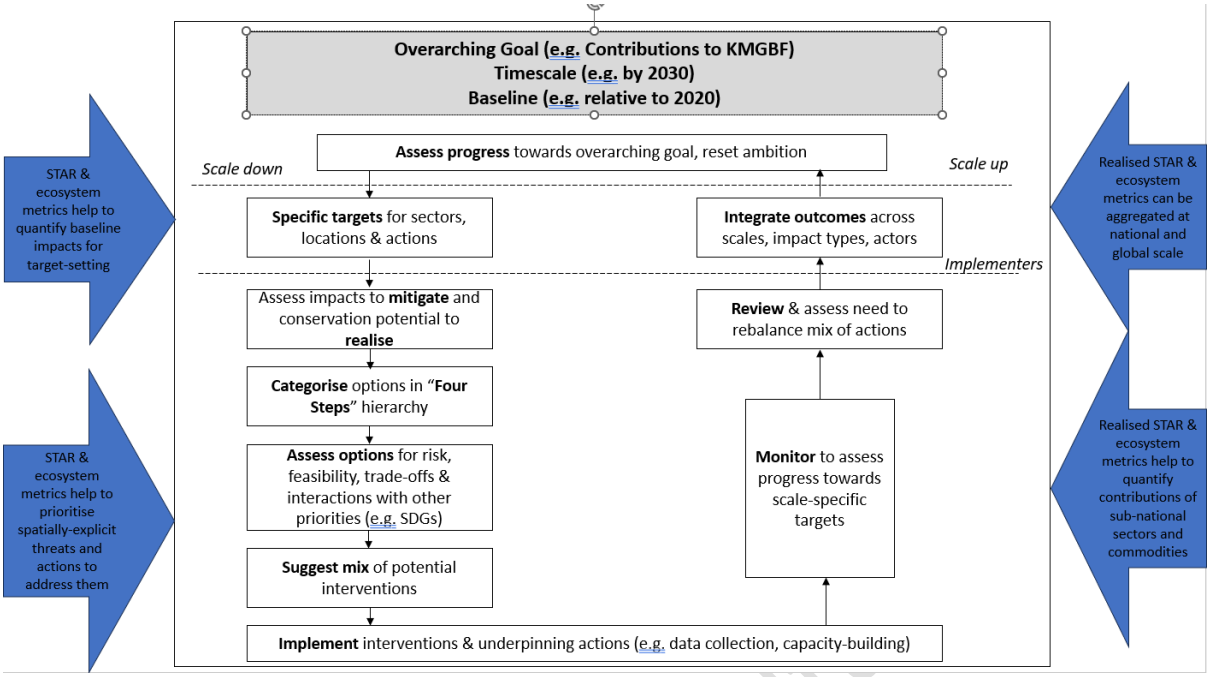



*Figure 5. Application of the MCH within an adaptive management approach to biodiversity target setting, where an overarching goal is set with a timeline and a baseline, which is scaled down to specific targets for different sectors, locations and actors, and realised contributions are then scaled up to monitor progress. Specific opportunities for metrics from the approach highlighted with blue arrows. From Milner-Gulland et al., 2021.*

The approach offers several opportunities, including standardised metrics for biodiversity losses and gains that can be disaggregated at different spatial scales and attributed to different institutions (Figure 5). This means that national targets can be scaled down to sub-national and sectoral levels, to support target setting, while standardised disclosure and reporting by companies and sectors can be scaled up, to help agencies track contributions within sectors and administrative regions (Figure 5). Based on this information, governments can then monitor whether sectoral sub-targets are being met, and appropriately incentivise sectors to decrease emissions via institutional arrangements and policy instruments (e.g. regulations, incentives, taxes). Similarly, it would be possible for corporations to set institutional-level targets which are in line with sector sub-targets and proportional to, for example, their historic share of impacts relative to the sector overall.

Moreover, direct investments by governments towards the KMGBF, for instance through creation or improved management of protected areas, can also be measured using the approach. These contributions can then also be aggregated with company (and other actors'/sectors') contributions in a meaningful way (e.g. under the MCH framework) through adoption of the same metrics. It may also be possible to track the impact of institutional arrangements and policy instruments which facilitate company actions to deliver positive contributions.

### 4.9.1 Civil society

Civil society has played a key role in advocating for the KMGBF and its implementation. NGOs play key roles in conservation research and practice, and in both holding the private sector and governments accountable for biodiversity impacts and working with the private sector and governments through constructive partnerships to improve outcomes for biodiversity.

NGO contributions to the KMGBF are already being tracked using the STAR metric through the IUCN Contributions for Nature platform, and these could also be used to show NGO and civil society contributions to sub-national, national and global goals as outlined above.

Transparent disclosure and reporting by different companies and governments also allows civil society and the public to hold institutions accountable for their impacts, and make more informed decisions regarding responsible consumer choices and ensuring leaders are delivering on commitments.

# 5. Assessment framework

The two main components of the Assessment Framework are: (a) a means to assess where on the pathway towards making Nature-Positive contributions a company is (detailed above), and (b) a means to quantify contributions to Nature-Positive at a site level and through actions within value chains. The two components are integrated; a company uses the quantification mechanism as part of the pathway to making contributions. These contributions can then be aggregated at country, sub-national unit or sector level to show how they form part of the Kunming-Montreal Global Biodiversity Framework (KMGBF).

IUCN will develop detailed pathways, metrics and guidance for companies and sectors to contribute measurably to the KMGBF and Nature-Positive societal goals, with explicit means to:

1) Register and publicly commit to contribute to the KMGBF (via the Contributions for Nature platform), and identify and 'score' where on the pathway they are;
2) Screen value chains and investments, including operations, land holdings, commodity sourcing, downstream impacts and portfolios for opportunities to contribute to the KMGBF;
3) Estimate a biodiversity impact baseline, which includes both positive and negative impacts, across a range of landholdings;
4) Define targets and timeframes for actions to improve positive and reduce negative impacts;
5) Decide on, design and manage interventions (informed by data provided);
6) Manage biodiversity performance;
7) Ensure regular monitoring, verification and disclosure of progress; and
8) Enable assessment of contributions made by companies, compared to a baseline, to societal goals for nature.

Progress down the pathway to the Nature-Positive alignment can be scored at each stage, so at any point an institution will have a cumulative score based on the fraction of the pathway they have covered, to provide a simple means of communicating progress. This pathway and a proposed scoring system to be applied to it will be developed, in consultation with stakeholders, for the next iteration of this document. Some key design criteria are described further in Section 5 and Tables 5 and 6. Baselines, targets and metrics will be based on the best available data sets on species and ecosystems convened under IUCN; and on IUCN global standards, data and policy guidance (e.g. offsets and net positive impact).

Initially, pathways will be developed in detail for three categories of company:

A. Companies with opportunities to affect spatially-explicit land-use decisions through their own management authority (the Direct Operations Target Boundary of SBTN; e.g. infrastructure and renewable energy developers, primary agricultural and logging commodity producers, extractive industry);

B. Companies with value chain connections to land holdings, through purchase and processing of commodities with impacts on biodiversity at the site of production or extraction, but for which the company does not have direct authority over land-use decisions (the Upstream Target Boundary of SBTN; processors, traders, manufacturers and retailers; guidance for companies with limited commodity traceability is included in Sections 6.3.5, 6.4 and 6.5); and
C. Finance companies with portfolios that contain combinations of Categories A and B.

Proposals of suggested steps that can be used by these categories of company are described in Section 7. The role of governments in co-investing, supporting and coordinating sub-national and sectoral contributions towards national and global goals is covered in Section 4.9.0.

## 5.1. Defining baselines and setting targets

IBAT and the IUCN Contributions for Nature platform currently allow users to evaluate their potential opportunity to contribute to species extinction risk reduction using Estimated STAR. The process required for users to move to Calibrated STAR, which allows them to validate the STAR scores in the sites and footprints they manage, is already developed (Schneck et al., 2023). Figure 6 below shows a simplified sequence of steps leading to calculation of Calibrated STAR and delivery of Realised STAR. This process is in draft as a peer-reviewed publication scheduled for the end of 2023; a summary is presented in Appendix 1.

Calculations for Calibrated STAR will be automated in appropriate platforms, once companies have registered polygons for potential interventions and collected expert input or ground-truthed data.

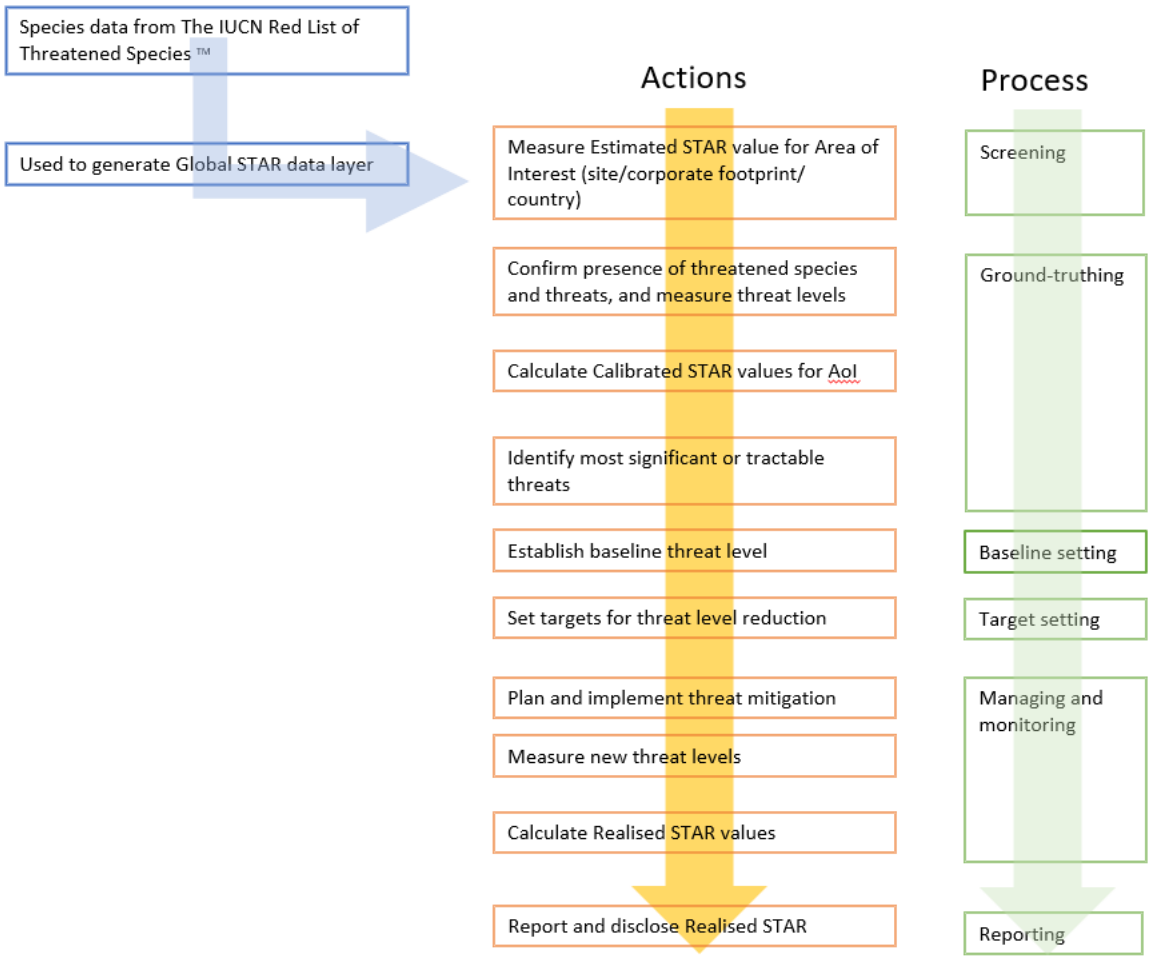



*Figure 6. Simplified sequence of actions for calculating Calibrated STAR and delivering Realised STAR outcomes.*

Companies will then be able to select preferred interventions and set targets.

This process will include checklists and correction factors for attribution of impacts, confirmation of additionality, and assessment of potential risks of leakage, according to best practice and principles and drawing on experience in the verification of emissions reductions. In addition, clear guidance will be developed on the expectations for smallholder-based supply chains where this level of validation and analysis is not feasible by individual land owners. Trading companies may need to do this on behalf of supply sheds.

### 5.2. Planning and implementing interventions and assessing and reporting on outcomes

Once baselines are established and targets set, companies will be able to plan, document, implement and monitor management actions to reduce threats.

Outcomes will be assessed through calculation of Realised STAR values and verified according to a standard based on the methodology used. The units generated will be held on a registry, ensuring that institutions cannot claim credit for units that have already been registered. IUCN will evaluate the potential for establishing a certification programme for Realised STAR within the developing NbS certification programme, and/or with appropriate partners, such as the major emissions reduction certification initiatives (e.g. Verra, Gold Standard, ISO).

An equivalent process will be developed and implemented for ecosystems, using an ecosystem metric, and based on the same spatial data and verification process as for STAR.

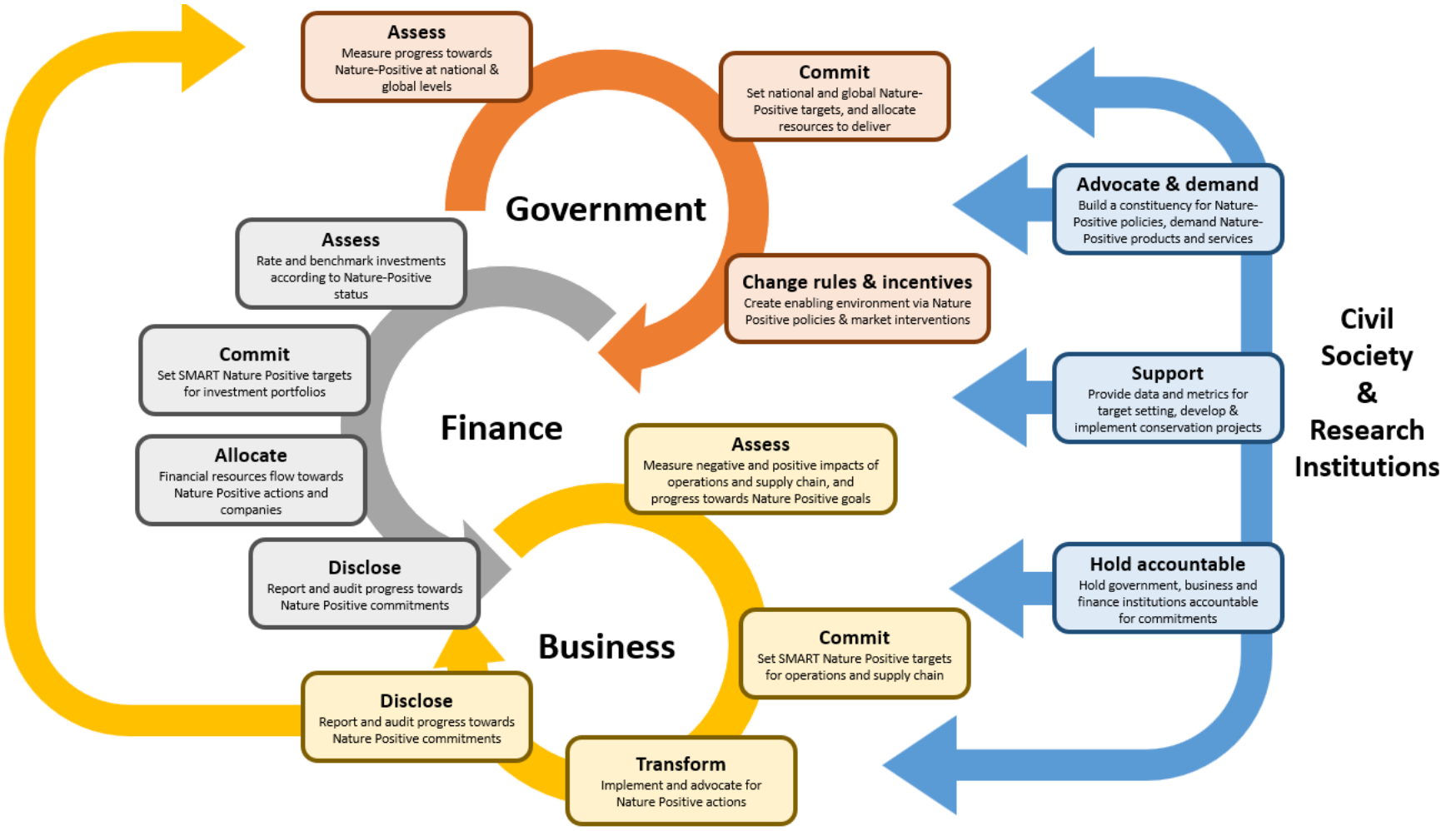
Outputs from the reporting process will be specifically tailored to the final formulation for the species extinction risk reduction and ecosystem goals under the KMGBF and SDG Goal 15, and for appropriate corporate reporting frameworks. This will provide a clear means for articulating and communicating corporate contributions to global goals.

### 5.3. IUCN Green Status of Species

While the STAR metric used in the current framework is intended as a way for companies to make contributions to species extinction risk reduction in particular places, there are other ways that contributions can be made to species recovery – in particular the part of the recovery process after a species is no longer threatened with extinction. Full species recovery can be assessed by the IUCN Green Status of Species, which provides a standardised framework for measuring species recovery. This enables users to recognise conservation achievements; to highlight species whose current conservation status is dependent on continued conservation actions; to forecast the expected conservation impact of planned conservation action; and to elevate levels of ambition for long-term species recovery. These objectives together encourage conservation towards species recovery, throughout a species' range. While actions measured by the Green Status of Species (GSS) are generally focused on single species across its entire range, in contrast to STAR which is intended to identify measures to reduce threats to many species in particular places, the GSS can be measured at a given spatial unit. For instance, GSS can accommodate measurement at the national and global levels, through a GSS Index (under development) and this could be part of a basket of metrics used to evaluate conservation responses from a species lens.

### 5.4. Measuring Nature-Positive functionality

IUCN will develop dedicated Measuring Nature-Positive functionality (potentially with several access mechanisms) for use by companies wishing to demonstrate their move towards Nature-Positive alignment. This functionality will be accessible for companies wishing to quantify and disclose biodiversity impacts and contributions using clearly defined and appropriate measures.

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979 *Figure 7. Transformation loops for delivering Nature-Positive outcomes, showing the inter-play between different sectors.*

## 5.5. Key principles

IUCN has established an initial set of principles for Nature-Positive alignment by companies. These are draft principles that require consultation and refinement.

*Table 5. Initial principles for the approach for companies, and recommended actions*

| Category | Topic | Principle for companies |
|---|---|---|
| **Definitional principles** | *Nature-Positive ambition* | Set out an overall statement of ambition to align with societal goals for biodiversity. |
| | Entire value chain | Assess positive and negative impacts and set targets across entire value chain (scopes 1, 2 and 3, upstream and downstream), prioritising and sequencing value chain components according to the significance of impacts for biodiversity (i.e. based on planetary materiality). |
| | A measured biodiversity baseline | Measure or estimate current and predicted negative and positive impacts on biodiversity, including species and ecosystems, using quantitative metrics. Where estimations are used, they can be iteratively improved over time, in proportion to the significance of impacts for biodiversity. |
| | A timeframe | Align actions with the Nature-Positive/global goals timeline, with a focus on early actions. |
| | Targets | Set quantitative and time-bound targets at a meaningful level of granularity, with distinct and separate targets for reducing negative impacts and positive impacts. Establish and keep updated accounts of both negative and positive impacts. Target setting may be iterative, with the aim of covering all material impacts in a reasonable period. |
| | Extended migration hierarchy | Apply the mitigation hierarchy and go beyond addressing direct attributable impacts by making positive contributions to biodiversity recovery, through a combination of positive actions and sector transformation. |
| | A clear set of actions to be carried out, costed and sequenced | Support targets with a comprehensive action plan, and feasibility assessments to demonstrate effectiveness, including estimated costs. |
| | Mainstreaming and integration | Mainstream biodiversity actions throughout operations and governance and seek complementarity and synergies with other aspects of nature. |
| **Implementation principles** | Precautionary approach | Prepare conservative estimates of positive and negative biodiversity impacts including margins of safety proportional to the risks to biodiversity, people and delivery. |
| | Equity | Share the risks and rewards associated with Nature-Positive actions with rights-holders and stakeholders in a fair and balanced way, respecting legal and customary arrangements. Give special consideration to respecting both internationally and nationally recognised rights of Indigenous peoples and local communities. |
| | Stakeholder participation | Design Nature-Positive actions based on appropriate, extensive, meaningful and transparent stakeholder consultation, taking into account different perspectives, means of communication and modes of governance that stakeholders may have. |
| | Recognising traditional knowledge | Recognise and respect traditional knowledge systems and alternative ways of relating to and valuing nature. |
| | Mitigation Hierarchy | Follow the extended mitigation hierarchy, in line with the principles below. |
| | Mitigation Hierarchy: prioritising avoidance | Prioritise avoiding all conversion of natural habitats wherever feasible, as well as any impacts on areas or biodiversity features excluded in the IUCN Policy on Offsets. |
| | Mitigation Hierarchy: reducing negative impacts | Reduce unavoidable negative impacts in line with science-based thresholds where possible, and at a minimum to as low as reasonably practicable. |

| Category | Topic | Principle for companies |
|---|---|---|
| | Mitigation Hierarchy: limits | Stay within societal limits. Some negative impacts on biodiversity are so significant that they would preclude attaining societal goals, for example where they would be impossible to offset. Avoid these impacts. |
| | Mitigation Hierarchy: least cost approaches | When seeking to apply a least cost approach to the mitigation hierarchy, demonstrate (to a high standard of proof, involving appropriate specialists and experts) that the overall outcome for the biodiversity feature will be positive, at an appropriate spatial scale and over an appropriate period of time. |
| | Mitigation Hierarchy: sector transformation | Where there is a significant risk of displacing, rather than reducing, negative impacts (e.g. by increasing purchased volumes of certified commodities without increasing the overall volume of certified production), engage with supplier- and sector-scale initiatives to ensure actual reductions in negative impacts. Transformation actions should be initiated, and budgeted, before positive contributions to nature recovery, but since they often take time to produce results, do not need to be complete before making positive contributions to nature recovery. |
| | Mitigation Hierarchy: positive contributions | In addition to implementing the preceding steps of the mitigation hierarchy, make positive contributions to nature recovery of a type and scale that is proportional to historical impacts, capacity and the geographic context of operation. |
| | Equivalence | Apply the principle of 'like for like or better' if offsets are used for unavoidable new impacts from 2022.<br>Implement broader positive actions predominantly in the same geography and at a minimum in the same ecosystem functional group and ecoregion (i.e. same biogeographic ecotype) for which negative impacts occurred. Similarly, for species impacts, compensation should be targeted towards as close to like-for-like as possible. Trading up is also an option for species; impacts on widespread species could be compensated by positive impacts on threatened species. |
| | Additionality | Only count positive impacts towards Nature-Positive targets where they are additional, i.e. 1) absolute (i.e. relative to a static baseline), 2) clearly attributable to a company's actions, and 3) demonstrably above and beyond results that would have occurred without intervention. |
| | Long-term outcomes | Design impact reductions and positive impacts to last for at least as long as Nature-Positive targets, and ideally permanently. Implement an adaptive management approach based on established thresholds and monitoring. Where there is a risk to outcomes due to external factors (e.g. fire), implement actions to mitigate those risks, for example through multiple intervention sites. |
| | Transparency | Design, implement and monitor actions, targets and outcomes of Nature-Positive actions in a transparent way, and communicate outcomes in the public domain on a regular basis. |
| | Net gain | Where offsets are used via strict implementation of the mitigation hierarchy, align with jurisdictional or downscaled societal targets, delivering at a minimum in situ, measured, equivalent, net gains compared to the 2022 reference year. |
| **System-scale principles** | No double counting | Record Nature-Positive contributions in a public registry, which is periodically retired to avoid double counting by different companies, or in national or jurisdictional contribution reporting. Report transparently on discounting (i.e. including corresponding adjustments) if positive gains are also reported as contributions by host countries. |
| | Nature-Positive contributions mainstreamed within corporate management system | Embed Nature-Positive contributions within high integrity guidelines that require a corporate management system to follow the mitigation hierarchy rigorously and sequentially in addressing nature impacts. |

| Category | Topic | Principle for companies |
|---|---|---|
| | Value chain scale action | Adopt a 'whole value chain' scale perspective to address environmental externalities at the scale at which they occur. Address indirect impacts through collaborative action with other value chain actors to transform value chains towards more sustainable trajectories. |
| | Contribution towards global societal goals | Design Nature-Positive goals and targets to contribute directly towards global societal goals, specifically including stakeholders such as youth, IPLCs and women in outcomes. |

## 5.6. Key building blocks

Following on from these principles, the key building blocks for the approach proposed here are outlined in **Error! Reference source not found.**Table 6, together with an indication of current status and IUCN's components.

Several building blocks are ready for piloting, testing and validation. Others require further development and stakeholder engagement.

A priority is to enable companies to set initial, short-term targets and begin making contributions to a Nature-Positive future as soon as possible. IUCN will develop a detailed workplan and timetable for further building block development, with emphasis on providing the materials to support rapid business engagement.

995 *Table 6. Key building blocks for the approach for companies*

| Building block | Importance and key requirements | IUCN components | Current status |
|---|---|---|---|
| **Suitable metrics and data** | Reliable, science-based metrics and data that are feasible for companies to use and which provide an effective connection between societal goals and companies' positive and negative impacts are critical for designing effective action.<br><br>The underlying data must be open to independent scrutiny, but to provide confidence to companies, data provision must be based on a sustainable business model. The need for a sustainable business model must be balanced with accessibility and low barriers to entry to enable the use of metrics and data to scale up rapidly enough to resolve the biodiversity crisis. | IUCN has developed the STAR metric for species extinction risk based on the IUCN Red List.<br><br>IUCN will develop a complementary ecosystem metric. In the meantime, this document provides an initial conceptual framework for a complementary ecosystem metric. | STAR is available and ready for piloting for the terrestrial realm through the IBAT portal. Additional functionality is being built into IBAT. Freshwater and marine versions will be available later in 2023.<br><br>This paper provides a conceptual foundation for an ecosystem approach.<br><br>IUCN is working on a business model for data and metrics that balances sustainability with accessibility and scalability. |
| **Assessment framework and tools** | Clear guidance and tools are needed to enable effective use of data and metrics.<br><br>Companies need a clear framework for conducting assessments. As far as possible this should build on assessments companies are already doing, for example for setting climate targets, to avoid duplication of effort and reduce barriers to entry.<br><br>The framework needs to be compatible with the types of information companies have available about their value chains and allow iterative improvement for priority areas as more data becomes available. | This document sets out a first version of how an assessment framework can work for species extinction risk using STAR, and for ecosystems using an extent and condition metric. It requires testing, validation and peer review. IUCN is working with the IBAT partners to integrate appropriate functionality into the IBAT tool.<br><br>This document also sets out a proposed approach for how species-based and ecosystem-based approaches can interact, and when companies can choose one or other (or use both).<br><br>The framework is intended to align with and support evolving approaches in other initiatives including SBTN, TNFD and the Capitals Coalition. IUCN will continue to engage with other initiatives in this space to ensure alignment and complementarity of approaches. Ongoing research programmes in academia can also inform this component. | The draft assessment framework using STAR is ready for piloting.<br><br>The ecosystem element will be ready for piloting once the interim metric is developed. At the point at which the Red List of Ecosystems is ready, the approach will consider how to apply it to the Assessment Framework.<br><br>IUCN is actively engaged with other relevant processes, including as co-leads of the SBTN Biodiversity Hub. |
| **High integrity principles and guardrails** | Implementation of companies' contributions to Nature-Positive needs to ensure both:<br>• local-scale integrity – does an action actually reduce impacts or deliver biodiversity gains, in an appropriate, socially equitable way, and | IUCN will draw on existing standards such as the Nature-based Solutions Standard, and forthcoming certification method, the IUCN Green List of Protected and Conserved Areas and the IUCN Environmental and Social Management System to inform key principles for local-scale integrity. | This document provides an outline of some of the key required guardrails, some key principles and an outline of how existing IUCN standards can be used to ensure high integrity outcomes. |

| Building block | Importance and key requirements | IUCN components | Current status |
|---|---|---|---|
| | • system-scale integrity – individual actions must contribute to societal goals and positive actions should not replace avoiding and reducing impacts in the first place.<br><br>Companies need actionable principles and steps to follow to ensure this.<br><br>A key theme will be to set out principles on when and how much companies could engage in company- or sector-scale transformation versus positive contributions. | IUCN will draw on the expertise of its Commissions and Specialist Groups, for example the Commission on Ecosystem Management Impact Mitigation and Ecological Compensation Thematic Group, the Species Survival Commission Conservation Planning Specialist Group, and the World Commission on Protected Areas Connectivity Conservation Specialist Group, to develop key principles for system-scale integrity. IUCN recognises that processes like SBTN/SBTi have existing and developing guidance in this space; IUCN will continue to engage to ensure alignment and interfacing of approaches.<br><br>IUCN will consider making the setting of robust targets for critical issue areas not covered by this approach (e.g. setting a climate target under SBTi or similarly robust approach) a pre-condition for registering/maintaining contributions on an appropriate platform. | IUCN recognises that this is a component that needs further work and engagement with key internal and external stakeholders and processes. |
| **Target-setting methods and guidance** | Companies need to know which impacts must be avoided entirely, how much residual impacts must be reduced and what level of positive contribution is equitable. The overall outcome must clearly meet the high integrity principles described above.<br><br>The method and process must take account of local conditions and contexts as well as overall societal goals, allowing for bottom-up as well as top-down input.<br><br>As the window of opportunity to resolve the nature crisis is short, it is imperative to enable companies to set short-term targets to begin making contributions to a Nature-Positive future as soon as possible. Companies need to be aware and ready for an iterative approach to target setting. | IUCN recognises that setting targets will need to be iterative and will evolve as societal goals are agreed.<br><br>The approach proposed here is based on reducing threats and promoting restoration, informed by an analysis of biodiversity state. This will complement work by SBTN and others that focuses on sustainable, regenerative land- and water-use, and on reducing the drivers of biodiversity loss.<br><br>As well as addressing impacts, the approach must also catalyse transformational change. IUCN will continue to work with its Members and partners, including forward-looking companies, on this issue, which is outside the scope of the current working paper.<br><br>The appropriate platform will, in subsequent iterations, include a mechanism to allow analysis of the combined effect of sector or geographic contributions which will enable identification of gaps and opportunities for further contributions, as well as updating the target-setting methods and guidance. | This document provides an outline of a target-setting approach using STAR.<br><br>Subsequent phases of work, in collaboration with academia and other stakeholders, will test and validate the approach.<br><br>IUCN continues to engage with SBTN to ensure alignment and complementarity of approaches. |

| Building block | Importance and key requirements | IUCN components | Current status |
|---|---|---|---|
| **Implementation guidance and frameworks** | Once companies have targets there is a need for clear and actionable guidance on implementation.<br><br>Guidance needs to cover the full scope of Nature-Positive contributions: 1) impact avoidance and reduction, 2) restoration, regeneration and offsets, 3) positive contributions, and 4) transformative actions.<br><br>This needs to build from the principles of adaptive management, and needs to include guidance on appropriate levels of monitoring. | For positive contributions, IUCN has a wealth of guidance and standards around the successful design of conservation interventions and appropriate safeguards. IUCN will build from these to develop comprehensive guidance for companies. IUCN recognises that the implementation guidance needs packaging and synthesis for a business audience.<br><br>For targets around reducing impacts, IUCN recognises that SBTN and others are preparing detailed guidance and will continue to engage and support that process, providing complementary guidance where appropriate.<br><br>IUCN further recognises that there is a gap in detailed guidance around implementation of the mitigation hierarchy in business value chains and around the 'transform' element of the mitigation hierarchy and will seek to engage with appropriate partners to develop guidance. | This document highlights existing relevant IUCN guidance and frameworks and provides some overarching principles drawn from those.<br><br>The initial assessment framework (Section 5) includes outline guidance on the overall approach and detailed guidance on measuring Calibrated and Realised STAR (Figure 6).<br><br>The document also identifies key complementary guidance and processes as well as a number of gaps.<br><br>A second version of this document will provide more detailed guidance. |
| **Commitment, disclosure and verification** | To be credible, company contributions need to be documented and open to scrutiny.<br><br>A verification process will be required to ensure commitments are credible and actually delivered. This will need to balance rigour with practicality. | IUCN will set out a vision for how companies' contributions could be registered and disclosed through appropriate platforms.<br><br>IUCN will engage with its Members and external stakeholders to develop and support appropriate verification protocols and processes. This will include considering use of the Nature-based Solutions Standard.<br><br>IUCN recognises that initiatives like TNFD and SBTN are also developing processes that will allow companies to commit and disclose broader pressure-reduction targets. IUCN will continue to engage to ensure complementarity with the approach proposed here. | This document sets out the vision for how an appropriate platform could be used by companies to register Nature-Positive contributions.<br><br>It further sets out a potential process for prioritising verification.<br><br>This will be developed more in subsequent versions. |



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## 5.7. Key considerations for a high integrity approach to measuring contributions to Nature-Positive

To deliver the desired environmental and social outcomes that are embedded within the vision of societal goals for biodiversity, there is a need to establish some fundamental principles for high quality Nature-Positive contributions that create real, additional and verifiable positive outcomes for nature, whilst enabling social justice. Nature-Positive contributions that meet these principles can be described as having 'high integrity'.

Integrity can be defined at local scale and system scales (TBC, 2022):

- *Local integrity* (or supply-side integrity) is the extent to which a given business action, at a specific location, avoids or reduces negative impacts, or achieves positive impacts, on local biodiversity values in a socially equitable way.
- *System-scale integrity* (or demand-side integrity) means that the combined overall effect of individual actions by a company or companies within a sector contributes tangibly and proportionately to societal goals (promoting synergies for nature, climate and people); and actions are aligned with the mitigation hierarchy and corporate good practice principles for managing biodiversity impacts.

This section sets out key considerations for developing high integrity approaches to measuring contributions to Nature-Positive and identifies some options for operationalising them in a Nature-Positive framework.

### 5.7.0 Local-scale integrity

For the approach proposed here to deliver effectively for nature, it needs to provide integrity at both local and global scales. Local-scale integrity ensures that biodiversity gains are demonstrably delivered and maintained, are locally appropriate and socially equitable. Previous approaches to business and biodiversity have developed a series of key principles for ensuring local-scale integrity of actions for biodiversity, which are codified in the IUCN Policy on Offsets (IUCN, 2016) and the Business and Biodiversity Offsets Programme (BBOP) principles (BBOP, 2012b). Although the approach described here is much broader, and offsets form a small part of the approach, these core principles remain relevant and could be adapted to the approach as set out in Table 7 below.
A key consideration when deriving principles will be to ensure that the process remains sufficiently scalable to allow implementation at the scale and speed that is required to effectively address the nature crisis, while addressing critical issues such as social equity effectively.

### 5.7.1 System-scale integrity

System-scale integrity means that Nature-Positive contributions are undertaken as part of a corporate management system that promotes global nature recovery. System-scale integrity has two parts: 1) a high integrity corporate management system that strictly adheres to the mitigation hierarchy and good practice guidelines for managing companies' impacts on nature, 2) a high integrity global governance system that ensures corporate activity contributes to global societal goals for nature, climate and people; and embeds the global economy within a recovering environmental system.

A high integrity corporate performance management system requires recognising and accounting for a company's impacts on nature across the company's value chain and addressing impacts through rigorous adherence to the mitigation hierarchy. Addressing these indirect corporate impacts on nature requires proactive collaboration with other companies to transform value chains towards Nature-Positive trajectories. High integrity corporate performance management systems therefore

need to readily interface with other companies, taking a whole value chain approach. They also need to ensure that all key elements of nature and climate are considered in an integrated way – to promote synergies and minimise trade-offs – and are fully embedded within all forms of organisational decision making.

A high integrity global system means increasing corporate accountability for global nature recovery by building connections between corporate activity and global-scale outcomes. This includes setting corporate targets that are aligned with the scale of ambition required by global societal goals. A high integrity global governance system for Nature-Positive contributions sets transparent scientific criteria and accounting practices, and requirements for third-party verification and limits of Nature-Positive claims in relation to corporate activity to avoid greenwashing and ensure tangible contributions to global nature recovery. This includes guidance on criteria governing when company action can take direct restoration steps, versus sector wide transformation steps (e.g. where there is a high risk of impact shifting – or leakage – then a focus on sectoral transformation may be more appropriate than moving immediately to positive contributions). It should also set clear rules and guidelines on linkages between Nature-Positive targets and, for example, emissions reduction targets under the Paris Agreement, to promote synergies (e.g. via NbS) while minimising trade-offs and guarding against risks such as double counting. These guiding principles will be developed in the next draft.

Rules on use need to include transparent disclosure of corporate Nature-Positive contributions and registration of linked actions that underpin these claims on publicly available platforms. Verification of Nature-Positive contributions should be made by an independent third party, supported by clear rules on retirement of Nature-Positive contributions that are aligned with corporate reporting timeframes, to avoid double counting of contributions.

Finally, these high integrity systems will also need to be supported and underpinned by enabling policy, regulatory and market environments. Such environments will be created through government commitments, and domestic institutional arrangements and instruments for delivering the KMGBF (see Section 4.9.0 on how governments can use the approach), however companies and finance also play a role in advancing government agendas and driving transformation loops (Figure 7).

1070 *Table 7. Opportunities for adapting existing principles to a Nature-Positive context*

| Key existing principles of net gain approaches[6] | Description of existing principle | Relevance to the approach proposed here and potential adaptations |
|---|---|---|
| **Adherence to the mitigation hierarchy** | All appropriate avoidance, minimisation and on-site restoration measures will be implemented or explored and reasonably ruled out. | The mitigation hierarchy remains a fundamentally important basis for an approach, at both local and system scales. However, there are some differences from previous site-based approaches:<br>1) The need to stop and reverse nature loss – i.e. a far more ambitious target than just local no-net-loss – places greater emphasis on avoiding and reducing impacts in the first place than the existing IUCN offsets policy. In alignment with the Nature-Positive goal (Locke et al., 2021), climate science (Cook-Patton et al., 2021; Dooley et al., 2022; Matthews et al., 2022) and stakeholder expectations (AFI, 2019; SBTN, 2021), the objective should be zero conversion of natural habitats by companies where feasible. This raises equity concerns, for example for countries which have historically protected natural habitats (Maron et al., 2020), so guiding principles need to be developed around where and when conversion may be appropriate.<br>2) The principle needs to be expanded to include the extended mitigation hierarchy, including regeneration, transformation and positive contributions for nature. For example, there is a need for guiding principles and objective criteria for when companies should avoid impacts by changing supplier or sourcing location (which risks leakage and splitting the market) and when they could instead engage with suppliers to reduce impacts.<br>3) The principle could be extended to incorporate thinking on 'least-cost' implementation of the mitigation hierarchy by applying principles from marginal abatement cost curves for emissions reduction to nature conservation and restoration (Squires & Garcia, 2018), in which mitigation hierarchy steps are deployed not as a hierarchy but through identifying the most cost-effective management strategies (Booth et al., 2020; Milner-Gulland et al., 2021). |
| **Limits to what can be offset** | There are situations where residual impacts cannot be fully compensated for by a biodiversity offset because of the irreplaceability or vulnerability of the biodiversity affected. | This is as applicable for the approach proposed here as for traditional net gain approaches, despite the limited role for offsets in this approach. A focus on zero conversion of natural habitats greatly limits the scope of this principle in this approach. |
| **Equivalence** | Biodiversity gains from offsets must be 'like for like or better'. | Where offsets are used to compensate for unavoidable residual new impacts, then the principle of equivalence needs to apply, as otherwise there is a risk of 'hidden trades' and unintended consequences for biodiversity (Pilgrim & Ekstrom, 2014; S. zu Ermgassen et al., 2020). However, for broader positive contributions to nature recovery, and where value chain data are less precise (so it is impossible to identify the precise type of biodiversity impacted), a looser definition of equivalence is likely to be more practical and appropriate. Nevertheless, a minimum level of equivalence (e.g. in same ecosystem functional group in the same ecoregion – otherwise known as a 'biogeographic ecotype') is appropriate and guidance will need to be developed. |

[6] Adapted from BBOP (2012a) and IUCN (2016).

| Key existing principles of net gain approaches[6] | Description of existing principle | Relevance to the approach proposed here and potential adaptations |
|---|---|---|
| **Net gain** | A biodiversity offset should be designed and implemented to achieve in situ, measurable conservation outcomes that can reasonably be expected to result in a Net Gain of biodiversity. | The approach has alignment with societal goals as a core element, whereas this principle focuses on local net gain. It needs updating to focus on outcomes aligned with jurisdictional or societal targets (Simmonds et al., 2020). |
| **Additionality** | Conservation gains will be clearly attributable to the project's actions and will be demonstrably above and beyond results that would have occurred if the offset had not taken place. | This principle remains relevant but could be extended to apply to all positive impacts, not just offsets. Further, the existing language implicitly allows for biodiversity gains relative to a counterfactual (which may be declining) which is not compatible with an approach which seeks absolute gains from a static baseline. This principle therefore needs updating to take account of that key design element, and also of recent experience evaluating counterfactual scenarios (Maseyk et al., 2020), and the growing body of work on robust evaluations of conservation project effectiveness (e.g. Devenish et al., 2022). |
| **Landscape context** | Offsets will be designed accounting for connectivity across the landscape, avoiding fragmentation, and maintaining flows of ecosystem services. | This principle can be generalised for any positive contribution, not just offsets. This criterion is implicit in the IUCN Nature-based Solutions Standard Criterion 2 but could be made more explicit. |
| **Precautionary approach** | Estimates of gains and losses will be conservative and include a margin of safety proportional to the risks involved in offset delivery. | This principle is even more important in a Nature-Positive context, given the coarse resolution of much value chain data. It can be generalised to cover all assessments and be informed by risks to achievement of societal goals. Concepts in the IUCN technical considerations for offsets (Pilgrim & Ekstrom, 2014) concerning multipliers and risk management can be adapted, as can approaches from carbon credits such as buffer pools and leakage multipliers. |
| **Long-term outcomes** | Biodiversity offsets will use an adaptive management approach, incorporating monitoring and evaluation, to secure outcomes that last at least as long as project impacts. | A key principle for Nature-Positive contexts. The principle needs updating to go beyond offsets and to consider a long-term business value chain perspective rather than just a project impact perspective. |
| **Equity** | The sharing among stakeholders of the rights and responsibilities, risks and rewards associated with a development project are offset in a fair and balanced way, respecting legal and customary arrangements. Special consideration must be given to respecting both internationally and nationally recognised rights of Indigenous peoples and local communities. | A critically important issue – see detailed discussion below. |
| **Stakeholder participation** | Offsets will be based upon appropriate, extensive and transparent stakeholder consultation. | A critically important issue, which needs broadening to cover aspects other than offsets, in a scalable way. |

| Key existing principles of net gain approaches[6] | Description of existing principle | Relevance to the approach proposed here and potential adaptations |
|---|---|---|
| **Transparency** | The design, implementation and monitored outcomes of biodiversity offsets will be transparent and communicated in the public domain. | This is a fundamental part of mainstreaming, a core component of the approach, and needs expanding to cover the whole process, not just offsets. |
| **Science and traditional knowledge** | Both kinds of information will be used, where appropriate, to underpin an offset. | This issue is as applicable for the IUCN approach as for offsets. Incorporation of the key insights from recent years into revised equity principles should include: the importance of respecting local knowledge systems, alternative cultural ways of relating to nature (e.g. biocultural perspectives), and traditional governance approaches. |

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## 5.8. Social equity and safeguards

To align with emerging definitions and global goals, Nature-Positive contributions should facilitate social justice and equity at both local and global levels, to help the world stay within safe and just planetary boundaries (Röckstrom et al., 2023) according to the principles of interspecies justice and Earth System Stability (i.e. averting species extinction and ecosystem collapse), intergenerational equity (i.e. ensuring future generations can benefit from biodiversity), and intragenerational equity (i.e. ensuring people around the world alive today have fair access to resources and the benefits of biodiversity). Nature-Positive contributions should operationalise this by ensuring it: (a) respects and protects human rights (recognition justice), (b) provides a fair process and governance structure for delivering those outcomes (i.e. process/procedural justice), and (c) delivers socially equitable outcomes (i.e. consequential and distributive justice).

A human rights-based approach to conservation (Boyd & Keene, 2021) recognises that there are universal, inalienable, unconditional and non-discriminatory rights to life, liberty and security that are held by all human beings (Newing & Perram, 2019). This means that companies and institutions hold legal and moral obligations to ensure that Nature-Positive contributions avoid exclusionary approaches; are founded on free, prior and informed consent (FPIC); and ensure full respect for the rights and wishes of Indigenous peoples and local communities.

Beyond the moral imperatives of taking human rights-based approaches, undertaking socially equitable and collaborative approaches supports the achievement of biodiversity outcomes (Hajjar et al., 2021; Oldekop et al., 2016). A systematic review comparing different forms of governance by Dawson et al. (2021) found that when Indigenous peoples and local communities have a substantive role in decision making, these projects are more likely to deliver both effective conservation outcomes and improved well-being outcomes compared to externally controlled projects. In contrast, when interventions are governed by external organisations and involve strategies to change local practices and override customary institutions, they tend to result in relatively ineffective conservation and produce negative social outcomes. Therefore, the approach proposed here can promote positive outcomes for people and nature by ensuring the central importance of Indigenous peoples and local communities is recognised and that socially equitable processes are followed.

Existing guidelines and frameworks can be applied for promoting positive well-being outcomes alongside biodiversity outcomes, such as No Net Loss for people and biodiversity (Bull et al., 2018) and Net Gain: Seeking Better Outcomes for Local People when Mitigating Biodiversity Loss from Development (Jones et al., 2019). These include considering social impacts in terms of locally defined measures of human well-being, thereby ensuring that social impacts consider both economic or non-economic aspects of peoples' lives; and that any unintended negative impacts are accounted for and addressed (Loveridge et al., 2020; Woodhouse et al., 2015). In doing so, it is important to define the spatial scale for considering social impacts as the area encompassing all people directly or indirectly affected by project activities, commonly referred to as the project's 'area of influence' (Bull et al., 2018).

Other frameworks and standards include the IUCN Natural Resource Governance Framework (Springer et al., 2021), which requires assessment of the role of actors in improving effective and equitable natural resource governance; the International Finance Corporation's Performance Standards on Environmental and Social Sustainability (IFC, 2012), particularly IFC Standard 5 (Land Acquisition and Involuntary Resettlement) and IFC Standard 7 (Indigenous Peoples) requiring free, prior and informed consent; and the Global Environment Facility's Policy on Environmental and

Social Safeguards that emphasises access to grievance and conflict resolution systems for affected persons (GEF, 2019). The Accountability Framework also provides useful guidance on socially equitable actions to address nature impacts across value chains (AFI, 2019).

In the next version of this document, these frameworks will be integrated into a set of high integrity Nature-Positive social equity principles.

### 5.9. Implications for resource requirements

It is clear that aligning company efforts with the high integrity approach outlined above will require considerable investment and effort. The amount of investment and effort required will vary considerably across the range of options for most companies, and a priority should be to focus on the identification of contributions that not only generate significant benefits for biodiversity but can also be conducted efficiently and rapidly. Automation of calibration calculations and provision of detailed guidance will provide additional efficiency, and joint work to pilot efforts between early-adopter companies and IUCN can provide working models for refining these estimates.

# 6. Outline draft framework for assessment and implementation by companies

### 6.1. Introduction to draft framework

The approach presented here is intended to allow companies to deliver contributions to the KMGBF in a verifiable but efficient and logical manner. In the description of the pathways outlined below, we have not made a distinction between companies with different governance structures, as the approach is focused on how companies interact with biodiversity in their footprint, sourcing and investment strategies. These may be influenced significantly by their governance, in particular how shareholders have control over impacts, and the extent to which governments can impose regulation on them. As an example, government influence on state-owned enterprises will obviously be much greater than that on large multinationals that source commodities at a distance from their areas of production.

We recognise that a company's impacts and opportunities relating to biodiversity lie somewhere on a spectrum – from having clear and unequivocal authority over decisions affecting biodiversity in a specific site, to purchasing a commodity or service that, in its production or delivery, has impacts on biodiversity that are not discernible by the company, owing to lack of spatial precision of product or service source in the value chain, to investing in companies that sit somewhere on the above spectrum. Our aim is to enable companies to identify opportunities to make positive contributions to the KMGBF across this spectrum, even in the worst of these cases. We believe that with time, the interests of the consumer will push suppliers to be more transparent about sourcing information, and in addition, the application of technology such as artificial intelligence and blockchain will reduce the ability of producers to conceal the origin of products they are selling.

For convenience, while the spectrum of knowledge about sourcing locations is continuous, and companies' control over producer standards also varies from complete to none, we have divided the guidance into three categories.

The approach outlined below will translate into **pathways for the three categories of company, which are described in more detail in Section 7** (many companies will have activities that touch all three categories)**:**

A. Companies with opportunities to affect land-use decisions through their own management authority (the Direct Operations Target Boundary of SBTN; e.g. infrastructure and renewable energy developers, primarily agricultural and logging commodity producers, extractive industry), where biodiversity is directly within their sphere of control.
B. Companies with value chain connections to land holdings, through purchase and processing of commodities with impacts on biodiversity at the site of production or extraction, but for which the company does not have direct authority over land-use decisions (the Upstream Target Boundary of SBTN; commodity consolidators, consumer product companies in sectors with significant reliance on commodities with heavy biodiversity footprints, retailers, wholesalers). For such companies, biodiversity is within their sphere of influence but not directly within their sphere of control, therefore they have a more complex task to assess and address biodiversity impacts. As far as possible, it will be desirable to design interventions in places where commodities are sourced that follow the protocol outlined for Company A. However, for many products that companies buy, the precise geographical sourcing information may be missing, requiring a more iterative approach.
C. Finance companies with portfolios that contain combinations of Categories A and B. For such companies, biodiversity impacts are within their sphere of influence, yet they are less able to directly control them. However, finance companies can assess how their portfolio is performing overall in terms of biodiversity impacts, through evaluation of investee companies' progress. Sector-level statistics could then be compiled to inform how portfolio holdings are performing, and how they can be adjusted or improved through, for example, biodiversity-linked loan covenants, shareholder activism (e.g. voice and exit) or sector-specific messaging. An appropriate platform will provide finance sector companies with a means to assess investee companies' performance in relation to their progress along the Nature-Positive pathway and overall contributions, and attribute a score to each. This will enable the calculation of portfolio-level Nature-Positive scores, and identify opportunities for exerting influence over investee companies to improve their biodiversity performance.

The pathways will contain explicit means to:

1) Register and publicly commit contributions to the KMGBF, and identify and 'score' where on the pathway they are;
2) Screen their value chains and investments, including operations, land holdings, commodity sourcing, downstream impacts and portfolios for opportunities to align better with Nature-Positive;
3) Estimate a biodiversity baseline, which includes both historical and ongoing impacts;
4) Define SMART objectives and, using the approach described here, assess performance measures or KPIs to drive actions that will improve positive and reduce negative impacts;
5) Decide on, design and deliver interventions (informed by data provided and building upon the activities already identified as Biodiversity Finance Eligible Activities (by the IFC));
6) Identify incentives and subsidies that enable companies to deliver these contributions;
7) Ensure regular monitoring, verification and disclosure of progress; and
8) Allow the assessment of contributions made by companies, compared to a baseline, to societal goals and to Nature-Positive.

Potential steps for each category of company are summarised in Figure 8, and are described in more detail in Section 7. Use of these pathways will be supported by online toolkits and guidance notes that will be produced in 2024 in Phase 2 of the approach.

Company pathways will be iterated with the WBCSD Roadmaps to Nature-Positive, which focus on particular sectors, and include dependencies as well as impacts, and non-living nature (Roadmaps to Nature Positive – World Business Council for Sustainable Development (WBCSD).

A robust scoring system is under development to assess companies' progress along pathways to Nature-Positive alignment. An initial proposal for steps on these pathways is presented in Section 7 below. A simple approach for measuring progress could be to set standards and means of verification for each step in the pathway, with 'points' available for each standard achieved. These standards would need to be objectively verifiable and act as indicators to ensure logical and meaningful progress and high integrity. Acknowledging that progress towards Nature-Positive alignment may also be iterative (e.g. as availability and accuracy of spatially-explicit data improves, or as ambitions and scope develop), the scoring system could also be structured into three tiers (e.g. bronze, silver and gold), which reflect different levels of ambition, and recognise the best performing companies whilst also encouraging new companies to begin their journey to Nature-Positive.

To guard against greenwashing and negative outcomes, companies could also score negative points for evidence of poor performance or failure to uphold principles of high integrity, which can only be re-added after a minimum period and once progress or proper implementation has been proven. Setting – and delivering on – robust targets for issue areas not covered by the approach (such as climate) within a short, specified period could be a precondition for entering the scoring system. IUCN recognises that a credible scoring system is critical for assessing and incentivising companies, and will work with key stakeholders to develop a robust approach for the next iteration of this working paper.

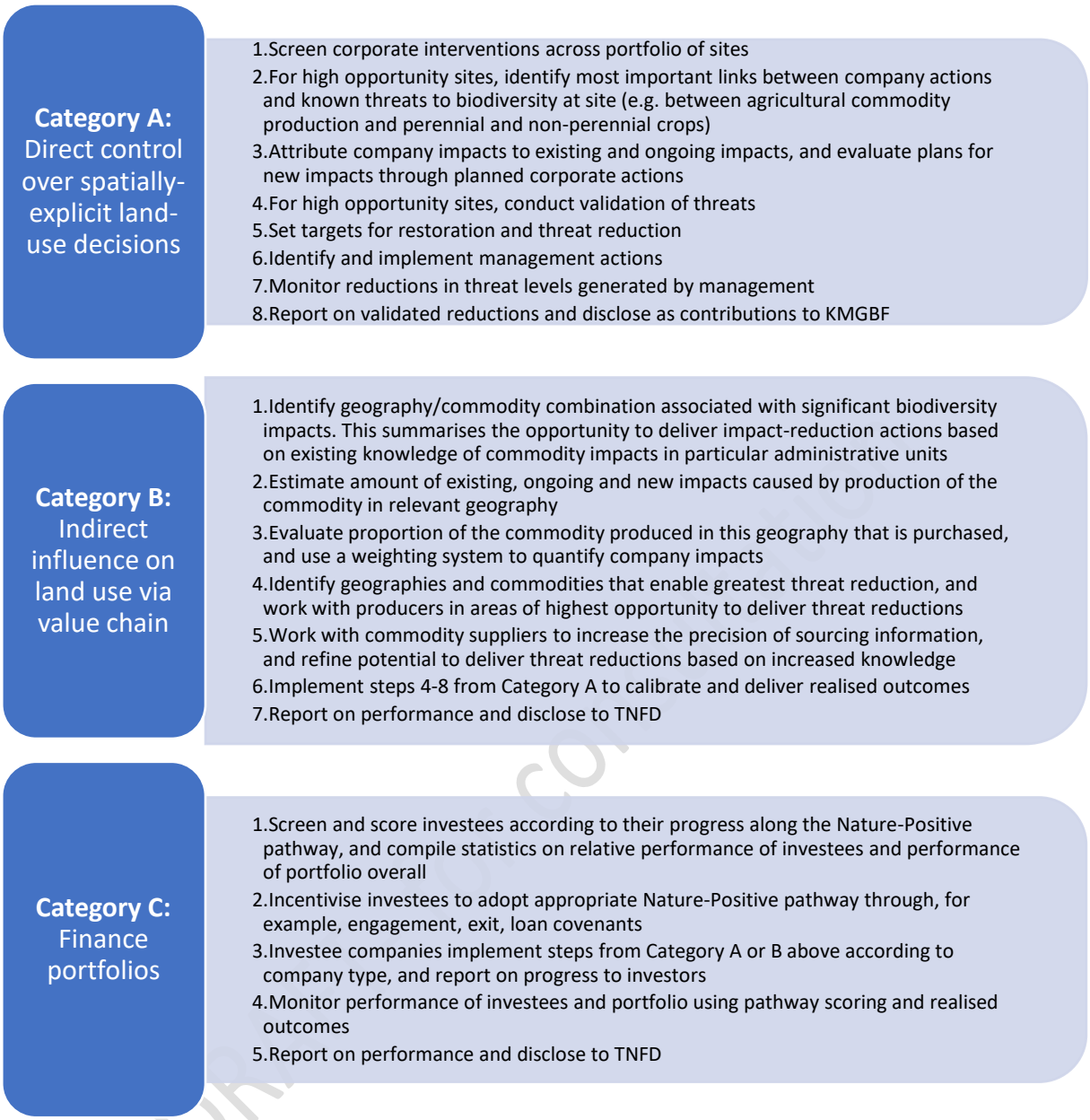


*Figure 8. Steps that can be used by different categories of companies to implement the approach. See Section 7 for fuller details of these pathways.*

## 6.2. Assessment framework[7]

This section outlines a proposed assessment framework for the approach, building on existing IUCN metrics, datasets and standards. The methodology described here will require discussion, refining and testing.

[7] This assessment framework draws in part on materials in development for the Science Based Targets Network Biodiversity Hub's draft guidance on target setting.

***Box 1. Assessment framework***

The two main components of the assessment framework are: (a) a means to assess where on the pathway towards making Nature-Positive contributions a company is, and (b) a means to quantify contributions to Nature-Positive at a site level. The two components are integrated; a company uses the quantification mechanism as part of the pathway to making contributions. These contributions can then be aggregated at country, sub-national unit or sector level to show how they form part of the KMGBF.

The KMGBF[8], in line with global goals for nature set out by non-state actors (Locke et al., 2021), aims to put biodiversity on a path to recovery by 2050. This requires 'bending the curve' of biodiversity loss from its current downward to a positive (Mace et al., 2018; Secretariat of the Convention on Biological Diversity, 2020). 'Bending the curve' requires integrated action across a suite of targets (Leadley et al., 2022). The approach assessment framework thus focuses on two key and complementary elements of the global goals:

- Stemming biodiversity loss through reducing species extinction risk; and
- Biodiversity recovery through ecosystem conservation and restoration.

The KMGBF has goals for ecosystem, species and genetic diversity. This initial version of the IUCN assessment framework covers ecosystem and species diversity. It does not directly address genetic diversity as despite recent progress (e.g. Hoban et al., 2022), this remains relatively difficult to assess and challenging to build into a Nature-Positive framework for companies.

The proposed initial version of the Nature-Positive approach's quantification framework uses two complementary metrics (described in greater detail below):

- The Species Threat Abatement and Restoration (STAR) metric. STAR combines species diversity, range restriction and threat status to highlight where there are greatest opportunities for interventions to reduce species extinction risk.
- Ecosystem extent × condition metric. IUCN is in the process of identifying an appropriate ecosystem metric.

STAR focuses attention on species' vulnerability and irreplaceability, two key elements in conservation priority setting. The proposed ecosystem metric does not distinguish the conservation importance of different ecosystems but applies equally to all. The two metrics complement each other: STAR addresses the need to reduce biodiversity loss by prioritising the places where this is most urgent, and where there are fewest spatial options. The ecosystem metric addresses the need for nature recovery across all ecosystems.

The ecosystem- and species-level metrics used in the approach assessment framework are spatially explicit, that is, they refer to impacts that can be generated in particular sites. These sites may be places where commodities (agricultural, mineral and other) are produced, or they can be protected areas, or infrastructure projects (dams and roads for instance). The fact that the metrics used are scalable means that impacts (negative or positive) can be added up across larger administrative or ecological areas. This can allow governments to assess the combined contributions of companies to KMGBF targets across a country or state, or allow companies to assess combined contributions across a set of landholdings, for instance farms or mines. While the production of many commodities

[8] https://www.cbd.int/article/draft-1-global-biodiversity-framework

is not yet linked to specific sites, the expectation is that pressure from regulators and consumers will push commodity producers to identify production locations more explicitly in the future.

The two metrics are also overlapping, as actions to reduce species' threats will also improve ecosystem extent and condition, and vice versa. Each is best suited for application in different contexts (see Section 6.3.2 below).

Milner-Gulland (2022) sets out six key elements needed for a robust approach to biodiversity net gain, relating to baseline, timeframe, action, adequacy and monitoring. Table 8 outlines how these elements are included in the approach and draft assessment framework.

*Table 8. Key elements needed to achieve and demonstrate net gain*

| Key element | IUCN proposed approach and draft assessment framework |
|---|---|
| **A measured biodiversity baseline** | The assessment framework applies either STAR or an ecosystem metric. In either case, a measured baseline is required against which conservation gains can be assessed: for the intensity of relevant threats (STAR) or the area and condition of targeted ecosystem(s). |
| **A timeframe** | The KMGBF, including global goals and targets, was agreed at the end of 2022. IUCN proposes a baseline year of 2022 for assessment of existing and ongoing impacts.<br>STAR is focused on halting biodiversity loss, through urgent action to reduce species extinction risk.<br>For existing and ongoing impacts, IUCN proposes to use a timeframe to 2032 for assessing gains under STAR.<br>For new impacts, IUCN proposes to use a timeframe of ten years from the start of the intervention for assessing gains under STAR.<br>At the end of this period, outcomes and compensation targets could be reassessed using current Red List information and the most recent version of STAR (see Figure 6).<br>The ecosystem metric is focused on biodiversity recovery, through actions to restore ecosystems. For existing, ongoing and new impacts, IUCN proposes to use a timeframe up to 2050, in line with the KMGBF.<br>However, this will include a review point in 2032 (for existing and ongoing impacts) or ten years after the start of interventions (for new impacts). At this review point there will be potential for reassessment and re-targeting, depending on progress and the expected trajectory of recovery. |
| **A target** | The draft assessment framework requires explicit targets for biodiversity gains, based on assessment of biodiversity losses. The approach to target setting depends on impact type:<br>Existing impacts – A sector-specific proportional contribution (to be defined) to compensate for historic impacts;<br>Ongoing impacts – Reduction of impacts as far as feasible, and full compensation for residual impacts;<br>New impacts – Reduction of new impacts are far as feasible, and net gain for residual impacts. A multiplier of 10 x the assessed impacts is proposed for compensating new impacts;<br>For the ecosystem metric an additional multiplier (ranging from 1.2–4) is proposed according to conservation status of the ecoregion where impacts occur. The STAR metric already incorporates consideration of conservation priority, so no further multiplier is needed. |
| **A clear set of actions to be carried out, costed and sequenced** | Interventions will be registered on an appropriate platform, which will require a clear and costed action plan, a credible theory of change related to realistic predictions of expected gains, and an appropriate monitoring framework with relevant outcome (state), pressure and response indicators.<br>The platform will also require regular reporting on progress towards targets.<br>For Nature-Positive alignment, action plans should make clear how the intervention is contributing to existing conservation priorities and plans, for example National Biodiversity Strategies and Action Plans and Nationally Determined Contributions for biodiversity. IUCN |

| Key element | IUCN proposed approach and draft assessment framework |
|---|---|
| | will develop approaches to aggregate planned actions and achieved outcomes, using the STAR and the ecosystem and other relevant metrics, to demonstrate overall contribution to agreed global goals and targets. |

### 6.2.1 Extinction risk – STAR

STAR is a biodiversity metric based on information in The IUCN Red List of Threatened Species™. STAR is well suited as a metric to support Nature-Positive business alignment, as it directly supports several key elements of the KMGBF: the objectives in Goal A and Milestone A2 to reduce species extinction risk, and Target 4 on active management actions to enable the recovery and conservation of species.

The STAR methodology maps range rarity, a measure of the number of species and proportion of their distributions overlapping at a site, weighted by species' threat of extinction risk (Mair et al., 2021). STAR thus combines the elements of biodiversity vulnerability and irreplaceability, frequently used for conservation priority setting as they imply constrained conservation options in time and space, respectively. Changes in STAR values used in evaluating Nature-Positive contributions can be generated by the reduction in threats to threatened species. These threats are often closely linked to company activity (for instance habitat loss caused by infrastructure development) and so give companies a means to link their activities directly to the status of biodiversity.

STAR is accessible via IBAT as a set of global data layers showing STAR scores in 5 x 5 km grid cells, although this will be downscaled to 1 x 1 km in the next version. The STAR global data layers include all Threatened and Near Threatened amphibians, birds and mammals – the major taxon groups that are comprehensively assessed and mapped. These data layers currently only cover terrestrial species, but work is underway to extend STAR to the marine and freshwater realms, and to expand the coverage to other well-assessed taxon groups.

STAR has two complementary elements: STAR for threat abatement (STAR-t) and STAR for restoration (STAR-r). These can be used to identify areas where actions to abate threats or undertake restoration can help reduce species extinction risk and contribute to conservation goals.

High threat abatement (STAR-t) scores indicate areas that currently contain relatively high numbers of threatened species, a large proportion of individual species' ranges, and/or species that are severely threatened. These are locations where positive interventions could make a large contribution to reducing global species extinction risk and where developments that increase threats to species need to be mitigated.

High restoration (STAR-r) scores indicate areas that previously supported relatively high numbers of threatened species, a large proportion of individual species' ranges, and/or species that are severely threatened. These are locations where restoration activities could make a relatively large contribution to reducing species extinction risk.

STAR is calculated in a standardised way, using global and spatially-explicit data, meaning that scores can be assessed, compared and added for any site, country or region for a particular company activity. This supports the aggregation of company activities that have different levels of spatial information.

STAR scores can also be broken down to show the contributions of individual threat types or company activities. STAR's scalability lends itself to prioritisation and the setting of science-based targets, as it enables identification and comparison of opportunities and risks across assets and types of company activity.

STAR can be calculated at different scales, using national, regional or global Red Lists, but only the version based on the global Red List is comparable across the world. STAR scores based on the global Red List have a skewed distribution, where many grid cells have relatively low scores, and a few have relatively high ones. Effectively, STAR focuses attention on places with high species diversity, endemism and threat. Such places are often in the tropics and especially in centres of endemism.

STAR does not provide a means to evaluate the changes in the status of common species that may play key roles in ecosystems and their accompanying processes. Other species metrics that may contribute to the measurement of these functions would be desirable but are beyond the scope of the IUCN approach.

### 6.2.2 Risk of ecosystem collapse – ideal metrics and possible short-term proxies

Ecosystems are critically important components of Earth's biological diversity and the natural capital that sustains human life and well-being. Assessing risks of biodiversity loss at the ecosystem level, and using this to implement the mitigation hierarchy, accounts for broad scale ecological processes and important dependencies and interactions among species and addresses trends in common species and in turn ecological form and function on which many of nature's contributions to people depend. For this reason, draft societal goals seek to increase ecosystem integrity and reduce risk of ecosystem collapse.

The IUCN Red List of Ecosystems (RLE) is a global, science-based standard for how we assess the conservation status of ecosystems, applicable at local, national, regional and global levels. Supported by the IUCN Global Ecosystem Typology (GET), more than 4,000 ecosystem assessments have been carried out, with more underway. The IUCN RLE provides a methodology to assess the risk of ecosystem collapse (Keith et al., 2013). Red List of Ecosystem assessments thus provide an ecosystem-level, but not site-level, measure of integrity.

However, both mapping of ecosystems and coverage of RLE assessments are not yet sufficiently comprehensive to form the basis of a global Nature-Positive framework. Given the ecological importance of assessing impacts and opportunities at scales broader than species and the focus on ecological integrity in societal goals, an interim solution to the ecosystem metric issue is required in order to be able to operationalise the approach.

### 6.2.3 Possible alternative metrics and datasets for ecosystem condition

In the future, IUCN plans to use the IUCN RLE and an associated metric to assess the potential for reducing the risk of ecosystem collapse to sit alongside STAR, once RLE assessments become more readily available. In the meantime, Nicholson et al. (2021) list available ecosystem condition metrics and the components of condition that they include. Many of these have global coverage based on information from remote sensing (e.g. for structure and land/seascape characteristics) and/or pressure-impact modelling (e.g. for composition).

Examples include the ecoregion intactness index Q' (Beyer et al., 2020) that shows the contribution of a particular grid cell to overall ecosystem intactness, including a landscape connectivity element; and Mean Species Abundance – based on the GLOBIO pressure-impact models (Schipper et al.,

2020), a measure of the abundance of species compared to the reference state, assessed using a standard set of taxonomic groups. GLOBIO is derived from a limited number of reference points per ecosystem, so specific impacts of interventions cannot be tracked, and target setting and disclosure of impacts are therefore not possible.

Other condition-related metrics currently in development include:

- The Ecosystem Integrity Index (led by UNEP-WCMC). This is intended to support science-based targets for nature and including measures for structure, composition and function. The EII is based on modelled and remotely-sensed data and it may not be easy to calculate using ground-truthed data from the field. It is thus likely to be more suitable for broad assessment of potential negative and positive impacts than for assessing gains for species and ecosystems in Nature-Positive interventions.
- The Critical Ecosystems Area metric (led by the Wildlife Conservation Society), which combines assessment of pressures (as proxies for ecosystem condition) and systematic conservation planning to identify the highest priority areas for conservation and restoration. This metric may be suited to identifying priority locations for interventions, rather than assessing losses and gains in the approach.
- IUCN also recognises the ecosystem extent and condition metrics used by the System of Environmental-Economics Accounting Ecosystem Accounting (SEEA EA), an international standard adopted in 2021 by the UN member states which uses the IUCN Global Ecosystem Typology. IUCN Resolution WCC-2020-057 calls for the use of SEEA.

Where global spatial data are available for ecosystem condition metrics, these provide a resource for priority setting and initial impact assessment. Because they are often based on models and remote sensing data, however, they may contain inaccuracies at fine scales.

Incorporation of a metric of risk of ecosystem collapse, and possible surrogates for these, is under current discussion for incorporation into IBAT. This will be advanced through meetings over the course of the consultation period, and this text updated accordingly in the next version of the paper.

## 6.3. Conceptual foundations for implementation approaches

### 6.3.0 Spatial scale

Where possible, Nature-Positive contributions should be assessed and delivered at a scale that allows precise attribution of the impacts of actions on the underlying biodiversity. In practice this means at the site scale.

STAR is currently mapped globally using 5 x 5 km grid cells.

Indicative ecosystem mapping using the IUCN typology is available at https://global-ecosystems.org/. The spatial grain of map rasters varies from 10 minutes to 1 degree of latitude and longitude, depending on the resolution of available base layers. Given the relatively coarse granularity, for application in this framework these maps will need to be combined with finer scale landcover/land-use mapping, as an indication of which ecosystem types are likely to occur at particular point locations.

The draft assessment framework will apply at larger-scale units in some contexts, i.e.:

(1) When spatial information on company activities or sourcing is imprecise, for instance if only the country or continental sub-region of origin for a commodity is known. Weighting for geographic imprecision is outlined in Section 6.5.6.

(2) When assessing an allocated STAR score for ongoing impacts (see Section 6.5), which requires estimation across a broader area beyond specific company activities.

The default larger-scale area of assessment is the Country Ecoregion Component (CEC), representing the portion of an ecoregion (Dinerstein et al., 2017) found within a national boundary. CECs are likely to be relatively distinct from one another both ecologically (reflecting the set of threatened species present) and socio-economically (reflecting the threats and conservation measures present), and offer the opportunity to frame interventions in appropriate policy contexts, within countries. CECs will not always be applicable (e.g. when economic data needed to determine a company's share of ongoing impacts are available only at national or provincial scale): the smallest suitable administrative unit is then the next larger-scale unit of choice.

### 6.3.1 Impact scopes and types

Nature-Positive alignment by companies needs to consider the full value chain, with action prioritised where impacts are assessed to be most material. Different scopes of impact will be most relevant to different sectors. Table 9 summarises impact scopes (based on the Greenhouse Gas Protocol) and their components relevant to biodiversity.

*Table 9. Scopes and components of impacts, and examples of relevant sectors*

| Scope[1] | Component | Description | Example sectors where impacts likely to be material[2] |
|---|---|---|---|
| ***1*** | ***Direct*** | Impacts arising directly from company activities and within a company's control, e.g. habitat loss or degradation, pollution, species' displacement | Mining, forestry, energy, agriculture, fisheries, infrastructure, construction |
| ***1*** | ***Indirect*** | Impacts arising indirectly through wider demographic, socio-economic or ecological changes enabled as a consequence of company activities, e.g. through in-migration resulting in land-use change, or invasive species infiltration along new roads | Mining, agriculture, infrastructure |
| ***2*** | ***Energy inputs*** | Impacts linked to supply of energy. As well as carbon emissions, may include footprint, pollution and other impacts from specific energy sources | Technology, manufacturing, transportation |
| ***3*** | ***Upstream*** | Impacts in the supply chain, from sourcing and transporting commodities and materials | Manufacturing, renewable energy, construction, retail, hospitality, health, education |
| ***3*** | ***Downstream*** | Impacts from the distribution and use of products, including packaging, transport, storage and disposal | Manufacturing, retail, chemicals |

[1] *Impact scopes as defined by the Greenhouse Gas Protocol,* https://ghgprotocol.org/

[2] *See also Figure 5*

Assessment metrics do not differ between impact scopes, though the assessment approach may vary. For assessment purposes, impacts may be divided into three main categories: existing (or historical), ongoing (or recurrent) and new impacts (Table 10). Existing (or historical) impacts relate

primarily to past land- and sea-use change, and ongoing impacts (those that continue) to other pressure categories[9].

Suitable assessment metrics depend on both the context (see Section 6) and the impact type. For existing (historical) impacts, STAR-r (for restoration) across the impact footprint gives a measure of the overall area of habitat lost (Section 6.6.3). For ongoing impacts, a portion of the relevant STAR-t (for threat abatement) for the threat types relevant to the sector is allocated to a company based on its share of sectoral output (Section 6.6.4).

*Table 10. Impact types, Nature-Positive actions, and assessment metrics*

| Nature-Positive criteria | Description | Relevant IPBES pressures | Nature-Positive company actions aligned with global goals[10] | Assessment metrics |
|---|---|---|---|---|
| **New impacts** | Impacts arising from expanded footprint or recurrent impacts, through expanded corporate activity. New impacts are an expansion of existing and ongoing impacts. | All pressures | Avoid footprint impacts – *no future conversion of natural habitats*<br>Avoid and reduce recurrent impacts as far as feasible<br>Offset for residual impacts as a last resort | STAR can be applied to new impacts (Section 6.4) but this poses some technical challenges. IUCN is working on improved approaches to applying STAR in this context. STAR could in principle be used to project the future impact on species extinction risk of continued or anticipated activities. This in turn could be used for avoided loss accounting. |
| **Ongoing impacts** | Recurrent and arising from continuing company activity. May result in diffuse and spatially extended impacts, e.g. via resource exploitation, pollution or disturbance | Direct exploitation<br>Pollution<br>Invasive alien species<br>Others, such as collision fatalities at wind farms | Reduce and restore impacts as far as feasible<br>Compensate for residual impacts | STAR-t for sector-specific threats or an ecosystem metric, depending on context (Section 6.5) |
| **Existing (historical) impacts** | Already existing, non-recurrent impacts from habitat conversion or degradation (e.g. on occupied working lands, or through cumulative disturbance or pollution) | Land- and sea-use change | Regenerate working lands and waters<br>Reduce footprint impacts<br>Make a proportional contribution towards restoration | STAR-r or an ecosystem metric, depending on context (Section 6.6) |



[9] Note that impacts from climate change pressures are not directly included in this framework, as (a) companies are setting and implementing separate science-based targets for greenhouse gas emissions, and (b) this framework is spatially explicit, whereas climate change pressures are global.

[10] See: Interim Targets of the Science Based Targets Network https://sciencebasedtargetsnetwork.org/take-action-now/take-action-as-a-company/what-you-can-do-now/interim-targets/; zu Ermgassen et al., in review.

### 6.3.2 Relationship between metrics

The two assessment metrics, STAR and the appropriate ecosystem metric, relate to two distinct but overlapping goals for a Nature-Positive future: reducing species extinction rates, and conserving and restoring ecosystems, respectively. Either metric may be used for assessing company impacts and setting targets, and the conservation actions to be implemented will often be similar in either case. However, there are contexts in which it is preferable to deploy either STAR or the ecosystem metric:

- When impacts occur in a region of high STAR scores, indicating high species diversity, threat and/or endemism, STAR is an appropriate first-choice metric. Using the ecosystem metric will not differentiate this region from others where biodiversity vulnerability and irreplaceability are lower, nor will it provide information on the threats underlying the STAR scores.
- Many regions of the world have near-uniform low STAR scores. In these areas, STAR has little discriminatory power for the significance of impacts or the scale of opportunities. Using an ecosystem metric, which treats all ecosystem types equally, ensures that neither positive nor negative impacts in the region will be under-valued when assessed.

Ranking CECs by their STAR score[11] (combined for STAR-r and STAR-t) gives an indication of the relative biodiversity vulnerability and irreplaceability, and the appropriate metric to select.

*Table 11. Contexts for using STAR or ecosystem metric for assessment and target setting*

| Context | First-choice metric |
|---|---|
| **CEC ranked in top third of STAR scores** | STAR |
| **CEC in middle third of STAR scores** | Either STAR or Ecosystem metric |
| **CEC ranked in lowest third of STAR scores** | Ecosystem metric |

The methods to assess baselines, set targets and track progress using the ecosystem metric are currently in development, so initial application of the framework will use STAR alone.

### 6.3.3 Baseline year and timeframe

The KMGBF, including global goals and targets, was agreed at the end of 2022. However, following guidance from the Net Positive Initiative a baseline year of 2020 for assessment of existing and ongoing impacts is proposed; this may be updated based on the outcomes of the KMGBF and to align with future SBTN methods. The IUCN approach allows contributions to KMGBF by companies to be set using intervention and project-level baselines and delivery (for instance setting a baseline when a company starts impact mitigation actions) to be aligned with KMGBF baselines.

STAR is focused on halting biodiversity loss, through urgent action to reduce species extinction risk. For existing and ongoing impacts, IUCN proposes to use a timeframe to 2032 for assessing gains under STAR. For new impacts, IUCN proposes to use a timeframe of ten years from the start of the intervention for assessing gains under STAR. At the end of this period, outcomes and compensation targets could be reassessed using current Red List information and the most recent version of STAR (see Figure 6).

[11] Because STAR scores are strongly right-skewed, taking the 80$^{th}$ percentile grid cell score for the CEC is recommended for this purpose. This approach will be further trialed in the next iteration of this framework.

The Ecosystem metric (to be selected) is focused on biodiversity recovery, through actions to restore ecosystems. For existing, ongoing and new impacts, IUCN proposes to use a timeframe up to 2050, in line with the KMGBF. However, this will include a review point in 2032 (for existing and ongoing impacts) or ten years after the start of interventions (for new impacts). At this review point there will be potential for reassessment and re-targeting, depending on progress and the expected trajectory of recovery.

### 6.3.4 Allocating impacts and responsibilities

Achieving global goals for nature requires a concerted effort across society. One challenging problem is how to allocate responsibility fairly across actors – including companies. In the draft assessment framework, allocation issues arise in two main places:

*Existing (historical) impacts*: IUCN proposes that companies make a sector-specific proportional contribution to addressing existing, historical impacts. The rationale for this is that there is a global need to reverse biodiversity loss and other planetary boundaries that we are currently overshooting. Nature-Positive contributions beyond the application of the mitigation hierarchy (i.e. the focus of the proposal) will effectively make contributions that address society-wide existing impacts, in most cases caused by other entities. There are two principles that could guide scale and target of contribution. Scale could be determined by economic size, reflecting capacity and the indirect contributions of economic growth to the direct drivers of biodiversity.

The advantage of sector-wide collaborations to direct these contributions (ideally proportional to their economic capacity) that were historically caused by that same sector is that they enable synergies in actions (e.g. to restoring affected landscapes) and help catalyse transformative change. For example, food and beverage sectors working together to reduce their land footprint and/or increase on-farm biodiversity can pool their efforts in one landscape to be more effective for conservation and can invest in strategies to reduce the total land footprint or biodiversity impact of the sector. Assessed historical impacts provide the starting point (the 'grandfather' principle), adjusted by a weighting determined by the overall proportional contribution expected from companies, and a sector-specific and possibly company-specific weighting. The weighting (still to be determined) may be based on considerations such as economic capacity, nature of impacts and potentially size of companies.

*Ongoing impacts*: Allocation of ongoing impacts within an administrative or other region is simply based on the share of sector-specific economic output. This will usually be a monetary value but in some cases could be based on quantity of a commodity or manufactured item.

Allocation of responsibilities within supply chains is briefly discussed in Section 6.6.4. These challenges apply to responsibilities in downstream value chains also. IUCN will develop guidance on this issue, and/or adopt principles in development by others such as the Science Based Targets Network.

### 6.3.5 Supply chain complexity

Supply chains remain a challenge for Nature-Positive corporate alignment, for several inter-related reasons.

1. It remains difficult for many companies to understand and address their supply chain impacts (Lyons-White & Knight, 2018). There is often very limited reliable, fine-grained information on supply chain sources (World Bank & WWF, 2020). There are increasing efforts to enhance transparency and develop high-resolution understanding of the ecological

impacts of agricultural supply chains. Nevertheless, large sections of these supply chains can remain hidden from view because end users purchase from indirect suppliers, making it difficult to trace the commodities to source (E. K. zu Ermgassen et al., 2022). Improved supply chain information is being incentivised through policy initiatives such as the EU's zero deforestation law[12] that aims to end commodity imports associated with deforestation, the EU Corporate Sustainability Due Diligence Directive, and European Sustainability Reporting Standard E4 (within the broader framework of the EU Corporate Sustainability Reporting Directive), all of which will require high-resolution data to assess impacts and monitor for compliance. TNFD, an initiative largely driven by companies and finance, in their beta assessment framework[13] emphasise the need for location-specific information about companies' interactions with nature. This has the potential to make an expectation of traceability in supply chains the norm rather than an exception.

2. A company's steps to address supply chain impacts could be undermined through the actions of others. Attempts to improve management practices on the ground can lead to displacement of impacts to other sites ('spillover' or 'leakage': Meyfroidt et al., 2020). Switching to alternative suppliers in the same region, or sourcing from different countries altogether, can lead to re-routing through less discriminating purchasers (Lima et al., 2019; Lyons-White & Knight, 2018; Wilman, 2019) (a market 'split').
3. Responsibility for supply chain impacts (and also downstream impacts in the value chain) can be unclear due to the length and complexity of supply chains (Lyons-White & Knight, 2018). Control over ultimate biodiversity impacts can be hindered by inter-company barriers (e.g. culture and values), fragmentation in supply and use of commodities, lack of leverage or control over other tiers in the supply chain, poor traceability and lack of incentives, amongst others (Lyons-White & Knight, 2018; Wilman, 2019). If the company producing commodities or materials is not willing or able to take steps to reduce and compensate for biodiversity impacts, how far should a company buying those commodities take responsibility for those impacts?

These challenges all highlight the need for companies seeking Nature-Positive alignment to work with other companies, civil society and governments to drive transformational improvements throughout their sectors, including via advocacy for a level playing field through improved regulation.

### 6.4. New impacts: STAR

New impacts relate to an expansion of current existing and ongoing impacts, through additional economic activity creating an increase in physical footprint and other pressures on biodiversity.

To align with global goals, companies should avoid any further conversion of natural habitats, reduce new ongoing impacts as far as feasibly possible (according to the high integrity principles set out in Section 5.6), and compensate for any residual impacts, delivering a net gain.

Because STAR is based on current assessments in the IUCN Red List, there are some practical and conceptual challenges in applying the metric to new impacts. Specifically:

- The underlying information used to calculate STAR would change when new impacts introduce additional types of threat, substantially alter a species' area of habitat, or change its Red List category. The process of calculating a Calibrated STAR score (see Figure 6) for a

[12] https://environment.ec.europa.eu/publications/proposal-regulation-deforestation-free-products_en
[13] https://framework.tnfd.global/wp-content/uploads/2022/06/TNFD-Framework-Document-Beta-v0-2.pdf

particular site where a company's interventions may create new threats will accommodate this issue.

- Compensation for new impacts based on STAR involves trading off an increased threat to species in one place with a reduced threat somewhere else. This is a type of averted-loss offset, an approach that is often considered problematic (e.g. Simmonds et al., 2020). For this approach to contribute to 'bending the curve' of biodiversity loss in the right direction, targets for compensation (gains) need to be set substantially higher than losses.

For this reason, we recommend the use of STAR only for new impacts in the value chain (i.e. Scopes 2 and 3) and recommend traditional net gain approaches for new impacts under direct operational control (Scope 1), as described below.

### 6.4.0 New impacts under direct operational control (Scope 1)

Where an unavoidable new impact is within a company's direct operational control (Scope 1), then the company should apply existing standard approaches to delivering net gain. In particular, companies should demonstrate, **before the impact occurs**, that it is feasible to align with the IUCN Policy on Offsets (IUCN, 2016), and especially with paragraph 9 on limits to offsetting; if this is not feasible, the impact should not occur.

Detailed guidance on planning and delivering project-level net gain is available from the Business and Biodiversity Offsets Programme (https://www.forest-trends.org/bbop/resources/) and from the Cross-Sector Biodiversity Initiative CSBI (CSBI & TBC, 2015) (http://www.csbi.org.uk/wp-content/uploads/2017/10/CSBI-Mitigation-Hierarchy-Guide.pdf). Guidance on setting net gain targets aligned with jurisdictional and societal targets will be distilled, based on the literature on these topics, much of it derived from the IMEC group, as well as thinking on addressing risks of ecosystem collapse (Nicholson et al., 2021; Simmonds et al., 2020, 2022).

There is no fixed timeframe for achieving project-level net gain. In line with this draft IUCN assessment framework and the Global Goal for Nature, projects should aim to achieve net gain within 10 years of impacts occurring. A time discount (typically 2% per year) could be applied for gains to be achieved in the future.

Project net gain will focus on priority biodiversity features, but should include all impacts on biodiversity. Priority features could include, but may not be confined to, natural habitat, so that an ecosystem extent × condition metric can be applied as outlined in this draft assessment framework.

IUCN will develop additional guidance on project net gain for Scope 1 impacts and how it is incorporated in the approach.

### 6.4.1 New impacts in the value chain (Scopes 2 and 3)

*For impacts where the extent of a physical footprint can be estimated, but the location is not known precisely and is not under a company's direct control* (expansion of 'existing or historical impacts'), magnitude can be measured by assessing the STAR-t score for the future footprint area and a sector-specific buffer (Section 6.5.6). This assumes that (as will usually be the case) the footprint area will become unsuitable for the threatened species that currently occupy it, leading to the loss of a portion of their populations. That loss would need to be compensated for by reducing threats to the species, and/or restoring its habitat, elsewhere.

A 'net gain' approach is required for compensating new impacts. To ensure that gains outweigh losses, to account for uncertainties, and to incentivise impact avoidance wherever possible, a multiplier of 10 x the impact STAR units is suggested for the STAR compensation target.

*For other impacts* (expansion of 'ongoing impacts'), the following approach is proposed:

1. Define the spatial unit of analysis (e.g. CEC or administrative unit);
2. Assess the scale of overall economic activity, *E*, for the relevant sector (see Section 6.5.3);
3. Identify the sector-specific threat categories (section 6.5.4.);
4. Calculate the total STAR-t score, *T*, for those threat categories in the spatial unit of analysis;
5. Calculate the STAR-t score per unit of sectoral economic activity, i.e. *T/E;*
6. Assess the expected expansion in sector-specific economic activity, *e*, that will result in new ongoing impacts; and
7. Calculate *e* x (*T/E)* to estimate new ongoing impacts.

This approach is applicable only when relevant sectoral activities linked to ongoing threats are already present in the preferred spatial unit of analysis. Where that is not the case, the spatial unit of analysis will need to be expanded to incorporate sectoral activities that can be linked to STAR scores. Ideally, this should be the smallest practical such unit, but may need to be at national, regional or global level. The larger the unit of analysis, the less accurate the estimate of new ongoing impacts. When a large unit of analysis is applied (overlapping more than two CECs), corrective weighting can be carried out following the approach outlined in Section 6.5.6. This approach merits further testing and exploration with a range of commodities.

To ensure that gains outweigh losses, to account for uncertainties, and to incentivise impact avoidance wherever possible, a multiplier of 10 x the impact STAR units is suggested for the STAR compensation target.

IUCN is progressing research into other approaches to apply STAR to new impacts more accurately, for example using a species-by-species assessment of the added scope x severity for relevant threats. This approach will be important for like-for-like rather than generic biodiversity impacts, but would be cumbersome to carry out manually. Approaches to automate or semi-automate such analyses are being investigated.

## 6.5. Ongoing impacts: STAR

Ongoing impacts (also called dynamic impacts) are continuing periodic impacts, such as pollution and mortality caused by ongoing pesticide or fertiliser use on agricultural land. As in that example, ongoing impacts are frequently linked to existing, static impacts. However, they can be diffuse and extend spatially beyond a physical footprint. They typically act via pressures such as direct exploitation, pollution and disturbance.

To align with global goals, the expectation is that companies will fully address ongoing impacts, first through actions to reduce them as far as feasibly possible, and then through compensation for any residual impacts.

For ongoing impacts, targets are set using the component of STAR-t (threat abatement) scores for specific defined threat(s) that can be directly related to sectoral activities. STAR-t is used as ongoing impacts give rise to continuing threats within a species' current areas of habitat. To be meaningful, this assessment must be for a spatial unit larger than a company's footprint – for example, a Country Ecosystem Component. A company's responsibility for the total STAR-t score for the relevant threat(s) is assessed by determining its share of the relevant economic activity in the spatial unit.

The process for using STAR to assess impacts and set targets is outlined below.

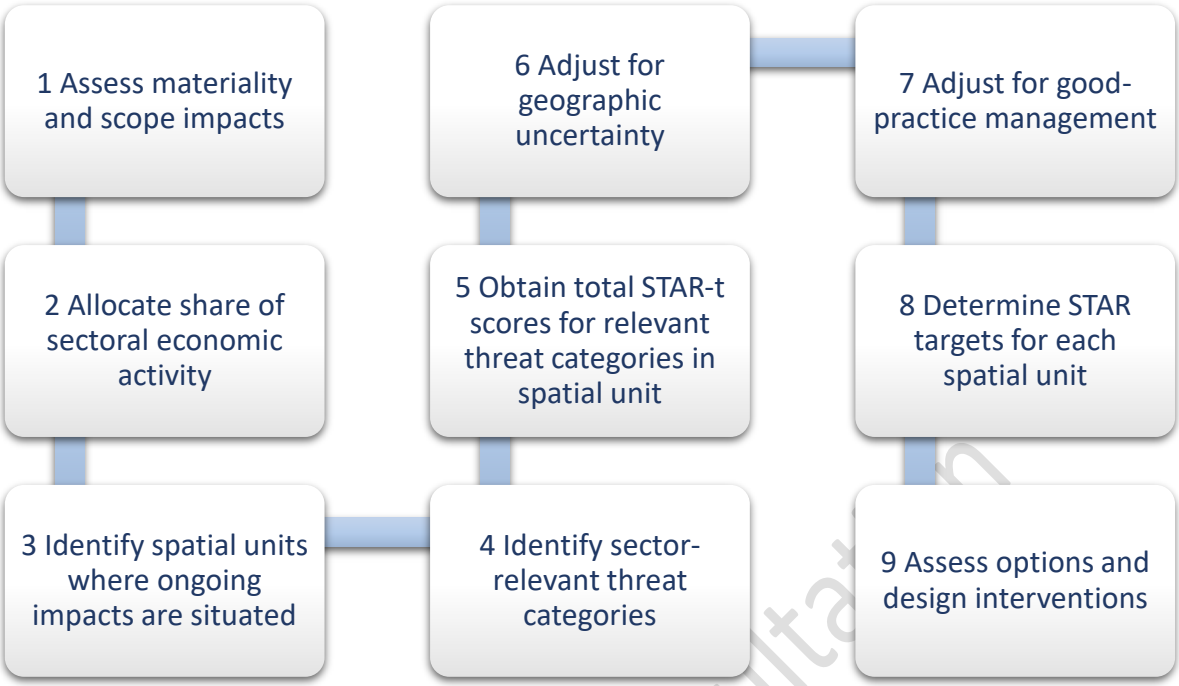


*Figure 9. Summary of process for assessing ongoing impacts using STAR*

Many steps in the process are similar to those for existing (historical) impacts. Elements that are different for ongoing impacts are explained below.

### 6.5.1 Assess materiality and scope impacts

The initial step is to determine the initial focus – both geographically and in the value chain – for addressing material existing (historical) impacts on biodiversity. Guidance for this is provided in *Science-based Targets* for *Nature: Initial Guidance for Business*[14] (SBTN, 2020), under Step 1 (Assess) and Step 2 (Interpret and Prioritise) of the target-setting process.

### 6.5.2 Allocate share of sectoral economic activity

The company's share of sectoral economic activity in the spatial unit of analysis needs to be assessed, as the basis for then allocating a share of the sector-linked STAR-t score.

For this, economic statistics and company economic data will be required. Production data (e.g. tonnes of a particular commodity) could also be used, but as sectoral classification is fairly broad it may be more feasible to apply monetary values of production rather than volumes.

### 6.5.3 Identify spatial units where ongoing impacts are situated

For ongoing impacts, Country Ecoregion Components (CECs) are a useful default spatial unit for analysis, for reasons outlined in Section 6.2.

However, the relevant economic data – e.g. sectoral revenue totals or production totals (tonnage) – to allow allocation of impacts to a company (see following section) may often only be available at

[14] https://sciencebasedtargetsnetwork.org/wp-content/uploads/2020/09/SBTN-initial-guidance-for-business.pdf

the level of an administrative unit, e.g. provincially or nationally. This scale may overlap with a number of different CECs.

### 6.5.4 Identify sector-relevant threat categories

For mapping threat categories onto sectoral activities, IUCN uses the concordance matrix of threats and sectors developed by Irwin et al. (2022)[15]. This allocates each economic sector within the UN Statistics Division's Central Product Classification standard to relevant IUCN threat classifications, and weights values based on the size of each of the economic sectors.

### 6.5.5 Obtain total STAR-t scores for relevant threat categories in spatial unit

An IBAT STAR analysis will generate total STAR-t values for the spatial unit of analysis, and scores split up by threat category. From this, the STAR-t total assigned to relevant threat categories can be extracted.

### 6.5.6 Adjust for geographic uncertainty

When ongoing impacts are known to be in a particular CEC, but data from a larger administrative unit must be used to allocate a company's share of impacts, STAR scores can be weighted to reflect the reliability of spatial information and the relative STAR score of the CEC compared to the whole administrative unit.

The proposed weighting approach is:

$$\textbf{Weighting} = \frac{\textit{median grid-cell STAR-t score for defined threat type in source CEC}}{\textit{median grid-cell STAR-t score for defined threat type across whole assessment area}}$$

Scores will be down-weighted if the CEC where impacts occur has a relatively low STAR score compared to the whole administrative unit, or up-weighted if the opposite is the case. On the other hand, if spatial information on impacts is poor and it is not known which CEC an ongoing impact is in, applying a precautionary approach ensures that impacts are not underestimated because of a lack of sourcing information, and incentivises information improvements.

In the situation of poor spatial information, the proposed weighting approach is:

$$\textbf{Weighting} = \frac{\textit{maximum of median CEC grid-cell STAR-t scores for defined threat type, across all CECs in whole assessment area}}{\textit{median grid-cell STAR-t score for defined threat type across whole assessment area}}$$

### 6.5.7 Adjust for good-practice management

There are many good-practice management activities that a company can carry out to reduce its ongoing impacts. Examples include reduced pesticide and fertiliser inputs through adopting regenerative agricultural techniques, reducing water extraction through water conservation and storage, shutdown on demand to reduce bird or bat fatalities at wind turbines, planting pollinator strips, better managing waste disposal, improving treatment of wastewater before discharge, and managing noise and atmospheric pollution.

[15] Available via online supplementary material for the paper, at https://static-content.springer.com/esm/art%3A10.1038%2Fs41598-022-09827-0/MediaObjects/41598_2022_9827_MOESM1_ESM.pdf

Activities to reduce biodiversity impacts may be required by regulators for permitting, or banks for financing, or may be implemented as part of a company's environmental policy to meet shareholder and stakeholder expectations. Good management may also be required by specific certification schemes or industry standards, for the company or its chosen suppliers.

Good management practices effectively reduce a company's contribution to pressures on biodiversity. In the draft IUCN assessment framework, they are recognised by down-weighting the allocated STAR score. Weighting ranges from 1 (with no good-practice measures demonstrably implemented) to – in theory, but unlikely to be realised – 0 (contribution to pressures completely eliminated). IUCN will develop weighting scores for a range of sector-specific management practices and certification schemes, based on available evidence and expert opinion.

#### 6.5.8 Determine STAR targets for each spatial unit

See Section 6.6.8.

#### 6.5.9 Assess options and design interventions

See Section 6.6.9.

### 6.6. Existing (historical) impacts: STAR

Existing (also called historic or static) impacts are linked to past conversion or degradation of habitats, where continuing occupation, disturbance or other factors are preventing natural recovery. Examples include land used for agriculture, or marine benthic habitats damaged by bottom trawling.

In terms of the STAR metric, these areas represent a foregone opportunity for threat reduction or restoration to reduce species extinction risk. Given that the impact has already happened, it is difficult to calculate the change in STAR-t caused by the impact. Existing impacts are therefore assessed using STAR-r, for restoration, although management options to compensate for existing impacts could be in the form of threat abatement in areas of similar or greater biodiversity value. Such compensations should be guided by the Business and Biodiversity Offsets Programme Design and Implementation Handbooks (online at https://www.forest-trends.org/bbop/resources/). The assessment process is outlined in Figure 10 and described in more detail below.

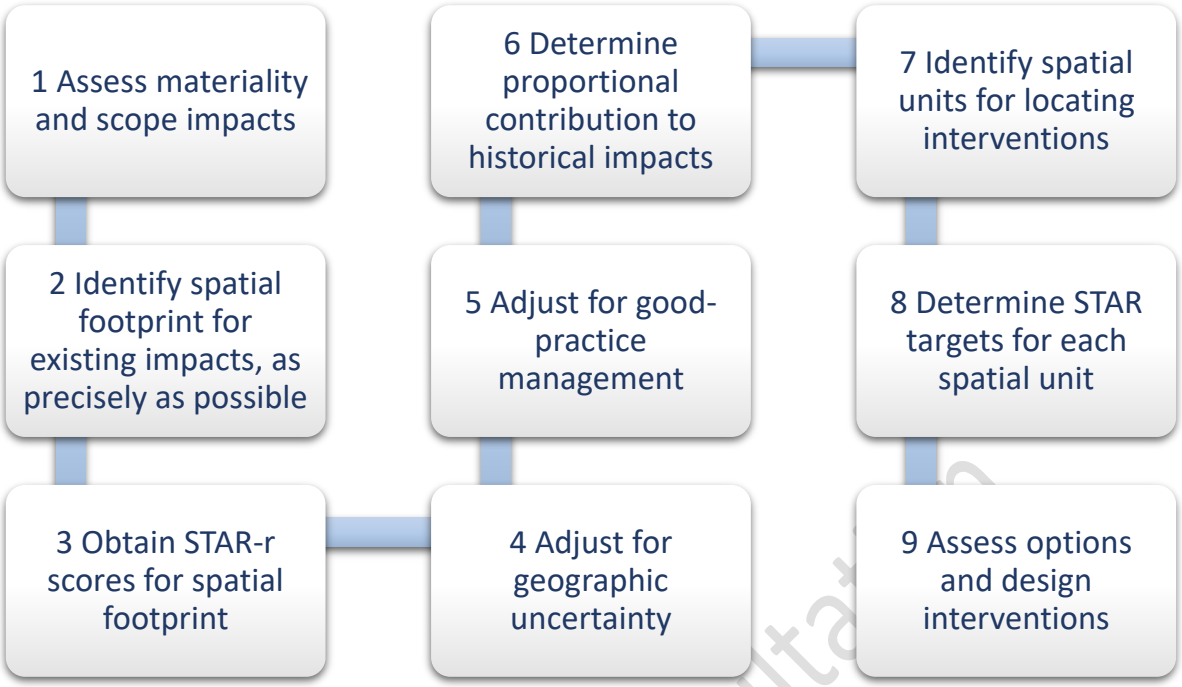


*Figure 10. Summary of process for assessing existing (historical) impacts using STAR*

### 6.6.1 Assess materiality and scope impacts

The initial step is to determine the initial focus – both geographically and in the value chain – for addressing material existing (historical) impacts on biodiversity. Guidance for this is provided in *Science-based Targets* for *Nature: Initial Guidance for Business*[16] (SBTN, 2020), under Step 1 (Assess) and Step 2 (Interpret and Prioritise) of the target-setting process.

### 6.6.2 Identify spatial footprint for existing (historical) impacts, as precisely as possible

Because of the highly local nature of biodiversity, accurate impact assessment depends on accurate spatial information (e.g. TNFD, 2022). Preferably, the spatial footprint for impacts will be available in the form of GIS polygons for specific locations. Where this is not the case, the smallest well-defined spatial unit including the impacts can be identified (e.g. a Country Ecoregion Component), along with an area estimate for the impact footprint. The area estimate will need to be based on relevant data sources, for example, information on amount of an agricultural commodity sourced from a country together with data on local or national crop yields.

The available spatial information can be combined with other available information to define the spatial footprint as precisely as possible. For example, when a specified quantity of an agricultural commodity is known to be sourced from a particular country, but with no other information available, the extent of the spatial footprint can be estimated from national yield information for that commodity.

Where spatial information is imprecise, mapping is used to derive a precautionary STAR score for the footprint (see Section 6.6.4).

[16] https://sciencebasedtargetsnetwork.org/wp-content/uploads/2020/09/SBTN-initial-guidance-for-business.pdf

For many company activities (including, for example, mines, infrastructure, large-scale agriculture and renewable energy projects) there may also be existing (historical) impacts caused by indirect impacts outside the spatial footprint. Indirect impacts most typically arise through in-migration to the project area (IFC, 2009). The risk of significant indirect impacts is higher in lower income countries, for large-scale projects, and where the landscape around the project includes a large proportion of natural habitat. Assessing the scale of indirect impacts can be difficult, especially for long-established developments where the human footprint in the wider landscape may have changed substantially over time.

For Nature-Positive alignment, the STAR assessment should consider existing attributable indirect impacts, as far as feasible. IUCN will develop a simple framework to guide this assessment, through defining: (a) a risk threshold based on scoring of relevant criteria, below which indirect impacts do not need to be considered, and (b) default buffer sizes and proportional impact levels (e.g. 10 km and 20% loss) for specific sectors.

Where there is an indirect impact assessment available as part of the environmental permitting process, this could be used (rather than IUCN's default values) to inform the STAR assessment.

### 6.6.3 Obtain STAR-r scores for spatial footprint

The total STAR-r scores for the spatial footprint are assessed using IBAT (see Section 6.6.4. for the case where spatial information is imprecise). In IBAT, STAR-r scores are adjusted for the expected improvement in condition during a 10-year restoration period, based on average observed annual rates of habitat condition improvement in restoration projects (2.9%; Jones et al., 2018). For impact assessment, the 'full' STAR-r scores (that assume potential for eventual complete restoration) are needed. These can be found by multiplying scores from IBAT by 3.45[17].

Where indirect impacts are being assessed, STAR-r scores in the defined buffer could be assessed and weighted by the IUCN default values for proportional loss, or according to available information in an indirect impact assessment.

### 6.6.4 Adjust for geographic uncertainty

Where spatial information on impacts is poor, precautionary adjustment for geographic uncertainty ensures that impacts are not underestimated because of a lack of sourcing information, and incentivises improvements in locating impacts.

For existing (historical) impacts, the approach is to use available mapping to identify potential locations for impacts. These are then allocated in sequence of grid-cell STAR-r scores, starting with the highest scoring grid cell.

For commodity sourcing, if production of the commodity is mapped these maps can be overlaid with maps of STAR-r scores. STAR-r grid cells overlapping mapped commodity production locations are allocated in sequence of STAR-r score, starting with the highest, until the footprint area sufficient to produce the specified quantity of commodity has been covered.

If production of the commodity is not mapped, maps of land use showing agricultural areas can be used instead. Again, grid cells are allocated in order of their STAR-r scores, until sufficient footprint area has been covered.

[17] In other words, 1/0.29, where 0.29 is the weighting factor used for IBAT STAR-r scores, representing the condition of habitat (compared to an undisturbed condition of 1) after ten years of restoration.

These approaches require analysis of the STAR-r layer and other spatial data layers within a GIS system, necessitating access to a STAR data download via IBAT and some GIS expertise. If the necessary IBAT access and expertise are unavailable, or there is no further information on likely footprint locations, an impact estimate can be obtained by applying the maximum STAR-r grid cell value for the spatial unit defined for impacts (e.g. an administrative unit or a CEC) to the whole footprint area. This may, however, result in a very precautionary estimate (higher than the actual existing impact), especially where spatial information is extremely imprecise, e.g. when sourcing location is known only to the level of region or not at all.

### 6.6.5 Adjust for good-practice management

Most Nature-Positive management actions in the spatial footprint will be aimed at reducing ongoing impacts (Section 6.5). However, certain actions will serve to reduce existing (historical) impacts, notably via protecting or restoring parts of the footprint area. Examples include protection of riparian buffers, maintaining or restoring habitat corridors, and restoring natural habitat patches (see e.g. Garibaldi et al., 2020). Based on empirical evidence, IUCN will develop correction factors to adjust STAR-r impact scores positively based on these good-practice management actions.

### 6.6.6 Determine proportional contribution to historical impacts

To align with global goals for nature recovery, companies are expected to make a proportional contribution to restoring their existing (historical) impacts. However, that proportional contribution has not yet been defined. IUCN will work with stakeholders, including business forums, to define appropriate contribution levels by sector, initially for the priority sectors identified for the approach.

### 6.6.7 Identify spatial units for locating interventions

To align with the mitigation hierarchy, interventions that contribute to restoring a proportion of existing impacts should, as far as possible, occur in locations ecologically similar to the impacts, so that negative and positive impacts are for the same suite of species. Where spatial locations are known, this will usually mean interventions in the same landscape. Where there is imprecise spatial information, interventions should usually be located within the same spatial unit used for impact assessment, and ideally in the same ecosystem functional group within the same ecoregion (i.e. in the same biogeographical ecotype).

In some cases, it may not be feasible to maintain ecological equivalence, for instance when there are no good options available for conservation and restoration actions. STAR is a fungible metric, so the required gains in STAR units can in theory be achieved by interventions elsewhere. The 'like for like or better' rule constitutes good practice for ecological compensation and should be applied here, for instance through targeting compensation to a CEC with a higher STAR ranking (see Section 6.7) than the CEC where impacts took place. This allows potential use of biodiversity credits, where credible and ecologically-equivalent credits are available. However, since biodiversity values are often place- and context-specific (i.e. not fully fungible in practice), robust stakeholder engagement processes are essential to ensure high integrity in terms of process and distributional justice (WEF, 2022), and youth/children, IPLCs and women need to be fully integrated as key stakeholders.

### 6.6.8 Determine STAR targets for each spatial unit

The STAR target for each spatial unit is determined based on the impact assessment process outlined above, accounting for indirect impacts (if appropriate), geographic uncertainty, and good management practices to reduce existing (historical) impacts.

### 6.6.9 Assess options and design interventions

When assessing options to meet STAR targets, both STAR-t and STAR-r scores (unadjusted, with a ten-year time horizon) are relevant, and interventions can involve both threat abatement and restoration. STAR scores and species and threat lists can be obtained for candidate intervention sites. These are a starting point, as many other aspects (e.g. technical feasibility, potential impacts on local communities, opportunities for community, NGO or government implementation partnerships, costs, risks of leakage) will need to be considered before deciding on preferred options. STAR scores for preferred sites will need calibration, and baseline levels and monitoring for threats will need to be established (see Figure 6).

Process costs to set up and manage interventions can be considerable, but can often be reduced by aggregating interventions through collaboration with other companies or investors. Interventions designed to support agreed conservation plans and priorities (e.g. a National Biodiversity Strategy and Action Plan) are likely to be the most effective contributions towards meeting global biodiversity goals, and to be best accepted by conservation stakeholders.

Guidance for designing and implementing compensatory interventions is available in the Business and Biodiversity Offsets Programme Design and Implementation Handbooks (online at https://www.forest-trends.org/bbop/resources/).

Attributions for existing (historical) impacts are based on STAR-r totals within the physical footprint and (to capture indirect and other impacts) a sector-specific share of a sector-specific buffer area.

As with ongoing impacts, when sourcing locations are poorly known, precautionary weightings are applied to ensure that there is no advantage related to lack of sourcing information, and information improvements are thereby incentivised.

As existing (historical) impacts represent an occupancy impact, no weightings are applied to reduce attributions based on good-practice management. However, actions taken by companies to restore or offset impacts can (if quantified in Realised STAR units) be counted against STAR attributions for existing (historical) impacts.

## 6.7. Positive impacts: STAR

STAR assesses biodiversity gains realised from actions to address threats to species and/or to restore their habitats, thus reducing threatened species' extinction risk and putting them on a trajectory to recovery.

The STAR global layers show the estimated potential to achieve gains through threat abatement or restoration at specific locations. After selecting locations for further assessment, the next step is to calibrate the STAR estimates through ground-truthing to confirm the presence of the relevant species and threats. Once interventions have been planned (see also Section 6.6.9.9), a suitable proxy measure must be selected, and a baseline assessed for each threat being targeted for reduction. The reduction in intensity of this threat over time, as indicated by the proxy measure, is the basis for calculating the gains realised in STAR.

This process is described in detail in draft guidance for assessing calibrated and realised STAR (Figure 6).

A clear timeframe is needed for predicting and assessing gains, outlined in Section 6.6.9 above.

### 6.8. Ecosystem assessments

Given that discussion around the specific ways to incorporate a metric of risk of ecosystem collapse, and possible surrogates for these, is under current discussion for incorporation into IBAT, and that this process will be advanced in 2023, proposals for methods to allow ecosystem-level assessments will be updated in due course.

# 7. Draft Nature-Positive pathways for companies in Categories A, B and C

This section provides some initial proposals for how companies can develop and then deliver positive impacts based on their interactions with biodiversity. These proposals will need refinement and testing in a range of different practical contexts, and this process will lead to the formulation of improved pathways, guidance and tools to help companies proceed efficiently down the pathways. The proposed pathways will be available as standalone documents, with supporting documentation, at that point.

As noted in the scope section of this document, an individual company cannot claim to be nature positive on its own, but rather companies can contribute to a global Nature-Positive goal by demonstrating:

- that they have delivered verifiable Nature-Positive impact across their measurable, attributable, contemporary sphere of influence (i.e. new and ongoing impacts within value chain; see Sections 6.4 and 6.5 above) by adherence to the mitigation hierarchy; and
- a proportional positive contribution to addressing historic, indirect and diffuse impacts and driving systemic change (i.e. beyond value chain investments, driving land/seascape and sector-wide transformations).

However, this creates significant challenge for corporates and financial institutions with complex value chains, where there are trade-offs between cost of information vs. uncertainty, and driving innovation and investment vs. risk of greenwashing. These pathway descriptions are intended to provide a first step in solving this challenge.

As described in Section 7 above, we divide companies' interactions with biodiversity in three typologies:

- Category A – site-based impacts: the Direct Operations Target Boundary of SBTN;
- Category B – embedded value chain impacts: the Upstream Target Boundary of SBTN
- Category C – embedded portfolio impacts

As we move from A to B to C there is a trade-off between cost and uncertainty:

- Increasing distance from impacts on biodiversity
- Increasing uncertainty regarding the magnitude and location of impacts
- Increasing cost of obtaining reliable information due to value chain complexity
- Increasing geographic scope of impacts and influence
- Decreasing leverage and proportion of accountability for any one given site-based impact in any one location

At some point, the time and cost of gathering additional information to fully quantify and spatialise impacts for ensuring Nature-Positive impacts outweigh the benefit. We therefore propose a risk-based precautionary approach.

### 7.1. Pathway for Category A companies with site-based impacts

Impacts occur at one to many sites, with low spatial uncertainty. This relates to the Direct Operations Target Boundary of SBTN. The analysis is conducted using a landscape-based approach.

Steps in the pathway:

1. Screen corporate interventions across portfolio of sites; identify sites and/or landscapes where opportunity to deliver Nature-Positive outcomes is greatest, using Estimated STAR (species extinction risk) and an ecosystem metric.

2. For selected landscapes/sites, conduct comprehensive spatial biodiversity footprint analysis to define extinction risk (Estimated STAR-t score) that is under company's sphere of impact/control at the land/seascape level.

3. Apportion footprint analysis across existing/historical, ongoing/recurrent and new impacts (see Sections 6.4–6.6 above and Figure 11 below).

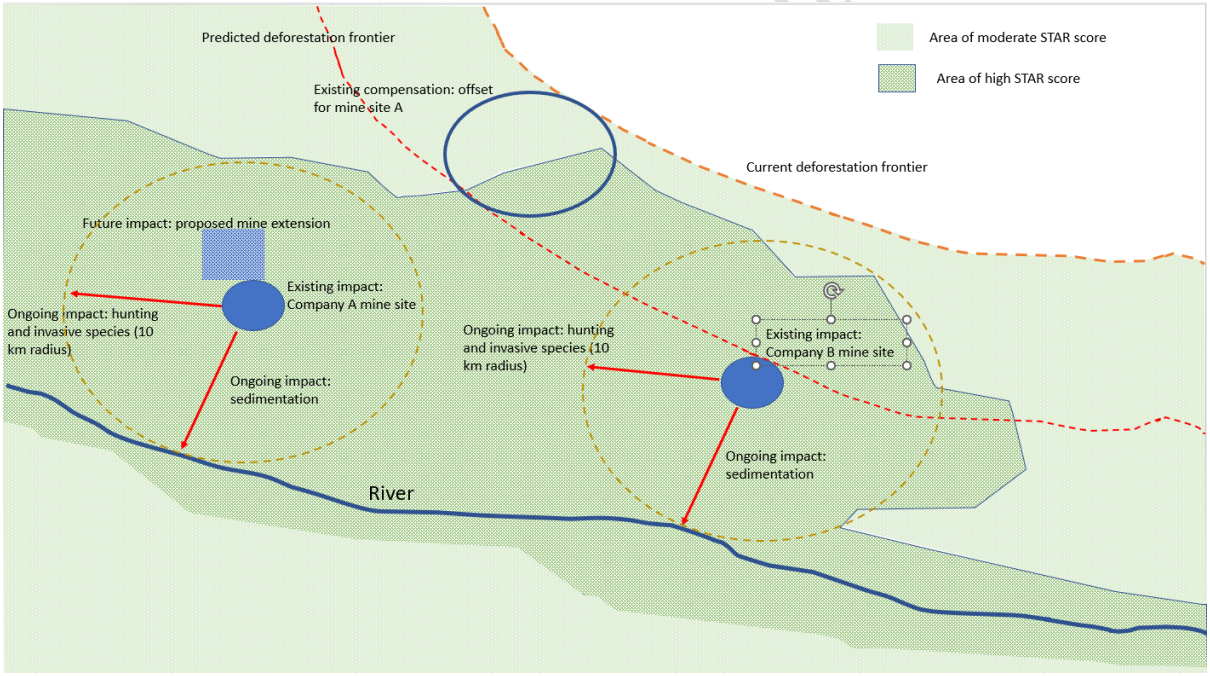


*Figure 11: Hypothetical landscape with mining interventions to illustrate differences between existing, ongoing and new impacts and compensation intervention. Ongoing impacts on freshwater biodiversity in the river are caused by sedimentation, and are shared between the two mines. Ongoing impacts on hunting and invasive species are calculated separately for each mine site. Note the considerably larger compensation intervention for mine site A compared to the existing footprint. There are clear opportunities for Nature-Positive impacts in managing ongoing landscape threats including hunting, invasive species and deforestation, in particular as the deforestation is considered a possible secondary impact of both mines.*

4. Verify species and threat presence on the ground (Calibrated STAR-t) and STAR-r score within the land/seascape (see Figure 5).

5. Set landscape-scale targets such that the company is responsible for threat abatement and restoration in the land/seascape that are together greater than or equal to the threats they are responsible for.

6. Develop landscape-scale mitigation hierarchy of actions, including threat abatement for ongoing threats in area of control (e.g. by changing company operations), and compensatory threat abatement and restoration in wider impact landscape, to compensate for existing/historical impacts. See Table 12 below for example related to Figure 11 above.

*Table 12: Relationships between management options, impact category, mitigation hierarchy components, STAR calculations and threats for hypothetical mining example in Figure 11 above.*

| Management options | Impact category | Scope of impacts (from Greenhouse Gas Protocol | Mitigation hierarchy component | STAR calculation | Threats considered | Relative contribution to Nature Positive |
|---|---|---|---|---|---|---|
| Implement offset | Existing/Historical | Scope 1 Direct | Offset | Area of offset: establish net positive value of offset compared to original mine site | All | Moderate: only consider net positive value |
| Stop sedimentation | Ongoing/Recurrent | Scope 1 Direct | Reduce | STAR score of river downstream of sedimentation point; share with Company B | Sedimentation and pollution for threatened species in river | Potentially large: but within mitigation hierarchy obligations |
| Stop hunting and eliminate invasive alien species | Ongoing/Recurrent | Scope 1 Indirect | Reduce | Within 10 km radius from mine site | Unsustainable resource use and invasive species | Potentially large: but within mitigation hierarchy obligations |
| Stop planned extension | Future/New | Scope 1 Direct | Avoid | Footprint of planned extension plus 10 km radius | All threats in extension footprint, plus invasive species and unsustainable resource use in 10 km radius | Moderate: but within mitigation hierarchy obligations |
| Stop deforestation in predicted zone of deforestation | Future/New | Scope 1 Indirect | Beyond mitigation hierarchy | Area of avoided deforestation excluding offset | All | Potentially very large: needs to focus on areas with high STAR values |

7. Use Calibrated STAR score to prioritise specific threats to target for threat abatement (see Figure 6).

8. Use Realised STAR to quantify impact of actions on extinction risk (see Figure 6).

9. Supplement with company data on pressures (to demonstrate absolute avoidance and reduction over time) and field data (to demonstrate biodiversity outcomes).

10. Report on validated reductions and disclose as contributions to KMGBF.

## 7.2. Pathway for Category B companies with embedded value chain impacts

Where impacts occur at many sites, and knowledge of sourcing sites (the Upstream Target Boundary of SBTN) is imprecise, a commodity-based approach is taken. STAR can be used to estimate the potential global significance of a company's value chain impacts, when used in combination with an extent x condition footprint analysis, although most Category B companies do not have precise information on where their impacts occur.

For companies with precise sourcing information for all or part of their value chain, they can follow the method outlined for Category A companies for all relevant sites within their upstream value chain.

For companies with sourcing information to the sub-national jurisdiction or national level, the pathway is as follows:

1. Identify geography/commodity combinations associated with significant biodiversity impacts; see Section 8.1 below for preliminary steps in this process. This summarises the opportunity to deliver impact reduction actions based on existing knowledge of commodity impacts in particular administrative units.

2. Estimate amount of Existing, Ongoing and New impacts caused by production of the commodity in relevant geography; see Sections 6.4–6.6.

3. Evaluate proportion of the commodity produced in this geography that is used, and use a weighting system to quantify company impacts; see Sections 6.6.4 and 6.6.5 above.

4. Identify geographies and commodities that enable greatest threat reduction, and work with producers in areas of highest opportunity to deliver threat reductions; see Sections 6.6.6–6.6.9 above.

5. Adjust for good-practice management, and in areas where there is no good-practice management, work with commodity suppliers to increase the precision of sourcing information, and refine potential to deliver threat reductions based on increased knowledge; see Section 6.6.5 above.

6. Implement steps 3–10 from the Category A pathway to calibrate and deliver realised outcomes.

For companies with no spatially-explicit sourcing information for part/all of their value chain:

- List the top five producing companies, or companies that make up >80% of global production;

- Use 80$^{th}$ percentile potential STAR score of highest STAR scoring country across production countries;

- Identify extinction risk reduction targets in ecologically relevant landscapes in top producing countries, with uncertainty multipliers. A full methodology for this approach will be published in the next version of this document.

## 7.3. Pathway for Category C companies

This pathway applies to financial institutions with embedded portfolio impacts. Such companies will likely have difficulty measuring the exact magnitudes and locations of their impacts, rather impacts are more likely to be inferred at the product or industry level. We also present a method for portfolio managers to assess where investee companies are on the pathway to delivering verified Nature-Positive contributions.

### 7.3.0 Pathway C.1 – investment share approach

o By linking STAR with EXIOBASE, it is possible to attribute STAR scores (via threats) to products/industries, and give the proportion of a country's STAR score that a given product/industry can be linked to.

o This could be multiplied by a financial institution's market/investment share for a given product/industry, to estimate an attributable STAR score.

o That investment firm could then be responsible for abating threats or restoring habitat in proportion to that score x a risk multiplier.

- Since impacts cannot be fully spatialised, it may be appropriate to use global values, such that investment firms direct conservation funding towards areas that are most impacted by a given product/industry globally.

- Investment firms could also introduce disclosure and reporting requirements for the companies of Category A and B that they invest in, to ensure they are implementing their own 'within value chain' actions, whereas the positive contributions of investment firms may be more appropriately considered 'beyond value chain' investments.

#### 7.3.1 Pathway C.2 – evaluation of progress of investee companies

1. Screen and score investees according to their progress along the Nature-Positive pathway, and compile statistics on relative performance of investees and performance of portfolio overall.
2. Incentivise investees to adopt the appropriate Nature-Positive pathway through direct engagement, divestment or loan covenants.
3. Investee companies implement steps from Category A or B above according to company type, and report on progress to investors.
4. Monitor performance of investees and portfolio using pathway scoring and realised outcomes.
5. Report on performance and disclose to TNFD.

# 8. Initial priority sectors (to be completed in next version)

## 8.1. Current situation regarding linking of potential for delivery of the Nature-Positive outcomes and commodity production

Linkages between STAR (Mair et al., 2021) and EXIOBASE (Stadler et al., 2018) enable companies to investigate their value chain. EXIOBASE is a global Multi-Regional Environmentally Extended Supply-Use Table (MR-SUT) and Input-Output Table (MR-IOT). It harmonises supply-use tables for a large number of countries, which allows for the estimation of emissions and resource extractions by different industries. This enables the products required by each industry to be identified. Previous studies have linked product classification codes to the IUCN Threat Classification (Irwin et al., 2022), which establishes a link between products and their impacts. Concordance tables between product codes allow for these products to be linked to EXIOBASE product codes, thus linking EXIOBASE products and industries to IUCN threats. EXIOBASE also provides information on the global production of each EXIOBASE product and so provides a connection with countries. Country STAR scores (split by threat) can then be joined to this information, completing the link between EXIOBASE product, IUCN threat, country and STAR score. The proportion of the country STAR score that is assigned to the threats related to the EXIOBASE product can then be calculated. If the sum of the threats a product/industry contributes to is greater than a certain threshold (e.g. 50%) then it could be classified as higher risk for that location.

**Next steps:**

Further testing is required between the EXIOBASE products/industries to ensure that results are accurate and make sense. Refinement of appropriate thresholds can be made to identify higher/lower risk cases, taking account of the proportion of a country's STAR score attributable tp the threats that are contributed to by the product/industry. Currently, it is only possible to reliably identify the threats that are associated with a product/industry. The information to accurately identify the exact contribution of each product/industry to each threat (thus assigning an exact STAR score) is not available. This would require accurate information on production and the relative intensity of each threat from each product/industry (e.g. the amount of pollution produced per tonne of the commodity). Additionally, EXIOBASE is limited in geographical resolution to 43 countries and five Rest of the World (RoW) regions. This is a particular issue for Africa, which as a continent is entirely considered as "ROW: Africa". Next steps could focus on obtaining accurate production information for EXIOBASE products across the countries in these RoW regions. Finally, linkages can be made between EXIOBASE products and the SBTN High Impact Commodities. This will also help companies to prioritise specific products/industries when assessing their biodiversity impacts.

**Future Directions:**

Refinement by CEC regions will be possible if spatial information on the production of products is made available. Initial focus could be placed on the SBTN High Impact Commodities as a starting point. Additionally, should accurate information on the intensity of threats by products/industry be made available, then STAR scores could be attributed to products/industries. However, it should be noted that this is unlikely to be particularly accurate or useful as things currently stand. It would offer a false element of precision if specific STAR scores are assigned at this point. Using STAR to assess the relative risk of products/industries in different locations is currently possible and suggested as the methodology to help companies identify priorities in their supply chains.

# 9. Outline of risks and opportunities for specific sectors (site and value chains, related to impact Scopes 1, 2 and 3) (to be completed in next version)

# 10. Acknowledgements (to be completed in next version)

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# Appendix A: Assessing Calibrated and Realised STAR

This section presents draft guidance (version 15 August 2022) that outlines the methodology for moving from Estimated STAR values for a site, based on the global data layers, to a ground-truthed Calibrated version that can be used to set targets and plan interventions, and a Realised version based on the outcomes of conservation actions over time.

The guidance focuses initially on STAR for threat abatement (STAR-t), but will be extended to cover STAR for restoration (STAR-r). Other material still under development is indicated in [square brackets].

*Introduction*

The Species Threat Abatement and Restoration metric (STAR) is a biodiversity metric based on The IUCN Red List of Threatened Species™. STAR combines data on species, the threats they face and their risk of extinction, to produce two complementary global data layers for threat abatement (STAR-t) and restoration (STAR-r). These can be used to identify areas (referred to here as sites) where actions to abate threats or undertake restoration can help reduce species extinction risk and contribute to conservation goals. STAR can then be used to set targets for conservation action, and measure progress towards these targets.

*STAR measures **changes in the intensity of threats** to Threatened and Near Threatened species. Through appropriate **management**, these threats can change over relatively short time periods that are relevant to managers and investors.*
*Changes in the intensity of threats will produce reductions in extinction risk for the relevant species.*

STAR aims to support efforts to reduce [ongoing/] negative impacts, build on mitigation hierarchy guidance on offsetting or compensating existing (historical) impacts, and increase positive impacts on biodiversity. It informs decisions through providing access to simple and actionable information on estimating and delivering reductions in species extinction risk. The process for delivering reductions in species extinction risk described here is deliberately a 'good-enough' strategy, intended to mobilise action that is demonstrably positive. Each step that is taken to mitigate threats will have a positive outcome, and the precise quantity of change generated will become clearer the further down the pathway that users move.

Actions that are undertaken to reduce negative impacts on threatened species will also have potentially significant positive impacts on other components of biodiversity, for instance on other species, their habitats or ecosystems. For the moment, there is no easy way of quantifying these additional contributions, but given that the threats that apply to species and ecosystems are often identical within particular sites, these broader benefits are likely to be substantial.

The basis of the Red List of Threatened Species is that the extinction risk of threatened species is estimated using published criteria that enable reviewers to put species into any one of the Red List threat categories (Least Concern, Near Threatened, Vulnerable, Endangered or Critically Endangered). Each species is assessed against these criteria and also against a set of threats that are known to be associated with extinction risk. The premise of STAR is that if all the threats to a species

are removed, eventually the threatened species will revert to Least Concern. This means that a verified contribution to threat reduction is a legitimate contribution to reducing a species' extinction risk (Mair et al., 2021). A reduction in the level of threat at a particular site may not by itself result in a change in a threatened species' threat category. This could be because threats persist or have even increased in other parts of the species' range. However, extinction risk for that species overall will still have been reduced following the intervention, compared to the situation without it.

STAR can be used to assess the opportunity to generate positive impacts on biodiversity. On the other hand, STAR also provides one measure of biodiversity risk to business through potentially increasing negative impacts. These assessments are made on the basis of the STAR global data layers, currently consisting of STAR values attributed to every terrestrial 5 x 5 km square on the planet. The two global STAR data layers quantify the potential reduction in species risk through abatement of threats (STAR-t) where the species is expected to be present, and through restoration of habitat (STAR-r) where the species was formerly present. The STAR-t value for each of these pixels is a combination of the proportion of the Area of Habitat (AoH; Brooks et al., 2019) for Threatened and Near Threatened birds, mammals and amphibians present in the pixel, weighted according to their threat status. The STAR-r value for each pixel is generated through estimating the contribution of the pixel to the historical AoH of a species that could be restored. The process of calculating these values is described in Mair et al. (2021).

Amphibians, birds and mammals are included in the current global STAR layer because they are the only major taxon groups that have been globally assessed and for which AoH has also been calculated. Including taxa that are not globally assessed would mean that STAR values in different parts of the world were not comparable.

The values in each of the global STAR layer pixels are derived from the AoH maps and the threat status of globally assessed species obtained from The IUCN Red List of Threatened Species. As new information about the AoH and threat status of these species is acquired, through research or assessment, the Red List is updated. This means that the potential for delivering species extinction risk reduction will change with each update to the Red List. These updates occur over different timescales, for example birds are updated every year and amphibians less regularly. In addition, as new taxon groups become assessed globally, and have AoH calculated, they are added to the global STAR layer. Reptiles, freshwater fish and some marine species are the next likely taxa to be added.

So that users can track their contributions to reducing species extinction risk, changes in threats to species must be compared with a stable baseline. Current plans are to update the global STAR layer with new data from the Red List and new globally assessed taxa every two to three years. Each version of the STAR layer will have a unique identifier that links the layer to the year of update. Users will be able to assess delivery of contributions to species extinction risk against the particular STAR version. Figure A1 below summarises these steps.

As use of STAR goes to scale and interventions start to reduce species extinction risk globally, the expectation is that the total STAR score (for the same groups of species) will ratchet downwards in each version, eventually to near zero.

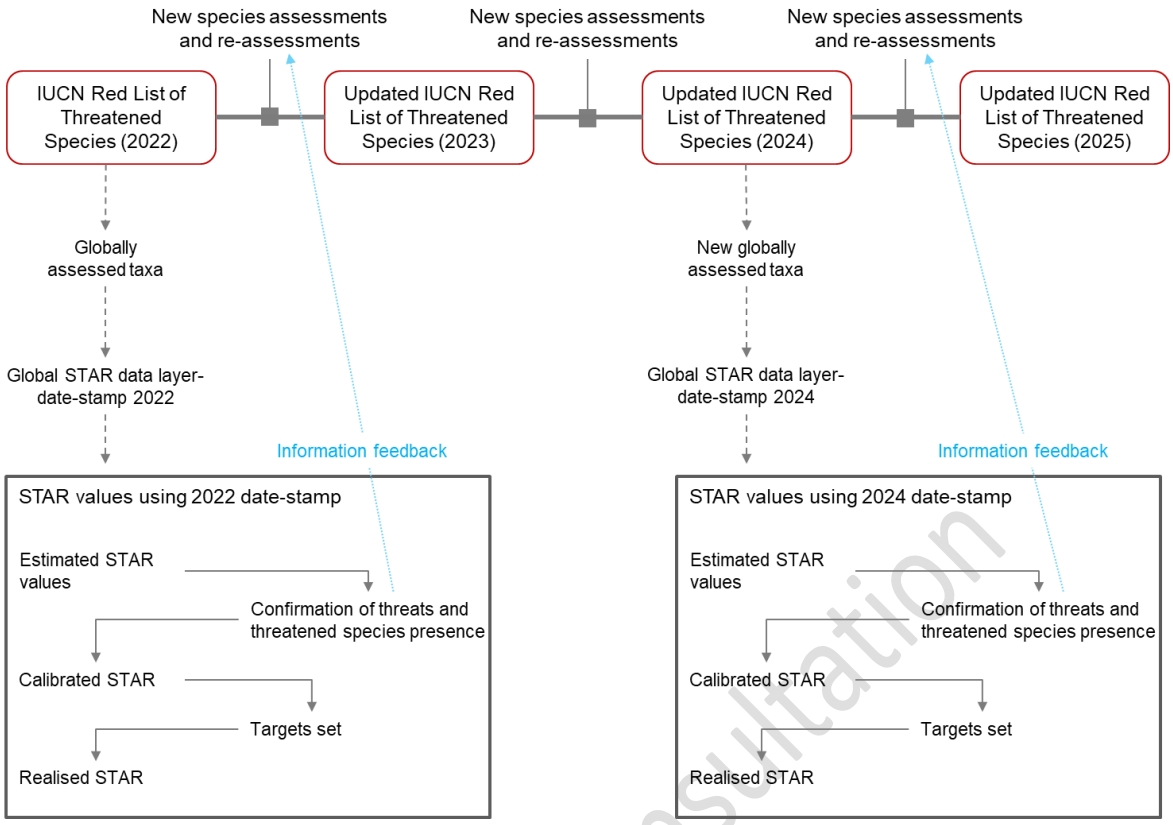


*Figure A1. Relationship between the global STAR data layers, the Red List assessment and update process, and the globally assessed taxa.*

Companies can use the STAR process in a number of ways. The simplest is to assess the potential for contributing to species extinction risk reduction at a particular site. This is done by running an Estimated STAR report through IBAT. This indicates the overall opportunity at the site, the threats and the species responsible for contributing to this total, and the geographical distribution of risk across the site. A company can run the same report across multiple sites to screen the sites for extinction risk reduction potential, identify the sites with the greatest potential contribution, the threats that can be mitigated, and the species that are affected by the threats. If a company then wants to invest in management to mitigate the threats and deliver validated reductions in extinction risk it can then ground-truth the STAR value by moving to the Calibrated STAR phase (2). Setting targets, taking action, monitoring and evaluation, and reporting follow.

There are a range of ways in which STAR can be used for companies that are not directly responsible for site management. These are described in Part 3. In order to calculate STAR for commodity footprints, for instance as a measure of the opportunity for reducing species loss through the raw materials purchasing strategy of a company, an additional set of steps is required if information on the exact source of raw materials is not available (Dealing with spatial imprecision, Part 3.1). STAR can also be used to evaluate a company's contribution to Nature-Positive, through the IUCN Contributions for Nature platform. This process is described in more detail in Part 3.2.

Access to the global STAR data layers is currently through the Integrated Biodiversity Assessment Tool (IBAT) STAR portal (https://www.ibat-alliance.org/star).

Further development and application of STAR is overseen by the STAR sub-committee of the IUCN Red List of Threatened Species Committee.

## I.Using STAR to screen projects and actions, set targets and deliver impacts

The current global STAR layer is generated from The IUCN Red List of Threatened Species, and provides an estimated value of the potential for reducing species extinction risk at a site or across a range of sites. While the data in the Red List is as up-to-date as resources permit, there are two significant potential sources of error for these estimated values. First, the Area of Habitat (AoH) calculation for each threatened species is based on habitat requirements of the species contained in the Red List, which are then overlain onto habitat models (Brooks et al., 2019). However, a species may not be present everywhere within its mapped AoH. Second, the threats that apply to the species in the Red List assessment may vary from place to place – not all threats may be significant at all sites. In order for a STAR user to make a verified claim of reduction of species extinction risk using STAR, it is necessary first to establish whether the species and the threats that apply to it are present in a given site. This step generates the Calibrated STAR value for a site. The Calibrated value can then be used to set targets for the reduction of threat levels, which are then delivered through management actions over time. Delivered STAR values refer to the validated changes in the threat levels that are generated through these actions. Figure A2 summarises these steps.

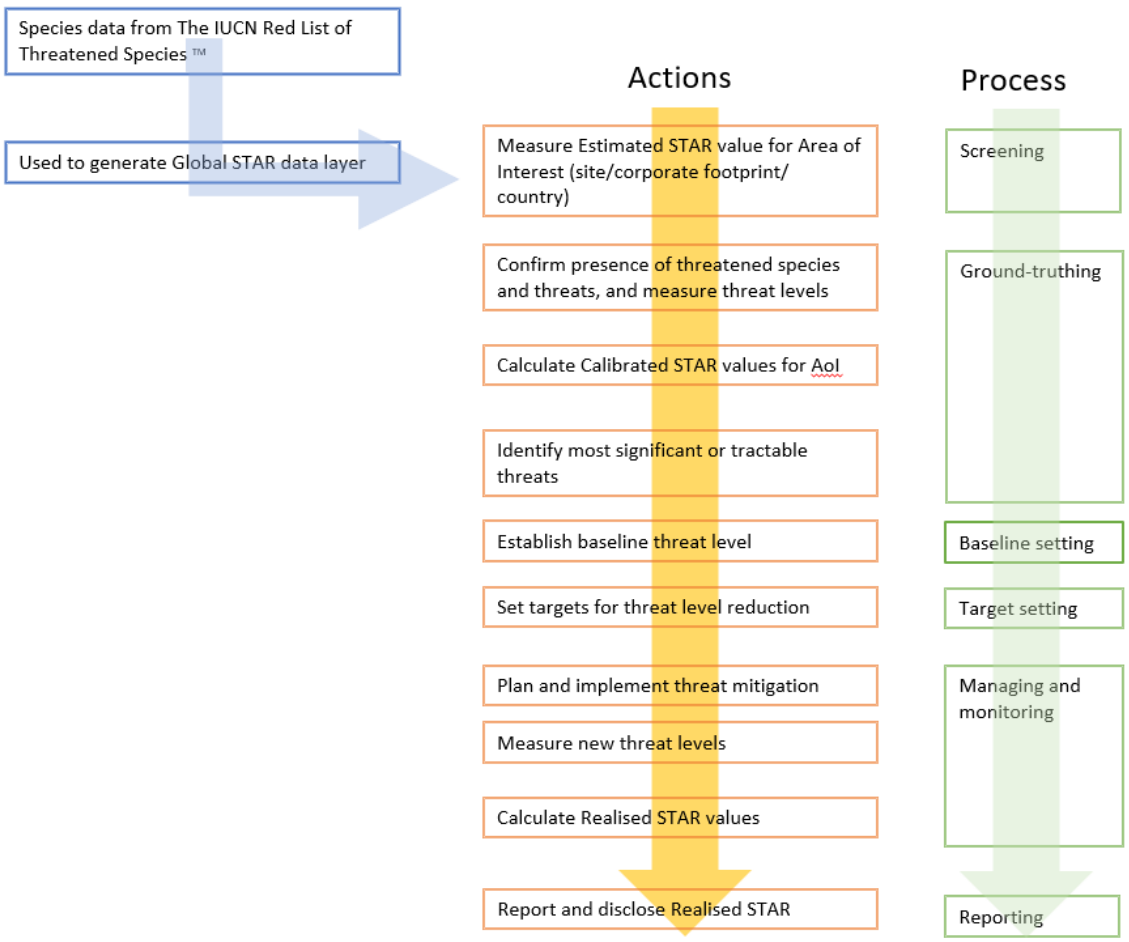


*Figure A2. Simplified sequence of actions in reducing species extinction risk using STAR.*

This section describes the steps users can take to move through the process of generating validated contributions to species extinction risk.

*Screening*

The IBAT STAR report, using the global STAR layer, provides information to make an **initial evaluation** of the potential to reduce species extinction risk at a site. This includes the **Potential** (**Estimated) STAR score** (hereafter referred to as the **Estimated** score) for the site, for both threat abatement (STAR-t) and restoration (STAR-r). This score is also broken down by the threats that contribute to the total, for instance a STAR score for a particular site might be 70% attributable to invasive species and 30% attributable to urbanisation. The report also contains a list of the Threatened and Near Threatened species expected to be at the site [and will in future include their individual contributions to the STAR scores]. Interpretation of the results is guided through additional material available on the IBAT STAR portal.

*The STAR screening report generates information about how species extinction risk can be reduced through two processes: abatement of threats that apply to places where the species still occur (the STAR-t value) and restoration of habitats within the species' current range where the species no longer occurs (the STAR-r value).*

Specific threats that apply to threatened species in the IBAT STAR report and in the examples below are from the IUCN Red List Threat Classification Scheme, and are presented in italics.

Users wanting to screen a portfolio of projects can use the multi-site report, which summarises STAR scores for a range of sites. Once this report has been used to identify sites with most potential for reducing species extinction risk, and which offer the closest link to user actions (for instance, sites that have threats that are related to users' production activity), users can then produce a single site report for those sites that shows the overall STAR-t and STAR-r scores for the site, and the distribution of STAR scores by 5 x 5 km pixel across the site.

*Ground-truthing*

Users then confirm the potential for extinction risk reduction at the site by revising the Estimated score to produce a **Potential (Calibrated) STAR score** (hereafter referred to as the **Calibrated** score)**,** through confirming the presence of threatened species and relevant threats at the site. Species that are absent from the site, or new threatened species that are discovered at the site, will be integrated into the Calibrated score.

*Assessing feasibility*

Having confirmed the threats that are present, the next step is to assess the feasibility of addressing specific threats, and decide which will be the target for interventions.

*Setting baselines*

The reference level of the targeted threat(s), measured through an appropriate indicator, is the baseline against which progress can be measured. This phase includes establishing the nature and level of the threats.

*Setting targets*

Users can then **set targets** for the delivery of species extinction risk reduction, based on knowledge of the specific character of the threat and an estimate of the resources and effort required to reduce threat levels.

### *Managing and monitoring*

The user wishing to reduce threat levels will identify and implement **management** that will mitigate threats and restore habitats at the site over a given time period, and monitor changes in the level of threat or condition of restored habitat.

### *Generating results*

Implementation of management will result in reductions in threat levels, which will generate a **Realised STAR score**, that can be verified and reported as a contribution to global, national or corporate biodiversity targets such as the Kunming-Montreal Global Biodiversity Framework, through the generation of quantified, verified and scientifically robust reductions in species extinction risk, delivered through the reduction in threat level.

## II.Steps to Calibrated and Realised STAR

Potential contributions to species extinction risk reduction through threat mitigation at the site are measured through the STAR-t score. The process of generating an Estimated STAR-t score for a site is quick and simple, through the IBAT STAR portal. Following production in IBAT of an Estimated STAR-t report based on global STAR layers, the steps outlined in Figure A3 are needed to demonstrate verifiable reductions in species extinction risk.

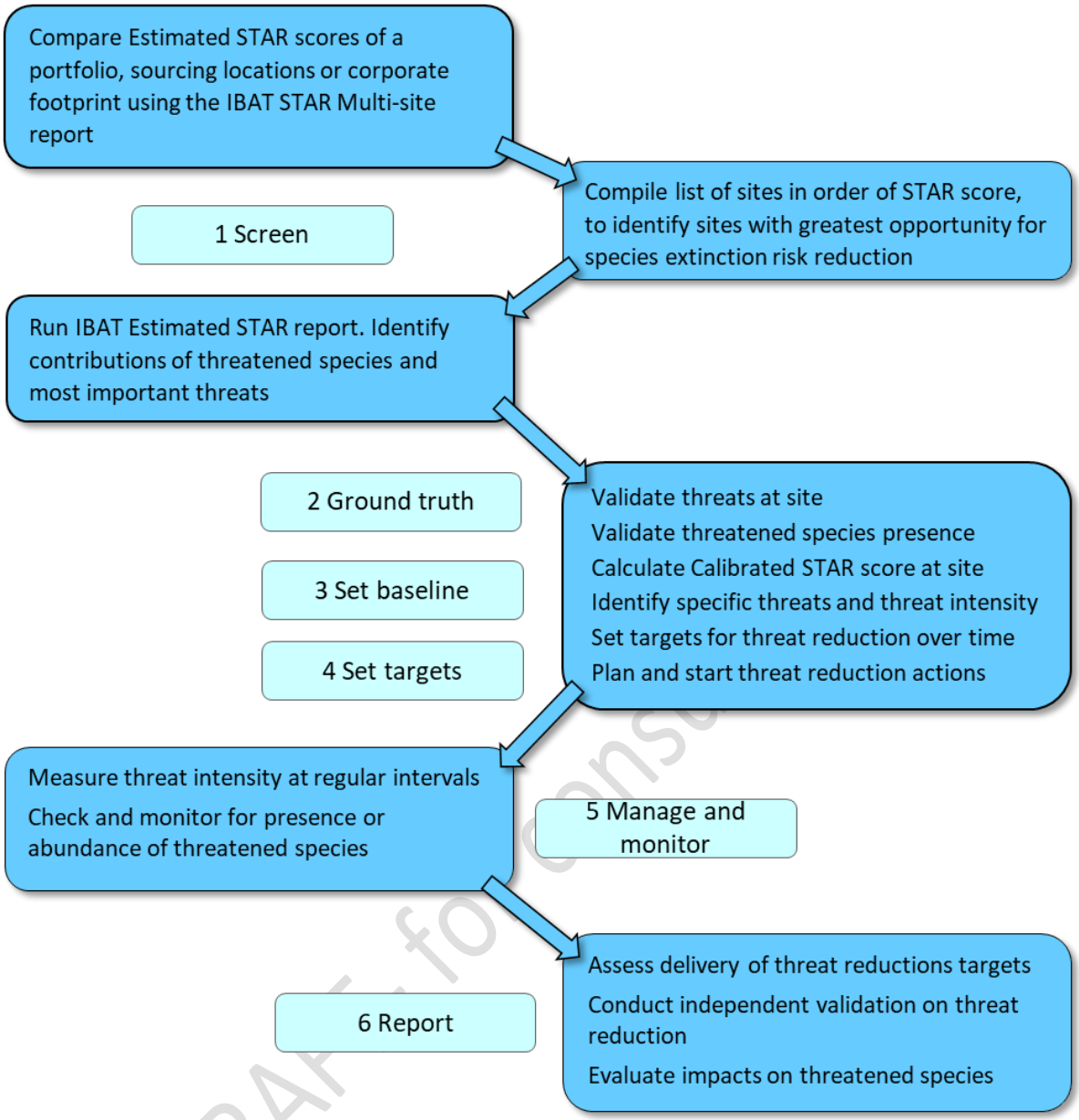


*Figure A3. The detailed steps required to produce Calibrated and Realised STAR-t scores for a site. The time required for each step will vary depending on the context and to what extent additional surveys, expert input or stakeholder consultation are needed.*

## III.The process in detail

### *Confirm presence at site of Threatened and Near Threatened species identified in Estimated STAR-t report*

The global STAR layers available through IBAT are based on maps of Area of Habitat (AoH; Brooks et al., 2019) for each species. These maps show where the species is *likely* to be present within its known range, based on existing knowledge of the range (the Red List range maps), ecological preferences (such as habitat requirements) and elevational distribution.

The presence of a species within a particular site thus requires confirmation. Presence in this context means of regular occurrence, such that the site is likely to be a significant component of the species range, not just a place where the species occurs irregularly or as a vagrant. If the species is found not

to be present at a site, then action to reduce threats at the site will not contribute to reducing that species' global extinction risk.

The initial Estimated STAR-t report comes with a list of species that are expected to be present at the site, based on an overlay of the site polygon with the AoH maps contained in the Red List of Threatened Species. This can form the basis for the confirmation.

There are several possible routes to confirm a species' presence. Project developers should ensure that the efforts made (ideally as many of these as possible) are documented:

I. Consult with people knowledgeable about threatened and near-threatened species at the site
    a. IUCN Red List of Threatened Species reviewers (listed on the relevant species page)
    b. IUCN Species Survival Commission Specialist Groups for the relevant taxa
    c. Local, national or international NGOs involved in species and site conservation, especially any with active conservation programmes in or near the Area of Interest. For example, BirdLife International Partners and Local Conservation Groups, IUCN local/regional offices or in site WWF local/regional offices
    d. Taxon specialists at national universities or research institutes
    e. Relevant site management authorities (for protected areas)
    f. Local or regional environmental/ecological consultancy companies
II. Review Threatened and Near threatened species information in GBIF and citizen science databanks (e.g. eBird, I-Naturalist)
III. Identify species or ecological monitoring initiatives in and near the site, e.g. through the IUCN Species Monitoring Specialist Group or on the relevant IUCN Red List of Threatened Species page

Document how recent the information is and the sources (personal experience, reports) for each case. It is important to ensure that the expert input to the calibration process is as good as it can be, and that external validation will confirm this. It is advisable that credentials of experts, including experience with the site and species/threats are kept on file for the validation process. Consider paying a small honorarium for each contribution, especially if the source is from the global south or contributes significant information.

For Threatened and Near Threatened species for which no reliable, recent confirmation of presence is available, it may be necessary to carry out targeted surveys using appropriate methods that have a high chance of detecting the species. Ensure that surveys are conducted using appropriate methodologies and at the appropriate season, taking into account seasonal detectability or presence, for instance for migratory species. Further details of how to plan this effectively can be found at the website of the IUCN SSC Species Monitoring Specialist Group. Technology such as acoustic monitoring, camera trapping or e-DNA sampling may all provide both evidence of the species' presence and data on continued presence or abundance for the measurement of management impacts and target delivery.

For Threatened and Near Threatened species that are not confirmed from the site, it is important to distinguish species that have been present in the past but have been extirpated, and those that never occurred in the site. For species that have been extirpated at the site (confirmation obtained through the expert networks already consulted), the site will form part of the historical AoH for the species that can be used to calculate the STAR Restoration Score (STARr) – see Section 9.

If the species has never occurred at the site, this may be due to errors in the species' AoH resulting from errors in the range map, habitat preferences and/or elevational limits, as coded in the IUCN Red List, or taxonomic differences. Confirmed absences can be fed back to the IUCN Red List via redlist@iucn.org. Note that STAR is based on the taxonomy followed by the IUCN Red List, and that there are sometimes delays between taxonomic recommendations for individual taxa being published in the scientific literature, these being adopted by the global taxonomic sources followed by the Red List, and updated Red List assessments being undertaken following the revised global taxonomic sources.

[If the presence of a previously unrecorded threatened species is confirmed at the site, then the STAR score for the site will have to be calculated based on the inclusion of the species' revised AoH in the site. This is accommodated in a routine in the IBAT portal, and the information is automatically fed back to the Red List].

In all cases, information obtained from the consultation process can be fed back to the Red List in order that the species assessment can be updated.

### *Confirm presence of threats identified in Estimated STAR-t report that affect each t Threatened and Near Threatened species*

The extinction risk for a particular Threatened and Near Threatened species is caused by threats to that species – loss of habitat, over-exploitation, for instance – and these are identified for each Threatened and Near Threatened species in the Red List assessment. The different threats that apply to the species present at a site are listed in the STAR-t report, and the Estimated STAR-t score for the site is broken down by threats. Management of these threats is necessary to reduce extinction risk, and it will clearly be important to manage the threats that contribute the most to the overall STAR-t score (where this is feasible) as a matter of priority.

The process of threat assessment in the Red List assumes that threats apply uniformly across the species' AoH. However not all threats may be acting in particular localities. For Calibrated STAR-t scores, it is thus necessary to assess whether individual threats are present at a site, at levels likely to be affecting the extinction risk of the species. An appropriate rule of thumb to assess if a threat is significant at a particular site is that the threat affects more than approximately 5% of the surface area of the site (for instance for habitat loss or conversion), or if there are more than five instances of the threat reported in a year (for instance for hunting). If a threat is insignificant at a particular location, efforts to address the threat there will not reduce species extinction risk, so that threat can be removed from the STAR-t score for that site, and the overall STAR-t score reduced accordingly. It may be necessary to assess the significance of a threat for different species separately, as the same threat may affect species in different ways. For instance, the presence of small numbers of an invasive species may not be important for some Threatened and Near Threatened species but very serious for others. Threats should be retained for any species for which they are significant. [Automation of threat recalculation in IBAT is in development.]

For practical purposes it is not necessary to confirm the presence of threats that will not be the focus of interventions at the site, either because they contribute a relatively small amount to the overall STAR score or because they are not amenable to cost-effective reduction through management action. For example, where there are no feasible management options to address *Climate change and Severe Weather,* the status of this threat at the site will not affect STAR targets.

Routes to confirm non-negligible presence of threat at a site could include:

- Local knowledge, using same sources as for confirmation of species' presence;

- Remote sensing, for instance from Global Forest Watch or other sources of land-use change imagery (land cover change, fragmentation statistics, habitat quality);
- Remote sensing + modelling (hunting, resource use);
- Global Invasive Species Database, and Threatened Island Biodiversity Database, which includes information on which native species are impacted by invasive alien species on individual islands; and/or
- World Database of Key Biodiversity Areas, which contains much information about threats at particular sites of biodiversity importance.

### *Recalculate relative contribution of threats to site STAR-t score*

If research reveals that some species and threats are not present, or a threatened species not previously expected to be present is discovered at the site, a module [under development] in IBAT will permit the user to adjust the threats and species present at the site. The resulting score is the Calibrated STAR-t value.

### *Migratory species*

Some threatened species, especially birds and fish, may only be present at a site for part of the year. [The migratory character of a species is indicated in the species list generated in the Estimated STAR report.] In addition, a species may face different threats at different stages in migration, and species' AoH and density of individuals may also vary between breeding, passage and non-breeding areas. For example, some species have very extensive breeding grounds but concentrate in small areas during the non-breeding season, or vice versa; others show 'bottlenecks' where most of the population passes through a small area on migration. These interactions between varying population proportion and threat intensity pose some challenges for accurately calibrating STAR site scores for migratory species.

Future versions of the global STAR layer will make adjustments for migratory species' STAR scores based on the geographic scale of breeding, passage and non-breeding areas, and the threats applying to each. For the present, calibration of site STAR scores for migratory species can follow the same process as for non-migratory species. Where threats differ between the different components of migratory range, this approach may result in underestimates of the 'true' STAR value.

There are two verification steps to improve the accuracy of STAR scores for migratory species at a site:

1. To confirm that particular threats to the species apply when the species is present at the site. The process is the same as for non-migratory species, outlined above, but particularly important because migratory species may face different kinds of threats at different points in their migratory cycle.
2. To assess whether the STAR score needs adjusting to reflect the proportion of the species' population at a site that is present for part of the year, or passes through during migration. STAR calculates site scores based on the proportion of each species' AoH that the site contains, using this as a proxy for the proportion of population present. For migratory species, this approximation may not be accurate.

Some migratory threatened species may have a very large AoH, meaning that the contribution to extinction risk reduction that a single site may make will be very small. The most important threats may also only apply at certain points during its annual movement cycle, where conservation efforts will be most effective. Expert input is therefore recommended for calibrating STAR scores for migratory species at a site. [Further guidance is in development on how to refine STAR scores for

migratory species, along with refinements to the underlying STAR data layers. This will reflect that the whole species' population may be in different geographic areas, and subject to different threats, at different stages in the migratory cycle.]

### IV.Setting targets and calculation of Realised STAR-t units

The recalculated contribution of individual threats to the site STAR-t score, described above, gives the Calibrated STAR-t value against which progress in reducing threats to generate Realised STAR-t units can be measured. The basic approach to calculate Realised STAR-t values is:

a. identify target threats,
b. find a suitable index measure for each,
c. assess baseline levels of threat using appropriate index measures (see Section 5),
d. set outcome targets for threat reduction through improved management,
e. monitor over time to assess success in threat reduction.

An example of this process might be:

For the imaginary case of Makira, a site in Madagascar, with a Calibrated STAR-t score of 100, two threats were assessed and found to be occurring at a significant scale. They were:

- *Annual and Perennial Non-timber Crops* (*Shifting Agriculture*) (STAR-t score of 75)
- *Biological Resource Use* (*Hunting and Collecting Terrestrial Animals*) (STAR-t score of 25)

The first threat causes loss of forest, and so can be measured using remote sensing. It was found that the pre-intervention rate of forest loss, caused almost entirely by shifting agriculture, was equivalent to 1% of the site per year. The second threat was focused on trapping of lemurs, given that this threat applied almost entirely to this group of animals. The index of intensity used was the number of lemur trap sites found per year across the site. The pre-intervention value for this index was 100.

The targets chosen were to reduce forest loss from 1% per annum to 0.1% per annum over 5 years, and to reduce incidence of lemur trap sites from 100 per year to 5 over the same period.

***Theory of Change***

*It is recommended that each project develops a theory of change demonstrating how conservation interventions will reduce the intensity of particular threats, and through that the particular stressors acting on species (see https://www.iucnredlist.org/resources/stresses-classification-scheme). This clarifies the assumptions being made and helps ensure that the project is following a logically robust approach that has good chances to succeed.*

***Survey effort bias***

*Indices of intensity such as trapping frequency are subject to bias caused especially by survey effort. There are recommended methods to minimise this effect, as well as a database of sampling techniques, on the SSC Species Monitoring Specialist Group website.*

The interventions implemented were shown to reduce the level of each threat at an approximately equal rate over the 5-year period, and the targets were achieved, representing a 90% reduction in forest loss rate and a 95% reduction in lemur trapping.

The Realised STAR-t scores achieved were therefore

(75*0.9) + (25*0.95) = 67.5 + 23.75 = 91.25

For reporting purposes, an equal proportion of this total was achieved in each of the five years of management, equal to 18.25 STAR-t units per year.

This process would ideally be accompanied by confirmation of the impact of these measures on the threatened species present. For the hunting example, probably the easiest measure would be to assess the encounter rate of lemurs on surveys, to confirm that the effect of reducing trapping rate as measured by this index did in fact have the impact of increasing their numbers.

***How often should I monitor threats?***
*In general, threat monitoring can be repeated in accordance with the reporting needs of the funding source, with a maximum period of 3–5 years. Some threats may be dealt with rapidly and others may take much longer to manage, so an overall management investment of at least 5 years is recommended. Annual and seasonal fluctuations need to be borne in mind when planning the timing and frequency of monitoring.*

This basic approach can be modified in a number of ways depending on the situation. Firstly, the change in threat intensity can be calculated in two ways:

- In terms of changes in threat intensity measured against a pre-intervention trend at the site (the method used in the example above). To establish a trend, it is best to have more than two time points where possible, although delaying management action to permit the establishment of a time series is likely to increase the probability of species extinction.
- Changes in threat intensity compared to a control site (a counterfactual).

### *Leakage of threats*

Apparent gains from interventions to address impacts can be undermined by potential *leakage* of impacts. Leakage occurs when reducing threats in one place leads to increased threats in another, either through shifting of activities or market effects. Activity shifting is most likely to be relevant for projects aiming to deliver Realised STAR gains.

Leakage is a well-known issue in carbon markets. The Voluntary Carbon Standard's Jurisdictional and Nested REDD+ (JNR) Framework[18] includes methods for evaluating both primary and secondary leakage. Leakage can be detected through monitoring pressures within and outside project boundaries, and when it occurs may require discounting of assessed gains.

The risk of leakage needs to be considered when planning project interventions. The risk is likely to be higher for some interventions (e.g. actions to reduce illegal hunting) than for others (e.g. control of invasive plant species). When leakage risk is high, interventions at a particular site may not

[18] Verified Carbon Standard. (2014). *Jurisdictional and Nested REDD+ Leakage Tool*.

https://verra.org/project/jurisdictional-and-nested-redd-framework/rules-requirements/

succeed in reducing threats overall unless they are part of broader conservation efforts that may involve local communities and local and national governments. A landscape-level rather than single-site approach may often be needed.

*Control sites*

Use of a control site (to show trends in pressures when no interventions take place) may provide a more robust approach to assessing trends in pressures at the intervention site. However, it can be difficult to find an appropriate control site, and ideally conservation efforts would be extended to all sites in a landscape with potential to deliver significant STAR gains. Further details of control site selection, and monitoring are to be found in a range of publications relating to biodiversity offsets, such as here, here and here.

*Establishment of trends and identification of suitable indices for measurement of threat intensity*

In the spirit of delivering 'good-enough' outcomes and moving towards Nature-Positive outcomes, implementation should be prioritised rather than spending many years collecting data before starting management. It will be desirable to collect some trend data, for instance some threats can be assessed using a few time samples. In the example above, *Biological Resource Use–Hunting and Collecting Terrestrial Animals* was measured using an established assessment protocol giving an intensity per unit area or unit survey effort, for instance:

- Lemur traps found per year over constant survey effort

Other potential index measures appropriate for this threat might be:

- Detection of hunters per unit time by audio sampling (gunshots) or camera traps
- Appropriately designed household surveys aimed to assess the level of consumption of lemurs; information available here.

Guidelines on planning constant survey effort can be found here. The Choice of index will vary according to the way in which the threat is manifested, and the impact on the individual threatened species. For instance, *Invasive and other Problematic Species, Genera and Diseases* might be manifested on one species by direct predation and on another by degradation of habitat, and would therefore require different indices. The impacts of invasive plants at a site would need very different measures compared to measuring predation by rats on islands, and many threats would need a specifically-tailored in situ index measure. [A systematic map of the literature on threats with suggested measures and thresholds is in development.]

Other threats may vary substantially seasonally or between years (for instance *Agriculture and Aquaculture: Annual and Perennial non-timber crops* or *Pollution: Agricultural and forestry effluents*), so require a longer time series of samples to permit the calculation of a mean rate of threat occurrence per time period, for instance:

- Running mean of hectares of forest cut for cultivation of oil palm per year over last 5 years
- Running mean concentration of sediment in river per year over last 5 years

Many of these trends can be estimated from remotely-sensed data, which is often available over historical time series, reducing the need for delay in implementing management. It is clearly the case that significant effort might be required to quantify changes, even those available from remotely-sensed data. One constructive contribution that will be considered in the future is to provide a means for project developers to access technical and financial support to conduct this work, through regional networks of institutions.

*Implement management regime in site to deliver targets*

Once the indices have been identified and targets established, management to achieve the targets can be implemented. The techniques employed to achieve the targets will vary according to the specific circumstances at the site, and there is considerable expertise and literature on the subject available in a wide range of sites.

For business, it will often be essential to work in close partnership with local communities, national and international NGOs, and/or local and national governments. It may be practical to determine a lead implementation partner with the necessary skills in conservation project design, management and monitoring. For long-term sustainability, projects could also consider capacity-development needs and how to help meet these through project actions.

*Calculate STAR-t units realised through management*

The Makira example illustrated above shows the methodology to be applied in calculating the Realised STAR-t units generated as a result of the management. These Realised STAR-t units can be validated by external evaluators as evidence of contributions to global conservation targets, and can be added up across interventions to provide a summary of the impact on species extinction risk generated by a company, NGO or government.

## V.Issues related to measurement of changes in threats

[Further guidance will be developed on a range of issues related to measuring change in threat intensity, including:

- Non-linear relationships between threat intensity and impacts on species,
- Inter-linked and synergistic threats, e.g. road development and invasive animals and plants,
- Scale effects – a given level of threat reduction might have greater benefit in a small site than a large one (or the reverse, depending on circumstances).

Demonstrating improved species status may be easier for species with small populations and small ranges, such as some Critically Endangered, range-restricted species.]

## VI.Verification of effect of impacts on species

In practice, collecting sufficient data to disentangle these effects will be very hard in real life situations, and it is recommended that users ensure that changes to the status of Threatened and Near Threatened species caused by mitigation of threats are understood through species monitoring where possible.

# Appendix B: Consultation and review process

The first stage of the consultation process was through a restricted circulation of the working paper (v 0.1) to partner institutions in August and September 2022 ahead of the IUCN Leaders Forum meeting in October. This resulted in over 350 separate comments including from: Convention on Biological Diversity Secretariat, IUCN Secretariat, Commission on Ecosystem Management's Impact Mitigation and Ecological Compensation (CEM IMEC) Group, SBTN, WBCSD, Business for Nature and WWF International. These comments have been systematically grouped and summarised into ten key themes (Table B1).

The revised version of this paper was presented at the IUCN Leaders Forum held in October 2022, Jeju, Republic of Korea. Additional edits were made based on the comments received through the restricted circulation, and discussions held at the IUCN Leaders Forum.

Following review by the Programme and Policy Committee (PPC) of IUCN Council, in June 2023, the draft was circulated to the chairs of the Commissions for further commentary. Responses to comments received during this process have been tracked in a summary document.

We are grateful for the opportunity to have received valuable feedback from the Nature Positive Initiative Partnership.

This document is now available for a broad consultation process involving IUCN constituencies and companies, following which we will provide a response to all comments received.

*Table B1. Key themes extracted from initial feedback, and responses/edits made in this version*

| Themes | Summary of response and key edits |
|---|---|
| **1. Treatment of ecosystems and ecosystem metrics** | IUCN plans to use the Red List of Ecosystems (RLE), underpinned by the Global Ecosystem Typology (GET), and a metric derived from this to sit alongside STAR in the future. An ecosystem metric, to be identified, will be a 'placeholder' while RLE comes online. |
| **2. Distinction between nature and biodiversity** | IUCN is focused specifically on living components of nature (i.e. biodiversity) to capitalise on IUCN's capacities and data sets. This distinction has now been made more clearly in Sections 4.3 and 4.4–4.9. |
| **3. Links to climate emissions reduction efforts** | While the approach focuses specifically on species and ecosystems (i.e. biodiversity), as stated in the working definition, Nature-Positive commitments should ensure integration with climate commitments across all components of socio-ecological systems including climate, nature and social justice. We anticipate that the approach can facilitate synergies, for example by demonstrating how companies could use their approaches in delivering land-based emissions reductions to generate synergistic biodiversity impacts. See newly added Section 4.7 'Synergies with emissions reductions' under key considerations for high integrity approach. |
| **4. Links to Nature-based Solutions** | The approach is directly framed to allow delivery of Criterion 3 of the IUCN NbS Standard (on biodiversity net gain), and also supports application of its Criteria 4, 5 and 6. Alignment with NbS |

| Themes | Summary of response and key edits |
|---|---|
| | standards will support social justice and integrity. This is explicitly mentioned in Section 4.6 and explored further in Section 5.8 (Social equity and safeguards). |
| **5. Distinction between biodiversity impacts and dependencies** | The approach focuses specifically on biodiversity impacts, as opposed to dependencies, which are typically mediated through ecosystem services or nature's contributions to people. This distinction is made more clearly in Section 4. |
| **6. Clarifying finance sector engagement** | Biodiversity impacts are not typically within finance companies' direct sphere of control. However, finance companies exert shareholder influence over companies (e.g. via voice, exit, biodiversity-linked covenants) to improve the biodiversity performance of investees and sectors. To facilitate this a Nature-Positive platform will provide finance sector companies with a means to assess and score the biodiversity performance of their investees and portfolios, to support investment decisions. This is explained in more detail in Section 6 on how companies can use the approach. |
| **7. Clarifying the role of the approach (accounting framework vs. assessing contributions)** | A wide range of comments were received about the overall approach and the tricky design decisions that need to be made to ensure that it drives robust outcomes and does not unintentionally enable greenwashing, in particular by building on the experience of existing approaches such as Business and Biodiversity Offsets Programme (BBOP), Science-based Target initiative (SBTi) and Science Based Targets Network (SBTN). IUCN recognises these challenges. The approach intends to be a high integrity approach that also offers a practical on-ramp for companies to support progress towards a Nature-Positive future.<br><br>This iteration addresses these comments by:<br>1) Emphasising that IUCN will encourage companies to sign up to complementary high integrity approaches for critical nature issue areas (such as climate) that are not covered by the approach (e.g. by establishing a climate target under SBTi or another similarly robust framework). IUCN will consider having at least a near-term time-bound commitment to sign up for key complementary initiatives as a pre-condition for companies to register on the proposed platform for recording Nature-Positive contributions. Voluntary initiatives such as the Taskforce on Nature-related Financial Disclosures (TNFD) and SBTN could be appropriate examples for complementary initiatives.<br>2) Not presenting a draft scoring system in this version, recognising that it needs substantive work with stakeholders to devise a robust and suitable approach that complements other initiatives; a scoring system will be included in the next version of the document.<br>3) Emphasising that the approach does not intend to provide a detailed framework for offsets and compensation. Companies seeking to make Nature- |

| Themes | Summary of response and key edits |
|---|---|
| | Positive contributions should aim to eliminate new negative impacts on biodiversity entirely; offsets should therefore be at most a small part of a company's approach, and where they are unavoidable, they are best dealt with by local regulatory processes with extensive stakeholder engagement. However, the approach will build from existing guidance, including the IUCN Policy on Offsets, the IMEC group's work on target-based compensation and previous initiatives such as BBOP to provide guidance to clearly delimit appropriate use of offsets within the overall framework.<br>4) Various edits and rewording for clarification.<br><br>IUCN looks forward to working with key stakeholders to address these important design decisions and to deliver a truly high integrity approach. |
| **8. Links between companies' targets and government roles and contributions** | The approach can support governments to set sub-national targets, and monitor and aggregate contributions across sectors and institutions. It can also help to guide governments on policies and instruments to incentivise delivery by public and private actors, and account for governments' direct contributions (e.g. public spending on protected areas). This is now articulated in newly added Section 4.9.0 on how governments can use the approach, and summarised in the Executive summary. Additional details have also been added on the importance of enabling policy and regulatory environments for system-scale integrity (Section 5.6). |
| **9. Relationship with other initiatives (SBTN and TNFD)** | A rapidly growing number of peer institutions, networks and initiatives are concurrently working on related topics; IUCN is directly involved in many of these. Consistent with IUCN's role as a Union, the approach seeks to maximise both synergies and complementarities with these peer initiatives (see Table 3 and Figures 3 & 4). |
| **10. IUCN consultation process** | This document, revised following integration of the comments above, and from feedback received through the IUCN Leaders Forum, has been extensively revised following detailed commentary from the IUCN Commissions, and is now available for a formal IUCN consultation with IUCN constituencies (Members, Secretariat, Commissions), companies and key alliances. |

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