# Enabling finance to deliver on the SDGs through the improved use of biodiversity data: An assessment of available biodiversity data

Input paper prepared for the G20 Sustainable Finance Working Group

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# Table of contents

## ACRONYMS

| | |
|---|---|
| ASEAN | Association of Southeast Asian Nations |
| CBD | Convention on Biological Diversity |
| CDP | Carbon Disclosure Project (formerly) |
| CDSB | Carbon Disclosure Standards Board |
| CSRD | Corporate Sustainability Reporting Directive |
| eDNA | Environmental DNA |
| ESG | Environmental, Social, and Governance |
| GBF | Kunming-Montreal Global Biodiversity Framework |
| GBIF | Global Biodiversity Information Facility |
| GFW | Global Forest Watch |
| GRI | Global Reporting Initiative |
| HCV | High Conservation Value |
| IBAT | Integrated Biodiversity Assessment Tool |
| IFC | International Finance Corporation |
| IPBES | Intergovernmental Platform on Biodiversity and Ecosystem Services |
| ISO | International Organization for Standardization |
| ISSB | International Sustainability Standards Board |
| IUCN | International Union for Conservation of Nature |
| KBAs | Key Biodiversity Areas |
| KPI | Key Performance Indicator |
| M&E | Monitoring and Evaluation |
| NBSAP | National Biodiversity Strategies and Action Plans |
| ODA | Official Development Assistance |
| OOF | Other Official Financial Flows |
| OP2B | One Planet Business for Biodiversity |
| PS6 | Performance Standard 6 |
| SBTN | Science Based Targets Network |
| SDGs | Sustainable Development Goals |
| SEEA EA | System of Environmental-Economic Accounting Ecosystem Accounting |
| SFWG | Sustainable Finance Working Group |
| SNA | System of National Accounts |
| STAR | Species Threat Abatement and Restoration |
| TDWG | The Biodiversity Information Standards |
| TNFD | Taskforce on Nature-related Financial Disclosure |
| UNEP-WCMC | United Nations Environment Programme World Conservation Monitoring Centre |

# EXECUTIVE SUMMARY

The adoption of the Kunming-Montreal Global Biodiversity Framework in December 2022 may be opening a new phase in financing nature, and in turn the Sustainable Development Goals. There is emerging pressure on companies, investors and governments to ensure that finance delivers measurable contributions to these societal goals. As a result, various approaches to measuring biodiversity have been attracting great attention over recent years. This fast-evolving demand for biodiversity data necessitates a stocktaking of where we are, current challenges, and potential opportunities to better understand the risks, impacts and dependencies on biodiversity, and to use this understanding in financial decision-making.

IUCN has developed this input to feed into the work of the G20 Sustainable Finance Working Group on enabling enhanced financing for the biodiversity-focused SDGs – i.e. 14 (life below water) and 15 (life on land) – leveraging the adoption of the Global Biodiversity Framework. This is also timely as the current and upcoming G20 Troikas are particularly well-suited to advancing synthesis of biodiversity measurement for sustainable finance. India, Indonesia, and Brazil are three of the most significant 'megadiversity' countries.

The paper covers issues relating to the availability of data on biodiversity, its governance and the implications for the measurement of biodiversity-related risks, opportunities and impacts, for both identification and reporting purposes, challenges, options and implications for the finance sector. An enhanced focus is given to impacts on biodiversity. It concludes with a series of preliminary recommendations to help accelerate and better target biodiversity data improvements with a look to aiding application in financial decision-making (in the private and public realms).

Biodiversity data is very complex, poorly understood, time consuming to validate and deploy, imperfectly linked to international frameworks, and difficult to aggregate. Yet, the data and information available at present is valuable enough to allow initial decision-making towards investing in nature, as well as integrating biodiversity considerations into the alignment of the financial system to sustainable development. As biodiversity consolidates its place in the financial agenda, the increasing demand for data will likely in turn act as a driver for further resources to be deployed in order to accelerate the improvements needed.

Selected key recommendations for G20 members to help accelerate the improvement of biodiversity data in support of enabling finance for the SDGs fall into four categories:

1. **Increasing the use of existing data tools**
    - Further support the raising of awareness, knowledge and capabilities of G20 members to understand the dimensions of biodiversity and biodiversity loss, and of the related transmission channels.
    - Advance the mapping and tracking of existing biodiversity data platforms and knowledge frameworks.
    - Promote the use of the strongest biodiversity data platforms and knowledge frameworks, envisioning eventual integration to market and regulatory requirements.
    - Facilitate the development of guidance for G20 members to apply and use such biodiversity data platforms and knowledge frameworks.

- Strengthen capacity building for national statistical offices, public finance institutions, and relevant line ministries to use nature-related data, and incorporate them into social and economic decision-making processes.
- Support implementation, broad adoption, and further development of robust assessment frameworks and standards, such as System of Environmental-Economic Accounting Ecosystem Accounting and the Taskforce on Nature-related Financial Disclosure, on the linkages between economic activities and nature.

2. **Improving existing data**
    - Promote and facilitate the testing and piloting of specific biodiversity data platforms and knowledge frameworks to help users identify priority improvements relevant for financial decision making.
    - Assess possible joint actions, in partnership with biodiversity data developers, to support the mobilisation of finance to improve available data relevant for nature conservation, restoration, and sustainable use.

3. **Addressing data gaps**
    - Assess data gaps across ecosystems and species and identify financial resources and expertise that can assist in filling those gaps.
    - Strengthen the two-way data flow between national and global processes for assessing nature-related data.
    - Develop case studies to strengthen the application of Indigenous and local knowledge to biodiversity data generation and assessment.
    - Devise channels for companies to feedback relevant data into global and national datasets.
    - Promote and facilitate the participation of civil society and institutions in data governance structures to ensure that data generated on biodiversity is compliant with global standards for acquisition and storage, and accessible to appropriate users.

4. **Accelerating and scaling the flow of capital towards nature**
    - Mainstream the Global Biodiversity Framework and High Seas Treaty into the sustainable finance work agenda and related financial mobilisation efforts.
    - Promote the integration of commitments and investments towards nature in the net-zero strategies of companies, both financial and non-financial.
    - Promote the piloting by private financial institutions of the IUCN transition pathways towards a nature positive economy using biodiversity knowledge platforms to identify risks, opportunities and priorities, and implement investments for managing biodiversity impacts at the portfolio level.
    - Promote screening analyses of the risks and opportunities afforded to biodiversity by companies with specific landholdings or assets.

## ABOUT THIS INPUT

**The adoption of the Kunming-Montreal Global Biodiversity Framework in December 2022 may be opening a new phase in financing nature, and therefore helping close the sustainable development finance gap**. This is especially true with the inclusion of Goal D (means of implementation) and Targets 18 (incentives) and 19 (financial flows) that directly address resource mobilisation to fully implement the Framework. This in turn reinforces and further structures the efforts to address the Sustainable Development Goals (SDGs), directly through positively impacting on Goals 14 and 15 (on "life below water" and "life on land" respectively), and beyond this, through the spillovers on other goals. Indeed, various estimates suggest that more than half of global GDP, or more than USD 40 trillion, is dependent on nature, and the services that it provides (WEF 2020, Swiss Re Institute 2020). Biodiversity decline represents a significant risk to a wide range of social and economic goals, therefore, supporting the means of financing the actions to halt its loss is a critical piece in achieving long term sustainable development and growth.

**The past years have seen the theme of increasing finance for biodiversity become very prominent**. There is emerging pressure on companies and governments to ensure that finance delivers measurable contributions to these societal goals for biodiversity. This has in turn triggered a growth in the demand for data. While national statistical organisations have a long history of measuring the social and economic dimensions of sustainable development, capacity and experience in handling environmental dimensions is often much lower. Yet, this growing demand has resulted in a variety of approaches to measuring biodiversity. Even if this proliferation of innovation is to be expected to meet the emerging demand for data, the fast-emerging array of initiatives in biodiversity measurement can appear daunting from the national perspective, and risk generating policy confusion.

**Understanding the current landscape of biodiversity data is instrumental in approaching the integration of nature to the efforts of aligning the financial system to long-lasting and sound sustainable development and growth**. As Ministries of Finance and Central Banks, together with other regulators (e.g. securities commissions, insurance supervisors), consolidate their engagement with the biodiversity agenda, awareness raising and applicable science-based information is needed to support better policy decision-making (e.g. incentives, signals, regulation, guidance, etc.). Understanding of available nature-related data and accessing appropriate information has been raised through the work of the Network for Greening the Financial System and the Coalition of Finance Ministers for Climate Action, reflecting both, the interest in biodiversity and the need for knowledge. Furthermore, actions in this direction have been incorporated in the SFWG's Roadmap. The current and upcoming G20 Troikas are particularly well-suited to advancing the synthesis of biodiversity measurement for sustainable finance. India, Indonesia, and Brazil are three of the most significant 'megadiversity' countries, between them holding nearly a third of all vertebrate species globally, and with more than 10% of all vertebrate species *only* found in these three nations (statistics from IUCN Red List of Threatened Species). And going forward, India, Brazil and South Africa comprise a similar concentration of 'megadiversity'.

**With this in mind, and welcoming the interest and efforts of the Sustainable Finance Working Group (SFWG), the International Union for Conservation of Nature (IUCN) has**

**developed this input to feed into the Group's work on enabling enhanced financing for two selected non-climate SDGs (14 and 15).** The timing of this work allows us to also leverage the achievements brought by the adoption of the Global Biodiversity Framework (GBF), further supporting and contributing to addressing the finance gap for sustainable development.

**This working paper leverages the longstanding and accumulated knowledge and resources of IUCN in the biodiversity and conservation space**. Such knowledge is backed by the contributions and involvement with its Members and partners, including ~200 State, Government Agency, and Sub-national Government Members, and ~1,200 non-governmental and Indigenous Peoples' Organisation Members. The Union also harnesses the experience of over 15,000 experts, organised into seven Commissions, which undertake work on topics including species survival, environmental law, protected areas, social and economic policy, ecosystem management, education and communication, and climate change.

## Scope

**This paper focuses on data related to living nature, that is, *biodiversity*, including its three components: ecosystems, species and genes**. It does not cover data that relates to non-living components of nature such as water flows, carbon storage, and soil health, except in how the variation of these components affects living nature. This is consistent with the approach stated above of supporting the implementation of the GBF and SDGs 14 and 15.

**The issues covered relate to the availability of data on biodiversity, its governance and the implications for the measurement of biodiversity-related risks, opportunities and impacts, for both identification and reporting purposes, challenges, options and implications for the finance sector**. Special focus is allocated to impacts on biodiversity, rather than dependencies of economic activity on biodiversity. Impacts relate to changes imposed by economic activity on the underlying biodiversity, again in alignment with our focus on the GBF and SDGs 14 and 15. Value chain dependencies on biodiversity relate specifically to ecosystem service provision, for instance water provision and pollination. The volume and quality of these services, while crucially important to livelihoods and economies globally, varies at small scales across the world, with variation generated by many factors unrelated to the quality of the underlying biodiversity, for instance, slope, climate, the sector receiving the benefits, and many others. Dependency-related impact is better assessed through analyses such as those summarised in ValuES, the Natural Capital Protocol or the Business and Biodiversity Interdependence Indicator.

**With this document IUCN aims to support G20 members through the generation and approach of the underlying data on biodiversity in the pursuit of scaling and accelerating finance towards the SDGs**. The paper synthesises recent developments in measuring biodiversity for sustainable development and sustainable finance, and makes evidence-based recommendations as to the most promising approaches and tools for use at the national level.

# THE CASE FOR FINANCING NATURE POST COP15

**In addition to spelling out several ambitious, measurable, and time-bound targets related to actions to conserve and restore biodiversity, the GBF set itself apart by adopting targets to ensure sufficient mobilisation of resources to implement the Framework**. This made the negotiations challenging, but in the end, they led to a two-part resource mobilisation strategy in which an interim resource mobilisation immediately kickstarts implementation. In addition, a comprehensive longer-term resource mobilisation strategy will be developed leading up to COP16 of the Convention on Biological Diversity (CBD), with the aim to match resource mobilisation with the needs of the Global Biodiversity Framework.

**One distinct strength of the agreement is that it includes several targets on resource mobilisation, with specific numerical goals and timelines**. These include Target 18 on reforming incentives, including reducing harmful subsidies by USD 500 billion per year by 2030 and Target 19 on mobilising at least USD 200 billion per year by 2030, from all sources, including at least USD 30 billion going to developing countries. These figures, both in their specificity and magnitude, represent a level shift in the amount of financing towards conservation. Although several of the targets, including elimination of harmful incentives to biodiversity, were already included in the 2010 Aichi Biodiversity Targets, those targets lacked specificity (e.g. in magnitude and timeline).

**The agreement also emphasises an active role for private capital**. This includes Target 15 that calls on countries to take legal, administrative or policy measures to encourage and enable business, especially large and transnational companies and financial institutions, to monitor, assess, and transparently disclose their risks, dependencies and impacts on biodiversity. Moreover, Target 19 on resource mobilisation specifically spells out the need to leverage private finance and stimulate innovative financing schemes, such as green bonds, payments for ecosystem services, and biodiversity offsets and credits.

## Evolving demands for biodiversity data

**Governments, private sector and investors are under increased societal pressure to manage environmental risks and strengthen their Environmental, Social and Governance (ESG) practices**. Interest in biodiversity data for financial decision-making has increased substantially in the last year, driven by two main factors: the goals and targets of the GBF, and the emergence of voluntary commitments for disclosure from the finance and corporate sectors. Both may lead to regulation. The following paragraphs briefly review these two factors, synthesising developments over the last few months. Recognition on the rapidly changing demand from corporates for biodiversity data is justified by the impact that this demand may have on regulatory and legal frameworks.

**Regulations and guidance on disclosure of nature-related impacts are key drivers of the growing interest in biodiversity by the private sector**. Of particular importance are the Taskforce for Nature-related Financial Disclosures, European Union legislation (such as the Corporate Sustainability Reporting Directive and the 2021 Sustainable Finance Disclosure Regulation), but also national legislation like France's 2019 climate and energy law. This is a space of extremely rapid change over the past three years and into the near future. We are moving towards a situation where any multinational business or financial service provider should

anticipate that it will be legally required to report in a standardised way on its nature impacts across different jurisdictions.

**Underlying and complementing the interest by the finance sector in biodiversity, is the growing corporate engagement in the matter**. Multiple ambitious voluntary commitment platforms have seen significant corporate engagement and are contributing to strong interest in biodiversity data by companies. These include Fashion Pact, OP2B, Act4Nature, Finance Pledge for Biodiversity, Platform for Biodiversity Accounting Financials, Business for Nature, Terra Carta, among others. Membership of many of these requires a company to set specific commitments or goals on biodiversity, often mirroring language in the GBF. Notably, nearly all of the aforementioned platforms were set up within the past three years, and in some cases they have very substantial sectoral leverage (e.g. the Fashion Pact signatory companies and brands represent approximately a third of the sector by revenue). This represents a step-change in the number and type of different companies and sectors engaging actively on biodiversity. Up until the late 2010s, the only companies using biodiversity data were those with a direct impact or dependency on land or water (e.g. extractives, infrastructure, food and agriculture, forestry, fisheries). There has been a rapid growth of interest in biodiversity from 'downstream' companies (e.g. fashion, fast-moving consumer goods, pharmaceuticals and healthcare, retail, electronics, telecommunications, 'big tech') for whom many of the most substantial biodiversity impacts are embedded within complex supply chains.

**The ratchet effect of imminent regulatory pressure prompted an increased demand from the corporate and finance sectors for clarity from policy makers and for biodiversity data**. The ask has been clear: the private sector needs to know what they have to report on, and regulators have to set a level playing field. TNFD will be instrumental in helping policy makers and regulators provide clear, concise guidance. Underpinning the advance on this is better understanding the data landscape and addressing the pending challenges with it. That is the purpose of this paper.

## WHERE ARE WE ON DATA?

**Assessing and measuring impacts on biodiversity and progress on conservation is a complex undertaking**. Many stakeholders struggle to find the right metrics and data. This is because biodiversity consists of several different components – ecosystems, species and genes – which vary in their distribution across the world at a very fine scale, and in their responses to human drivers over time. We know very little about variation in the distribution of genetic diversity across the world and how it responds to human drivers, so in the short term, biodiversity metrics must focus on assessing impacts on species and ecosystems.

**The impact of actions has varying consequences depending on the location of the intervention**. Some species and ecosystems are rarer or more vulnerable than others. This means that action that impacts biodiversity (for instance, the destruction of habitats for a mine or the creation of a protected area) will have very different consequences for biodiversity depending on exactly where they happen. Governmental and corporate actions to conserve biodiversity – or that impact on biodiversity – must therefore document the specific site or landscape in which they are being implemented, with a high degree of spatial precision, if the exact impact of those actions is to be measured. Additionally, measuring the impact of actions

on ecosystems or species can be difficult in its own right. For example, defining the precise limits of an ecosystem is often challenging, and some species are hard to detect or are poorly known.

**Therefore, for practical purposes, it is most informative to assess the impacts of actions on biodiversity in terms of how those actions increase or decrease threats to the biodiversity at that place**. It is not sufficient to simply mitigate threats, without knowing what effect this mitigation has or is likely to have on the underlying biodiversity. For example, a protected area established in a place holding few threatened species or ecosystems might yield very little benefit. Fortunately, the biodiversity data landscape is evolving rapidly, allowing to better assess interventions and solutions and select preferred options.

## What is available?

**Biodiversity data can be arranged into two main components- the "what" and the "where"**. For the purposes of this analysis, the "what" relates to species and ecosystems, as knowledge of genes is very incomplete. There are probably between 5 and 10 million species of plants and animals in existence – the latest estimate is around 8.7 million species (Mora et al. 2011). However, to date, only between 1.2-2.2 million species have been identified and described (Mora et al. 2011; IUCN 2022a). This includes about a million insects, about 110,000 molluscs and arachnids, 80,000 crustacea, 36,000 fish, and between 6,000-12,000 of each: reptiles, amphibians, birds and mammals. Meanwhile, at ecosystem levels of biodiversity, the IUCN Global Ecosystem Typology identifies 25 Biomes and 108 "Functional Groups" across the whole world, that cover more than 4,000 ecosystems.

**The "where" component of data relates to biodiversity location**. In relation to species, historically, the main thrust of biodiversity data gathering focused on collection of species location records, initially from museums and latterly from citizen science initiatives such as EBird. This focus is valuable in that it enables managers to evaluate the likely impacts of actions on biodiversity through the species that occur at a site. Location data for species is aggregated by the Global Biodiversity Information Facility (GBIF), a database for records of species across the world, with metadata for each record describing the geographical precision and identity of the collector. The GBIF governing board is composed of government representatives from at least 41 countries, including various G20 members (e.g. Australia, Brazil, Canada, France, Germany, South Africa and the US).[1] These data are curated and made available to all users. Meta-databases based on species occurrence data like GBIF are an increasingly valuable source of 'raw' species data. As for ecosystems, many countries (including G20 members) have ecosystems mapped according to national standards, and IUCN's Global Ecosystem Typology provides a framework for globally standardised ecosystem location data, designed to be interoperable with different national standards. While the importance of genetic data for evolution, conservation and management of wild and domesticated species is clear, there is very limited knowledge of genetic variation between species and across geographies.

**Data on species and ecosystems can be acquired, analysed and presented in ways to help biodiversity management**. Recent developments in biodiversity data acquisition and

[1] These are participants with voting rights enabled by their annual financial contributions to GBIF. There are, additionally, Associate Participants.

storage have advanced in two directions. One, greater focus has been put on targeting data with particular importance for conservation or biodiversity management, as opposed to more general knowledge of the distribution and richness of species. Knowledge of extinction risk and the threats that cause species to be at risk of extinction can enable managers to focus action on reducing those threats, lowering, in turn, the risk of extinction. The following are examples of datasets supporting biodiversity management:

- The IUCN Red List of Threatened Species (Red List) is the world's most comprehensive inventory of the global extinction risk of species. Established in 1964, it provides information about range, population size, habitat and ecology, use and/or trade, threats, and conservation actions. It is crucial not only for helping the identification of those species in need of targeted recovery efforts, but also for focusing the conservation agenda by identifying the key sites and habitats that need to be protected. It also helps tracking biodiversity trends over time and space through tools such as the Red List Index, used by governments to track their progress towards targets for reducing biodiversity loss under SDG 15 and the GBF's Monitoring Framework. Ultimately, the Red List helps to guide and inform future conservation and funding priorities. Many regional and national Red Data Books and Red Lists have been published around the world, of which an ever-increasing number are using the current IUCN Red List Categories and Criteria.

- The Red List of Ecosystems (RLE) is a tool for assessing and monitoring the risk of collapse of ecosystems. It seeks to assess the 'health' condition and threat levels faced by each ecosystem, as well as to identify the most effective management pathways to reduce risks and loss of biodiversity. Given the scope and urgency of the global environmental crisis, it is important to (a) better understand the dynamics and processes of ecosystems, (b) identify which ecosystems are healthy and which are at risk of collapsing, (c) identify the main threats and possible ways to mitigate or eliminate their impact, and (d) monitor the impacts of conservation measures, in order to identify the most effective and efficient ones.

- The Key Biodiversity Areas Database provides information about sites of importance for species and ecosystems, analysed by land-use or administrative unit. A site qualifies as a global Key Biodiversity Areas (KBAs) if it meets one or more of 11 criteria, clustered into five higher level categories: threatened biodiversity, geographically restricted biodiversity, ecological integrity, biological processes, and irreplaceability. The KBA criteria can be applied to species and ecosystems in terrestrial, inland water, and marine environments, and may be applied across all taxonomic groups (other than micro-organisms).

- The World Database on Protected Areas, in Protected Planet, was established in 1981 and relates to sites that have statutory or customary conservation regulation, protected and conserved areas. These sites vary in their relevance from the perspective of the conservation of biodiversity. If they are highly relevant, they may be additionally identified as KBAs.

**The second direction in advancing data for biodiversity management has been the application of remote sensing**. Efforts have pushed for an increasing array of remotely sensed

data products of relevance to biodiversity, often with global or near-global coverage, at very high resolution and at low cost. Combined with vastly improved computing power, this has enabled the development of global-scale high-resolution derived datasets such as the advanced data for forest extent and the relatively less developed forest condition indexes (e.g. Hansen et al. 2019; Grantham et al. 2020), as well as broader 'ecological integrity' indexes (e.g. Beyer et al. 2020). Many of these new datasets which are based on publicly funded remote sensing are freely available, even for commercial use, driven by government 'open data' policies.

**The application of new technologies will further drive the availability of biodiversity data**. Development of tools like eDNA-based assessment and passive acoustic monitoring, citizen science portals (e.g. eBird) and improved solutions based on digital technologies and combination of uses (e.g. big data, machine learning, artificial intelligence) are likely to drive further innovation and rapid progress in the availability of biodiversity data. In general, these techniques are valuable for generating data on common species, but these may not be the priority species for conservation action. For rarer or higher priority species, their likely utility will depend greatly on our ability to validate the data. For instance, for eDNA assessments, detection of species depends on the existence of genetic markers for species. The rare or threatened species that are the top priority for conservation action are also those least likely to have genetic markers available. For citizen science portals, a similar problem relates to the rarity of priority species – the information about how to identify them may be limited to a few experts, who may not have the time to assess the many claims that are generated by citizen science. Furthermore, the availability of data continues to evolve, more so as interest and need for it grows in different sectors and activities.

## Notes on data at national levels

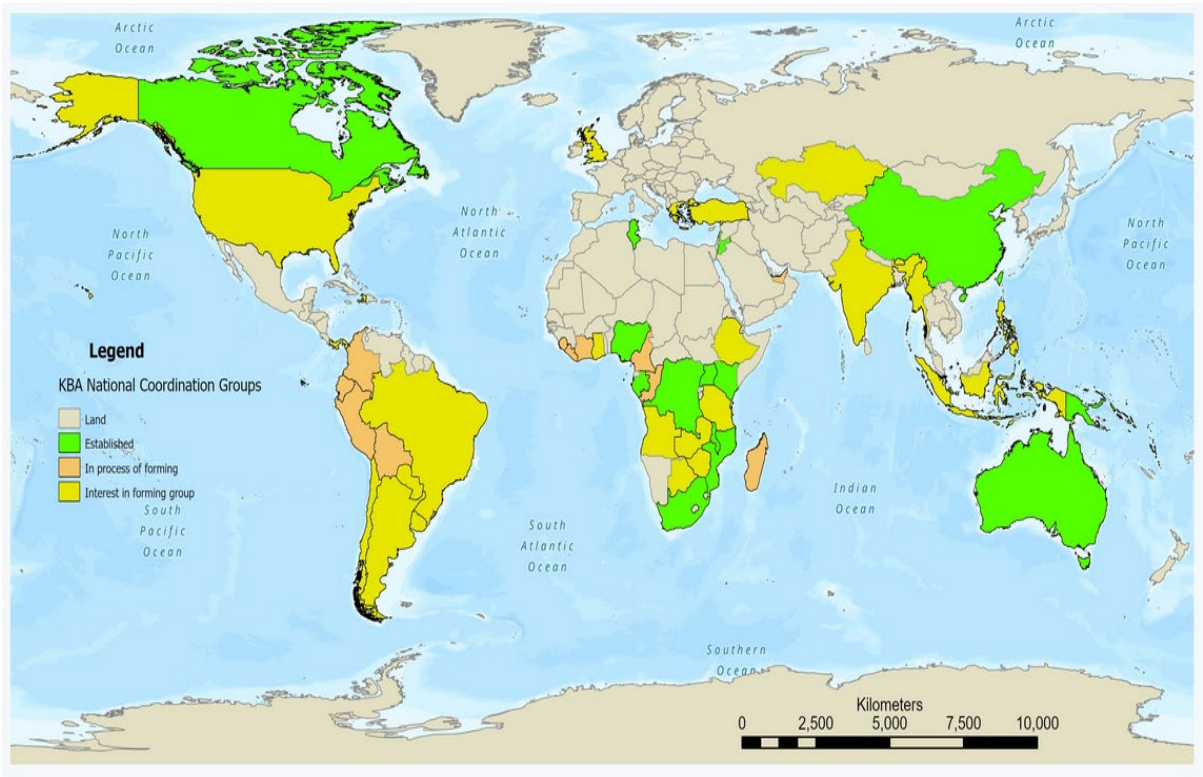
**The breadth of biodiversity data is large and there is no comprehensive national comparative analysis of biodiversity data**. Much of the biodiversity data generated at the national level is made available through the efforts of national research institutions, scientists and NGOs. In many cases, these institutions and individuals coordinate their research efforts through engagement with IUCN's specialist groups that work on particular species, such as IUCN/SSC Primate Specialist Group.[2] Therefore, as a proxy, having an overview of state-level engagement in the commissions working on data could provide a first snapshot and possible window of engagement to advance efforts at the level of each country or the SFWG itself. Annex 1 presents summarises the participation of G20 members and 2023 G20 guest countries in the different IUCN governance and coordination mechanisms.

**The status of biodiversity data varies across countries**. There is a general concentration of data on several groups of species, while there are relatively larger gaps in others. In the case of the Mediterranean region, for example, there is a concentration of data and monitoring on large vertebrates, a certain lack of data on the most threatened groups of vertebrates, such as amphibians or native fish, and very little data on invertebrates, plants, fungi, ecosystems and genetic resources. In some countries, there are large gaps in research and information for biodiversity overall. As an illustration of the geographic unevenness, Figure 1 shows the highly

[2] Out of the 19 countries that comprise the G20, 16 are State Members of IUCN, in addition to eight of the guest countries under India's Presidency in 2023.

heterogeneous distribution of Key Biodiversity Area National Coordination Groups, reflecting the global imbalances of the ongoing maintenance of biodiversity data and assessment.

Figure 1. The distribution of Key Biodiversity Area National Coordination Groups




*Source: KBA National Coordination Groups.*

## WHAT IS THE ARCHITECTURE AND GOVERNANCE FOR BIODIVERSITY DATA?

**Biodiversity data has a long-lasting yet evolving governance and architecture**. Gathering extensive and in-depth data is a crucial step to identifying pressing threats, gaining updated insight on the area of distribution for species and habitats, understanding ecosystem interactions, supporting the implementation of conservation frameworks and informing environmental policies. In 2022, the Open-Ended Working Group on the Post-2020 Global Biodiversity Framework noted that "global infrastructures and data sharing and quality principles have increased the availability of high-quality biodiversity data", yet that to assemble such global biodiversity data infrastructure "sustained investment and development is needed."[3]

[3] "Expert Input to the Post-2020 Global Biodiversity Framework: Transformative Actions on All Drivers of Biodiversity Loss Are Urgently Required to Achieve the Global Goals By 2050", Geneva, Switzerland, 13-29 March 2022. https://www.cbd.int/doc/c/5735/c241/efeeac8d7685af2f38d75e4e/sbstta-24-inf-31-en.pdf

## Standard setting

**Data standards provide the rules and guidelines to approach data generation and structure information to allow and ensure reliability, interoperability, and accuracy**. In the space of biodiversity, at the global scale, we can find standards being developed by several organisations, jointly building the governance system. Among these are IUCN itself, and more recently the International Organization for Standardization (ISO), the Biodiversity Information Standards (TDWG), and the Global Reporting Initiative (GRI). Additionally, there are biodiversity data standards at the national level in many countries (e.g. national ecosystem typologies such as the United Kingdom's National Vegetation Classification).

**IUCN provides the standards and principles for the mobilisation of a series of data sets**. Among these standards are: the IUCN Red List Categories and Criteria, the Global Standard for Identification of Key Biodiversity Areas, and the IUCN Global Standard for Nature-based Solutions. Each of these standards are developed through the work of IUCN Commissions. The Union generates data to enable application of these standards, yielding knowledge products such as the aforementioned IUCN Red List of Threatened Species, the World Database of Key Biodiversity Areas, and Protected Planet. These in turn allow the production of derived metrics such as the Species Threat Abatement and Restoration (STAR) metric and indicators such as the Red List Index. These standards and their derived knowledge products are widely used 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 (See Box 1) and the GBF. The key drivers for these standards are the quality, legitimacy, and global coverage of key data products.

**As the biodiversity and conservation space evolved, additional standard-setting processes came to complement the governance of biodiversity data**. The ISO embarked in the biodiversity field in June 2020 through the technical committee on biodiversity, referred to as ISO/TC 331. It aims to produce standardisation in the field of biodiversity, for organisations to enhance their contribution to sustainable development. Specifically, the work programme will develop requirements, principles, framework, guidance and supporting tools in a holistic and global approach. Currently, 34 countries are members of the committee and 20 more are observers. IUCN has supported the creation of this committee from its inception, further to the initiative of AFNOR, the French standardisation agency. IUCN holds a liaison-A partnership, i.e. at the ISO/TC global level.

Box 1. Data products based on IUCN standards in the SDG indicator framework

Since 2015, IUCN has been actively supporting the monitoring of progress towards SDGs 14 and 15. It serves as the custodian agency for 5 of the 231 official SDG indicators to national governments (especially National Statistical Offices) and the United Nations Statistics Division, on targets dealing with coverage by protected areas in different realms (including of Key Biodiversity Areas), threatened species, and Invasive Alien Species. Specifically, these indicators are:

- 14.5.1 Coverage of protected areas in relation to marine areas
- 15.1.2 Proportion of important sites for terrestrial and freshwater biodiversity that are covered by protected areas, by ecosystem type
- 15.4.1 Coverage by protected areas of important sites for mountain biodiversity
- 15.5.1 Red List Index
- 15.8.1 Proportion of countries adopting relevant national legislation and adequately resourcing the prevention or control of invasive alien species

**There are as well additional pieces of data architecture with standards and protocols that help reinforce the data system.** More focused on the underlying species taxonomy is the Biodiversity Information Standards (TDWG).[4] This is an open, bottom-up organisation focusing on the development of standards for the exchange of biological and biodiversity data. Its work has been highly relevant to enable interoperability. Complementary actions in the space have been facilitated by the Group on Earth Observations Biodiversity Observation Network (GEO BON), Global Ocean Observing System (GOOS). Additionally, there are principles for scientific data management from FAIR (Findable, Accessible, Interoperable and Reusable) and for Indigenous data Governance from CARE (Collective benefit, Authority to control, Responsibility, Ethics).

**An important recent advance has been the adoption of the System of Environmental-Economic Accounting Ecosystem Accounting (SEEA EA)**. The SEEA EA was adopted by the UN in 2021. It describes ecosystems and the services they provide to the economy and to people, consistent with the System of National Accounts (SNA). The SEEA EA assesses and documents the links between biodiversity and economic activity and human well-being by providing a description of the relationships between ecosystems, the species that comprise them, and the economic benefits that ecosystems provide. Rather than providing direct measures of ecosystem diversity, information from ecosystem accounts supports assessing the status of and trends in biodiversity, along with ecosystem services supported by ecosystems. In 2022, 41 countries indicated that they are implementing the SEEA EA and/or related thematic accounts (UNSD 2022). Differences exist in the scope and coverage of the accounts developed by different countries, but many developed (e.g. United Kingdom, Netherlands, Finland) and developing countries (e.g. Brazil, India, Mexico, Rwanda) alike are actively compiling SEEA accounts. The number of countries compiling SEEA accounts is used as an indicator to monitor SDG Target 15.9: “By 2020, integrate ecosystem and biodiversity values into national and local planning, development processes, poverty reduction strategies and accounts”.

**Three main connections exist between the SEEA EA and biodiversity assessment and monitoring frameworks**. First, data from biodiversity assessments can also support the development of ecosystem accounts, including on the condition of ecosystems and the measurement of ecosystem services supported by them. Second, output data from SEEA EA provides relevant sources to other assessment frameworks and global monitoring initiatives, including on ecosystem extent, ecosystem condition or ecosystem service flows. Third, data from the ecosystem accounts, especially concerning ecosystem services, provides support for the discussion of the interactions between biodiversity, people and the economy. These connections are relevant in helping bridge global goals and national priorities, along with signalling to the public and private sectors alike the need to direct capital towards biodiversity.

**The Global Reporting Initiative’s (GRI) Biodiversity Standard is currently being updated, with a new version due later in 2023**. GRI is an independent international organisation that provides a globally widely used sustainability reporting standards, applied by private and public sector entities to report on a range of topics including biodiversity. This effort is highly relevant in the context of greater involvement in the space of corporates and financial institutions, and

[4] Based on the initials of its predecessor, the International Working Group on Taxonomic Databases for Plant Sciences, founded in 1985.

the need to cross biodiversity data with data from economic activities. It is relevant to highlight that “the revision process saw extensive engagement with other biodiversity frameworks and initiatives, to align the GRI Standard with new developments in the field” (GRI 2023), since harmonisation has been a clear market demand.

**Finally, the standard setting ecosystem more specifically related to finance is becoming more established and starting to incorporate biodiversity.** The International Sustainability Standards Board (ISSB), founded in 2021, has the topic of biodiversity, ecosystems and ecosystem services already as one possible research project to advance its workplan (currently in consultation). The latter made it to the list of possible topics based on an assessment of investors’ information needs. Furthermore, 2023 will see the release of the final recommendations by the Taskforce on Nature-related Financial Disclosures (TNFD). Building on the Taskforce on Climate-related Financial Disclosures, TNFD seeks to put forward a risk management and disclosure framework so that organisations can report and act on evolving nature-related risks and opportunities. This in turn, would generate useful intelligence for aligning global financial flows towards nature-positive outcomes. As such work is adopted and increasingly applied, it will become a new piece within the data standards ecosystem for nature financing, providing the framework for approaching the generation and publication of data needed to cover some of the current gaps. The TNFD guidelines will hopefully help generate or make available new relevant data from companies, filling gaps and fine-tuning currently available data and tools.

## Data curation

**In order for biodiversity data to be accessed and used, it must be validated, organised, and maintained.** At the global scale, a number of entities are involved in the curation of large biodiversity datasets. Some of the most significant are:

- The Global Biodiversity Information Facility (GBIF) – The GBIF is an international network and data infrastructure funded by governments and aimed at providing open access to data about all types of life on Earth. Coordinated through its Secretariat in Copenhagen, the GBIF network of participating countries and organisations, working through the participant nodes, provides data-holding institutions around the world with common standards and open-source tools enabling them to share information about where and when species have been recorded.

- The United Nations Environment Programme World Conservation Monitoring Centre (UNEP-WCMC) hosts and maintains a number of global biodiversity datasets, and datasets related to biodiversity management, including the World Database of Protected Areas, a joint initiative of UNEP and IUCN.

- IUCN curates several large biodiversity datasets, notably the Red List of Threatened Species and the Red List of Ecosystems, which describe the vulnerability of species to extinction and of ecosystems to collapse, and identify what pressures apply to each that make them threatened. The information included in The Red List of Threatened Species and the Red List of Ecosystems datasets are collated and curated by the IUCN Species Survival Commission and Ecosystem Management Commission respectively. These datasets are the first step in making sense of the vast amount of data on biodiversity, by

providing users with knowledge of the distribution and status of components of biodiversity that are under risk of disappearing.

**There are varied national level biodiversity data curation processes as well**. There are many institutions and initiatives at the regional (e.g. European Union), national and sub-national (e.g. Australian States) levels that compile and maintain a range of different biodiversity datasets for particular countries or jurisdictions. The picture is complex and it is hard to generalise the data curation arrangements of different countries, even among G20 members. These processes are quite idiosyncratic and vary a lot from place to place. Some data is held by government bodies, some by academic institutions (e.g. national museums), some by data-focused NGOs and conservation organisations (e.g. British Trust for Ornithology in the UK).

**The increasing democratisation of data, driven especially by the emergence of citizen science, has implications for the architecture and governance of data**. Taking the examples of eBird and iNaturalist, any citizen can set up an account and start registering their sightings of species. These data are then evaluated by volunteer reviewers, before being accepted as 'Research Grade' or 'Confirmed'. These records then make their way into the proprietary databases and analysis tools developed by the supporting organisation. In general, the data are freely available, but are owned by the sponsoring organisation (e.g. the Cornell Lab of Ornithology for Ebird), and users grant the organisation a royalty-free permanent license for the use of the materials, including supporting information such as photographs and sound recordings. Any use of material by users is limited to non-commercial ends. These citizen science platforms have transformed the way in which biodiversity data is acquired, especially for species that are well known and easy to identify, and where the support networks are established. iNaturalist now has 128 million observations worldwide, of 419,000 species, submitted by 2.5 million observers – however almost half of these are in the United States. Equally, in the United States there are now 50 million eBird Checklists submitted by 600,000 observers. This huge volume of data has led to ground-breaking analyses, for instance of the changes in distribution of birds caused by climate change. In other parts of the world with less coverage, there are fewer data – for instance in Madagascar there are 128,000 iNaturalist observations submitted by 1,500 observers, and 19,000 Ebird Checklists submitted by 1,160 observers. For Ebird in Madagascar, with only one volunteer reviewer, there are many observations that have yet to be validated, many of which concern rare or threatened species. There is clearly enormous value in ensuring that these data are available for conservation decision-making, for instance in contributing to Red List of Threatened Species assessments, but for the moment, except in resource-rich (and volunteer-reviewer rich) parts of the world, there is a bottleneck in validation which is limiting the full realisation of that potential.

**There is equal potential for artificial intelligence, particularly as applied to remotely sensed data, to speed up accessibility and robustness of datasets for conservation management**. A good example is the potential for artificial intelligence to help the identification of Area of Habitat polygons for the calculation of threatened species ranges. At present the technology is emergent, and any outcomes of the analyses still have to be validated manually, thus repeating the bottleneck of technical capacity that limits the application of citizen science-generated data.

### Knowledge generation, thematic assessment, capacity building, and policy support

Cutting across these various levels of intervention in the governance and architecture of biodiversity data are important functions of knowledge generation, thematic assessment, capacity building, and policy support. In the intergovernmental arena, these are served through formal science-policy platforms like the Intergovernmental Platform on Biodiversity and Ecosystem Services (IPBES). Most of IPBES' efforts to date have focused on thematic assessments, yielding coverage of pollination, land degradation, sustainable use, values and valuation, four regional assessments, and a global assessment.

## CHALLENGES WITH AVAILABLE BIODIVERSITY DATA

**A great deal of useful biodiversity data is already available at the global scale, but could be even more effectively deployed to inform policy decisions given improvements in some key areas**. The following are highlighted challenges to address:

- **Taxonomic and geographic coverage**. Biodiversity around the world consists of thousands of ecosystems, millions of species and billions of genes. While it is possible to evaluate for the purposes of management the ecosystems around the world, it is impractical to imagine that a complete inventory of species and genes could be deployed to focus conservation action. Biodiversity data (location, extinction risk, etc.) typically has a bias towards particular groups of species. We understand the distribution of larger vertebrates and many of the flowering plants, but our knowledge of insects, fungi, microorganisms such as bacteria and protozoans, and ecosystems in the deep marine realm and underground is very poor. Efforts to increase knowledge of these species and ecosystems is ongoing, but the time and effort required to inventory and describe the millions of as-yet undescribed plants and invertebrates will be very substantial, and expertise across many of these species groups and ecosystems is sparse and underfunded. The taxonomic coverage (best for vertebrates) is largely congruent with policy needs but patchy for some groups, such as bees, that have important roles in ecosystem services provision. Terrestrial biodiversity is better known than marine or freshwater biodiversity. Availability of data varies geographically, and is lacking for some areas of high biodiversity value and nature conservation importance. For example, the biodiversity of the tropical forests of West and Central Africa is relatively poorly known compared to that of Europe.

- **Frequency of updates.** A second problem with biodiversity data is that, owing to the cost and expertise required to gather it, it is often outdated, and distributions of species and extent of ecosystems are impacted by processes that take place after a survey or evaluation.

- **Consistency and quality.** A greater need for data sharing and harmonisation is important to further advance the availability of biodiversity data. Much data exists within different government agencies and civil society organisations, but there is rarely a centralised harmonisation of such data and information, either at a national or regional level. One example of a sub-regional approach to harmonise data is the ASEAN Clearing House Mechanism, which aims to act as a portal to all of the biodiversity

information available in Southeast Asia. Beyond collecting and organising data, this Mechanism also provides Association of Southeast Asian Nations (ASEAN) Member States with capacity building materials and regional analyses of species and protected areas to aid decision makers in setting and undertaking priority actions, as well as fulfilling their reporting obligations under multilateral environmental agreements. In much the same way that the Clearing House Mechanism makes regional biodiversity data accessible to policymakers, advancing in such harmonisation efforts is crucial to allow a better and faster application of data in the corporate and financial sectors.

- **Access to available data is not always easy**. Some national databases are only accessible to specific users, such as when restricted to government officials. In other cases, databases on species and protected areas are not user friendly for the policy makers and the financial sector. Making sure the databases put together at national and regional levels are user friendly and accessible to private actors is important to help accelerate the improvement of available data. As the private demand for biodiversity data grows, the public-private interaction and collaboration will be important to ensure the right level of robustness and applicability, to consolidate efforts and prioritise data development investments. Further, many resources are available in English only, though web translation tools are now readily available.

## Options to overcome the challenges

**Gaps in biodiversity data are related to two issues: the incomplete coverage of species and ecosystems, and the fact that some data on ecosystems and species is out of date**. These two issues are closely related to resource availability. It is expensive to gather data on species and ecosystems that are poorly known owing to inaccessibility, such as ocean depths, and there are few experts available to conduct reassessments of sometimes obscure species and ecosystems.

**Yet, we have good enough data to mobilise policy and investment for biodiversity, though still underutilised**. While the datasets we have are incomplete, it is very important that we use the current biodiversity data to enable urgent conservation action for species and ecosystems that we know about. Together with this, that we focus therefore data improvement efforts on the priority ecosystems and species and the threats that apply to them; and that we understand in particular how the impacts of our actions on these priority threats can be measured and managed. Once knowledge of poorly-known groups and ecosystems improves, priority actions can be reoriented to ensure that they accommodate the needs of these groups. Furthermore, the use of available data will itself support the further development of data.

**In addressing the incomplete nature of biodiversity data and knowledge, it is important to prioritise and stratify efforts**. Here it would be required to: identify the most important existing sets of biodiversity data; the gaps in biodiversity data; efficient methods to identify priorities among these gaps; and important steps to present data for decision-making for preventing further loss. Acknowledging that further refinement and consultation with national experts and institutions will permit the identification of steps that can be taken by specific governments, below a preliminary snapshot is shared:

- If biodiversity is not threatened with extinction or collapse, then it is not generally an urgent priority to expend resources managing it. Rather actions to conserve the most threatened species and ecosystems are necessary. This means tackling the causes of biodiversity loss in the places where this loss is occurring. Data that identifies and localises the species and ecosystems that are under threat is therefore of primary importance in planning interventions.

- Secondly, make sure that the data on which we rely, that of species and ecosystems that are under particular threat, is as up to date as possible. Only in this way decisions that are based on this data will be more likely to be correct. Improved investment in remote sensing techniques, artificial intelligence and citizen science, with their accompanying verification systems, would help greatly in filling the major data gaps and resolving these problems.

**Procuring sustainable funding is high in the priorities to address the above challenges at the pace required to achieve the SDG 14 and 16 and the GBF targets.** As an illustrative example, the annual budget for maintaining the World Database on Key Biodiversity Areas is USD 300,000, and an estimate of the need to complete reviews of existing KBAs (each KBA once every 10 years), support National Coordination Groups and provide analytical and reporting tools is at around USD 4 million per year. In turn, more than 50% of the cost of maintaining the data products mentioned earlier is covered by philanthropic sources, with a further quarter from governmental sources (Juffe-Bignoli et al. 2016). The overall annual cost of maintaining these data sets is around USD 12 million, and upgrading them to provide an adequate monitoring system for global biodiversity would cost around USD 100 million (Juffe-Bignoli et al. 2016). The benefits of better management of biodiversity that accrue from the use of these products is hard to estimate, but just for one use (i.e. screening for biodiversity impacts under the International Finance Corporation's (IFC) Performance Standard 6), many multilateral and bilateral donors depend largely on these data sources. Efforts to increase the contribution to the recurrent costs of maintaining these datasets through private sector contributions have yielded positive impacts recently, but the shortfall is still being covered by ad-hoc support from philanthropy and small grants from governments. Currently, the sources of funding to maintain the existing data storage, curation, analysis and reporting mechanisms are short term and inadequate. A major contribution to ensuring that government and corporate impacts on biodiversity can be appropriately managed could be made by strategic investments in the acquisition, curation and presentation of biodiversity data, through existing platforms that are ready to accept this challenge. Given the development phase of new technology, it is hard to evaluate their potential in aiding these processes, but it is expected that resulting efficiencies in data acquisition, curation and analysis will make the costs of strategic decision-making on biodiversity simpler, more accurate and more efficient. Finally, the potential for massive increases in data volume that could be generated from citizen science will impose additional burdens on scientific expertise required to validate the data. Much of this expertise is required at a national level, as local context knowledge is crucial for validation. There are already very large disparities in the capacity of governments, national institutions and civil society between G20 countries, and investment in increasing this capacity will be required, especially in places of global importance for biodiversity.

## WHERE ARE WE ON INFORMATION AND KNOWLEDGE MANAGEMENT?

**Available biodiversity data needs to be translated into accessible usable information**. As noted above, there are many obstacles preventing wider adoption and use of biodiversity data. Indeed, the Taskforce on Nature-related Financial Disclosure has noted that the "lack of understanding of how the information derived from data can be used by decision-makers is more of a challenge than shortage of data." (TNFD 2022). There has been a recent proliferation of knowledge management platforms for biodiversity data, with providers and portals seeking to make biodiversity data more accessible, useful and action-oriented to different groups of users. The range of users engaging with biodiversity data has grown as well. Table 1 synthesises the main types of users, the types of usages and what drives such demand.

Table 1. Summary of the main groups of consumers of information products using data based on IUCN standards and the main drivers and data needs

| | Site-based private sector projects and project finance | Agriculture, forestry, fisheries | Corporates | Institutional investors (asset managers etc,) | Governments |
|---|---|---|---|---|---|
| **Principal data uses** | Risk screening, impact assessment, mitigation & offset planning, M&E | High Conservation Value assessments, certification, land-use planning (set-asides etc), managing stocks/offtake | Value-chain footprinting, target setting, KPIs, measuring biodiversity benefits on investments | Due diligence, development of 'green' products (e.g., green funds) | Spatial planning / conservation planning, strategic environmental assessment, reporting against global conventions esp. CBD |
| **Main drivers** | Lender standards (e.g., PS6, HCV), national regulation | Certification, national regulation | Reporting and disclosure requirements (e.g., CDP, GRI, SBTN, CDSB, CSRD, sectoral commitment platforms like the Fashion Pact and OP2B) Voluntary alignment with global goals (esp. Paris Agreement; SDGs) | Reporting and disclosure requirements (e.g., CDP, GRI, CDSB, CSRD) | National policies CDB and UNFCCC NDCs |

**There are various data portals bridging access to biodiversity information.** They differ in focus, but all provide biodiversity data integrated with contextual data layers on the living and non-living environment; and are focused on businesses, using web services for easy integration into internal business processes and clear commercial licensing. The following three are

exemplified here given that they share a comparable scale and are supported by leading institutions[5]:

- The Integrated Biodiversity Assessment Tool (IBAT) provides free access for governments to the four main biodiversity-related datasets referred to above, in addition to providing analytical tools and reporting that can be used by governments to, for instance, provide reports on National Biodiversity Strategies and Action Plans (NBSAPs). IBAT also has a corporate-focused portal that provides data to companies for screening of biodiversity-related risk, delivered through reports that align with the IFC's Performance Standard 6 guidance on Critical Habitats. Later developments allow companies to evaluate their potential contributions to reducing species extinction risk, by use of the STAR metric. The STAR metric permits the comparison of sites, across a country, corporate footprint or sector, to allow users to identify priority interventions that can deliver outcomes towards Goal A of the Global Biodiversity Framework. Bang (2023) provides a recent private credit use case of IBAT, including the STAR metric and IFC Performance Standard 6 applications, as part of ADM Capital's Asia Climate-Smart Landscape Fund's analysis of the biodiversity impacts and nature-related risks of different sustainable agriculture, agroforestry, and aquaculture investment projects in Indonesia.

- The Global Forest Watch (GFW) is an online platform that provides data and tools for monitoring forests. By harnessing cutting-edge technology, GFW allows anyone to access near real-time information about where and how forests are changing around the world.

- Nature Map Explorer (NatureMap) provides a set of integrated global maps on biodiversity and ecosystems services, including carbon, based on the best available scientific data. These maps aim to support the design and planning of policies aimed at limiting biodiversity loss, and net greenhouse gas emissions from land use, in an integrated manner.

**Biodiversity target setting is still in need of data improvement**. While the datasets cited across this paper help companies and governments screen and assess potential options for managing biodiversity-related risk, they do not provide a means to identify and set targets for contributions to policy goals such as the Kunming-Montreal Global Biodiversity Framework and the SDGs. Additionally, they do not currently provide a means for companies to disclose risk and opportunity around biodiversity impacts, such as may be required by standard-setting bodies and regulators following the recommendations of the Task Force for Nature-related Financial Disclosures and other disclosure frameworks. The development of such mechanisms and toolkits is therefore of urgency if companies are to be able to deliver verified contributions to these global goals. See Box 2 presents an initiative to help deliver these contributions.

[5] Global Forest Watch and Nature Map, as well as other platforms such as Earth Map and Google Earth, contain many data layers useful in the interpretation of biodiversity data, but in general do not contain sources of biodiversity data other than that sourced from IUCN-related databases such as the Red List of Threatened Species, The World Database on Key Biodiversity Areas, and others.

Box 2. Application of the Species Threat Abatement & Restoration metric

The Species Threat Abatement and Restoration (STAR) metric allows business, governments and civil society to quantify their potential contributions to stemming global species loss, and can be used to calculate national, regional, sector-based, or institution-specific targets (Mair et al., 2021). The STAR was developed based on the IUCN Red List of Threatened Species™, in a collaboration between 55 organisations. The IUCN Red List is the most comprehensive global assessment of the status of biodiversity.

Because biodiversity is distributed unequally around the world, STAR assesses the potential of specific actions at specific locations to contribute to international conservation targets. STAR estimates the contribution of two kinds of action to reduce species extinction risk – threat abatement and habitat restoration.

This makes it possible to compare specific threat abatement and habitat restoration actions in different places toward reducing global species extinction risk, which will help companies, countries and others plan their conservation efforts. It also permits actors to add up their total contributions.


IUCN is currently developing the Nature-Positive Approach, with pathways for three categories of companies that will enable them, through use of data products such as STAR, based on the IUCN Red List of Threatened Species, to quantify their potential contributions to stemming global species loss. The three categories of companies include those with land-based assets, those dependent on commodities or value chains that have impacts on biodiversity at the site of production, and finance companies that invest in the first two categories of company. In each case, a set of steps for the company shows how they can screen their assets and value chains, identify priority actions, set targets for action against a baseline, and deliver verified contributions.

## CONCLUSIONS ON BIODIVERSITY DATA & INFORMATION

**Biodiversity data is increasingly in demand by financial institutions and governments for improved investment decision-making, as the risks of negative impacts on biodiversity become more material**. While biodiversity data are available and deployed to help decision-making, knowledge of species and ecosystems is incomplete, and genetic data minimal.

**Biodiversity data (relating to species and ecosystems, and where they occur) is collected largely at the national or local level, and the volume of this information is limited by the number of technical experts available to collect and validate this information**. Access to this underlying data is generally available at no cost to governments, but interpretation of the data limits the application of this knowledge to decision-making.

**Focusing on ecosystems and species that are known to be at risk is crucial to maximising the value of biodiversity data, and this enables investors and governments to screen options and manage risk**. However, the data that are used to support these decisions, even those referring to threatened ecosystems and species, are incomplete and in need of constant maintenance and reassessment to be up to date. Existing sources of support for maintenance and improvement are mostly from philanthropic sources, with governments contributing about 25%. Increased investment in these data products, especially those aligned with IUCN standards but compiled and available at the national level, and the development of new tools to help companies formulate and then report on contributions to global targets such as the GBF and the SDGs would provide a substantial improvement in achievement of these outcomes, and help governments to track and deliver policy outcomes.

## RECOMMENDATIONS

The following are recommendations to enhance biodiversity data improvement and its use for financial decision-making, based on the current findings of this working paper. It is suggested that these recommendations be pursued in the near future, especially within the next year.

### Increasing the use of existing data tools

- **Further support the raising of awareness, knowledge and capabilities of G20 members to understand the dimensions of biodiversity and biodiversity loss, and of the related transmission channels**. This would support understanding of the different types of data and information needed to address nature financing. To complement this, a channel or platform could be set up through which biodiversity data developers/providers could further inform G20 SFWG members and partner organisations (incl. multilaterals and IFIs), in a targeted manner, on biodiversity data for decision-making, including the sources and magnitude of pressures on ecosystems.

- **Building on this input paper and other relevant feedback received, advance the mapping and tracking of existing biodiversity data platforms and knowledge frameworks**. This could be commissioned by the G20 members or the SFWG, or alternatively channelled through the NGFS. Taking on board such a task in the near future will be critical and could well fall within 2024 priorities. Assistance could be provided by IUCN to G20 members in conducting national level reviews of data

availability and access, in line with requirements for delivery of commitments under the GBF and the SDGs.[6]

- **Promote the use of the strongest biodiversity data platforms and knowledge frameworks, envisioning eventual integration to market and regulatory requirements.** In devising this effort, starting with the identification of critical indicators could be a first step.

- **Facilitate the development of guidance for G20 members to apply and use such biodiversity data platforms and knowledge frameworks.** Identifying the specific areas of need in capacity building related to nature in financial regulators, ministries of finance/treasuries and related actors, can help institutions that possess the data and knowledge to better serve their needs, including adjusting tools to serve their specific needs. Identification of particular data analysis outputs should be incorporated into guidance, for instance policy cost, impact assessments, or identification of impacts on biodiversity generated by the production of particular commodities or by the consumption of these same commodities through export markets.

- **Strengthen capacity building for national statistical offices, public finance institutions, and relevant line ministries to use nature-related data, and incorporate them into social and economic decision-making processes**. It is particularly important that these efforts also build from existing headline indicator mobilisation, for example for Sustainable Development Goals 14 and 15, and for the Kunming-Montreal Global Biodiversity Framework.

- **Support implementation, broad adoption, and further development of robust assessment frameworks and standards such as SEEA EA and TNFD on the linkages between economic activities and nature.** Ensuring that available, verified biodiversity data is used to design, pilot and implement disclosure and reporting at corporate and public (sovereign and sub-sovereign)[7] levels is important. One first and critical space for this is in relation to the TNFD biodiversity impact metrics, aiming to have TNFD identifying and recommending relevant nature-positive pathways for companies with specific site-based impacts and value chain impacts. Specific guidance could be provided on metrics frameworks, including those on GBF-related issues such as ecosystem extent and condition and species extinction risk, and the relationships between policy options and delivery of targets related to these metrics.

## Improving existing data

- **Promote and facilitate the testing and piloting of specific biodiversity data platforms and knowledge frameworks to help users identify priority improvements relevant for financial decision making.** Assessment of the application of nature-related data to risk management of central banks and other financial regulators is a priority. IUCN could support such an exercise making use of the STAR metric. This could be taken forward either jointly, for example under the NGFS, or individually, guided

[6] IBAT Country Profiles could serve as important starting points in such reviews.

by the G20's joint work. Kickstarting the testing of existing datasets with financial regulators could be tremendously timely and instrumental in improving data availability and reporting. Assessments on available metrics and indicators could be made at the level of commercial financial institutions to identify key areas of adjustment or further development of existing tools. A further step could be to identify and conduct cost curve analyses for policy options to deliver the commitments to the GBF and SDGs.

- **Assess possible joint actions, in partnership with biodiversity data developers, to support the mobilisation of finance to improve available data (i.e. coverage, curation, validation, updating, maintenance) relevant for nature conservation, restoration, and sustainable use**. The pace of improvement of available biodiversity data is constrained by the current funding arrangements that still reflect a historical lower attention given to biodiversity compared with economic and social issues. In the context of growing demand for data by the private sector and the enhanced commitments by the public sector (financial and non-financial) following the adoption of the GBF, addressing the resource mobilisation for data improvement at a greater speed will be instrumental.

### Addressing data gaps

- **Assess data gaps across ecosystems (e.g. deep seas) and species (e.g. invertebrates, fungi) and identify financial resources and expertise that can assist in filling those gaps**. Coordinated national-level action on this will be important given that much of the biodiversity observation and tracking will need to happen with geographically precise actions.

- **Strengthen the two-way data flow between national and global processes for assessing nature-related data.** A flagship example could be the interaction between national Red List assessment processes and the global IUCN Red List of Threatened Species.

- **Develop case studies to strengthen the application of Indigenous and local knowledge to biodiversity data generation and assessment**. This could amplify, for instance, ongoing work on the application of Indigenous and local knowledge into the IUCN Red List of Threatened Species (IUCN 2022b).

- **Devise channels for companies to feed back relevant data into global and national datasets**. Companies often gather substantial biodiversity information, for example during baseline surveys carried out as part of impact assessments. These data would be highly relevant in the context of generating decision-oriented information. Addressing the confidentiality and cost constraints impeding such channelling of data, and effectively overcoming the barriers that businesses perceive to data sharing, are important to strengthen the information base on which business itself depends.

- **Promote and facilitate the participation of civil society and institutions in data governance structures to ensure that data generated on biodiversity is compliant with global standards for acquisition and storage, and accessible to appropriate users**. This would likely require capacity development programmes to promote the

emergence of technical specialists in the acquisition, management and use of biodiversity data.

## Accelerating and scaling the flow of capital towards nature

- **Mainstream the GBF and High Seas Treaty into the sustainable finance work agenda and related financial mobilisation efforts**. The upcoming G20 Troika provides an excellent opportunity to accelerate and deepen G20's members knowledge, decision-making and action concerning nature finance, especially against the short timeframe faced (2030 for both the SDG and the GBF targets) and the strong interlinkages between nature, climate change and social equity. Building on current efforts, the Brazilian presidency is uniquely placed to prioritise such work, including in relation to the resource mobilisation Targets 18 and 19 of the GBF.

- **Promote the integration of commitments and investments towards nature in net-zero strategies of companies, both financial and non-financial.** Advancing assessments of companies' biodiversity impacts throughout their value chains (including raw materials sourcing as well as direct operational impacts) can help to identify ways to contribute to their targets on climate change while also moving forward into reducing biodiversity loss and regeneration. Aligning net-zero targets with the GBF and SDGs and taking actions following the mitigation hierarchy would certainly be steps forward.[8]

- **Nurturing dialogue (hosting a joint meeting or creating a structured channel) between the SFWG and relevant groups in the Finance Track (e.g. Infrastructure) and Sherpas Track (e.g. Environment and Climate Sustainability Working Group) of the G20 on the integration of nature to policies, incentives, regulation and capacity building**. This would help create efficiency in the efforts and resources put forward for the integration of nature-related risk management and contributions (i.e. impact) to common goals (e.g SDGs 14 and 15, GBF, among others). Investment priority areas could result from such an exchange, to later integrate in the SFWG Roadmap. Given the opportunities provided by Nature-based Solutions (NbS) to address other SDGs, including climate mitigation and adaptation, a similar effort and/or inclusion of the Infrastructure working group in this dialogue would be highly desirable. In this way, the different angles of data needs for addressing nature as a whole could be targeted, since part of the data needed for approaching biodiversity loss investment requires other environmental, economic and social data as well. Finally, a conversation of the SFWG with Ministries of Commerce, Industry and Production may be worth in future presidencies, in the context of both, improving data gaps and devising investment priorities to scale financing towards SDG 14 and SDG 15.

- **Private financial institutions can start piloting the IUCN transition pathways towards a nature positive economy using biodiversity knowledge platforms to identify risks and opportunities and prioritise and implement investments for managing biodiversity impacts at the portfolio level**. Participating in pilot testing of existing tools would help investors to assess biodiversity risks and opportunities, and in

[8] The sequential steps of the mitigation hierarchy are (1) avoidance, (2) minimisation, (3) rehabilitation/restoration, and (4) offset.

turn, feed back into the data improvement process and demonstrate contributions to the GBF. This would also provide further information on possible or needed investment in technologies aiding the generation of relevant biodiversity data and information provision.

- **Companies with specific landholdings or assets could kick-off screening analyses of the risks and opportunities related to biodiversity.** This could be done, for example, through changing land-use practices. Such screening would allow companies to start identifying priority actions (i.e. commitments, strategies, investments, etc.) that would support the delivery of commitments to the GBF and SDGs. In this spirit, IUCN is piloting an approach for assessing contributions to ecosystem extent and condition and species extinction risk goals and targets of the GBF which could help such companies, and enable governments to evaluate policy options.

# ANNEX 1. G20 MEMBERS INVOLVEMENT IN IUCN BIODIVERSITY DATA COMMISSIONS

**As stated, much of the biodiversity data generated at the national level is made available through the efforts of national research institutions, scientists and NGOs working through IUCN's specialist groups**. While not intending to be comprehensive nor representative of the current status, having an overview of state-level engagement in IUCN commissions working on data could provide a first snapshot and possible window of engagement to advance efforts at the level of each country or the SFWG itself. All G20 members count with scientists, researchers and NGOs that contribute to IUCN data products. Table 2 below summarises the participation of G20 and G20 guest members in the different IUCN governance and coordination mechanisms.

Table 2. G20 members participation in generation of biodiversity data to IUCN data products

| G20 Members and guests | State Members of IUCN | Government Agency Members of IUCN | Country profile available in IBAT | IUCN National Committee | IUCN Framework Partner | Represented in KBA National Coordination Groups |
|---|---|---|---|---|---|---|
| Argentina | | | Y | Y | | Interested |
| Australia | Y | Y | Y | Y | | Y |
| Brazil | | | Y | Y | | Interested |
| Canada | Y | Y | Y | Y | | Y |
| China | Y | Y | Y | | | Y |
| France | Y | Y | Y | Y | Y | |
| Germany | Y | Y | Y | | | |
| India | Y | Y | Y | Y | | Interested |
| Indonesia | | Y | Y | | | Interested |
| Italy | Y | Y | Y | Y | | |
| Japan | Y | Y | Y | Y | | |
| Mexico | Y | | Y | Y | | |
| Republic of Korea | Y | Y | Y | Y | Y | |
| Russia | Y | | Y | Y | | |
| Saudi Arabia | Y | Y | | | | |
| South Africa | Y | Y | Y | Y | | Y |
| Türkiye | Y | | Y | Y | | Interested |
| United Kingdom | Y | Y | Y | Y | | Interested |
| United States | Y | Y | Y | Y | Y | Interested |
| Bangladesh | Y | | Y | Y | | |
| Egypt | Y | | Y | | | |
| Mauritius | Y | | Y | | | |
| Netherlands | Y | Y | Y | Y | | |
| Nigeria | Y | | Y | | | Y |
| Oman | Y | | Y | | | |
| UAE | Y | Y | Y | Y | | Interested |
| Singapore | | | Y | | | |
| Spain | Y | Y | Y | Y | | |

**Table 2 shows that the vast majority of G20 members and guest countries (2023) are also IUCN State Members, and a smaller majority have government agencies that are IUCN Members in their own right**. All G20 members and guest countries have access to IUCN data product national profiles through the Integrated Biodiversity Assessment Tool (IBAT, see below). Participation in IUCN governance structures is also wide, with three-quarters of G20 members and half of guest members hosting an IUCN national committee. Half of G20 countries are involved in or interested to be part of KBA National Coordination Groups. This high level of participation in IUCN data governance processes by G20 countries (government institutions within the members, as well as other non-governmental IUCN Members) means not only that there is a coordinated programme of biodiversity data gathering, validation, interpretation and use by G20 nations, but also that the G20 member countries have access to biodiversity datasets that are scientifically robust and comparable between nations. This in turn means that contributions to global societal objectives such as the GBF and the SDGs can be planned and measured in a coordinated, consistent manner.

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